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# ACER/CEER Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

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# ACER/CEER

## Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2014

November 2015



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This report is available in English.  
Luxembourg: Publications Office of the European Union, 2015  
ISBN 978-92-95083-19-6  
ISSN 2315-2095  
doi: 10.2851/525797

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# Contents

Foreword by the ACER Director, and the Chair of ACER's Board of Regulators and President of CEER .....	6
Executive summary .....	8
1 Introduction .....	21
2 Retail electricity and gas markets .....	21
2.1 Introduction .....	21
2.2 Main trends and benefits of retail market integration .....	22
2.2.1 Electricity and gas demand .....	22
2.2.2 Retail prices .....	24
2.2.3 Offers available to consumers .....	39
2.2.4 Conclusion .....	50
2.3 The level of competition in the retail electricity and gas markets .....	51
2.3.1 Market structure .....	52
2.3.2 Market conduct .....	57
2.3.3 Competition performance .....	71
2.3.4 The relative level of competition .....	83
2.3.5 Conclusion .....	86
2.4 Barriers to efficient retail market functioning .....	87
2.4.1 Intervention in retail price setting mechanisms .....	87
2.4.2 Consumer switching behaviour .....	96
2.4.3 Wholesale market issues .....	112
2.4.4 Conclusion .....	112
2.5 Recommendations .....	113
3 Consumer protection and empowerment .....	114
3.1 Introduction .....	114
3.2 The elements of consumer protection .....	114
3.2.1 Public service obligations and disconnections .....	114
3.2.2 Vulnerable customers .....	116
3.2.3 Customer information .....	121
3.2.4 Smart meters .....	126
3.2.5 Supplier switching process .....	127
3.2.6 Conclusion .....	128
3.3 Consumer complaints .....	128
3.3.1 Complaint data .....	129
3.3.2 Classification of consumer complaints .....	130
3.3.3 Complaint procedure .....	133
3.3.4 Alternative Dispute Resolution .....	134
3.3.5 Conclusion .....	135
3.4 Consumer experience .....	136
3.4.1 Conclusion .....	143
3.5 Quality of DSO Services .....	144
3.5.1 Conclusion .....	146
3.6 Recommendations .....	147

4	Wholesale electricity markets and network access .....	147
4.1	Introduction .....	147
4.2	Developments .....	148
4.3	Improving the functioning of the internal electricity market .....	150
4.3.1	Cross-zonal capacity calculation .....	150
4.3.2	Unscheduled flows and loop flows .....	163
4.3.3	Forward markets .....	174
4.3.4	DA markets .....	183
4.3.5	ID markets .....	194
4.3.6	Balancing markets .....	204
4.3.7	Capacity mechanisms .....	214
4.4	Recommendations .....	219
5	Gas wholesale markets and network access .....	221
5.1	Introduction .....	221
5.2	Gas wholesale developments .....	221
5.2.1	Demand and price developments .....	221
5.2.2	Supply developments .....	224
5.2.3	Conclusion .....	228
5.3	State of integration of gas markets .....	228
5.3.1	Level of integration: liquidity evolution .....	228
5.3.2	Level of integration: price convergence .....	236
5.3.3	Benefits of market integration .....	242
5.3.4	Conclusion .....	250
5.4	Improving the functioning of the internal gas market .....	250
5.4.1	Analysis of cross-border capacity utilisation .....	250
5.4.2	Market developments in CEE and SSE regions .....	255
5.4.3	Use of reverse flows into Ukraine .....	261
5.4.4	Utilisation analysis of underground storage facilities .....	265
5.4.5	Conclusion .....	270
5.5	Recommendations .....	271
	Annex 1: Typical electricity and gas consumer characteristics per country .....	273
	Annex 2: Electricity prices and break-down of offers, Europe, 2008-2014 .....	275
	Annex 3: Non-price-related elements of offers .....	276
	Annex 4: Market structure .....	280
	Annex 5: The relationship between wholesale and retail prices .....	281
	Annex 6: Methodology and data underlying mark-ups retail markets .....	288
	Annex 7: Methodology for assessing the level of competition in retail energy markets .....	296
	Annex 8: Consumer switching behaviour .....	299
	Annex 9: Minimum technical and other requirements of smart meters .....	301
	Annex 10: Methodology for calculating welfare losses due to unscheduled flows .....	302
	Annex 11: Estimated loss of social welfare and capacity due to loop flows and unscheduled allocated flows in the CEE, CSE and CWE regions and flow statistics 2011–2014 .....	306
	Annex 12: Methodology for calculating net welfare gains in gas markets .....	309
	Annex 13: Assessment of the state of development of electricity and gas market places .....	311
	Annex 14: Benchmark of average gas cross border transportation tariffs .....	316
	List of figures .....	317
	List of tables .....	323
	List of abbreviations .....	324

## Foreword by the ACER Director, and the Chair of ACER's Board of Regulators and President of CEER



We are pleased to present the fourth annual Market Monitoring Report produced by the Agency for the Cooperation of Energy Regulators (the Agency) and the Council of European Energy Regulators (CEER). As in previous years, this Report aims to provide a comprehensive assessment of developments in the electricity and gas sectors and on progress towards the implementation of the Third Energy Legislative Package and the completion of the internal energy market (IEM).

In 2011, the EU Council set 2014 as the target date for such “completion”. In February this year, the European Commission published its Energy Union Strategy, *inter alia* reaffirming the urgency of “a fully integrated European energy market”, as one of its five “mutually-reinforcing and closely interrelated dimensions [of such a Strategy] designed to bring greater energy security, sustainability and competitiveness”. While not all the Network Codes have yet been adopted, significant progress has been achieved on the ground through their early (voluntary) implementation. The Report assesses the extent to which EU energy consumers are already reaping the benefits of this. As the Network Codes and Guidelines come into force and their provisions start to apply, the Market Monitoring Report will keep track of their implementation. In this respect, the availability of consistently defined and comparable data is essential. While the Agency has been assigned extensive monitoring responsibilities, it does not have the corresponding powers to define and obtain the necessary information from National Regulatory Authorities, Transmission System Operators – and their European Networks - and other market stakeholders. The Agency already highlighted this inconsistency in the Conclusion Paper of its “Bridge to 2025” initiative (September 2014) and proposed improved governance of the energy sector. We take this opportunity to reiterate the call for stronger powers for the Agency in this area.

For the first time, the Report assesses the state of play in the implementation of capacity remuneration mechanisms in the different Member States. These developments are a source of concern to both the European Commission – which earlier this year launched a sector enquiry - and to the Agency – which has been working on this issue since late 2012 following a request from the ITRE Committee of the European Parliament for an Agency Opinion; that Opinion was delivered in February 2013 and the Agency has continued to work on the issue since. The Agency’s main concern was, and still is, the possibility that national, uncoordinated approaches to system adequacy might have a detrimental impact on the functioning of the IEM. Regional coordination of adequacy assessments and regional capacity remuneration mechanisms (or at least cross-border participation in such mechanisms) are ways to avoid, or at least minimise, any such detrimental impact. There is no evidence, however, that such regional coordination is implemented at present.

A further important challenge facing the European energy sector is the integration of an increasing share of renewable-based generation, part of which is not as easily programmable as “conventional” resources. This calls for greater system flexibility, primarily in the electricity sector, but also in gas, given that gas-fired power stations may offer a source of flexibility for the electricity system. Short-term markets – and in particular Intra-day and Balancing markets in electricity – are becoming increasingly important in this respect. The Agency welcomes the recent breakthrough in the deadlock which has delayed the Cross-Border Intra-Day (XBID) project for almost three years and notes the new expected date for go-live in Q4 2017. The Agency urges the European Commission, whose intervention was instrumental in breaking the deadlock, to maintain its involvement to ensure

that this target date is respected and, if possible, brought forward. The Report analyses the functioning of the Intra-day and Balancing markets, confirming that the implicit allocation of cross-border capacity in the intra-day timeframe delivers a more efficient use of such capacity.

In the gas sector, we focus on the functioning of gas hubs and on trading between them. Earlier this year, the Agency published its revised and updated Gas Target Model. That Model calls for a self-assessment by National Regulatory Authorities of the functioning of their national gas markets and proposes measures – including regional integration – to overcome those situations in which the structure of the national sector is not conducive to competition and liquidity in the market.

A further important section of this Report assesses the functioning of retail markets, where consumers can directly reap the benefits of the liberalisation and market integration process. It is clear that our objective should not be the creation of a EU-wide retail market, where consumers will be able directly to access suppliers located in any of the Member States, but rather to ensure that sufficient competition is created in national retail markets. This should be pursued by facilitating the entry of new suppliers and promoting the engagement of consumers, so that they can take full advantage of greater choice and better prices. The results presented in the Report still show a mixed picture in this context: consumers continue not to switch even in the presence of significant potential savings. While switching rates do not themselves provide conclusive evidence regarding the functioning of retail markets – for example, low levels might be consistent with both highly competitive and immature markets – the picture emerging from a newly developed “composite indicator” is a very varied one across the EU, with some national markets clearly exhibiting scope for improvement. CEER has launched its own considerations as to what constitutes a well-functioning retail market. Work will therefore continue to pinpoint any remaining retail market barriers and to identify how they can be removed. Until then, we will not have fulfilled our mandate of establishing an internal energy market for the benefit of consumers providing them with the “New Deal” envisaged by the Energy Union Strategy.

The data used for compiling this Report have been collected or provided by the European Commission, National Regulatory Authorities, and the European Networks of Transmission System Operators for electricity and gas. We are grateful for their contribution and cooperation, and in particular to colleagues in National Regulatory Authorities who have played a key role in assessing national developments. Above all, our sincere appreciation goes to our colleagues in the market monitoring team at the Agency for their sustained effort in continuously monitoring market developments and in producing this Report.

The Agency and National Regulatory Authorities stand committed to continue their work at EU, regional and national level to contribute towards the establishment of a well-functioning, competitive, secure and sustainable internal market in energy to the benefit of Europe’s consumers and to play our role in the implementation of the Energy Union Strategy.



Alberto Pototschnig  
ACER Director



Lord Mogg  
Chair of ACER’s Board  
of Regulators and CEER

## Executive summary

### Introduction

**Structure of the report** This is the fourth annual Monitoring Report by the Agency for the Cooperation of Energy Regulators ('the Agency') and the Council of European Energy Regulators (CEER), covering developments in EU electricity and gas markets in 2014. Building and expanding on the analysis performed last year, this Report focuses again on retail markets and consumer issues, on the main developments in gas and electricity wholesale market integration and on network access issues. It also provides an analysis of continuing barriers to further market integration.

The Report is divided into four chapters: (i) the electricity and gas retail market; (ii) consumer protection and empowerment; (iii) the electricity wholesale market; and (iv) the gas wholesale market. Both wholesale chapters also report on network access issues.

### Retail electricity and gas markets

The Report assesses the state of play in retail markets, comparing 2014 with previous years. For this purpose, it presents a range of indicators that focus on the evolution of retail prices by component and on other relevant factors, including market concentration, wholesale retail mark-ups, entry and exit activity, and switching behaviour.

**Retail prices** Despite reduced electricity and (natural) gas demand in 2014, the average EU28 retail prices for households rose for both electricity and gas consumers. From 2013 to 2014, European post-tax total household electricity and gas prices increased on average by 2.6% (+4.5% in 2013) and by 2.1% (+2.6% in 2013), respectively. In contrast to household prices, industrial prices declined compared to 2013. Post-tax electricity and gas prices for industrial consumers decreased by 0.2% (they increased by 2.0% in 2013) and by 6.0% (they decreased by 0.5% in 2013), respectively.

As noted in last year's report, in most Member States (MSs) household electricity prices are greatly influenced by non-contestable charges (i.e. taxation and network charges). These make up on average (across MSs) 40% of the total bill in electricity and more than 50% in gas. Since 2008, and particularly over the last few years, non-contestable charges have significantly increased in many MSs, especially as a result of costs related to support schemes for renewable energy sources (RES). In fact, in several MSs (Germany, Italy, Greece, Slovenia, and Portugal) the increase in the final electricity price for household consumers from 2012 to 2014 can be attributed to RES charges.

**Taxation and network charges** In contrast to non-contestable charges, electricity wholesale prices have decreased, in large part as a consequence of the expansion of subsidised RES. Gas wholesale prices have also decreased chiefly due to decreasing gas demand and falling oil prices. Nevertheless, the relative size of non-contestable charges in post-tax prices inhibits the scope for significant final price reductions through retail price competition. Moreover, with the ongoing implementation of capacity remuneration mechanisms across Europe, the level of non-contestable components will further increase, although in some markets this could impact the contestable part instead.



### Competition in retail markets

The monitoring results show that the moderately concentrated electricity household retail markets of Sweden, Finland, the Netherlands, Norway and Great Britain perform relatively well. The same is true for the gas household markets of Great Britain, the Netherlands, Slovenia, the Czech Republic and Spain, although gas retail markets are often more concentrated than in electricity. For electricity, retail household markets in Latvia, Bulgaria and Cyprus, and for gas in Lithuania, Greece and Latvia show no or weak signs of competition. These results are based on the examination of a wide range of key competition indicators of market structure, conduct and performance and in particular on concentration, number of suppliers, ability to compare prices easily, annual net entry, switching rates, number of offers per supplier, expectations of customers about (the comparability of) offers and the average mark-up.

Despite the sign of increased switching trends, the majority of electricity and gas household consumers do not participate actively in the market by exercising choice among available suppliers and offers, which in turn generate less competitive pressure. As a result, the proportion of electricity and gas household consumers supplied by a supplier other than the incumbent is still very low in most MSs with the exception of Great Britain, Belgium and Portugal (both markets), Norway, the Czech Republic and Germany in electricity, and Ireland and Spain in gas markets.

From the results presented in this Report it emerges therefore that many markets are highly concentrated, with low switching activity by consumers and high retail prices, despite falling wholesale prices. In addition, even in markets which have a relatively low level of market concentration and perform well on other measures of market competition, the link between electricity wholesale prices and the energy component of retail prices is still weak and points to potential competition problems (e.g. electricity household markets in Austria, Great Britain and Germany). On the other hand, the strong link between wholesale prices and the energy component of retail prices for industrial consumers implies that this segment is benefiting more from stronger retail competition.

### Consumer choice and switching behaviour

Electricity and gas consumers in liberalised and, in particular, non-price-regulated countries can choose among several offers provided by different suppliers on the market. According to a data sample based on offers in capital cities, the results presented in this Report show that markets which liberalised earlier (Amsterdam, Berlin, Copenhagen, Helsinki, London, Oslo, and Stockholm) show the highest level of product diversification, though positive trends have been observed over the past three years in Lisbon, Madrid, Paris and Prague.

This differentiation of offers, which is a key trend highlighted in this Report, includes features such as contract duration, price preservation periods, dual-fuel offers, additional service provision or renewable/green features and sometimes includes additional charge-free services. On the one hand, these products offer more choice to consumers and are a positive sign of higher innovation in the sector. On the other hand, there is concern that the increasing diversification of offers makes the comparison of offers more difficult for consumers and reduces the overall level of transparency.

Despite the above trend in the proliferation of different product types, there are still some capital cities where suppliers in the household segment are not innovating (e.g. electricity and gas suppliers in the capitals of Bulgaria, Hungary, Latvia, Lithuania and Romania and electricity suppliers in capitals of Cyprus and Malta). This is often linked to the dominance of the incumbent electricity or gas supplier which, in the absence of competitive pressure, has no incentive to innovate.

While low switching rates are not, in themselves, a sign of insufficient competition, they may be an indicator of retail market barriers. Therefore it is important to assess the main determinants of these low rates. The most frequently mentioned reasons which prevent consumers from switching include insufficient monetary gains, lack of trust in the new supplier and/or the relative satisfaction with the existing supplier, as well as the perceived complexity of the switching process. This last aspect is of particular concern. As mentioned last year, consumer choice and consumer engagement in general can be facilitated by, for example, having reliable web comparison tools in place (allowing comprehensive and easy ways to compare suppliers), adopting standardised fact sheets for each retail offer, publishing easily comparable unit prices in terms of standing charges and variable rates for standard consumption profiles, and promoting systems/platforms fostering collective switching. These measures do not interfere with the ability of suppliers to set prices.

To improve consumer switching behaviour and awareness further, National Regulatory Authorities (NRAs) could become more actively involved in ensuring that the prerequisites for switching, such as transparent and reliable online price comparison tools and transparent energy invoices, are properly implemented.

Among the potential barriers to switching, this Report has also identified exit fees, since they tend to increase the threshold for consumers to switch due to the perceived diminished potential savings available. However, exit fees in fully competitive retail markets are applied to cover the costs incurred by suppliers due to early contract termination. Offers which include exit fees should be made fully transparent on price comparison tools and, for instance, filterable from other offers by consumers in search of a different deal.

Regulated end-user prices for households remain widespread and the process of moving away from regulated retail prices is very slow. After seven years of full market opening, regulated electricity and gas household prices still exist in 14 countries and 13 countries respectively, while regulated electricity and gas prices for industrial consumers exist in 11 countries and 10 countries, respectively. Most countries have a dual market structure, whereby regulated and non-regulated markets exist in parallel. In most cases, regulated prices are available to all consumers, but some countries have regulated prices (i.e. social tariffs) targeted at particular vulnerable consumer groups. Typically, there are large proportions of household consumers (i.e. at least 90%) on regulated prices in most countries where regulated prices still exist.

#### Barriers to entering retail energy markets

In a number of MSs, public authorities tend to set energy retail prices with greater attention to political considerations than to underlying supply costs. In some MSs, regulated prices are set below cost levels, which hampers the development of a competitive retail market. In other MSs, the public authority (usually the NRA) sets end-user prices with reference to wholesale prices, which is the preferred approach. However, even when set in this way, they may negatively impact the consumers' propensity to switch.

Therefore, where justified, regulated prices should be set at levels which avoid stifling the development of a competitive retail market. They must be consistent with the provisions of the 3<sup>rd</sup> Package, and should be removed as soon as a sufficient level of retail competition is achieved.

The Agency recommends that priority should be given to removing entry barriers

in order to foster market conditions which create sufficient opportunities for new suppliers to enter the market and compete for consumers with new offers. In line with the existing Energy Directives, cross-border entry could be facilitated by developing a single licence to supply electricity and/or gas at the level of a region, as has been implemented in the Spanish and Portuguese markets. However, given that markets differ in level of maturity, this might require different measures, or a different timing of similar measures, in different MSs.

### Consumer protection and empowerment

**Public service obligations and disconnections** Every consumer in the EU has the right to be supplied with electricity. As such MSs may appoint a supplier of last resort to ensure the provision of such a universal service. The provision of a supplier of last resort is also relevant for gas even though consumers do not have a general right to be connected to the gas grid.

By 2014, electricity suppliers of last resort have been established in all MSs except from France, Latvia and Malta. In gas, the provisions related to the supply of last resort have been implemented in national law and practice in all countries except from Bulgaria, France, Greece, Poland and Slovenia.

As for disconnections resulting from non-payment, despite the fact that the EU Directives state that MSs have to ensure that NRAs have data on such disconnections or, at least that those data should be made available to NRAs in the event that another authority is responsible for monitoring disconnections, only 16 NRAs were able to provide them. Among these countries, the percentage of electricity customers disconnected in 2014 is highest in Portugal, Italy, Malta, Greece, Spain and Poland (ranging between 5.6% and 2%). Yet, in Portugal and Greece, the disconnection rates are declining compared to 2013, while in Malta they are increasing. In other MSs, disconnection rates are significantly lower and range between 0 and 1 per cent of household metering points.

**Vulnerable consumers** As shown in last year's Report, MSs define the concept of vulnerable customers either in an explicit or an implicit way. An explicit definition of vulnerable customers refers to a list of criteria defining vulnerability such as, personal or household characteristics or specific (economic) conditions which are mentioned in national legislation. In 2014, explicit definitions of the concept of vulnerable customers were available in 18 out of 29 countries.

Implicit definitions on the other hand are more difficult to grasp. Vulnerability may often be rooted in a broader social security net. MSs with this concept argue that the eligibility criteria of existing national social protection and security measures already capture the essence of the concept of vulnerable customers.

Among the 10 NRAs that opted for an explicit definition and are reporting numbers, the share of vulnerable customers in electricity and/or gas remains stable (between 1% and 11% depending on the MS) except in Greece, which reported an increase from 7.2% to 10.5% in electricity and France with an increase from 6% to 7.8% in electricity and from 6% to 8.2% in gas.

**Consumer protection and information** The Electricity and Gas Directives consider information provided to consumers as the most important element of consumer protection and empowerment, because having relevant information at one's disposal is necessary for properly engaging in the market. Furthermore, the Energy Efficiency Directive, which was to be transposed into national law by 5 June 2014 in all MSs, seeks to empower energy

consumers to better manage their consumption through easy and free access to data on actual consumption.

This Report shows there was no major change in 2014 in either the legal or the practical provision of information to consumers in the different MSs in terms of price changes and other energy price components (network tariffs, taxes or other), the appointment of single point of contacts and the availability of a consumer checklist. There is still a lack of switching information on the bill in many MSs, but too much information can also lead to too complex bills inhibiting the beneficial role of information to consumers.

**Payment methods** In 2014, a variety of payment methods were available in most MSs. In a significant number of MSs, suppliers offer discounts or rebates depending on the method of payment.

The introduction of a Single Euro Payments Area (SEPA) in Eurozone countries as of 1 August 2014 (and in non-eurozone countries by 31 October 2016) represented a further consumer-friendly development for paying energy bills. With SEPA a household consumer can use their home bank account to pay bills in any Eurozone country. In 2014, it was possible to pay energy bills using SEPA in 9 out of the 19 Eurozone MSs: Austria, Belgium, Germany, Finland, France, Luxembourg, Malta, Netherlands and Slovenia.

**Smart metering** Smart meters for electricity are being rolled out across the EU. As of 2013, nearly all consumers in Sweden, Finland and Italy, were equipped with smart meters. Austria, Estonia, Malta, Spain and Great Britain have seen an increase in consumers equipped with smart meters from 2013 to 2014. In many of the remaining MSs, very few consumers were equipped with smart meters in 2014.

Few MSs have rolled out smart meters for gas. In the Netherlands, the share of consumers equipped with smart meters for gas increased from 6% in 2013 to 16.2% in 2014, while in Great Britain, the share increased from 0.5% to 1.9%. In France and Belgium, around 1% of consumers were equipped with smart meters for gas in 2014.

According to the Energy Efficiency Directive, MSs have to ensure that the “objectives of energy efficiency and benefits for final household customers are fully taken into account when establishing the minimum functionalities of the meters and the obligations imposed on the market participants”. Fourteen MSs have minimal technical and other requirements for smart meters in their legislation to ensure benefits to consumers. Most of these MSs require that smart meters provide information on actual consumption, make billing based on actual consumption possible and have an interface with the home, for easy access to information for consumers.

**Consumer complaints** As of 2013, all regulators collect data on complaints and in 2014 almost all NRAs reported numbers of final household customer complaints as addressed to them. 14 NRAs were able also to report the number of complaints addressed to distribution system operators (DSOs), 13 NRAs report complaints addressed to the Alternative Dispute Resolution (ADR) body, and 11 NRAs were able to report complaints addressed to the suppliers. These numbers show a minor increase compared to last year, highlighting the growing interest of NRAs in analysing the reasons for complaints in order to detect market dysfunctions and assess the degree of consumer satisfaction. Scope remains to improve systematic reporting on this issue, especially regarding the number of complaints addressed to regulated entities, such as DSOs.

Complaints addressed to NRAs have been studied separately in gas and electricity, but have similar characteristics. In 2014, the main share of complaints related to invoicing and billing (34%), with the second issue being price, contract and sales (24%). In most MSs, consumers seem to have high levels of dissatisfaction regarding these elements.

**Alternative Dispute** An alternative dispute settlement mechanism is available in all MSs free of charge. The most common way to provide customers with the relevant information is in the bill and/or the supply contract. In most MSs, the NRA is responsible for ADR. Four MSs have set up an Ombudsman (Belgium, France, Great Britain and Greece), four a new third-party body (Finland, Germany, Sweden and the Netherlands) and others have appointed existing third party bodies such as consumer associations.

**Resolution** For the first time, the MMR is monitoring the quality of four key distribution services. Twenty NRAs were able to provide data for 2014. Regarding the time to provide a price offer for a grid connection and the time to disconnect following a customer request, only a few countries comply with the CEER recommendation, although most of the respondents are close to it. The Swedish DSOs outperform the CEER recommendation to disconnect customers in one working day as it is done immediately by means of a smart meter functionality.

**Quality of distribution services** In contrast, the DSO service with the lowest result is the time to connect a customer to the network in the case of minor works at the customer's premises. In this case, the best performing countries make a minor connection in one week, and the European average is 25 days, much longer than the two working days recommended. However, some of these data may reflect differences in measurement, as the time to connect depends significantly on the complexity of the works. In any case, the time to connect a customer to the grid and activate the energy supply seems too long in some countries, and needs to be reduced, as also identified in the complaint section.

Particular areas for further action by MSs remain. First, a supplier of last resort (either in gas and/or electricity) must still be appointed in some countries and there is also a lack of minimum technical functionalities and other requirements for smart meters to ensure benefits to consumers in many MSs. Second, in most countries, there is a lack of information on consumers' bills regarding switching information.

Finally, a significant number of NRAs need to enhance the scope of monitoring in several areas. The number of disconnections for non-payment for example is not yet monitored by all regulators. Many regulators are also not able to report on the number or types of complaints received from consumers, notably by regulated entities i.e. ADR bodies and DSOs. Some regulators are as yet not monitoring the quality of key distribution services.

### Wholesale electricity market integration and network access

**Demand and price trends** Against a background of declining EU-wide electricity demand – 6.3% between 2008 and 2014 – the traded volume of electricity continued to increase in Europe. The declining demand, in combination with the increasing penetration of renewables, the availability of cheap coal on international markets and low carbon prices, has put downward pressure on EU day-ahead (DA) electricity wholesale prices since 2011. In 2014, the decline in gas prices contributed further to reduce electricity wholesale prices.

Capacity calculations in networks	<p>This year's Report contains a section assessing the way in which cross-zonal capacity calculation is applied by the Transmission System Operators (TSOs) on bidding zone borders. The results show that there is significant scope for electricity transmission networks to be used in a more efficient way and hence to make more cross-zonal tradable capacities available to the market. For instance, in nearly 70 per cent (33 out of 48) of all the assessed borders, the thermal capacities are at least twice as high as the tradable capacity. The Report concludes that the lack of coordinated and efficient capacity calculation methods is one of the key missing elements for achieving the efficient use of the network infrastructure and the internal energy market (IEM) in general.</p>
Unscheduled flows and the IEM	<p>In line with the findings of previous MMRs, unscheduled flows (UFs) are a challenge to the further integration of the IEM. Their persistence reduces tradable cross-border capacity, impacting market efficiency and network security. Welfare losses due to UFs, calculated with an updated methodology, show an increasing trend between 2011 and 2013, whereas a slight decrease is noted in 2014. Despite last year's decrease, social losses amounted to around one billion euros each year.</p> <p>The impact of unscheduled allocated flow (UAF) can be mitigated with further TSO coordination in capacity calculation and allocation (implementation of flow-based methods), while the impact of loop flows (LF) can be mitigated in the medium term by improving the bidding zone configuration or the regulatory framework for sharing redispatching costs, and, in the longer term, by investing in the transmission network. Moreover, the calculated welfare losses due to LFs provides a starting point for developing a short-term solution for addressing the distributional effects of LFs. Further, and as mentioned last year, improved transparency should allow data on distortive flows such as LFs to be tracked. This would provide an important basis for more adequately assessing the welfare impacts of reductions in cross-zonal capacity.</p> <p>In the Agency's view, a comprehensive review of bidding zones, leaving open the possibility of redesigning the current system, which is mainly based on national borders, could further mitigate inefficiencies due to LFs and hence reduce the true welfare losses caused by the sub-optimal bidding zone configuration.</p> <p>In Europe, two forward market designs have emerged in order to provide market participants with hedging opportunities against short-term (e.g. day-ahead) price uncertainties. The first design, which was implemented in Nordic and Baltic countries and on the internal borders of Italy, relies mainly on the market and on a variety of contracts linked to a hub price. The second design, which is implemented in nearly all MSs in continental Europe, gives an additional and specific role to TSOs which are responsible for calculating long-term capacities and auctioning Transmission Rights (TRs).</p>
Forward markets	<p>The monitoring results on forward markets show that the various cross-border hedging tools in Europe present different challenges. TRs (mainly physical, PTRs) are usually priced below the actual price differentials. This is largely due to the nature of the product; profit-maximising speculative traders will always bid below the expected cash flows originating from the TR. Large negative risk premia (such as, for example, on the Italian borders with Greece, France and Switzerland and on the border between Austria and Hungary) can be considered an undesirable outcome as they are inefficient.</p>

The magnitude of the negative risk premia is affected by the uncertainty (risk exposure) faced by market participants when buying TRs. The Report shows that market coupling can reduce uncertainty, and hence the magnitude of risk premia, and indicates that a stronger firmness regime may also contribute to their reduction. Further, there are indications that on particular borders (e.g. on the Northern Italian ones) the presence of irregular profiles of TRs may be a relevant driver of large risk premia. Some other causes of inefficiency may be less obvious (e.g. liquidity of forward energy markets) and may need to be investigated further on a border-by-border basis. Finally, the magnitude of risk premia can be reduced by improving competition in the auctioning of TRs, for example, by adjusting the products offered by TSOs to the hedging needs of market participants.

Electricity Price Area Differentials (EPADs) in the Nordic and Baltic markets are usually traded with a positive risk premium compared to the price spread between the system and the area price. In some cases (such as in Sweden 4 and Denmark East), high-risk premia are observed. These may act as a barrier to new suppliers, as it may be too expensive for them to hedge their procurement costs. The cases of high risk premia are associated with low liquidity and a highly concentrated supply of EPADs in the affected areas. The limited liquidity and competition in the supply of EPADs requires further monitoring, and where liquidity remains weak, different solutions (e.g. giving additional roles to TSOs, such as acting as, or supporting, market makers) need to be explored.

In 2014, the go-live of the North-West Europe (NWE) DA market coupling project (4 February), its extension to the Iberian market (13 May) and the extension of market coupling of the Czech Republic, Slovakia and Hungary, to Romania (19 November) in the Central-East Europe (CEE) region is expected to improve price convergence across all these regions in the coming years.

**DA markets** The DA monitoring results show an increase in the efficient use of European electricity interconnections from around 60% in 2010 to 86% in 2014, following the implementation of market coupling at several borders since 2010. The remaining 14% improvement will be achieved as soon as market coupling is implemented on the remaining borders (12 out of 40 borders). The significant efficiency gains for EU consumers from implementing market coupling demonstrates the importance of extending it to other borders without delay.

Due to the wide implementation of market coupling, the EU has been able to reap significant efficiency gains (and hence improve social welfare) for the benefit of EU consumers. The potential gain from the extension of market coupling to all European borders was estimated at more than one billion euros/year in the 2013 MMR, and from that amount more than 200 million euros per year could still be obtained from implementing market coupling on all remaining borders.

Integrating the increasing amount of RES in Europe requires a well-functioning and liquid intraday (ID) market. The Report shows that a significant amount of cross-border capacity remains underutilised (in more than 40% of cases, capacity remains unused in the economic direction) and that the level of liquidity in ID markets remains modest (on average, 3% of national annual demand).

**ID markets** The implementation of the ID and balancing Target Model will contribute to improving liquidity and the efficient use of ID cross-border capacity. For instance, ID liquidity in recent years has increased due to the implementation of implicit continuous cross-border ID trade (e.g. in France) and due to a decrease in the num-

ber of renewable plants exempted from balancing responsibility (e.g. in Germany). However, several barriers remain to developing ID liquidity further, including the persistence of uncoordinated and heterogeneous ID gate closure times, lack of balancing responsibility for renewable generation, and insufficient recalculation of cross-border capacities by TSOs in the ID timeframe. Finally, the analysis confirms that implicit allocation of cross-border capacity in the ID timeframe contributes to the more efficient usage of the available capacity (i.e. when it has a value).

The Report shows large disparities in the prices of balancing services and in the average costs – including energy and capacity components – of balancing for end-consumers in Europe. Factors that explain these disparities include the underlying costs of the available resources for providing flexibility and the level of competition in balancing markets that are often national in scope. Competition could be improved by improving adequate prequalification rules, including ensuring that they do not unduly discriminate among technologies and encompass demand-side flexibility. Further improvements could include optimising the procurement of balancing capacity and ensuring that it does not interfere with balancing energy price formation and implementing a pricing method based on marginal pricing for balancing energy. Lastly, the Agency encourages NRAs and TSOs to consider an additional settlement mechanism in order to ensure that the charges for Balancing Responsible Parties (BRPs) reflect the full energy and capacity costs of balancing.

**Balancing markets** In addition to improving the performance of balancing markets (BMs) at national level, the Report shows that further benefits could be obtained through increasing the cross-border exchanges of balancing energy (including imbalance netting), which are estimated at several hundred million euros per year and may even be higher in view of the ambitious decarbonisation objective of the EU energy market. The implementation of the Network Code on Electricity Balancing, once approved, should contribute to balancing the systems more efficiently and to increasing the level of competition and integration of BMs in Europe.

**Capacity mechanisms** This Report also shows the state of play regarding the implementation of capacity markets by MSs aiming to address adequacy concerns. Against this reality, the Agency believes that security of supply cannot be addressed only at a national level, and system adequacy analysis should therefore be performed regionally and encompass cross-border flows and their impact on system adequacy. It is important that coordinated adequacy assessments properly take into account the real contribution of interconnections and prevent discrimination between foreign and local adequacy providers. Moreover, fully removing remaining barriers to a well-functioning electricity market remains a key priority. These barriers include wholesale price caps and the lack of marginal pricing in some BMs.

**Implementation of the ETM** The full implementation of the Electricity Target Model (ETM) for cross-border trade, in particular in the ID and balancing timeframes, remains a priority in order to ensure that prices reflect the costs of flexibility. Moreover, flexibility in wholesale electricity markets (including RES balancing) requires efficient and well-integrated gas markets, which depends on, *inter alia*, balancing regimes, flexibility tools (such as storage and line-pack), nomination and re-nomination lead times, the bundling of capacity products at border points, transparent and consistent cross-border transportation tariffs and well-functioning secondary capacity markets and platforms.

Overall, the identified inefficiencies illustrate the urgent need fully to implement of the ETM. In particular, significant scope for improvement remains in: i) the coordination and efficiency of capacity calculations methods; ii) the use of existing



cross-border capacity at different time frames (i.e. long-term (LT), day-ahead, ID and BM); iii) the configuration of bidding zones; iv) facilitating demand side participation; and v) taking into consideration the efficient contribution of cross-zonal interconnectors to adequacy.

## Gas wholesale markets

Demand and price trends	<p>In 2014, EU natural gas consumption fell by 11% year-on-year to 4,460 TWh. Decreasing gas consumption in the EU was already recorded in previous years. This is being driven by continued lower gas demand for electricity generation (a consequence of the displacement of gas by coal as the fuel of choice and the increasing RES penetration), the impact of energy efficiency measures in other demand sectors (such as space heating), weak economic growth and higher average temperatures.</p>
Hub development	<p>Partially driven by low demand, gas wholesale prices saw a declining trend in 2014. Lower demand is prompting more competition between upstream producers, thus favouring the renegotiation of long-term contract conditions and giving preference to hub price indexation. Declining international oil prices and favourable LNG global market dynamics also influenced EU gas price formation. Despite these recent decreases, EU wholesale gas prices are on average twice as high as those in North America. This difference is explained by limited and decreasing EU domestic gas production, and by the EU's dependency on imported gas from a restricted number of providers, chiefly Russia, Norway and Algeria.</p>
Wholesale market integration	<p>Across the EU, gas price formation is increasingly being driven by gas-on-gas competition, a tendency backed by robust hub development. In recent years, hubs have been playing an increased role in gas trading and in the shorter-term hedging of physical supply portfolios. Consequently, hub prices have become a stable form of price reference to which long-term supply contracts can be indexed.</p> <p>In 2014, the aggregated liquidity of EU gas hubs increased significantly again. This can be attributed to suppliers' increasing preference to source gas and manage their gas risk positions at hubs, most likely as a consequence of the lower price of gas at hubs relative to long-term contracts, but also as a risk mitigation measure in response to the Russian-Ukraine conflict, which may have raised concerns about the reliability of Russian gas supplies.</p>
Welfare losses	<p>There is, however, a large discrepancy among EU hubs. The two leading trading places, national balancing point (NBP) and title transfer facility (TTF), are significantly ahead of the other hubs in terms of total traded volumes and, importantly for suppliers' hedging strategies, sizeable forward markets. As such, NBP and TTF act as sources of price reference for trading deals from other countries. Other sizeable hubs are mainly concentrated in North-West Europe, and include those in Belgium, Germany, France, Italy, Austria and Denmark, but other trading places are showing signs of growth, including those in the Czech Republic and Poland.</p> <p>In most other countries, however, trading places still play a minimal role, thus limiting the benefits of competitive gas supply trading. In such countries, there are limited or no short-term competitive wholesale gas price signals to attract additional gas supplies in times of high demand. This situation tends to favour large gas supply incumbents and may deter potential new entrants to such markets. This scenario may beg the question, as proposed in the Gas Target Model (GTM) 2014, of whether at some point in time trading zones might better merge into bigger entities.</p>

**Cross-border capacity utilisation** The monitoring results also show that progress continues to be made towards wholesale gas market integration. Price convergence between MSs – an important measure of the extent of market integration – has further increased, principally as a result of increased activity at price-converging hubs and upstream competition leading to long-term contract renegotiation. Enhanced cross-border interconnection and new reverse-flow possibilities also support this trend and growing intra-EU markets traded volumes. This is particularly observable in a number of CEE MSs that are seeing their prices becoming gradually more aligned with the NWE region. CEE shippers are beginning to rely more on developing regional hubs, as well as on the more liquid NWE adjacent trading places, for supply and arbitrage activities. This improved competitive environment also supports the renegotiation of their prevailing long-term gas contracts.

Nevertheless, bilateral long-term contracts still constitute the bedrock in gas procurement in the majority of EU MSs. But given that they increasingly contain hub elements in their price indexation formulas, the price gap with hub product prices is decreasing, promoting further price convergence among MSs. However, significant differences remain in selected regions, such as South-East Europe (SEE), the Baltic states and the Iberian Peninsula, where significantly higher prices are reported. These are due either to low gas supply diversity or to prevailing long-term gas contract terms not being oriented as much to hubs.

**Reverse flow use into Ukraine** As such, higher price convergence has further reduced estimated overall EU gross welfare losses measured as the price difference between suppliers' sourcing costs in each EU MS versus the baseline reference price of sourcing at TTF in the Netherlands. In comparison to 2012, estimated welfare losses have roughly halved. This is to a small extent linked to reduced demand, but the overarching contributor is hub development and hub price convergence, especially in the large gas markets of France and Italy.

Nevertheless, significant welfare gains could still be achieved through, for example, the optimisation of physically unused cross-border capacities. A theoretical analysis indicates that potential gains of up to more than 1 billion euros per year could be obtained by optimising the utilisation of physical unused capacity at cross-border IPs connecting market zones with persisting wholesale price differences above transmission costs.

**Gas storage dynamics** A comparative analysis of the 20 main EU cross-border IPs reveals high levels of booked capacity, i.e. above 85%. Physical utilisation, however, continues to decline. In 2014, it stood at around 50% for the sample, while peak month utilisation was around 65%. These decreasing numbers are driven by lower demand, but are also affected in several cases by enhanced reverse flow possibilities allowing for the netting of nominations. The level of unused capacity may raise questions regarding the extent and location of future infrastructure needs. Selected investments are still required in order to alleviate existing cross-border bottlenecks, but these market conditions should be reflected in a positive cost-benefit analysis and by a financially firm market test for demand. In addition, investment decisions can benefit from coordination at regional level, not least to facilitate cross-border cost sharing.

**Path towards further market integration** A high proportion of EU cross-border capacity remains subject to long-term capacity bookings, mainly due to the historical need to support long-term commodity commitments. There are, however, indications that, particularly in locations with excess capacity, the extent of longer-term capacity (i.e. beyond 5-10 years) booking is gradually decreasing. This seems to suggest that suppliers and traders are

looking at shorter-term auctioned products as a more flexible way to source capacity.

In certain regions, cross-border gas flows experienced notable variations in comparison to previous years. This was influenced by the commissioning of a number of key infrastructure projects enabling more reverse flows, zonal price differentials dynamics and the impact of the Russia-Ukraine conflict. Nord Stream supplies increased again in 2014, driven by onshore connected pipelines capacity enhancements and the implications of the Russia-Ukraine conflict, whereby Gazprom reduced transit dependence via Ukraine. The configuration of certain CEE and South-South East (SSE) region IPs were altered to reroute some of the Nord Stream flows and to take advantage of favourable price arbitrages among zones. Moreover, the need in the second part of the year to supply gas from the EU to Ukraine also played a role. Overall, capacity utilisation points towards a closer relation between gas flows and zonal price signals across the whole continent.

The Russia-Ukraine conflict influenced EU gas markets on various fronts. Flows from Russia into Ukraine were disrupted from the end of June until October, following disputes about the price terms of the supply contracts and the accumulated debt that Naftogaz owed Gazprom. Contrary to the 2009 crisis, the impact of the 2014 conflict on EU gas markets was mainly regional, with the EU more readily absorbing the impact on this occasion. This was largely a consequence of greater transit route diversification and enhanced market integration, but also lower demand. The gas disruption forced Ukraine to look for alternative gas supplies from the EU (5 bcm in 2014), which were chiefly sourced via Slovakia and to a lesser extent from Poland and Hungary. EU supplies, priced at hub references, were for most part of the year cheaper than Gazprom oil price-linked gas deliveries. However, at the end of 2014, and beginning of 2015, both prices saw a strong converging trend.

The security of supply concerns triggered by the Ukraine conflict led to increased gas storage injections at the end of the summer, particularly in CEE countries, contributing to relatively high storage stock levels at the beginning of winter 2014/15. During winter 2014/15 gas storage withdrawals were higher than any of the previous four years, reaching an equivalent of approximately 25% of EU winter 2014/15 gas demand. This was likely a consequence of high winter day-ahead prices relative to summer day-ahead prices, which made gas in storage competitive. By contrast, season-ahead winter/summer gas price spreads continue to be low. This price spread is believed to act as a beacon for the price of, and demand for, gas storage capacity. Despite demand for storage services being high, the decreasing season-ahead winter/summer price spread is said to be reducing the profitability of gas storage.

Despite the progress registered during 2014 towards the completion of the IEM, barriers to full market integration remain. Although all MSs can further improve, the barriers are more evident in SSE and the Baltics: weak functioning of wholesale markets; lack of transparency in price formation and an over reliance on long-term commitments for gas supply; and a lack of adequate gas transportation infrastructure remain the principle obstacles. It is therefore important that (i) the GTM is implemented, (ii) the development of functional gas hubs is further promoted, (iii) the necessary investments in selected infrastructure to alleviate bottlenecks in the security of supply and well-functioning of wholesale markets are undertaken and (iv) the gradual implementation of harmonised cross-border access provisions as established in the network codes are gradually implemented.

## Conclusions

This Report identifies the areas where additional measures (and monitoring) are needed in order to ensure that EU electricity and gas consumers benefit from fully integrated markets. The Report also shows the large disparities in MSs' national energy policies. This may reduce the contribution of the network codes to the market integration and harmonisation process and the trust of stakeholders in EU energy markets.

Particular areas for further action remain:

1. Transposition Full transposition and implementation by all MSs of the 3<sup>rd</sup> Package is essential. The European Commission should continue to monitor this closely and pursue cases of infringement where necessary.
2. Consumer rights Regulators must continue to promote the implementation of the consumer provisions in the 3<sup>rd</sup> Package.
3. Market design, rules and practical implementation The EU-wide network codes and Commission guidelines envisaged in the 3<sup>rd</sup> Package and their full implementation are imperative to foster the market integration process. The Agency will continue to be available to work with the European Commission, NRAs, the ENTSOs, and market players to deliver and implement a full set of binding market and network rules applicable across the EU.

At the same time, the EU Infrastructure Package is encouraging the development of adequate cross-border transmission infrastructure to facilitate wider market integration, and Regulation on Wholesale Energy Market Integrity and Transparency (REMIT) provisions are intended to promote transparency in wholesale markets price formation and to detect and deter abusive behaviour.

# 1 Introduction

- 1 The 3<sup>rd</sup> Package aims to make European energy markets work more effectively through the creation of single EU electricity and gas markets. While significant progress has been made, the objective of full market integration has not yet been achieved and many barriers to the Internal Energy Market (IEM) persist. For instance, at the wholesale level, pan-European market and technical rules (network codes developed on the basis of framework guidelines) must deliver further improvements in terms of the efficient use of the network and network security. Suppliers and users should have easier access to infrastructure and take advantage of lower transaction costs for cross-border trade.
- 2 The Agency for the Cooperation of Energy Regulators ('the Agency') is tasked<sup>1</sup> with tracking the progress of the integration process and the performance of energy markets. For this purpose, the Agency and the Council of European Energy Regulators (CEER) prepare an annual MMR in close cooperation with the European Commission and NRAs. This year's MMR also benefits from the contribution of the Bureau Européen des Unions de Consommateurs (BEUC).
- 3 The objective of this MMR is to assess the functioning of the IEM and to indicate which measures could be adopted to ensure that energy markets work more efficiently for the benefit of European energy consumers. In this respect, the MMR provides an in-depth year-on-year analysis of the remaining barriers to the well-functioning of the IEM and recommends how to remove them. Pursuant to Article 11 of Regulation (EC) No 713/2009<sup>2</sup>, it concentrates on retail prices (including compliance with consumer rights as mentioned in the 3<sup>rd</sup> Package), network access (including grid access for renewable energy sources) and barriers to the IEM. In addition to analysis undertaken specifically for this Report, information from other documents produced by the Agency and by NRAs has been used<sup>3</sup>.
- 4 It is worth noting that this MMR relies both on publicly available information and on information provided by NRAs, European Network of Transmission System Operations for Electricity (ENTSO-E) and European Network of Transmission System Operations for Gas (ENTSO-G) on a voluntary basis. The reporting requirements contained in Article 11 do not provide the Agency with data collection powers<sup>4</sup>.

## 2 Retail electricity and gas markets

### 2.1 Introduction

- 5 The analysis presented in this 2014 MMR is similar in scope to last year's report. It includes the main price and demand trends, assesses the level of competition in MSs and assesses why the energy component of the final consumer price still varies significantly from MS to MS.
- 6 The analytical framework for the assessment of the relative level of competition in each country is the conventional structure-conduct-performance framework which explores a range of retail market indicators (e.g. market structure and concentration, entry/exit, mark-up, the relationship between wholesale and retail energy prices, price dispersion, consumer switching activity and consumer experiences) and their interrelation.

1 The legal basis for this is Article 11 of Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing the Agency for the Cooperation of Energy Regulators, OJ L 211/1, 14/8/2009.

2 See footnote 1.

3 Norway applies most of the EU energy legislation, including legislation on the internal energy market, and is included in the data reported in several sections of this report. Switzerland has been reported in some parts of the wholesale sections on the basis of a voluntary commitment of their NRA. Consequently, the terms 'countries' and 'EU Member States (MSs)' are used interchangeably throughout this report, depending on whether the particular section/graph also covers Norway and/or Switzerland or not.

4 In its 'Energy Regulation: A Bridge to 2025' conclusions paper of September 2014, the Agency already "recommended that [the European Commission] consider proposing new legislation such that the Agency be given adequate powers to fulfil effectively the important monitoring responsibilities assigned to it, including, in particular, in respect of information gathering" (paragraph 5.9 of the Attachment to Recommendation of the Agency for the Cooperation of Energy Regulators No 05/2014 of 19 September 2014 on the regulatory response to the future challenges emerging from developments in the internal energy market).

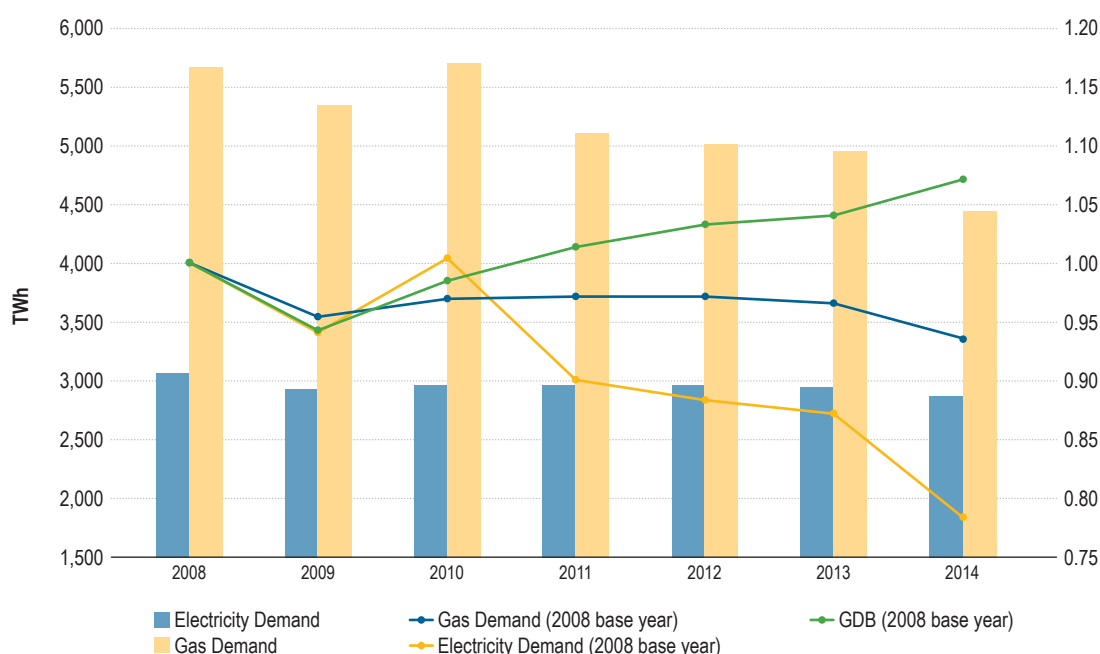
- 7 Further, in this MMR, the Agency extends and complements the scope of its analysis on retail markets by including analysis of the data on the consumer switching behaviour, obtained via a survey of energy experts and NRAs in Europe, undertaken jointly by the Agency and BEUC.
- 8 The Retail Chapter is structured as follows: Section 2.2 presents the main trends in electricity and gas demand, and prices and offers available to consumers; Section 2.3 assesses the level of competition in retail energy markets, including indicators on market structure, market conduct and competition performance, and an assessment of the relative level of competition in various markets; Section 2.4 focuses on barriers to retail market functioning, including (i) intervention in retail price setting mechanisms; (ii) consumer behaviour; and (iii) wholesale market issues. Section 2.5 ends this chapter with conclusions.

## 2.2 Main trends and benefits of retail market integration

### 2.2.1 Electricity and gas demand

- 9 In 2014, EU-28 demand for electricity by final consumers<sup>5</sup> was 2,870 TWh, which was 3.1% less than in 2013. This was the first significant fall in electricity demand since 2009 (when demand fell 4.6% compared to 2008), and the first fall to break the stagnant EU-28 electricity demand in the period from 2010 to 2013 (0.2%, -0.1% and -0.4% year-on-year variations in 2011, 2012 and 2013, respectively).
- 10 EU-28 demand for natural gas<sup>6</sup> also fell in 2014. The 4,457 TWh consumption level represents a 10.2% drop compared to 2013. This is an acceleration of the falling year-on-year gas demand trend in Europe (-1.2% in 2013 and -2.2% in 2012).

Figure 1: Overall demand for electricity and gas in the EU-28 (TWh) in relation to GDP (%) – 2008–2014



Source: Eurostat (15/9/2015) and ACER calculations.

Note: Electricity availability for the internal market and gross inland gas consumption. Data received from some NRAs show a less significant decline in electricity and gas demand than presented here.

5 Based on the Eurostat supply category of ‘electricity available for the internal market’, i.e. the amount of electricity to be sold and supplied to the domestic market, including all losses that occur during transportation and distribution, and the amount of electricity consumed in the energy sector for commercial needs. As such, the supply data shown often differ from the demand figures that NRAs have at hand, which are often taken at consumers’ metering points. Where these differences significantly affect the estimates in the year-on-year data, NRAs’ estimates are considered and noted under the figures.

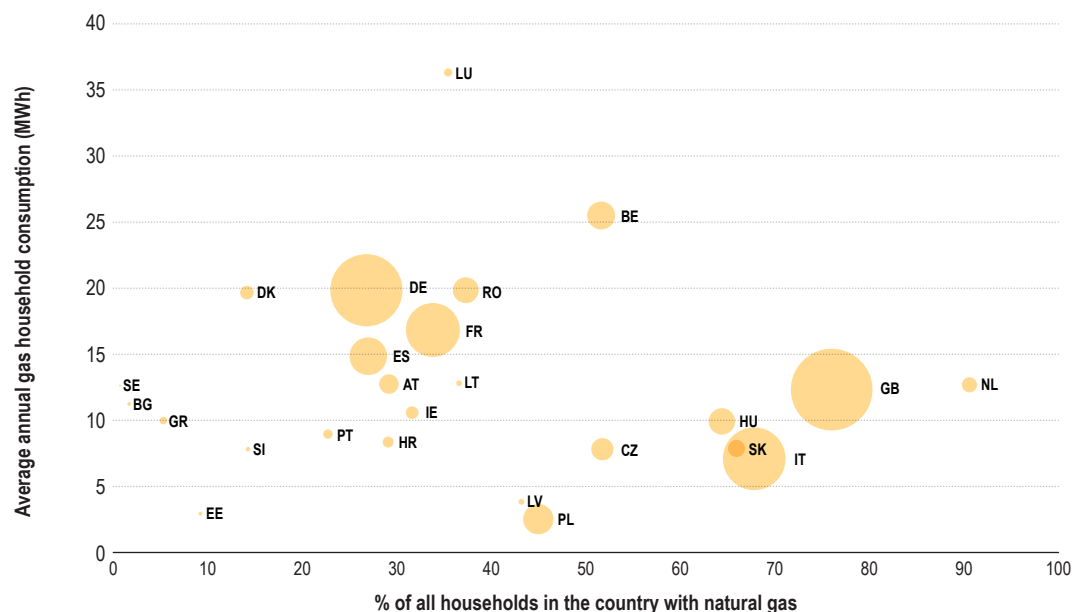
6 Gross inland annual consumption data for the years 2008–2012. For 2013, the data presented is the Eurostat monthly supply data category of ‘gross inland consumption’ as of 18 March 2014. In this category, supply is equal to the sum of production, net imports and stock change.

- 11 Compared to 2013, electricity demand fell in all but eight European countries<sup>7</sup>. The greatest decreases were in Belgium, France and the United Kingdom. Natural gas demand in 2014 continued its downward trend for all countries. The greatest decreases were in Estonia, Greece, Slovakia and Sweden.
- 12 The declining trends in electricity and gas demand for the EU28 in 2013-2014 are in contrast to the signs of Europe's economic recovery, with GDP recording a growth rate of 3.0% in 2014 compared to the previous year (Figure 1). To the extent that GDP correlates with industrial output, this would normally be expected to increase energy consumption. Absent this cause, the decline can be explained primarily by the warmer 2014/2015 winter and implementation of energy efficiency measures in some countries (Denmark, France, Portugal, Slovakia, the United Kingdom in particular). Although most obviously affecting gas demand, the warmer winter also affected household electricity consumption, as heating accounts for a significant share of electricity consumed across Europe (Figure A-1), particularly in countries with electricity-intensive space heating solutions. Gas demand was also affected, *inter alia*, by coal replacing gas as a source of production and by higher penetration of renewable sources in the electricity system, particularly in countries such as Spain and Portugal.
- 13 Consumption dynamics at the EU level are heavily dependent on an individual country's electricity and gas consumption profiles.
- 14 The level of household electricity consumption shows significant differences between countries<sup>8</sup> (see Table A-1 in Annex 1). Sweden, Norway and Finland have the highest per-household levels of annual electricity consumption (20,000 kWh, 16,000 kWh and 6,874 kWh, respectively), whilst Romania has the lowest per-household annual electricity consumption (1,358 kWh). The 2014 average European annual electricity household consumption level was 3,403 kWh (see Figure A-3 in Annex 2).
- 15 Figure 2 shows the differences in the levels of gas penetration in the household market and the average per-household gas consumption levels across Europe. While there is no gas in Cyprus, Malta or Norway (from where gas is only exported), in all other European countries, except for Belgium, the Czech Republic, Hungary, Italy, the Netherlands, Slovakia and the United Kingdom, gas is supplied to less than 50% of all households. In Italy, for example, 68% of all households are connected to the gas network; their annual average consumption is 7,301 kWh, leading to a total annual national household gas consumption of 170 TWh.

7 The effect of a reduction in consumption can have a larger effect on countries with smaller populations, where certain fixed costs have to be recovered through tariffs e.g. network-related costs.

8 Considering that almost all households across Europe have access to electricity, the size of household consumption per MS to some extent reflects the size of the country. This is not always the case, however. Eight and a half million Romanian households in total consume approximately almost 12 TWh electricity annually, which is almost eight times less than household consumption in Sweden (92 TWh), i.e. a country with approximately five million households.

Figure 2: Share of households with gas, average annual gas consumption per household and overall household consumption – 2014 (MWh and %)



Source: Eurostat (15/9/2015) and CEER Database (2014).

Note: Bubble size represents overall household consumption per country.

## 2.2.2 Retail prices

- 16 This section reports on changes in final retail prices due to the reduction in the retail energy component and, in the case of electricity, the slowing growth in RES charges. However, since energy price levels for individual countries are heavily dependent on national policies, these are presented in most detail where their effect on the final price has been the most pronounced.
- 17 This section is structured as follows. First, it presents electricity and gas retail prices for household and industrial consumers in 2014 across Europe (Section 2.2.2.1). It then reviews the reasons behind the more modest increase in the final electricity household prices and the decrease in gas prices during the last year compared to previous years (Section 2.2.2.2). Changes in the contestable and non-contestable charges for electricity are presented and analysed in detail in this section, in particular for those countries whose dynamics have been most affected by regulatory or market-induced events. Finally, Section 2.2.2.3 shows the break-down of electricity and gas household offers in the European capital cities and their changes over the 2012–2014 period. This analysis, based on data collected directly by the Agency, provides a further insight into the most recent price developments and the changes in the energy, network, taxes and charges component, including changes in RES charges.

### 2.2.2.1 Price levels

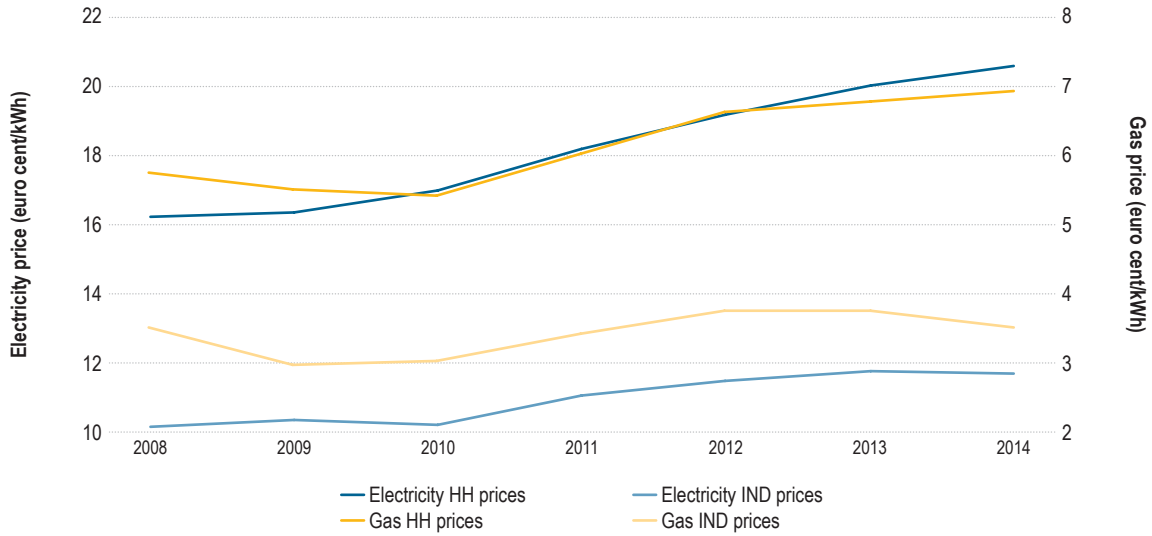
- 18 The 2014 household post-tax prices<sup>9</sup> (POTPs) presented in Figure 4 show an increase compared to 2013: 2.6% for electricity and 2.1% for gas household consumers (left vertical axis in Figure 3). Meanwhile, POTPs for industrial consumers decreased by 0.2% for electricity and by 6.0% for gas consumers (right vertical axis in Figure 3), making industrial gas consumers the only group experiencing a significant year-on-year fall<sup>10</sup>.

9 The post-tax total price is defined as the sum of the commodity price, regulated transmission and distribution charges, and retail components (billing, metering, customer services and a fair margin on such services) plus VAT, levies (as applicable: local, national, environmental) and any surcharges (as applicable).

10 Post-tax household prices for electricity in the 2008–2014 period increased the most: 4% average annual growth. This was followed by increases in post-tax household gas prices and industrial electricity prices (2.6% average growth). POTP for industrial gas consumers increased by 0.7% in 2014 compared to 2008. Electricity and gas POTPs for households are 1.7 and 1.9 times higher, respectively, than for the industrial consumers (Figure 7).



Figure 3: Electricity and gas POTP trends for household and industrial consumers in Europe – 2008–2014 (euro cents/kWh)

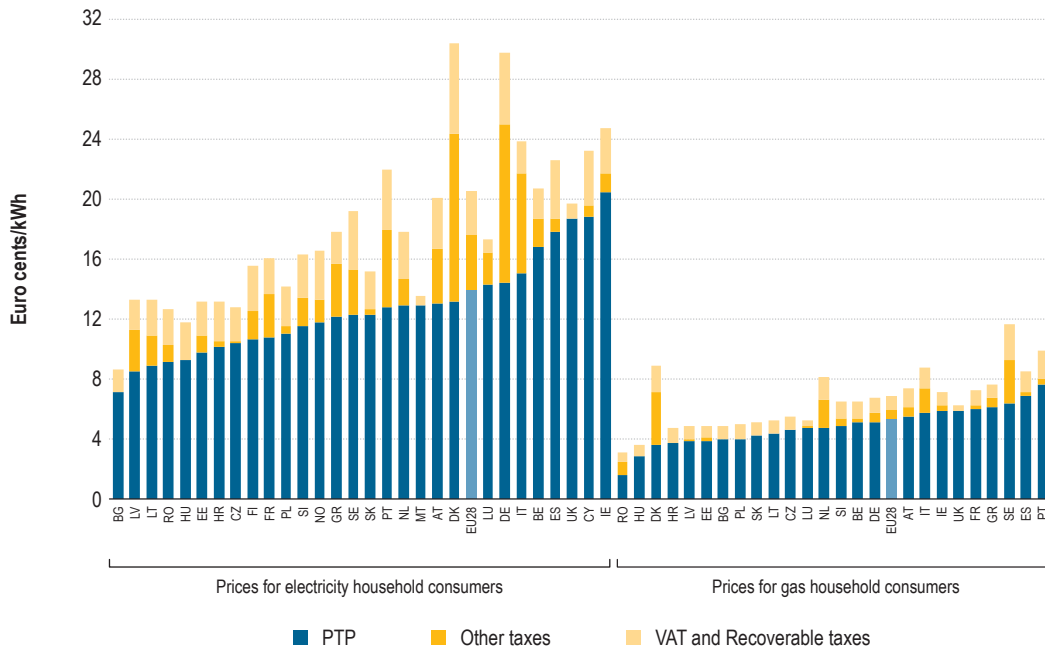


Source: Eurostat (29/08/2015) and ACER calculations.

Note: The figure is based on bi-annual data provided by Eurostat for consumption bands: DC: 2,500-5,000 kWh (electricity households), D2: 20 GJ-200GJ (gas households), IE: 20,000 MWh-70,000 MWh (electricity industrial consumers) and I5: 1,000,000 GJ-4,000,000 GJ (gas industrial consumers).

19 In 2014, the EU28 household POTP averaged 20.56 euro cents/kWh for electricity and 6.93 euro cents/kWh for gas. The EU28 average pre-tax prices<sup>11</sup> (PTP) for household electricity and gas consumption were 13.97 euro cents/kWh and 5.36 euro cents/kWh, respectively (Figure 4).

Figure 4: Electricity and gas POTP and PTP for households in Europe – 2014 (euro cents/kWh)



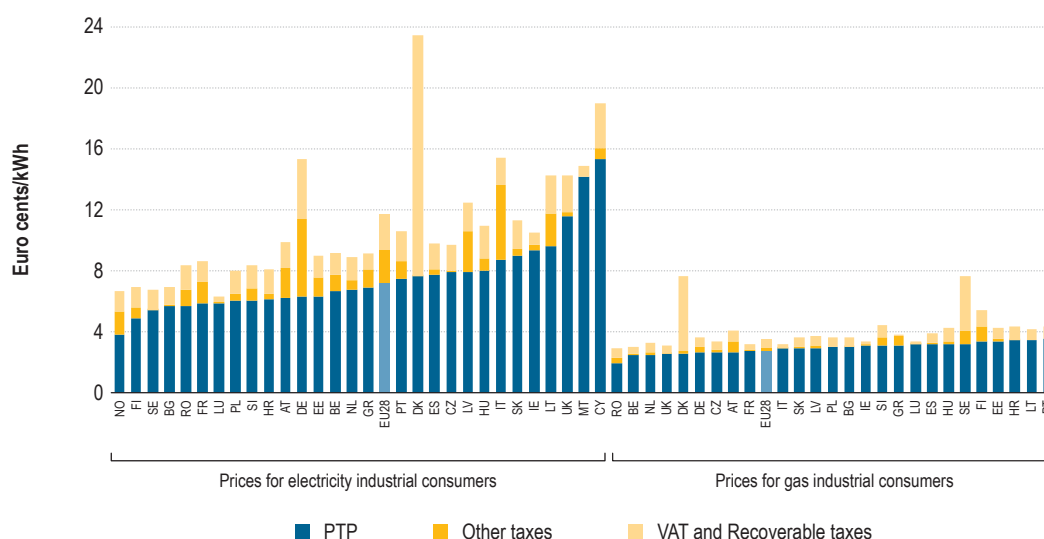
Source: Eurostat (29/08/2015) and ACER calculations.

Note: The figure is based on bi-annual data provided by Eurostat for consumption bands: DC: 2,500-5,000 kWh (electricity households) and D2: 20 GJ-200GJ (gas households). Within each group, MSs are ranked according to PTP.

11 The pre-tax total price (PTP) is defined as the sum of the commodity price, regulated transmission and distribution charges, and retail components (billing, metering, customer services and a fair margin on such services).

- 20 As in previous years, Denmark (30.38 euro cents/kWh) remained the country with the highest electricity household POTP, more than three times the POTP charged to electricity households in Bulgaria (8.63 euro cents/kWh), the country with the lowest POTP in Europe. Germany recorded the second highest electricity household POTP (29.77 euro cents/kWh). Irish household consumers faced the highest electricity PTPs (20.46 euro cents/kWh), which was almost three times higher than the lower PTP charged to Bulgarian electricity households (7.17 euro cents/kWh).
- 21 Household gas prices in 2014 remained the lowest in Romania (1.56 and 3.14 euro cents/kWh, pre- and post-tax respectively), despite a 6.1% increase in POTP compared to the previous year. This is almost four times less than the POTP charged to Swedish gas consumers (11.61 euro cents/kWh), who incur considerably higher taxes and charges compared to other European countries. The highest pre-tax prices for gas were recorded in Portugal (7.57 euro cents/kWh)<sup>12</sup>.
- 22 Danish electricity industrial consumers continued to face the highest electricity POTP (23.49 euro cents/kWh), more than three times the POTP charged to electricity industrial consumers in Luxembourg (6.32 euro cents/kWh). Industrial gas prices in 2014 remained at their lowest in Romania (2.88 euro cents/kWh) and highest in Denmark (7.68 euro cents/kWh) as shown in Figure 5.

Figure 5: Electricity and gas POTP and PTP for industrial consumers – Europe – 2014 (euro cents/kWh)



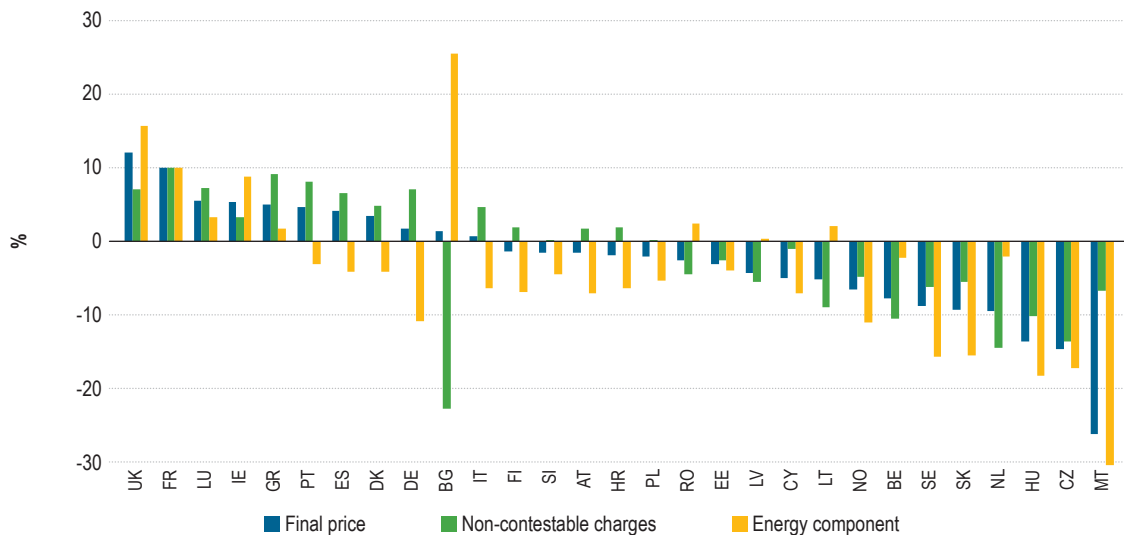
Source: Eurostat (29/08/2015) and ACER calculations.

Note: The figure is based on bi-annual data provided by Eurostat for consumption bands: IE: 20,000 MWh-70,000 MWh (electricity industrial consumers) and I5: 1,000,000 GJ-4,000,000 GJ (gas industrial consumers). Within each group, MSs are ranked according to PTP. Bi-annual data for consumption band I4 (100,000 GJ-1,000,000 GJ) is provided for Croatia, Lithuania, Luxembourg, Ireland and Slovenia.

2.2.2.2 Price developments

- 23 An analysis of the price components reveals the main drivers of the changes in electricity POTPs in 2014. Figure 6 shows that, in a majority of countries, the energy component dropped in 2014 compared to the previous year. An important driver in the fall of the energy component was the fall in wholesale electricity prices (see Section 3.2.3). However, in some MSs the fall in wholesale prices did not result in an overall decrease in the retail energy component. Overall increases in the energy component were observed for 2014 in the United Kingdom (by 15.8%), in Ireland (8.8%), in Luxembourg (3.3%) and in France (10.0%), despite a decrease in the wholesale electricity price in these countries<sup>13</sup>.
- 24 To varying degrees, in a number of countries, including Austria, Croatia, Finland, Germany, Italy, Portugal, Spain, the fall in the retail energy component has been offset by the growth in non-contestable charges. This can be said to reflect long-term national policy objectives or regulatory price-setting interventions in those countries, something which is also reflected in the period from 2008 to 2014, as shown in Figure 7.

Figure 6: The year-on-year change in the electricity POTP, energy component and non-contestable part of POTPs for households in Europe – 2013–2014 (%)



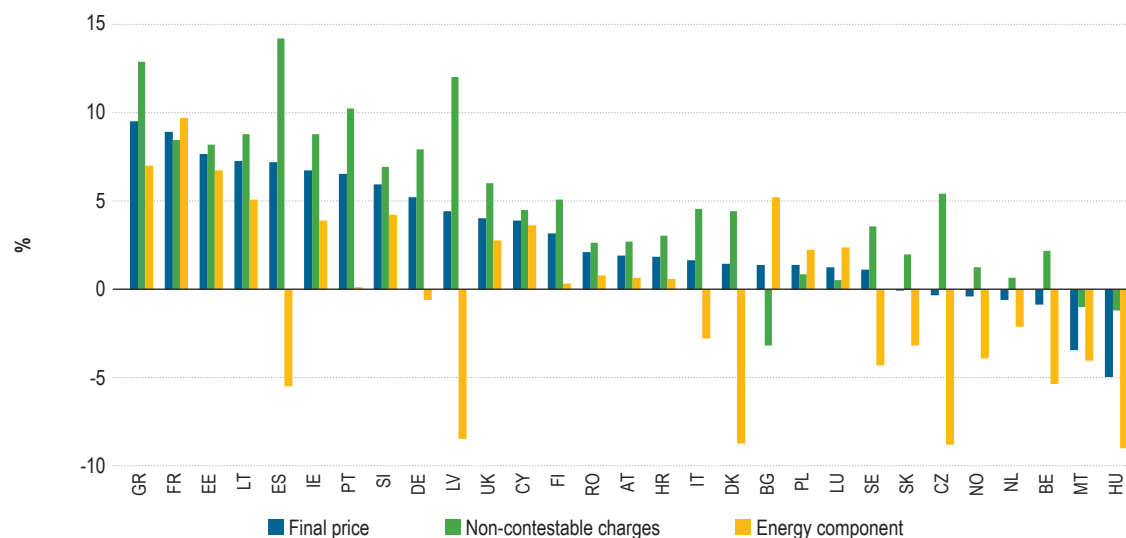
Source: Eurostat (29/08/2015) and ACER calculations.

Note: Consumption band: DC: 2,500-5,000 kWh (electricity households). The energy component pricing data for Ireland, Italy, Lithuania, Portugal, Spain and the United Kingdom were corrected for some costs which are not purely energy-related (e.g. network losses, capacity payments, etc.) and which were originally included in the energy component. According to CRE, the 2013-2014 price and component increases shown in the figure for France were lower than presented: instead, the energy component, non-contestable charges and the final price for a household consuming 3,700 kWh increased annually on average by approximately 4%, 1% and 6%, respectively. In Bulgaria, the increase shown in the energy component is due to a regulatory decision in 2014 to increase the energy component of the regulated price as a result of the higher cost of green energy and high cogeneration efficiency costs.

- 25 The prominent 2013–2014 POTP and component changes evident in Figure 6 can be said to reflect the long-term national policies or regulatory price-setting interventions in those countries (as shown for the period from 2008 to 2014 in Figure 7).

13 This section presents the changes in the energy component as shown by Eurostat. The energy component typically includes the price charged for the following costs: generation, aggregation, balancing energy, customer services, after-sales management, other supply costs and the retail margin. In some countries, the Eurostat energy component also includes elements which are not exclusively energy-related (e.g. renewable subsidies, network losses, capacity payments, etc.). For countries where available information indicated that this was the case, the necessary correction was made for the analysis in this section.

Figure 7: The compounded annual growth rate (CAGR)<sup>14</sup> of the electricity POTP, energy component and non-contestable part of POTPs for households in Europe – 2008–2014 (%)



Source: Eurostat (29/08/2015) and ACER calculations.

Note: Consumption band: DC: 2,500-5,000 kWh (electricity households). The energy component pricing data for Ireland, Italy, Lithuania, Portugal, Spain and the United Kingdom were corrected for some costs which are not purely energy-related (e.g. network losses, capacity payments, etc.) and which were originally included in the energy component. The change shown for Latvia has been impacted by a change in reporting of the mandatory procurement component (MPC), which was at the beginning of the observed period reported under the energy component, however it was later moved to the taxes and charges component. According to the ACER offer data, there has been no change in the price in Latvia. Due to data limitations, the price change shown for France only relates to the 2012–2014 change; for Greece the change relates to the 2009–2014 period, whilst for Cyprus and Ireland the compounded annual growth rate for the 2011–2014 is shown. According to CRE, the 2008–2014 price and component increases shown in the figure for France were lower than presented: instead, the energy component, non-contestable charges and the final price for a household consuming 3,700 kWh have increased annually on average by approximately 2%, 3% and 4%, respectively.

- 26 Eleven countries experienced increases in POTP between 2013 and 2014, with the United Kingdom experiencing the highest increase (12.1%) compared to the previous year. This increase was affected by exchange rate fluctuations, i.e. according to Department of Energy and Climate Change (DECC), approximately 7% of this increase is estimated to be due to the appreciation of the British pound against the euro. The remaining annual increase of approximately 5% in the UK was due to a combination of the increase in the retail energy component, as noted above, but also by an annual increase in non-contestable charges. The year-on-year change in the UK retail energy component is consistent with the longer term trend in the UK presented in Figure 7, which shows that the energy component has increased, on average by almost 3% *per annum*. This increase has happened despite average wholesale energy prices falling over the period, meaning that increases in other components of the energy price have prevented consumers from benefiting from the falls in wholesale prices (Figure 6).
- 27 With the exception of the Czech Republic and the Netherlands, the 2014 POTP only fell significantly compared to 2013 in countries where a regulatory price intervention<sup>15</sup> was applied i.e. in Hungary, Malta, and Belgium. Hungary has experienced the greatest reduction in household prices, 4.9% over the 2008-2014 period. This reduction was primarily due to government interventions to reduce retail prices in January and November 2013<sup>16</sup>, followed by a further government intervention in September 2014, further reducing the energy component and the final retail price (see Figure 7) in line with the falling electricity wholesale price.
- 28 The decrease in the final price and in the energy component as shown in Figure 7 for Belgium is due to

14 Compound Average Growth Rate (CAGR). CAGR is calculated by taking the  $n$ th root of the percentage of the year-on-year demand growth rate for the period analysed, where  $n$  is the number of years in the period being considered (in this case, the sixth root).

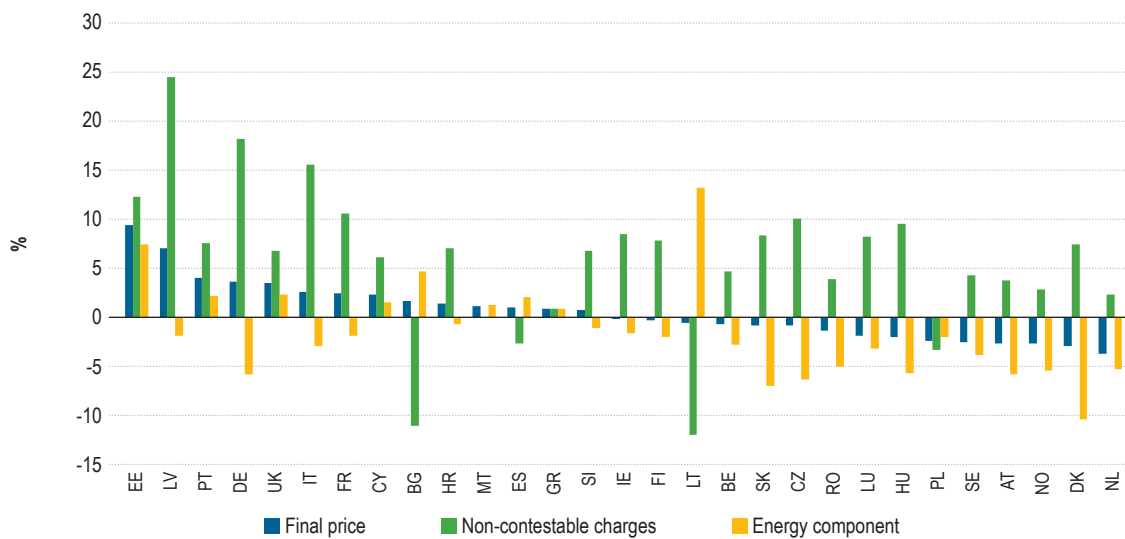
15 Regulatory price intervention means a non-market-based interference (i.e. reduction in this case) in the final price guaranteed to consumers. A government or an NRA may determine such a reduction. To read more on interventions in pricing, see Section 3.4.1.

16 See the 3<sup>rd</sup> MMR [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER\\_Market\\_Monitoring\\_Report\\_2014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER_Market_Monitoring_Report_2014.pdf), page 29.

the 9.5% reduction in the retail energy component in 2013 compared to 2012. The reduction followed the government intervention (i.e. the 9-month price freeze) and associated measures to promote competition (e.g. cancellation of contract exit fees, abolishment of oil price linked contracts)<sup>17</sup> introduced in 2012 and continuing until 2015, showing a further 2.1% year-on-year decrease in the retail energy component in 2014<sup>18</sup>.

- 29 The relatively modest Maltese electricity household price drop over the period 2008–2014 (Figure 7) can only be attributed to the price intervention of the Maltese government at the end of March 2014, causing the POTP for a DC-band<sup>19</sup>-consuming household to drop by 26.2% (Figure 6). The effect of this intervention was to target the energy component, which decreased by 30.4% compared to 2013, the largest drop in the retail energy component and final household price in Europe.
- 30 Cypriot household electricity prices, the highest in Europe in 2012, dropped by approximately 14.8% in 2013 compared to 2012. This was primarily due to the intervention of the Cypriot NRA. In 2014, the price fell further (by 5.0% for household and by 7.1% for industrial consumers compared to 2013) due to the decrease in the price of fuel (heavy fuel oil and diesel) used by the incumbent for electricity production.
- 31 While household electricity prices rose between 2008 and 2014, Figure 8 shows that electricity POTPs for industrial consumers decreased in many European countries, albeit to a limited extent. Considering that industrial electricity consumers are less burdened by non-contestable charges than household consumers<sup>20</sup> and considering that the industrial segment has been liberalised in the majority of countries, the change in the final price largely reflects the change in the energy component.

Figure 8: The compounded annual growth rate (CAGR) of the electricity POTP, energy component and non-contestable part of POTPs for industry in Europe – 2008–2014 (%)



Source: Eurostat (29/08/2015) and ACER calculations.

Note: Consumption band: IE: 20,000 MWh-70,000 MWh (electricity industrial consumers). Within each group, MSs are ranked according to PTP. For consistency reasons, the energy component pricing data for Spain in 2014 was corrected for some costs (e.g. renewable subsidies), which were recorded in a different component than the energy one before 2013.

17 See the 2nd MMR, [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Market%20Monitoring%20Report%202013.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202013.pdf), page 51.

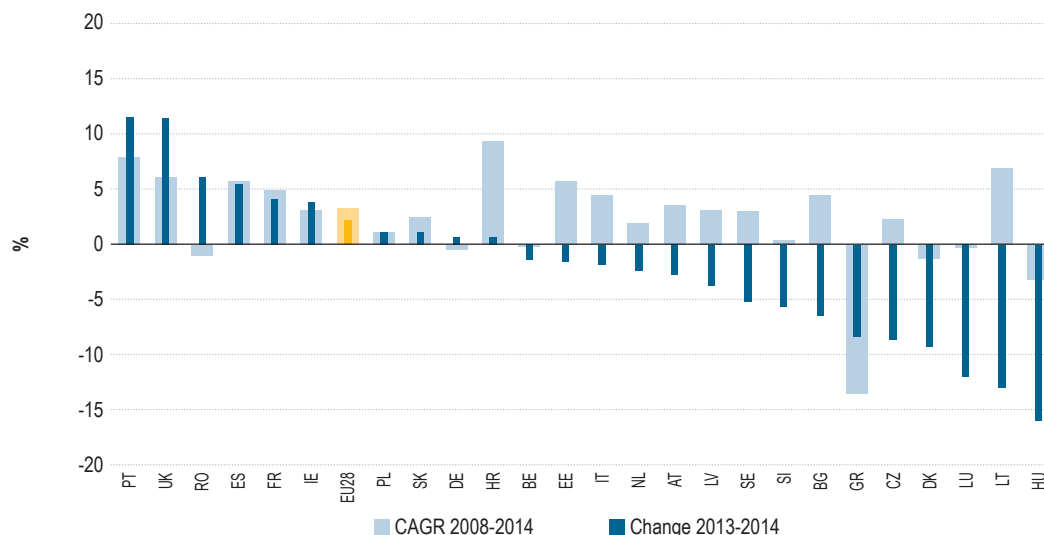
18 As a result of this, Belgium has experienced a -0.9% change in the POTP and a 5.4% drop in the energy component from 2008 to 2014.

19 According to Eurostat, households consuming from 2,500 to 5,000 kWh of electricity annually, fall into this band.

20 In 2014, the average share of the retail energy component in the POTP for industrial consumers was 66%. This percentage is likely to be even higher if VAT and taxes (which are recoverable for the industry) are not included in the break-down. In 2014, the retail energy component on average represented 41% of the final electricity price charged to household consumers (based on Eurostat, ACER assessment).

32 The analysis of the 2013–2014 gas price change shows that in all countries except Romania, Portugal and Estonia, final prices fell for industrial consumers. Gas prices for household consumers in 2014 fell in the majority of countries, with the greatest reductions occurring in Hungary, Lithuania<sup>21</sup> and Luxembourg, in excess of 10% year-on-year (by -16.0%, -13.1% and -12.1% respectively). This is a reversal of the trend observed in previous years.

Figure 9: The 2008-2014 compounded annual growth rate (CAGR) and 2013–2014 change year-on-year of the gas POTP for household consumers in Europe (%)



Source: Eurostat (29/08/2015) and ACER calculations.

Note: Consumption band: D2: 20 GJ-200GJ (gas households). For Greece, data is only available from 2012 onwards.

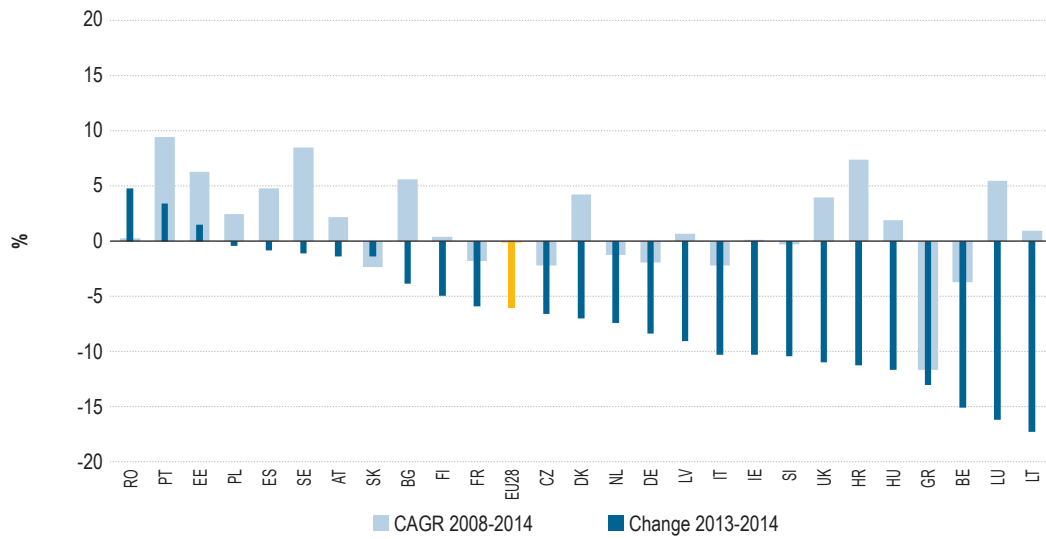
33 Although data limitations<sup>22</sup> prevent an analysis of gas price growth similar to the electricity analyses shown in Figure 6, Figure 7 and Figure 8, it can be observed in Figure 9 and Figure 10 that the falling gas wholesale prices in all countries except Portugal have affected final gas prices charged to households and, more so, industrial consumers. Over the past few years, gas wholesale prices have been falling due, *inter alia*, to lower demand, high storage levels at the end of the 2013/2014 winter season, declining LNG and oil prices and the renegotiation of gas supply contracts (see Sections 5.2 and 5.3).

34 The effects of falling wholesale gas prices on gas POTP can be expected to have been less pronounced in those countries in which network charges, taxes and levies account for a significant share of the final price of the gas supplied (i.e. Denmark, Sweden and Finland, where they account for more than 60% of the final price – see Figure 14).

21 In Lithuania, the fall in the 2014 final gas price is associated with the fall in the price of gas on the wholesale market. See Case box: Market impact of commissioning Klaipeda LNG terminal in Section 5.3.2 for further detail.

22 A break-down of gas prices into the energy, network and taxes and levies components for the period observed is not available from Eurostat.

Figure 10: The 2008–2014 compounded annual growth rate (CAGR) and 2013–2014 change year-on-year of the gas POTP for industrial consumers in Europe (%)



Source: Eurostat (29/08/2015) and ACER calculations.

Note: Consumption band: I5: 1,000,000 GJ-4,000,000 GJ (gas industrial consumers). Due to the unavailability of data for I5, band I4 (100,000 GJ-1,000,000 GJ) is shown for Danish, Irish, Croatian, Luxembourg, Lithuanian and Slovenian consumers. For Greece, data is only available from 2012 onwards.

### 2.2.2.3 Price break-down and changes in price components

- 35 For the third consecutive year, the Agency analysed the POTP break-down of standard electricity and gas offers<sup>23</sup> across European capital cities at the end of calendar year to understand better the final price composition and to follow the changes in its components year-on-year, in particular the RES charges for electricity and the energy component for gas, which are as yet unavailable in other data sources.
- 36 The results of the analysis, based on the collected standard offer break-down, support the conclusions from Section 2.2.2.2 that the energy component of electricity and gas retail prices has declined. RES charges, which represent a significant share of the non-contestable charges, have off-set the benefits from the falling energy component in a several capital cities; however, their growth is expected to slow down in the future years.

#### Electricity

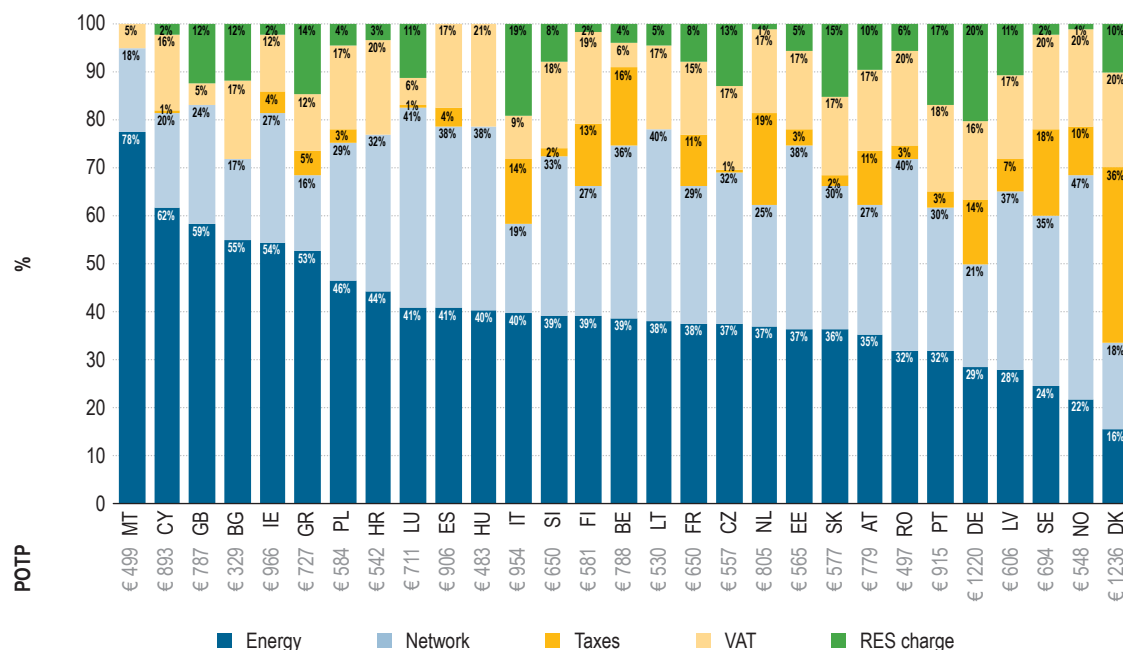
- 37 The electricity standard offer break-down<sup>24</sup> presented in Figure 11 reveals varying compositions of the final price offered across capital cities<sup>25</sup>. This is particularly true of the energy component, which ranges from 78% and 62% of the final offered price in Valletta and Nicosia, respectively, to a mere 16% of the final offered price in Copenhagen.

23 There are a number of reasons why the analysis of offers may differ from the prices reported to Eurostat. These include consumption profiles underpinning the data collection across capital cities in Europe, i.e. 4,000 kWh annually of electricity consumed and 15,000 kWh annually of gas consumed, and the fact that an offer might be different from the actual price paid.

24 For countries where dual-fuel offers prevail, the analysis in this section and in 2.2.3, which is based on single-fuel offers, is not the most representative of the standard electricity and gas offers to consumers.

25 For the break-down of electricity and gas offers from 2012-2014, see Figure A-3 and Figure A-4 in Annex 2.

Figure 11: POTP electricity break-down – incumbents' standard offers for households in capital cities – November-December 2014 (%)



Source: ACER Retail Database<sup>26</sup> and information from NRAs (2014).

Note: For some capital cities, the final price shown for the consumption of 4,000 kWh per household annually is not the most representative. In Italy, for example, the average consumption and the connection capacity were significantly lower (2,000 kWh in 2014); in Romania, average consumption is approximately 1,500 kWh, and in Lithuania 1,900 kWh annually. On the other hand, in Norway, Sweden and Finland, average demand is significantly higher than the average profile from the ACER Retail Database (over 16,000 kWh, 9,200 and 9,000 kWh respectively) (see the average consumption profiles in Annex 1). In the case of Denmark, the break-down refers to the average variable price in Copenhagen, with the presented RES charges equalling PSO charges. In the case of the Swedish and Norwegian spot-based offers, the RES charge is estimated. In Malta, a charge for the support of the RES is not included in the electricity tariff, as the support for RES is financed through national taxes in the national budget. In Spain, RES support is included in the network tariff set by the government and has been estimated to amount to 19% of the final bill<sup>27</sup>; however, the cost allocation to the specific components for this item is not known to the NRA. Percentage numbers shown are rounded-off.

- 38 The cost of procuring electricity on the wholesale market accounts for the majority share of the energy component<sup>28</sup>, with the rest being costs to suppliers for supplying electricity to consumers' homes. In line with the observations from Sections 2.2.2.2 and 3.2.3, the energy component – in the majority of capital cities – decreased both in absolute and relative terms (i.e. as a percentage of the total offer price) between 2013 and 2014.
- 39 Within the composition of energy costs, supply costs (including suppliers' margins) can differ significantly from supplier to supplier. EU-wide data on the breakdown of the composition of energy costs was not available for 2014. Of the capital cities for which information could be obtained, Londoners paid the most (18% of the final offered price) for the supply of electricity to their homes, followed by electricity household consumers in Nicosia (4.0%), Rome (3.1%), Zagreb (1.6%) and Vilnius (1.1%).

26 The ACER retail database is based on information from price comparison tools, NRAs and suppliers. It refers to direct debit, single-unit-rate offers for the annual consumption of 4,000 kWh of electricity and 15,000 kWh of gas, which has been calculated as the average consumption for European household consumers based on Eurostat data. National consumption profiles may differ from the consumption pattern used. Fixed-, variable-, mixed-price and spot-based offers are included in the comparison.

27 Source: [http://www.cnmec.es/Portals/0/Ficheros/Energia/Informes/Boletin\\_mensual\\_indicadores\\_electricos/150430\\_Boletin%20Indicadores%20EI%C3%A9ctricos%20-%20Abril%202015.pdf](http://www.cnmec.es/Portals/0/Ficheros/Energia/Informes/Boletin_mensual_indicadores_electricos/150430_Boletin%20Indicadores%20EI%C3%A9ctricos%20-%20Abril%202015.pdf).

28 Specifically, the 'energy component' includes the price charged for the following costs: generation (excluding capacity charges for generation adequacy), aggregation, balancing energy, customer services, after-sales management, other supply costs and retail margin.



- 40 The highest network charges<sup>29</sup> as a share of the total offer price were found in Oslo (47%)<sup>30</sup>. By contrast, in Athens, electricity network charges represented only 16% of the final offered price of electricity. In Portugal, network charges decreased the most, i.e. by 8% annually from 2012 to 2014, due to the reduction in some of the policy costs, such as the decision to end the Power Purchasing Agreement (PPA) stranded cost<sup>31</sup> and the isolated islands' compensation payments. In the majority of other capital cities, with the exception of Denmark and Germany, no major change in electricity network charges can be observed from 2012 to 2014.
- 41 In capital cities where the further break-down of electricity network charges can be provided by NRAs, distribution charges comprise the majority share of the total network charge (78% on average), followed by transmission charges, which on average comprise 17% of total network charges. Other network charges, such as metering and meter rental, are significant in only seven of the standard offers for the 15 capital cities for which information was provided. The limited availability of systematic detailed data on network components limits the Agency's ability to provide a more in-depth assessment of the extent to which differences in the composition of network charges across MSs is influencing the further integration and well-functioning of the IEM.
- 42 In addition to the different VAT rates charged across Europe, energy-related and other taxes charged to household consumers vary greatly from capital to capital. In Valetta, Sofia, Budapest and Zagreb, there are no taxes or levies other than VAT charged to electricity consumers, whilst in Copenhagen, energy-related taxes account for 36% of the final bill. Taxes and charges also significantly affect the final electricity bill in Oslo, Stockholm and Berlin, where they alone represent a considerably higher share (30%, 38% and 30% respectively) of the final price than that of the energy component (22%, 24% and 29% respectively).
- 43 Considering that VAT (charged as a variable tax on the energy, network and RES components) contributes most to the changes in the level and variability of the taxes and charges component, the most pronounced changes in the taxes and charges component have occurred in those capital cities where the POTP has varied the most, such as Prague, Nicosia, Budapest, Valetta, Oslo and Tallinn (see Figure A 3 in Annex 2).
- 44 Brussels households saw the most substantial decrease in taxes in the observed period, with the Belgian federal government lowering the VAT rate for electricity from 21% to 6% on 1 April 2014<sup>32</sup>. This reduction in VAT induced a fall in the electricity POTP for Belgian households by approximately 13% in 2014 compared to 2013.
- 45 In Riga and Rome, from 2012 to 2014, taxes and charges increased annually by 19% and 9%, respectively. In Rome, the increase was due to the introduction in 2014 of a new household charge to cover the cost of new incentives for energy-intensive industrial users. In some other capital cities, taxes increased due to a VAT-rate increase at some point during the observed period (e.g. in Amsterdam, Ljubljana, etc.)

29 The 'network charge component' includes the price charged for the following costs: transmission and distribution costs, including transmission and distribution losses, system operation costs (excluding balancing energy) metering and meter rental.

30 In Norway, fixed network charges make up a large share in total network charges. Network charges per kWh are therefore larger for lower consumption bands. As the average consumption in Norway is approximately four times higher than the average consumption profile presented in the break-down, the share of network charges in the total price for a typical Norwegian consumer is considerably lower (i.e. estimated at 32% in the final price).

31 Market liberalisation has led to the need to anticipate the termination of long-term financing agreements for the acquisition of generated power i.e. the PPAs (or long-term Electricity Acquisition Contracts (CAE)). Two of these contracts remained in force, and the energy generated by the two plants is now managed by a supplier. The remaining contracts were terminated and the respective power plants were included in a legal concept - Costs for the Maintenance of Contractual Equilibrium (CMEC) - which gives producers the right to receive financial compensation intended to grant them equivalent economic benefits as those provided by the CAE.

32 From September 2015, the VAT rate will be reversed to 21%. Source: [http://www.ejustice.just.fgov.be/cgi\\_loi/change\\_lg.pl?language=fr&la=F&cn=2015082309&table\\_name=loi](http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2015082309&table_name=loi); [http://www.ejustice.just.fgov.be/cgi\\_loi/change\\_lg.pl?language=nl&la=N&cn=2015082309&table\\_name=wet](http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=nl&la=N&cn=2015082309&table_name=wet).

- 46 The RES charges covering subsidies to investments in renewable energy sources have been increasing steeply year-on-year between 2012 and 2014. As shown in Figure 12, the RES component in 2014 almost tripled compared to 2012 in Lisbon<sup>33</sup> and Athens, jumping from 5.2% and 6.0% of the final POTP in 2012, respectively, to 16.6% and 14.5% of the final POTP in 2014. In London and Ljubljana, the RES charges have nearly tripled, representing 12.6% and 7.6% per cent of the final 2014 POTP, respectively.
- 47 In Berlin and Rome, RES charges in 2014 not only accounted for the highest percentages of the final POTPs of all European capitals (20.5% and 18.9%, respectively), but were also the highest in Europe in nominal terms (almost 250 euros and 180 euros, respectively)<sup>34,35</sup>. In 2014, the RES charges also grew in Copenhagen due to a correction by the regulator. In Denmark, the subsidy is calculated on the basis of the difference between the forecast electricity prices and realised prices. Because realised prices were lower than forecast prices over the past two years, the RES for 2014 had to be increased to make up the shortfall in renewable generation revenues.

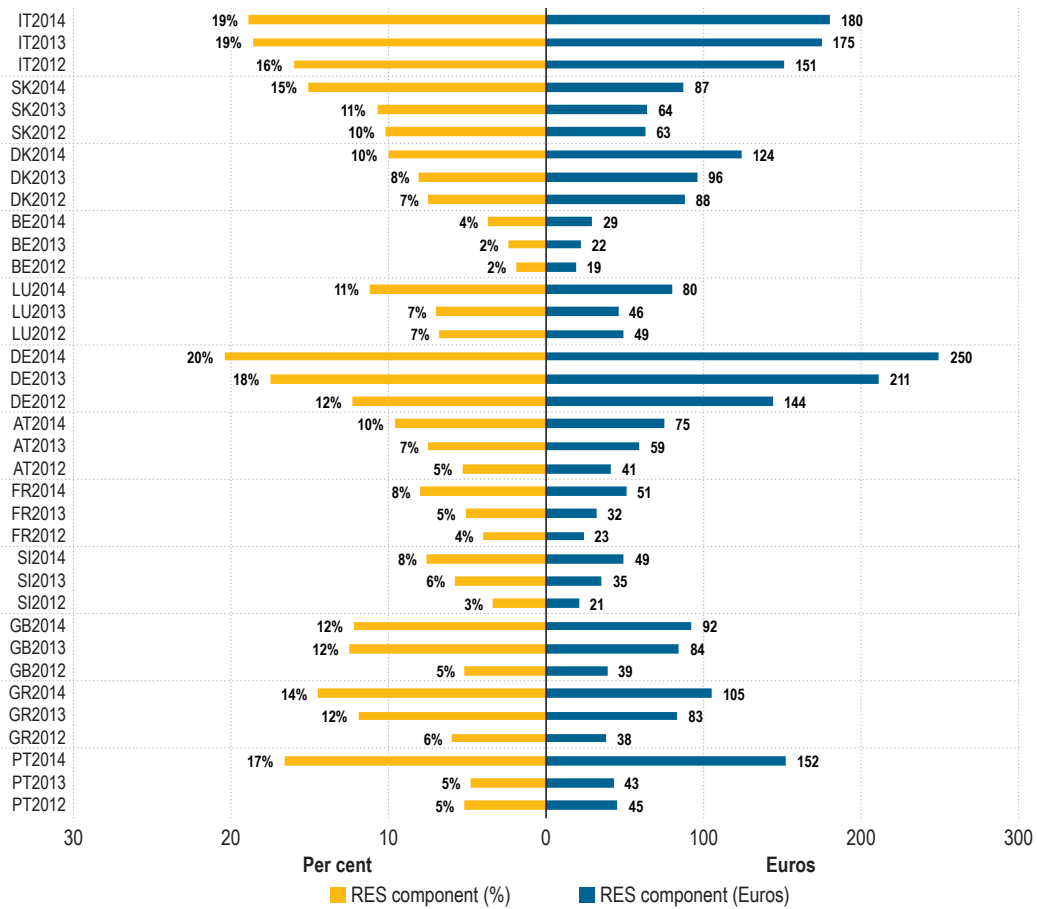
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33 In Lisbon, the RES and combined heat and power (CHP) costs considerably increased in 2014 due to the large amount of renewable energy produced and therefore due to the higher costs incurred. Furthermore, in 2014 under-recovered revenue from the 2013 RES had to be collected.

34 The German 2015 RES levy shows almost no change compared to 2014 (i.e. a decrease of 0.01%). In 2016, the RES levy will slightly increase to 6.35 euro cents/kWh (i.e. 254 euros for a household consuming 4,000 kWh of electricity annually). According to BNetzA, a sharp increase similar to the 2012 and 2013 increase is not expected. Source: [http://www.bundesnetzagentur.de/cdn\\_1421/SharedDocs/Pressemitteilungen/DE/2015/151015\\_EEG.html](http://www.bundesnetzagentur.de/cdn_1421/SharedDocs/Pressemitteilungen/DE/2015/151015_EEG.html).

35 In Italy, the future impact of RES charges on domestic customers will depend both on the evolution of different incentive schemes and on their distribution among the different consumption bands. The overall national amount of RES charges - which from 2012 to 2014 increased by 30% (i.e. from 10.3 to 13.4 billion euros) is due to fall from 2015 onwards to 12.5 billion euros, with the exception of 2016, when the green certificate mechanism in place comes to an end and a new incentive scheme increasing the overall amount to more than 14.0 billion euros begins. The distribution of charges among the different consumption classes will be impacted by the tariff reform currently underway, which should enter into force at the beginning of 2016 and which should eliminate the current progressive structure of charges. As a net result, RES charges for a household consuming 4,000 kWh annually, should decrease in 2015, remain stable in 2016 and start decreasing again in 2017.

Figure 12: RES component changes in POTP break-downs of offers for a selection of capital cities with the most pronounced growth trends, 2012–2014 (euros and %)

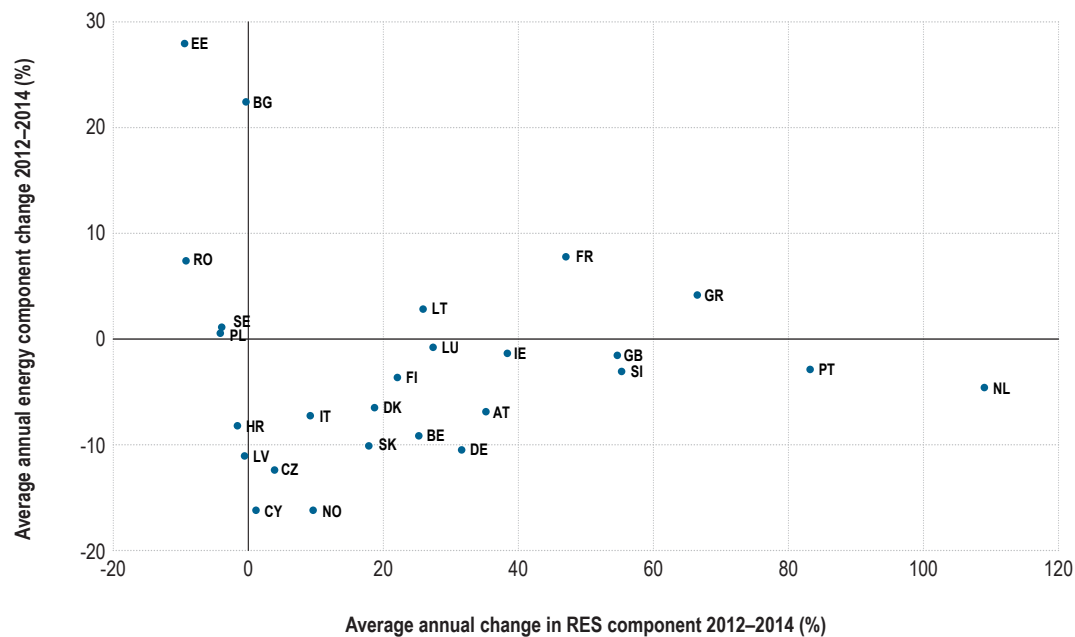


Source: ACER Retail Database and information from NRAs (2014).

Note: RES charges in Denmark include PSO charges.

48 The increased output from renewable generation, while increasing RES charges, has lowered electricity wholesale prices, and thus the electricity energy component in retail prices in the majority of European capitals (see bottom right quadrant of Figure 13). The exceptions to this are those capitals in which price regulation (Paris, Sofia) and/or its recent removal (Tallinn, Athens, Vilnius, Dublin, Warsaw) has affected the electricity energy component.

Figure 13: Annual average change in RES charges and the energy component in capital cities – CAGR 2012–2014 (%)



Source: ACER Retail Database and information from NRAs (2014).

Note: Average annual change in the period from 2012 to 2014 is shown for the energy and RES component for all capital cities except for Amsterdam, Bucharest and Zagreb, where the change relates to 2013–2014. Hungary (Budapest) appears out of the chart with a 15% decrease in the energy component and a 100% decrease in RES in the observed period. In Madrid, the RES charge could not be disentangled from other components. In Malta, a charge for the support of the RES is not included in the electricity tariff, as the support for RES is financed through national taxes in the national budget. In those capitals where the 2012 RES charges were nominally low (i.e. less than 10 euros annually), such as in Amsterdam, Helsinki and in Oslo, the annual change shown for the period from 2012–2014 is relatively higher compared to other capitals in which RES charges were nominally higher in 2012.

49 Over the 2012–2014 period, average annual final offered price drops were observed in the following locations: Budapest (15%), Valletta (14%), Nicosia (12%), Brussels<sup>36</sup> (9%), Oslo (7%), Prague (7%), Zagreb (6%)<sup>37</sup>, Bratislava (3%) and in Helsinki (2%). The reduction in the energy component was the main driver of these decreases, although, with the exceptions of Budapest, Zagreb and Valletta, this effect was partially offset by the increase in the RES component<sup>38</sup>. The latter was one of the main drivers of the overall increase in final prices in Ljubljana (by 4%), Copenhagen<sup>39</sup> (by 2%), Dublin, Berlin and Luxembourg (by 2% in all cases), Vienna<sup>40</sup> and Rome (average annual increase of 1% in the final price in from 2012 to 2014 in both cases), despite decreases in the energy component also being observed in these cities. In Athens and Paris, the energy component rose together with the RES and other charges to increase the final offer price (by 7% and 5% on average annually respectively).

## Gas

50 Similar to the break-down of offers for electricity, standard gas offers<sup>41</sup> across the European capitals vary considerably. In 15 of the 26 European capitals, the energy component is more than 50% of the POTP, with Tallinn (71%) showing the highest energy component share in the POTP, compared to Copenhagen and Gothenburg (Sweden) where the share is the lowest (29% and 33% of the POTP, respectively). The analysis in this section focuses on changes in the energy component as these have affected the POTP the most.

36 In conjunction with the reduction in VAT.

37 Refers to the 2013–2014 final price change.

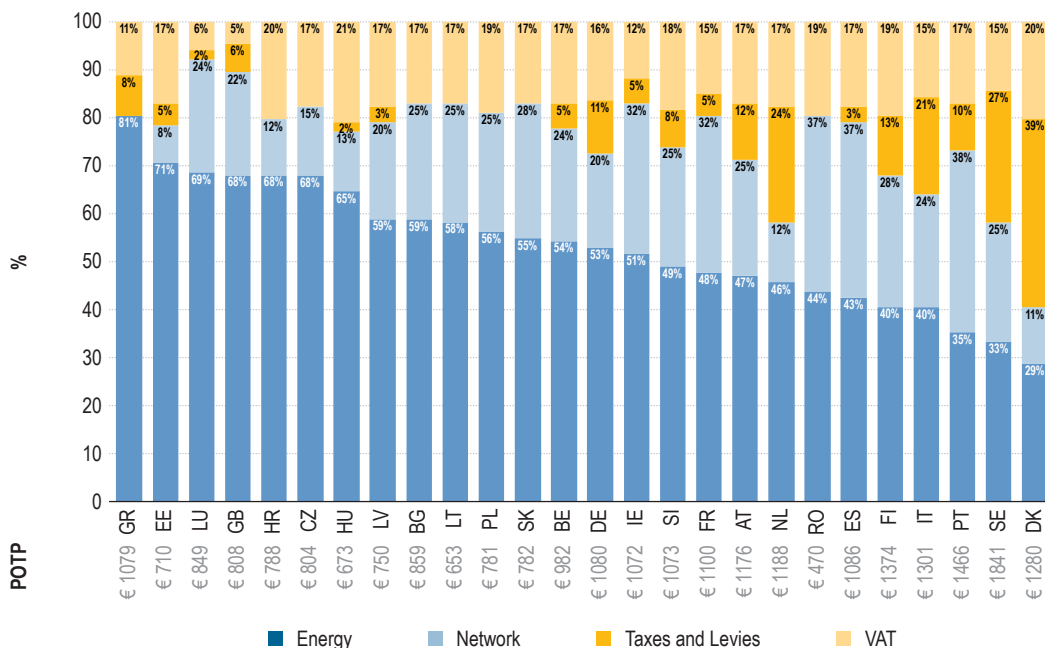
38 In Rome, by the RES component and taxes.

39 Together with network.

40 Together with network.

41 For countries where dual-fuel offers prevail, the analysis in this section and in section 2.2.3, which is based on single-fuel offers, is not the most representative of the standard electricity and gas offers to consumers.

Figure 14: POTP gas break-down – incumbents’ standard offers for households in capital cities – November–December 2014 (%)



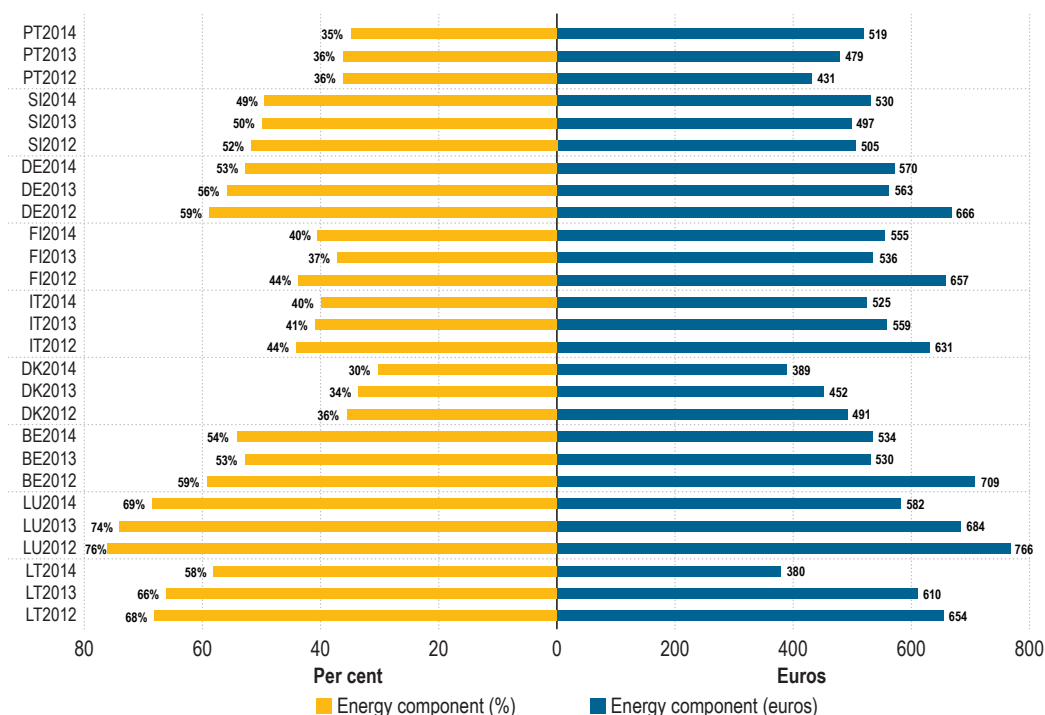
Source: ACER Retail Database and information from NRAs (2014).

Note: The break-down refers to the average of all offers for the consumption of 15,000 kWh annually in Berlin. The natural gas prices for Sweden refer to Gothenburg, a very limited area of the country with gas. In the case of the price of gas in Athens, the energy component shown includes network charges (estimated at approximately 220 euros, i.e. 20% of the POTP), which could not be unbundled. For some countries, the average consumption to which the offers refer is non-representative (for example, Portugal, where the typical consumer consumes from 220 to 500 m<sup>3</sup> a year) (please see the average consumption profiles in Figure A-1). In Warsaw, due to a change in methodology, the cost of accessing the transmission system is now recorded under the energy component and cannot be disentangled from it. However, the estimate by the Polish regulator, URE would correct the split between the components presented in the figure, as follows: energy: 52%; network: 29% and taxes: 19%.

- 51 The energy component of the retail gas POTP declined in the majority of capitals over the 2012-2014 period, except for Lisbon, Ljubljana, Budapest, Dublin, Bucharest and Riga, where the energy component rose, with annual average growth of 9.6%, 2.4%, 1.5%, 0.8%, 0.7% and 0.6%, respectively. In Lisbon, the increase in the energy component of the retail price coincides with the more modest increase in the Portuguese gas wholesale price (an exception in the otherwise declining trend in Europe), as shown in Section 5.2.1.
- 52 As Figure 15 demonstrates, the energy component of retail gas offers decreased the most in Vilnius (by over 270 euros or 23.8% on average annually from 2012 to 2014)<sup>42</sup>, Luxembourg (by more than 180 euros or 12.8% annually), Brussels (by more than 170 euros or 13.7% annually), Athens (by more than 130 euros or 7.1% annually), Copenhagen, Helsinki and Rome (by more than 100 euros or 11.0%, 8.1% and 8.8% annually respectively), Berlin (by more than 90 euros or 7.1%) and Paris (by more than 80 euros or 8.1% annually).

42 For reasons behind this decrease, please see Case box: Market impact of commissioning Klaipeda LNG terminal in Section 5.3.2.

Figure 15: Energy component changes in the POTP break-downs of gas offers for a selection of capital cities with the most pronounced trends – 2012–2014 (euros and %)



Source: ACER Retail Database and information from NRAs (2014).

- 53 While the energy component trend in gas offers is in line with the trends of declining prices on the gas wholesale market, the supply costs charged by gas suppliers remains a significant share of the energy component and may have partially offset these trends. Although the split between the supply costs and the wholesale energy costs could not be obtained for the majority of offers, for London, Tallinn, Vilnius, Amsterdam, Bratislava and Rome, supply costs accounted for an estimated 29.0%, 14.0%, 9.1%, 7.0%, 4.5% and 2.3% of the energy component respectively in 2014.
- 54 Network charges, which were mainly charges for gas distribution, accounted for only 8% of the final 2014 gas price offered in Tallinn<sup>43</sup>, the lowest share (and the lowest value) among European capitals. This compares to 38% in Lisbon. Network charges for household gas consumers from 2012 to 2014 most increased on an annual average in Paris (by 13.3%), Vilnius (by 12.2%), Bucharest (by 12.1%), Gothenburg (by 11.7%) and Luxembourg (by 10.51%), where network charges increased due to the higher cost of network tariffs and metering.
- 55 VAT comprised the majority share in the total taxes charged to household gas consumers across European capitals. Copenhagen, Rome and Amsterdam are exceptions to this trend. In Brussels, household electricity consumers saw their bills reduced significantly due to a decrease in VAT, whereas gas consumers still faced 21% VAT charges in 2014. In Tallinn and Vilnius between 2012 and 2014, taxes and charges fell on average annually by 25.6% and 20.3% respectively. This was as a result of significant decrease in the energy and network components and the consequential reduction in VAT levied on them.
- 56 From 2012 to 2014, taxes and charges for gas households in Ljubljana, Paris and Lisbon increased by 10.0%, 10.3% and 21.0%, respectively. Whilst in Lisbon the increase in taxes relates primarily to the increase in the TOS<sup>44</sup>, in Ljubljana, the main driver of the increase in taxes and charges has been the newly-

43 In Tallinn since May 2013, distribution and transmission charges, which differ between industrial and household consumers, are shown separately under the category of network charges. Consequently, network charges for households fell by 38.3% in 2013 compared to the previous year, while network charges for industrial consumers rose by 85.1%. The real consumption path as opposed to annual arithmetic average is considered in these calculations for Tallinn. Consumption is highest in the first two months of the year, while network charges at the end of the year are shown here.

introduced tax in support of renewables and the co-generation of electricity, which has also been charged to gas consumers since June 2014.

- 57 In a large majority of European capitals, the final offer price of gas to households decreased from 2012 to 2014. In nine of them, the final price decreased due to a drop in all components: energy, network, and taxes and charges. The biggest average annual decreases were in Tallinn (by 17.3%), Zagreb<sup>45</sup> (by 21.4%), Brussels (by 9.3%) and Athens (by 6.5%), followed by Rome and Warsaw (by 4.5%<sup>46</sup>), Helsinki (by 4.3%), Prague (by 2.5%) and Sofia (by 2.4%). In Berlin, London, Madrid, Vilnius, Luxembourg, Amsterdam and Stockholm, the effect of the decrease in the energy component on the final offered price was partly offset by an increase in either the network component or taxes and charges, or both.
- 58 The final price of gas offered to household consumers from 2012 to 2014 increased in seven capital cities: Lisbon (by 11.0% on average annually), Bucharest (by 5.8%), Ljubljana (by 4.8%), Paris (by 1.6% annually), Dublin (by 1.7%) and Vienna (by 1%). Except for Vienna and Paris, where the fall in the energy component was counterbalanced by the increase in the network and taxes component, the final price increases in the other five capitals were driven by a rise in all components.

### 2.2.3 Offers available to consumers

- 59 The central element of energy offers to consumers is price. However, there are also a range of non-price-related elements which suppliers use to meet different customers' needs.
- 60 Since 2011, the Agency has analysed electricity and gas offers available to consumers in capital cities in the EU MSs. This information is obtained from price comparison websites<sup>47</sup> and relates to the following non-price-related elements:
- types of energy pricing (fixed, variable, spot-plus etc.);
  - energy source (fossil versus renewable);
  - type of fuel (electricity only, gas only, or dual-fuel offers);
  - the inclusion of additional services provided by the supplier to attract consumers, either against payment or free of charge (meter reading, insurance services, maintenance, supermarket points, gifts etc.); and
  - contract duration.
- 61 Section 2.2.3.1 presents an overview of the number of offers available to electricity and gas consumers and Section 2.2.3.2 shows that the number of offers with non-price-related elements is growing in several markets.

45 For Croatia, the observation relates to 2014 compared to 2013, since no data are available for 2012.

46 This decrease includes the exchange-rate effect. Without it, the price is estimated to have decreased by 3.5%.

47 For an exhaustive list of the price comparison sites, see Table A-2, Annex 1.

### 2.2.3.1 The number of offers

- 62 At the end of 2014, electricity and gas consumers in the large majority of European capitals had more offers<sup>48</sup> from which to choose than in the previous year (see Figure A-5 in Annex 2). In Amsterdam, Berlin, Helsinki, London<sup>49</sup>, Prague and Stockholm, more than 150 offers were available to consumers on average, while in Copenhagen, Oslo<sup>50</sup>, Paris and Warsaw<sup>51</sup>, more than 100 electricity and gas offers were available to choose from. In those capitals in which household consumption is primarily based on regulated prices (Bucharest, Budapest, Riga, Sofia, Valletta) there were fewer offers, and for these the non-price-element analysis could not be performed. In the remaining capital cities, an average of 20 electricity and 14 gas offers were available to consumers at the end of 2014.
- 63 Ljubljana is the only capital in Europe in which the number of offers available to consumers through the main price comparison tool dropped considerably in 2014 compared to the previous year (five electricity and 11 gas offers compared to 35 electricity and 27 gas offers). This was due to the regulatory changes implemented by the Energy Act passed in April 2014, which, *inter alia*, intervened in the presentation of offers on the Slovenian Regulator's official Price Comparison tool. Case study 1 at the end of this section illustrates the effects of this change on the popularity of the tool.
- 64 Capitals not only vary greatly in the total number of offers available, but also in terms of the final price offered inclusive and exclusive of their non-price-related component. In 13 capitals, the difference in annual total costs between the highest and the lowest<sup>52</sup> electricity and gas offers was more than 50 euros; the difference was highest in Berlin, London and Vienna for electricity offers, and in Berlin and Luxembourg for gas offers.

### 2.2.3.2 Variety of offers with regard to non-price elements

- 65 Between 2012 and 2014, 'choice' for consumers in European capitals widened, with a greater variety of offers (i.e. increasing number of offers exhibiting the above non-price-related elements) being available, as presented in this section<sup>53</sup>. Offers with additional free-of-charge and/or payable services more frequently appear in price comparison tools in several markets. Fixed-price contracts still prevail in Europe and are increasingly offered at lower prices than variable-price contracts in some markets. Finally, offers labelled as green gas offers, have emerged in three capital cities in 2014 compared to 2013<sup>54</sup>.
- 66 In European capitals with a (co)existing liberalised market, product diversification continued to vary, with Amsterdam, Berlin, Copenhagen, Helsinki, Lisbon, London, Madrid, Oslo, Paris, Prague and Stockholm exhibiting several diversified products for electricity and/or gas consumers and thus a higher level of maturity compared to the other markets, as presented below.

48 In total, almost 3,100 direct debit, single-unit-rate offers electricity and gas, single and dual-fuel offers were screened for the selected electricity and gas consumption profiles of 4,000 kWh and 15,000 kWh, respectively, in European capital cities. Twenty European capital cities were analysed for electricity offers with regard to type of energy pricing, dual-fuel, contract duration, green offers and free additional services (Bulgaria, Cyprus, Latvia, Lithuania, Malta, Romania are not included, as only one offer was obtained from their respective regulator; while in the case of Hungary, Slovakia and Slovenia, none of the categories were identifiable from the offers downloaded). In the case of gas offers, the analysis of all four categories was completed for 15 European countries (Estonia, Poland, Finland, Lithuania, Latvia, Bulgaria, Greece, Croatia and Romania are not included, as only one offer was obtained from the respective NRA or - in the case of Poland, from the supplier's website - while in the case of Slovenia and Slovakia, the majority of the categories was unidentifiable from the downloaded offers).

49 Several price comparison tools, which are gaining importance among consumers for identifying their offer of choice as well as in the switching process, were available in London. In March 2010, 33% of gas consumers and 34% of electricity consumers found out about the best deal before they switched through a price comparison tool, whilst the percentages were significantly higher in March 2014, when 40% of gas and electricity consumers, respectively, found out about the best deal before they switched suppliers through the price comparison tool. Source: [https://assets.digital.cabinet-office.gov.uk/media/54ef378a40f0b61427000005/Price\\_comparison\\_websites.pdf](https://assets.digital.cabinet-office.gov.uk/media/54ef378a40f0b61427000005/Price_comparison_websites.pdf).

50 Only electricity offers are available in Oslo, as there is no gas offer.

51 The number of electricity offers in Warsaw is much higher than presented here, with numerous offers being duplicated in the tool.

52 The difference between the highest and the lowest offer referred to in this paragraph excludes the highest and lowest 10% percentiles.

53 Due to the lack of relevant data, this analysis does not indicate the popularity of these offers, i.e. how many consumers actually opt for offers with specific parameters.

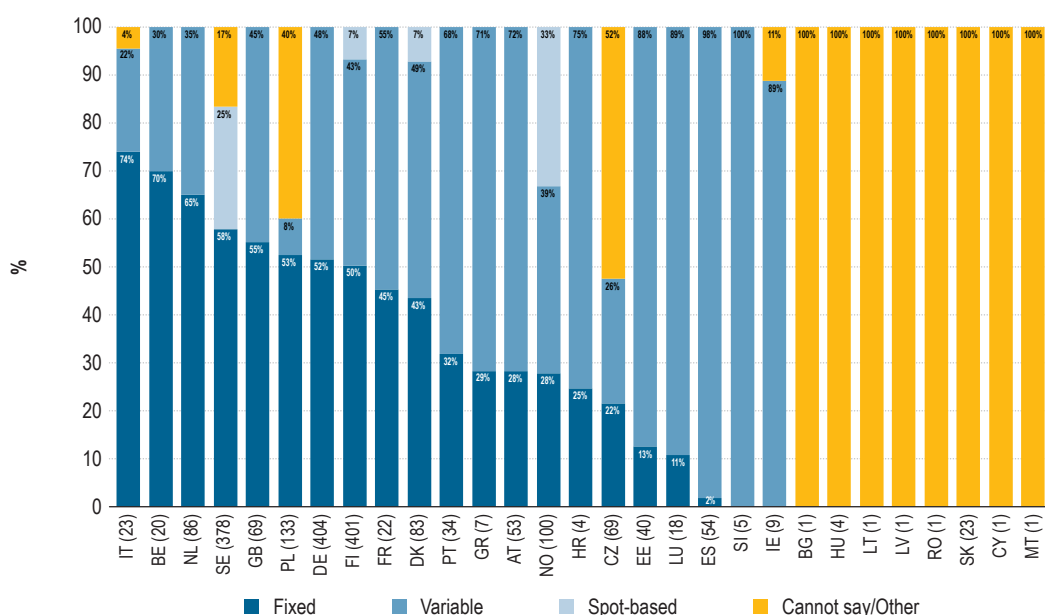
54 The change with regard to green gas offers cannot be shown for 2012 as the data on this parameter was then not systematically collected.



### Type of energy pricing

- 67 The type of pricing of the offer (i.e. fixed, spot-based or variable), hereinafter referred to as the ‘type of energy pricing’<sup>55</sup>, remains one of the most visible features of the analysed offers in price comparison tools across Europe.
- 68 At the end of 2014, almost half of all electricity offers<sup>56</sup> (940) in Europe were fixed price for a period of one year or more, with the other half being variable-price offers, including spot-based offers<sup>57</sup>. Fixed-price offers were most frequently listed in the price comparison tools in Amsterdam, Brussels and Rome. In Dublin<sup>58</sup>, Lisbon, Ljubljana and Madrid, almost all offers were variable-price offers. For approximately 10% of all offers across Europe, the type of energy pricing could not be established from the price comparison tool.

Figure 16: Type of energy pricing of electricity-only offers in capital cities as a percentage of all offers – November–December 2014 (%)



Source: ACER Database (November-December 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. The number of offers shown in the figure for Dublin does not include the lifestyle choice prepayment offers available to consumers and other varieties of payment options, which are popular in Ireland. In total, approximately 64 single-fuel electricity and gas offers were available to consumers in Dublin at the end of 2014. The above chart includes offers in which the type of energy pricing could not be determined due to the lack of information in the price comparison tools (Bratislava, Budapest, Dublin, Prague, Rome, Stockholm and Warsaw). In Stockholm, these types of offer relate to offers of suppliers of last resort, which are estimated to be mostly variable. In Bucharest, Budapest, Nicosia, Riga, Sofia, Valletta and Vilnius, the type of energy pricing could not be determined for regulated prices. In Lisbon, some offers can be updated according to the changed network charges or according to the consumer price index.

- 69 Gas offers tend to be fixed price<sup>59</sup> more than electricity offers. Of the 718 gas-only offers, 368 were fixed-price contracts and 247 were variable-price contracts, including spot-based offers, which were only available to gas consumers in Copenhagen and Gothenburg<sup>60</sup> (Sweden). Taking into account only those

55 Fixed-price offers provide a fixed price for an energy commodity for a definite period of time, regardless of changes in the market price. Price comparison tools tend to show offers as fixed for a period longer than 12 months (the Nordic electricity market sometimes lists offers as fixed, even if the period is six months only). Variable-price offers are based on a commodity price which the supplier can change at any time. In electricity, there exists a sub-type of variable-price offer called ‘spot-based’ (or sometimes ‘spot-plus’). This sub-type of variable offer, which seems to appear only in the Nordic electricity market, is shown separately in our analysis under ‘spot-based offers’. The price of a spot-based offer is packed to the wholesale price per unit. Consumers pay a margin on top of that. Under full competition and transparency, this margin should be minimal, because the supplier transfers the wholesale price and the associated risk to the consumer.

56 Across Europe, the type of energy pricing was unidentifiable for almost one tenth of all offers.

57 Compared to the offers from the end of 2013, in many capital cities the share of fixed-price offers in all offers has dropped. With the overall number increasing, it would appear that the share of variable offers is growing.

58 In Dublin, spot-based offers are available to industrial consumers only.

59 Relates only to offers from the price comparison tools where the type of energy pricing is available.

60 As there is no gas network in Stockholm, gas offers for the city of Gothenburg were considered in the analysis of all offers for Sweden.

capital cities for which more than one gas offer was obtained, variable contracts prevailed in all capital cities except Amsterdam, Berlin and Paris, where fixed-price gas-only contracts prevailed (see Figure A-7 in Annex 3).

- 70 Electricity spot-based-price offers, present only in the Nordic markets, were consistently the cheapest of all offers<sup>61</sup> (see Figure A-8 in Annex 3). Contrary to expectations, variable-price offers for electricity, which bear no risk premium for price changes within the contracted period, were on average more expensive than fixed-price offers in the majority of capital cities (12 out of 20)<sup>62</sup>. This is partly due to falling wholesale prices and the low risk of future price increases, which has enabled suppliers, particularly in some countries (e.g. Great Britain), to offer much lower fixed-price contracts. In Brussels, Dublin, Rome and Tallinn, however, electricity variable-price offers were considerably cheaper than fixed-price offers<sup>63</sup>.
- 71 In 6 out of 11 capital cities for which the final offer prices for gas could be compared according to the type of energy pricing, variable-price offers were on average cheaper than fixed-price offers. Surprisingly, in Gothenburg, spot-based gas offers were more expensive than variable-based offers, although marginally cheaper than fixed-price offers (see Figure A-8 in Annex 3).
- 72 The type of energy pricing is often closely related to the contract duration of an offer, which in its nature carries non-price-related elements (i.e. the binding aspects of a contract and the perception of consumers that they are tied by a contract), as well as financial elements (if exit fees are imposed on early termination of the contract). As Figure A-9 in Annex 3 illustrates, in most cases the duration of the contract<sup>64</sup> is either not explicitly mentioned or is from 12 to 24 months. Contracts lasting longer than 24 months most often relate to offers with fixed-price energy for the same period.
- 73 With a few exceptions, gas offers tend to specify a contractual period more often than electricity offers. However, as with electricity offers, the most frequently specified contractual period of gas offers is 12 to 24 months. Offers with a contractual duration of less than a year comprise approximately 20% of all offers (see Figure A-10 in Annex 3).

### Green sources of energy

- 74 With renewable generation sources making up an increasing share of total energy production, green energy<sup>65</sup> is one of the most frequently displayed differentiators of offers available to consumers through price comparison tools across Europe. By the end of 2014, in total, almost one third (697) of all electricity offers and almost one quarter (178) of gas offers were labelled as green<sup>66,67</sup>.

61 In Norway in 2014 and before, suppliers were obliged to display only certain offers in the national price comparison tool. As a consequence, the offers displayed in the tool were lower priced than other offers available on the market. This may have resulted in an underestimated average price of electricity shown for the Norwegian household market. The Norwegian Ministry of Petroleum and Energy passed a new regulation in 2015, championed by the Norwegian regulator, whereby all suppliers' offers have to be reported in the tool.

62 Taking into account the fact that in Stockholm 'other' offers are mostly variable price.

63 Or 'other' offers in the case of Dublin.

64 Whilst this could be interpreted differently, the assumption is that such contracts will be concluded until terminated by either party.

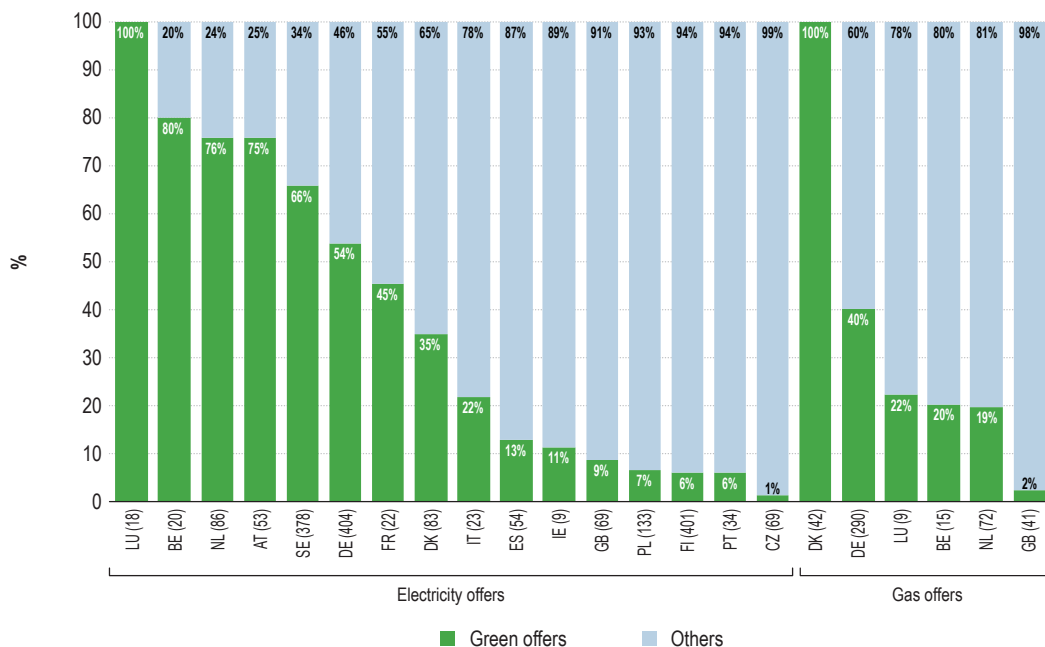
65 In this section, green energy only relates to the labelling of offers to consumers and does not relate to the actual guarantee of origin by suppliers in line the RES Directive (i.e. Directive 2009/28/EC of the European Parliament and the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC) which clearly states that only guarantees of origins should be used for the purpose of proving to final customers that a given share or quantity of energy is produced from renewable sources.

66 Although several interpretations exist as to the percentage of energy sourced from renewable resources, an offer is defined as 'green' if 100% of the electricity production comes from green sources or – in the absence of information on the input of green sources – if it is labelled as such by the price comparison tool.

67 Although sample-related (i.e. dependent on the total number of offers in the database), this represents a change compared to the previous year, with the share of green electricity-only offers decreasing from 40% of all offers in 2013, and the share of green gas-only offers increasing as a share of all offers to almost 13% in 2013.

75 Green<sup>68</sup> gas-only offers appeared in more capital cities than the previous year. In addition to Berlin, Amsterdam<sup>69</sup> and Luxembourg, in which they were already available at the end of 2013, green gas-only offers were for the first time identifiable in the price comparison tools in Brussels, Copenhagen and London<sup>70</sup>.

Figure 17: Presence of green electricity- and gas-only offers in capital cities – November–December 2014



Source: ACER Database (November–December 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. Offers are sorted according to the number of green offers in the price comparison tool. The number of green electricity offers in Dublin is estimated to be higher, as lifestyle choice prepayment offers that are available to consumers and other types of payment option, which are popular in Ireland, do not appear in the analysis.

76 Figure 17 shows that in Amsterdam, Berlin, Brussels, Luxembourg, Vienna and Stockholm, green electricity-only offers were more numerous than other offers. In Luxembourg, all electricity-only offers were green, whilst in Stockholm they comprised the great majority (more than 65%) of all offers. Green gas offers accounted for an average of 34% of all offers in capitals where they were available. In Copenhagen, all gas-only offers were labelled as green offers, while in Berlin they comprised 40% of all offers.

77 With the exception of Madrid, Dublin, Helsinki and Stockholm, green electricity-only offers were, on average, 4% more expensive than other offers. The difference was most marked in Brussels, London, Prague, Rome and Vienna, where green electricity-only offers were on average 7% more expensive than other offers. There was also a premium on green gas offers. In Berlin, Brussels and London, green gas offers were more expensive by 7%, 8% and 10%, respectively, with the average across the EU being 5% higher.

68 Although the quality and the composition of green gas can differ widely within a country and between countries, a green gas offer is most likely a bio methane or bio gas. Alternatively, it has been labelled as 'green' by the price comparison tool and may refer to other forms of off-setting released CO<sub>2</sub> emissions.

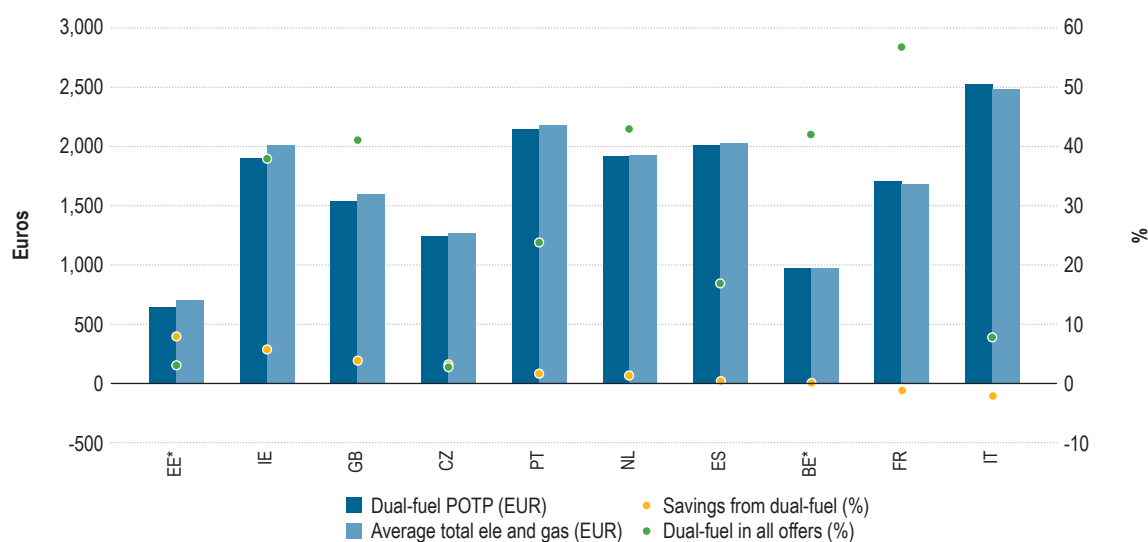
69 Green gas almost exclusively relates to a product whereby CO<sub>2</sub> emission compensation is offered through other means (e.g. tree-planting schemes etc.).

70 At the end of 2013, only green gas dual fuel offers could be identified in Brussels, Rome and London; however, this was due to the electricity component of the offer.

## Dual-fuel offers

- 78 At the end of 2014, dual-fuel offers<sup>71</sup>, which in Amsterdam, Brussels, Dublin, Lisbon, London and Paris comprised more than 35% of all offers on price comparison tools, continued to appear in countries with a traditionally higher consumption of gas (see Figure 18 and Figure A-11 in Annex 3). In the Netherlands and in Great Britain, in particular, approximately 85% and 70%<sup>72</sup> of all households, respectively, were supplied through dual-fuel contracts.
- 79 In Madrid, the number of dual-fuel offers decreased in 2014 compared to 2013 (from 120 dual-fuel offers available for the selected consumption profile in 2013 to 95 offers in 2014), primarily due to the changed presentation of offers of one of the main suppliers in the price comparison tool. In May and June 2014, Gas Natural Fenosa re-branded their offers to merge some of their existing offers with additional services into a new, simplified selection.
- 80 In the majority of capitals, dual-fuel offer prices were lower than single-fuel offers (Figure 18). According to the methodology used<sup>73</sup>, the differences were most apparent in Tallinn, Dublin<sup>74</sup> and London, where average dual-fuel offers were respectively 8%, 6% and 4% lower than the combined average single-fuel offers for electricity and gas. In Paris and Rome, the average dual-fuel offer was slightly more expensive than the respective averages for electricity and gas if bought as single fuels.

Figure 18: Differences in the average dual-fuel offer and combined average single-fuel offers per European capital – November–December 2014



Source: ACER Database (November–December 2013, November–December 2014) and ACER calculations.

Notes: In the case of Brussels, all gas offers are dual-fuel offers (i.e. offer electricity to gas consumers) thus the amount shown only relates to the price of gas if offered as dual-fuel. In Tallinn, dual-fuel offers are available exclusively to gas-only consumers (electricity-only consumers cannot obtain dual-fuel offers). In Prague, both fuels were compared as a part of the dual-fuel offerings against single fuel offers. Although there were dual-fuel offers in Copenhagen and Vilnius at the end of 2013, none could be found in price comparison tools at the end of 2014. According to the Austrian regulator, in Vienna, dual-fuel offers are provided by two suppliers; however, they do not appear in the price comparison tool. In Amsterdam, the savings observed by ACM are perceived to be higher due to additional services, which are typically offered with dual-fuel offers (e.g. cash-backs, 'free' electricity etc.).

71 Dual-fuel offers include offers for the supply of electricity and gas of a specific profile. A dual-fuel offer may be offered to a consumer of electricity for electricity and gas (an electricity dual-fuel offer), to a gas consumer for the supply of gas and electricity (a gas dual-fuel offer) or independently (an electricity and gas consumer in search of dual-fuel offers).

72 The number refers to electricity consumers i.e. an approximation of all households. Approximately 84% of all British gas consumers were on dual-fuel contracts.

73 In Figure 18, an average dual-fuel offer is compared to the sum of the average electricity and the average gas offer in capital cities. As such, it carries the limitation that an informed consumer choosing the cheapest single electricity and the cheapest single gas fuel offer in a capital city could obtain a better deal than the cheapest dual-fuel offer.

74 If consumers in Ireland chose the two cheapest single-fuel offers compared to a dual-fuel offer, then they could, save considerably. See: Electricity & Gas Retail Markets Annual Report 2014, CER, June 2015.

### Additional free-of charge or payable services offered to consumers

- 81 At the end of 2014, approximately 6% of all electricity and 12% of all gas offers presented in the price comparison tools across Europe included one of the following additional services<sup>75</sup>:
- a. Free-of-charge services and/or products enticing consumers into a contract (i.e. supermarket points or similar, membership points, air miles, gifts in kind, free insurance cover, maintenance services); or
  - b. Payable services and/or products complementing the electricity and gas offers against additional payment (insurance, boiler maintenance, home insulation, etc.).
- 82 This is an increase compared to 2013, when only 4% of all electricity offers and 7% of all gas offers included additional services. At the end of 2014, electricity offers with additional services appeared in 10 capitals (compared to 11 at the end of 2013), while gas offers with additional services appeared in seven (compared to five at the end of 2013).
- 83 Offers with additional free-of-charge or payable services appeared most frequently in Madrid and London. They could be found in price comparison tools for both electricity and gas, in single-fuel and dual-fuel offers, comprising 42% and 20% of all offers respectively. Additional services were included in more than 20% of all electricity offers in Dublin, Lisbon, London, Madrid, Paris and Warsaw, as well as appearing in price comparison tools in Brussels, Copenhagen, Prague and Vienna.
- 84 Additional services appeared together with gas offers in Copenhagen, Lisbon, London, Madrid, Paris, Prague, Rome and Stockholm. In Copenhagen, all gas offers included additional services, whilst in Madrid, more than half of all offers included additional services.
- 85 Free-of-charge additional services featured more frequently than payable services in electricity offers, while payable services were significantly more represented in gas offers. This is primarily due to the need to maintain gas appliances and the associated costs which gas consumers might wish to hedge against (insurance services offered against the charge).
- 86 Free-of-charge additional services or products offered to electricity consumers appeared in price comparison tools in Copenhagen, Dublin, Helsinki, Lisbon, London, Madrid, Prague and Vienna, where they most frequently included consumer loyalty programmes, discounts on other service providers' offerings and gifts (for example SIM cards, mobile phones, cinema tickets, and the possibility of buying company shares). In London, in particular, free-of-charge additional services included donations to nationwide charities of differing amounts. Gas consumers in Lisbon, London, Madrid and Paris were most frequently offered free-of-charge maintenance of their gas boiler and other appliances, consumer loyalty programmes and discounts on other service providers' offerings, such as SIM cards, phone and broadband discounts. In Paris, free-of-charge services offered detailed historical household consumption profiling and monitoring.
- 87 Payable services offered to electricity consumers in Brussels, Lisbon, Madrid and Warsaw mostly related to the purchase and maintenance of smart meters, the purchase of 24-hour assistance services and other products (e-books, e-meter reading, mobile phone contracts etc.), and discounts on subscriptions. Gas consumers in Copenhagen, Madrid, Paris, Prague, Rome and Stockholm were offered boiler maintenance, access to necessary repairs, technical and legal assistance, as well as insurance cover for equipment breakages.
- 88 Electricity and gas offers which included additional free-of-charge services appeared to be on average more expensive than offers without free-of-charge additional services<sup>76</sup>. Electricity offers in Helsinki and gas offers in Rome, however, were lower in price if they included additional free-of-charge services than the corresponding electricity/gas offers without such additional services. Only in these capital cities did offers with free-of-charge additional services appear to be free-of charge.

75 A contract with additional payable services might include adherence to separate sets of terms and conditions – one for the supply of electricity and gas and another for the additional services/products provided with the contract. The analysis of offers shows that different terms and conditions relating to additional services are not displayed in offers to consumers and thus remain unknown.

76 By on average 3% and 4%, respectively, in the case of electricity and gas offers with charge-free services.

### Case study 1: The introduction of a new Energy Act and its effects on the number of viewings of offers in the official price comparison tool

The main Slovenian price comparison tool<sup>77</sup> was introduced by Agencija za energijo, the Slovenian national energy regulator (NRA), with the full market opening in 2007. It served as the point of reference for consumers in search of a reference price for electricity and gas for different consumption profiles. In addition to this, it provided detailed information on the non-price-related elements of offers, such as the source of energy, additional free-of-charge and payable services and payment options<sup>78</sup>. The Slovenian government believed that this did not contribute to the transparency of offers and further immobilised ‘sticky’ Slovenian electricity and gas consumers in their switching process<sup>79</sup>. By showing those offers which were more reflective of prices incurred by consumers in Slovenia as opposed to the ‘special’, discounted offers, which had been advertised in the price comparison tools and which were as such less reflective of the real prices offered by the main suppliers, the government wished to show the standard offers with which suppliers really competed.

According to Article 434 of the new Energy Act<sup>80</sup>, the Slovenian regulator “shall monitor the operation of markets in the field of regulated and market activities in the energy sector”. In particular, according to Article 434(9), the government takes responsibility for “producing and maintaining a price comparison tool with a price list of standard electricity and gas offers<sup>81</sup> to household and small business consumers”. The regulator shall not show a comparative record of prices for reduced or bundled offers. This second<sup>82</sup> case study presents the effects of the new Act on the way the offers appear to consumers.

Figure (i) shows, first, a sharp drop in the number of competitive (cheaper) offers<sup>83</sup> publicly available in the web comparison tool following the regulatory change, from 58 to 8 on average<sup>84</sup>, and, second, the increasing gap between the ‘existing choice’ (i.e. approximately 94 offers<sup>85</sup>) for consumers and the ‘displayed’ number of offers, which reached its widest at the end of the year, when only approximately 7% of all offers on the market available for the consumer profile in question were publicly displayed by the tool from September 2014 onwards.

As Figure (i) illustrates, the number of average daily viewings of electricity offers more than halved after the regulatory change was introduced on 1 April 2014<sup>86</sup>, from an average of 130 viewings a day of electricity offers in the observed period (from 1 September 2013 to 1 April 2014) to 62 viewings a day in the period from 1 April to the end of December 2014.

77 See <http://www.agen-rs.si/primerjalnik>.

78 See the 2013 MMR, Table 1, page 42, for details regarding the non-price elements of offers in Slovenia.

79 The tool displayed fewer than 50 electricity and gas offers, respectively, at the time i.e. considerably less than in the most mature European capital cities, where the transparency of the choice to consumers could indeed be blurred.

80 See <http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO6665>.

81 A standard electricity offer is defined as the price currently offered by a supplier to a minimum of 50% of all its customers and to a minimum of 1,000 electricity consumers. A standard gas offer is an offer to a minimum of 50% of all the supplier’s customers and to at least 250 gas consumers. In principle, one supplier would only be able to make one offer.

82 See the previous case study on the performance of the gas retail market in Slovenia, page 171, of the 2012 edition of the MMR.

83 Excluding the minimum and maximum offers, in December 2014 the average electricity and gas standard offers were 6.8% and 2.6%, respectively, higher than the average non-standard electricity and gas offer.

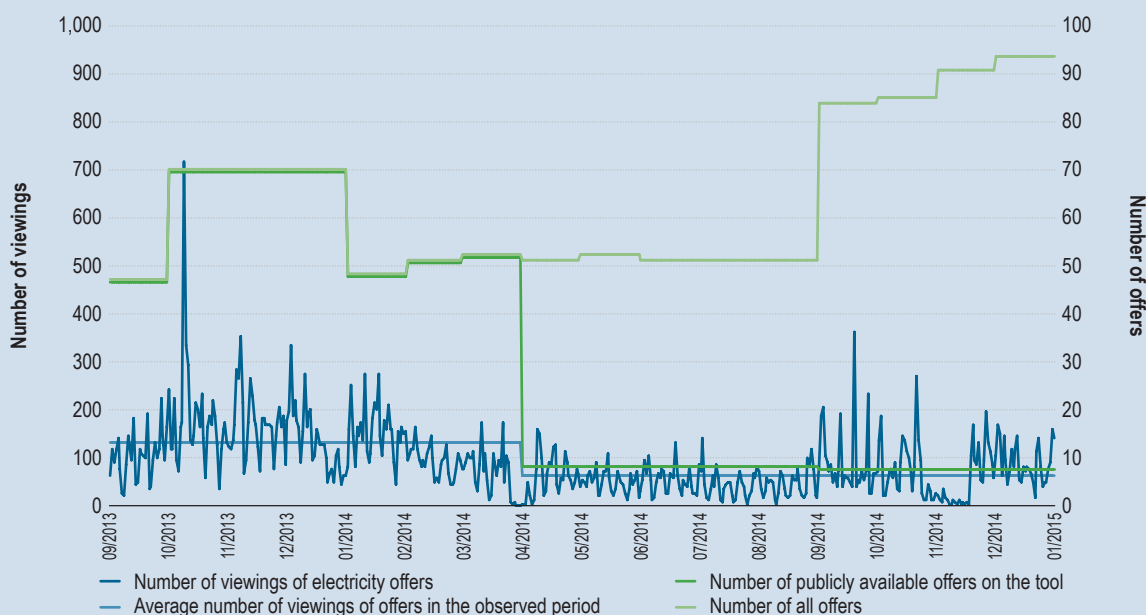
84 Only some suppliers’ offers are displayed in the tool, since some suppliers are unable or unwilling to meet the Energy Act criteria.

85 Relates to offers for a specific consumer profile. A large proportion of the offers, which are included in the tool but not publicly displayed, relate to offers from one of the 5 incumbent suppliers which adapted its marketing strategy to the requirements of the Act. The supplier in question decided to not appear at all in the tool with the standard offer as their standard offer would not rank 1<sup>st</sup> (i.e. be the lowest) out of all the offers. Instead, they decided to stand out with the most diversified range of offers for micro-segments. By doing so, they are able to provide the highest number of offers on the market.

86 Since the analysis of offers is performed on a monthly basis, the period observed after the change introduced on the 22 March 2014 starts on 1 April 2014.

These results seem to demonstrate that, as a result of the reduction in the functionality of the price comparison tool, consumer’s interest in the tool sharply declined<sup>87</sup>, and was only briefly revived by intensive supplier marketing activities in October 2014<sup>88</sup>. The tool was particularly unpopular in the first few months following the adoption of the new Act, when many suppliers needed time to adapt their product portfolio and to update the information on standard offers. The interest in the displayed offers started to peak again only at the end of the year as a result of the first collective switching campaign run by the Slovenian Consumer Association from mid-September onwards.

Figure (i): The number of publicly available electricity offers to household consumers in relation to the number of offer viewings in the web comparison tool – September 2013–December 2014



Source: AGEN-RS and ACER calculations (03/2015).

Note: Refers to all electricity offers to household consumers in Slovenia, including a day and night tariff and connection capacities of 3kW, 7kW and 10kW. The number of all offers has been reported by AGEN-RS.

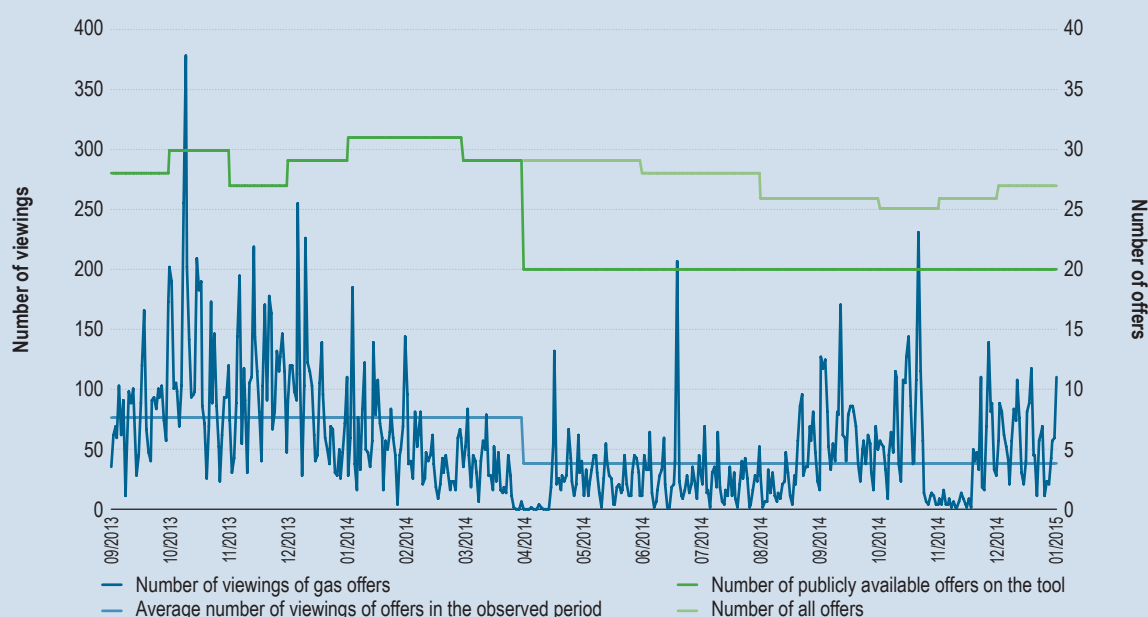
The number of gas offers publicly accessible to consumers through the web comparison tool declined after the adoption of the Act, albeit to a lesser<sup>89</sup> extent than the decline in electricity offers. From an average of 29 gas offers in the pre-Act period to 20 gas offers (i.e. on average 69% of all offers on the market) from 1 April to the end of 2014.

87 According to the Slovenian government, the decreased popularity of the tool could also be a result of other factors, such as decreased supplier marketing activities, completed market entry of the new entrant i.e. the main competitor to the five incumbents, rising popularity of commercial price comparison tools, higher number of consumers on lower prices etc.

88 Rebranded electricity offers were launched by an incumbent supplier and a new supplier. It is believed that this triggered an interest in the electricity offer viewings in the tool.

89 In contrast to electricity, where non-standard offers frequently appear on price comparison sites, gas is offered most often through standard contracts. This is in contrast to the electricity market, where discounted, non-standard offers are more present. This is the reason why the Act has had less of an effect on the presentation and appearance of offers in the tool.

Figure (ii): The number of publicly available gas offers in relation to the number of offer viewings in the web comparison tool – September 2013–December 2014



Source: AGEN-RS and ACER calculations (03/2015).

Note: Refers to a typical consumption profile of 15,000 kWh gas annually and includes all offers to consumers of gas in Slovenia.

Despite a higher share of gas offers being displayed in the price comparison tool (69%) than was the case for electricity offers (8%), the tool's popularity with gas consumers declined by nearly 51%<sup>90</sup>, from an average of 77 viewings to 38 viewings daily in the observed period before and after the adoption of the Energy Act<sup>91</sup>. As with electricity offers, the gas offer viewings peaked at the beginning of the heating season (autumn 2013 and 2014), in June 2014<sup>92</sup> when the lowest gas price was offered, and as a response to the launch of the first collective switching campaign from September to December 2014.

Figure (iii) shows that, despite the absence of causality between the reduced number of offers (and thus the popularity of the tool) and consumer switching behaviour<sup>93</sup>, consumers have been shifting back to the incumbent suppliers. This can be expected to the extent that it is the result of sound competition<sup>94</sup>; however, considering the non-incumbents were on the whole offering lower prices even after the expiry of the fixed-term offers, many consumers might have chosen to move back to the incumbents due to the non-price elements their offers provided. In parallel, electricity consumers (both household and industrial) switched less in 2013 and 2014 compared to previous years, and it would appear that the period of highest consumer responsiveness is over (see Figure A-6 in Annex 3).

90 Comparable to the drop in the number of viewings of electricity offers i.e. by 50%.

91 The passage of the Act coincided with the end of the heating season, which might have had some effect on the reduced interest in the tool.

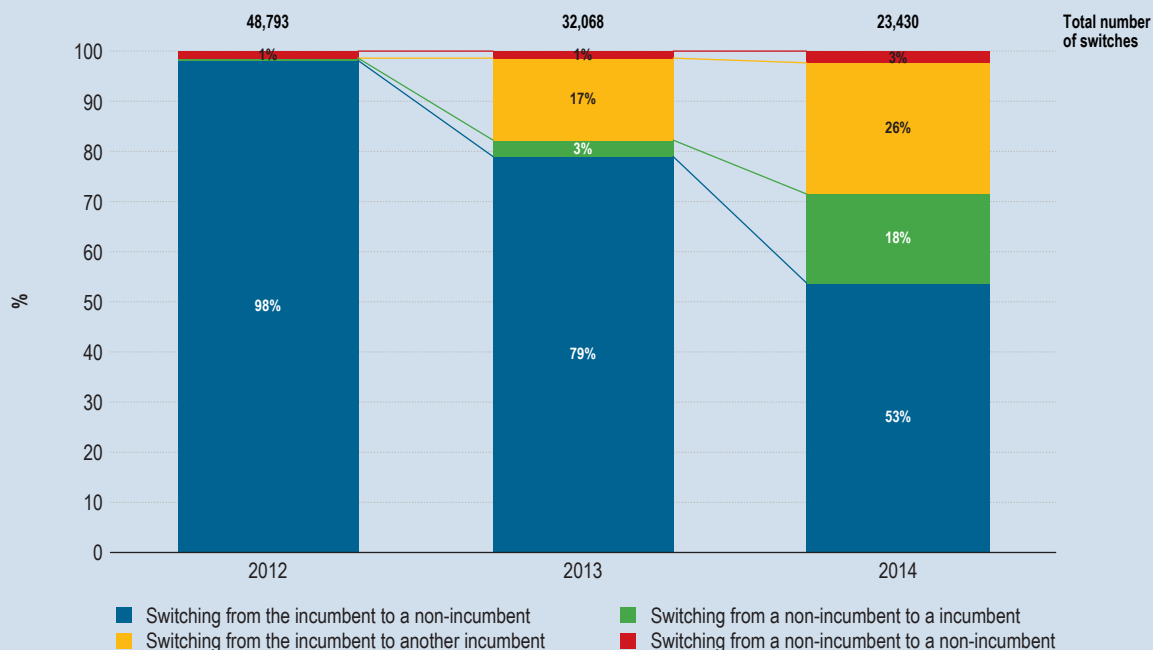
92 The price of gas per kWh dropped below 30 euro cents for the first time since April 2010. The supplier offering this price supported it with a marketing campaign, which resulted in an increase in viewings on the website.

93 The data provided by the Slovenian regulator with regard to monthly switching rates show that there is little or no correlation between the number of offers viewed and the actual switching process, and no correlation between the number of offers and consumer switching behaviour. Therefore, the reasons affecting the behaviour of Slovenian consumers must be sought elsewhere. For example, the supplier-specific marketing activities, such as the discount offer prices for gas at the beginning of the heating season mostly attracted consumers dependent on gas heating. Meanwhile, private web comparison tools grew in popularity, since they are not required to adhere to restricted regulatory terms. Other factors include the collective switching campaign, as well as factors for which data could not be systematically obtained.

94 I.e. contrary to the desired goal of the Act.



Figure (iii): Break-down of the number of switches according to type of supplier – 2012–2014



Source: AGEN-RS (03/2015).

Note: Refers to electricity consumers only. There are five incumbent suppliers in Slovenia in five different regions of the country. They all supply nationwide, which is why a category of switching away from the incumbent to another incumbent is possible.

While the vast majority of electricity supplier switching in 2012 represented a move from incumbents to non-incumbents, 2013 marked a slowing of this trend, with 20% of all switching moving back to incumbents. A year later, 44% of all switching represented a return to the incumbents. In 2014, a large proportion of the 53% of the consumers who switched from the incumbent to the non-incumbent supplier did so due to a collective switching campaign in which a non-incumbent supplier won the best contract.

Unfortunately, data which would allow for a similar analysis of gas supplier switching from incumbents to non-incumbents are not available. Nevertheless, according to the data from the Slovenian NRA, the gas market share of non-incumbent suppliers in Slovenia has steadily increased since 2011, from 0.02% of the household gas market in that year to 8.9% in 2012, 13.3% in 2013 and 15.0% in 2014.

In conclusion, the impact of the Act, which was aimed at increasing the transparency and comparability of the offers displayed in the price comparison tool, appears to have had a negative effect on consumer interest in the tool and led to some suppliers adapting their marketing strategies accordingly<sup>95</sup>. By only ranking standard offers, and with not all suppliers represented in the price comparison tool, the tool seems to have lost its relevance to consumers, many of whom may seek a ‘choice’ with regard to the other elements of offers as well as to price. In addition, electricity consumers have started to move back to the incumbent suppliers, despite the focus on standard offers in the comparison tool. Some of this may have been in response to competitive offers from incumbent suppliers, but the Slovenian government acknowledges that the reaction of consumers was contrary to the desired effect of the Act and that the regulation of the tool in the Act was too strict. As such, the government is planning an impact analysis, expecting – based on the initial results – that the provision in question from the Article 434 will be deleted in the next amendment to the Act.

95 For similar conclusions in the UK market, see [https://assets.digital.cabinet-office.gov.uk/media/559aacbee5274a1559000017/EMI\\_Notice\\_of\\_PFs.pdf](https://assets.digital.cabinet-office.gov.uk/media/559aacbee5274a1559000017/EMI_Notice_of_PFs.pdf).

## 2.2.4 Conclusion

### Demand and prices

- 89 In 2014, electricity and gas demand fell by 3.1% and 10.2%, respectively. Contributory factors include the warmer winter, the lower demand for gas as a source of electricity production and energy efficiency measures in some countries.
- 90 Following the 2008–2013 period of rising retail energy prices in the large majority of countries, electricity and gas prices for household consumers in 2014 increased moderately by 2.6% and 2.1%, respectively, compared to 2013. Industrial prices decreased by 0.2% for electricity consumers and by 6.0% for gas consumers.
- 91 These final price changes resulted from a combination of falling wholesale energy prices and increasing non-contestable charges.
- 92 The electricity energy component fall for household consumers was offset by an increase in RES charges in the large majority of countries. From 2012–2014, RES charges increased considerably in Germany, Italy, Greece, Slovenia, and Portugal etc. In future years, households will continue to face charges from investments in renewable generation; however, to some extent this steady growth, in Italy and Germany for example, is expected to peak.
- 93 The diverging effects of the changes in the various components inherently reflect the final price composition in individual MSs. In a large majority of MSs, network charges, taxes and levies and the RES charges all play a key role. The low contestability (i.e. share of energy component in the final price) minimises any potential final price reductions offered to consumers.

### Offers

- 94 The data collected in the ACER Database shows varying numbers of electricity and gas offers available to consumers, as well as different levels in the variety of offers with regard to non-price-related elements across European capitals. Markets with longer post-liberalisation paths (Amsterdam, Berlin, Copenhagen, Helsinki, London, Oslo, and Stockholm) show the highest level of product diversification, although positive trends have been observed over the past three years in Lisbon, Madrid, Paris and Prague.
- 95 Fixed-price offers account for the majority of all electricity and gas offers in Europe. Considering the fall in wholesale energy prices, suppliers are offering more fixed, low-price offers. In some markets, fixed-price offers, which are expected to include a risk premium, are lower than variable prices in 12 out of 20 capital cities in Europe. However, spot-based offers were found to be consistently the cheapest of all offers.
- 96 One of the key trends observed in many capital cities is an increase in the number of offers with additional charge-free or payable services. These could mask the transparency of offers available to consumers and as such should be managed in the respective markets (e.g. filtering of such services by consumers searching for a better deal should be enabled on all price comparison tools across Europe, contractual obligations imposed by the supplier of additional services should be laid out in the offer etc.). However, the increasing diversity and variety of offers, including those with additional services, is a sign of more innovation in the sector. Such offers help raise consumer interest in price comparison tools and the market in general. If an NRA does not take this into account, as shown in this Report in the case of Slovenia, a regulatory intervention to eliminate all bundled offers from the price comparison tool can reduce consumers' use of the tool.
- 97 The Nordic electricity market remains unique in offering spot-based contracts to household consumers. Spot-based offers transfer the benefits of falling energy wholesale prices to the final consumer, provided there is full transparency in the price composition and calculation, and provided consumers are aware of the risks arising from wholesale price fluctuations and are technically able to adapt their consumption habits (i.e. installation of smart meters).

## 2.3 The level of competition in the retail electricity and gas markets

- 98 This section provides a review of the level of competition in retail markets<sup>96</sup> at the national level across the EU MSs and Norway. It provides an assessment of the supply side by analysing the structure of the market, as well as both price and non-price competition factors. It then turns to the demand side to evaluate consumer switching activity and behaviour.
- 99 The aim of this assessment is to evaluate the impact of competition levels on retail price formation and, in particular, to examine why the energy component of the final consumer price still varies significantly from country to country.
- 100 To address these questions, the section explores the evolution of a range of market competition indicators over the period from 2008 to 2014. The analytical framework for this assessment is the conventional structure-conduct-performance framework, within which the performance of the market is a reflection of both the market structure, as well as the conduct of market participants (i.e. suppliers and consumers). More specifically, this section looks at the following indicators:
- i. market structure indicators (e.g. number of suppliers, market concentration indices and entry-exit activity);
  - ii. market conduct indicators (e.g. suppliers' price and non-price rivalry, consumer switching activity and switching behaviour); and
  - iii. competition performance indicators (e.g. mark-up, the relationship between wholesale and retail energy prices, consumer satisfaction and experiences and offers available to consumers).
- 101 The reasoning behind this choice of indicators is that the higher the number of competing suppliers in a market (assessed from concentration and market entry indicators), the more competitive retail margins should be (mark-up indicators). In the presence of competitive and liquid wholesale markets - and assuming no barriers to entering markets - retail prices are expected to have a close relationship with wholesale market prices (assessed through the evolution of wholesale and retail price indicators). Price dispersion levels may provide a measure of the level of price competition among suppliers and of the maturity of the market. Additionally, switching rate indicators will serve to indicate which competitive phase a market is in and how consumers respond to competition<sup>97</sup>.
- 102 On the basis of these individual indicators and their interaction, the Agency has produced a single composite index<sup>98</sup> ('ACER Retail Competition Index – ARCI') which provides a more comprehensive picture of the relative competition performance of the retail electricity and gas household markets in each country. According to the index, the most competitive markets for households are electricity markets in Sweden, Finland, the Netherlands, Norway and Great Britain and gas markets in Great Britain, the Netherlands, Slovenia, the Czech Republic and Spain. The index shows weak retail market competition in electricity household markets in Latvia, Bulgaria and Cyprus and gas household markets in Lithuania, Greece and Latvia.
- 103 This Report looks only at competition indicators at a national level. Although the regional and/local dimension is also very important for a complete assessment of the level of competition in a particular country (e.g. some of the analysis presented later in the Report points to the existence of strong local and/or regional markets in a number of countries), this level of analysis is beyond the scope of this MMR.

96 Although the main focus of this section is retail markets for households, the data and analysis for retail non-household markets are also presented and briefly discussed where relevant, either in the section itself or in annex(es).

97 Higher values of entry and switching suggest a more competitive market phase; meanwhile, more stabilised values may indicate that the competition is stable or that entry and competition barriers may exist.

98 ARCI is based on the methodology proposed by IPA Advisory Ltd, which was commissioned by the Agency to provide the methodology for calculating the composite index. IPA's study 'Ranking the Competitiveness of Retail Electricity and Gas Markets at the National Level in Member States of the European Union and in Norway' is available at: [http://www.acer.europa.eu/Gas/Market\\_monitoring/Pages/Methodology,-objective,-background.aspx](http://www.acer.europa.eu/Gas/Market_monitoring/Pages/Methodology,-objective,-background.aspx).

### 2.3.1 Market structure

- 104 Different types of competition may arise as a result of different market structures. The number of suppliers and other measures of market structure and market concentration (e.g. the number of main suppliers; market share of the three largest suppliers etc.) provide an indication of the degree of competition in a market. In general, a high number of suppliers and low market concentration are seen as indicators of competitive markets.
- 105 However, it is important to stress that even in countries where the number of suppliers seems to be relatively low and market concentration relatively high, markets may still be competitive if there is sufficient rivalry between suppliers and the threat of new entries to the market. In these cases, consumers will still have a relatively good choice of competing suppliers and will be able to switch between them in the case of higher prices being charged by dominant suppliers.

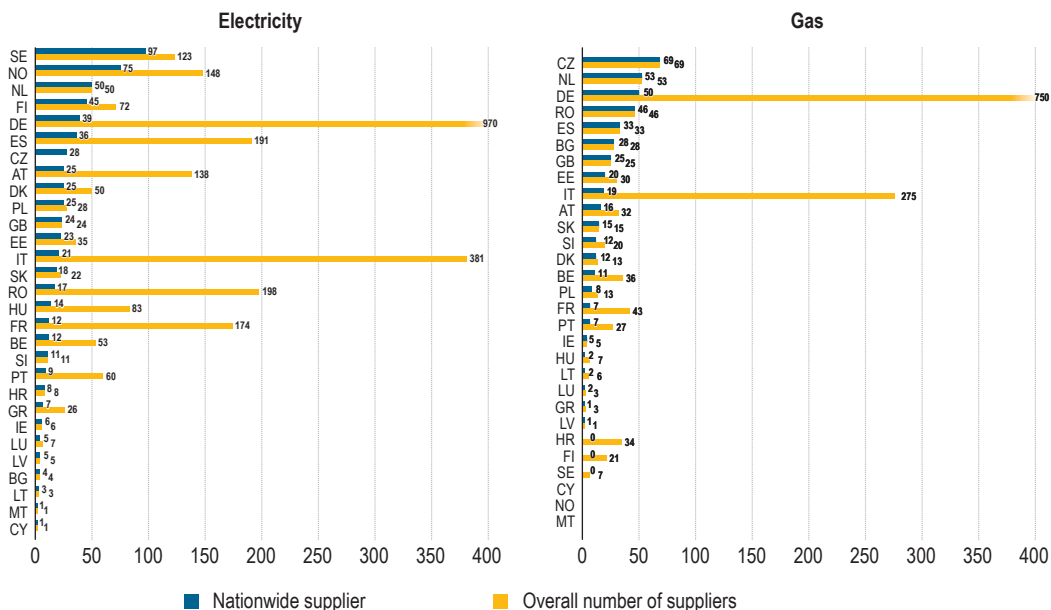
#### 2.3.1.1 Number of suppliers

- 106 Figure 19 shows that there are significant differences between MSs in terms of the structure of the retail electricity and gas markets for households. The total number of active electricity suppliers ranges between one in Cyprus and Malta to 339 in Italy and 970 in Germany, and the number of gas suppliers from one in Latvia to 275 in Italy and 750 in Germany. However, in some countries, a much smaller number of suppliers are active nationwide<sup>99</sup> (e.g. 39 electricity and 50 gas suppliers in Germany<sup>100</sup> and 21 electricity and 19 gas suppliers in Italy) and, therefore, the great majority of suppliers is active only in their local areas. The number of suppliers also varies widely between markets with similar population sizes and numbers of consumers (e.g. electricity markets in Italy, France and Great Britain).

99 Nationwide suppliers are suppliers that supply and/or offer to supply any consumers independently of their geographical location within the country. On the other hand, local and regional suppliers restrict supply and/or their offers to consumers in certain regions, which is often limited to the geographical area covered by the associated distribution company. The non-nationwide suppliers contribute to (potential) competitive pressure in regions where they are not active (yet).

100 In Germany, the average number of suppliers for household consumers in each DSO network (which also reflects the diversity of the market) was 91 in 2014 and, therefore, higher than the number of nationwide suppliers.

Figure 19: Overall number of suppliers and number of nationwide suppliers active in the retail electricity and gas markets for households in the EU MSs and Norway – 2014



Source: CEER National Indicators Database (2015).

Note: To make the figure clearer, the scale is limited to 400. The number of nationwide electricity suppliers for the Czech Republic is based on the ACER Database and shows the situation in Prague. The various footnotes under the relevant category in the CEER database suggest that not all NRAs are reporting only on the number of active household suppliers, but in some cases these figures also include all licensed suppliers. However, very often not all licenced suppliers are also active in the market, as suppliers may obtain a licence but decide to wait to start supplying consumers or simply, at later stage, choose not to enter the market at all.

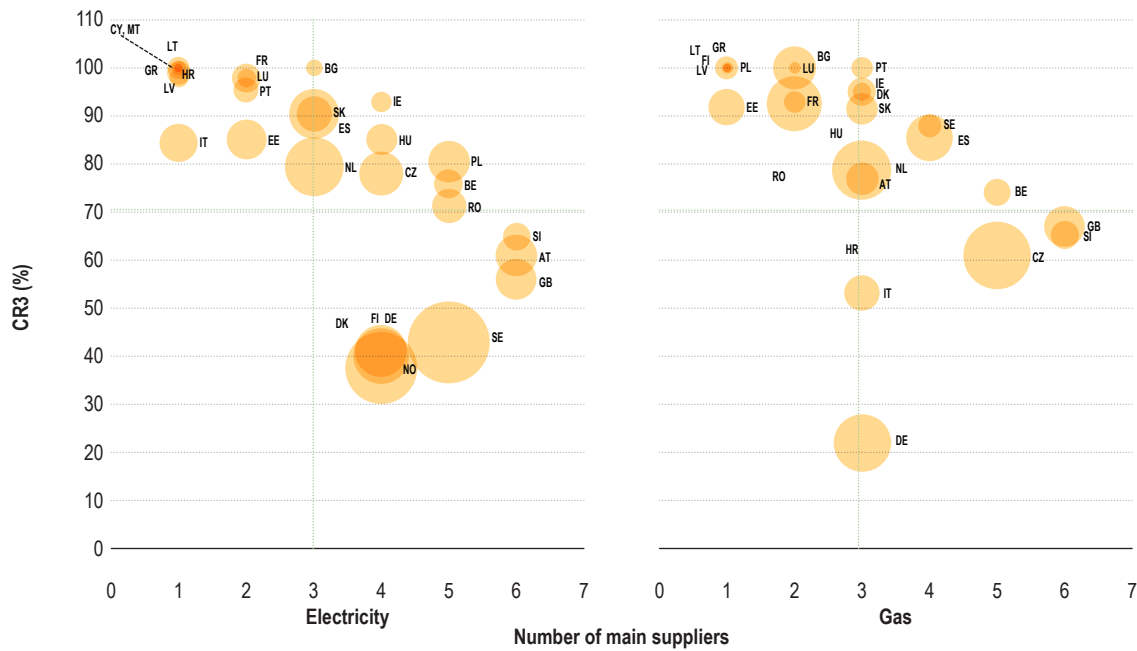
107 Although retail energy markets with a higher number of active suppliers (total and nationwide) are seen as more competitive, it is also evident that markets in some countries have a very strong regional/local component, where competition at regional/local level can be more intensive than in markets at national level or not competitive at all (e.g. consumers in regional gas markets in Bulgaria, Croatia and Finland cannot switch to a supplier from another region).

### 2.3.1.2 Market concentration

108 Figure 20 illustrates the level of concentration of European retail markets for households at the national level in 2014, measured by the concentration ratio CR3<sup>101</sup>, expressed as the sum of the market shares of the three largest suppliers in a market, and the number of main suppliers (i.e. suppliers with market shares equal to or higher than 5%). CR3 values above 70% and low numbers of main suppliers are indicative of possible competition problems.

101 The Agency was unable to obtain data to calculate the market concentration indicators CR4 and HHI used in last year's Report.

Figure 20: Market share of three largest suppliers (CR3) and the number of main suppliers and number of nationwide suppliers in retail markets for households – 2014



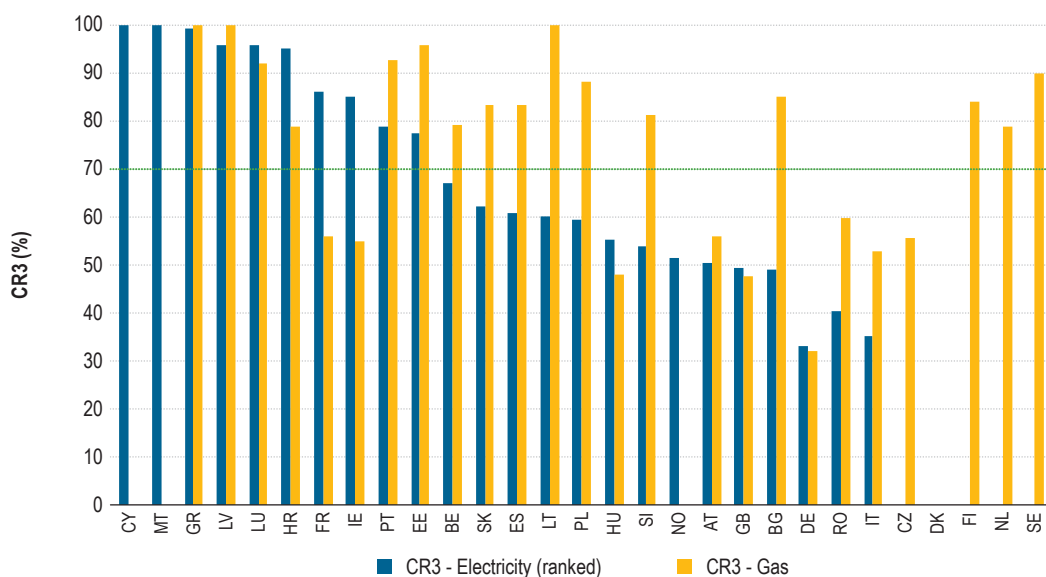
Source: CEER National Indicators Database (2015).

Note: The size of the bubble represents the overall number of nationwide suppliers active in the household market. In electricity CR4 used for Germany.

109 The figure clearly shows a high concentration in retail electricity and gas markets for households at the national level in the majority of countries. The cumulative market shares of the three largest electricity and gas suppliers for households is more than 70% in the majority of countries, including those with a large number of nationwide suppliers (i.e. those with a bigger ‘bubble’). As a result, the retail household market for small competitors is above 30% in only 8 out of 29 countries in electricity and in 5 out of 25 countries in gas, while the rest of the market is held by three dominant suppliers. Furthermore, Figure A-12 in Annex 4 points to little change in CR3 values since 2009, with decreases of 10% or more recorded only in the Czech Republic’s electricity and gas household markets, the Swedish electricity and the Spanish gas market. The less concentrated electricity and gas household markets at the national level are those markets where the three largest suppliers have a smaller share of the market and where several main suppliers operate in the market (e.g. electricity household markets in Austria, Denmark, Finland, Germany, Great Britain, Norway, Slovenia, and Sweden and gas household markets in Belgium, the Czech Republic, Germany, Great Britain, Italy and Slovenia).

110 The comparable CR3 data for retail markets for non-households (Figure 21), which are based on volumes of electricity and gas sold, show that in many countries non-household markets are much less concentrated than household markets.

Figure 21: CR3 in the retail electricity and gas markets for non-households in EU MSs and Norway – 2014 (%)



Source: CEER National Indicators Database (2015).

111 Closely related to the information presented above, Figure A-13 in Annex 5 shows that incumbent suppliers in the retail electricity and gas markets for households still hold a considerable proportion of the market (and consequently have a high degree of market power) in many countries for which data is available.

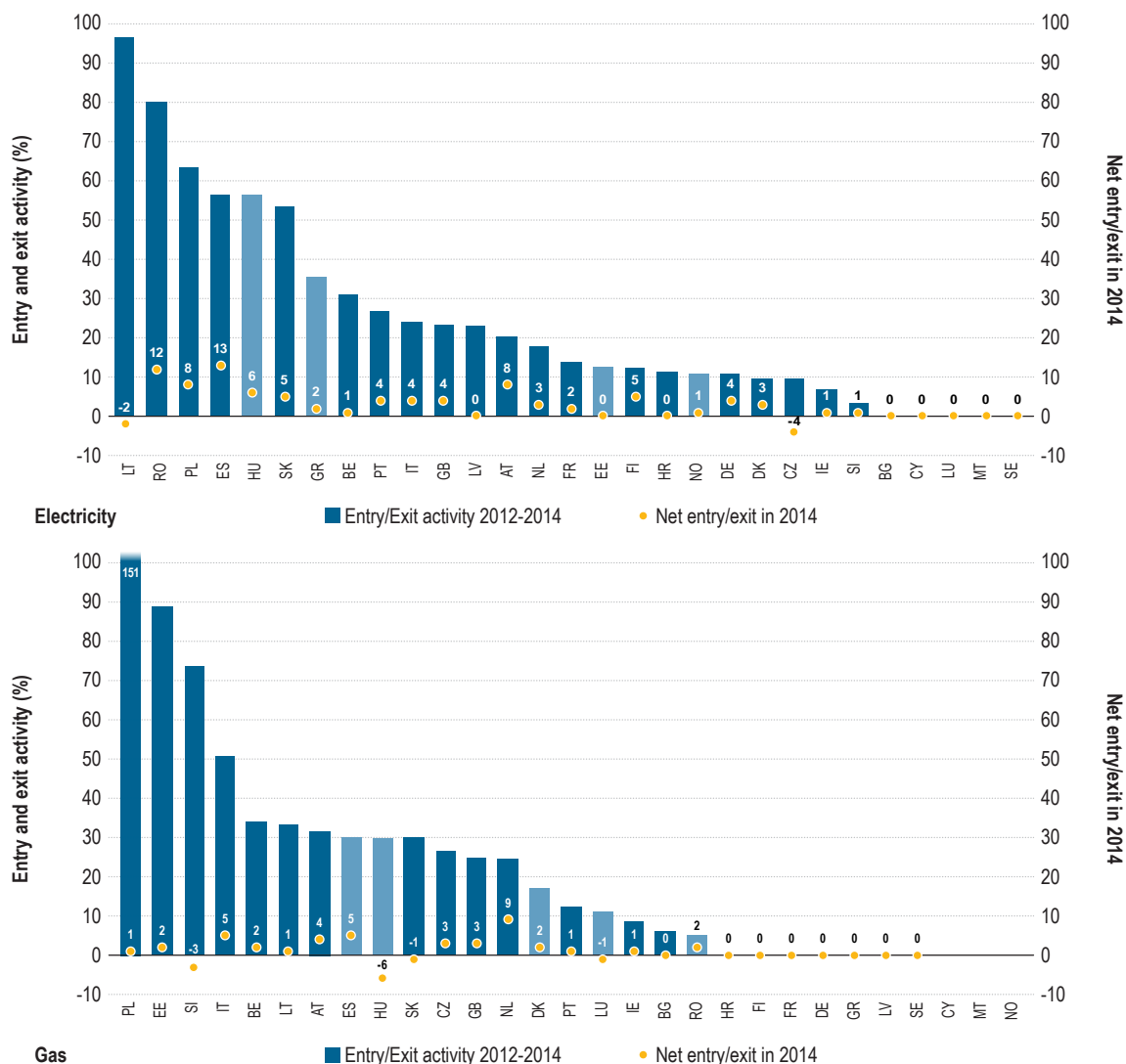
### 2.3.1.3 Entry and exit activity

112 In a competitive market, new suppliers will enter the market if the profits are sufficiently high and if market entry barriers (e.g. administrative, regulatory, legal etc.) are reasonably low. In turn, the higher number of suppliers should ensure a wider range of offers and better choice available to consumers and more competitive pressure on incumbent suppliers. A new entry or the credible possibility of new entry, therefore, exerts competitive pressure on existing suppliers to the benefit of consumers.

113 Figure 22 shows the entry and exit activity in the retail markets for households in various countries over the 2012–2014 period, assessed as the percentage of net new suppliers in the market in a given year with respect to the total number of existing suppliers<sup>102</sup> and the net entry in 2014.

102 For each year, absolute values were used to calculate the indicator on a three-year average basis.

Figure 22: Entry/exit activity of nationwide suppliers (3-year average) in retail markets for households – 2012–2014 (%)



Source: CEER National Indicators Database (2015) and ACER calculations.

Note: Darker shades of blue indicate that the number of active nationwide suppliers is decreasing.

114 The data show that over the last few years, several countries registered significant entry/exit activity into household markets (e.g. Latvia, Romania, Poland and Estonia in the electricity household market, and Poland, Estonia, Slovenia and Italy in the gas household market). In a number of MSs (e.g. Bulgaria, Cyprus, Estonia, Malta in the electricity household market, and Luxembourg, Lithuania, Latvia and Greece in the gas household market), no significant entry/exit activity occurred (i.e. number of active nationwide suppliers was stable and unchanged over the observed period).

115 The relatively high entry/exit activity recorded in the Lithuanian household electricity market is masked by the relatively low base from which the overall activity was calculated (i.e. an increase from 1 to 5 from 2011–2013 and a drop to 3 in 2014). In Romania, the number of active electricity nationwide suppliers for households increased considerably (from 5 to 15). The biggest increase in numbers of new nationwide electricity suppliers in 2014 were recorded in, Spain (13) and Romania (12).

116 The Polish and Estonian gas household markets recorded particularly high entry/exit activity. Most entries in Poland occurred from 2011 to 2012 (i.e. an increase from 1 to 5 nationwide suppliers) while in Estonia the number of nationwide suppliers increased gradually (i.e. from 1 in 2012 to 3 in 2013 and 5 in 2014). In Slovenia, the number of nationwide gas suppliers increased the most in 2013, from 5 to 15 nationwide. The biggest increases in new nationwide gas suppliers in 2014 were recorded in the Netherlands (9), Italy (5) and Spain (5).



117 Compared with 2011, at the end of 2014 most countries registered an increase in the number of nationwide suppliers. The number of suppliers decreased only in three countries in retail household electricity markets (Estonia, Greece and Hungary) and five countries in retail household gas markets (Spain, Hungary, Denmark, Luxembourg and Romania).

### 2.3.2 Market conduct

118 Effective retail competition is characterised by rivalry between suppliers over price and non-price elements. In a fully competitive market, where suppliers undercut each other's prices to the efficient cost level, suppliers will try, for example, to increase their market share by lowering their prices by improving the quality of their service and by developing products that meet the requirements of consumers with a view to increasing profits. These strategies are aimed both at attracting new consumers and retaining existing ones.

119 Consumers' ability to exercise freedom of choice by moving to an alternative supplier, or to renegotiate contracts with their current supplier, are also key features of competitive retail electricity and gas markets. (i.e. consumers who switch their supplier or a product within the same supplier benefit from the competition to a greater extent than those who do not). In turn, consumer activity puts competitive pressure on suppliers to lower prices and improve their service in order to retain existing customers and acquire new ones. Conversely, measures of consumer activity in the market and which indicates the extent of customer movement between suppliers (i.e. external switching<sup>103</sup>) and between alternative products from the same supplier (i.e. internal switching<sup>104</sup>) are, therefore, important indicators of competition in the market.

120 However, while higher switching rates are indicative of more competitive markets, they should be considered in conjunction with other competition indicators. Switching rates are, for example, sometimes high(er) during the early stages of market opening, when consumers first exercise their choice, but may then stabilise as a market matures. On the other hand, if consumers are satisfied with their current suppliers, they may have no reason to change supplier (e.g. their current supplier delivers competitively priced products and good quality service) and, therefore, switching rates may be low even in a very competitive market.

121 This section, therefore, looks at the conduct of electricity and gas suppliers and consumers in the EU MSs and Norway. It looks at the degree of price rivalry between electricity and gas suppliers, and looks at other strategies to acquire and retain consumers, such as product innovation and product differentiation. It also assesses consumer switching activity and switching trends since 2008 and some aspects of consumer switching behaviour, such as: (i) reasons for switching and not switching; (ii) consumer views of the choice of products available and (iii) consumer perception of the switching process, which can provide a deeper understanding of what is driving the development of retail competition.

#### 2.3.2.1 Price rivalry

##### Price dispersion of the energy component of the retail price

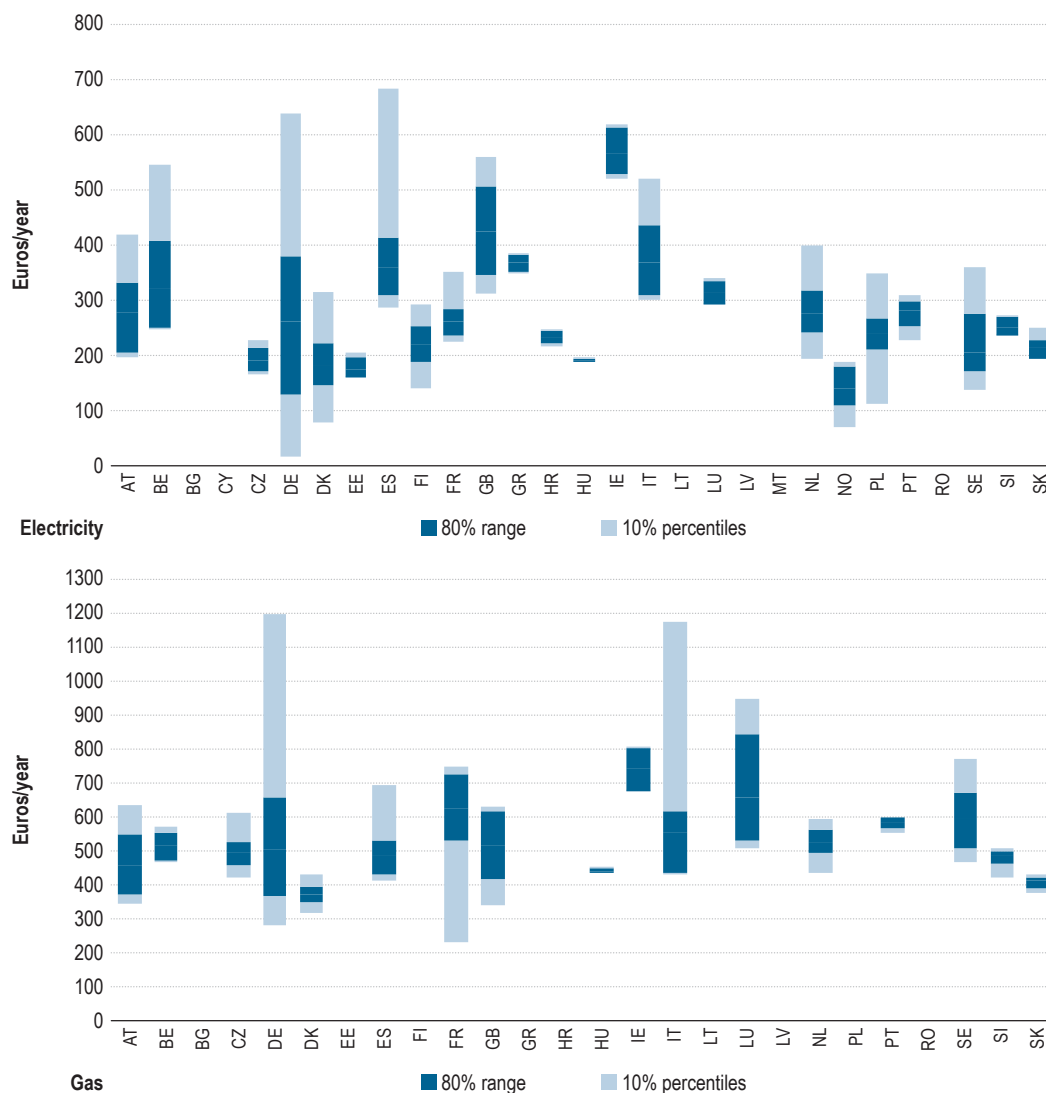
122 As with the 2013 report, for this year's Report the Agency again examined the price dispersion of the energy component of all retail offers in European capital cities. The comparison of this individual price component provides a valid representation of the actual level of price competition among the different suppliers, as the other retail price components – i.e. network charges and taxes – are generally similar for all similar retail offers. However, countries' individual data must be carefully interpreted and not viewed in isolation from other indicators. Large price divergences may also reflect inefficiencies in price formation mechanisms, e.g. lack of information or difficulties comparing prices by consumers and consumer inertia. In addition, the analysis is based on single-product offers and has limited applicability in countries where most consumers are on dual fuel offers.

103 Unless stated otherwise, throughout this Report a consumer switch refers to the action whereby a consumer acts and changes his/her supplier and where the meter point associated with the household consumer is re-registered with a different supplier.

104 In addition to looking at consumer switching activity, this year's MMR also looks at the number and percentages of consumers who renegotiated their contract with their current supplier.

123 Figure 23 illustrates the range of the energy component price dispersion of 80% of the offers in the capital city (in blue), and the price ranges of the 10% highest-priced offers and of the 10% lowest-priced offers (in grey).

Figure 23: Dispersion in the energy component of retail prices for households in capitals – December 2014 (euros/year)



Source: ACER Retail Database (November–December 2014) and ACER calculations.

124 The comparison of the dispersion of the energy components in the retail offers in Europe shows bigger differences in electricity than in gas. The individual demand/supply features of national electricity markets, mainly driven by their diverse generation portfolios and costs, sustain more significant wholesale price differences among countries, which are translated into more varying energy component price ranges.

125 In electricity, in the capital cities of those countries where liberalisation is more mature, and which therefore maintain more available offers and have more varying characteristics (e.g. Belgium, Germany, Great Britain and Italy) price dispersion is greater, albeit with a very different average value of the energy component (e.g. much higher in the capitals of Italy and Great Britain than in Belgium). In countries applying regulated electricity prices, and countries with a share of the market where regulated and liberalised prices co-exist, price dispersion is lower and clustered around the regulated price.

126 In gas, a comparison of energy component prices primarily shows that matching price ranges can be found in several EU MSs, with the notable exception of certain MSs with regulated prices whose prices rank below the EU average, arguably triggered by the fact that they feature negative mark-ups. These findings are aligned with the conclusions of the wholesale price chapter, showing the increasing convergence

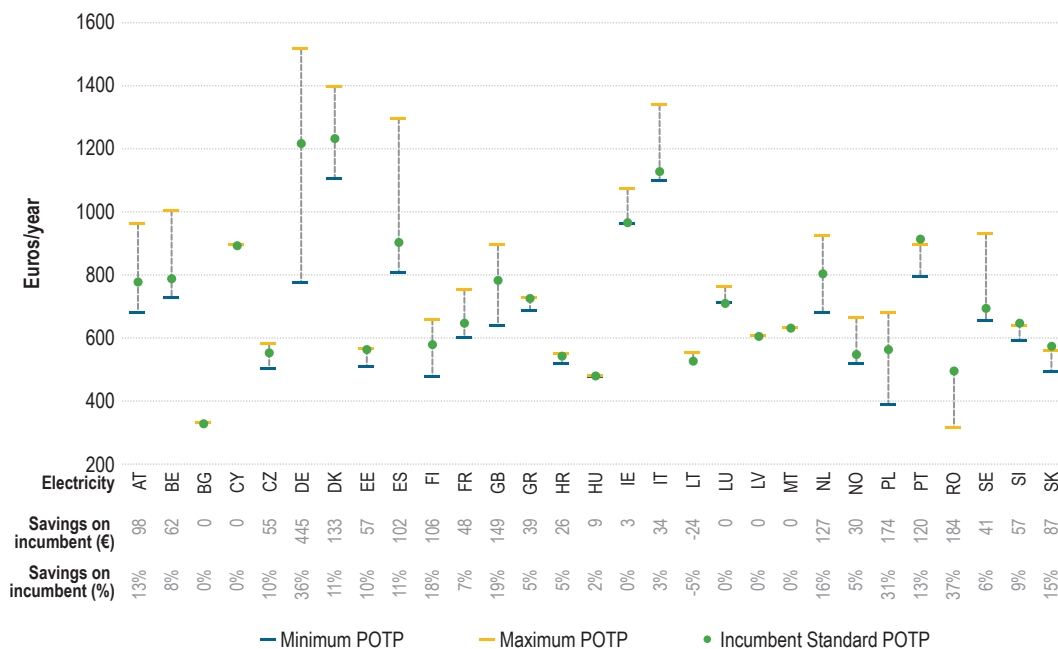
of gas wholesale prices that was registered among EU MSs.

- 127 At the individual MS level, the analysis indicates that in the majority of countries, the energy component of retail offers in gas is not widely dispersed. In the large majority of EU MSs, the energy component of 80% of available offers assessed does not seem to vary by more than 50 euros/year. The more notable exceptions are Austria, Germany, Great Britain and Italy, where price diversification seems to be stronger. This fact is possibly supported by the greater number of offers available in those MSs' capital cities, and on the more extended offer of additional services or varying characteristics that may affect final prices.
- 128 Conversely, in those MSs applying only regulated gas prices – or in those others offering them and also with a certain share of the market under liberalised market prices (e.g. France, and Spain) – the price dispersion of the energy component is reduced. In these MSs, the energy component of the regulated tariff seems to set a focal point on which the large majority of offers converge, and price-competition seems more depressed.

### POTP price spread

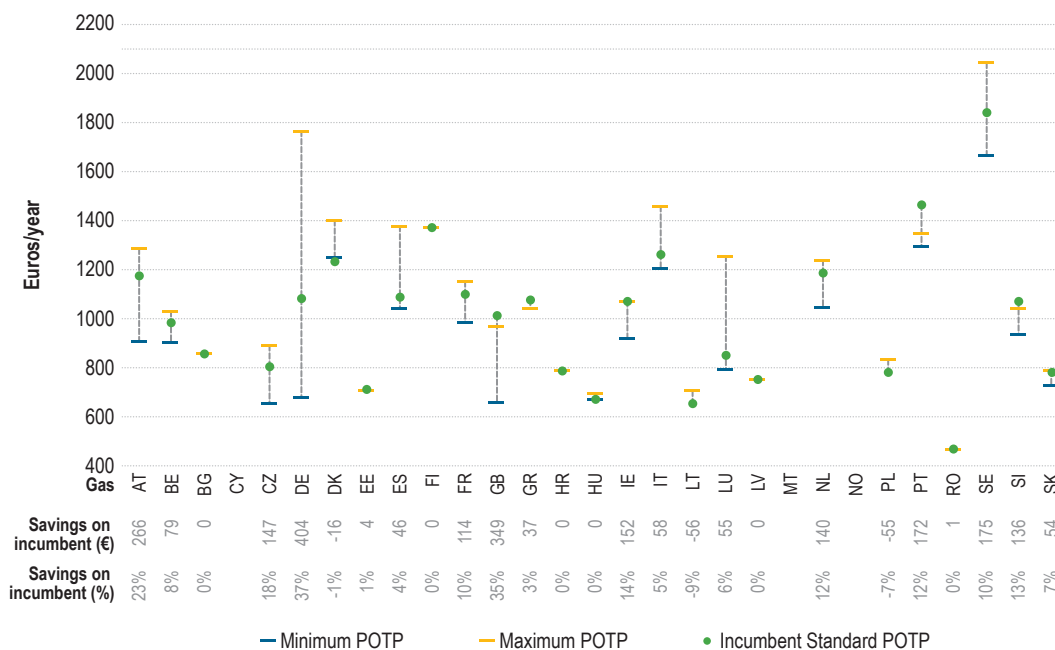
- 129 Figure 24 shows the POTP price spread (i.e. the difference between the cheapest and the most expensive offers on the market) and the discounts on the incumbent standard price (i.e. potential savings that are available to consumers when switching from the incumbent supplier)<sup>105</sup>. It illustrates that notable savings can be achieved by switching from the incumbent standard POTP offer to the cheapest offer in capital cities (i.e. to consumers who have not switched), but also to consumers who have switched, but may currently be on offers which are above the cheapest offer<sup>106</sup>.

Figure 24: POTP price spread and annual savings available from switching from the incumbent standard offer to the cheapest offer on the market in capital cities in December 2014 – (euros/year and %/year)



105 As with price dispersion, the analysis is based on single-product offers and has limited applicability in countries where most consumers are on dual-fuel offers.

106 The data on the exact number of consumers on each offer are not available.



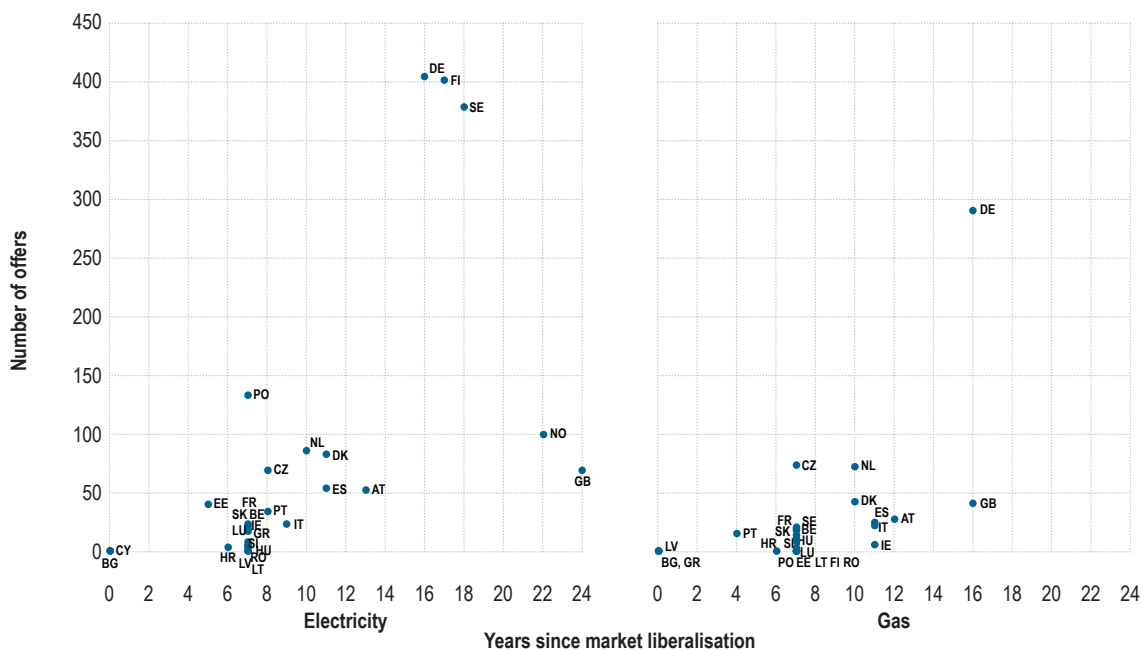
Source: ACER Retail Database (November–December 2014) and ACER calculations.

- 130 The analysis shows that alternative electricity offers exist which are cheaper than the incumbent supplier standard offers in the majority of capitals. For household electricity consumers who are still with the incumbent supplier, the maximum annual savings available with respect to the incumbent standard offer range from 425 euros (39%) in Germany to 9 euros (2%) in Hungary. In gas, annual saving opportunities are generally higher, and range from 349 euros (35%) in Great Britain to 4 euros (1%) in Estonia, while the cheapest offers in Poland and Lithuania are those offered by the incumbent gas suppliers.
- 131 In electricity, the difference between the most expensive and the cheapest post-tax price on the market is particularly high in the capitals of Germany and Spain (740 euros and 495 euros respectively), while in gas this is the case in the capitals in Germany and France (1,091 euros and 613 euros, respectively). In these countries, the amounts are so substantial that it would be surprising if consumers were unwilling to switch.

### 2.3.2.2 Product differentiation strategies

- 132 As indicated above, retail competition is not exclusively related to price elements. As the market matures, the scope of pure price competition is arguably reduced. In such markets, suppliers may develop product diversification strategies and utilise other competition elements to attract and retain consumers or to increase their margins.
- 133 In a market of undifferentiated products, consumers will be unwilling to pay more for the products of different firms compared to the cheapest offer. However, if differentiated products are offered, firms may be able to charge a higher price. In a fully liberalised retail energy market, an innovative supplier that differentiates its product will be able to act independently from other suppliers and be able to segment its market in order to increase its profits.
- 134 Over the last couple of years, retail energy markets have witnessed increased evidence of product innovation. The innovation in retail products includes characteristics, such as contract duration, price preservation periods, dual-fuel offers, additional service provision or renewable/green features. These innovative products offer more choice to consumers in an industry that was once considered to be completely homogeneous.
- 135 Figure 25 provides evidence that market liberalisation encouraged innovation in the market. For electricity, it shows that in countries where market liberalisation occurred earlier, the number of offers is greater, although the mature markets of Norway and Great Britain seem outliers. A similar, though less convincing pattern was observed for gas, with Great Britain being an outlier. This implies that in more mature markets the number of offers does not grow 'indefinitely', but stabilises at some point.

Figure 25: Number of offers in capital cities and years since market liberalisation – 2014



Source: ACER Retail Database (2015) and ACER calculations.

- 136 As the findings in Section 2.2.2 indicate, fixed-price offers prevail in the majority of European countries. Many suppliers also recognise the importance of ‘green issues’ for some consumers, and design their products accordingly. Some suppliers even distinguish between different categories of green consumers and offer them products with different levels of ‘greenness’. Entirely green products may be requested by consumers who are happy to pay a premium for such products, while other less green products may appeal to consumers who are environmentally aware, but not ready to pay a (higher) price for energy. As shown, these products are usually more expensive, as in some cases suppliers need to compensate for the higher supply costs of sourcing renewable energy. But in certain cases, where green supply costs are competitive, they can result in higher net margins.<sup>107</sup> Another product diversification strategy is linked to the presence of dual-fuel products (i.e. bundled products combining the supply of electricity and gas with an overall discount).
- 137 As shown in Section 2.2.2, suppliers are also offering other products and services associated with the buying of electricity and gas (i.e. bundled offers). These include free products (e.g. supermarket points or similar, membership points, air miles, gifts in kind or charge-free insurance and/or maintenance services) and competitively priced products and/or services (e.g. insurance, boiler maintenance, home insulation, etc.). Although bundled offers may be attractive to price-responsive consumers, they may also reduce the comparability of services offered and make consumers less keen to consider switching supplier<sup>108</sup>. The contracting of these plans may also result in higher overall margins for suppliers<sup>109</sup>. In order to make an informed choice, it is very important that customers receive clear and accurate information on the cost of all associated product or services when buying a bundle.
- 138 However, despite the general increase of product diversification and innovation, it is also evident (Figure 25 above and Section 2.2.2) that suppliers in the capital cities of some countries are not innovating at all or very little (e.g. electricity and gas suppliers in the capitals of Bulgaria, Hungary, Latvia, Lithuania and Romania and electricity suppliers in capital cities of Cyprus and Malta). This is often linked to the domi-

107 The main issue is the lack of standardisation of how Guarantees of Origin are used to prove green credentials in different member states. For more details, please refer to CEER’s Advice on customer information on sources of electricity’, published in March 2015 at: [http://www.ceer.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Customers/Tab5/C14-CEM-70-08\\_CustomerInfo-Sources%20of%20Electricity\\_Advice\\_March%202015\\_0.pdf](http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Customers/Tab5/C14-CEM-70-08_CustomerInfo-Sources%20of%20Electricity_Advice_March%202015_0.pdf).

108 See: BEUC (2013), Consumer rights in electricity and gas markets – BEUC position paper, December 2013: [https://www.beuc.eu/publications/x2013\\_083\\_mst\\_consumer\\_rights\\_in\\_electricity\\_and\\_gas\\_markets.pdf](https://www.beuc.eu/publications/x2013_083_mst_consumer_rights_in_electricity_and_gas_markets.pdf).

109 Switching rates for Spain and Portugal also include switching within the same corporate group (i.e. intra-supplier switching).

nance of the incumbent electricity or gas supplier, which, in the absence of competitive pressure, has no incentive to innovate.

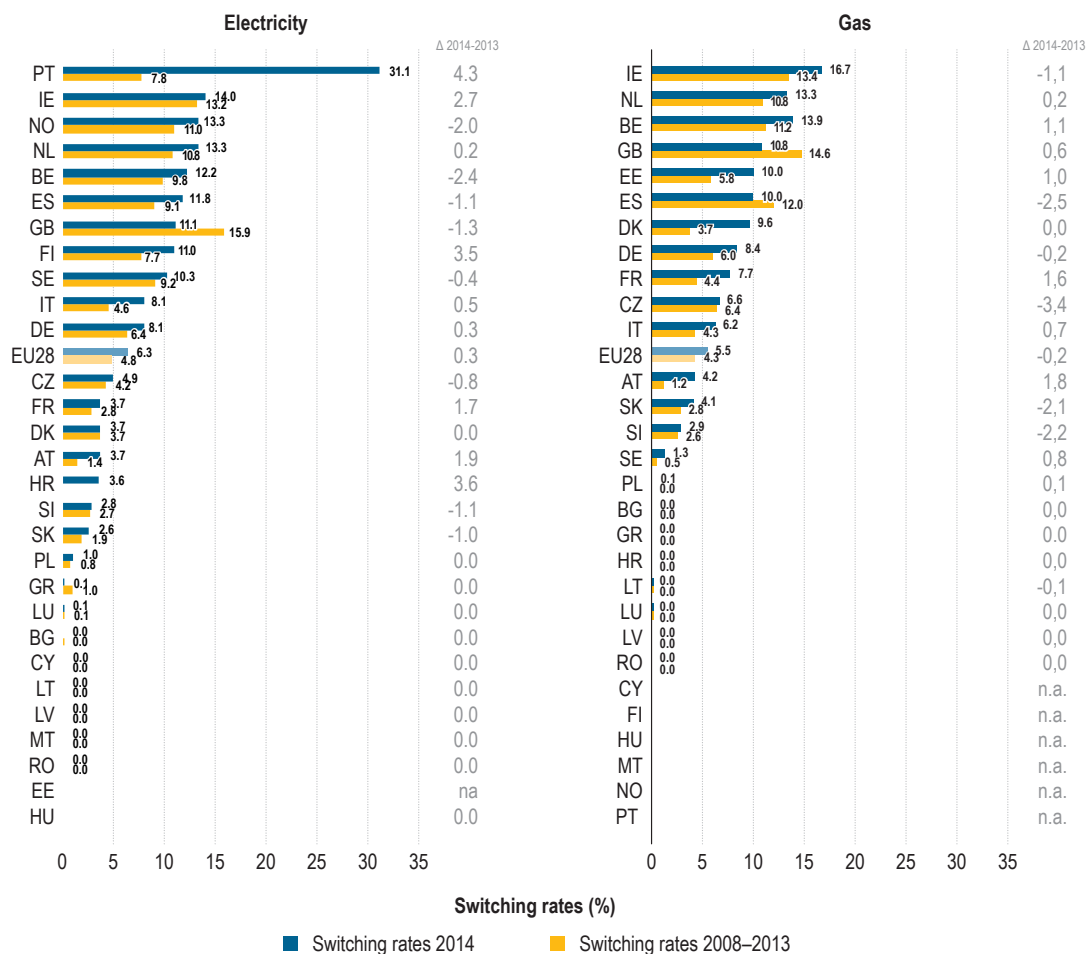
### 2.3.2.3 Consumer switching activity

- 139 The measures of consumer activity in the market indicate the extent of customer movement between suppliers (i.e. external switching) and between alternative products from the same supplier (i.e. internal switching). These are important indicators of competition in the market as they provide an important insight into consumer participation in the market. Other aspects of consumer switching behaviour, such as: (i) reasons for switching or not switching; (ii) consumer views on the choice of products available to them and (iii) consumer perception of the switching process, can provide a deeper understanding of what is driving the development of retail competition.

#### External switching

- 140 According to Figure 26, in the retail electricity household market, Norway, Belgium, the Netherlands, Great Britain, Ireland and Sweden continue to have higher external switching rates (i.e. above 10%) than the majority of other countries. Portugal<sup>110</sup> and Belgium recorded a significant increase in switching rates in 2014 compared to the average over the period 2008–2013 (an increase of 23.4% and 4.8%, respectively) and have joined the group of countries with switching rates above 10%. On the other hand, electricity switching rates in some countries remained at zero, mainly due to the lack of retail competition (e.g. Malta, Cyprus) or very weak retail competition and limited choice available to consumers (e.g. Bulgaria, Latvia, Lithuania, Romania). However, although electricity switching rates remained low in many countries, the overall trend is upward, as switching rates for 2014 are higher than averages for the 2008-2013 period in the majority of countries.
- 141 The overall picture in retail gas household markets is similar to that in electricity: (i) low external switching rates in most countries, with few countries with switching rates above 10%, (ii) several countries with switching rates of zero due to the lack of competition and consumer choice (e.g. no nationwide suppliers in Croatia, a single nationwide supplier in Greece and Latvia and two in Luxembourg), and (iii) despite low absolute values, some signs of an upward trend, as external switching rates are increasing from a low base.

Figure 26: Switching rates for electricity and gas household consumers in 2014, annual average 2008–2013 and change 2014–2013 (%)

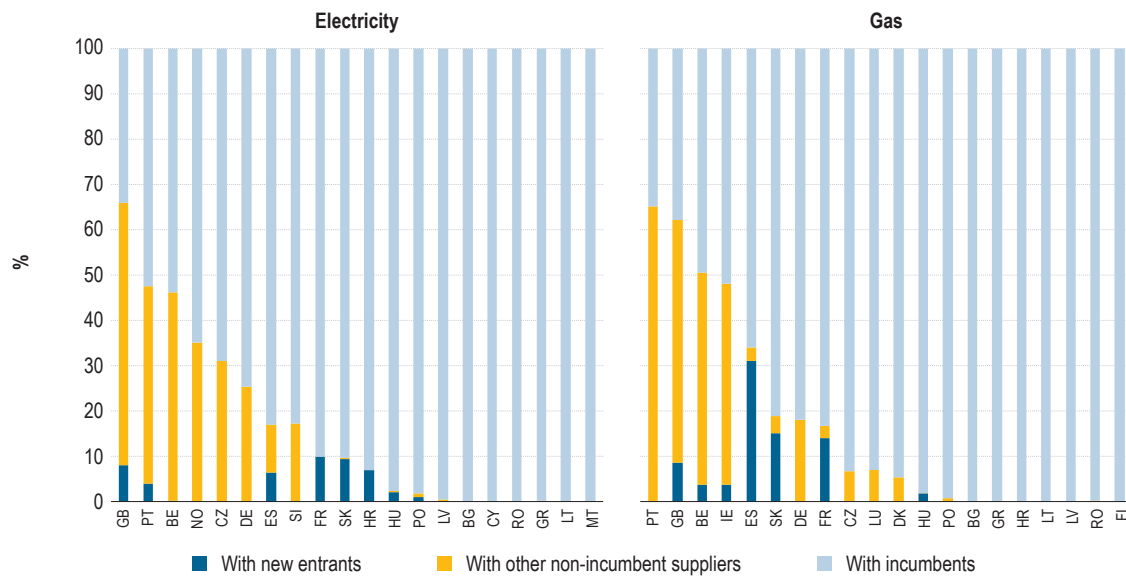


Source: CEER National Indicators database

- 142 The largest increases in switching rates in 2014 compared to 2013 were recorded in the electricity markets in Portugal (4.3%), Finland (3.5%) and Germany (2.4%) and in the gas markets in Germany (2.9 %) and Austria (1.8%); the largest decreases were observed in the electricity markets in Norway (-2.0%) and Great Britain (-1.3%) and in the gas markets in the Czech Republic (-3.4%) and Estonia (-2.5%).
- 143 Although the switching trend is upward for both markets, Figure 27 shows that the proportion of consumers who are with an alternative supplier<sup>111</sup> (i.e. not with their incumbent supplier, including new entrants who entered the market after 1 July 2007), is still very low in all but a few countries for which data are available (i.e. Great Britain, Portugal and Belgium in both markets, Norway, the Czech Republic and Germany in electricity and Ireland and Spain for gas). This measure can be viewed as an important indication of the maturity of a market, as considering switching from an incumbent is usually the necessary first step a customer takes in exercising market choice.

111 These figures are also indicative of the proportion of consumers who switched at least once. Conversely, figures on the proportion of consumer still with their incumbent supplier are indicative of the proportion of consumers who never switched, although they may also include those consumers who may have switched away from the incumbent but consequently switched back to it.

Figure 27: Proportion of electricity and gas consumers with a different supplier than their incumbent supplier – December 2014 (%)



Source: CEER National Indicators Database (2015) and ACER calculations.

144 Despite this, it is evident that new entrants<sup>112</sup> have captured a significant share of the household electricity and gas markets in some countries (e.g. 10% of the electricity household market in France and 8% in Great Britain and 30% of gas household market in Spain, 15% in Slovakia and 12% in France), indicating that new entrants can be successful.

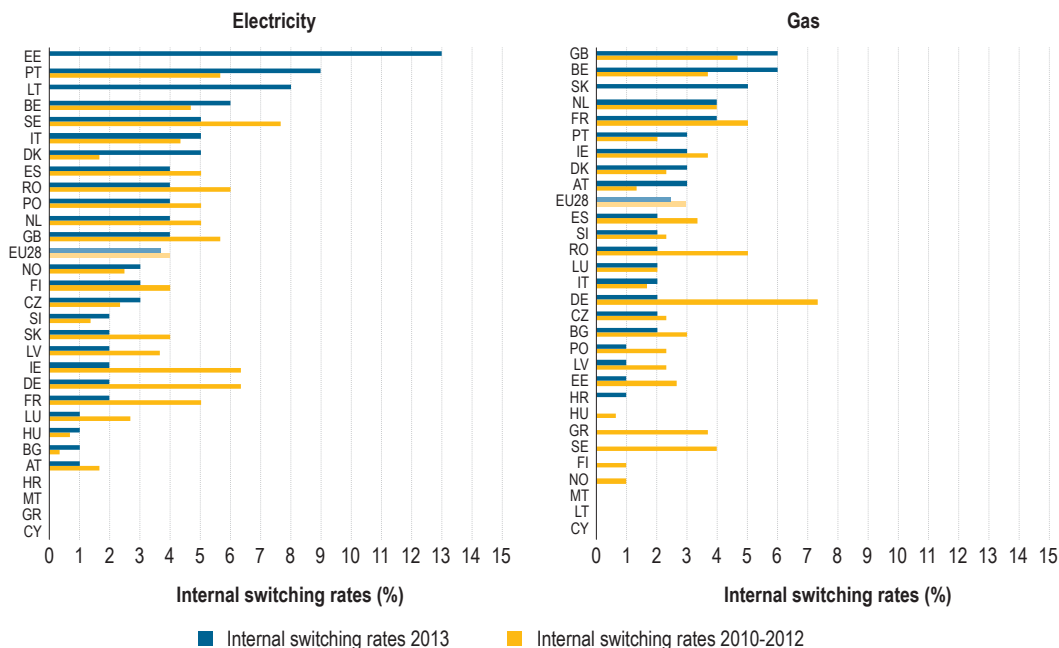
### Internal switching

145 Switching to another product with the same supplier also constitutes an active decision by consumers which can increase competition, and is something which is very popular in some markets, as shown in Figure 28 below.

112 In the CEER Database, a new entrant (or new active supplier) in the domestic (household) national market is defined as a supplier that, as of 1 July 2007, had either not entered the domestic national market or had a market share (household customers, by number of metering points) lower than 0.1%, but had a market share higher than 0.2% as of 31 December of the current year.



Figure 28: Internal switching rates for electricity and gas household consumers in 2013 and annual average – 2010–2012 (%)



Source: DG Justice and Consumers (2014).

Note: Survey question: ‘Have you switched tariff plan or supplier in the past period’. The choice of answers was: (1) ‘no’; (2) ‘yes - product/service with same provider’; and (3) ‘yes – supplier’. Figure 28 includes only these who said that they had switched product/service with same provider.

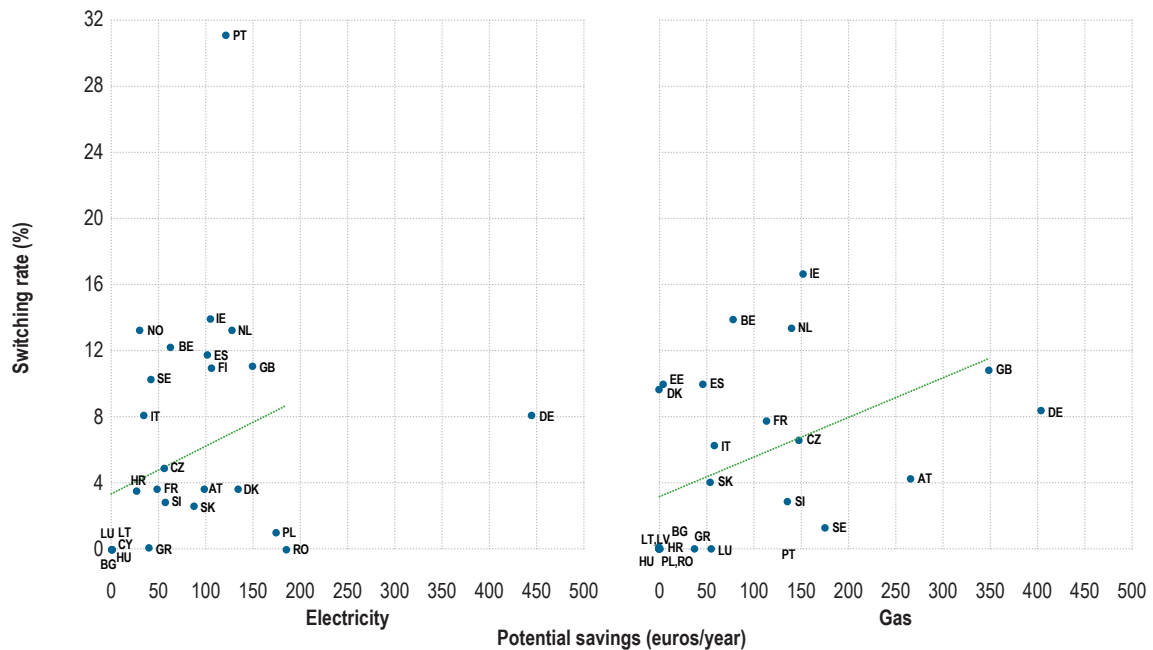
146 The highest internal switching rates in 2013 were recorded in electricity household markets in Estonia (13%) and Portugal (9%) and gas household markets in Great Britain (6%) and Belgium (6%). Over the 2010-2012 period, this was the case in electricity household markets in Sweden (7.7%), Germany (6.3%) and Ireland (6.3%) and gas household markets in Germany (7.3%) (for more details on switching in Germany, please refer to the case study presented later in this section).

### Price responsiveness

147 As pointed out in previous MMRs, price elasticity of demand tends to be lower for energy services than for other services, mainly because demand is relatively constant and substitutable supply options limited. However, company-specific price elasticity of demand can be higher (in absolute value). If consumers are price sensitive, a price differential will result in them switching supplier. If this is the case, more competitive suppliers could enter the market by undercutting the incumbent.

148 As in previous editions, the Agency analysed the relationship between switching rates and available savings by using pricing data obtained from price-comparison websites and the switching data from the CEER National Indicators database. Figure 29 shows that in some MS capitals, consumer response seems to be positively related to price differentials, but also that consumer switching behaviour in some countries could be more influenced by other elements. The results for 2014 show the same pattern as in previous years.

Figure 29: Relationship between switching rates and annual savings available in capital cities – 2014 (%)



Source: CEER National Indicators Database (2015) and ACER calculations.

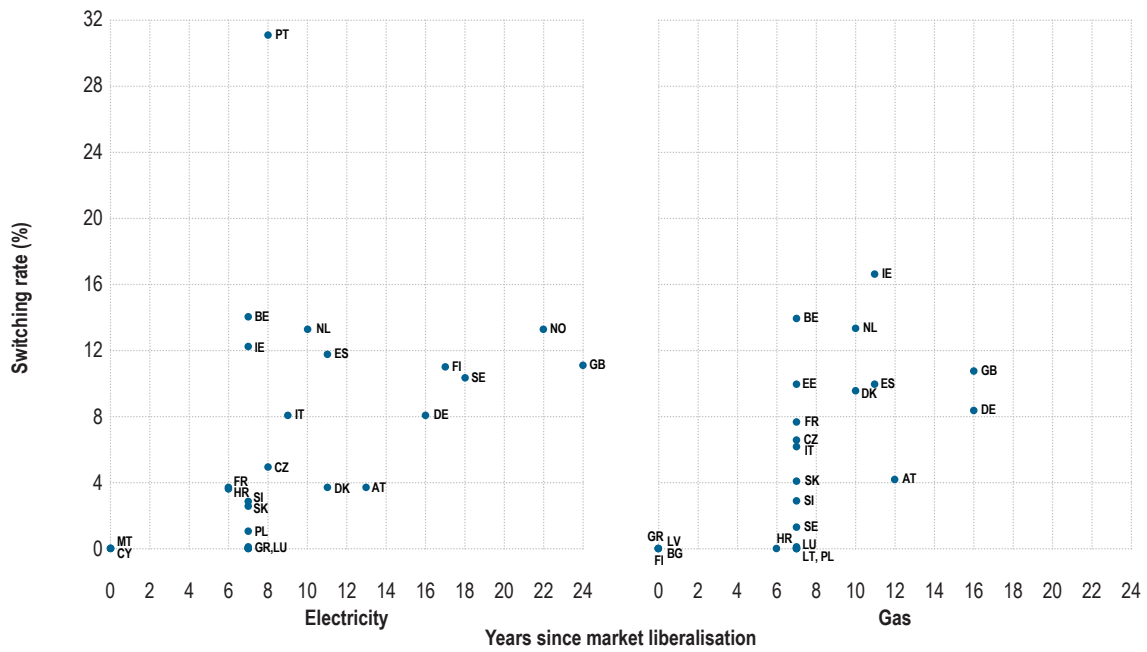
- 149 From the data, the saving potential seems to be a factor of limited relevance for explaining consumer behaviour in most countries. In general, countries with higher saving potentials do seem to have slightly higher switching rates, but there are many countries where this is not true.
- 150 Despite the increase in switching rates, Germany<sup>113</sup> is still a country where both electricity and gas consumers seem to be less price sensitive than elsewhere, and given the saving potential, ‘under-switched’ in 2014. This is also true for electricity consumers in Poland, and gas consumers in Austria and Sweden, while, from the data, it could be said that electricity consumers in Portugal and gas consumers in Ireland ‘over-switched’ i.e. switching rates were relatively compared to available savings. Such behaviour is difficult to explain in economic terms and might be linked to other factors that influence consumer switching decision, such as different consumer preferences, high satisfaction with, and loyalty to, a current supplier, and in some cases the continued presence, or perceived presence, of barriers to switching.

### Market liberalisation

- 151 Figure 30 illustrates to a certain extent the positive relationship between switching rates and the time since market liberalisation.

113 The relatively high savings available in Germany can be explained by the high discounts offered by some suppliers in the first year of supply.

Figure 30: Relationship between switching rates and time since market liberalisation – 2014 (%)



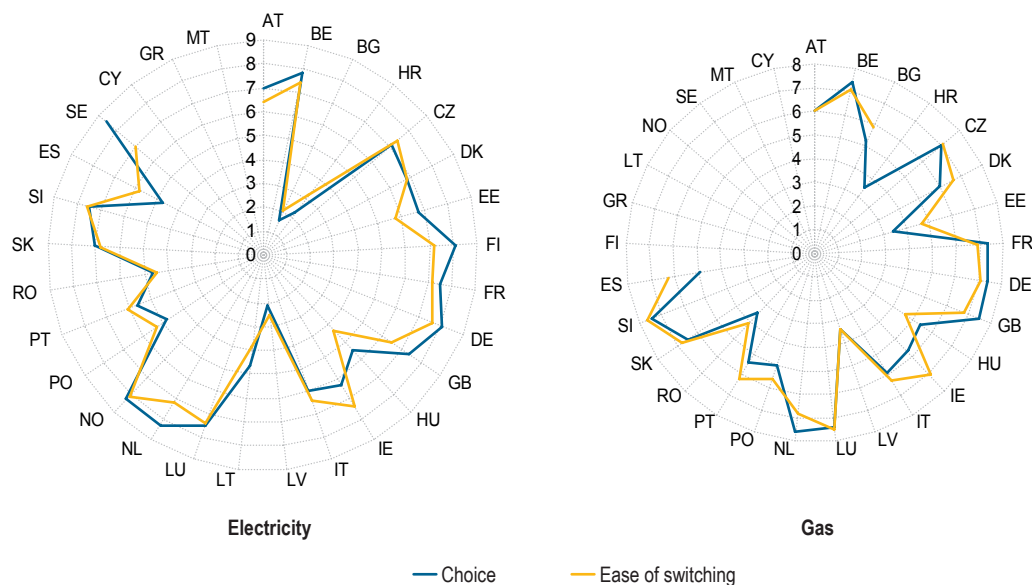
Source: CEER National Indicators database (2015) and ACER calculations.

152 Switching rates tend to be higher in a number of countries where the market has been liberalised for longer, with Portugal being an outlier in electricity. This positive relationship can be explained by the fact that consumers often need time to become aware of new market conditions, that savings can be made, and that the switching process need not be complicated.

### Perception of choice of products and switching process

153 Consumer views on the choice of products available to them and their perception of the switching process, shown in Figure 31, are other important elements which determine consumer switching.

Figure 31: Consumer perception of choice of suppliers and the switching process – 2013<sup>114</sup>



Source: DG Justice and Consumers (2014).

Note: It was not possible to conduct interviews for both electricity and gas markets in every country as: (i) gas markets do not exist in some countries; and (ii) in some countries, these markets are monopoly markets and, therefore, the questions of the switching component and the choice component were not asked for these specific markets. The EC survey is done for the UK rather than GB.

'Choice' measures if consumers are satisfied with the choice of different suppliers/retailers in a given market and is assessed with the question: "On a scale from 0 to 10, would you say there are enough different retailers/providers from which you can choose?"

'Switching' is evaluated through actual switching behaviour and the perceived ease of switching (both for consumers who have actually switched and for consumers who have not). This component was assessed with the question: "On a scale from 0 to 10, how difficult or easy do you think it would have been/was it to switch provider in the past year?"

154 The data indicates, perhaps not surprisingly, that in markets with low consumer perception of choice and where the switching process is perceived to be difficult, the actual switching rates are also very low (e.g. electricity and gas markets in Croatia, Latvia and Romania; electricity markets in Bulgaria and Lithuania and gas markets in Estonia and Romania). There are also other reasons which may explain why consumers choose to switch or not, and which are covered in more detail in Section 2.4.2 ('Consumer switching behaviour').

114 The EC DG Justice and Consumer's data were produced annually from 2010 to 2013, but from 2013, will be only available every other year. Therefore, data for 2014 are missing and data for 2013 are used instead.

## Case study 2: Switching behaviour in Germany – electricity household market

### Introduction

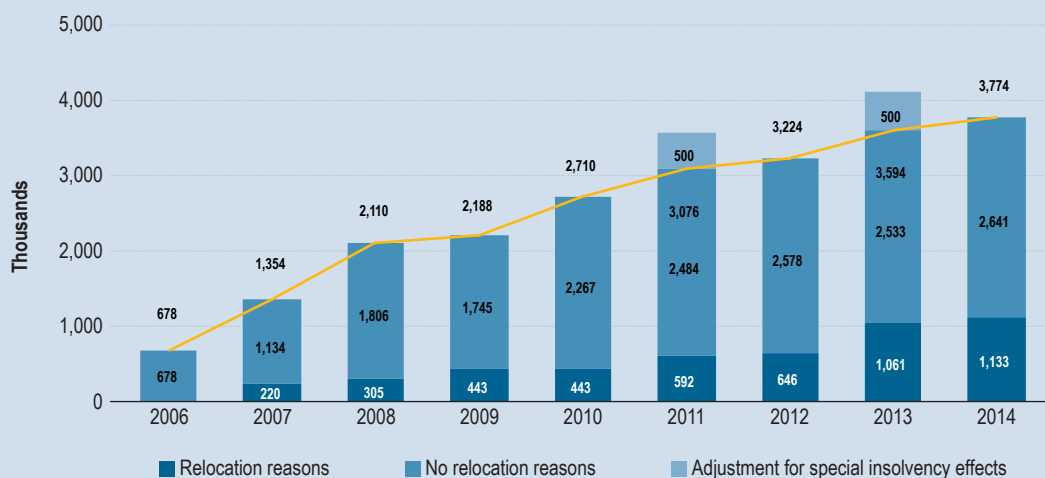
Switching rates and switching processes are key indicators of competitive developments. Since the liberalisation of the German electricity market in 1998, the number of household customers that switched electricity suppliers has been increasing significantly.

Consumer switching to another supplier increased from 2006 onwards, after Bundesnetzagentur had set a standard (‘the Standard’) for supplier switching in the electricity sector (i.e. the Decision abbreviated as ‘GPKE’ (Geschäftsprozesse für die Kundenbelieferung mit Elektrizität) – BK6-06-009<sup>115</sup>). This case study shows the positive developments in German consumer switching behaviour. However, when assessing competition using switching rates, it is also important to consider the reasons for not switching.

### Switching trends

In 2014, nearly 3.8 million electricity household customers switched suppliers. These numbers also include 1.1 million households that chose a supplier other than the local default supplier due to moving into a new residence<sup>116</sup>. Since 2010, the number of households that switched from the default supplier has increased from 15.5 per cent in 2010 to 23.7 per cent in 2014.

Figure (i): Supplier switching by electricity household consumers, 2006–2014 (in 000)



Source: BNetzA.

115 The Decision contains business processes for supplier switching, the start and end of supply, SoLR and transmission of meter readings, as well as processes for the modification of customer’s master data, grid usage billing and transmission of business data. It is binding on all market roles i.e. suppliers, DSO’s and meter operators alike. For each of the processes, a sequence of work steps describes in detail:

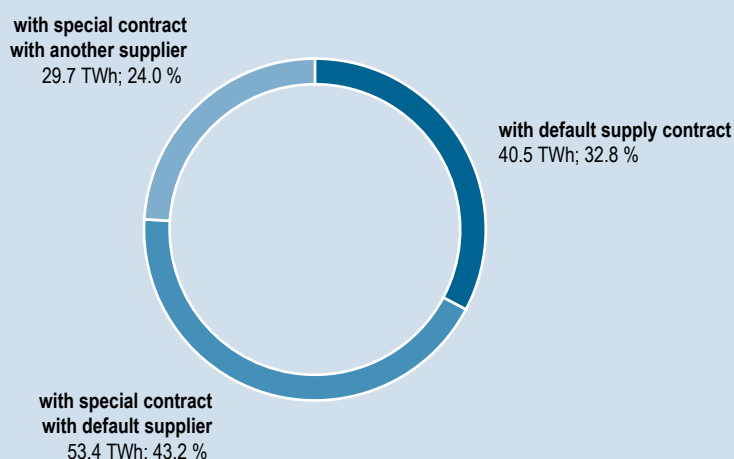
- the event that triggers the workflow,
- the action or reaction that needs to be taken by the market roles involved,
- the deadline within which each work step needs to be completed and
- the content and message type to be used for a particular communication.

In 2011, the GPKE was slightly adapted to implement the IEM-directive that requires a supplier to switch within three weeks and to eliminate some shortcomings and streamline the processes. The processes are based on the supplier- centric “one-contract model”, with the supplier being the only contractual partner of the customer. For the customer, this means he or she just needs to find a new supplier and authorise it to realise the switch; everything else is done by the supplier.

116 In Germany, nearly four million household customers change residence per year (see: [https://www.destatis.de/DE/Publikationen/Datenreport/Downloads/Datenreport2013.pdf?\\_\\_blob=publicationFile](https://www.destatis.de/DE/Publikationen/Datenreport/Downloads/Datenreport2013.pdf?__blob=publicationFile)). When moving to their new house or flat, customers have two options: i) they can conclude an energy supply contract with a supplier of their choice or ii) if they do not take any action, they are automatically supplied by the local default supplier under the terms and conditions of default supply.

Figure (ii) shows that nearly 44 per cent of households in 2014 have a special contract with the local default supplier. However, the switch of contract (from default supply to a special contract) requires an active decision by the customer such as the decision to switch to a supplier. Every switch, including a switch of contract, is a market activity and a sign of a competitive environment in the retail market. However, one third of all household customers in Germany have not switched yet.

Figure (ii): Contract structure of electricity household consumers (TWh and percentage), 2014



Source: BNetzA.

### Reasons for not switching

One possible explanation for this inactive consumer behaviour – besides other manifold reasons – could be the correlation between consumption and switching: a higher level of electricity consumption positively influences the decision to switch. The average volume of electricity consumed by a household customer that made a switch was approximately 3,100 kWh in 2014. In contrast, customers who were supplied by a default supplier consumed on average only approximately 2,200 kWh in 2014. If consumption is lower, then the monetary incentive to switch is also lower.

In 2014, a typical household customer could generate an average saving of around 42 euros per year (without bonus) for a switch from default supply to a special contract with the default supplier. The average saving for a switch from the default supplier to another company was around 77 Euro per year.

Yet the offers that can be found in price comparison tools (PCTs) and switching tools on the internet suggest that much higher savings are possible. Some suppliers sell their products exclusively on the internet or even only through PCTs. Having no physical customer centres and offering only online-contracts with electronic billing enables suppliers to work at low fixed costs. To attract customers who are searching for the cheapest price possible, suppliers offer a variety of welcome bonuses or instant discounts, limited price guarantees and prepaid-offers in order to make prices appear lower and savings higher.

Stiftung Warentest, a publicly funded German foundation that carries out tests on goods and services, found in 2013 that the main problems with switching tools are their pre-set search options, which often automatically include several of the above-mentioned allegedly attractive components<sup>117</sup>. Customers actively need to eliminate certain search options in order to be shown cheap yet fair offers.

<sup>117</sup> Test results as of March 2013, available at: <https://www.test.de/Stromtarifrechner-Kein-Vergleichsportal-ist-gut-4505887-0/>.

Low prices during the first year of supply are usually compensated by a significant price increase in the second (contract) year. Therefore, suppliers need to rely on their customers to not cancel their contracts after the initial contract period. In a market where many customers already have experience with supplier switches and are able to harvest the benefits, some discount suppliers ask their potential customers about the date of their last switch and reject customers that are likely to switch after one year.

Therefore, it is not surprising that the majority of customer complaints received at BNetzA<sup>118</sup> and the dispute resolution body<sup>119</sup> address supplier's contract management and service level in general, as well as incorrect bills that either contain unexpected price increases or do not contain promised bonuses. The 'GPKE' business processes on the other hand are well established and functioning, which is also documented by the low number of customer complaints and dispute settlement procedures about the switching process itself.

### 2.3.3 Competition performance

- 155 Competition performance is a reflection of both market structure and the conduct of suppliers and consumers, and as indicated at the beginning of the chapter, can be assessed through various performance indicators including mark-ups, wholesale-retail price relationship over time, consumer experience in the market (e.g. overall satisfaction with the market, trust in electricity/gas supplier, and the availability of information to inform decisions) and offers available to consumers.

#### 2.3.3.1 Mark-ups

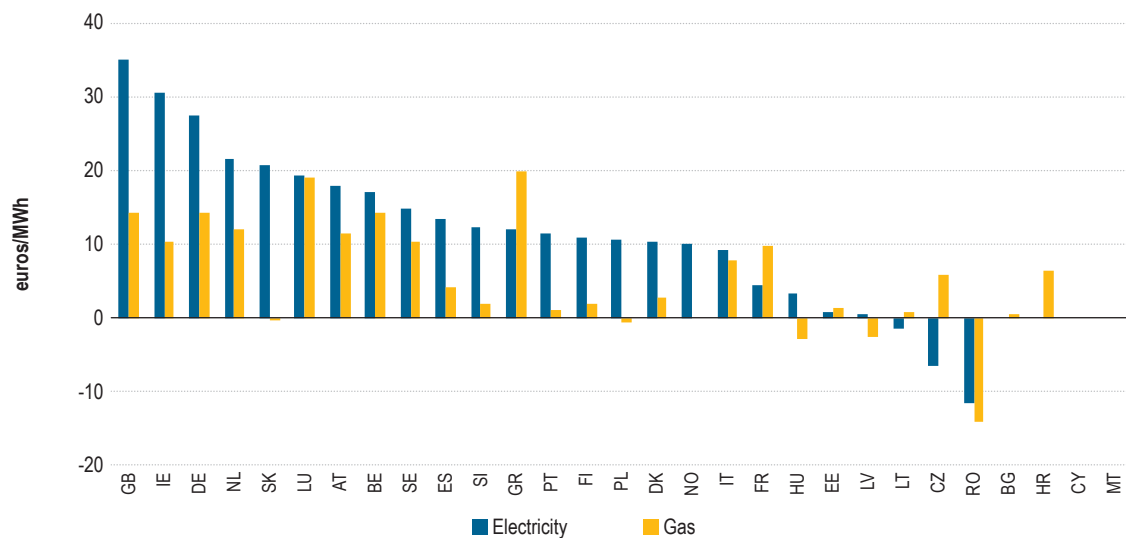
- 156 One of the key indicators of competition performance is the difference between the prices charged to consumers and the costs to supply them. The level of profit that suppliers earn can provide an insight into whether a market is subject to effective competition. High mark-ups can be a sign of a less competitive market, which should act as a signal to new entrants, while low mark-ups can signal that effective competition has reduced prices to an efficient level. This does not always hold if suppliers are insulated to some extent from competitive pressure by market interventions. In the case of markets with regulated prices, mark-ups may be high or low, but in any event competition is distorted.
- 157 Therefore, the Agency expects electricity and gas suppliers' gross profits (measured over a number of years) to be a good indicator of the extent of competition. If suppliers are highly profitable, in the absence of significant barriers to entry, new companies would see opportunities to profit and therefore enter the market. In doing so, existing suppliers' profits are likely to fall.
- 158 The 'profitability level' presented in the analysis was calculated by using, as a proxy, a mark-up defined as the difference between wholesale energy costs and the energy component of retail prices (i.e. the margin suppliers make from the difference in the costs they have for purchasing their energy and the energy component of the retail price charged to consumers). Clearly mark-ups are not the same as profits as suppliers have to pay additional operational costs (e.g. marketing, sales, customer services, overheads etc.) in bringing a product to market. However, the evolution of the mark-up may serve as a comparable proxy to minimum gross margin, and therefore as an indicator of the level of retail competition and the responsiveness of changes in energy retail prices to changes in wholesale prices. The evolution of the mark-up also shows that, if expressed in euros per MWh, mark-ups for electricity suppliers are almost always higher than the mark-ups for gas suppliers, but it is different if mark-ups are expressed in euro/consumer terms. It also shows that, if expressed in euros per MWh, mark-ups for electricity suppliers are almost always higher than mark-ups for gas suppliers, but it is different if mark-ups are expressed in euro/consumer.

118 See Bundesnetzagentur, Annual Report 2014, page 53.

119 See working report of the German ADR for the year 2013, page 11 ('Tätigkeitsbericht der Schlichtungsstelle Energie'), available at: <https://www.schlichtungsstelle-energie.de/presse/presseartikel/id-28-februar-2014.html>; figures for 2014 not yet available.

159 Figure 32 shows that estimated average mark-ups in the retail electricity and gas markets vary widely across countries and even among countries within the same region where the wholesale price is similar or the same (e.g. electricity mark-ups in the Nordic Region, which has a single power exchange). It also shows that, if expressed in euros per MWh, mark-ups for electricity suppliers are almost always higher than mark-ups for gas suppliers, but it is different if mark-ups are expressed in euro/consumer.

Figure 32: Average annual mark-ups in electricity and gas retail markets for households from 2008 to 2014 for electricity and from 2012 to 2014 for gas – (euros/MWh)



Source: ACER Database, Eurostat and European power exchanges data (2015) and ACER calculations.

Note: For Greece, the estimated electricity wholesale costs used for the comparison with the retail energy component include elements which are not purely energy-related (e.g. capacity payments, other uplift accounts) and represent an estimate of the average costs of all suppliers for supplying households and industrial consumers.

160 As indicated, mark-up differences can be partially explained by differences in suppliers' operating costs and/or expenditures incurred in acquiring and retaining consumers (i.e. mark-up is not fixed and can vary for the same supplier during campaigns and other times). These costs may be higher in countries such as Ireland, Great Britain and the Netherlands, where switching rates are relatively high and where suppliers face significant competition and therefore have higher sales, marketing and customer services costs. On the other hand, due to the high proportion of consumers on dual-fuel offers in these countries, costs to serve them could be arguably lower due to service synergies and economies of scale.

161 A principal factor driving the level of mark-ups are, *inter alia*, consumption levels. For example, the electricity mark-up in Sweden measured in euro/consumer would be almost as high as that in Great Britain, while in the above chart, Swedish mark-ups measured in euros/MWh rank relatively low. This is explained by the fact that in Sweden the average annual electricity consumption per household consumer is much higher than the European average (i.e. approximately 9,000 kWh versus 4,000 kWh). It is also worth mentioning that the estimate of wholesale procurement costs is based for most markets on a simulated hedging strategy as presented in Annex 6. In markets where an organised forward market was not available, the procurement costs are based on DA prices only, and this might have caused a slight underestimate of wholesale costs, hence a slight overestimate of mark-ups.

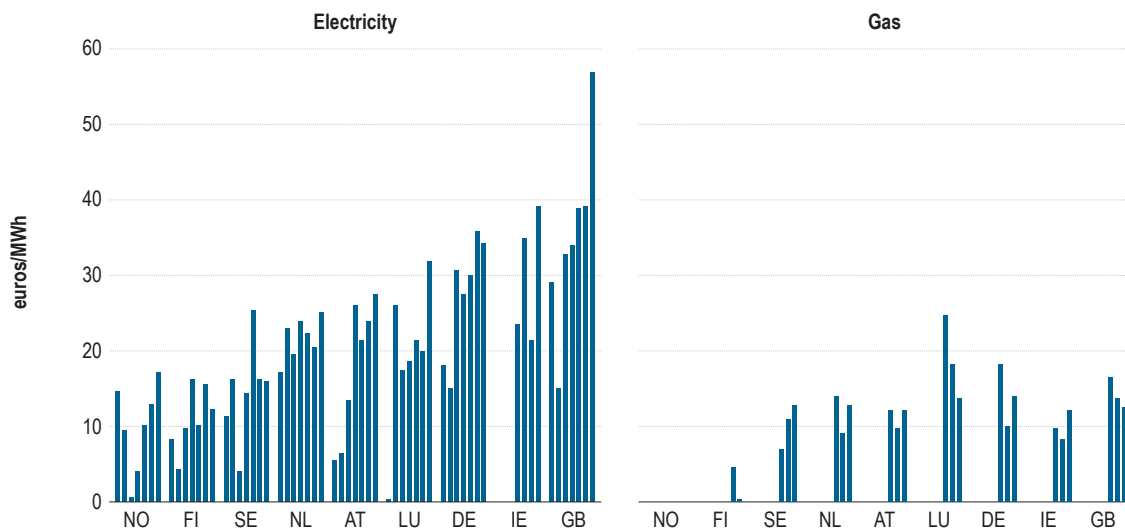
162 In some countries with regulated prices, mark-ups are negative because the retail price of the energy component is set at a level which seems to be below wholesale energy costs. This is the case in Lithuania,



Romania<sup>120</sup> and Hungary in electricity, and in Latvia, Hungary and Romania in the gas market<sup>121</sup>. This creates a dysfunctional market, not only because negative mark-ups mean that consumers are not facing the true cost of providing energy directly (and thus are not receiving the correct price signals regarding consumption), but also because this makes these markets highly unattractive for competing energy suppliers, as negative mark-ups constitute absolute barriers to entry. Actions by regulators or governments aimed at keeping energy prices below costs significantly increase regulatory risks, eventually to the detriment of consumers, and have a negative impact on investment.

- 163 Compared to last year’s assessment, the main changes in terms of mark-ups happened in the electricity markets for households in France and the Czech Republic. The French electricity mark-up moved from being slightly negative to the ‘positive territory’, mainly due to the significant fall in the wholesale electricity price over the past year<sup>122</sup>.
- 164 Figure 33 provides more details on the change in electricity and gas mark-ups for a selection of countries which do not apply price regulation, have relatively low market concentration, and perform relatively well based on the other indicators presented in this MMR (i.e. choice of suppliers and offers, switching rates, entry/exit activity, consumer experience etc.).
- 165 The data shows that even in some of these countries, electricity mark-ups have increased constantly over the observed period (e.g. Austria, Germany, Great Britain, Luxembourg, Ireland and, to a lesser extent, the Netherlands), while they are much lower in the Nordic countries (Norway, Finland and Sweden). Gas mark-ups are generally more stable, which can be explained by suppliers sourcing more gas long-term, either via forward hub products or via long-term supply contracts.

Figure 33: Electricity and gas mark-ups in a selection of countries with non-regulated retail prices from 2008 to 2014 for electricity and from 2012 to 2014 for gas (euros/MWh)



Source: Eurostat, NRAs and European power exchanges data (2015) and ACER calculations.

120 Retail electricity and gas mark-ups in Romania are calculated from official sources (i.e. Eurostat data on retail, OPCOM, the Romanian PX, on wholesale prices for electricity and long-term import contracts for gas). In electricity, regulated tariffs for non-households were removed, starting on January 1, 2014, and the energy component in the final price is based on wholesale market prices. If the gas wholesale price (which is regulated by ANRE) were used in the calculation, the gas mark-up in Romania would be positive.

121 Gas results correspond to the average mark-up values in 2012–2013. In 2013, Bulgaria shows a positive mark-up.

122 In France, suppliers can source their electricity by using a special mechanism, ARENH (‘Accès régulé à l’électricité nucléaire historique’ or ‘Regulated Access to Incumbent Nuclear Electricity’), which is a right that entitles suppliers to purchase electricity from EDF at a regulated price in volumes determined by the French energy regulator, CRE. Thus, part of their sourcing costs does not depend on the market price, but on the ARENH price if it is below the market price (this part of the sourcing costs may vary between 70 and 90%, depending on consumers’ profiles). The ARENH price was 40 euros/MWh between July 2011 and December 2011, and increased to 42 euros/MWh thereafter (the price was the same at the end of 2014), while the wholesale price on open the market fell significantly over the last year. Therefore, by sourcing cheaper energy directly on wholesale markets, instead at ARENH price, suppliers were able to raise their mark-ups.

- 166 As mentioned above, a high mark-up should trigger price competition, as there would be scope to gain market share by offering lower prices. Indeed, the theoretical link between mark-ups and such savings is confirmed in a comparison between Figures 24 and Figure 33. Figure 24 shows the annual savings that can be made by electricity consumers by switching from the incumbent standard offer to the lowest priced offer in the market. According to these data, the largest savings are available in countries which, according to Figure 33 feature higher mark-ups (e.g. Germany, Great Britain and the Netherlands).
- 167 Market entry and exit activity is another factor that seems to be influenced by mark-up levels. As higher profits attract new market entrants, this should in turn lead to more competition, lower prices, and less competitive players being forced to exit, and ultimately lower mark ups as the competition phase stabilises. Although the mark-up levels and entry/exit activity are correlated in some countries, based on available data there is not much evidence to show a clear pattern of positive relationships between the level of entry/exit activity and the level of mark-ups across all countries.
- 168 In countries where no significant entry of nationwide suppliers occurred (e.g. Bulgaria, Cyprus, Estonia, Malta in electricity household market, and Luxembourg, Lithuania, Latvia and Greece in gas) regulated prices and the initially low or negative mark-ups have led to low entry/exit activity in most cases. The exceptions are Luxembourg in the electricity market and Greece in the gas market. Luxembourg does not regulate retail prices and has high mark-ups, but the entry in the electricity market is still very low and no entry has occurred in the gas market. The small size of the market in a business featuring economies of scale is likely to influence entry/exit activity.

### 2.3.3.2 The relationship between wholesale and retail prices

#### Household segment

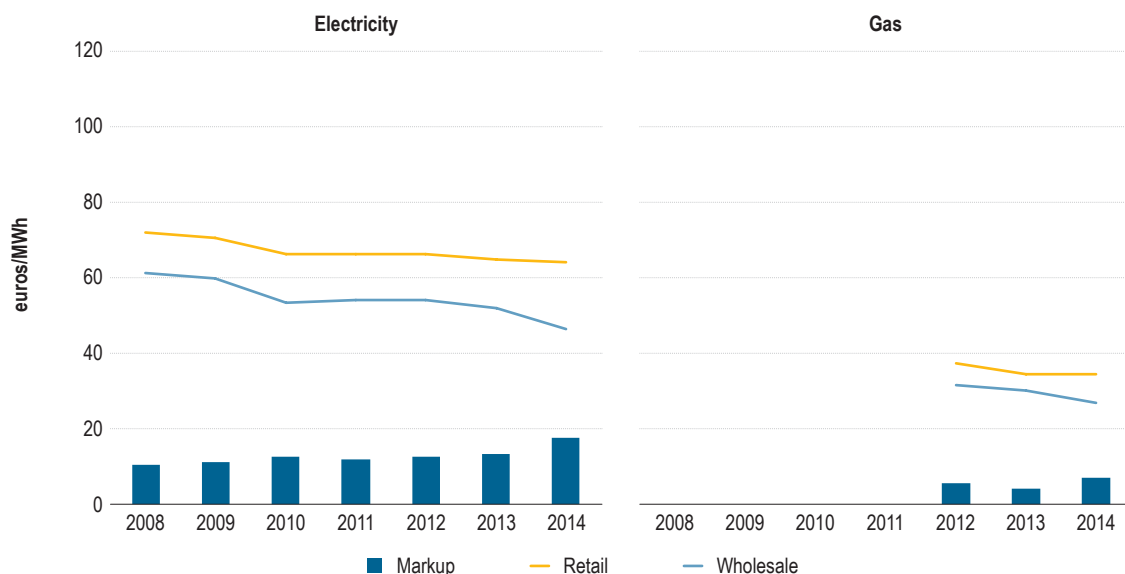
- 169 The degree of alignment between retail and wholesale prices over time is a proxy for the efficiency of retail competition<sup>123</sup>.
- 170 Figure 34 shows the responsiveness of the energy component of retail prices to changes in the wholesale price and the evolution of the mark-up over the 2008–2014 period for electricity and the 2012–2014 period for gas in countries without regulated prices<sup>124</sup>.
- 171 In electricity, the data show a relatively strong correlation between the two components from 2008 to 2011. The main divergences from this trend were observed over the 2011–2014, period where the decrease in the wholesale price was not followed by a similar decrease in the energy component of the retail price. Absent increases in other energy costs, this would have led to an increase in mark-ups over this period.
- 172 The correlation between the two components in the household gas market is better than in electricity, with a slight divergence between the wholesale and retail components observed only over the 2013-2014 periods<sup>125</sup>.

123 In the electricity market, these overall costs will include a range of variables, including generation, transmission and distribution, as well as operating costs for the supply business (e.g. metering, meter reading, billing, customer service and marketing).

124 See Annex 1 for the methodology applied.

125 Relevant gas data are only available over the period 2012–2014.

Figure 34: Relationship between the wholesale price and the energy component of the retail price and evaluation of mark-up in household segments in countries with non-regulated retail prices from 2008 to 2014 for electricity and from 2012 to 2014 in gas (euros/MWh)



Source: ACER Database, Eurostat, NRAs and European power exchanges data (2014) and ACER calculations.

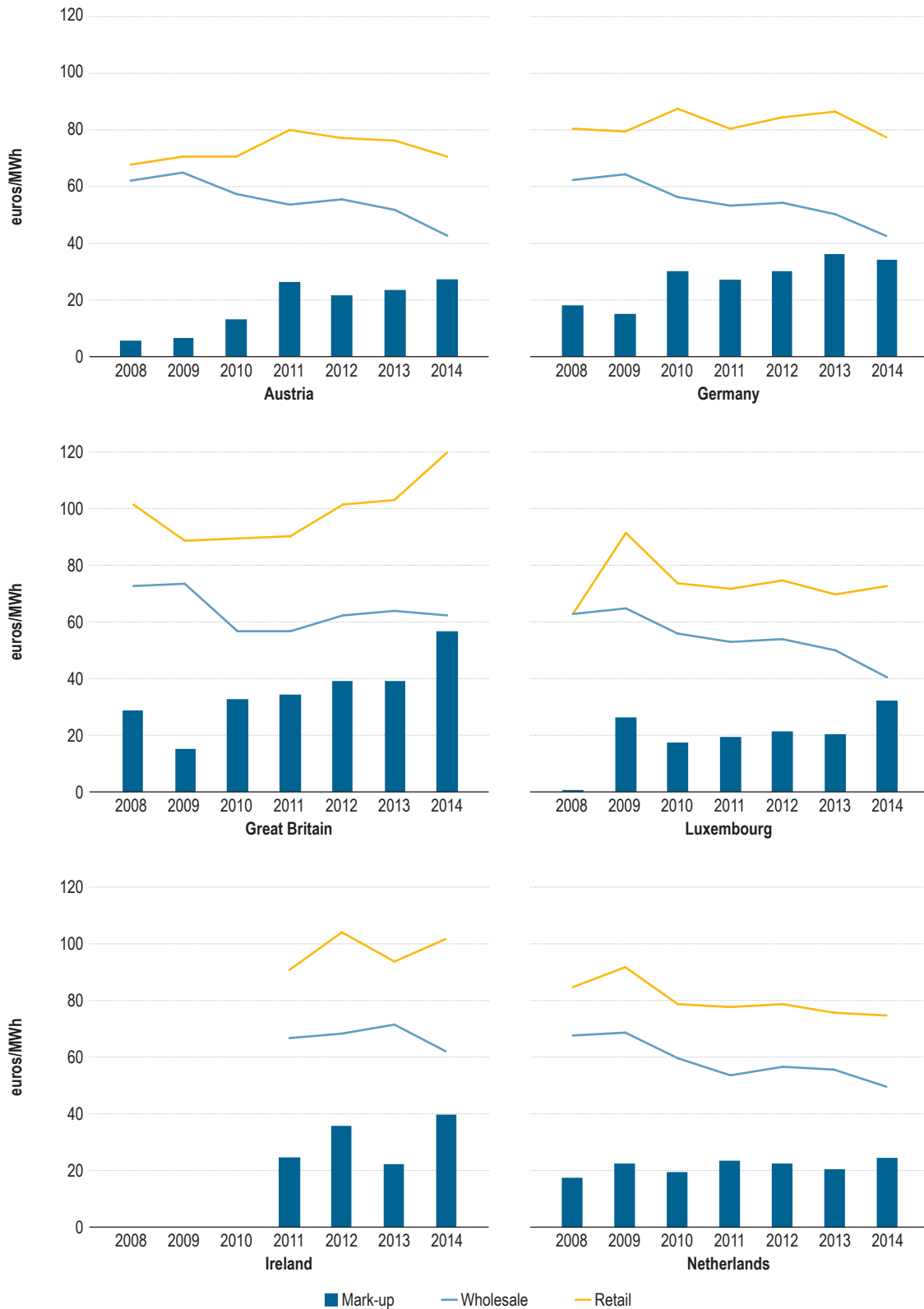
Note: Gas data are available only for the period 2012-2014.

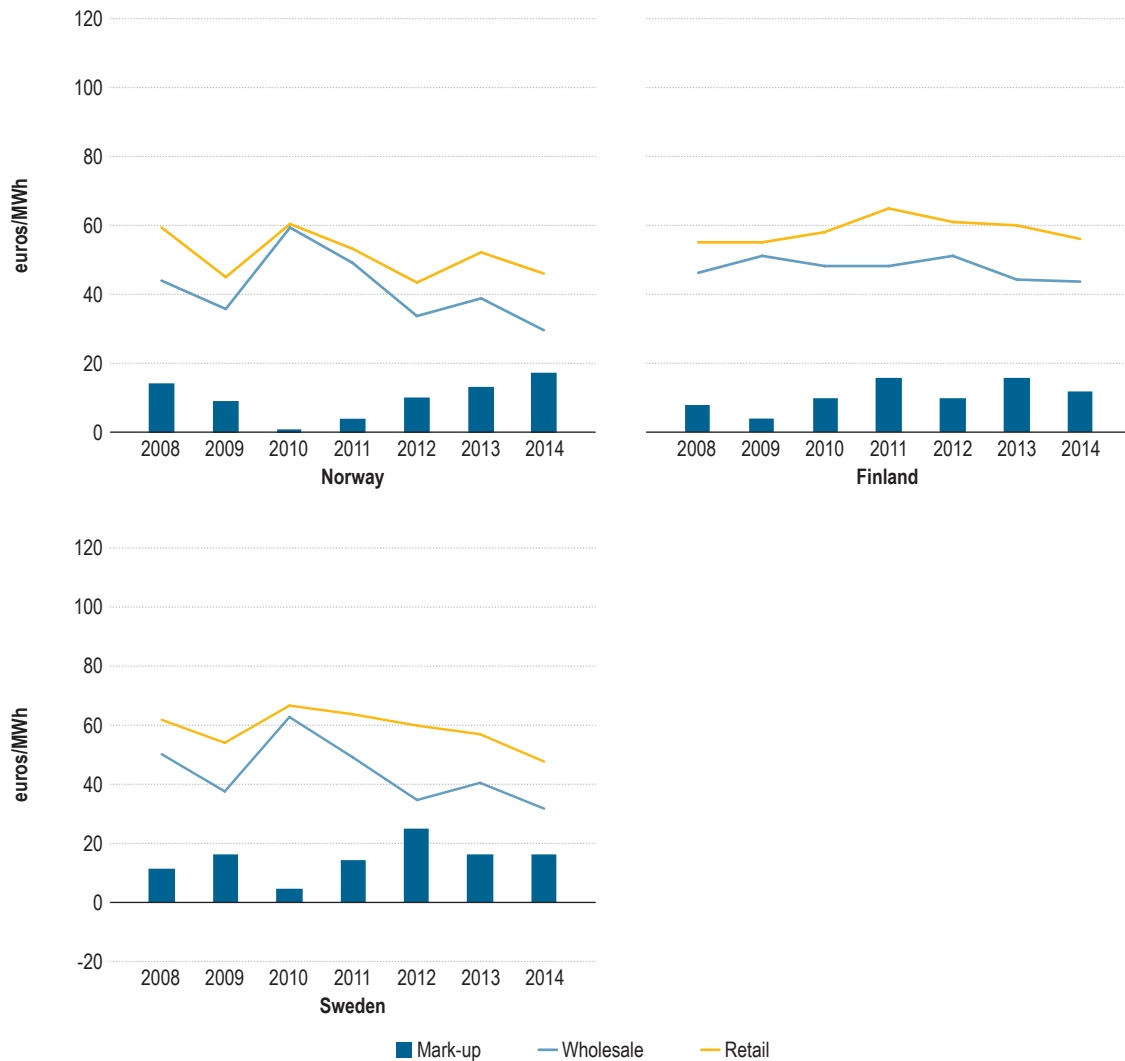
- 173 At a national level (Figure 35 and Annex 6) the degree of correlation between the energy component of retail prices and wholesale electricity prices is more varied. Some countries (e.g. Sweden, the Netherlands) continue to show moderately strong wholesale/retail price correlations, with Norway presenting the strongest correlation and relatively low mark-ups.
- 174 Conversely, in countries such as Austria<sup>126</sup>, Great Britain, Luxembourg and Ireland, the trend suggests a rising electricity mark-up during the observed period. In Austria, Germany and Luxembourg, the relatively stable energy components in retail prices did not reflect the observed decrease in wholesale prices<sup>127</sup>. Great Britain, Ireland and Luxembourg showed a particularly weak relationship between retail and wholesale prices and an increasing mark-up, particularly in Great Britain. The Netherlands showed a better correlation between the energy component of retail prices and the wholesale electricity price, but also a relatively high mark-up (i.e. over 20 euros/MWh).

126 Incoherencies between the development of electricity end-user prices and that of wholesale prices between 2008 and 2012 caused E-Control to instigate a market inquiry pursuant to section 21(2) Energie-Control-Gesetz (E-Control Act) in conjunction with section 34 E-Control Act and section 10 Elektrizitätswirtschafts- und -organisationgesetz (Electricity Act) 2010.

127 See the EC DG COM Energy prices and costs report indicating this trend [http://ec.europa.eu/energy/doc/2030/20140122\\_swd\\_prices.pdf](http://ec.europa.eu/energy/doc/2030/20140122_swd_prices.pdf).

Figure 35: Relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in electricity the household segment in a selection of countries with non-regulated retail prices from 2008 to 2014 – (euros/MWh)





Source: NRAs and European power exchanges data (2015) and ACER calculations.

- 175 In some of these countries, mark-ups seem to be higher than the values that could in principle be expected, posing questions about the extent of real price competition. Given the specificities of each country, the analysis of the relationship between wholesale and retail prices for electricity and gas markets merits further investigation by NRAs, similar to those already undertaken or still going on in Austria and Great Britain<sup>128</sup>.
- 176 Annex 6 shows that, in electricity, in some countries with price regulation or intervention in price-setting mechanisms, interesting developments were also observed. In France, for example, wholesale prices were below the regulated retail price reference<sup>129</sup>, allowing the presence of positive mark-ups, i.e. positive margins if the energy was procured in the power exchange only, something which was not the case in 2013. In Belgium, mark-ups went down in 2013, following the introduction of a price-freeze regulation in 2012, and went up again in 2014.
- 177 As illustrated in Figure 35 above and Figure A-14 in Annex 5, the energy component of retail and wholesale prices seem to correlate better in two groups of countries, but for different reasons. Prices correlate

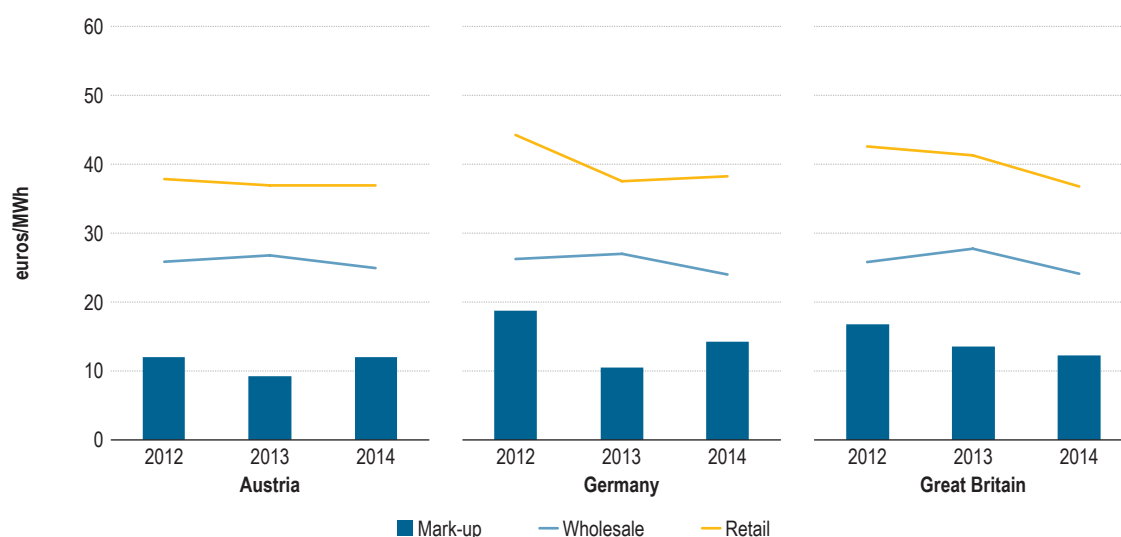
128 According to some national investigations on rising mark-ups (e.g. E-Control's supply probe, May 2014) no evidence of market abuse was found, but there are reasons for concern from a market efficiency perspective (among other issues, lack of consumer switching does not sufficiently discipline suppliers to be more cost-efficient). In GB, a market competition investigation that started at the end of 2014 is still in progress. The Competition Markets Authority (CMA) issued its provisional findings in July 2015, and the final decision is expected by June 2015. A key provisional finding concerns the existence of several features of the retail market, mainly weak customer response, that give incumbents unilateral market power to overprice their inactive customer base (standard tariffs have been found above the level that can be justified by underlying costs). The provisional view on profitability also indicates that retail prices have been above the level that would be expected in a competitive market. Ofgem will be working closely with the CMA on defining remedies to overcome the identified adverse effects on competition.

129 ARENH ('Accès régulé à l'électricité nucléaire historique' or 'Regulated Access to Incumbent Nuclear Electricity'). See footnote 123.

well in those more competitive markets where final retail prices are closely reliant on the wholesale market spot price (e.g. electricity markets in Norway, Sweden and Finland). A good correlation trend is also observed in certain countries featuring regulated retail prices (e.g. Denmark, Lithuania and Poland) where the energy component of final consumer retail prices is significantly more reliant on long-term wholesale contracts, the prices of which are usually more stable in time and where retail prices are set in a way that they closely follow changes in wholesale prices.

178 Although comparable gas data are available only for the 2012–2014 period, Figure 36 points to a better correlation between the two components than for electricity, i.e. retail gas prices follow fluctuations in wholesale prices closer than in the electricity household market in most countries. The data for all countries is presented in Figure A-15 in Annex 5.

Figure 36: Relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in gas household segments in a selection of countries with non-regulated retail prices from 2012 to 2014 – (euros/MWh)



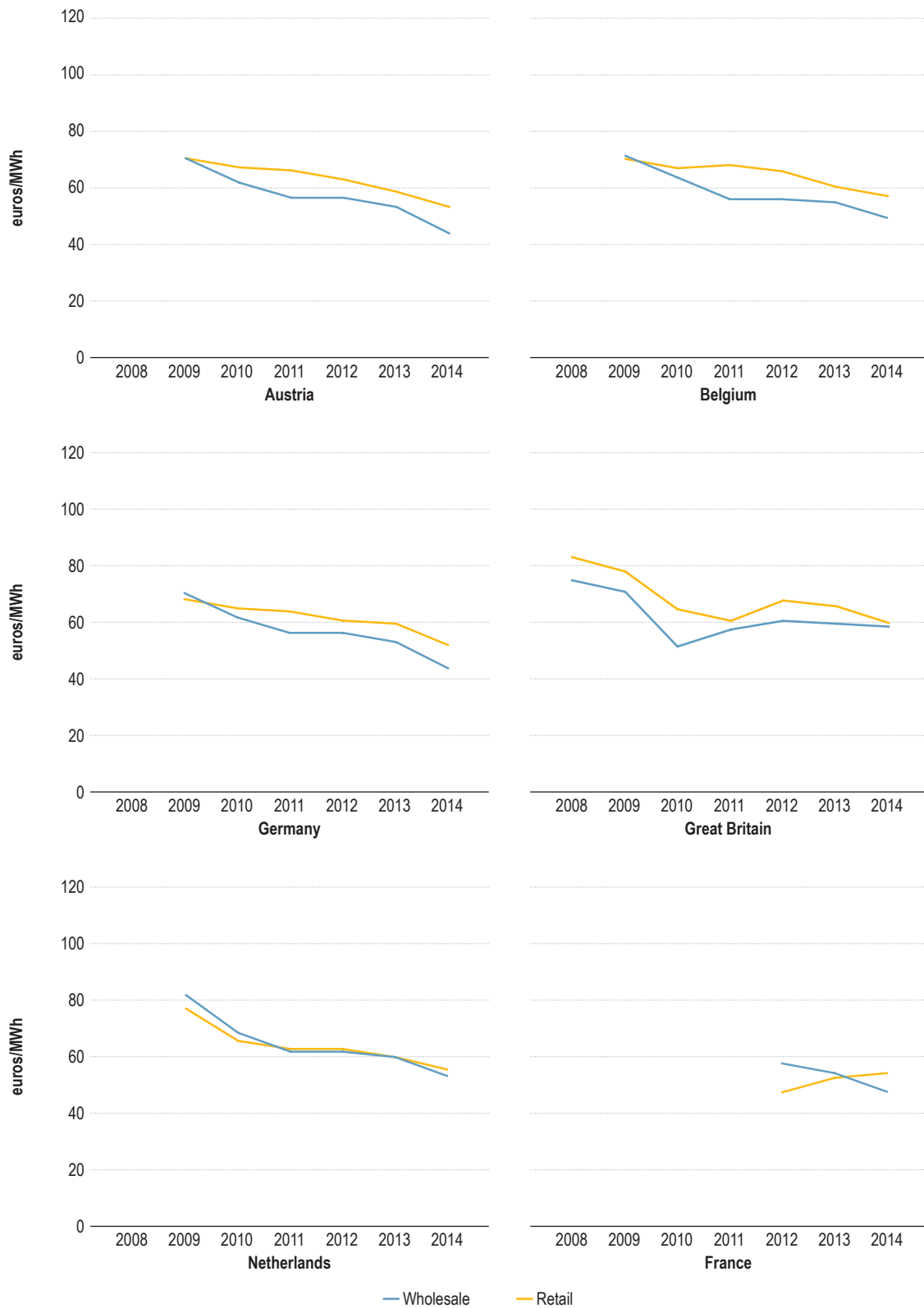
Source: ACER Database, Eurostat, NRAs and European power exchanges data (2014) and ACER calculations

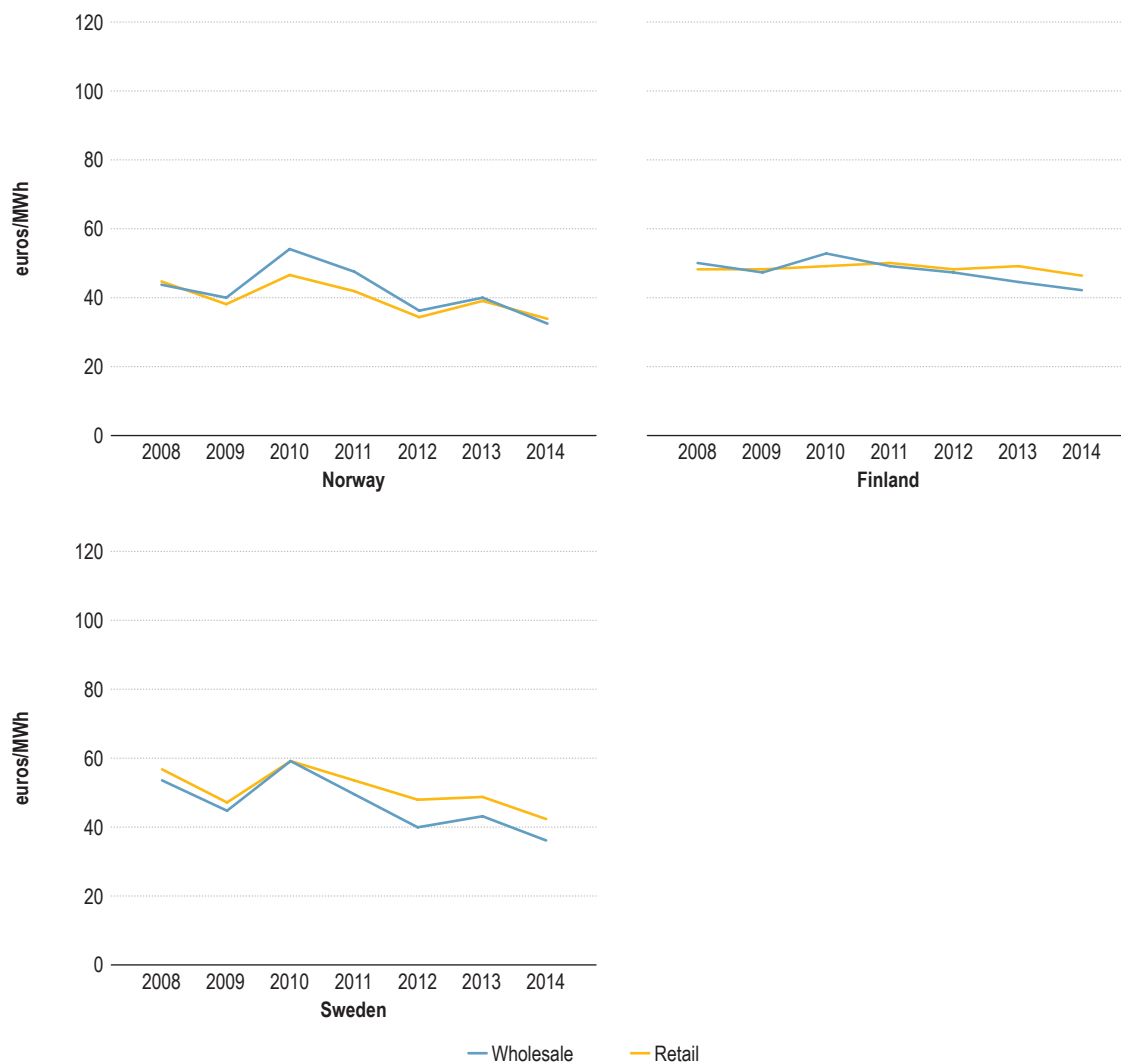
### Industrial segment

179 The findings presented in Figure 37 show more wholesale price responsiveness in the industrial segment of the electricity retail market than the household segment<sup>130</sup>, strongly suggesting that industrial consumers are benefiting from competition to a greater extent than household consumers.

130 Due to the lack of data on gas, this analysis was performed only for electricity (i.e. the data on the energy component for industrial gas consumers over time are not available from Eurostat's energy price break-down data).

Figure 37: Relationship between the wholesale price and the energy component of the retail electricity price in the industrial segment in a selection of countries with non-regulated prices – 2008–2014 (euros/MWh)





Source: NRAs and European power exchanges data (2015) and ACER calculations.

### 2.3.3.3 Consumer experience and satisfaction

- 180 Information about consumers' experience of the household electricity and gas markets is a key aspect for assessing the overall performance of these markets. Consumer satisfaction can be viewed as an indicator of the extent to which competition in the market is working for customers. Consumers' views are also important indicators of whether suppliers are responding adequately to changing consumer preferences; if consumers are not satisfied with their current supplier, they are more likely to switch and thereby foster competition in the market.
- 181 This section, therefore, considers the overall performance of the retail electricity and gas markets from the consumer perspective and explores some of the constituent elements of the overall performance (e.g. expectations, trust and comparability) in more detail.



- 182 According to the 10<sup>th</sup> edition of Consumer Scoreboard<sup>131</sup>, which is based on consumer survey<sup>132</sup> and expressed in a composite Market Performance Index (MPI)<sup>133</sup>, electricity services rank 28<sup>th</sup> and gas services 22<sup>nd</sup> among the 31 markets for services across the EU. Therefore, both markets (i.e. electricity and gas retail market) are considered as low performing markets.
- 183 In order to assess consumers' experiences in electricity and gas household markets in the EU MSs and Norway, the Agency obtained the data from a customer survey undertaken for the European Commission's Directorate-General Justice, used it to compile the Consumer Scoreboard and analysed it to understand how competition works at the level of the individual electricity and gas household consumer.
- 184 Figure 38 shows large differences between the top-ranking and bottom-ranking countries in the markets for electricity and gas services, measured by composite indices MPI and MPIsc<sup>134</sup>. This is particularly true for the electricity markets, where consumers in Bulgaria and Spain perceive their markets to be functioning poorly (measured by the composite MPI Index). This is also the case in Croatia and Latvia (measured by the composite MPIsc Index).

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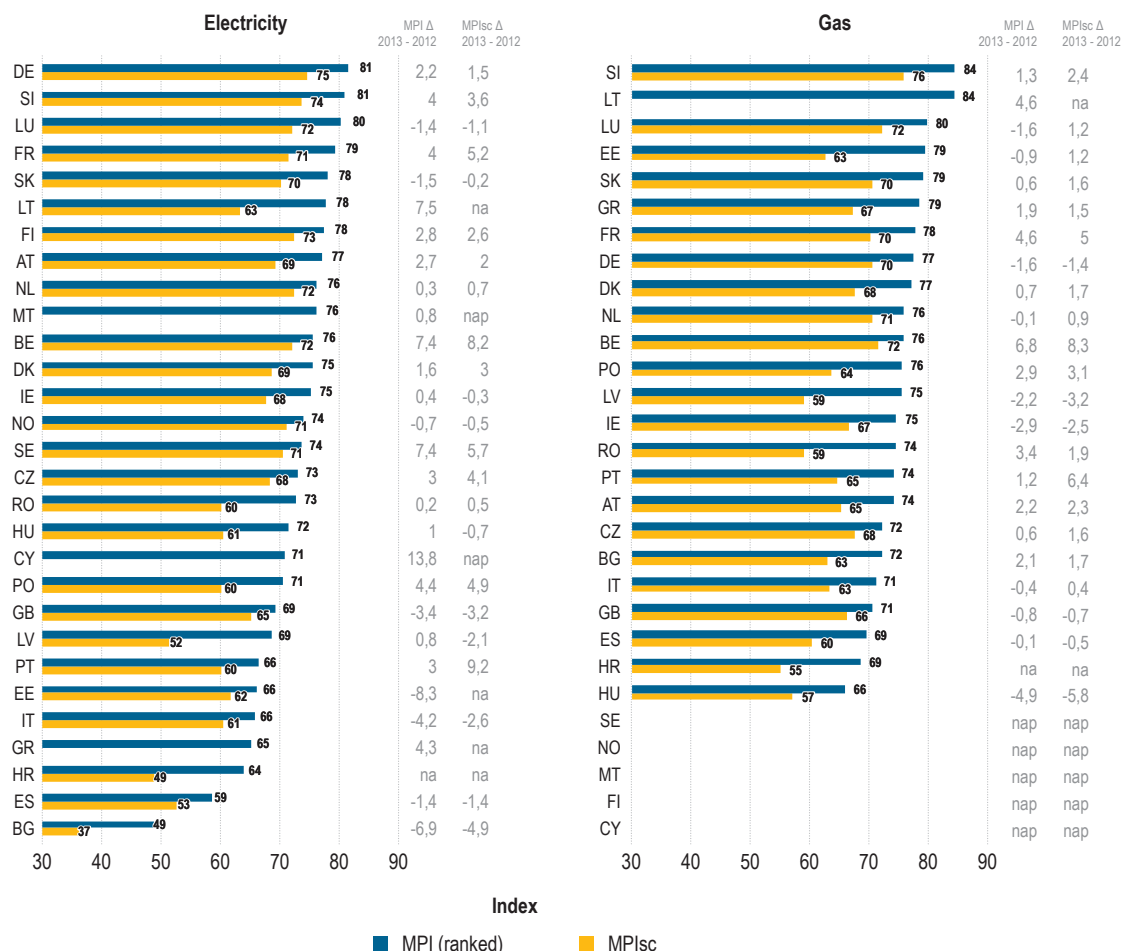
131 The EC DG Justice and Consumer's 'Consumer Markets Scoreboard' which provides at the EU-wide level a quantitative assessment of how different markets worked for consumers. The 10th edition of Consumer Market Scoreboard published is available at: [http://ec.europa.eu/consumers/consumer\\_evidence/consumer\\_scoreboards/10\\_edition/index\\_en.htm](http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/10_edition/index_en.htm).

132 The 2013 edition of the Market Monitoring Survey is available at: [http://ec.europa.eu/consumers/consumer\\_evidence/consumer\\_scoreboards/market\\_monitoring/index\\_en.htm](http://ec.europa.eu/consumers/consumer_evidence/consumer_scoreboards/market_monitoring/index_en.htm). The 'Market Monitoring Survey' which has been used as the main statistical source for the Scoreboard has been produced annually from 2010 to 2013. However, from 2013, it will be available only every other year and therefore as data for 2014 are lacking and data for 2013 are used instead.

133 The MPI is a composite index based on the results of survey questions on four key aspects/components of consumer experience: (1) expectations (i.e. the extent to which the market lives up to what consumers expect); (2) the ease of comparing goods or services; (3) consumers' trust in suppliers to comply with consumer protection rules; and (4) the experience of problems and the degree to which they have led to complaints. These four aspects of consumer experience are equally weighted when creating the overall score.

134 MPIsc is the MPI supplemented with 'choice' and 'switching' components and is used only in markets where it is possible to switch services and providers.

Figure 38: Overall performance of markets for electricity and gas services by country – 2013 and change on 2012 (index)



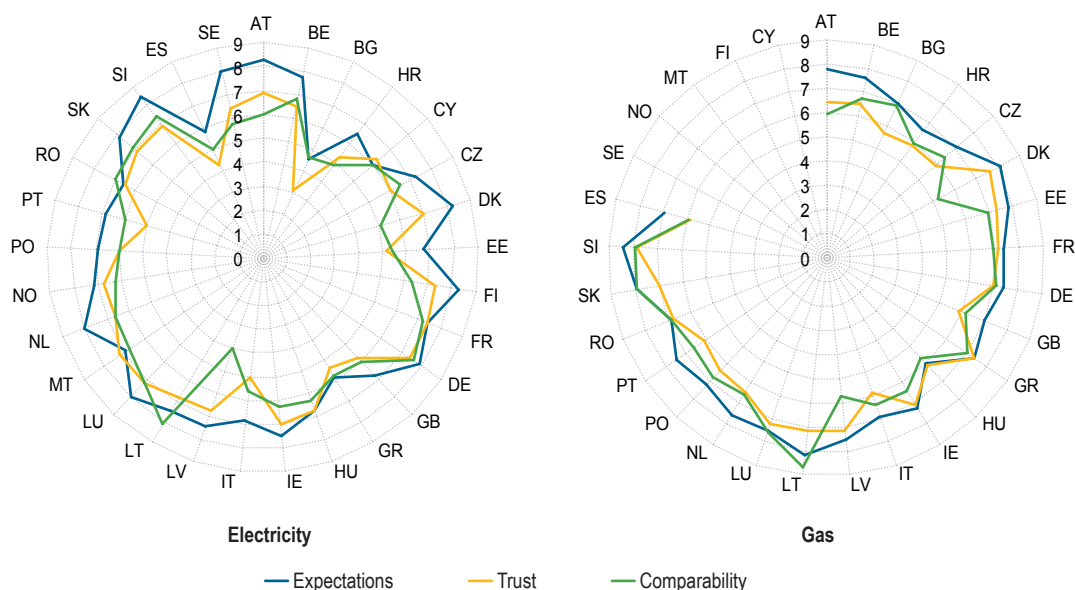
Source: DG Justice and Consumers (2014).

Note: It was not possible to conduct interviews for both electricity and gas markets in every country as: (i) gas markets do not exist in some countries; and (ii) in some countries, these markets are monopoly markets and therefore the questions about the switching component and the choice component were not asked for these specific markets. The EC survey was done for the UK rather than GB.

- 185 The results show that, in 2013, electricity household consumers in Slovenia, Germany and Luxembourg, and gas household consumers in Slovenia, Lithuania and Luxembourg had the most positive experience (i.e. they are the best scoring countries over all elements).
- 186 It is also notable that all countries perform much better on the MPI Index which, as opposed to the MPIsc Index, excludes ‘choice’ and ‘switching’ components. The results suggest that, generally, consumers are not satisfied with the choice of product and do not find the switching process easy.
- 187 Compared to 2012, the electricity markets in Cyprus, Lithuania and Belgium and gas markets in Belgium, Lithuania and France have improved the most. The largest drop in performance has been noted in some of the worst performing electricity markets, such as Estonia (-8.3) and Bulgaria (-6.9). On the other hand, gas markets have generally recorded much lower drops in performance, with the highest drop recorded in Ireland (-2.9).
- 188 Figure 39 shows again that consumers’ views of the individual components of the composite indices (i.e. satisfaction, trust and comparability of offers)<sup>135</sup> differ widely from one country to another.

135 The ‘expectations’, ‘trust’ and ‘comparability’ components are analysed in this section. ‘Choice’ and ‘switching’ components are discussed in the section on switching, and ‘problems’ and ‘complaints’ in the ‘Consumer protection and empowerment’ chapter.

Figure 39: Consumer’s expectations, trust and perceived offer comparability in retail electricity and gas household markets – 2013



Source: DG Justice and Consumers (2014).

Note: It was not possible to conduct interviews for both electricity and gas markets in every country as: (i) gas markets do not exist in some countries; and (ii) in some countries, these markets are monopoly markets. The EC survey was done for the UK rather than GB.

‘**Expectations**’ is a dimension that measures the extent to which the market generally lives up to what consumers want, assessed with the question: “On a scale from 0 to 10, to what extent did the products/services on offer from different retailers/providers live up to what you wanted within the past year?”

‘**Trust**’ measures the extent to which consumers are confident that suppliers, or providers, respect the rules and regulations that protect the consumer. Trust measurement is based on one question: “On a scale from 0 to 10, to what extent do you trust retailers/providers to respect the rules and regulations protecting consumers?”

‘**Comparability**’ reflects the ability of consumers to compare between products or services as they are offered by different suppliers or providers in the market, and implicitly includes a price and quality comparison. This topic was assessed with one question: “On a scale from 0 to 10, how difficult or easy was it to compare the products/services sold by different retailers/offered by different service providers?”

189 The results of the consumer survey suggest that consumers in some countries are not satisfied with their supplier (Bulgaria and Greece for electricity and Croatia and Romania for gas), have low trust in suppliers (Bulgaria and Italy for electricity and Bulgaria and Great Britain for gas) and do not find the price comparisons easy (Bulgaria and Latvia for electricity and Denmark and Latvia for gas). The high difference between the scores for different components is a clear indication that performance in these markets is highly country-dependent and should be addressed by appropriate national actions.

### 2.3.4 The relative level of competition

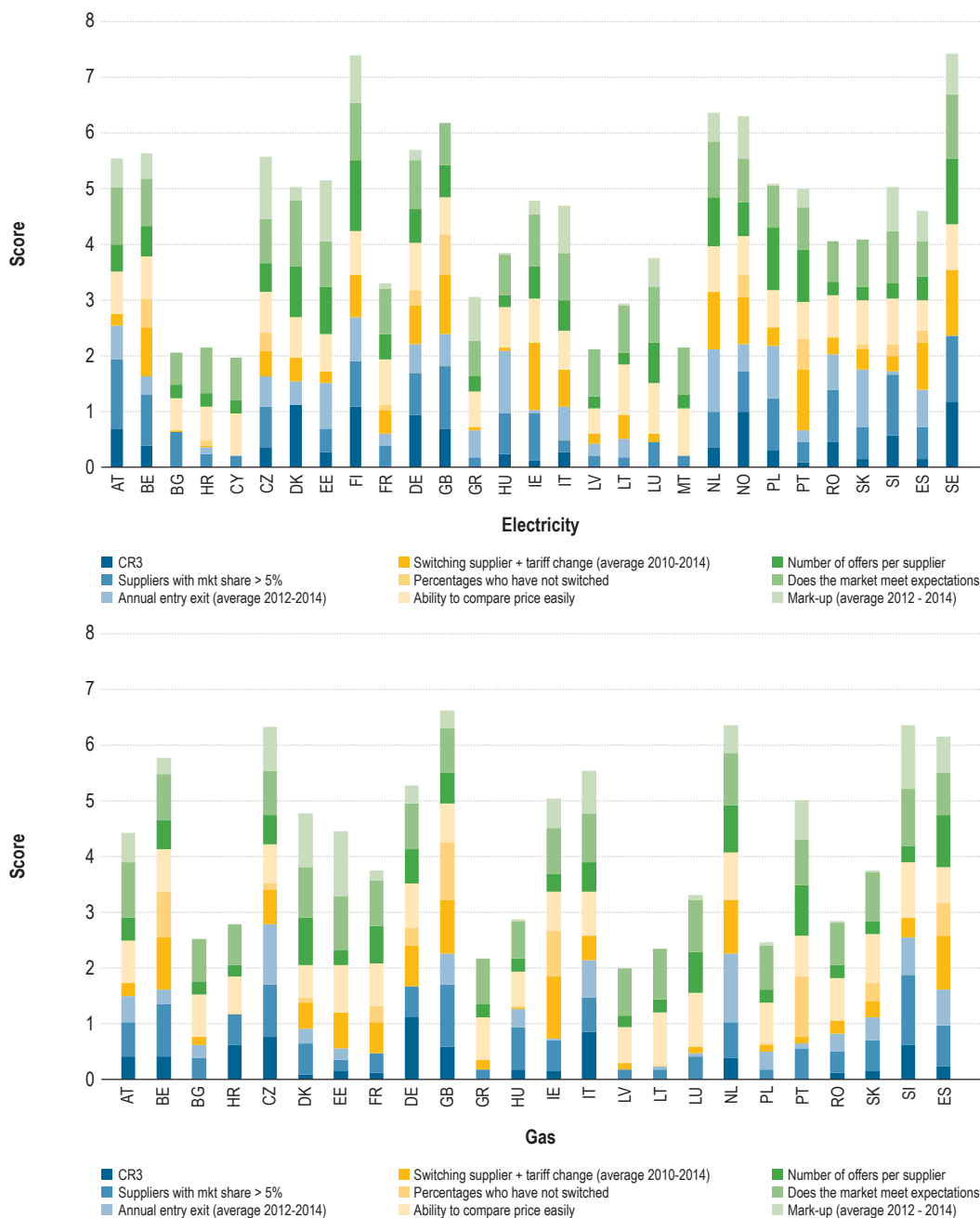
190 In previous MMRs, the performance results of national retail markets were summarised in a section that categorised countries’ relative level of retail markets competition. A summary provided the ranking of the MSs’ markets based on the indicators used in the main analysis of the Report.

191 This year, the Agency created a composite index, the ‘ACER Retail Competition Index (ARCI)’, using a representative selection of the most important indicators presented and analysed in this chapter. It allows the results of the individual indicators to be summarised in a more comprehensive way and, on this basis, provides an indication of the relative performance of competition in MS’s retail markets. For consistency and for comparison reasons, the individual indicators that were developed over the last three years and that were presented in the respective previous MMRs were used for ARCI. Detailed data have been collected for these indicators in close cooperation with the NRAs.

192 To ensure the robustness of the composite index, the Agency commissioned an independent study to

- develop a methodology for its development. Annex 7 provides a summary. The methodology developed for ARCI is likely to evolve over time, because, as with other indicators in this Report, the in-depth understanding of how these markets function can advance. Moreover, access to better and more detailed data may render more sophisticated indicators.
- 193 The methodology for the development and dissemination of a composite index comprised three main steps: i) selecting the indicators; ii) combining the indicators; and iii) presenting the results. Based on the three previous years of work, the Agency has successfully collected detailed data on retail markets. Based on this, a range of indicators have been presented in previous MMRs. From all the potential indicators available, a selection was made based on factors such as the relevant literature (e.g. the structure-conduct-performance framework was followed) and expert's views. Attention was paid to avoid the duplication of indicators measuring the same (e.g. a CR4 measures the same as a HHI) and to the quality of available data. In total, with the input of NRAs, the Agency chose nine indicators to be part of ARCI. Each indicator was given equal weight. Lastly, to present the ARCI results, grouping MSs was considered, but it was not clear what the threshold levels should be to categorise them in different groups. Therefore, the MSs are presented separately.
- 194 The ARCI is intended to provide a useful comparison of relative levels of competition, but the methodology, as with any methodology, is subject to assumptions and imperfections which need to be considered when interpreting the results. The key caveats include the following. First, ARCI is based on individual indicators. Any weakness in these indicators and in particular the underlying data will inherently bear on the ARCI results (e.g. the granularity of the indicators and/or data may not sufficiently show country specific particularities). Second, the selection of the individual indicators may need to be expanded in the future if important indicators or new aspects become available. Third, some data were missing and proxy data had to be used. Further improvement in data availability and quality in the future will enhance the ARCI results. More detail on this is contained in Annex 7.
- 195 Finally, as in the case with individual indicators, ARCI shows only the relative level of competition at national level. Although the regional and/local dimension (e.g. existence of strong local and/or regional markets in a number of countries; the significant variety of suppliers in Germany in combination with the number of network areas etc.) is also very important for a complete assessment of the level of competition in a particular country, this level of analysis is beyond the scope of this MMR.
- 196 The 2014 ARCI results for electricity and gas household retail markets in each MS and in Norway are presented in Figure 40. The figure shows large differences between the retail market relative competitive levels at the national level. The height of the bars shows the scoring ranging from zero (low level of competition) to nine (high level of competition). The differences in the coloured areas within each bar shows the contribution from each individual indicator.
- 197 The retail markets for households where, according to the ARCI, competition is the most advanced are, for electricity, those in Sweden, Finland, the Netherlands, Norway and Great Britain and, for gas, those in Great Britain, the Netherlands, Slovenia, the Czech Republic and Spain. This list does not preclude other MSs with well-functioning markets. On the other hand, the index shows weak retail market competition in electricity markets for households in Latvia, Bulgaria and Cyprus and gas markets in Lithuania, Greece and Latvia.

Figure 40: ACER Retail Competition Index (ARCI) for electricity and gas household markets – 2014

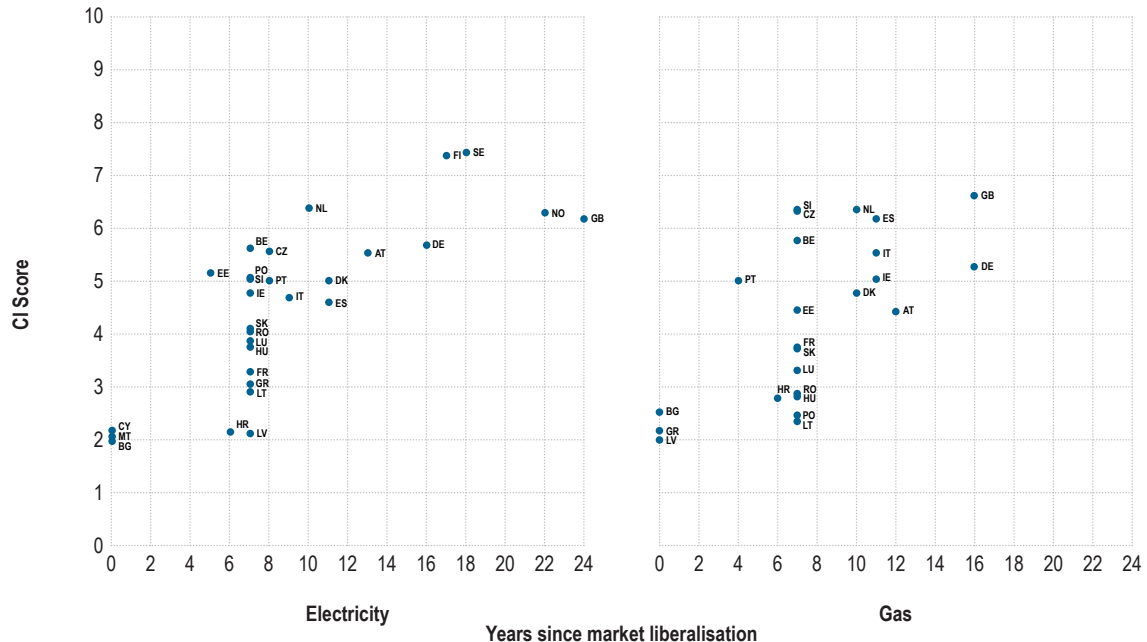


Source: ACER Database, CEER National Indicators Database, DG Justice and ACER calculations based on IPA Advisory’s methodology.

- 198 In general, the relative performance results show that there is scope for further improvement in all markets. The potential for improvement is also higher in gas than in electricity. It is worth mentioning that this is a relative presentation comparing the countries against the best performing market. This implies, therefore, that even the best performing markets could still improve more. Note further, that the statistical differences between countries are often very small.
- 199 The results also indicate that high market concentration, low entry-exit activity, limited choice for consumers (in terms of number of offers per supplier) and low or non-existent switching rates contribute most to the low scores in less competitive markets. Therefore, the focus of efficient remedial actions in these markets should be on these areas. It is also evident that, the level of competition in countries with regulated household prices is much lower than in countries that do not regulate them, with the exceptions of the gas markets in Spain and Denmark.

200 Figure 41 illustrates the positive relationship between the level of competitiveness and the time since market liberalisation, showing that overall scores tend to be higher in markets which were liberalised earlier.

Figure 41: The relationship between the level of competition and time since market liberalisation – 2014 (score, years)



Source: ACER Database, CEER National Indicators Database, DG Justice and ACER calculations based on IPA Advisory’s methodology.

201 However, the figure also shows that competition in markets which were liberalised later (i.e. in 2007) developed at different speeds, as some of these markets are already relatively competitive (e.g. electricity markets in Belgium and Poland and gas markets in Belgium, the Czech Republic and Estonia) while other markets lag behind (e.g. electricity markets in Greece, Lithuania and Latvia and gas markets in Lithuania, Hungary and Poland).

202 Although, the different time of market liberalisation is one of the main factors explaining the fact that competition at a national level in retail electricity and gas markets for households is at different stages in different countries, other factors such as the speed of market reforms (e.g. privatisation and unbundling of the industry, slow introduction of competition and transposition/implementation of Energy Directives etc.) impact competition.

### 2.3.5 Conclusion

203 The retail electricity and gas markets for households are highly concentrated at the national level in the majority of countries. Despite increasing cross-border entry, retail markets remain largely national with varied (i.e. non-harmonised) regulatory frameworks across countries.

204 The majority of electricity and gas household consumers do not participate actively in the market by exercising choice among available suppliers or among price and product offerings which lowers competitive pressure on suppliers. As a result, the proportion of electricity and gas household consumers with an alternative (i.e. non-incumbent) supplier is still very low in all but a few MSs: Great Britain (both markets), Norway in electricity and Germany, Spain and Ireland in gas markets.

205 High market concentration and low switching activity by consumers leads to weak competition and high retail prices, despite falling wholesale prices. In addition, in several markets which have a relatively low level of market concentration and perform well on other measures of market competition, the link between electricity wholesale prices and the energy component of retail prices is still weak and points to potential competition problems (e.g. electricity household markets in Austria, Great Britain and Germany). On the

other hand, the strong link between wholesale prices and the energy component of retail prices in retail electricity markets for industrial consumers implies that this segment is benefiting more from stronger retail competition.

- 206 According to ARCI, the most competitive retail household markets are the electricity markets in in Finland, Norway, Sweden, the Netherlands and Great Britain and the gas markets in Great Britain, the Netherlands, the Czech Republic, Slovenia and Spain. On the other hand, the index shows weak retail market competition in the electricity markets for households in Latvia, Bulgaria and Cyprus and gas markets in Lithuania, Greece and Latvia.
- 207 Finally, the maturity of markets – expressed in the number of years since liberalisation – remains one of the main factors determining the level of competition at the national level in retail electricity and gas markets for households.

## 2.4 Barriers to efficient retail market functioning

- 208 This section analyses some of the possible barriers that hinder the functioning of the retail electricity and gas markets across all MSs and Norway and suggests possible improvements that could facilitate their better functioning.

- 209 In this regard, the section looks at: (i) intervention in price setting mechanisms<sup>136</sup> in the retail electricity and gas markets, including an update on regulated end-user prices which includes a case study from Spain on the main characteristics of the new system of price regulation (Precio Voluntario al Pequeño Consumidor, PVPC) which has been in place since early 2014; (ii) consumer switching, with a case study on BEUC-organised collective switching campaigns; and (iii) other potential barriers to efficient retail market functioning, such as wholesale market liquidity.

### 2.4.1 Intervention in retail price setting mechanisms

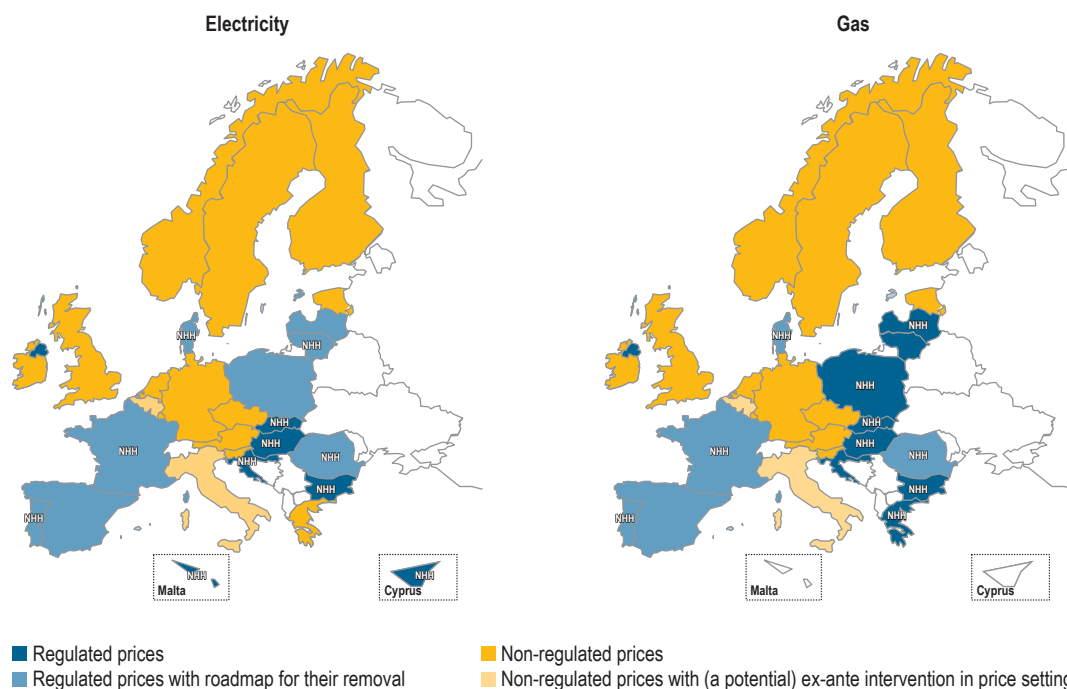
- 210 As pointed out in last year's MMR, in countries where regulated end-user prices exist, competition is compromised. This is particularly true for markets where retail end-user prices are regulated and set below costs (i.e. without taking into consideration wholesale market prices and other supply costs). Artificially low regulated prices (even without pushing them below costs) limit market entry and innovation, prompt consumers to disengage from the switching process and consequently hinder competition in retail markets. In addition, they may increase investor uncertainty and impact the long-term security of supply. Furthermore, regulated prices (even when set above costs) can act as a pricing focal point which competing suppliers are able to cluster around and – at least in markets featuring strong consumer inertia – can also considerably dilute competition.
- 211 In this Report, a regulated end-user price is considered as a price subject to regulation or control by public authorities (e.g. governments, NRAs), as opposed to being determined exclusively by supply and demand. This definition includes many different forms of price regulation, such as setting or approving prices, standardisation of prices or combinations thereof. The analysis in this section focuses solely on the regulation of the energy component of retail prices and excludes any discussion on the regulation of network prices.
- 212 Regulated prices for household consumers are sometimes justified by NRAs on the basis of the need to protect vulnerable consumers and/or to fulfil public service obligations (PSO) under Articles 3 of Directives 2009/72/EC and 2009/73/EC. In the case of PSOs, the price regulation must satisfy the legal requirements of these Articles and should only be in place for a certain transitory period, with a clear roadmap for phasing it out. Other forms of (price setting) intervention, such as the 'single buyer' (Acquirente Unico) and standard offer prices in Italy, 'Safety net regulation' in Belgium and 'Tariff Surveillance' in the Netherlands, may also have an impact on market competition, but as explained below in more detail, this is not always the case.

136 This includes end-user price regulation and any other kind of intervention in the price-setting mechanisms which are not considered as pure end-user price regulation.

## The existence and coverage of regulated prices

- 213 Figure 42 illustrates whether retail end-user prices in the electricity and gas household and non-household markets are regulated and whether there are any kinds of intervention in the price setting mechanism which are not considered to be (pure) price regulation<sup>137</sup>.

Figure 42: The existence of regulated prices in the EU MSs and Norway – December 2014



Source: CEER National Indicators Database.

Notes: NHH indicates countries where the non-household market segment is also price regulated. Cyprus and Malta do not have retail gas markets, while the Nordic countries (Finland, Norway and Sweden) have relatively small retail gas market.

- 214 The figure shows that the number of countries with regulated household prices in December 2014 is almost unchanged from 2013 and therefore remains high (i.e. in 14 countries for electricity and 14 countries for gas). Several countries also have regulated prices in the industrial segment (9 in electricity and 10 in gas).
- 215 The great majority of MSs with regulated household prices regulate prices in both the electricity and gas markets. The exception is Greece, which has regulated prices in the gas household market, but not in the electricity household market. By contrast, in a minority of countries, retail prices are fully liberalised and there is no government intervention apart from social security policies. Compared to the situation in 2013, only one country, Ireland, removed end-user price regulation in the retail gas market for households.
- 216 As already mentioned, two countries (Italy and the Netherlands) do not regulate retail prices, but do have some kind of 'intervention in price-setting mechanisms'.
- 217 Under the 'single buyer' (Acquirente Unico) model which exists in Italy, the electricity which is consumed under the standard offer is procured in the market by a single buyer and resold to standard offer retailers in accordance with, and with direction from, the NRA at prices which reflect single buyer's recognised costs. As pointed out in last year's MMR, standard offer prices in Italy are based on market conditions and do not distort competition among suppliers however they may still be a pricing focal point for suppliers, be considered by consumers as a safer option than a competing offer, and may reduce the propensity of consumers

<sup>137</sup> In this Report, all MSs which regulate end-user prices to consumers which are not defined as vulnerable consumers are classified as countries with regulated prices, and the differentiation between them is based on whether or not they have a clear roadmap for phasing out regulated prices.



to seek better offers. As a consequence, as part of effort to further promote competition in the retail energy market<sup>138</sup>, the Italian Government is considering the possibility of gradually removing, from 2018, the standard electricity and gas tariff regime, provided, in its assessment, general market conditions allow it.

- 218 From the 1 January 2013, the retail energy markets in Belgium are subject to safety net regulation, which tackles the issue of price volatility and the complexity of pricing formulas through the following: (i) indexation of variable pricing formula is subject to CREG's supervision and is limited to four times a year (at the beginning of each quarter); (ii) checking the indexation formulas used by suppliers against a list of set criteria to obtain transparent parameters linked to energy exchanges instead of those developed by suppliers (CREG approves both the parameters and their values); and (iii) enabling on-going comparison of energy prices in Belgium with prices applied in neighbouring countries (i.e. the Netherlands, Germany and France), used by CREG to analyse price increases announced by suppliers, as all planned price increases which are not directly linked to the evolution of indexation parameters have to be motivated by the supplier in an *ex-ante* procedure.
- 219 'Tariff Surveillance' in the Netherlands means that all energy prices must be submitted to the Dutch regulator ACM, which has the right to force suppliers to lower their prices if they judge them unreasonable. However, the regulator has so far never formally exercised this right, so prices are in practice determined in the competitive market. In addition, ACM's report shows that this practice still offers enough room for tariff differentiation and has not acted as a barrier to market entry. This practice of 'overseeing prices' does not fall under the definition of regulated prices and, therefore, it is considered that household prices in the Netherlands are not regulated.
- 220 Table 1 shows the year of final market opening (i.e. the year when markets for household consumers became open to competition) in countries with regulated prices and the percentage of household and non-household consumers supplied under them.

**Table 1: Year of full market opening and percentage of household and non-household consumers supplied under regulated prices – December 2014 (%)**

	Year of final market opening		% with regulated prices		Households Switching in and out allowed		% with social tariffs		Non-households % with regulated prices	
	E	G	E	G	E	G	E	G	E	G
Bulgaria	-	-	100%	100%	Yes	No			100%	100%
Croatia	2008	2008	93%	100%	Yes	Yes			33%	
Cyprus	-	nap	100%		No		3%		100%	
Denmark	2003	2004	80%	n/a	Yes	Yes			n/a	n/a
France	2007	2007	90%	67%	Yes	Yes	8%	8%	86%	40%
Greece	2007	-		100%		No	9%			100%
Hungary	2007	2007	99%	98%	Yes	Yes			61%	86%
Latvia	2007	2014	100%	100%	Yes	No				100%
Lithuania	2007	2007	100%	100%	Yes	No			21%	
Malta	-	nap	100%		No		10%		100%	
Poland	2007	2007	98%	96%	Yes	Yes				100%
Portugal	2006	2010	53%	35%	Yes	Yes	1%		12%	12%
Romania	2007	2007	100%	100%	Yes	No	12%		54%	96%
Slovakia	2007	2007	100%	100%	Yes	Yes			30%	28%
Spain	2003	2003	48%	25%	Yes	Yes	9%			

Source: CEER National Indicators Database and ERGEG.

Note: Cyprus and Malta do not have retail gas markets.

- 221 The table shows that most countries with regulated end-user prices have a dual market structure where regulated and non-regulated markets exist in parallel. In these countries, household consumers have the choice of being supplied under regulated prices or under the market price. However, in most countries

138 The Roadmap for the exit from 'standard offer and gas tariff regime' for domestic consumers is at present under discussion in Parliament (Draft law AC 3012 'Annual law for market and competition') and should be adopted by December 2015. The deadline of 2018 and how gradually to eliminate the standard regime is still under discussion.

where switching to non-regulated price is possible, the majority of household consumers remained (i.e. choose to stay) on regulated prices. (e.g. 100% of electricity households in Bulgaria, Latvia, Lithuania, Romania and Slovakia) and gas households in Croatia and Slovakia).

- 222 It is also notable that after almost eight years of formal EU market liberalisation, the option to switch to market prices still does not exist for electricity households in Malta and Cyprus and gas households in Bulgaria, Greece, Latvia, Lithuania and Romania (i.e. there are no alternatives to regulated prices).
- 223 In contrast, there the unregulated electricity and gas markets in Spain and Portugal have expanded. This can be explained by the fact that markets in these countries opened to competition earlier and consumers have had more time to adapt, while in countries that opened their market later, consumers needed a longer ‘transition period’. In addition, in Portugal, regulated prices are set higher than the market price in order to incentivise the switch to an unregulated market.
- 224 Special regulated prices for vulnerable consumers (i.e. often called ‘social tariffs’), aimed at protecting consumers who spend a higher proportion of their income on energy, exist in several countries (seven in electricity and one in gas), but the available data in Table 1 suggest that the percentage of consumers on prices for vulnerable consumers is relatively low.

### Type of price regulation applied

- 225 NRAs reported that price regulation takes the form of rate-of-return, price-cap or revenue-cap regulation. There are also some examples of countries linking the regulated price to the prices in what is considered to be the competitive part of the market. For example, in Denmark, the price cap reflects the prices and margins in the competitive market and ensures that prices are not below costs. A similar approach was introduced in Spain in 2014. More detail on the Spanish approach is explained in the case study below.
- 226 In most cases, the regulator sets the level of regulated prices, but in France<sup>139</sup>, Greece, Hungary and Spain, regulated prices are set by the government, while the regulator only gives its opinion.
- 227 Across countries, the regulated prices are typically those of the incumbents, which are also in many cases the ‘default suppliers’ and/or the ‘supplier of last resort’. Consumers who have not actively switched supplier or moved to another offer with the same supplier, will therefore typically be on a regulated tariff.

### Case study 3: Introduction of 'Precio voluntario al pequeño consumidor (PVPC)' or 'Voluntary price for small consumers' in Spain

#### Background and overview of the PVPC

The Spanish electricity market was fully liberalised on 1 July 2003. Since then, all consumers have been able to choose their supplier. The Act 24/2013 of the Power Sector and the Royal Decree 216/2014 modified the regime of the last resort supply and introduced the PVPC for consumers with a contracted power connection below 10 kW. As a result, as of 1 January 2014, the last resort regulated tariff for small consumers was replaced by the PVPC system. Under the new system, the energy price paid by consumers is the price resulting in the day-ahead spot market and ancillary services cost during the billing period as opposed to the previous system based on specific long-term hedging products<sup>140</sup>. The objective of this new mechanism is to avoid the risk premium internalised in long-term energy markets.

Until September 2015, the day-ahead hourly prices of each day of the metering period are multiplied by a standard hourly demand profile in order to compute the energy cost to be paid by customers. In addition, customers have to pay the applicable access tariffs and other charges, such as the margin of the reference supplier<sup>141</sup>. As of October 2015, customers equipped with smart meters will be billed based on metered hourly consumption and hourly prices. As the discrepancy between standard consumption profiles and the actual demand of a given customer can be quite significant, the billing based on hourly metered consumption is a more efficient way to charge customers.

The 'reference suppliers' have the obligation to apply these prices to small consumers that wish to be supplied at a variable price. Additionally, the reference suppliers have the obligation to offer a price which is fixed for one year, is not regulated and can be freely established by these suppliers. This is because some consumers may wish to choose an ex ante fixed price instead of a variable price. However, most small consumers have variable price contracts.

#### Market impacts

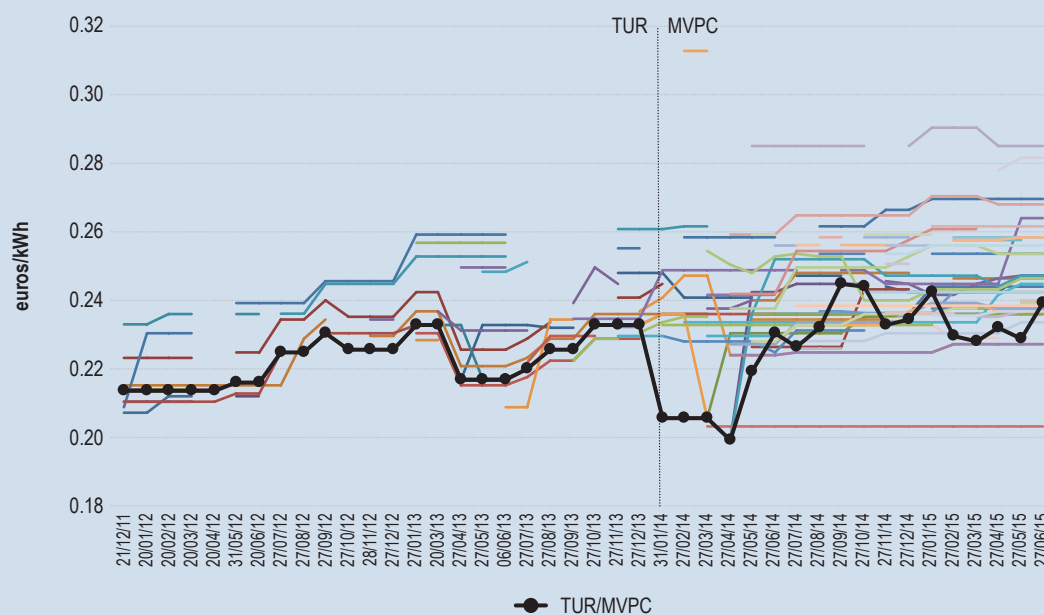
##### *Increased variety of offers*

This new approach in practice has changed consumers' and suppliers' mindsets, as 'fixed' regulated prices are no longer the baseline for free market offers. Before 2014, most free market offers were indexed to the last-resort tariff, establishing small discounts on this tariff. In fact, most of them were very similar. Since 2014, free market offers have varied more (see Figure (i)) compared to 2013, and more offers are available.

140 In Spain, the last resort tariff system in place between 2009 and 2013 was based on long-term hedging products whose risk premium was consistently positive.

141 The margin of the 'reference suppliers' (those that are nominated to supply customers with the PVPC) is regulated. CNMC has the mandate to perform a study to establish this regulated margin.

Figure (i): Estimated billing (€/kWh) for last-resort tariff (TUR until 2013) and PVPC (as from 2014) versus different suppliers' offers published in the price comparison website of CNMC (May 2015) (euros/MWh)



Source: CNMC.

Note: Calculated for a consumer with a maximum load of 4.4 kW and annual consumption of 3,000 kWh.

### Switching rates

As shown in the table below, the evolution of the domestic switching rate<sup>142</sup> during 2009-2014 has followed an increasing trend.

Table (i): Household electricity switching 2009-2014 (percentages and switches)

	2009	2010	2011	2012	2013	2014
Household switching rate	6%	7%	10%	12%	12%	13%
Number of household switches	1,502,403	1,966,244	2,822,147	3,236,804	3,388,367	3,652,387

Source: CNMC.

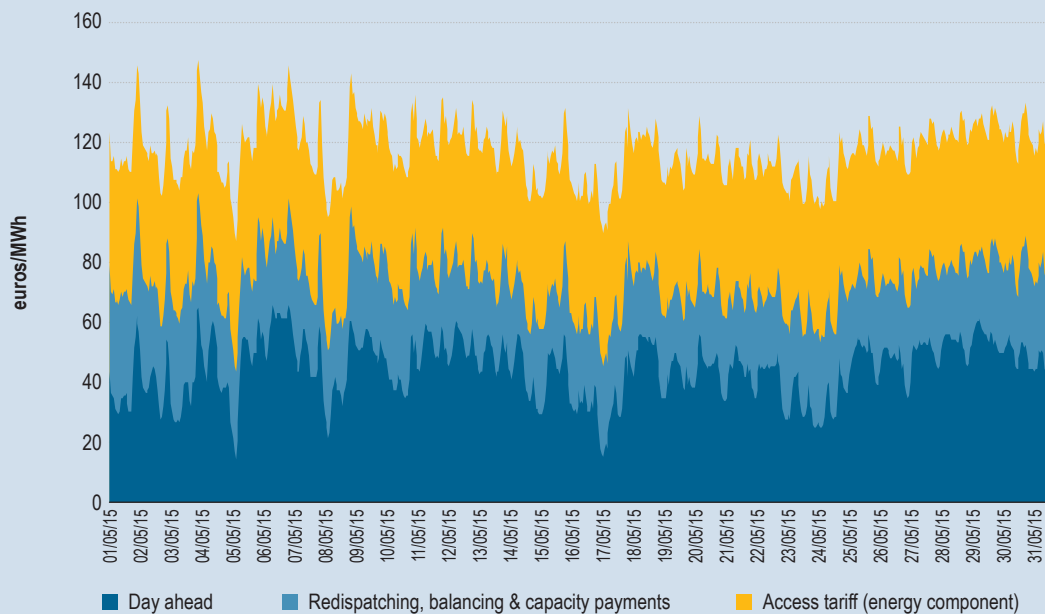
The number of consumers supplied under the PVPC regime by reference suppliers (below the threshold of 10 kW) at the end of 2014 was 13,957, i.e. nearly half of the consumers entitled. In terms of energy supplied, at the end of 2014, 44% of the all small consumers' consumption (or 14% of the overall energy consumption in Spain) was delivered by reference suppliers under the PVPC scheme (one year before, this figure was 50% below the last resort tariff mechanism). The free market is dynamic and keeps attracting customers: during 2014, 1.7 million consumers abandoned the PVPC in favour of the free market.

### Hourly prices facilitate demand response

Recently, the Resolution of 2 June 2015 of the Secretary of State for Energy approved the Operational Procedures necessary to start issuing bills that charge customers equipped with smart meters based on hourly consumption and hourly prices. The first bills of this kind will be issued in October 2015. As Figure (ii) shows, this measure is intended to provide a dynamic price signal to small customers and, consequently, a way to implicitly participate in the market by shifting consumption to the hours of the day when energy is cheaper.

<sup>142</sup> Included are consumers that switched to a free market supplier (either from a reference supplier or from another free market supplier).

Figure (ii): Example of variable component (euros/MWh) charged to small consumers in the PVPC scheme in a given month (May 2015)



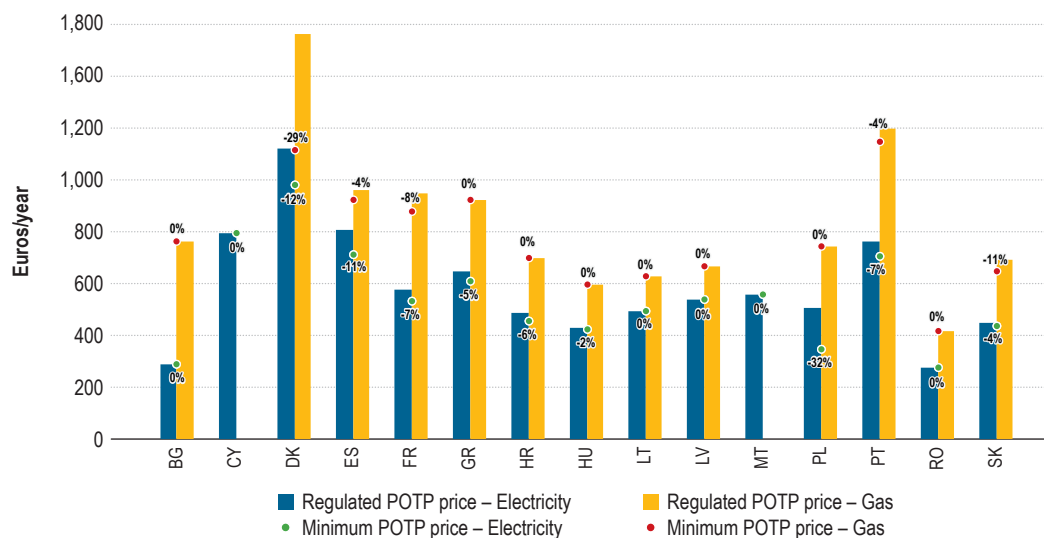
Source: CNMC.

Note: The hourly variable component is the aggregation of day-ahead spot market prices, redispatching costs, balancing costs, capacity payments, losses and the part of the access tariff recovered through the energy component of the bill. This is multiplied by consumption (either metered or estimated through a standard hourly consumption profile) in each hour.

### The level of regulated prices

- 228 The relative level of regulated and non-regulated prices determines consumers' incentives to switch between the regulated and non-regulated segment of the market. If the regulated price is lower than the competitive price, consumers have no financial incentive to switch to an unregulated price. In a number of countries, particularly in Eastern Europe, regulated end-consumer prices have historically been below costs. Therefore, there has been little scope for an unregulated competitive market in these countries. In addition, low regulated prices may provide energy consumers with wrong signals about costs, which may result in over-consumption.
- 229 Figure 43 shows that the level of regulated post-tax prices is similar to that of market prices (i.e. ranging between plus and minus 5% of the market price) in the majority of countries with regulated prices (9 out of 15 in electricity and 10 out of 13 in gas).

Figure 43: The difference between regulated POTP price and the cheapest offer in markets with regulated prices – December 2014 (euros/year)



Source: ACER Database.

Note: The figures are based on annual consumption of 4,000 kWh for electricity and 15,000 kWh for gas. Numbers next to each minimum point show the percentage difference between 'cheapest energy component price' and 'regulated energy component price'.

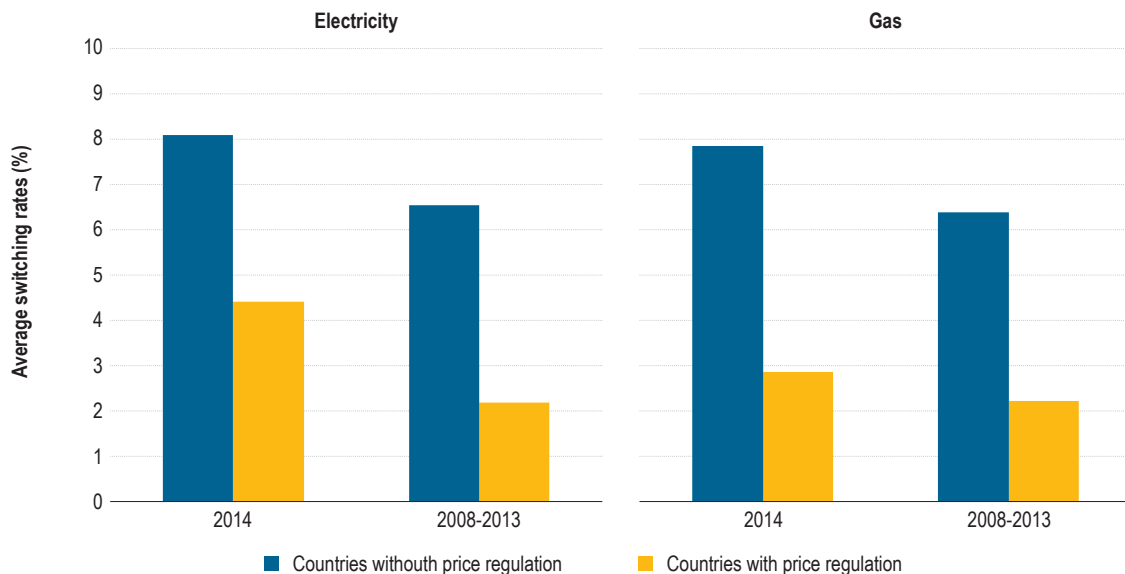
230 The price spread between the regulated POTP price and the cheapest POTP offer for household consumers in the market (i.e. minimum POTP price in the legend) is zero in the electricity markets in Bulgaria, Cyprus, Latvia, Lithuania, Malta and Romania and gas markets in Bulgaria, Croatia, Hungary, Greece, Latvia, Lithuania and Romania). The highest price spread can be observed in the electricity and gas markets in Denmark, France, Spain and Portugal, which are also countries with a higher proportion of consumers on non-regulated prices.

### Impacts of regulated prices

231 Because regulated prices often act as a focal point for market prices, the propensity to switch from regulated prices to market prices is typically low, as shown in Figure 44, as the saving potential is limited<sup>143</sup>.

232 According to Figure 44, switching rates for households in countries without regulated retail prices are almost three times higher than in countries with regulated retail prices.

Figure 44: Average switching rates in countries with and without regulated electricity and gas prices – 2008–2013 and 2014 (%)



Source: CEER National Indicators Database.

233 As shown in Section 2.3, countries with regulated prices perform worse than countries without regulated prices on most individual indicators of competition. Consequently, the overall level of competition in countries with regulated prices is much lower than in countries that do not regulate them. As pointed out in last year’s report, weak competition in countries with regulated prices is used as an excuse for maintaining them, which in turns weakens the competition and creates a vicious circle in the retail energy market in many countries.

**Roadmaps for removal of regulated retail prices**

234 According to the information received from NRAs, during 2014, end-user price regulation for gas households was removed in one country (Ireland), while there was no change in electricity household markets. Therefore, as of 31 December 2014, household end-user price regulation existed in 14 countries (out of 29) for electricity and in 14 countries (out of 27) for gas.

235 In electricity, roadmaps for the removal of regulated retail prices for household and industrial consumers are in place in several countries. Portugal agreed to phase out regulated gas prices for households as part of its tripartite agreement with the IMF, EC and ECB in the context of its financial support plan, while Romania proposed a calendar for phasing out regulated prices from mid-2014 (for industrial consumers) and from the end of 2018 (for households). Latvia, Lithuania, Poland and Slovakia have adopted roadmaps for the removal of price regulation in electricity. As noted in Case study 3 above, Spain modified the last resort tariffs for electricity and introduced the PVCP for electricity households, which includes the energy cost (price resulting in the spot market during the period), access tariffs and other charges. In Denmark, deregulation in 30 of the 39 default supplier areas will take place by 1 October 2015 in conjunction with the termination of the new tendered obligations of supply. For the remaining 9 areas, price regulation will end in May 2017, when the old obligations to supply the default supplier product expire. In France, regulated prices for industrial electricity consumers with contract power superior to 36 kVa will be removed on 31 December 2015.

236 Roadmaps for the removal of retail price regulation in the gas household and industrial segments are also in place in several MSs. Romania proposed a calendar for phasing out regulated prices from mid-2014 (for industrial consumers) and by the end of 2018 (for households). Portugal entered its final phase for phasing out regulated tariffs for household consumers, with a transitional period until the end of 2017 for low-pressure customers with an annual consumption below 500 m<sup>3</sup>, a category which covers all house-

hold consumers. In France, regulated prices for industrial gas consumers are removed in phases: (i) on 18 June 2014, for non-household consumers connected to the transmission network; (ii) on 31 December 2014 for industrial consumers with annual consumption higher than 200,000 kWh; and (iii) on 31 December 2015 for non-household consumers with annual consumption higher than 30 000 kWh.

- 237 These plans show that the removal of regulated prices across the EU will be achieved sooner in electricity than in gas, as countries are more committed to removing regulated electricity prices.

## 2.4.2 Consumer switching behaviour

- 238 Consumer switching behaviour<sup>144</sup> has been identified as one of the key factors for low switching rates in European retail markets (see the two previous MMRs<sup>145</sup> and the CEER Position paper on well-functioning retail markets<sup>146</sup>). In order to further assess this, the Agency and BEUC conducted a joint survey<sup>147</sup> of energy experts and NRAs in Europe on the topic of consumer switching behaviour in 2014. The focus of the subsequent analysis<sup>148</sup> was on the key drivers and 'preventers' of consumer switching behaviour, as well as the key features of the collective switching campaigns led by BEUC members.

- 239 Thirteen consumer associations and five NRAs responded to the questionnaire. This section presents the key findings of the analysis.

### 2.4.2.1 Key drivers and factors preventing consumer from switching

- 240 According to the respondents, most switches in the responding MSs are first and foremost influenced by the price of electricity and gas<sup>149</sup>, followed by the 'pressure' imposed on consumers by the suppliers' marketing activities. The quality and reliability of supply also play a role in consumer switching<sup>150</sup>. Electricity consumers were assessed to be the least influenced by environmental issues<sup>151, 152</sup>.

144 I.e. consumer switching behaviour, which results in consumer switching inactivity. The inactivity itself can be reflective of market dysfunctions (e.g. price regulation, dominance of the main suppliers and thus low monetary gains from switching) or of consumer inertia deriving from the lack of consumer interest in the market, consumer loyalty to existing suppliers etc.

145 In particular, the section 'Barriers to efficient retail market functioning' (Section 2.4).

146 See: [http://www.ceer.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Customers/Tab5/C15-SC-36-03\\_V19\\_Well-functioning\\_retail\\_markets.pdf](http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Customers/Tab5/C15-SC-36-03_V19_Well-functioning_retail_markets.pdf).

147 The survey was conducted on a voluntary basis. Respondents were asked to provide answers which were underpinned by research. If no such research existed, they were asked to provide their expert opinion in the comments. The following consumer associations responded: Spain (2), Germany, the Netherlands, the UK, Italy, Portugal, Slovenia, Latvia, Greece, Cyprus, Belgium and Norway. Slovenian, French, German, Polish and Slovakian NRAs responded to the questionnaire.

148 The analysis assumed an awareness of the choices and switching possibilities of electricity and gas consumers. It was further aimed at collecting information separately for the searching and the switching process, with the respective search and switching costs and monetary gains derived from the two processes estimated as the overall potential gain by consumers. The analysis assessed the behaviour of the average household electricity and gas consumer for each MS, as opposed to the segmented European consumer behaviour (i.e. comparing older/younger, computer (il) literate, switching-experienced etc. consumers across countries). Only those topics for which representative responses were received were included in the analysis.

149 The assessment was consistently high by all respondents, ranging from 7 to 10. This contrasts with the evidence of consumer switching behaviour in some MSs, i.e. Germany, where consumers do not respond to price signals as expected. However, in their responses, the German consumer association warns that consumers fear losing money when switching supplier due to recent supplier bankruptcies, which – as reported by the Agency – were primarily triggered by the 'disloyal discounts' offered to consumers as teasers. Section 2.2.3 on the offers available to consumers shows that this practice might not have entirely disappeared.

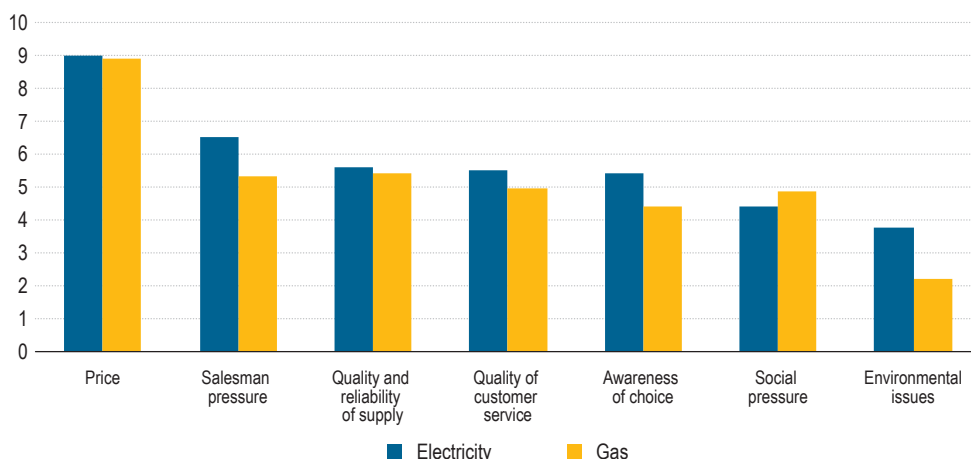
150 Even though the reliability of supply is in the domain of distributors, consumers of some countries in particular (e.g. Spain, Poland and Latvia) fear that the security of supply will be jeopardised when switching to a new supplier.

151 Although the differences between assessments for electricity and gas consumers are presented in the figures, they are not analysed in detail as the data are not suitable for such comparisons.

152 However, according to the respondents, electricity and gas consumers act differently as consumers of other goods/services, as with exception of two respondents, they all denied the existence of typical consumer behaviour across markets within their respective countries. For an example, see Case study 5, comparing energy to consumers of health services.



Figure 45: Factors influencing consumer switching behaviour – 2014 (1 – not at all important; 10 – very important)

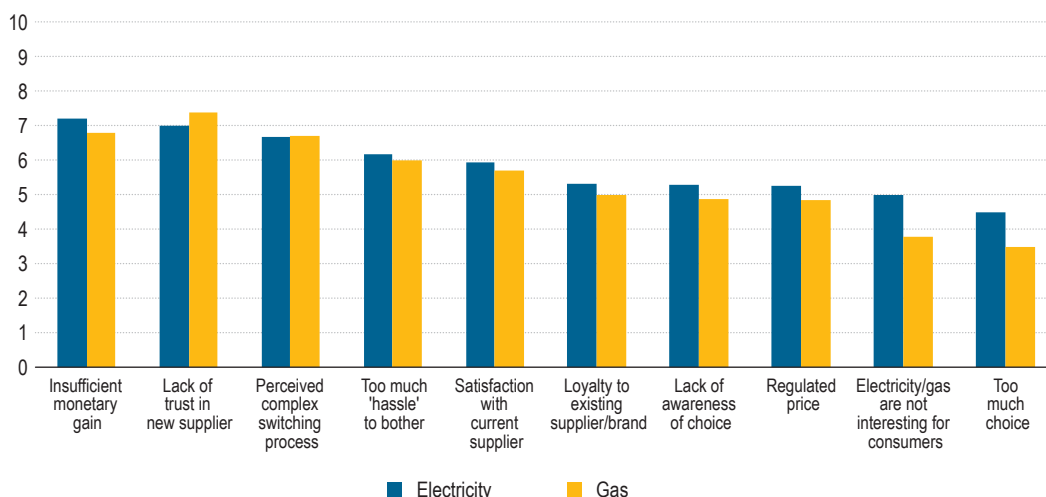


Source: ACER Questionnaire, February–April 2015.

Note: The opinions presented in the chart were those of experts in all but two responses, where the answers were underpinned by research. The respondents were asked to answer the following question: ‘Based on your experience, what are the key factors influencing a typical electricity/gas consumer in your country to switch supplier (1- not at all important, 10 very important): Price (i.e. monetary gain/saving money); Environmental issues (i.e. green choice); Awareness of choice; Quality or customer service; Quality and reliability of supply; Salesman’s pressure; Social pressure (from family, friends, neighbours, collective switching campaigns etc.); Other (please specify).

241 The perceived (insufficient) monetary gain, the lack of trust in new suppliers<sup>153</sup>, the perceived complexity of the switching process, as well as satisfaction with the current supplier were identified as the most influential ‘preventers’ of consumer switching behaviour. The switching process may be perceived to be too complex or too burdensome by consumers in terms of the benefit it provides (see the respective average scores in Figure 46).

Figure 46: Factors preventing electricity and gas consumers from switching – 2014 (1 – not at all important, 10 – very important)



Source: ACER Questionnaire, February–April 2015.

Note: The opinions presented in the chart were those of experts in all but two responses, where the answers were underpinned by research. The respondents were asked to answer the following question: ‘Based on your experience, why do electricity/gas consumers in your country not switch to an alternative offer or supplier? (1- not at all relevant, 10 the most relevant): Insufficient monetary gain; Satisfaction with current supplier; Electricity/gas are not appealing/interesting for consumers; Regulated price; Lack of awareness of choice; Loyalty to existing supplier/brand; Lack of trust in new supplier/fear of the unknown; Too much trouble to bother switching; Perceived complex switching process; Too much choice; Other (please specify). Insufficient monetary gain per se includes exit fees, which themselves pose a barrier to switching.

153 The Norwegian consumer organisation advises consumers who switch to an unknown supplier, in order to minimise the risk of supplier bankruptcy, to never to settle any payments in advance.

- 242 Other studies<sup>154</sup> also demonstrate the significance of the perceived financial benefit<sup>155</sup>, something which may differ depending on the stage of the switching process, and may convince consumers to walk away from the process at any point: at the beginning, the perceived monetary benefit must be sufficiently high<sup>156</sup> to awake consumer interest in the switching process and for consumers to proceed in the search for the best offer. Moreover, search time and effort must be perceived not to significantly reduce<sup>157</sup> the monetary gain deriving from the new offer the consumer will eventually switch to. In addition to this, perceived risks of switching (potential temporary loss of supply, inadequate customer support, risk of consumers moving to a higher price in error, etc.)<sup>158</sup> may affect consumers' switching behaviour.
- 243 The Agency's questionnaire aimed to collect information on the perceived switching trigger (i.e. savings to be made) for each individual MS; however, the study failed to obtain a significant share of the respondents' estimates of the range within which the switching triggers lie. In Belgium, Germany, Italy, Latvia, Poland and Slovenia, the perceived minimum savings required by electricity consumers to switch lie in the range of 0–100 euros, whilst in the United Kingdom, the Netherlands, Portugal and Sweden, these were estimated to lie in the 100–200 euro bracket. The switching trigger ranges were the same for gas consumers as for the electricity ones, with the exception of Italy, where gas consumers are estimated to perceive the sufficient switching saving trigger to be in the range of 100–200 euros.
- 244 The majority of respondents stated that in their countries<sup>159</sup> there is no basis for estimating search costs, including the time spent searching for a better deal. Nevertheless, respondents were able to provide information on exit fees<sup>160</sup>, which seem to represent a significant share of the switching costs in their respective countries, thus reducing the final savings made by consumers in switching. Exit fees, which are most often charged to consumers on fixed-price and fixed-term contracts, can be considered a type of product differentiation as their relatively high value compared to the final price of energy usually exceeds any potential costs incurred by suppliers due to consumers' breaking away from the contract within the contractual period (e.g. marketing costs for signing up a 'replacement' consumer, costs of re-selling the pre-purchased energy, discounts on energy included in the contract etc.). These considered costs need to be objectively justified.
- 245 Exit fees, which can pose a barrier to switching, are more common for electricity consumers<sup>161</sup> than gas consumers. While the latter seem only to incur exit fees in London<sup>162</sup>, Dublin and Amsterdam, electricity consumers in Copenhagen, Madrid, London, Zagreb, Riga, Amsterdam, Oslo and Warsaw are commonly charged when changing suppliers before the end of a contract. In some countries (e.g. Belgium, Italy), suppliers are not allowed to charge exit fees to consumers who wish to break the existing contract, as exit fees are considered to act against competition, mask the comparability of offers and to tie consumers to their existing contracts.

154 See, for example Ofgem's Retail Market Review Baseline Survey (July 2014), <https://www.ofgem.gov.uk/ofgem-publications/89113/ofgemrmbaselinefinal.pdf>.

155 Which can either be a sufficient trigger or prevent consumer switching.

156 In Europe, exit fees or early termination fees may significantly further reduce the monetary gain from switching and can deter consumers from the process overall. Due to the still relatively low energy prices in some countries with unlikely high price fluctuations, consumers' interest in the market may be low, as savings to be made are lower than expected by consumers, and suppliers try to attract consumers with low, fixed-price offers. On the other hand and especially in Central and East Europe, energy poverty has been reported as significant by the EC due to rising energy prices, low incomes and poorly energy-efficient homes. Almost 11% of the EU's population are not able to heat their homes adequately at an affordable cost. In 2012, 54 million people were affected. Source: [https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT\\_E\\_Energy%20Poverty%20-%20Main%20Report\\_FINAL.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf).

157 Whilst the search costs depend on the existing choice and the ease of finding it, they also depend to a great extent on consumers' personal situation (their income, time availability etc.) i.e. their opportunity cost.

158 <http://competitionpolicy.ac.uk/documents/107435/107587/13-10+Flores+%26+Waddams+%28Complete%29/4f25262f-8b14-48c1-9048-b443e5b338be> summarising the most recent studies on the topic.

159 With the exception of Slovakia, where search costs are estimated to reach 100 euros on average, all respondents who confirmed the existence of an estimate of search costs referred in their estimate to the average exit fee when switching supplier. These estimates were compared to the data from the ACER database and included in the above figure under the category of switching costs.

160 Exit fees in this section refer to any cost imposed on consumers for quitting a contract. Exit fees are typically charged to consumers on fixed-price and fixed-term contracts (i.e. early termination fees). See Annex 8 for further details.

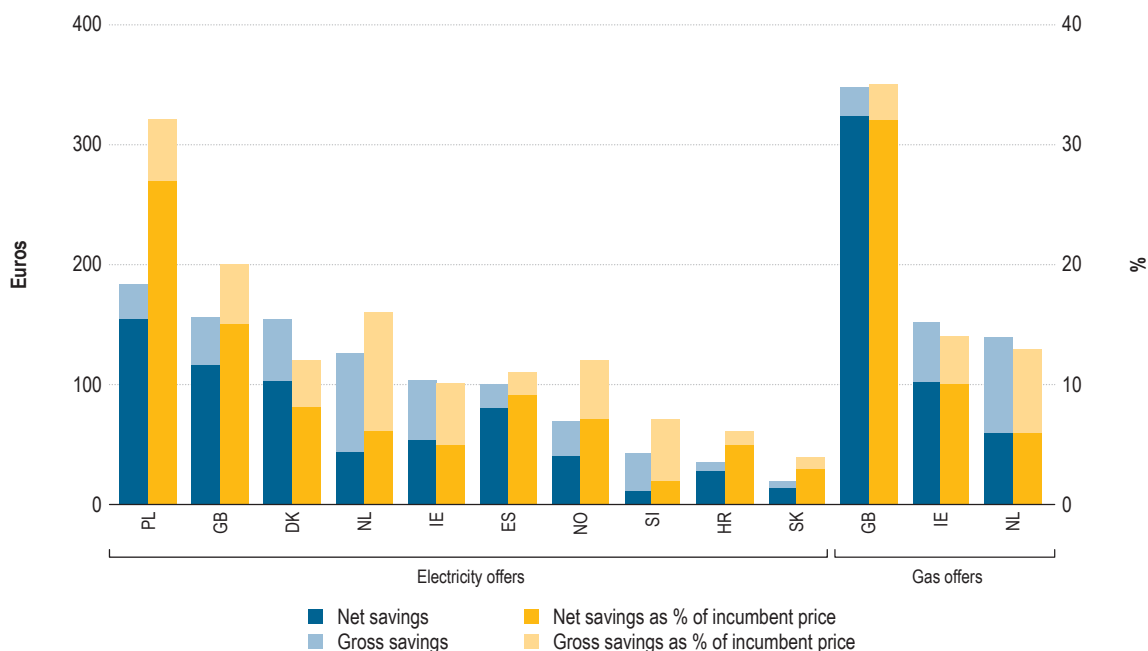
161 Facing a higher number of offers from a higher number of suppliers.

162 In Great Britain, short- and medium-term fixed price plans have taken over the 'best buy' energy charts since 2013. Even though some of them include exit fees, termination cannot be levied when there is a price change (a similar rule also exists in Austria and Germany). In addition to this, fixed-price contracts also mean fixed-term to provide further protection.

246 Due to these inherent features of exit fees, and considering the national specifics regarding consumer protection, offers including exit fees should be fully transparent on price comparison tools and, for example, filterable from the rest of the offers. Consumers should be fully aware of the contractual obligations inherent in an offer. Figure 47 shows that at the end of 2014, electricity and gas consumers on fixed-price and fixed-term contracts in Amsterdam were the most affected by exit fees, and these could significantly reduce their saving potential from 16% (without exit fees) to 6% (with first-year exit fees included) with respect to the average incumbent standard offer for electricity consumers, and from 13% to 6% with respect to the average gas standard incumbent price. Exit fees could also considerably reduce potential savings for electricity consumers in Ljubljana, Dublin<sup>163</sup>, Copenhagen, London and Warsaw. In contrast, exit fees could have only a relatively small impact on the overall savings potential when switching away from the electricity standard offer in Bratislava, Madrid and Zagreb.

247 Even with average exit fees factored in, gas consumers switching supplier in London would still be able to rely on a relatively high potential saving (i.e. more than a third of the standard incumbent price), which was far higher than the perceived switching trigger in the United Kingdom (see paragraph (245)). This could explain the relatively high rate of switching among gas consumers in the UK in 2014 (10.8%); however, it does not explain its declining trend (from 18.9% in 2007 to 17.3%, 16.1%, 14.8%, 10.5% in the subsequent years, respectively), which can probably be attributed to the cessation of doorstep sales<sup>164</sup>.

Figure 47: Potential effect of exit fees on annual savings to be made from switching away from the incumbent in Europe – 2014 (% and euros)



Source: ACER Questionnaire, February–April 2015, and ACER Retail Database, November–December 2014.

Note: Calculated on the basis of offer data for capital cities from the ACER Retail Database and the information from the consumer organisations. For those countries where standard offers are variable and where consumers typically incur exit fees while on fixed-term, fixed-price contracts, the above figure should be considered illustrative. ‘Net’ savings equal the difference between the incumbent price and the lowest offer, minus average exit fees typically imposed on fixed-term offers (i.e. savings for consumers after exit fees have been paid for). ‘Gross’ savings equal the difference between the incumbent price and the lowest offer. The data presented include information from the questionnaire (i.e. an assessment of the existence and the level of exit fees in member states and the information collected on the basis of offer data in the ACER database to show the potential effect of exit fees in those MSs where these exist. The exit fees shown in the above figure are the averages of all exit fees incurred by consumers breaking away from contracts in the first year, and might be higher than those incurred when breaking away in the 2<sup>nd</sup> or 3<sup>rd</sup> year. In the case of electricity offers in Oslo and Warsaw, exit fees are estimated at 5% of the final standard offer.

163 The same is true of gas consumers in Dublin.

164 To some extent, falling switching rates might be related to consumer (dis)satisfaction with the energy sector, which is lower in Great Britain than the European average.

- 248 The perceived monetary gain that triggers consumer switching behaviour may be founded on false perceptions of the actual amounts currently paid for electricity and gas by consumers as well as on unrealistic expectations of the savings which can be made from switching (also based on low contestability in many countries).
- 249 Furthermore, the phenomenon of consumers switching ‘in error’<sup>165</sup> adds to the complexity of understanding consumer inertia. For instance, consumers may not maximise their gain or may even switch to a more expensive offer due either to a lack of attention paid in the choice of offers<sup>166</sup> or to their inability to compare prices. The responding consumer organisations stated that an average electricity and gas consumer in their respective countries is only able to compare prices to a limited extent. When asked to evaluate the average ability of an electricity and gas consumer in their country on a scale from 1 to 10, where 1 is not at all able and 10 is very able, the respondents answered with an average score of 4.8 and 5.0, respectively.
- 250 The ability of consumers to compare prices can be hampered by the complexity of pricing and the range of energy products, as well as by an increasing number of offers and their bundling with additional charge-free or payable services. The survey confirms the outcomes of the research from the offer data presented in Section 2.2.3 that there is an increasing presence of such offers in the market and that the availability of such offers is expected to increase. Consumer associations and NRAs have expressed concerns over the lack of transparent choice faced by consumers, and in some instances they have called for regulatory intervention to remove opaque offers from price comparison tools<sup>167</sup>.
- 251 Additional services, offered together with either gas or electricity supply (for example, boiler maintenance, additional insurance cover), impose further conditions (contracts with providers of such services) which may act as impediments to consumers contemplating switching from their current supplier. Consumer associations in Spain have highlighted this as a growing concern based on frequent complaints from consumers who have been locked in with an electricity or gas supplier due to the co-existence of an agreement with a provider of additional services (while the termination of the energy contract would have been charge-free). Similar complaints have – to varying degrees – also been received by consumer associations in the United Kingdom, Belgium, Latvia, Norway, Germany, Portugal, Poland and Slovenia.
- 252 Unethical supplier sales practices in some countries (e.g. Belgium, Czech Republic, Poland, Great Britain, Spain, where switching under pressure has been reported by BEUC) have created bad publicity for some alternative suppliers, which has undermined trust in the market and thus discouraged consumer from switching. Some countries have already taken measures against such practices, including advising against door-step selling altogether (the Czech Republic, Great Britain) or introducing a ‘cooling off’ period during which a consumer can move back to the previous supplier (Poland).
- 253 According to the respondents, a number of good regulatory practices applied in Europe in the last few years have helped build consumer trust. Examples of such practices include: a regulatory obligation imposed on suppliers to eliminate exit fees in Belgium; a 21-day cooling off period guaranteed by the Polish Energy Law, during which a consumer may reverse the switch without any consequences; safety net regulation and ‘fair’ regulation<sup>168</sup> in Belgium, the Netherlands, Italy and Portugal; simplification and unbundling of offers in price comparison tools in Belgium and Great Britain; and an obligation on suppliers to publish all of their offers on a publicly financed comparison tool in Norway. The further provision of green tariffs also provides scope to better engage consumers in the market, as the selection of such tariffs imply an active consumer choice on a wider range of product criteria. Collective switching campaigns (see Case study 4), which were mentioned as the key strength of the Belgian, Italian, Slovenian and Dutch markets, provide further opportunities to mobilise consumers in their switching activity, despite the caveats they bear on some occasions.

165 See, for example, Wilson & Waddams Price (2010): ‘Do Consumers Switch to the Best Supplier?’ Oxford Economic Papers 62 (2010), p. 647–668.

166 See for example Sitzia, Zheng & Zizzo (2014): ‘Inattentive Consumers in Markets for Services’. Accessible through *Springerlink.com*.

167 However, this intervention has to be managed in a way that does not affect consumer responses negatively – see Case study 1 on regulatory changes in Slovenia.

168 For definitions, see Section 3.3.1 on price interventions. Safety net regulation refers to a system where a reference retail price of energy is provided and checked against the indexation of variable price formulas and of potential price increases by suppliers, following a process of price comparisons. ‘Fair’ regulation refers to either NRA checks of suppliers’ costs and the NRA’s right to request price levelling when the costs are found to be unfounded, as is the case in the Netherlands. It can also refer to the existence of a reference price in the retail market which is linked to the wholesale market (the case of Italy, Portugal and Spain).

## Case study 4: Collective switching campaigns as mobilisers of consumer switching behaviour

Collective switching campaigns by aggregating consumption build on the bargaining power of a large group. Over the past few years, collective switching campaigns have become increasingly effective, due to their potential to remove perceived barriers to switching, such as the time-consuming switching process, the risk of not obtaining the best deal and distrust of new suppliers. This case study presents the main features of a collective switching campaign and shares the results and lessons learnt by consumer associations (BEUC members) which have organised collective switching campaigns in their countries. Over the years, other collective switching campaigns have been organised by private and public entities not affiliated to BEUC. Their results, which positively contributed to consumer engagement, are not presented in this case study.

### What is a collective switching campaign?

A collective switching campaign is a form of organised group switching that is led by an intermediary (i.e. the campaign organiser), often a consumer association or a private entity. The collective switching process usually undergoes the four phases presented in Figure (i).

Figure (i): The collective switching process – stages

<b>1. Expression of interest</b>	Consumers express their interest and provide information regarding their consumer profile. Registration is usually open for a few weeks for recruitment of new participants.
<b>2. Recruitment of and competition among suppliers</b>	Suppliers are approached by intermediary to participate in the campaign and to provide the best offer for the group of consumers who have signed up to the campaign. The supplier with the best offer at the time of closing of the competition, is the winner.
<b>3. Consumers consider the offer</b>	Consumers are informed of the winning offer and of the savings they would make if they accepted it compared to what they are currently paying. If consumers wish to proceed to the final phase, they inform the intermediary about their intention to switch.
<b>4. Conclusion of the contract and the switch</b>	The intermediary manages the switch on consumers' behalf including sending the consumer a contract with the new supplier, informing their old supplier about the switch and providing the new supplier with all the necessary details. The intermediary might provide a helpline to consumers in case of any questions/problems with the switch.

Source: ACER (based on different sources regarding collective switching campaigns).

### Collective switching campaigns organised by BEUC members

Between them, ten BEUC members have over the past four years conducted at least 27 collective switching campaigns over the past four years<sup>169</sup>. As Figure A-21 illustrates, the campaigns have differed greatly from country to country (to a large extent depending on the number of energy consumers), as well as from year to year.

Most campaigns were organised at the national level. Of the six consumer organisations responding to the questionnaire, four of them organised the campaign together with one and the same private entity. Although they financed the campaign alone, they relied on knowledge transfers from other consumer organisations and umbrella organisations (BEUC, Euroconsumers).

<sup>169</sup> The analysis in this case study was conducted on the basis of data provided by BEUC regarding the number of consumers who signed up and switched during the campaign, as well as on the estimated savings made in the campaign. Six BEUC members (Test-Achats/Test-Aankoop (Belgium), DECO (Portugal), Altroconsumo (Italy), Consumentenbond (the Netherlands), OCU (Spain) and ZPS (Slovenia) answered Part B of the ACER questionnaire, sharing their experience of the collective switching campaigns which they led in their countries.

In total, more than four million people expressed an interest in participating in the campaigns organised by BEUC members, with more than 800 thousand electricity and gas consumers switching collectively. The 2012 Dutch collective switching campaigns alone mobilised 110,186<sup>170</sup> consumers to switch, providing them with an estimated 34.71 million euros in direct savings<sup>171</sup>.

The first Austrian collective switching campaign, organised in 2013 and 2014, attracted approximately 70,000 electricity and gas consumers who switched to – for a majority of consumers – considerably lower electricity and gas offers. The success of the campaign came as a surprise, as no marketing campaigns were organised by VKI, the Austrian consumer association. However, the campaign was supported by a strong public relations campaign and by the Austrian regulator, E-Control.

According to VKI, the key factors determining the success of the campaign included large savings to be made from the switch, consumer trust in the organiser of the campaign, consumer dissatisfaction with their supplier at the time and the support of the regulator. The latter provided VKI with the electricity and gas price data they collect through the price comparison tool. E-Control helped with cases where regulatory requirements were not met e.g. by network operators.

The consumers who switched in the first Austrian collective switching campaign were bound to the negotiated contract for a minimum of one year. The second Austrian collective switching campaign which aimed at attracting new consumers engaged considerably fewer consumers. It took into account the results of the survey conducted by VKI among the 22,807 consumers<sup>172</sup> who had expressed interest in participating in the first Austrian collective switching campaign; 75% of all respondents in the survey believed a similar campaign should be repeated.

VKI was particularly interested in understanding why some consumers decided not to switch in the campaign. The large majority of them (33%) decided not to switch due to the small savings they would have been able to make; 17% of them found a better deal through the regulator's price comparison tool and a further 14% of them negotiated a better deal with their supplier<sup>173</sup>. For one tenth of the respondents who did not switch, the process was perceived as too laborious to justify their continuing, whilst the rest listed other reasons for not switching.

### Reasons behind the organisation of a collective switching campaign

The mobilisation of sticky electricity and gas consumers has been the most frequently stated reason for organising a collective switching campaign by consumer organisations who replied to the Agency's questionnaire, as well as awareness raising among electricity consumers specifically. The dominance of major suppliers and low switching rates were cited as major reasons in four instances, equally for electricity and gas collective switching campaigns, while increasing financial revenue for the organiser was given as a reason in two instances.

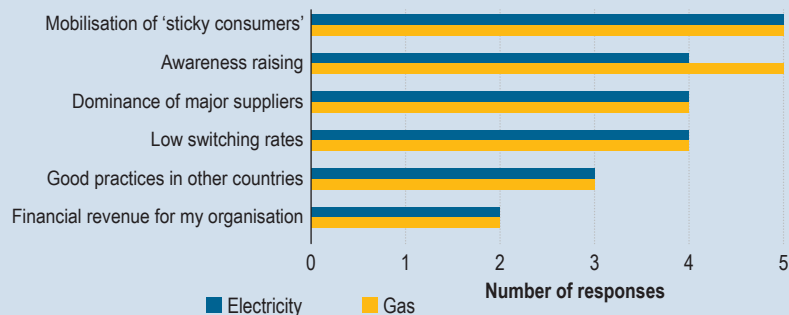
170 I.e. 17% of all switches made that year.

171 Collective direct savings have been calculated as a sum of individual consumer's savings i.e. the difference between the final bill based on their consumption profile before the switch and their costs for the contract period whilst contracted with the winning offer.

172 Out of the 22,807 respondents, 13,323 consumers switched in the campaign and 9,484 consumers decided not to

173 This is consistent with the findings of the German regulator regarding 'unrecorded' switching. See Case Study 2 for further details.

Figure (ii): Reasons for the organisation of a collective switching campaign – BEUC members



Source: ACER Questionnaire, February-April 2015.

Note: Six consumer associations which have conducted collective switching campaigns provided their assessment of the following question (see Footnote 170): What were the main reasons which led you to organise electricity/gas collective switching campaign(s)?: Low switching rates among consumers; Dominance of major suppliers; Sticky consumers; Awareness raising; Good practices in other countries; Additional financial revenue for my organisation; Other (please specify). Two responses were received under the category 'Other', namely 'image building for the organiser' and 'to obtain savings through collective power'.

### The process and the characteristics of the winning offer and supplier

Consumer organisations invested significant effort in consumer and supplier recruitment, especially since consumers and suppliers were unfamiliar with the concept of a collective switching campaign, except in the Netherlands, and in Slovenia for suppliers.

Consumers were mostly approached through electronic communication (by email to their members, through a dedicated website, social networking) and advertising (television, radio, newspapers<sup>174</sup>, internet). Suppliers, on the other hand, were approached individually, either via a formal invitation or face-to-face meetings or both. None of the responding consumer organisations collected any information about consumers' expectations with regard to a minimum savings threshold, nor regarding the non-price-related characteristics (e.g. green, fixed-price etc.) of the winning offer.

Consumer organisations quoted the following most often encountered obstacles during a campaign: lower engagement of suppliers due to their size (small suppliers do not have logistical capacities to accommodate such a high number of switches), their portfolio (niche suppliers who do not compete on price only and hence did not wish to take part) or inability to supply nationwide<sup>175</sup>. They also faced the limitations of their internal capacities, which in some cases also affected the recruitment of potential consumer participants to the campaign. To avoid the challenges related to supplier engagement faced by some consumer associations, regional campaigns or supplier clustering, in offering the best deal, could be considered to allow for their wider participation.

In addition to offering the lowest price, the winning electricity and gas offers of the standard collective switching campaigns across countries included the following non-price-related elements: fixed-price, non-green, standard-term offer, with no additional services. Overall, evidence suggests that collective switching campaigns have provided a much needed boost to non-incumbent suppliers, new entrants and smaller companies, all of whom have won the campaign on most occasions.

### What are the key factors of success of the campaign and what could have been done better?

Five out of six respondents indicated that the key factor in the success of the respective collective switch-

174 In the case of one campaign only.

175 These challenges could be addressed with regional campaigns or a campaign which would allow for the clustering of suppliers to provide one offer.

ing campaigns was consumer trust<sup>176</sup> in the campaign organiser. This was followed by the savings to be made from switching to the winning offer and consumer price sensitivity (five out of six responses)<sup>177</sup>. Other reasons cited among the key success factors include the perceived simplicity of the switching process, support services provided to consumers during the campaign and the high publicity generated by the campaigns. In the case of the first Austrian collective switching campaign, the support of the regulator was one of the key factors of success of the campaign.

When asked about the lessons learnt, consumer organisations cited among others: (a) the need to improve the speed of data processing (i.e. calculations, sending the results to the participants etc.); (b) the need to provide more information about the switching process, as well as support and reassurance to consumers during the campaign; and (c) to attempt to change the terms and conditions of the winning offer (i.e. to impose a 12-month offer price freeze).

### Principles to be followed in a collective switching campaign

While collective switching campaigns encourage many consumers to switch to lower offers, thus enabling considerable savings for consumers, they do not as such yet provide a long-term solution to a dysfunctional (concentrated) retail market. Full transparency of the process for suppliers and consumers participating in the campaign should be provided to build trust for future switching campaigns. It is important that consumers recognise that under current market practices the winning offer is guaranteed for a defined period only and that higher fees might apply once the agreement has expired.

### The future of collective switching campaigns

However, future collective switching campaigns' potential could develop further to maintain an ongoing good rate and to automatically negotiate and guarantee a new deal for consumers when the old one expires.

Further, collective switching could increase levels of engagement for vulnerable and disengaged consumers (i.e. non-traditional switchers). Face-to-face interaction is believed to work well in encouraging such segments of switchers to engage with collective switching schemes<sup>178</sup>.

### Conclusions

More than 800,000 consumers switched supplier as part of the 27 collective switching campaigns led by BEUC members from 2011 to 2015, with estimated total direct consumer savings of 173.9 million euros. These collective switching campaigns were organised to mobilise sticky electricity and gas consumers who wished to switch safely even though not necessarily to the lowest offer, while consumer trust in the campaign organiser was identified as the decisive factor in the success of these campaigns. Collective switching campaigns have to be organised in a transparent manner and must entail quality control of the service provided by the winning supplier. To boost their effectiveness, collective switching campaigns organised by trustworthy consumer or other organisations could enjoy the support of their respective NRAs<sup>179</sup>.

176 See also other consumer organisations' studies, for example Collective switching: Exploring opportunities for low income energy consumers in Wales by Consumer Futures, 2013. <http://www.consumerfutures.org.uk/files/2013/09/Collective-switching-04.07.13.pdf>.

177 Uninteresting savings to be made from the switch were most often quoted by consumer organisations as the main reasons for consumers dropping out in the middle of the campaign i.e. high discrepancy between the number of registered consumers and those who actually switched in the campaign. The second most quoted reason for the drop out according to the consumer organisations was consumers renegotiating their existing deals with existing suppliers.

178 In Great Britain, many schemes have been promoted to vulnerable and disengaged consumers, and figures from the service provider iChoose show that in their auction carried out in February 2014, 34.8% of the vulnerable group of consumers made the switch to the winning supplier. Source: [https://www.citizensadvice.org.uk/Global/Migrated\\_Documents/cita-collective-switch-response--2---2-.pdf](https://www.citizensadvice.org.uk/Global/Migrated_Documents/cita-collective-switch-response--2---2-.pdf).

179 The consumer associations envisage the support to come in different forms, from a purely declarative support, organisational support and finally to an accreditation scheme for collective switching facilitators accompanied by a new licence requirement on suppliers that oblige them to deal only with accredited providers.



### 2.4.2.2 Relevant consumer behaviour research by NRAs

- 254 The following two case studies present a sample of the latest research by NRAs in the area of consumer behaviour. First, it is assessed whether there is a typical consumer in the Netherlands behaving similarly as a health services' consumer and as an energy consumer and the opportunities this may offer for stimulating consumer switching activity. Second, consumer research and econometrics are explored in order to assess the impact of the Retail Market Reform policies on consumer behaviour in Great Britain.

#### Case study 5: Consumer behaviour in the energy and the health insurance market; similarities and differences

ACM considers active consumers to be the key drivers of competition, as they exert pressure on companies to improve their product offerings in terms of price, quality and service. Therefore, it is ACM's objective to identify and remove barriers that prevent consumers from becoming active market players<sup>180</sup>.

The ability and willingness to exercise choice is a necessary requirement for consumers to become active in the market. Merely having a choice is not enough. The ability to exercise choice requires comprehensible product information, accurate product comparisons and trouble-free switching procedures. The willingness of consumers to exercise choice depends also on less tangible aspects, such as trust, confidence, and satisfaction.

ACM monitors the retail energy market twice a year. Part of this monitoring task is an annual survey among consumers. In 2014 and 2015, ACM carried out similar surveys among consumers in the health insurance market<sup>181</sup>.

#### The basics

The markets for energy and health insurance in the Netherlands are in many ways very similar: both are essential commodities (basic health insurance is a legal obligation), with liberalised markets, characterised, on the one hand, by a high concentration level of incumbent firms, and, on the other hand, by a broad range of offers in terms of labels, contract forms and price ranges. However, there are also some key differences.

While electricity and gas are in themselves homogenous products, their complicated price structure, containing multiple price components and differentiation in contract terms, complicate comparisons. With health insurance, the price structure is simple, but coverage and contract terms are complicated, and differentiation (in additional coverage on top of the mandatory basic health coverage) is endless.

Furthermore, consumers in the Netherlands can switch energy suppliers at any given time, while switching health insurers is only possible between 16 November and 1 January. Regulation of the Dutch energy sector is centralised within ACM. With regard to health insurances, several authorities have varying responsibilities.

The Dutch Healthcare Authority (NZa) is the primary sector-specific authority to deal with health insurance, whereas the Netherlands Authority for the Financial Markets (AFM) deals with generic consumer law for financial products, including health insurance and price comparison tools for financial products. ACM takes an interest in the functioning of the health insurance market from the perspective of its responsibilities in the application of generic competition law in all sectors, including health care. On that account,

<sup>180</sup> The Netherlands Authority for Consumers and Markets (ACM) is a multi-disciplinary authority that combines sector-specific regulation, consumer protection and competition oversight. ACM uses their combined knowledge, experience, and competences to keep a close eye on the balance between consumer protection and competition. ACM aims to realise well-functioning markets that offer options and opportunities for both businesses and consumers.

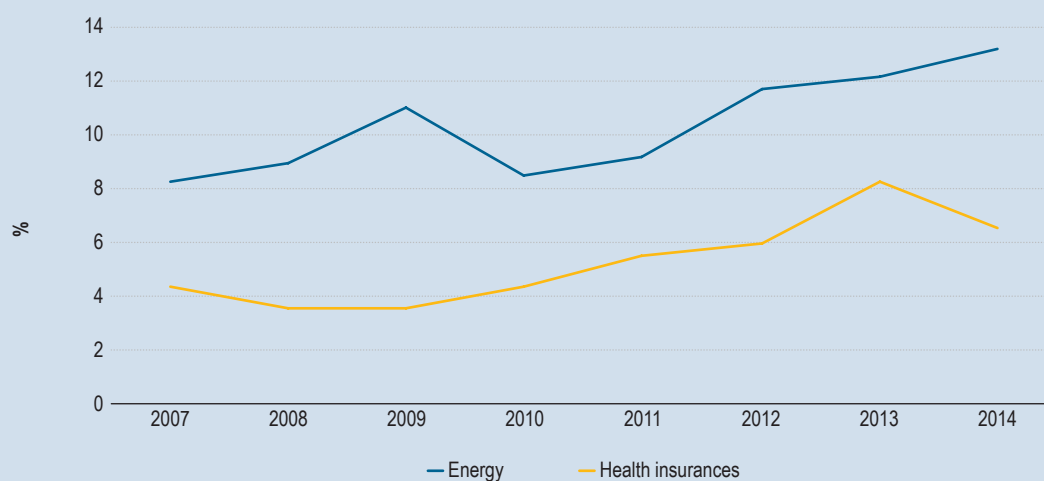
<sup>181</sup> The surveys in both markets contained similar questions on switching behaviour and perceptions about switching.

ACM cooperates with the NZa and AFM to empower consumers in the health insurance market.

### Key figures

The annual switching rate is traditionally higher in the energy market than in the health insurance market (Figure (i)). In 2014, 13.6% of energy consumers switched suppliers, while 6.5% of consumers switched health insurers. Both the energy and the health insurance markets are highly concentrated. In both sectors, the total market share of the four largest companies amounts to 90%. Still, there are significant price differences: an energy consumer can save up to 400 euros per year by switching, while a consumer switching to another insurer for basic health insurance can save up to 103 euros per year<sup>182</sup>.

Figure (i): Annual switch – 2007–2014 (%)



Source: ACM and Vektis (2015).

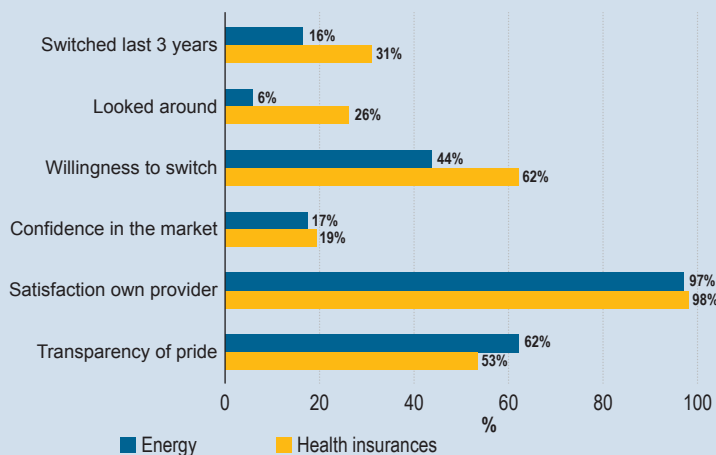
### Consumer behaviour

The results from the annual survey show that consumers tend to behave similarly in some respects, but quite differently in others (Figure (ii)). Consumer confidence in both markets is relatively low. Barely one in five consumers has confidence that energy providers and health insurers as a whole have consumer interests in mind. However, the overall satisfaction with their own provider is very high (almost 100%). Satisfaction with their current provider is also the most frequently mentioned reason for consumers not to consider switching. More research showed that, in fact, a number of cognitive biases, such as the *status-quo* bias explain this high satisfaction rate<sup>183</sup>.

<sup>182</sup> The savings for energy are calculated by ACM using data from several price comparison websites and are based on a contract for dual-fuel and average annual consumption of 3331 kWh electricity and 1,314 m<sup>3</sup> gas.

<sup>183</sup> ACM case study ACER/CEER MMR 2013.

Figure (ii): Consumer behaviour, % of consumers with a positive answer



Source: ACM, Annual consumer survey (2014).

Consumers who switch providers in both markets say that they do so primarily because of the savings involved. Energy consumers are willing to switch for 185 euros in savings on average per year, while consumers are willing to switch their health insurance provider for 120 euros. While the average energy consumer expects to save 131 euros, and consumers of health insurances expect 90 euros, the perceived price barrier is lower for health insurances (30 euros) than for energy (54 euros). Also, the percentage of consumers that actively look for competing offers is higher in the health insurance market. ACM also observed that consumers in the health insurance market are less confident about price comparison tools. When asked whether the information provided by price comparison tools is understandable and comparable, 53% of health insurance consumers and 62% of energy consumers agreed.

### Barriers to switching

In view of the lower perceived price barrier to switching, one would expect a higher switching rate in the market for health insurance, but this is not the case. Over the last three years, almost twice as many energy consumers switched suppliers compared with those in the health insurance market<sup>184</sup>. Furthermore, the share of consumers that did look for competing offers but eventually did not switch, is much higher in the health insurance market (26%) compared to the energy market (6%). This can be explained in part by the fact that cash-back offers in the energy market give consumers a recurring opportunity to save money, while these offers do not exist in the health insurance market. But the survey results also suggest that loss aversion is more prominent in the health insurance market. More than 70% of the non-switchers in the health insurance market agree with statements that switching involves uncertainty (“I know what I’ve got and I don’t know what I will get”), and that they value the certainty of their current plan more than the opportunity to save a few euros. Moreover, these statements refer to perceived certainty: in reality, the conditions of a policy may change each year, and most people do not look into these changes.

There are some plausible explanations for this. First of all, the choice of health insurance is a more personal one than the choice of energy supplier. Consumers perceive choice for a certain health insurance also as a choice for a certain degree of coverage for health care (although basic health insurance includes the same coverage for everybody). This makes the choice for a consumer a lot more complex, in contrast to the choice for a relatively homogeneous product such as energy. Also, the additional coverage that is offered on top of the basic health insurance complicates the choice even further.

All in all, the perceived complexity of choice and the amount of choice in itself lead to an increase in insecurity, which in turn leads to cognitive biases. Some of these biases are well-known switching barriers,

184 The two surveys were conducted using two different samples, so individual cases could not be compared.

such as the interrelated *status-quo* and loss-aversion biases and the endowment effect, which increases the tendency for consumers to stick to what they have<sup>185</sup>. An abundance of choice may lead to choice-overload, which has the same effect on consumers.

Although ACM observes the same problems in the energy market (choice overload, difficulty to compare offers), it seems that in the market for health insurances they affect consumer decisions to switch much more.

### The role of ACM

ACM uses the knowledge on cognitive biases to effectively encourage consumers to make use of their empowerment, for instance, through public awareness campaigns run by the national consumer-information portal Consuwijzer<sup>186</sup>. On the basis of ACM's report, the Minister instructed the Dutch Healthcare Authority to carry out a more in-depth study into the issue of choice overload as a switching deterrent. Finally, energy suppliers, comparison websites and other energy intermediaries agreed to offer consumers tailor-made offers based on actual consumption and using harmonised terminology. ACM will see to it that energy offers do indeed comply with these terms.

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185 ACM explains these cognitive biases as switch deterrents in its case study in the ACER/CEER MMR 2013.

186 In 2013 and 2014, ACM launched campaigns on switching barriers in the energy market and market for health insurance: <https://www.consuwijzer.nl/downloads/algemeen/stappenplan-zorgverzekeringen-vergelijken> and If you snooze, you lose: <https://www.youtube.com/watch?v=K1RnQXftcCE>.

## Case study 6: Combining consumer research and econometrics to assess the impact of RMR policies on consumer behaviour

### Background

Ofgem launched the Retail Market Review (RMR) in late 2010 due to concerns that the retail energy market was not working effectively for consumers. In particular, the review showed that it was often difficult for consumers to find and understand information in suppliers' communications, and that complex tariffs could undermine consumer engagement. Additionally, levels of trust in suppliers and the market were lower than in many comparable industries.

To address these barriers to effective consumer engagement, Ofgem introduced a wide-ranging package of measures aimed at making the retail energy market simpler, clearer and fairer for consumers. These reforms were rolled out between August 2013 and June 2014, and included measures to simplify tariff structures, provide clearer information to customers (e.g. through bills and annual statements) and introduced new standards of conduct for suppliers to treat customers fairly.

In order to assess the impact of these measures, Ofgem decided to go beyond straightforward monitoring of market developments and to pro-actively evaluate the effect of the reforms in contributing to change.

### The evaluation framework

The evaluation is aimed at robustly identifying where RMR policies have contributed to the changes observed. In turn, this will determine whether the reforms have contributed to improving consumer engagement and help identify which policies are of most benefit to consumers.

The ability to establish correlations between policies and market outcomes is extremely beneficial. If successful, Ofgem will be able to construct a strong basis for informing future development of these policies, and for identifying areas of the market where further intervention is required.

Ofgem identified a number of challenges to establishing a robust evaluation framework, relating to, among other things, the establishment of a baseline and the isolation of the impacts of specific policies from other factors unrelated to the RMR reforms. Despite the challenges and limitations of some evaluation approaches considered, a comprehensive evaluation framework was adopted by Ofgem, based on:

- **Bespoke consumer survey** – Ofgem commissioned a nationally representative face-to-face survey of 6,000 energy consumers in Great Britain. Interviews were planned to be carried out over four years to allow Ofgem to conduct an econometric analysis of what is driving changes in consumer engagement.
- **Qualitative research** – A consumer panel would complement Ofgem's survey analysis and provide detailed insight that is unachievable solely through quantitative methods.
- **Compliance assessment** – An assessment of how new rules have been implemented by suppliers and third parties were to enable Ofgem to understand whether and how suppliers implemented the rules correctly.
- **Wider market monitoring** – Monitoring of both consumer and supply-side indicators (such as prices or tariffs offered by suppliers) were to enable Ofgem to contextualise findings and provide holistic context to the RMR reforms.

The evaluation design set out above is underpinned by a theoretical framework of how Ofgem expects the RMR reform to affect the market. Reflecting the fact that policies are often interdependent, each of the policy areas was grouped according to their primary aim. These policy groupings were developed by using 'theories of change' for each policy measure, detailing the expected remedies for possible future problems and the expected intermediary outputs to improving consumers' engagement, trust, understanding and ability to compare.

This framework will allow Ofgem to measure changes over time compared to a baseline set before the entire package came into effect and the contribution the RMR reforms have made to changing the market. By monitoring the contribution of the RMR reforms, Ofgem will be able to identify and correct any policies or elements of the rules that are not working effectively.

### The consumer engagement index

One key feature of the new evaluation framework is a consumer engagement index, which is used to track changes in the proportions of consumers at different levels of engagement. This stylised index is based on concrete actions taken by consumers, such as whether they have switched tariff or supplier, compared tariffs, or read their bills in detail.

The index scores consumers on their awareness and activity across a range of indicators, and places them in different engagement segments depending on their score. Typically those at the more engaged end of the spectrum regularly compare and switch tariffs or suppliers, and read routine communications in detail. Those that are less engaged tend to have glanced at a bill, for instance, but not had any interactions with the energy market beyond that. See Figure (i) for a detailed description of the factors used to create this index.

Figure (i): Factors used to create the consumer engagement index

Factor	Points allocated
<b>Awareness that it is possible for energy consumers to...</b>	
Switch to a different supplier	0 – aware of no options
Change their tariff with their current supplier	5 – aware of one or two options
Change their payment method with their current supplier	10 – aware of all options
<b>Switching supplier</b>	
	0 – not switched supplier in last 5 years
	5 – switched a supplier between 1 and 5 years ago
	10 – switched a supplier in the last 12 months
<b>Changing tariff with existing supplier</b>	
	0 – never changed tariff with an existing supplier
	5 – changed tariff with an existing supplier but not in the last 12 months
	10 – changed tariff with an existing supplier in the last 12 months
<b>Compared tariff with those offered by other suppliers, or with any others available with existing supplier in last 12 months</b>	
	0 – not made any comparisons
	10 – made any comparisons
<b>Contacted a current or previous energy supplier in the last 12 months ...</b>	
To complain	0 – did not make any contact with current or previous supplier in the last 12 months
For something other than a complaint or routine meter reading	10 – made contact with current or previous supplier in last 12 months for any reason (other than a routine meter reading)
<b>Contacted another energy supplier in last 12 months</b>	
	0 – did not contact another energy supplier in the last 12 months
	10 – contacted another energy supplier in last 12 months
<b>Amount of detail consumer read the following communications received in last 12 months</b>	
Annual summary	
Bill or direct debit/ prepayment statement	0 – read no communications
Price increase notice	5 – glanced over/skim read at least one communication
End of fixed term letter	10 – read at least one communication in detail

Source: TNS BMRB/Ofgem, Retail Market Review Baseline Survey, July 2014.

Many things affect consumers' perceptions of the market, which may in turn affect how they engage. These include trust, understanding and how easy they find it to compare tariffs. In conjunction with an expert academic, Ofgem used the survey data to analyse the interactions between these factors, and what drives them individually<sup>187</sup>. The most significant finding was that consumers' understanding has a reasonably strong positive influence on how easy they find it to compare tariffs and, to a lesser extent, their level of engagement overall. There is a small positive effect of both understanding and ability to compare on consumers' level of trust.

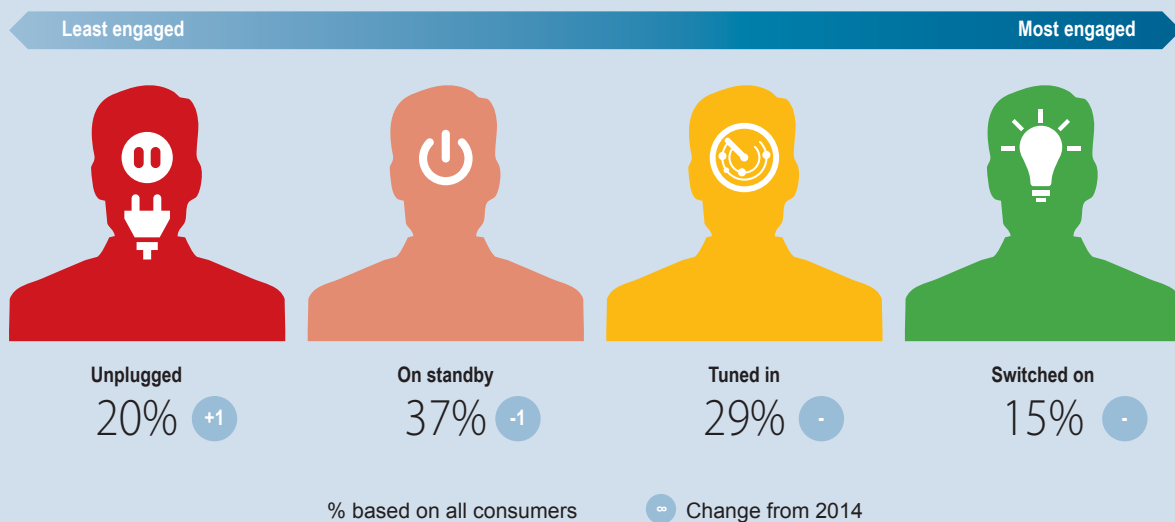
The analysis also points to a very slight negative relationship between trust and engagement. This indicates that, on the whole, more engaged consumers tend to trust suppliers less. Previous qualitative research, however, showed that the interaction between trust and engagement will vary depending on the individual consumer<sup>188</sup>. Some will have a higher level of trust, and will be more comfortable engaging, whereas others do not trust suppliers to treat them fairly and so are more likely to engage to ensure that they do not get a bad deal.

### First year evaluation results

In July 2014, Ofgem published the baseline evidence and the evaluation framework for the RMR reforms. The first year evaluation results were published in September 2015.

Figure (ii) shows the proportion of consumers falling into each engagement segment in 2015, compared to 2014. The distribution of consumers between the four segments of engagement in 2015 is very similar to the baseline results obtained in 2014, showing that overall levels of engagement among domestic consumers have not changed much year-on-year.

Figure (ii): Consumer engagement segments in 2015



Source: TNS BMRB/Ofgem, Retail Market Review 2015 survey, July 2015.

Note: The findings are based on a large nationally representative face-to-face sample of approximately 6,000 respondents.

More detailed survey evidence suggests that there are early signs that the RMR reforms may have had some positive impact on consumers' understanding of, and trust in, the energy market. For example, there have been some small but significant improvements in how clear consumers say

187 The full findings of the analysis are included in 'Retail market review: a structural equation modelling analysis'. Internal analysis was also carried out internally to explore the drivers of consumer perceptions of the ease of comparing tariffs and consumer perceptions of the clarity of the information in the annual summary. The findings of this analysis are included in 'Analysis of the drivers of tariff comparability and clarity of the annual summary'.

188 'Consumer engagement and trust in the energy market – RMR reforms', Big Sofa/Ofgem, Oct 2014

they find routine communications, and an increase from 48% to 67% in the proportion of consumers seeking out information to make comparisons. However, with only one year's data available, it is too early to tell whether any of these positive developments indicate longer-term trends: this will be a focus of future evaluation.

While there has been a small increase in the proportion of consumers reporting they find it easier to compare tariffs than a year ago, in general the RMR "simpler" tariffs rules do not appear to have had a significant impact on consumer engagement in the market. Suppliers have also reported that the rules are restricting their ability to innovate. As part of its ongoing energy market investigation, the Competition Market Authority<sup>189</sup> has provisionally found that the RMR "simpler" tariff rules may have had an adverse effect on competition. Ofgem will support the CMA as they consider whether aspects of the simpler tariffs rules should be amended or removed.

### 2.4.3 Wholesale market issues

- 255 Although the retail chapter looks primarily at the functioning of retail markets, changes in wholesale energy prices have a significant effect on the level of prices paid by end-users, and therefore, wholesale markets have also a strong bearing on the overall level of competition in retail markets and their functioning.
- 256 Competitive power exchanges and gas hubs, for example, attract contending market participants and provide more options to source and hedge wholesale energy. This puts downward pressure on electricity and gas prices, which should translate into benefits for retail markets. Well-functioning wholesale markets also enable suppliers to offer products which reflect variations in wholesale prices which benefit household consumers (e.g. spot based offers in electricity household markets in Nordic countries).
- 257 A dedicated study commissioned by the Agency in 2014, in which retail suppliers that were interviewed about the barriers to entry and expansion, confirmed that the existence of a transparent and functioning wholesale market - especially exchanges and access to cross-border capacities - significantly influences the supplier's decision to enter a new market. According to this study, one of the key perceived barriers was the low liquidity of wholesale markets, particularly in less developed markets, due to the presence of dominant incumbents and lack of diversification in power production (Bulgaria, Croatia, Hungary, Romania and Slovenia) and disrupted exchanges, especially in Eastern Europe (e.g. there is no OTC market and power exchange in Croatia, the OTC market in Romania is dominated by a state-owned incumbent and in Slovenia future trading products do not exist). The study also highlighted that access to cross-border capacities and associated regulation also play a relevant role for potential entrants. Such barriers were explicitly mentioned for France, Hungary and Eastern Europe in general.
- 258 Wholesale market liquidity and access to cross-border capacity (and other wholesale market issues) are examined in detail in dedicated chapters of this Report (i.e. Chapters 4 'Wholesale electricity markets and network access' and Chapter 5 'Wholesale gas markets and network access').

### 2.4.4 Conclusion

- 259 The results of the analysis confirm that price regulation for household consumers is still widespread and that the process of moving away from regulated retail prices is very slow. After seven years of full market opening, regulated electricity and gas household prices still exist in 14 countries in both electricity and gas markets, while regulated prices for industry exist in 9 countries in electricity and 10 countries in gas. Most countries have a dual market structure, where regulated and non-regulated markets exist in parallel. In most cases the regulated prices are available to all consumers, but some countries also have regulated

189 Following the 2014 State of the Market assessment, last summer Ofgem referred the market to the CMA for a full investigation because it was concerned that, in the domestic and small business markets, competition between suppliers was not working as well as it should for consumers. This investigation is currently ongoing and should be finalised by the end of 2015.



prices (i.e. social tariffs) targeted at particular vulnerable groups of consumers.

- 260 Typically, there are large proportions of consumers (i.e. at least 90%) on regulated prices in most countries where regulated prices still exist. Although, in some countries there is no real alternative to regulated prices, the percentage of consumers on them are high even in countries with a parallel non-regulated market. In some countries the financial incentives to switch to non-regulated prices (i.e. potential savings) are too low, which results in limited switching (i.e. inactive consumers remain on regulated prices).
- 261 The inactivity of a significant proportion of European consumers in the market is a barrier to retail market competition. Insufficient monetary gain, lack of trust in the new supplier, the perceived complexity of the switching process, as well as satisfaction with the current supplier seem to most frequently prevent consumers from switching. The complexity of offers (bundling of offers) and their large number further negatively impact consumer behaviour.

## 2.5 Recommendations

- 262 The existence of price regulation and the existence of other entry barriers seem to be the main causes of lower market entry and reduce the scope for competition. Therefore, the Agency recommends removing these barriers in order to ensure market conditions which create sufficient opportunities for new suppliers to enter the market and compete for consumers with new offers. However, as not all markets have the same degree of maturity, this might require different actions in different MSs.
- 263 The Agency also recommends implementing the existing Energy Directives which encourage MSs to have due regard to licensing in other MSs (this has been done in the Spanish and Portuguese market); a single licence to supply electricity and/or gas in the whole region could be developed.
- 264 The inactivity of a significant proportion of European consumers in the market is a barrier to retail market competition. Insufficient monetary gain, lack of trust in the new supplier, the perceived complexity of the switching process as well as satisfaction with the current supplier, seem to most frequently prevent consumers from switching. The complexity of offers (bundling of offers) and their large number further negatively impact consumer behaviour. It is important that pricing information is transparent, relevant and accurate for the consumers who use it, particularly where it underpins a decision to switch supplier.
- 265 Where exit fees are imposed on consumers who wish to switch supplier, offers which include exit fees should be fully transparent in price comparison tools and, for example, filterable from the rest of the offers by consumers in search of a different deal. Contractual obligations deriving from such offers should be made available to consumers. While this Report has identified exit fees as a barrier to switching, since they tend to increase the threshold for consumers to switch due to the perceived diminished potential savings available, in fully competitive markets, exit fees are set up to cover the costs incurred by suppliers due to early contract termination.
- 266 Collective switching campaigns aggregating consumption are a good stimulant of consumer switching behaviour, provided the campaigns are organised in a transparent manner. As such, they could be particularly promoted in those national markets with a large proportion of sticky consumers and for vulnerable consumers. The success of the collective switching campaigns organised by BEUC-members was assessed to be primarily due to consumer trust in the campaign organisers.
- 267 In order to facilitate the development of retail competition further, for the benefit of all energy consumers, MSs should follow good practice by: (i) advancing industry reforms, including full implementation of Energy Directives; (ii) promoting market entry by removing the remaining regulatory and administrative barriers and improving the functioning of the wholesale markets; (iii) removing regulated end-user prices, particularly where they are set below costs; and (iv) facilitating more active participation by household consumers by simplifying the comparability of offers on the market (i.e. providing consumers with transparent, relevant and accurate information on available offers and prices).

## 3 Consumer protection and empowerment

### 3.1 Introduction

268 The consumer protection and empowerment chapter aims to contribute to market monitoring through a critical examination of the existence and effectiveness of consumer protection mechanisms. Covering central consumer protections from the 3<sup>rd</sup> Package, the chapter explores transpositions of these provisions into national legislation, examines compliance and collects information of affected consumers to comment on market functioning from a consumer perspective.

269 This year's 4<sup>th</sup> MMR focuses on selected aspects and goes into depth concerning essential elements of consumer protection and empowerment. While Section 3.2 presents the results of monitoring on public service obligations and disconnections, consumer empowerment and protection also covers the availability and accessibility of information, switching and, of increasing importance and relevance for consumer empowerment, smart metering. Section 3.3 then examines the number and categories of consumer complaints to a variety of market players across MSs, as well as information about ADR services. In Section 3.4, three case studies present additional information about levels of consumer satisfaction in Austria and Italy, and empowerment tools to provide consumers with additional information about German suppliers. Finally, Section 3.5 explores the quality of DSO services which are essential for market functioning from a consumer perspective.

### 3.2 The elements of consumer protection

#### 3.2.1 Public service obligations and disconnections

270 The 3<sup>rd</sup> Package suggests that MSs can appoint a supplier of last resort to ensure the provision of such universal service. The provision of a supplier of last resort is also relevant for gas, even though consumers do not have a general right to be connected to the gas grid.

271 The 3<sup>rd</sup> MMR already showed that most MSs have established a supply of last resort mechanism in their country. In 2014, electricity suppliers of last resort were established in all MSs plus Norway, except for France, Latvia and Malta (only one supplier). In gas, in all MSs apart from Bulgaria, France, Greece, Poland and Slovenia, the provision of supply of last resort has been implemented in national law and practice.

272 Last year's 3<sup>rd</sup> MMR showed that MSs opt for different supply of last resort mechanisms. The functions of these suppliers vary greatly across jurisdictions in Europe. Most often, they include mechanisms in case of supplier bankruptcy or supplier licence revocation. In other cases, the mechanisms address the situation in which a customer does not succeed in contracting a supplier on the free market<sup>190</sup>. As a consequence of variable functions, the number of household consumers supplied by their supplier of last resort varies greatly across jurisdictions. In some countries, all households are considered to be supplied by last resort suppliers in electricity (Cyprus, Romania) and gas (Croatia), while in other countries the supply of last resort has a marginal role (with shares of last supply customers equal or very close to 0%) in electricity (Austria, Greece, Ireland<sup>191</sup>, Latvia, Lithuania, Luxembourg, Poland, Slovakia and the Netherlands) and gas (Austria, Bulgaria, Cyprus, Ireland, Lithuania, Luxembourg, the Netherlands, Romania and Slovakia). For other countries, the share of households supplied by last resort suppliers rises to 53% (Portugal and Spain, electricity) and 35% (Portugal, gas). Data are not available for some jurisdictions.

273 In selected cases suppliers and or DSOs can disconnect consumers from electricity and gas networks. Specific consumer protection legislation foresees a number of provisions to mitigate disconnecting household consumers in cases of non-payment of bills. However, if those consumers continue to fail to pay their

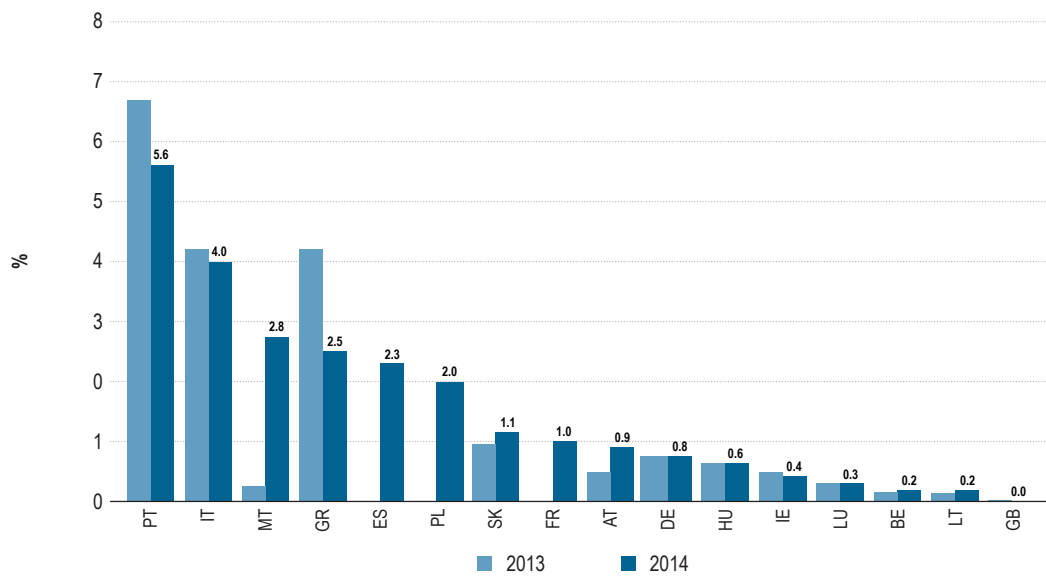
190 In some jurisdictions, the available information suggests (legal) changes to the supply of last resort mechanism from 2013 to 2014. These countries are, in electricity: Bulgaria, Croatia, Italy, Latvia, and Lithuania, and in gas: Denmark, Estonia and Ireland.

191 For instance, the Irish supplier of last resort designation does arise with any customers supplied under its scheme, since it is activated only if a supplier exits the market (which has not happened over the observed period).

bills, suppliers and DSOs can disconnect them. Most MSs have installed a procedure for disconnections which foresees a certain period between non-payment and disconnection to settle due amounts. As the 3<sup>rd</sup> MMR has already shown, the disconnection process takes several months in some jurisdictions, making it a long process for the consumers and the companies involved.

274 Figure 48 and Figure 49 illustrate disconnection rates in electricity and gas due to non-payment by residential consumers for 2013 and 2014. Electricity disconnection rates are highest in Portugal, Italy, Malta and Greece. Yet, in Portugal and Greece, whose populations were struck by severe financial austerity measures during this period, disconnection rates are declining. In other MSs, disconnection rates are significantly lower, ranging between 0% and 2% of household metering points. However, the availability of data on disconnections remains limited. This is despite the fact that the EU Directives state that MSs have to provide for disconnection data to be collected by NRAs unless another authority is responsible for monitoring disconnections.

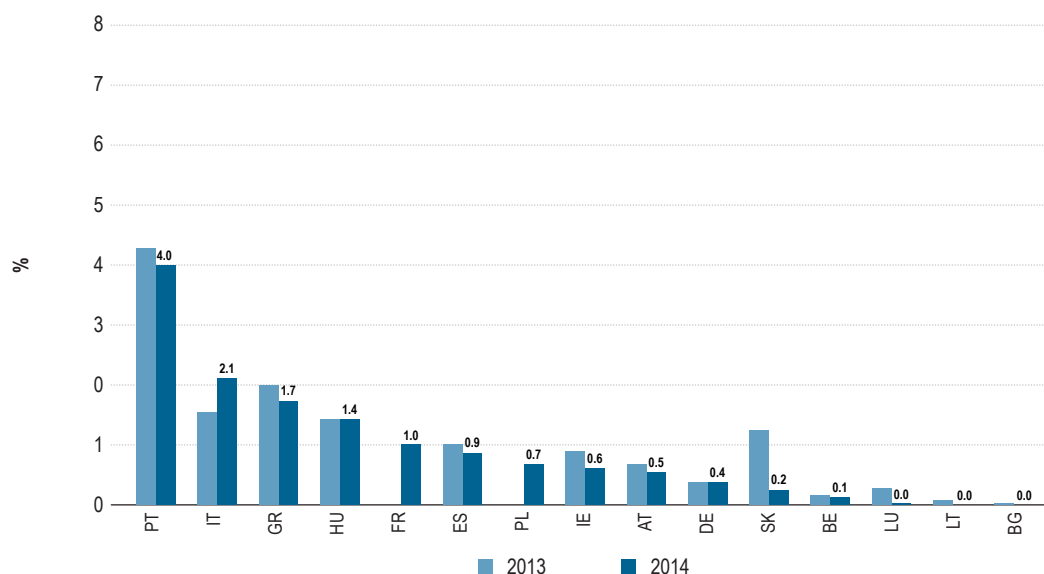
Figure 48: Share of electricity disconnections due to non-payment – 2013–2014 (%)



Source: CEER Database, National Indicators (2015).

Note: Value labels for data for 2014.

Figure 49: Share of gas disconnections due to non-payment – 2013–2014 (%)



Source: CEER Database, National Indicators (2015).

Note: Value labels for data for 2014.

275 Focusing on disconnection rates alone may lead to premature conclusions concerning the ability and willingness of household consumers to pay their energy bills. For instance, prepayment meters are often installed by companies to limit consumer debt, as these meters guarantee payment for energy consumption and grid use. While prepayment meters thus allow a continuation of electricity (and gas) supply, this rests on the ability of the consumer to top-up credit in the prepayment meter, failing which the consumer will face ‘self-disconnection’ from electricity and gas services. Hence, the responsibility for maintaining connection rests with the household alone. When commenting on disconnections, there is a need to keep in mind current practices and the prevalence not only of disconnections by energy companies but also “by consumers”, that is, the installation of prepayment meters.

276 Prepayment meters are deployed at different rates in different countries. In Great Britain, for instance, roughly 4.4 million electricity prepayment meters (roughly 16% of household metering points) are installed in total as of 2014. In Belgium, this figure amounts to 250,000 (5.8%), in Poland to 240,000 (1.6%) and in Ireland to 75,000<sup>192</sup> (3.7%)<sup>193</sup>. Thus, prepayment meters have gained some popularity in selected countries, but they are not deployed to the same extent across Europe. NRAs report less than 0.1% of prepayment meters in Austria, Germany and Hungary). In other countries still, prepayment meters are either not installed at all (Croatia, Finland, France, Greece, Lithuania, Luxembourg, Portugal, Slovakia, Spain and Sweden in gas, and Cyprus, Finland, France, Greece, Luxembourg, Malta, Portugal, Slovakia, Spain and Sweden in electricity) or figures are not available (remaining countries).

### 3.2.2 Vulnerable customers

277 Article 3 of the Directives 72/2009/EC and 73/2009/EC states that MSs shall take appropriate measures to protect final customers, and, in particular, shall ensure that there are adequate safeguards to protect vulnerable customers. In this context, each MS should define the concept of vulnerable customers, which may refer to energy poverty and, *inter alia*, to the prohibition of disconnecting electricity to such customers in critical times.

192 This figure (75,000) relates to customers that have been placed on prepayment meters by their suppliers due to difficulties with paying their bills. Irrespective of payment difficulties, two Irish suppliers provide prepayment services only. In 2014, these two suppliers had approximately 95,000 customers. For details, see <http://www.cer.ie/docs/001035/CER15112%20The%20Electricity%20and%20Gas%20Retail%20Market%20Report%202014.pdf>.

193 Similarly high numbers of existing prepayment meters are given for gas in Great Britain (3.3 million), Ireland (90,000) and Belgium (90,000).

- 278 MSs take different approaches to define the concept of vulnerable customers, as the 3<sup>rd</sup> MMR has already shown. There are explicit and implicit definitions of the concept. An explicit definition of the concept of vulnerable customers could refer to a list of criteria defining vulnerability, such as personal or household characteristics or specific (economic) conditions, which are specified in a MS's national law. Implicit definitions of the concept are, however, more difficult to grasp. They may often be rooted in a broader social welfare context. Implicit definitions of the concept of vulnerable customers are usually not encoded in law but there still exists a shared understanding that vulnerable customers are supported by a wider social security net (without stating explicitly what vulnerability is). In cases of implicit definitions of the concept of vulnerable customers, MSs argue that the eligibility criteria of existing national social protection and security measures already capture the essence of the concept of vulnerable customers.
- 279 In 2014, explicit definitions of the concept of vulnerable customers existed in 18 out of 29 jurisdictions from which data are available: Belgium, Bulgaria<sup>194</sup>, Cyprus, Finland<sup>195</sup>, France, Great Britain, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Poland<sup>196</sup>, Portugal, Romania<sup>197</sup>, Slovenia<sup>198</sup>, Spain and Sweden. Table 2 provides an overview of existing explicit definitions<sup>199</sup>.

Table 2: Explicit definitions of the concept of vulnerable customers - 2014

Jurisdiction	Explicit concept of vulnerable customer
Belgium	<p>Art 2 of the Ministerial decree of 30 March 2007 states: For the purposes of this decree, the "protected low income or vulnerable customers" is understood to be defined as in the sense of article 20 section 2 of the law of 29 April 1999 relating to the organisation of the electricity market, amended by the law of 1 June 2005:</p> <p>A. Any end customer who can prove that they or any other person living under the same roof benefits from a decision to grant assistance in the form of:</p> <ul style="list-style-type: none"> <li>• a social integration allowance granted by their municipality's CPAS (public social welfare centre) in accordance with the law of 26 May 2002 concerning the right to social integration;</li> <li>• guaranteed income for elderly persons, according to the law of 1 April 1969, instituting a guaranteed income for elderly persons and the income guarantee for the elderly (GRAPA) in accordance with the law of 22 March 2001;</li> <li>• a disability allowance following a permanent incapacity to work or a disability of at least 65%, in accordance with the law of 27 June 1969 relating to the granting of disability benefits;</li> <li>• an income replacement allowance for the disabled, under the law of 27 February 1987 on disability allowances;</li> <li>• a social integration allowance for disabled persons of categories II, III or IV, in accordance with the law of 27 February 1987 relating to disability benefits.</li> <li>• an elderly person assistance allowance, in accordance with articles 127 et seq of the law of 22 December 1989</li> <li>• an attendance allowance according to the law of the 27 June 1969;</li> <li>• financial social assistance allocated by a CPAS to a person listed in the aliens' register with a permanent residency permit and who, due to their nationality, cannot be considered as having the right to social integration.</li> </ul> <p>B. If they are in categories 2, 3, 4, 5, 6 and 7 mentioned in point A, the beneficiary of a waiting allowance, whether it is a guaranteed income for elderly persons, disability, or attendance allowance, which is allocated to them by the CPAS.</p>
Bulgaria	Vulnerable clients are household clients who receive target assistance for electric power, heat energy or natural gas under the Act on Social Assistance and the legislative normative instruments on its implementation
Finland	According to Article 103 of the Electricity Market Act: If the default on payment is caused by the user's financial difficulties that he has run into because of serious illness, unemployment or some other special cause, principally through no fault of his own, the supply of electricity may be cut at the earliest two months after the due date of payment. The same applies to the Natural Gas Market Act (Chapter 4 Article 5).
France	A person is in energy poverty when they have difficulties in their accommodation to ensure their necessary energy supply to satisfy their basic needs because of the inadequacy of their incomes or their living conditions.
Great Britain	Consumers who are significantly less able than a typical consumer to protect or represent their interests in the energy market; who are significantly more likely than a typical consumer to suffer detriment, or for whom detriment is likely to be more substantial. The needs of the following particular groups of consumers must be taken into account: of pensionable age that have a disability, that are chronically sick on low incomes, or living in rural areas.

194 Despite mentioning that Bulgaria has an implicit definition of the concept of vulnerable customers in 2014, the Bulgarian NRA provided a text defining the concept of vulnerable customers.

195 In the Electricity Market Act and Natural Gas Market Act non-personal, situational circumstances which result in vulnerability are defined only with respect to the disconnection of electricity or gas. Also, there is a constitutional concept of basic rights and social security legislation defining the target group. Finnish legislation thus includes both explicit and implicit elements.

196 Despite mentioning that Poland has an implicit definition of the concept of vulnerable customers in 2014, the Polish NRA provided a text defining the concept of vulnerable customers.

197 Despite mentioning that Romania has an implicit definition of the concept of vulnerable customers in 2014, the Romanian NRA provided a text defining the concept of vulnerable customers.

198 Despite mentioning that Slovenia has an implicit definition of the concept of vulnerable customers, the Slovenian NRA provided a text defining the concept of vulnerable customers.

199 Explicit definitions of vulnerable customers for electricity and gas markets overlap in all countries, apart from slight adaptations to energy requirement differences between electricity and gas.

Jurisdiction	Explicit concept of vulnerable customer
Greece	<ol style="list-style-type: none"> <li>1. Low-income households suffering from energy poverty.</li> <li>2. Customers who themselves, or their spouses or persons who live together, rely heavily on a continuous and uninterrupted power supply due to mechanical life support</li> <li>3. Elderly people over 70 years old, provided they do not live together with another person who is younger than the above-mentioned age.</li> <li>4. Customers with serious health problems, especially those with severe physical or mental disability with intellectual disabilities, severe audio-visual or locomotive problems, or with multiple disabilities or chronic illness who cannot manage their contractual relationship with their supplier.</li> <li>5. Customers in remote areas, especially those living on non-interconnected Islands.</li> </ol>
Hungary	Any person or a person who lives in the same household, who receives old age allowance, is entitled to receive supply of active age, receives housing benefits, receives nursing fee, receives child protection allowance, receives homemaking support, is a foster parent, and has a contractual relationship with the National Asset Management Zrt. Only one person can be considered vulnerable at one location.
Ireland	A vulnerable customer is a household customer who is (a) critically dependent on electrically powered equipment, which shall include, but is not limited to, life-protecting devices, assistive technologies to support independent living and medical equipment, or (b) particularly vulnerable to disconnection during winter months for reasons of advanced age or physical, sensory, intellectual or mental health.
Italy	<p>There are two definitions of vulnerability (in electricity), depending on economic and/or health conditions.</p> <p>Economic: in this case vulnerability is measured by a specific indicator, named ISEE (equivalent economic status indicator). It states the general economic conditions of a family taking into account family income, assets, the number and type of families.</p> <p>Health: a customer that requires electricity-powered life-support equipment with severe health problems and disease (with a medical certification) is considered vulnerable without limitations referred to income.</p> <p>In addition, vulnerable customers in the gas sector are utilities and activities relating to 'public service, including hospitals, nursing homes and rest, prisons, schools and other public and private facilities that perform an activity' recognised as a public service.</p>
Lithuania	Vulnerable electricity customers are households or persons who receive financial social support under the national laws (Information System of the Social Support for the Family). Vulnerable gas customers are households and consumers consuming up to 20 thousand cubic metres of gas/year.
Netherlands	A consumer for whom ending the transport or the supply of electricity or gas would result in very serious health risks for the domestic consumer or a member of the same household if the household customer is regarded as vulnerable, and thus disconnection is not permitted, unless a case of fraud has been proved.
Poland	According to the Polish Energy Law Act, a vulnerable consumer is "a person (to whom) a housing allowance is granted within the meaning of Art. 2. 1 of the Act of 21 June 2001 on Housing Allowances (Dz. U. of 2013. Pos. 966), which is a party to a comprehensive agreement or contract of sale of electricity and resides at the place of electricity supply."
Portugal	<p>According to Portuguese law, customers are considered economically vulnerable individuals if they are in socio-economic situation of low income and have the right to access to the essential service of energy supply. For this purpose, people are considered who are in the following situations (under social security programmes):</p> <ol style="list-style-type: none"> <li>a) solidarity supplement for the elderly;</li> <li>b) social inclusion income;</li> <li>c) social unemployment subsidy;</li> <li>d) first level of child benefit;</li> <li>e) social pensions due to disabilities.</li> </ol> <p>Economically vulnerable end customers have to meet all of the following supply criteria: the beneficiary of the social security programme has to be the electricity supply contract holder; electricity consumption is exclusively for domestic use in permanent housing; supply is at a low voltage with a contracted power of up to 4,6 kVA. Each economically vulnerable end customer can only benefit from the social tariff at one consumption point.</p>
Romania	The final customer belonging to a category of residential customers, which due to age, health or low incomes risk social marginalisation and, in order to prevent this risk, benefit from social protection measures, financial measures included. Social protection measures and the selection criteria are established by normative acts.
Slovenia	A vulnerable customer is a householder who, due to their financial circumstances, income and other social circumstances and living conditions, is unable to obtain an alternative source of energy for household use that would incur the same or smaller costs for essential household use.
Spain	<p>According to the 10th Transitory Disposition of the Electricity Law 24/2013, vulnerable customers with a right to apply for a social tariff are:</p> <ul style="list-style-type: none"> <li>• consumers over 60 years old, pensioners, persons with permanent disability and widows, and who receive the minimum amounts applicable for such people</li> <li>• consumers with large families (i.e. 3 or more children)</li> <li>• consumers who members of a family unit with all members unemployed.</li> <li>• consumers who are natural persons with contracted power less than 3 kW in their residence.</li> </ul>
Sweden	Vulnerable customers are defined as persons continuously incapable to pay for the electricity or natural gas that is transferred or delivered to them for purposes which are outside business activities. This consumer group is protected by the Social Welfare System.

Source: CEER Database, National Indicators (2015).

Note: Belgium: for gas, Article 2 additionally states: C. The social tariff is applicable to tenants living in an apartment building where heating and natural gas are provided by a shared central system, where the accommodation is rented as social housing by a housing society. France: Note that this is a definition of energy poverty.

- 280 Table 2 suggests common threads in explicit definitions of the concept of vulnerable customers across countries. In most jurisdictions, vulnerability refers to aspects of low income, bad health, or critical dependence on energy for life support. In some jurisdictions, an explicit reference is additionally made to the energy consumption of a vulnerable household, e.g. by reference to an upper limit of power or consumption level over a certain period (for instance, Portugal and Spain). Most explicit definitions thus include references to existing national social security laws with respect to eligibility criteria. This strongly underlines the embedded character of the concept of vulnerable customers in a wider social protection agenda<sup>200</sup>.
- 281 Other MSs (also) state that their national laws (energy laws, social security laws or other laws) implicitly define the concept of vulnerable customers. These jurisdictions are Austria, Bulgaria, Croatia, the Czech Republic, Denmark, Finland, Germany, Hungary, Ireland, Luxembourg, Malta, Poland, Romania and Slovenia. In these countries, the concept of vulnerable customers is embedded in wider social protection mechanisms, which exist independently of the particular provisions in the 3<sup>rd</sup> Package. It is often the case that different types of households and/or individuals are eligible for a variety of social security benefits, for instance low-income households or critically ill people. All or at least some of these affected households are then also considered vulnerable in the energy sector.
- 282 Table 3 illustrates measures to protect vulnerable customers and where they are available in Europe.

Table 3: Measures to protect vulnerable customers in the EU - 2014

Protections	# jurisdictions	
	electricity	gas
A) Limitations on disconnection due to non-payment	AT, CY, GR, FI, FR, GB, , HU, IE, IT, LU, LT, NL, RO, SI, SE	AT, BG, EE, GR, FI, FR, GB, , HU, IE, IT, LU, NL, RO, SI, SE
B) Special energy prices for vulnerable customers (also known as social tariffs)	BE, CY, GR, ES, FR, GB, PT, RO	BE, FR, GB, PT
C) Free basic supply with energy; please specify amount of free energy in kWh	GR, IE	IE
D) Exemption from some components of final customer energy costs (e.g. energy price, network tariffs, taxes, levies, etc.)	AT, CZ, FR, IT	AT, CZ, EE, FR, IE
E) Additional social benefits to cover (unpaid) energy expenses (non-earmarked financial means)	AT, CZ, DE, FR, HU, NO, SE	AT, CZ, DE, FR, HU, NL, SE
F) Earmarked social benefits to cover (unpaid) energy expenses	AT, DE, FI, GB, HU, IE, NO, PL, SE	AT, DE, FI, GB, HU, IE, PL, SE
G) Free advice on energy saving for vulnerable customers	AT, FR, HU	AT, FR, HU
H) Replacement of inefficient basic appliances at no cost to vulnerable household	FR	BE, FR
I) Financial grants to replace inefficient appliances	AT, CY, FR	AT, FR
J) Right to deferred payment	CY, FR, HU, LT	FR, HU
K) Other	AT, DK, GR, HU, IE, LT, MT	AT, DK, HU, IT, LT, SI

Source: CEER Database, National Indicators (2015).

Note: Results based on data from 29 jurisdictions.

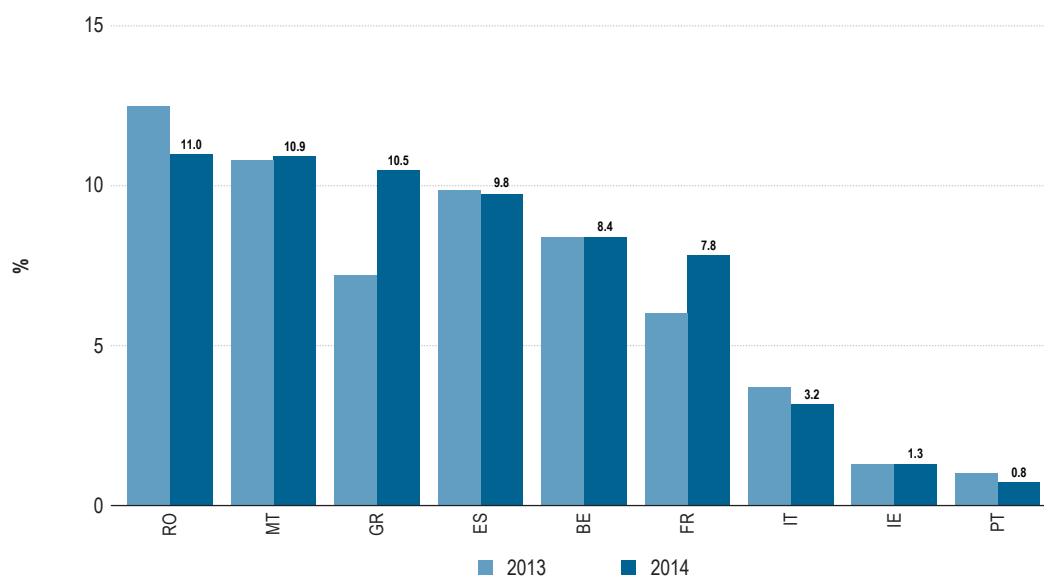
In Greece, the free basic energy supply includes 300 kWh/month for certain sub-groups of vulnerable customers according to recent social policy measures. In Ireland, the Department of Social Welfare has a scheme for persons over the age of 70. They are entitled to either free gas or electricity credit up to the value of 35 euros.

- 283 A very frequently used instrument to protect vulnerable customers is a limitation on disconnections due to non-payment. Popular measures, that is, safeguards implemented in a large number of MSs, include an extended notice procedure, the involvement of social support institutions in disconnection processes and similar hurdles for suppliers and DSOs to prevent premature disconnections of their non-paying customers from essential energy services. Social tariffs, i.e. reduced energy prices (total cost), and social benefits to cover energy expenses are also available to vulnerable customers in a considerable number of jurisdictions across Europe. Other safeguards are only selectively used by MSs to protect their vulnerable customers (e.g. free energy or the right to deferred payment).
- 284 MSs collect data on the number of vulnerable customers. Some MSs clearly refer to the number of explicitly defined vulnerable customers where available, while other MSs note the number of persons receiving one or

200 A recent study (insight-e 2015) collects both explicit and implicit definitions of the concept of vulnerable customers and reaches very similar conclusions. The full study report can be downloaded here: [https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT\\_E\\_Energy%20Poverty%20-%20Main%20Report\\_FINAL.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/INSIGHT_E_Energy%20Poverty%20-%20Main%20Report_FINAL.pdf). The definitions of vulnerable customers (sic!) can be found on pp. 28ff.

more general social support benefits which form part of their (implicit) definition of the concept. For instance, some NRAs can only provide numbers of customers on social tariffs (e.g. France<sup>201</sup>, Greece and Romania). Figure 50 and Figure 51 illustrate data on vulnerable customers in both electricity and gas. Findings vary greatly across jurisdictions, in part because of differences in the underlying definitions of vulnerable customers and/or a reference to consumers on social tariffs (instead of vulnerable customers). The findings suggest rather stable numbers or even some decrease in vulnerability (with Belgium as a notable exception in gas). In Greece and France, however, the numbers of consumers on social tariffs have noticeably increased in the last year. However, since the understandings of the concept of vulnerable customers vary across jurisdictions (see Table 2) additional cross-national comparisons of these data are limited.

Figure 50: Share of vulnerable customers in electricity – 2013–2014 (%)

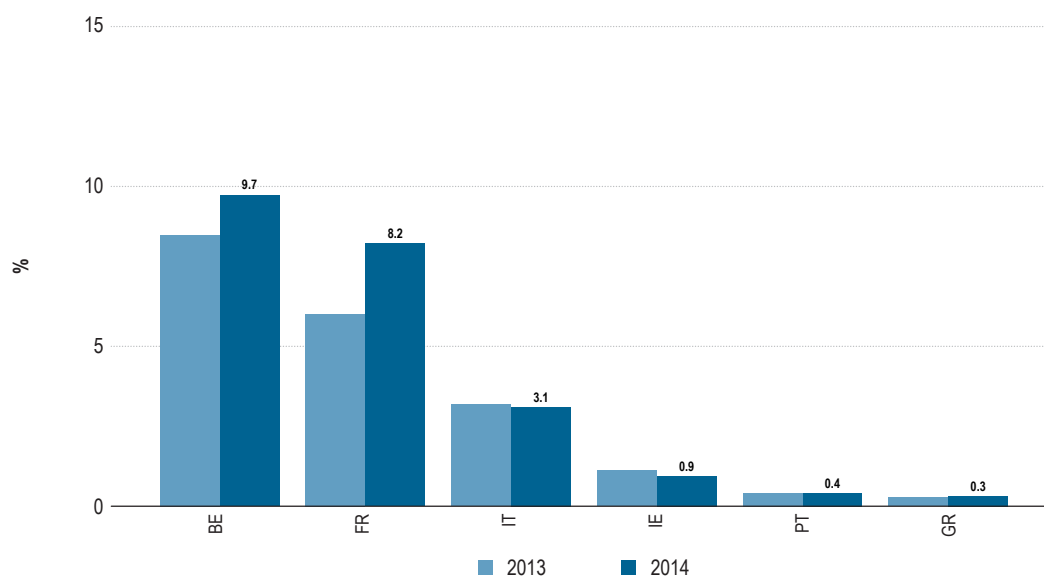


Source: CEER Database, National Indicators (2015).

Note: Percentages for data for 2014.

For France, Greece and Romania, the chart shows percentages of customers on social tariffs.

Figure 51: Share of vulnerable customers in gas – 2013–2014 (%)



Source: CEER Database, National Indicators (2015).

Note: Percentages for data for 2014.

201 The total number of vulnerable customers in France is collected by another institution. According to the French regulator, the (total) share of vulnerable customers is 14.4% of households who are vulnerable according to the explicit definition outlined in Table 2.



For France and Greece, the chart shows percentages of customers on social tariffs.

285 To conclude, MSs apply explicit and implicit definitions of the concept of vulnerable customers. Almost everywhere, definitions of the concept of vulnerable customers refer to groups of the population with low incomes and/or other constraints in their daily activities, e.g. bad health, disabilities, old age etc. Furthermore, according to Figure 50 and Figure 51, the existence of an explicit definition does not necessarily lead to lower numbers of vulnerable customers as no associations between the share of vulnerable customers and the type of concept can be observed – although only a minority of MSs is able to report figures on the share of vulnerable customers. The findings further show that MSs provide a mix of two or more different types of safeguards to protect vulnerable customers and ensure their necessary energy supply irrespective of the type of definition (see Table 3). That is, similar protections are in place irrespective of the existence of an explicit definition and there is no indication that the existence of an explicit definition of the concept contributes to a higher level of protection of vulnerable customers.

### 3.2.3 Customer information

286 Consumers' engagement in the market requires them having easy access to the relevant information. Therefore, the Electricity and Gas Directives consider information provided to consumers as the most important element of consumer protection and empowerment. Furthermore, the Energy Efficiency Directive, which was to be transposed into national law by 5 June 2014 in all MSs, seeks to empower energy consumers to better manage their consumption through easy and free access to data on actual consumption. In the following, both the legal and practical provisions of information to consumers in the different MSs are described.

287 As already shown in the 3<sup>rd</sup> MMR, the provision of information on price changes and other components of the bill varies among MSs. Table 4 shows how consumers were informed about price changes in 2014.

Table 4: Time point of information about energy price changes – 2014

Legal requirement to inform final household customers about energy price changes	Fixed price		Variable price	
	Legal	In practice	Legal	In practice
10 working days in advance	BG** <sup>^</sup>	AT		AT, NO* <sup>††</sup>
15 working days in advance	HR*, RO*		RO*	
22 working days in advance	LT	LT	LT	LT
30 working days in advance	CZ, EE**, GR**, ES <sup>^^</sup> , FI <sup>†</sup> , FR, HR**, IE <sup>†</sup> , LU <sup>†</sup> , LV, SI*, SK <sup>†</sup>	CZ, EE**, ES*, FR, IE, LV, SK <sup>†</sup>	CZ, EE**, GR**, ES <sup>^^</sup> , FI <sup>†</sup> , FR, GB <sup>†</sup> , IE <sup>†</sup> , LU <sup>†</sup> , SI*	CZ, EE**, FR, GB <sup>†</sup> , IE
60 working days in advance	DK, IT <sup>^^^</sup>	BE, DK	IT <sup>^^^</sup> , SE**	BE
Legal requirement to inform final household customers about energy price changes does not extend to a specific number of days	AT, BE, BG*, PL, PT, RO**, SI**	BG*, PT, RO**	AT, BE, DE, DK, LU**, NL, PL*, PT, RO**, SI**	DE, DK, NL*, PT, RO**
There is no legal requirement to inform final household customers about changes in the energy price component	HU, MT*	MT*	EE*, GR*, HU, MT*, NO*, SE*	EE*, MT*, SE* <sup>††</sup>
The supplier is not allowed to change the price during the fixed period of the contract	DE, EE*, GB, NL, NO*, SE	DE, EE*, GB, NL, NO*, SE		

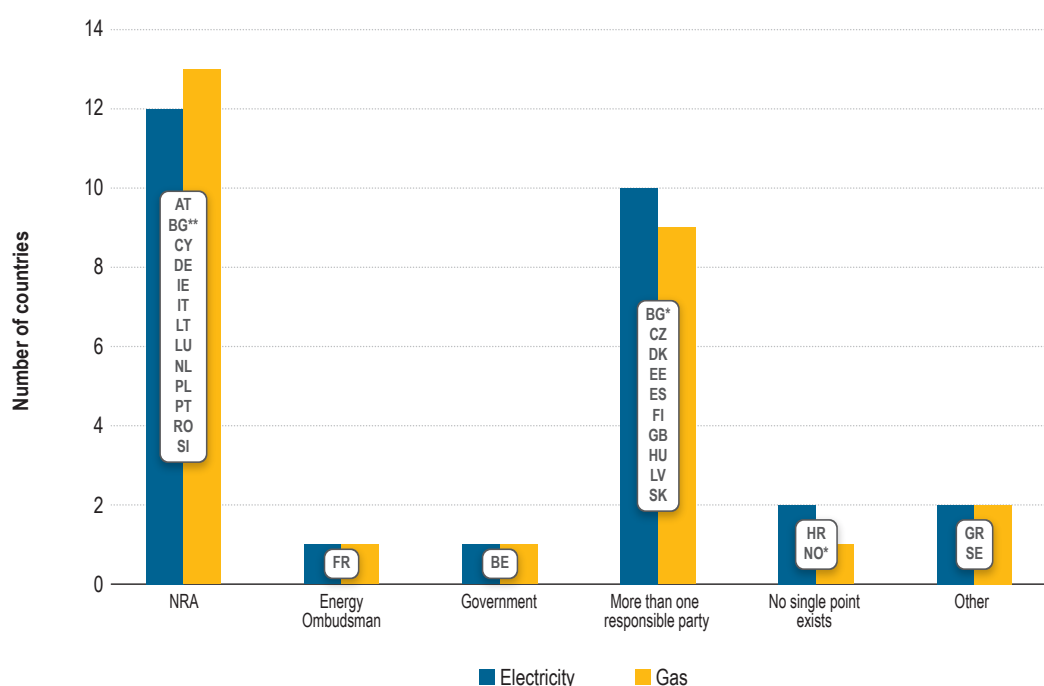
Source: CEER Database, National Indicators (2014-2015).

Note: \* electricity, \*\* gas, † calendar days, †† the contract between the supplier and the customer specifies how and when information about price changes are provided, ^ 7 working days, ^^ 30 days for electricity (fixed price), 44 days for gas, ^^ 90 calendar days.

288 Almost half the MSs have legal requirements to inform consumers about changes in the energy price component within a specified number of days. In other MSs, the legal requirement to inform consumers about changes in the energy price does not extend to a specific number of days. In a few MSs, the supplier is not allowed to change the price during the fixed period of a fixed price contract. In Estonia, Greece, Norway and Sweden, there are no legal requirements to inform consumers about changes in the variable energy price for electricity. In Malta, there are no even requirements to inform consumers about changes in either fixed or variable energy prices in hindsight.

- 289 Most MSs stated that there is a legal requirement to provide information to consumers about changes in the other energy price components (network tariffs, taxes or other) for both gas and electricity<sup>202</sup>. This information is also supplied in practice in most of these countries<sup>203</sup>. However, information about changes in other energy price components are not provided in practice in Austria, Belgium, Denmark, Luxembourg, Slovenia and the Netherlands, nor is it required by law to do so. While in Romania there is no legal requirement to provide information about changes in other price components of the energy cost for gas, this information is nonetheless provided in practice.
- 290 MSs must establish a single point of contact which consumers can contact in order to obtain independent information about their rights and the market. There have been few significant changes in the party or parties acting as the single point of contact as compared to the 3<sup>rd</sup> MMR report. However, in Slovenia where no single point of contact existed last year, the NRA is now the single point of contact.

Figure 52: Single point of contact – 2014 (number of countries)



Source: CEER Database, National Indicators (2014–2015).

Note: \* Electricity, \*\* Gas.

- 291 The European Commission has called on MSs to make available a consumer checklist or handbook of practical information related to energy household customer rights. Such a checklist exists in 17 MSs<sup>204</sup>: in 12 of them the checklist is the responsibility of the NRA<sup>205</sup>, while in the other five countries the checklist is the responsibility of either the government or a consumer organisation. The remaining 12 MSs report that they have no single consumer checklist, but some state that the relevant information can be found in several different brochures/documents or on websites.

202 Data on electricity are not available in Hungary and Malta, while data on gas are not available in Greece, Latvia and Poland. In Ireland, data for neither are available.

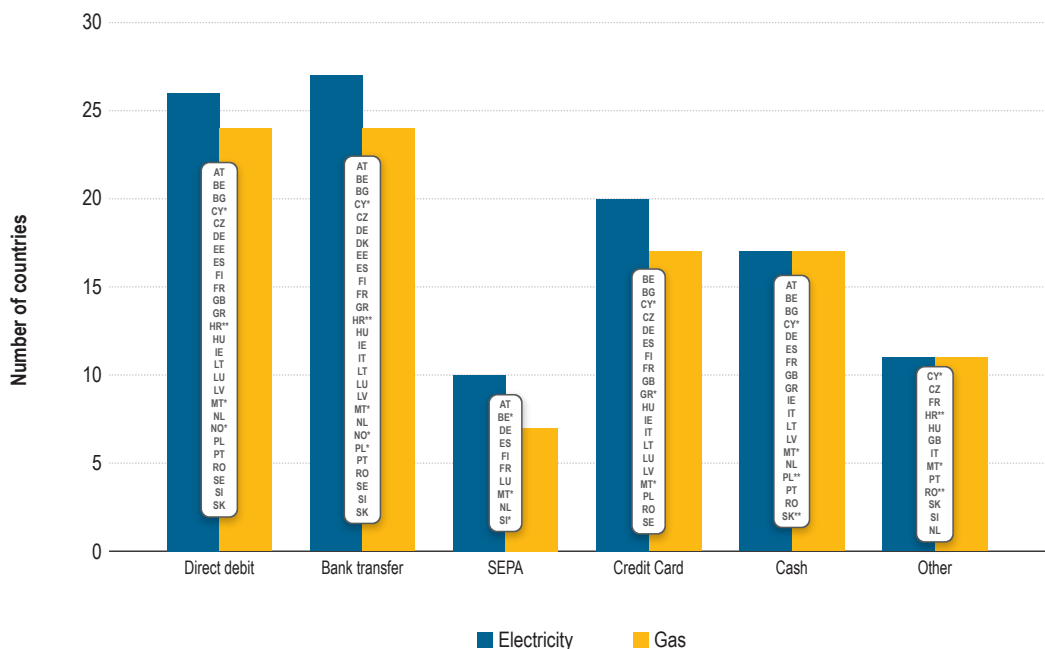
203 Information about whether or not the information is supplied in practice is not available in Croatia, Greece, Hungary, Ireland and Luxembourg. Information is not available for electricity in Estonia and Slovenia, and not available for gas in Cyprus, Italy and Poland.

204 Cyprus (for electricity), Czech Republic, Finland, France, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Slovakia and Sweden.

205 Cyprus, Finland, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, the Netherlands, Poland and Portugal.

292 The Electricity and Gas Directives require a variety of payment methods to be made available to energy consumers. The data depicted in Figure 53 indicates that consumers in most MSs have a choice between two or more different payment methods. In 11 out of 29 countries, suppliers offer discounts or rebates depending on the chosen type of payment method<sup>206</sup>.

Figure 53: Choice of payment methods – 2014 (number of countries)



Source: CEER Database, National Indicators (2014-2015).

Note: \* Electricity, \*\* Gas.

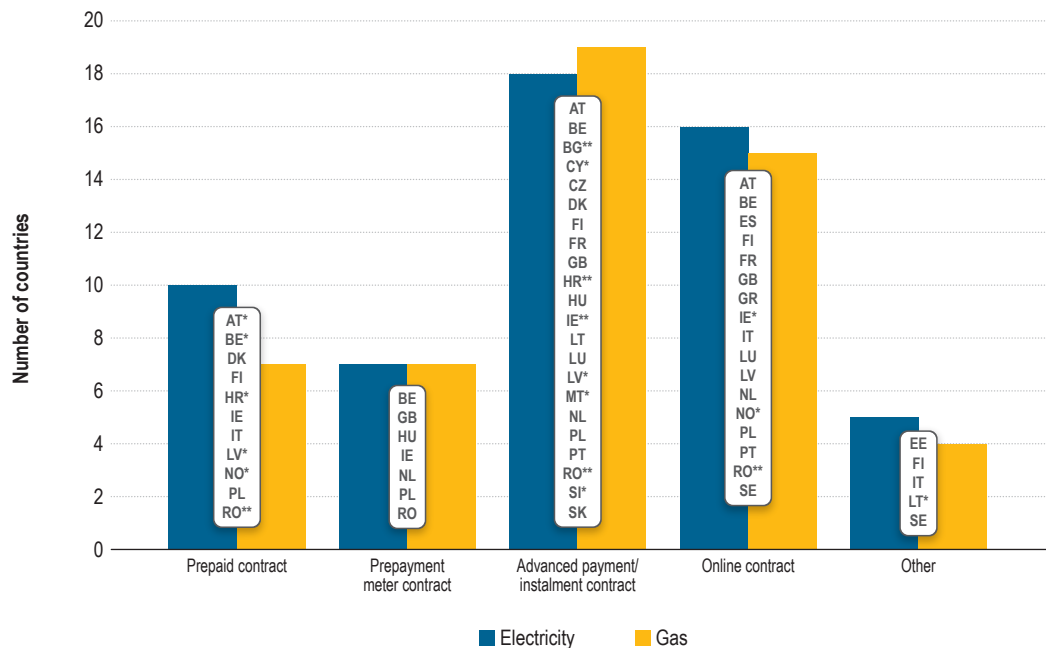
293 In addition to the more traditional payment methods, such as direct debit and bank transfer, it was possible to pay energy bills using SEPA in 10 out of 19 Eurozone countries in 2014<sup>207</sup>. SEPA, or the Single Euro Payments Area, aims to create a true European Single Market for retail payments in euros, and makes all electronic payments in the euro area as easy as cash payments. With SEPA, a household customer can use their home bank account to pay bills in any Eurozone country.

294 As well as a variety of payment methods, there is also a variety of contract terms relating to payment. Some of these contract terms are shown in Figure 54. In the majority of MSs, advanced payment (or instalment) contracts are available. These are contracts where consumers pay regularly (monthly, bimonthly, quarterly, etc.) for their energy in advance of their annual (or biannual, quarterly, etc.) bill. Some MSs also have prepaid contracts and/or contracts tailored to prepayment meters. Prepaid contracts are contracts where a fixed amount of energy is bought and paid for at the start of the billing period, and where actual consumption is used to determine the final (accurate) bill. With a contract tailored to a prepayment meter, energy is bought ‘piece-wise’ in small amounts, e.g. kWhs for 20 euros or so (pay-as-you-go). Contracts which require that all communication, including payment, between household consumers and their supplier take place exclusively online (online contracts) are available in many MSs.

206 Austria, Belgium, Great Britain, Ireland, Italy, Luxembourg, Malta (for electricity), Norway (for electricity), the Netherlands, Portugal, and Romania (for electricity).

207 The SEPA Regulation (EC 260/2012) was adopted in 2012, and 1 February 2014 was originally set as the implementation date for all countries within the Eurozone. The Regulation was amended in January 2014 (IP/14/6) to extend the deadline to 1 August 2014. Non-eurozone countries have until 31 October 2016 to implement SEPA for their transfers in euros.

Figure 54: Choice of contract terms relating to payment by country – 2014 (number of countries)



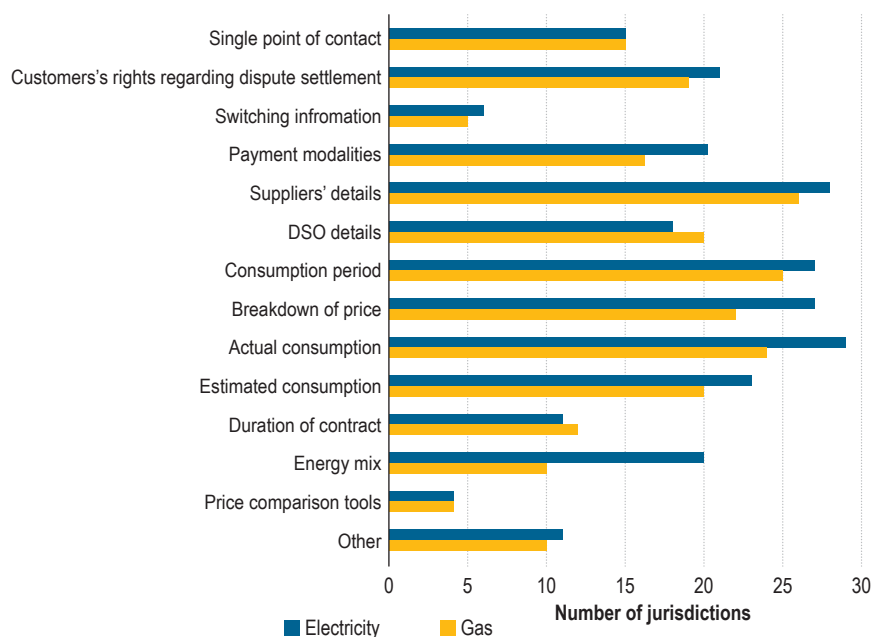
Source: CEER Database, National Indicators (2014–2015).

Note: \* Electricity, \*\* Gas.

295 Article 10 of the Energy Efficiency Directive states that energy bills should contain information facilitating energy efficiency, e.g. information about current actual prices and actual consumption of energy, comparison of final customers’ current consumption with consumption in the previous billing intervals and contact information for organisations where final customers can find information on energy efficiency.

296 Figure 55 illustrates information provided to household customers on their bills. Customers in the majority of MSs are provided with information on the consumption period, actual and/or estimated consumption, and a breakdown of the price. Information about the single point of contact is included on the bill in around half the MSs<sup>208</sup>.

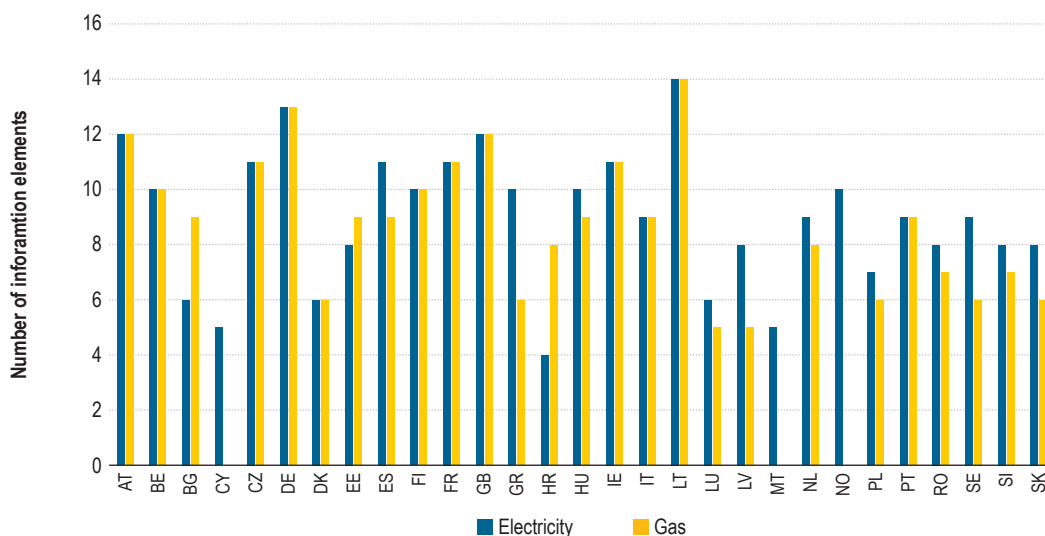
Figure 55: Information on household customer bills in MSs – 2014 (number of countries)



Source: CEER Database, National Indicators (2014–2015).

- 297 There is still a lack of information in many MSs regarding consumer empowerment through switching information, information about price comparison tools and the duration of the contract, as already pointed out in the 3<sup>rd</sup> MMR. Five countries only require that information about price comparison tools be printed on consumer bills<sup>209</sup>, while seven countries require the provision of information about switching<sup>210</sup>.
- 298 However, Figure 56 shows that in most MSs, many of the information elements listed in Figure 55 are included on the bill. Giving information to consumers in an easy and understandable way is important. Yet, the danger persists that presenting too many different pieces of information on the bill might make it less accessible to the consumer, because of the plethora of details which are all presented at once at long intervals. When communicating with consumers, other communication channels may be at least as efficient as the bill, such as regular email or the consumer’s ‘my page’ on the supplier and/or DSO website.

Figure 56: Information on household customer bills in MSs – 2014 (number of information elements)



Source: CEER Database, National Indicators (2014-2015).

- 299 According to point 1.1 of Annex VII of the Energy Efficiency Directive, MSs are required to ensure that, where individual meters are available, individual bills based on actual consumption are provided at least once a year as of 5 June 2014. According to an interpretative note published by the European Commission on 22 January 2010, where smart metering is available to final customers, billing information based on actual consumption should be provided on a monthly basis<sup>211</sup>.
- 300 In almost all MSs, legal requirements specify that billing information based on actual consumption should be available for consumers without smart meters at least once a year<sup>212</sup>. Table 5 shows how often billing information based on actual consumption is available in MSs both by law and in practice. In Bulgaria, Estonia and Lithuania, consumers receive billing information based on actual consumption every month. Electricity consumers in Sweden<sup>213</sup> and gas consumers in Croatia also receive this information monthly. The legal requirements on access to billing information based on actual consumption for electricity consumers with smart meters differ from those without smart meters in Austria, Finland, the Netherlands, Portugal and Spain; it is made available monthly for consumers equipped with smart meters in all countries except Finland (daily)<sup>214</sup> and the Netherlands (bimonthly).

209 Bulgaria (for gas), Great Britain, Lithuania, Norway (for electricity) and Spain.

210 Bulgaria (for gas), Germany, Great Britain, Greece (for electricity), Lithuania, Norway (for electricity) and Spain.

211 Source: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1416394987283&uri=SWD:2013:448:FIN>.

212 No legal requirements for billing based on actual consumption (for consumers without smart meters) in Belgium, Cyprus (for gas), Germany, Great Britain, Greece, Italy, Latvia, Luxembourg, Malta, Poland (for gas), Sweden (for electricity) and Spain (for gas).

213 All electricity consumers in Sweden have smart meters.

214 The law in Finland requires metering data to be available to the consumer at the same time that it is passed to the supplier, i.e. daily.

Table 5: Frequency of billing information based on actual consumption – 2014

	Without smart meters		With smart meters	
	Legal	In practice	Legal	In practice
Daily			FI*	
Monthly	BG, EE, LT, SE*	BG*, EE, HR**, LV*, LT, SE*	AT, EE*, ES*, PT*, SE*	FR, ES*, PT*, SE*
Bimonthly	CY*, PT**	CY*, ES*, FR, PT**	NL	NL**
Quarterly	AT, IE, NO*, PT*, RO**	DK, IE, PT*, RO	NO*	DK*, EE*, NO*
Triannually	FI	GR		
Biannually	HR, RO*, SI	HR*, MT*		
Annually	CZ, DK, GR, ES*, FR, HU, NL, PL*, SE**, SK	LU, NL, SI, SK	DK, FR, SE**	

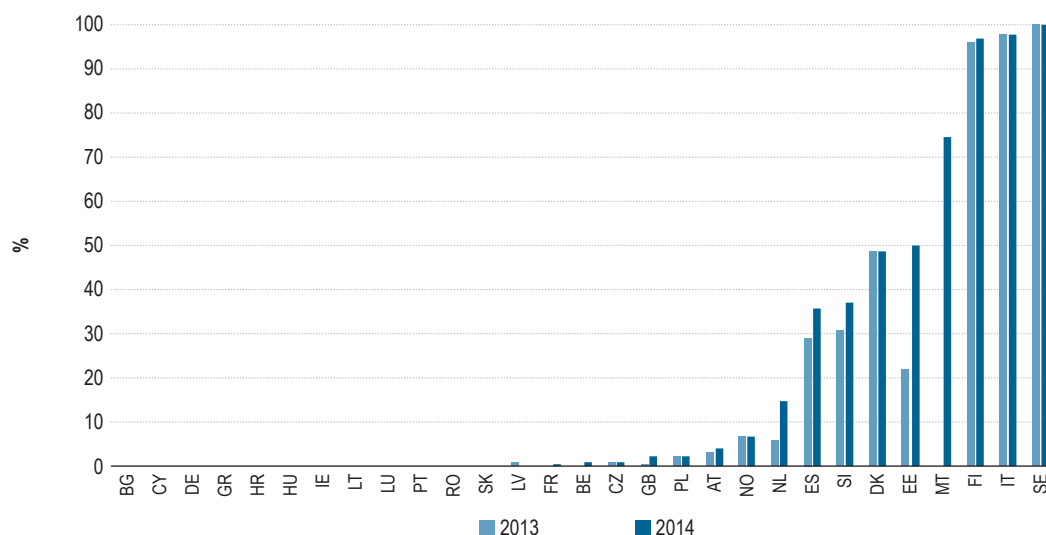
Source: CEER Database, National Indicators (2014-2015).

Note: \* Electricity, \*\* Gas.

### 3.2.4 Smart meters

- 301 Smart metering is an important step towards modernising the energy industry, giving the consumer, the DSO and the supplier easy access to accurate consumption data. This benefits the consumer by enabling frequent billing based on actual consumption, and raises awareness on energy consumption.
- 302 Smart meters for electricity are being rolled out across MSs. Figure 57 shows the progress of rollouts in all MSs from 2013 to 2014. In Sweden, Finland and Italy, all (or close to all) consumers are equipped with smart meters. Austria, Estonia, Great Britain, the Netherlands, Malta, Slovenia and Spain saw an increase in the number of smart meters from 2013 to 2014. However, in many MSs, none (or very few) consumers are equipped with smart meters<sup>215</sup>.

Figure 57: Share of household customers equipped with smart meters for electricity – 2014 (%)



Source: CEER Database, National Indicators (2014–2015).

- 303 Few MSs have rolled out smart meters for gas. In the Netherlands, the share of consumers equipped with smart meters for gas increased from 6% in 2013 to 16.2% in 2014, while in Great Britain, the share increased from 0.5% to 1.9%. In France and Belgium, around 1% of consumers were equipped with smart meters for gas in 2014.
- 304 The Commission Recommendation on preparations for the roll-out of smart metering systems<sup>216</sup> aims to facilitate the roll-out of smart meters, and provides common minimum functional requirements for the

215 Latvia and Slovenia reported that some consumers were equipped with smart meters in 2013, but did not provide this information for 2014.

216 Commission Recommendation 2012/148/EU of 9 March 2012 on preparations for the roll-out of smart metering systems (OJ L 73, 13.3.2012, p. 9–22).

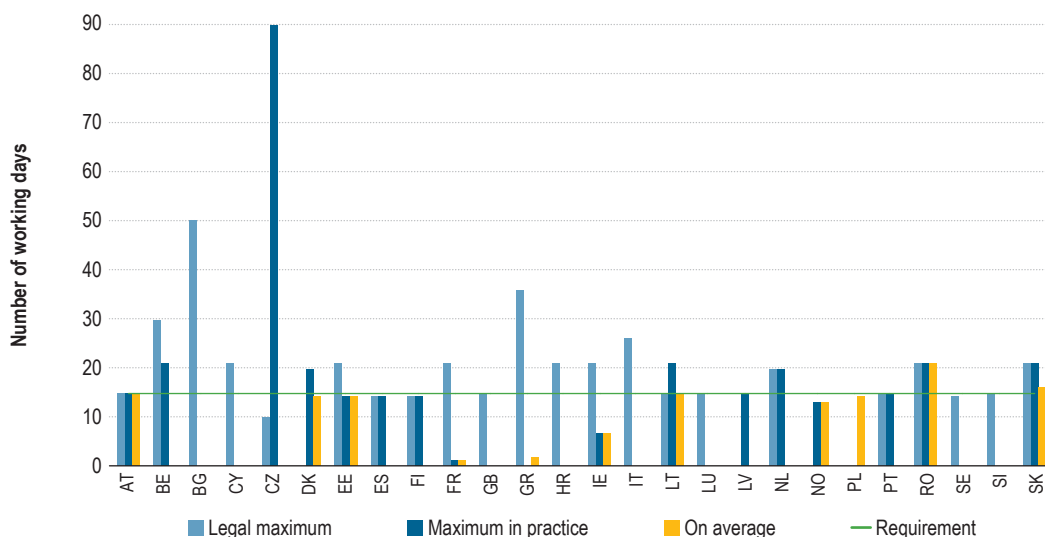
smart metering of electricity. The requirements concern access and frequency of meter readings for the consumer, the network operator and any third party designated by the consumer. The meters must provide two-way communication for maintenance and control, support advanced tariff systems, allow for the remote control of the power supply and/or flow or power limitation, and provide import/export and reactive metering. Furthermore, the meters must provide secure data connections, fraud prevention and detection.

- 305 Article 9(2)(a) of the Energy Efficiency Directive establishes the obligation for MSs to ensure that the “objectives of energy efficiency and benefits for final household customers are fully taken into account when establishing the minimum functionalities of the meters and the obligations imposed on the market participants”. It is for MSs to decide which energy- efficiency objectives and which benefits to final customers are taken into account when setting minimum standards for smart meters<sup>217</sup>.
- 306 Approximately half of MSs have the minimal technical and other requirements of smart meters in their legislation to ensure benefits for consumers<sup>218</sup>. Most of these MSs require that smart meters provide information on actual consumption, make billing based on actual consumption possible, and have an interface with the home, for easy access to information for consumers. Most MSs also have requirements concerning remote power capacity reduction/increase and activation/de-activation of supply<sup>219</sup>.

### 3.2.5 Supplier switching process

- 307 Supplier switching is the most direct way for consumers to benefit from market liberalisation. Furthermore, supplier switching behaviour influences the development of competition. According to the Electricity and Gas Directives, a supplier switch should take no longer than three weeks, and consumers should receive their final bill within six weeks.
- 308 As can be seen from Figure 58, the legal maximum duration of an electricity switch is below the requirement set by the Electricity Directive in many MSs, but in not all of them<sup>220</sup>. Figure 58 also illustrates the average and maximal duration of a switch in practice in different MSs<sup>221</sup>.

Figure 58: Duration of supplier switching in electricity – 2014 (working days)



Source: CEER Database, National Indicators (2015).

Note: The requirement set in the Directive is that the switching period should not last more than three weeks, i.e. 15 working days. In the Czech Republic, the switching process itself takes 10 days in practice. However, in combination with a 90-day (3 months) notice

217 Source: <http://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1416394987283&uri=SWD:2013:448:FIN>.

218 Austria, Belgium, Denmark (for gas), Finland, France, Great Britain, Hungary (for electricity), Italy, the Netherlands, Norway (for electricity), Portugal, Romania (for electricity), Slovenia (for electricity) and Spain (for electricity).

219 Table A-5 in Annex 9 summarises some of the functionalities required for smart meters in the MSs, both legally and in practice.

220 In the Netherlands, the switching period is 20 working days, because the former supplier has to be given four weeks' notice.

221 Information not provided by Germany, Hungary and Malta.

period, to switch from one supplier to another appears to take 90 days in practice.

- 309 Only six MSs could provide the percentage of switches that are executed within the country's legal maximum switching period<sup>222</sup>. In five of these, more than 85% of switches are executed within the legal maximum of between 15 and 36 working days<sup>223</sup>, while in Cyprus no switches are executed within the legal maximum of 21 working days. In Malta, supplier switching (for electricity) is not possible at all, as there is only one supplier.
- 310 In most MSs, by law as well as in practice, consumers receive their final bill within six weeks after switching supplier, as required by the Directive. However, almost half the MSs do not have information about the timing when consumers receive their final bill in practice<sup>224</sup>. In Belgium, Denmark, Germany (for gas) and Norway, there is no information about when consumers receive their bill, either by law or in practice.

### 3.2.6 Conclusion

- 311 Consumer protection covers a number of mechanisms following the provisions in the 3<sup>rd</sup> Package. While most (but not all) MSs have implemented a supplier of last resort mechanism as well as protections against disconnection, the definition of the concept of vulnerable customer has taken explicit and implicit forms across Europe. Despite different approaches, MSs have similar groups of their population in mind when assessing vulnerability/economically disadvantaged households. However, many MSs cannot yet provide figures on disconnections and vulnerability. All in all, these findings lend some support to the rapidly growing awareness of the importance of monitoring vulnerability issues. While the first step has been taken to identify vulnerable customers in more or less all MSs, some have not yet caught up with the forerunner MSs on obtaining empirical evidence about these issues.
- 312 Access to relevant information can empower the consumer and contribute to consumers' participation in the energy market. MSs have put in place regulations on the distribution of information to consumers on energy related topics, such as changes in price and other variables, the single point of contact, information provided on bills and billing information based on actual consumption. The provision of information to consumers varies among the MSs, both by law and in practice. Most MSs provide a variety of payment terms and methods.
- 313 Smart meters are increasingly being rolled out across Europe, and approximately half the MSs have minimum technical and other requirements for smart meters in their legislation to ensure benefits for consumers.
- 314 Most MSs have legislation that ensures that the supplier switching process takes no more than three weeks and that consumers receive their final bill within six weeks.

## 3.3 Consumer complaints

- 315 According to Article 37 of Directive 2009/72/EC and Article 41 of Directive 2009/73/EC concerning common rules for the internal market in electricity and natural gas, the NRAs of MSs have to monitor "the level and effectiveness of market opening and competition at wholesale and retail levels, including (...) complaints by household customers (...)".
- 316 To monitor complaints by household customers, MSs in general and NRAs in particular have to clarify three issues. Firstly, define what a consumer complaint is. MSs handle this issue in different ways. In eight MSs (Croatia, Cyprus, Great Britain, Hungary, Italy, Lithuania, Portugal, and Romania) there is a legal defi-

222 Cyprus, Greece (for electricity), Lithuania (for gas), Poland, Slovakia and Spain.

223 Greece: 86% within 36 working days for electricity; Lithuania: 100% within 15 working days for gas; Poland: 97.3% for electricity and 100% for gas (legal maximum not provided); Slovakia: 98% within 21 working days for electricity and gas; Spain: 97.9% within 14 working days for electricity and 99.9% within 15 working days for gas.

224 Austria, Belgium, Cyprus, Czech Republic, Denmark, Great Britain, Italy, Luxembourg, Malta, Norway, Slovenia and Spain. Croatia, Finland, Germany, Greece, Latvia, Portugal and Romania could not provide this information for gas, while Bulgaria and Estonia could not provide this information for electricity.



inition of what a consumer complaint is. The definitions extend from general understandings of complaints to full and detailed explanations of the complaint process. Nevertheless, all the definitions reflect an understanding that a consumer complaint is described by reporting dissatisfaction of consumers with a received service or product. In most cases, the complaints have been reported to the competent authority in writing.

- 317 Secondly, following the respective national legislation, customers must also be informed about the competent authority to receive their complaints. Therefore, MSs have to ensure that consumers have access to this information. In three out of 4 MSs, the consumer can find the contact details of a complaint service directly on the bill. In more than 50% of MSs the contact details are given in the supply contract, and in 30% of MSs this information can be found in leaflets, flyers etc. A large number MSs use at least two of these methods. Moreover, in most countries consumers can find additional information on the internet.
- 318 Thirdly, NRAs must have access to information about consumer complaints to be able to monitor them. Therefore, all complaints by household customers addressed to DSOs, suppliers or ADR bodies have to be reported to NRAs. Using this information and combining it with the consumer complaints directly addressed to NRAs, the NRAs can put together an overview of all consumer complaints. As such they can fulfil their statutory mandates under Directives 2009/72/EC (Article 37) and 2009/73/EC (Article 41) to monitor complaints by household customers.
- 319 To ease the data collection and comparison, the forerunner of the Agency, the European Regulators Group for Electricity and Gas (EREG) recommended the inclusion of the number of consumer complaints by category as an indicator of consumer (dis)satisfaction when monitoring retail energy markets<sup>225</sup>. Moreover, it has been suggested that data should be collected at least annually. When analysing and comparing the data on consumer complaints, we have to remember that differences remain in defining complaints within MSs. Moreover, the methods of data collection differ, depending on whether the authority is responsible for collecting complaint data directly or whether data is collected via third parties. These issues may explain some differences between MSs, nevertheless, the data provides an overview of the procedures for handling consumer complaints within MSs.

### 3.3.1 Complaint data

- 320 This section focuses on assessing the number of complaints from household customers received by suppliers, DSOs and ADR and reported to NRAs, as well as the number of complaints directly received by NRAs. Moreover, the focus is on the categories of consumer complaints in order identify the reasons for consumer dissatisfaction.

Table 6: Available number of final household customer complaints per 100,000 inhabitants (electricity and gas) in 2014 received by

	Suppliers in 2014 (as reported to the NRA)	DSOs in 2014 (as reported to the NRA)	The ADR in 2014 (as reported to the NRA)	Directly addressed to the NRA
Austria	-	-	34.43	34.43
Belgium	99.74	254.38	43.01	8.43
Bulgaria	-	2.61	2.61	0.22
Croatia	-	0.82	-	1.44
Cyprus*	72.49	5.01	-	3.03
Czech Republic	-	-	0.98	42.36
Denmark	-	-	-	0.55
Estonia	-	-	-	0.53
Finland	-	-	-	1.28
France	-	32.86	22.69	-
Great Britain	10,134.22	59.75	-	0.01
Greece	563.98	413.74	42.5	1.39
Hungary	716.38	329.91	329.91	16.19
Ireland	-	-	-	10.44
Italy	580.07	28.12	2.35	75.23

225 Source: EREG (2010): GGP on Consumer Complaints Handling, Reporting and Classification.

	Suppliers in 2014 (as reported to the NRA)	DSOs in 2014 (as reported to the NRA)	The ADR in 2014 (as reported to the NRA)	Directly addressed to the NRA
Latvia*	1.95	347	-	1.95
Lithuania	-	25.17	-	3.43
Luxembourg	-	-	1.82	-
Malta	4.47	-	-	4.47
Netherlands	-	-	4.46	34.48
Norway+	-	-	5.21	0.27
Poland	433.89	124.88	-	6.84
Portugal	1,815.88	509.74	-	143.6
Romania	-	-	-	17
Slovakia	253.71	279.34	15.99	16.25
Slovenia	-	-	-	2.57
Spain	-	-	-	4.79
Sweden	-	-	0.04	6.43

Source: CEER Database, National Indicators (2015), Eurostat (2015).

Note: \* Electricity only. Data for Germany and Iceland are not available.

Belgium: The number of final household customer complaints received by suppliers and by DSOs is for Flanders only from VREG, The number of final household customer received by ADR comes from the federal energy ombudsman.

Croatia: New rules on the quality of gas supply were introduced in place in 2014 which will include collection and reporting on complaints data. No information is available on gas in 2014.

Italy: Gas data contains small non-household customer complaints.

Portugal: Data of Mainland (all customers).

Spain: Data contains also small non-household customer complaints.

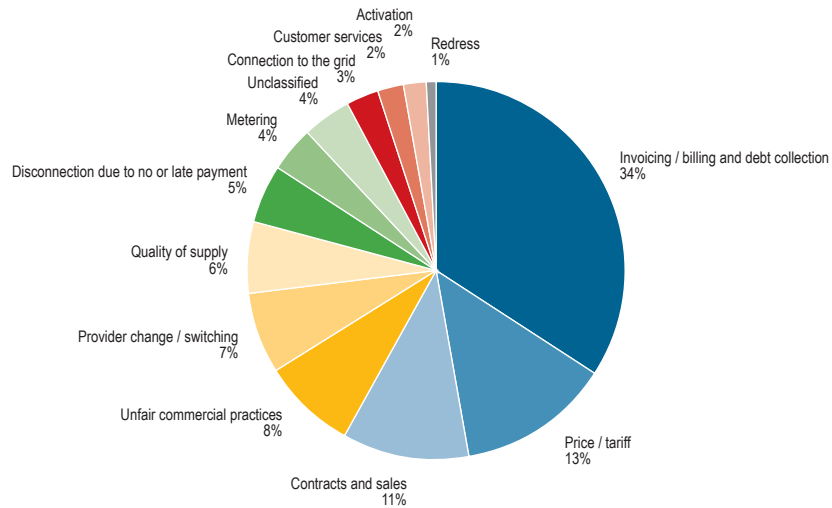
321 As shown in Table 6, the range of final household customer complaints per 100,000 inhabitants received by suppliers, DSOs and ADRs as reported to the NRAs in electricity and gas varies in between 0.53 and 10,193.97 for countries for which data are available (under consideration of possible double counting of complaints in cases where ADR responsibilities are within the NRA). The distribution is skewed with a mean of total customer complaints per 100,000 of about 953, and a median of 51, which means that 50% of the NRAs received fewer than 51 customer complaints per 100,000 inhabitants. The main reason for these variances is not necessarily due to differences in consumer complaints, but can also be explained by the diverse handling and reporting processes across MSs. Besides customer complaints received by suppliers, DSOs and ADRs, a number of complaints were directly addressed to NRAs, which are more homogenous. In most MSs, there is a relatively important number of complaints directly addressed to NRAs. The number varies from 0.27 in Norway up to 143.6 in Portugal. Consequently, it can be argued that consumers seem to take advantage of the opportunity to address complaints directly to their NRAs.

### 3.2.2 Classification of consumer complaints

322 To better present the structure of consumer complaints, the classification of complaints is evaluated. This is done separately for complaints in electricity and in gas to provide a clear picture of the differences between both markets with respect to the identified main complaint issues - connections, metering, disconnections, billing, prices etc. This Report focuses on complaints directly addressed to NRAs for data quality reasons. Consequently, the number of markets included in this analysis is reduced.

323 Figure 59 presents the mean share of different types of final household customer complaints directly addressed to NRAs in electricity.

Figure 59: Mean share of classification of final household customer complaints directly addressed to NRAs weighted by the total number of complaints (electricity, in total 62,728 complaints)

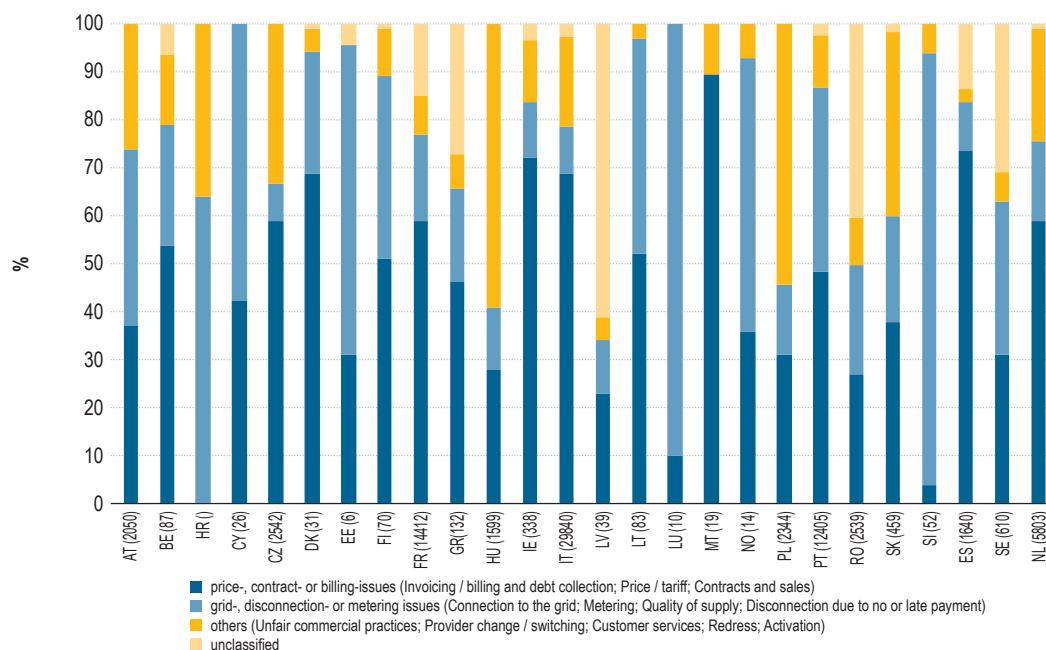


Source: CEER Database, National Indicators (2015).

Note: Percentage of complaints of a particular type addressed to the NRA 'as NRA' and not as ADR or in any other function. Figures are rounded)

- 324 The main share of customer complaints relates to “Invoicing/billing and debt collection” (21 NRAs, 34%). Considering that an additional 24% of complaints relate to “contracts and sales” and “price / tariff”, more than half of the complaints relate to price, contract or billing issues. In most MSs, consumers show high level of dissatisfaction about these elements without obvious reasons. All other types of complaints have a share lower than 10% or less; “redress” forms the lower limit with less than 1%.
- 325 The result for customer complaints directly addressed to NRAs in the gas sector is quite similar. As in the electricity sector, the largest share of complaints concerns “invoicing/billing and debt collection”, whereas the share of price-, contract- or billing-related issues combined is more than 50%.

Figure 60: Share of classification of final household customer complaints addressed to NRAs (electricity, total number of complaints given in brackets) for available countries



Source: CEER Database, National Indicators (2015).

Note: Percentage of complaints of a particular type addressed to the NRA “as NRA” and not as ADR or in any other function. Values are rounded, possible differences to 100%. Numbers in practice refer to the total number of complaints addressed to NRAs).

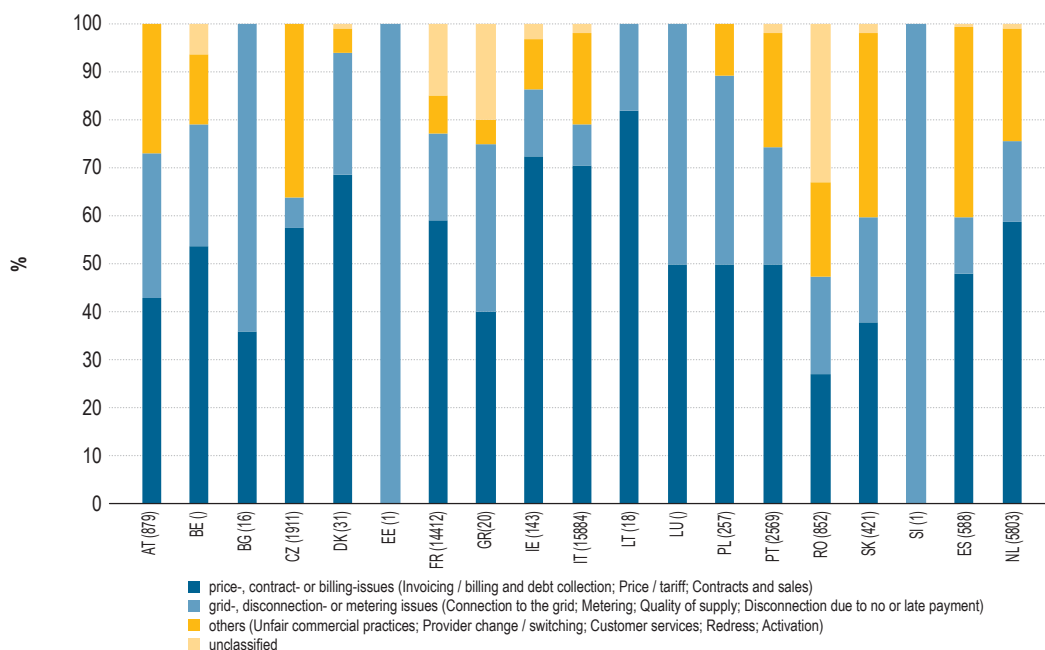
France and Luxembourg provide data on the classification of consumer complaints “reported to NRA by DSOs”/ “reported to NRA by ADR” but not directly “addressed to NRA”. For comparison, the data on consumer complaints “reported to NRA by ADR” of France and Luxembourg were added to the figure.

For 8 of 16 MSs the difference up to 100% is due to rounded values. For the others it is due to lack of information or to problems of classification. Some MSs reported only the share of classification.

326 As Figure 59 shows, in 13 MSs consumer complaints due to “invoicing/billing and debt collection” comprise the largest share. Also “price/tariff” related complaints have a significant share in 13 MSs. For other complaints the picture is much more heterogeneous. Consumer complaints related to “connection to the grid” offer a good example. In some MSs, such as Slovenia, Croatia or Luxembourg, these complaints attract a high share, as opposed to other MSs. The same holds for other classifications and other MSs. Only a small number of reasons for dissatisfaction affect consumers significantly in all MSs (e.g. “invoicing/billing and debt collection” or “price/tariff”).

327 The results of consumer complaints in the gas market (Figure 61) are comparable with those of the electricity market (Figure 60), although the quantity of data is higher for the electricity market (Electricity: 26 MSs; Gas: 19).

Figure 61: Share of classification of final household customer complaints addressed to NRAs (gas, total number of complaints given in brackets) for available countries



Source: CEER Database, National Indicators (2015).

Note: Percentage of complaints of a particular type addressed to the NRA ‘as NRA’ and not as ADR or in any other function. Values are rounded, possible differences to 100%. Numbers in practice refer to the total number of complaints addressed to NRAs) France and Luxembourg provide data on the classification of consumer complaints “reported to NRA by DSOs”/ “reported to NRA by ADR” but not directly “addressed to NRA”. For comparison, the data on consumer complaints “reported to NRA by ADR” in France and Luxembourg were added to the figure. Hungary provides the same data as for electricity and was not added to the figure.

For 6 of 10 MSs the difference up to 100% is due to rounded values. For the others, it is due to a lack of information or to problems of classification. For some MSs a differentiation between gas and electricity is not possible (in such cases, the total number of complaints in Figure 60 and Figure 61 is equal).

328 Again, complaints due to “invoicing/billing and debt collection” and “price/tariff” have a significant share in many MSs. For other issues, the findings are – as for electricity – much more heterogeneous. To sum up, Figure 59 to Figure 61 suggest that the most common complaints by household customers are related to price, contract or billing issues, and these complaints are an issue in almost all MSs. This is true for the electricity as well as for the gas retail market.

### 3.3.3 Complaint procedure

329 Knowledge about customers’ complaints facilitates a better understanding of the malfunctioning of the retail market. Likewise, it is necessary to have an independent and transparent procedure for complaints to better understand market conditions. Directives 2009/72/EC and 2009/73/EC explicitly address this point: “Member States should introduce speedy and effective complaint handling procedures”. NRAs have always stressed the importance of setting up independent and effective complaint handling mechanisms.

330 To ensure higher level of consumer protection, all MSs have established complaint handling mechanisms. In most cases, the standards for these mechanisms are set by the NRAs (11 MSs). In seven MSs, the government or parliament define the standards for the mechanism to handle consumer complaints. Among other things, the standards contain (1) rules to ensure access to necessary information for the consumer (e.g. like contact details); (2) details about the processing time and (3) standards for service providers.

331 In most MSs consumers receive the contact details of a complaint service either on their bill (20 jurisdictions) or have at least access to additional sources of information (e.g. fixed in the contract, leaflets, or flyers – 18 MS). In addition, most MSs publish contact information for consumer complaints on the internet.

- 332 The processing time for service providers to deal with complaints in most countries (19 MSs electricity/21 MSs gas) is less than two months, which is considered a reasonable window for response. The deadline is not fixed by legislation in all these MSs. In some countries the processing time is less than one month (electricity: Greece, Luxemburg, Poland, Portugal for DSOs / gas: Austria, Greece, Luxemburg, Poland, Portugal for DSOs), while in others it exceeds two months (Norway). In Belgium, there are regional differences for complaints about both gas and electricity services (differ between ten working days and three months).
- 333 In the majority of MSs the standards for service providers concerning complaint handling are made explicit. In addition to questions concerning the time to deal with a complaint (see above) the standards also cover additional issues. In Greece, for example, the electricity supplier has to give a prompt first answer or acknowledgement of receipt within one day. Moreover, the standards for service providers often define how to register customer complaints. In one third of MSs, the electricity providers have to register all customer complaints (in gas this is the case in 11 MSs). In only in four MSs, no statutory complaint handling standards for gas providers are in place (six MSs in electricity).

### 3.2.4 Alternative Dispute Resolution

- 334 According to Article 13 of Directive 2009/72/EC and Articles 9 of Directive 2009/73/EC, MSs should ensure an “independent mechanism, such as an energy ombudsman or a consumer body in order to ensure the efficient treatment of complaints and out-of-court dispute settlements.” According to Table 7, almost all MSs implemented an ADR mechanism<sup>226</sup>. An alternative dispute settlement is available and free of charge for final household customers in 25 MSs. In all MSs, except the Netherlands where ADR is available, but only free of charge in case the consumer “wins” the settlement dispute, the service is free of charge, and in some countries this service is only available for electricity or for gas.
- 335 The most common way to provide household customers with the relevant information on the ADR body is to include the information in the bill and/or in the supply contract. In three MSs, the contact information is provided to household customers by other sources: at service desks (Cyprus); through the Internet (Italy); or through the NRA (Luxembourg).
- 336 In most MSs, the NRA is responsible for ADR. Four MSs established an ADR mechanism by setting up an ombudsman and in four MSs a third party body fulfils this task (e.g. a consumer organisation).

Table 7: General information about ADR handling procedures within the MSs

	Where are final household customers provided by the service providers with the relevant contact information of the competent ADR body in case they want to complain?			Who is responsible for Alternative Dispute Resolution in your country?
	Bills	Contract	Others	
Austria	X	X		NRA
Belgium	X			Ombudsman
Bulgaria		X**		NRA**
Cyprus			at service desks**	NRA
Czech Republic	X*			NRA*
Denmark	-	-		-
Estonia	X	X		NRA
Finland	X	X		Non energy-specific third party body
France	X	X		Ombudsman
Germany	X	X		Non energy-specific third party body
Great Britain	X			Ombudsman
Greece	X*	X	Internet	Ombudsman

	Where are final household customers provided by the service providers with the relevant contact information of the competent ADR body in case they want to complain?			Who is responsible for Alternative Dispute Resolution in your country?	
	Bills	Contract	Others		
Hungary			Customers are informed about the details in the answers of the complaints.	Other	
Ireland	X	X		NRA	
Italy			Internet	NRA	Energy Conciliation Service
Latvia	X*			NRA*	
Lithuania	X	X		NRA	
Luxembourg		X	NRA	NRA	
The Netherlands	X	X	Internet	Energy-specific third party body	
Norway	X*	X*		Other	The Norwegian Consumer Council*
Poland		X		Other	
Portugal		X		Other	NRA, Consumers associations and other
Romania	X			NRA	
Slovakia	X*	X	Internet	NRA	
Slovenia	X	X	Internet	Other	appointed person
Spain	X*	X*		Other*	Regions
Sweden	X	X	Internet	Non energy-specific third party body	

Source: CEER Database, National Indicators (2015).

Note: \* Electricity only; \*\* Gas only; Great Britain: Suppliers/DSO are required to write to the customer to inform them about their right to refer their complaint to the ADR scheme after eight weeks or sooner if they can do no more to resolve the complaint. Ofgem is required to approve a statutory ADR scheme under the Consumers, Estate Agents & Redress Act 2007; it is executed by Ombudsman Services.

Ireland: Suppliers are required to provide information on their website, on their bills and in the terms and conditions issued to customers. Details are also provided on the CER website.

Luxembourg: Final household consumers are informed by the mediation services provided by the NRA (i) via the internet, (ii) by flyers/leaflets, (iii) by the association for consumer protection.

Poland: Permanent Consumer Courts of Arbitration at the Trade Inspection Authority; Private court in Warsaw for energy-specific cases.

- 337 The processing time to settle disputes differs across MSs. In 17 MSs the processing time is between one and three months whereas in Sweden and Norway, for example, the processing time is between 5 and 6 months when it comes to disputes settled by ADR. Other countries have no specific deadline. Some 64,650 disputes were registered by the ADR mechanisms in 2014 (52,308 were reported by Great Britain alone)<sup>227</sup>. The difference in the numbers of disputes is linked first to the fact that all information about disputes by ADR are available only for those countries in which the NRA is directly or indirectly involved in the ADR mechanism; and second to the fact that the number of household consumers differ significantly between countries (which submit numbers).

### 3.3.5 Conclusion

- 338 Well-functioning and transparent complaints procedures are key to empowering consumers in electricity and gas markets. Almost all MSs provide numbers of customer complaints. The overall mean of customer complaints per 100,000 inhabitants is about 950. Yet, half of the NRAs received less than 51 customer complaints per 100,000 inhabitants in 2014.
- 339 Looking at the categories of complaints, the data show that more than half of the complaints are related to price, contract or billing issues. This holds for both gas and electricity markets. In most MSs consumers seem to show a high level of dissatisfaction about these elements, nevertheless the reasons for their complaining often remain unclear.

227 A separation of electricity- and gas-related disputes is not possible.

340 To ensure greater consumer protection all MSs established complaint handling mechanisms considering rules to ensure access to necessary information to the consumer, details about the processing time and standards set up for service providers. Moreover all MSs set up an independent ADR mechanism and 64,650 disputes were registered in 2014.

341 Consumers increasingly use the complaint mechanism. The result of the analysis suggests that the majority of complaints are related to price-, contract- or billing-issues. Empowering the consumer and reducing their dissatisfaction will be an ongoing task for market players, NRAs and consumer organisations alike.

### 3.4 Consumer experience

342 Understanding the consumer experience in European energy markets is essential to completing any monitoring activity concerning market functioning. Insights derived from studies on consumer experience help to understand how consumers perceive energy markets, what works for them, how they obtain information and guidance on beneficial action, how they act and where they have issues with particular market players. This section aims to illustrate selected experiences of energy consumers, i.e. mainly household customers, using case studies from three countries, Austria, Germany and Italy. The section includes an illustration of how satisfied gas consumers are with the services of their DSO (Austria), an innovative website bringing together a wide array of useful information on energy suppliers for household consumers (Germany) and general customer satisfaction with suppliers (Italy). Together, the three case studies shed light on direct consumer experience to gain a better understanding of market functioning.

#### Case study 7: Customer satisfaction with gas DSO services in Austria

In 2014, E-Control Austria, the NRA for electricity and gas markets in Austria, teamed up with gas DSOs across the country to conduct an in-depth consumer satisfaction survey with key DSO services, including their customer services. The starting point for this survey was the legal mandate of E-Control to conduct such customer surveys to assess the validity of DSO data submissions for monitoring purposes, as well as the quality of their customer service. Since identifying customers of specific gas DSOs has proven time consuming and costly for E-Control, the NRA sought the cooperation of DSOs, which were equally interested in obtaining such information from their customers. After careful considerations concerning the survey design, a private and independent market and survey research institute was commissioned to conduct a representative survey among customers using 50MWh or less of each of the participating gas DSOs (14 out of 20 DSOs participated in the survey). Customer contact lists were provided to the research institute to draw random samples of approximately 200 customers of each participating DSO, who were interviewed by computer-assisted telephone interviewing (CATI) technology in summer 2014. In total, 2,814 Austrian households consuming gas and DSO services participated in this comprehensive study, covering topics such as reliability, safety and service quality, including an assessment of the competences and consumer-friendliness of customer service staff at the DSOs customer call centres.

Overall, the results clearly indicate a very high level of consumer satisfaction with gas DSO services in Austria. Table (i) illustrates that customers appreciate the quality, reliability and security of Austrian gas DSO services on a scale of 1 to 5, where 1 meant “very satisfied” and 5 meant “not satisfied at all.” In general, gas DSOs score best on reliability, which was measured with a set of questions on satisfaction levels with the

- Availability of gas;
- Punctuality concerning appointments with the DSO at customer’s premises;
- Competence of DSO staff.

Differences between the satisfaction levels of customers of different DSOs vary only slightly, with a range of 1.19 to 1.43 on the 5-point satisfaction scale. Hence, even customers of the “least satisfactory” DSO still report high levels of satisfaction.



Table (i): Satisfaction with gas DSO services: index scores on quality, reliability and security (Satisfaction scores refer to averages on a 5-point scale, where 1 means “very satisfied” and 5 means “not satisfied at all”).

Gas DSO	Reliability 1.27	Security 1.31	Quality 1.42
Elektrizitätswerk Wels	1.23	1.27	1.35
Energie Graz	1.28	1.24	1.40
Netz Niederösterreich	1.23	1.36	1.36
Energie Steiermark Gasnetz	1.27	1.28	1.40
Kärnten Netz	1.33	1.32	1.50
Linz Gas Netz	1.25	1.32	1.47
Netz Burgenland	1.22	1.33	1.36
OÖ. Ferngas Netz	1.23	1.31	1.46
Salzburg Netz	1.35	1.35	1.48
Stadtbetriebe Steyr	1.26	1.39	1.42
Stadtwerke Bregenz	1.24	1.31	1.40
TIGAS Erdgas Tirol	1.19	1.26	1.33
Vorarlberger Energienetze	1.21	1.24	1.34
Wiener Netze	1.43	1.44	1.63

Source: E-Control 2014.

A similar picture arises for the remaining two aspects. As for security of supply, customers of any DSO are very satisfied, ranging from satisfaction scores of 1.24 to 1.44. Here, index scores are the composite of satisfaction with ease of reporting any gas disruption and technical competence of the DSO with respect to safety of the gas network.

Likewise, satisfaction levels with issues relating to quality of service are high and hardly vary across gas DSOs in Austria. On average, consumers give a score of 1.42 on the 5-point scale on satisfaction with customer orientation of DSO staff; general maintenance works of the DSO; and meter reading procedures.

The study further investigates whether customers had direct contact/have initiated contact with their DSO in the previous 12 months and why. In total, only a small minority of approximately 13 per cent of customers had initiated direct contact with the DSO. This percentage, however, varies between 4 and 22 per cent across gas DSOs. The main reasons for contacting the DSO were:

- Questions about the gas (network) bill: 24%;
- Technical issues: 24%;
- Registration/departure of a meter: 13%;
- Questions on the monthly instalment: 10%;
- Questions relating to switching supplier: 8%;
- Questions on the meter reading: 7%;
- Questions on the date of meter reading: 6%.

Differences in satisfaction levels with reliability, security and quality between customers who had direct contact with their DSO in the previous 12 months and those who did not have such contact are small and statistically insignificant given the sample sizes of roughly 200 respondents per participating DSO. Yet there is a tendency for customers with direct contact to be slightly more critical and less satisfied with the quality of DSO services. For instance, the overall score for satisfaction with reliability of services is 1.37 among customers with direct contact, as compared to 1.25 among customer without direct contact. Likewise, the differences in the scores concerning satisfaction levels with security and quality amount to 0.09 and 0.21 points, respectively, on the 5-point scale. Considering that any direct customer contact is first grounded in a customer’s need for clarification or even a complaint, these differences appear negligible. Rather, the small differences between customers with and without direct contact suggest a perceived high level of service quality and thus satisfaction with the DSO despite the reason for contact.

In conclusion, this consumer satisfaction survey showed several lessons for further investigations of consumer satisfaction. First, for regulators to assess customers' perceptions of the service quality of their DSO, cooperation with DSOs is necessary to keep the costs of such a study at a reasonable level. This is particularly true in rural areas, where other means of identifying customers are bound to be extremely time consuming and complex (think of a region where only 1 in 10 consumers is connected to the gas grid, not to mention willing to participate in such a study – identifying only one customer could necessitate approaching 100 or even more people in such a setting). Following from these circumstances, the costs of monitoring satisfaction levels or any other consumer perceptions for that matter is likely to exhaust the budget of many NRAs across Europe unless it is done with the companies to be monitored. Second, satisfaction levels with DSO services have proven to be generally very high, which is a reassuring finding and contrasts with information received by NRAs from ombudsman services and other complaint handling bodies. One explanation for this finding may be that the vast majority of consumers have no reason to be dissatisfied, since they have no reason to complain. In other words, one should not expect overly critical or demanding customers in a regulated market where there is little or no concern or inconvenience caused by rare interruptions to gas supply. Thirdly, the negligible differences in the satisfaction scores of customers who had direct contact as compared to those customers who had not had such contact comes as a surprise. This finding supports the claim that significant efforts have been made by DSO customer service centres, where staff appear eager to assist customers. Whether that is the case in general, or merely in this Austrian survey, is subject of further investigation.

#### Case study 8: Online in-depth information about energy suppliers in Germany

In Germany, there are currently at least 1,266 electricity and 853 gas suppliers active in the market<sup>228</sup>. Many consumers can choose from dozens of suppliers and even more offers in their network area. A lot of new suppliers have entered the German market since its liberalisation in 2007. Many of them with new and innovative customer-tailored offers. Unfortunately, some suppliers attracted public attention because of their consumer-unfriendly behaviour, questionable terms and conditions, or because they had to file for bankruptcy.

For consumers who want to switch suppliers, several price comparison tools provide full information about supplier's offers and some background information about the supplier itself. Nevertheless, in order to learn more about suppliers' background and their level of service, consumers often have to rely mainly on information from the internet, i.e. from supplier's websites or advertisements, other consumers' reviews, supplier specific warnings by consumer organisations, information from the company register, the regulator, the dispute resolution body or newspaper articles.

Currently, 67% of customers have taken a conscious decision to enter into a contract with alternative suppliers or have switched to a special tariff offered by their local supplier. However, 33% of consumers in Germany still have a default supply contract with their local supplier.

The reasons why some households are still reluctant to switch suppliers cannot be monitored by Bundesnetzagentur. These reasons could be manifold:

- A switch might not generate enough financial benefits;
- There might be long-lasting trust or relatedness to the local supplier;
- Consumers might be reluctant because of inconsistent or negative information about a few individual suppliers;
- They might not make the effort to search for all the information they deem necessary to make an informed switch; or
- Consumers might simply struggle to evaluate all the information they find online.

<sup>228</sup> These figures are taken from the BNetzA Market Monitoring Report (2015).

A transparent and concise collection of background information on suppliers and their tariffs in a consumer-friendly manner and by a trustworthy source could help to overcome this information dilemma, where consumers are in a weaker position versus market players due to either a lack of information or an abundance of inconsistent information.

Therefore, the Federal Ministry of Justice and Consumer Protection (BMJV)<sup>229</sup> together with Bund der Energieverbraucher e. V. (BdE), a non-profit association of German energy consumers, launched a joint initiative called “Informationen über Energieanbieter” (Information on energy suppliers) in spring 2014.

Their website [www.energieanbieterinformation.de](http://www.energieanbieterinformation.de) gathers for the first detailed and reliable (background) information on electricity and gas suppliers from all publicly available sources in a systematic way.

So far, the project has chosen more than 50 electricity and gas suppliers. It offers detailed material on each supplier with regard to

- Formalities (e.g. business register entries)
- Management, ownership and board of directors
- Annual statements of accounts
- Composition of terms and conditions
- Consumer experiences
- Evaluation of services
- Electricity disclosure.

Given the large number of suppliers in the market, the project does not aim to be exhaustive. Special focus is put on suppliers with presumably low tariffs that strongly attract consumers’ attention. Consumers often want to know whether these tariffs are actually low and if there are potential difficulties related to these attractive offers. The focus is also on suppliers which play an important role in the market or are especially interesting e. g. because of their size, their level of services or their innovative products.

The information (see Figure (i)) has to meet the highest standards of objectivity and verifiability at the same time. The project does not provide a ranking. It lists suppliers in alphabetical order and provides more insight into consumer experiences and the quality of services based on a compilation of existing reviews from other websites, studies and user forums. It analyses supplier’s contractual terms with regard to consumer-(un)friendly terms or even legally dubious or illegal terms.

Before being published on the website, the suppliers concerned are contacted and asked to review the respective information on their tariffs and point to potential inconsistency. This is primarily done to avoid legal conflicts with suppliers, but it also provides suppliers an opportunity to adapt their terms and conditions or to rethink their level of service.

229 Bundesministerium der Justiz und für Verbraucherschutz.

Figure (i): Information on Suppliers at [www.energieanbieterinformation.de](http://www.energieanbieterinformation.de): an example.

The screenshot shows the website interface for 'Energieanbieterinformation.de'. At the top, there is a logo and navigation links: DRUCKEN, SEITENSTRUKTUR, IMPRESSUM, MITGLIEDER LOGIN. Below the logo are five main menu items: ENERGIEANBIETER (Infos zu den Anbietern), ANBIETERWECHSEL (Tips & Tricks), INFOQUELLEN (Studien & Untersuchungen), VEREIN (Vorstellung Vereins), FEEDBACK (Meinungen), and PROJEKTINFOS (Informationen über das Projekt). A search bar is located in the top right corner.

The main content area is titled 'Energieanbieter | LichtBlick'. On the left, there is a list of suppliers with a search filter 'All 0-9 A B C D E F G H I K L M N P R S V X Y'. The selected supplier is 'LichtBlick SE'. The profile for LichtBlick SE includes the following information:

- Bundesweit über **700.000 Strom- und Gaskunden**
- Seit 1998 als Energieanbieter tätig
- Kein eigenes Strom- oder Gasnetz
- Betriebsergebnis 2013:** fast 7,5 Millionen Euro
- Keine Verflechtung mit den vier großen Energieanbietern
- Eigentumsverhältnisse:** Hauptaktionär ist eine Vermögensverwaltungsgesellschaft.
- In Privatbesitz ohne kommunale Beteiligung
- Die **allgemeinen Vertragsbedingungen** enthalten sechs verbraucherunfreundliche Regelungen und eine verbraucherfreundliche Regelung.  
Der **AGB-Index** beträgt 0,42 (nachteiligste AGB: 0 beste AGB: 1, Mittelwert 0,4)
- Der **Service-Index** beträgt 0,89 (besten Service: 1,0 geringster Service: 0,0)
- Internetseite: [www.lichtblick.de](http://www.lichtblick.de)
- [Wikipedia über Lichtblick](#)

Additional details include 'Segment-ID: 85' and a button 'ALLE ZEIGEN'. Below the main text are several expandable sections: 'Formalien', 'Unternehmen', 'Geschäftsführung', 'Eigentumsverhältnisse', and 'Beteiligungen'.

Source: BNetzA (2015).

The overall aim of the project, which is to continue until mid-2016, is to provide a complementary tool to advise consumers and provide guidance beyond the pure price comparison and switching tools already on the market. The project aims to enable consumers to judge the quality of a supplier and its tariffs so that they can make an informed decision and experience the full benefits of the retail market. More strategically, information deficits on the consumer's side should be minimised so as to strengthen their position vis-à-vis suppliers.

### Case study 9: Quality of customer service and customer service experience in Italy

Since 2008, the Italian energy and water services regulator AEEGSI carried out a bi-annual survey to monitor the quality of telephone services of energy suppliers. The survey is part of a broader regulation aimed at incentivising the quality of telephone services, including:

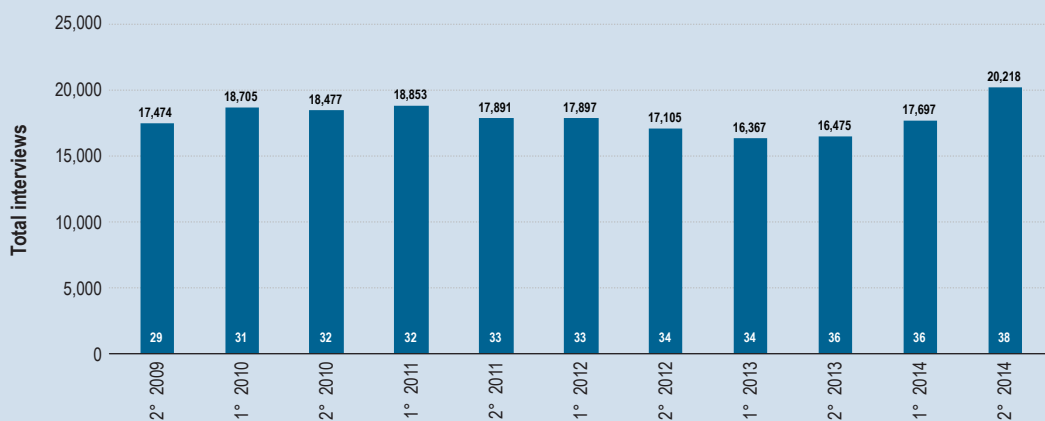
- Minimum service obligations for the call centres of energy suppliers;
- Overall quality standards<sup>230</sup> for services delivered by telephone;
- A bi-annual survey to monitor the quality of telephone services;

A scoring system ranking retail companies are published twice a year, based on phone survey results and customer care services offered to customers. The ranking was based on customer satisfaction survey results using an instrument called the Customer Satisfaction Index (CSI) and on scores assigned on the basis of different aspects of customer care services delivered by the companies.

Quality standards for commercial call-centre services were introduced to guarantee customers contacting suppliers. The ranking of energy suppliers based on comparative indicators and customers' perception of perceived quality was launched to stimulate competition between retailers.

About 40 suppliers with more than 50.000 customers each were monitored by the survey (Figure (i)); a sample of those customers or potential customers who needed assistance from their contact centres were interviewed by an independent research company through telephone interviews using CATI methodology. A base sample for each bi-annual wave of 15.000 interviews was distributed equally between the participating companies; companies could purchase additional lots of 300 or more interviews per lot in order to enhance the sampling estimate by reducing statistical error. Each survey involved the participating companies for 8 – 12 weeks.

Figure (i): Number of interviews (red bars) and companies involved in customer survey 2009-2014



Source: AEEGSI (2015).

The questionnaire submitted to customers focused on evaluating call centre/contact services and was comprised of three sections: experience of the contact and the call outcomes; customer satisfaction with respect to the provided service; expectations and suggestions for enhancing the service quality. Customers were asked to score the telephone conversation with an agent based on their individual experiences on 6 factors of perceived quality:

230 Overall standards for call-centre quality are service accessibility (SA), average waiting time (AWT) and level of service (LS).

- Ability to promptly resolve the problem (weight 37% in the global Customer Satisfaction Index);
- Clarity of answers (weight 29.5%);
- Courtesy of the call centre agent (weight 13.1%);
- Waiting time for free line (weight 11.2%);
- Waiting time to reach a call centre agent (weight 4.7%);
- Simplicity of the interactive voice response (weight 4.5%).

A smaller sample of respondents were exposed to additional questions relating to expectations of telephone and customer care services, like preferred opening hours and days, preferences regarding the choice between physical branch offices and other types of contact centre.

An overall performance score and the CSI were calculated for each company, based on the judgement arising from the interviewed customers<sup>231</sup>. CSI comprises the evaluation of all relevant factors of perceived quality; weights were estimated by regression analysis.

All the mentioned relevant indicators are regularly published on the AEEGSI website, both at aggregate level and for each single energy supplier, including the CSI and different aspects of telephone service or the customer contact service access<sup>232</sup> (PA) and score for service quality<sup>233</sup> (PQ) to determine the overall score for the quality of call centres called Total Quality Index (IQT)<sup>234</sup>.

The use of this index allows a comparison of retail companies customer services; each company involved also received a specific report with individual results in comparison with the average system performance.

Three goals were pursued with this method:

- Monitor the quality of customer care services in energy markets at the national level, to check its evolution and prevent deterioration;
- Allow customers the comparison of individual performance of suppliers, to be included in relevant information for supplier choice;
- Give comparative information and incentives for companies' management to improve the quality of customer services.

The results from the customer survey show a gradual and progressive improvement in both individual performance and in the national aggregate index; during the monitored period, the quality of customer care services offered by retail energy companies as perceived by their customers improved. The improvement during the first two years was sharp, while high and slowly increasing levels have been recorded in the following period (Figure (ii)).

The monitoring and ranking of customer care services performance caused a sort of "improvement race" among suppliers. The results of comparative surveys were also used at company level to improve operational targets. Many companies increased the range of services provided to their customers in order to increase their scores and, consequently, improve their position in the ranking.

231 As "satisfied", "dissatisfied" or "delighted" arising from the gap between expectations and service received. The rating scale was 1-5.

232 The availability of telephone lines, access periods for calls (time ranges and the number of opening days of the call centre), free calls from the mobile network.

233 The average waiting time before being able to speak to an operator, the percentage of calls answered by an operator, the ability of the customer to be called back, reporting the number of calls that precede in a queue or estimated waiting time, the ease of browsing at logon, the presence of internet services, the adoption of initiatives with consumer associations.

234 Total Quality Index (IQT) represented a composite indicator which compares companies' performance in a half-year ranking drawn up by the AEEGSI. The composite indicator is calculated for each company participating in the survey as:

$$IQT = [(PA + PQ) / (PA + PQ)_{max} \times 100] \times 0,7 + PSC \times 0,3$$

where:

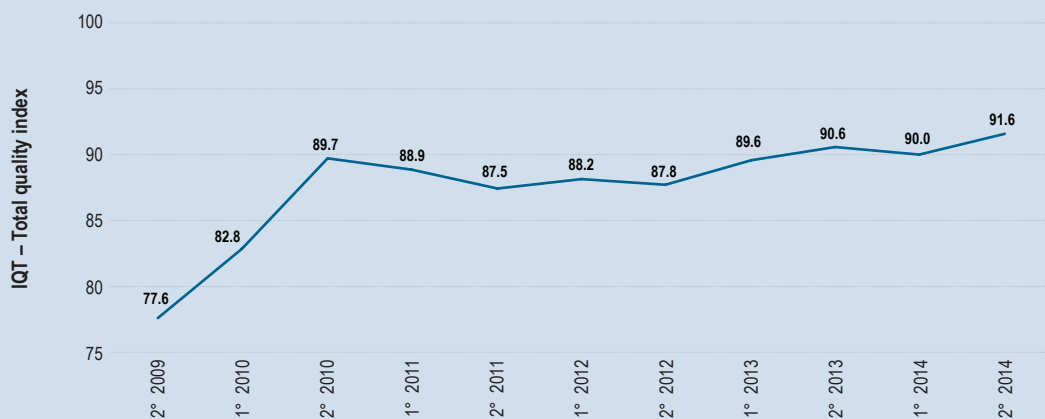
PA is the partial score related to access to the service;

PQ is the partial score related to service of quality delivered;

(PA + PQ)<sub>max</sub> is the best value achieved in the period considered by a seller as the sum of the partial scores PA and PQ;

PSC is the partial score related to the call-back survey.

Figure (ii): Total Quality Index IQT (2009-2014)



Source: Italian Regulator (2015).

### 3.4.1 Conclusion

- 343 The three case studies provide important insights into consumers' experiences and perceptions. The Austrian and Italian cases provide some evidence of high levels of consumer satisfaction among the majority of the populations of both countries and how such knowledge may be further utilised by NRAs. The German case study illustrates a project which aims at providing a more detailed picture about suppliers in Germany by answering frequently asked questions about trustworthiness.
- 344 Yet, all three case studies suggest that monitoring consumer experience differs from other market monitoring exercises in significant ways. First, it is costly to obtain information on consumer perception and satisfaction since this requires large-scale surveys. Second, identifying the specific shortcomings of market players through consumer experience might be difficult, since research costs are high. If consumers do not pro-actively contact monitoring bodies such as NRAs, ADR bodies or an ombudsman, the monitoring results of consumer experience may not be able to deliver a true picture because of the lack of access to consumers. Third, consumers need and want information about suppliers beyond the price and properties of their products, and they need and want to get to 'know' key supplier characteristics before signing a contract. The next generation of 'price comparison tools' should pay close attention to the fact that key business data about suppliers may equally help consumers make an informed decision about whether to switch to a specific supplier or not.

### 3.5 Quality of DSO Services

- 345 MSs are required to take appropriate measures to protect final customers and to ensure that they have the right to a contract with their electricity or gas service provider that specifies the services provided and the service quality levels offered, as well as the time needed for the initial connection. Based on Directive 2009/72/EC (Article 37(1)(m)) and Directive 2009/73/EC (Article 41(m)), the NRAs have the duty to monitor the time taken by transmission and distribution system operators to make connections and repairs. While these requirements concern the regulated part of energy markets, their functioning is essential for retail markets as a whole. Therefore, it is important to monitor these key services and their timely provision by DSOs to provide a full picture of market functioning from a consumer perspective.
- 346 The CEER's Advice on the Quality of Electricity and Gas Distribution Services Focussing on Connection, Disconnection and Maintenance<sup>235</sup>, proposes 16 recommendations on quality levels of DSO services provided to household consumers. The service areas are: connection to the grid, disconnection of energy supply; disconnection due to non-payment; planned energy interruptions; information during un-planned energy supply interruptions; consumer information about connection and disconnection; and safety and installation handling. In general, the recommendations are based on best practices identified in 5<sup>th</sup> CEER Benchmarking Report on Quality of Electricity Supply.
- 347 The manner in which these services are defined and carried out is an important part of market design. This advice constitutes a first step towards a European-wide harmonised view in which DSO services within connection, disconnection and maintenance would benefit from being defined and monitored by NRAs.
- 348 From a consumer perspective, connections, activations, maintenance and disconnections are very relevant processes as, in some cases, they represent the consumer's first interaction with the energy market. If these processes are well designed and function efficiently, they will help to improve consumers' perception of the energy market.
- 349 According to last year's MMR, consumer complaints about connections in electricity were the fifth most frequent case of complaints among the 12 areas considered, and the third most frequent case of complaints for gas.
- 350 This section monitors, for the first time in this Report, the quality of four key DSO services in comparison to CEER recommendations: the time to provide a price offer for a grid connection, the time to connect to the network and activate the energy supply to a customer, the time to disconnect the energy supply following a customer request, and the maximum duration of a planned supply interruption.
- 351 A summary of the results of the survey is shown in Table 8 and the individual country data are presented in Table 9 and Table A-5 in Annex 9. It is important to mention that the results should be interpreted with caution, since some elements can be measured in different ways and data are not yet available in every MS.
- 352 As presented in Table 8, the maximum duration of a planned supply interruption is the service for which the current actual level is closer to the CEER recommendation (six hours for electricity and twelve hours for gas, on average). Regarding the time to provide a price offer for a grid connection as well as the time to disconnect following a customer request, only a few countries comply with the recommendations, even though most of the respondents are close to it. In some countries (Sweden), disconnection of the energy supply after a customer request is done immediately, by using smart meter functionalities.
- 353 In contrast, the DSO service that shows the lowest performance is time to connect a customer to the network, in the event of necessary minor works at the customer's premises<sup>236</sup>. Here, the best performing countries make a minor connection within one week. The average is about 25 days, much more than the recommended two working days.

235 C14-RMF-62-04 Advice on the Quality of Electricity and Gas Distribution Services Focussing on Connection, Disconnection and Maintenance (Sep 2014).

236 A connection with minor works is defined as a connection that requires no more than one day of work at the customer's premises.



Table 8: DSO services quality monitoring in 2014

Indicator	Recommendation from CEER		Electricity	Gas
	Advice on quality of DSO Services			
Average number of days to provide a price offer for a grid connection (practical view)	<b>1 week</b> (2 weeks for complex connections)		Average: 18 days Range 7 to 37 days	Average: 12 days Range 3 to 30 days
Average number of days to connect to the network and activate energy supply to a customer (in the case of minor works)	<b>two working days</b> (unless a longer period is requested by the customer)		Average: 24 days Range 7 to 76 days	Average: 26 days Range 5 to 60 days
Average number of days to disconnect the energy supply following a customer request (practical view)	<b>one working day</b> (unless a longer period is requested by the customer)		Average: 5 days Range 0 to 16 days	Average: 4 days Range 0 to 15 days
Maximum duration of a planned supply interruption	<b>six hours</b> for electricity and <b>twelve hours</b> for gas		Average: 13 hours (legal)/ 8 hours (practical) Range 1 to 16 hours	Average: 14 hours Range 2 to 24 hours

Source: CEER Database, National Indicators (2015).

Note: Most of the indicators include data only from 6 to 12 countries. See individual data in Table 9.

354 Some of these data may reflect differences in measurement, as the time to connect a customer depends significantly on the complexity of the works. In addition, some NRAs may measure the time considering all types of connections, not only connections with minor works requiring no more than one day of work at the customers' premises. In any case, the time to connect a customer to the grid and activate the energy supply still seems too high in some countries, and needs to be improved. Some countries also need to improve the monitoring of these services (see Table 9).

### 3.5.1 Conclusion

355 As a conclusion, the quality of distribution services offered by DSOs could be improved in some MSs, e.g. regarding the time to connect a customer to the grid and activate the energy supply. Further monitoring is also required from a significant number of NRAs in this area

Table 9: DSO Service Quality Indicators

Indicator Countries	Average number of days to provide a price offer for a grid connection (practical view)		Average number of days to connect to the network and activate energy supply to a customer (in the case of minor works) (practical view)		Average number of days to disconnect the energy supply following a customer request (practical view)		Maximum duration of a planned supply interruption (legal and practical view)		
	Electricity Days	Gas Days	Electricity Days	Gas Days	Electricity Days	Gas Days	Electricity [Legal view] Hours	Electricity [Practical view] Hours	Gas [Legal or practical] Hours
Austria	14	3.2	21						
Bulgaria				60		3			24
Cyprus	20		20		7		24	24	
Czech Republic	7		2.5				20/12/8		
Denmark	7	7							
Estonia	30	30			3	5	10		
France	36.8		75.9				10	2.04	
Great Britain								4.2	
Greece	15		24	40	3	3			2
Hungary	30	30	8	8	15	15			
Italy	10.29	5.41	7.37	5.07	0.53	2.63	8	2.47	
Latvia	10		10		3			8	
Lithuania			25						
Malta			21.3					2.41	
The Netherlands	10	10							
Poland	16	8	Legal data	Legal data	6			16	
Slovakia				35		2			15
Spain		6	30	6					
Sweden					0	0			
Average:	18	12	24	26	5	4	13	8	14
Range:	7 -37	3 -30	7 -76	5 -60	0-15	0-15	1-24	1-24	2-24

Source: CEER Database, National Indicators (2015).

Note: Data on Poland (228 days in electricity and 141 days in gas) was excluded as refer to the legal view, and don't differentiate among connections with mayor and minor works. In the Czech Republic, the legal maximum of a planned supply interruption is 20 hours/week, 12hours/interruption between April and October and 8hours/interruptions in other months.

## 3.6 Recommendations

- 356 As reported in last year's report, many of the consumer-related provisions of the 3<sup>rd</sup> Package have been transposed into national legislation and applied in practice. This is also true for the Energy Efficiency Directive, which is to be implemented in 2014. Some countries perform even better than the EU requirements as regards some provisions.
- 357 This Report confirms the variety of definitions of vulnerable customers, as well as the relative percentage of the population considered as such.
- 358 There remain particular areas for further action by MSs. Firstly, a supplier of last resort (either in gas and/or electricity) must be appointed in some jurisdictions, and there is also a lack of minimum technical functionalities and other requirements for smart meters to ensure benefits to consumers in many MSs. Finally, in most countries, there is a lack of information regarding switching information on consumers' bills.
- 359 Further monitoring is also required from a significant number of NRAs in several areas. The number of disconnections for non-payment is not yet monitored by all NRAs. Many regulators are not able to report on the number and the type of complaints addressed by consumers, notably to regulated entities i.e. Alternative Dispute Resolution Bodies and DSOs. Some NRAs do not monitor the quality of key distribution services.
- 360 Market research is an efficient tool for NRAs to monitor consumer experience. It is however recognized that to get a true picture of the market, large scale surveys are required and are costly.
- 361 The quality of distribution services offered by DSOs could be better in some MSs, e.g. the time to connect a customer to the grid and activate the energy supply seems too high in some MSs.

# 4 Wholesale electricity markets and network access

## 4.1 Introduction

- 362 The creation of the IEM requires the full integration of Europe's energy markets, networks and systems with a view to promoting an efficient and secure energy supply, and facilitating the transition to a low-carbon economy.
- 363 Interconnectors connecting wholesale electricity markets play a vital role in ensuring that the IEM is able to operate flexibly and efficiently. However, the assessment of the level of market integration and of the efficiency in the use of interconnectors contained in this Report shows that, despite some progress in recent years, important barriers to market integration still remain for two key reasons. First, because of inefficiencies in the use of existing transmission networks stemming from inefficiencies in cross-zonal capacity calculation, in cross-zonal capacity allocation, and, possibly, in the definition of bidding zones. Second, because of the lack of adequate and efficient investment in electricity network infrastructure to support the development of cross-zonal trade between areas characterised by differing demand-supply balances.
- 364 The starting point for the better use of existing transmission networks are efficient cross-zonal capacity calculations, an aspect addressed in Section 4.3.1, and the appropriate definition of bidding zones. The recently adopted Capacity Allocation and Congestion Management (CACM) Regulation<sup>237</sup> and forthcoming network codes, including on BMs and forward markets, provide for clear objectives in this area: (i) full coordination and optimisation of capacity calculation within regions; (ii) the use of flow-based capacity calculation methods<sup>238</sup> in highly meshed networks; and (iii) regular monitoring and reviewing of the efficiency

237 Commission Regulation (EU) 2015/1222, see OJ L 197, 25/7/2015 ("CACM Regulation").

238 In the flow-based capacity calculation method, exchanges between bidding zones are limited by the maximum flows on the critical network elements and power transfer distribution factors.

of bidding zones. These processes are intended to optimise the utilisation of the existing infrastructure and to provide the market with more possibilities to exchange energy, enabling the cheapest supply to meet demand with the greatest willingness to pay in Europe, subject to the capacity of the existing network. This year's Report includes a new dedicated section on capacity calculation.

- 365 Building on efficient capacity calculations results and appropriate bidding zones, the next vital step is to improve the efficiency of existing capacity utilisation by implementing a common, EU-wide cross-zonal approach to capacity allocation. This and the development of binding rules at EU level through the framework guidelines/network code process has been over the last four years, and still remains, the priority of the Agency's work. The aim of this work is to implement the ETM, i.e. a shared vision to improve the level of market integration between MSs and to facilitate cross-border trade in all timeframes.
- 366 The ETM is intended to remove the remaining cross-border barriers to market integration, as it envisages: (i) a single DA market coupling with implicit auctions of cross-border capacity, which should replace explicit auctions (Section 4.3.4); (ii) a single ID market coupling with continuous implicit allocation of cross-border capacity (Section 4.3.5); (iii) a single European platform for allocating long-term (LT) TRs; (iv) a flow-based capacity allocation method in highly meshed networks; and (v) for balancing, a TSO-TSO model with a Common Merit Order (CMO) list for cross-border exchanges of balancing energy and harmonising key aspects of national balancing mechanisms (Section 4.3.6). As regards short-term markets, efficient, liquid and integrated balancing and ID will facilitate the integration in the system of energy produced from RES, and liquidity could be strengthened by increasingly exposing these generators to the same commitment and balancing responsibilities as conventional ones.
- 367 The ETM will contribute to developing a well-functioning energy(-only) market, which should in the long term, in theory, with no remaining barriers left, deliver optimal energy adequacy<sup>239</sup>, for instance, by attracting demand response and investing in new capacity and preventing efficient existing capacity from leaving the market. However, several MSs have intervened or intend to intervene in their electricity market design by introducing a Capacity Remuneration Mechanism (CRM) or further referred to as capacity mechanism (Section 4.3.7), as they fear that the market price signals alone will not deliver sufficient capacity to meet future demand at all times. The structure of this wholesale electricity chapter is as follows: Section 4.2 presents some key trends in electricity wholesale trade and prices; Section 4.3 presents the state of integration in the areas referred to above; and Section 4.4 presents recommendations.

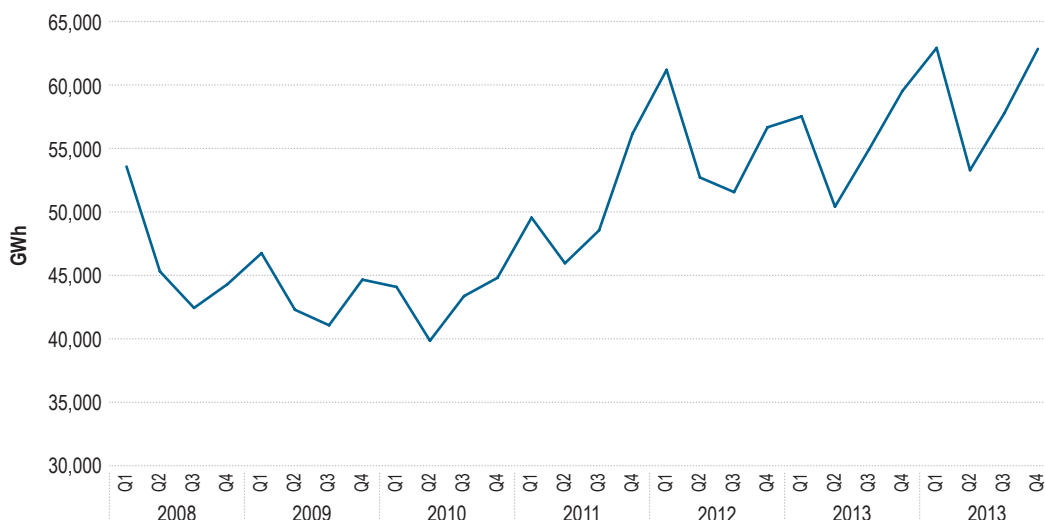
## 4.2 Developments

- 368 Despite the decline in EU electricity demand by 6.3%<sup>240</sup> between 2008 and 2014, the traded volume of electricity continued to increase in Europe, which is reflected in Figure 62. It shows an upward trend of traded volumes across EU borders since 2010. The increasing cross-border trade underpins the importance of efficiently integrating the European electricity wholesale markets, as envisaged in the ETM.
- 369 In 2014, the go-live of the NWE DA market coupling project (4 February), its extension to the Iberian market (13 May) and the extension of market coupling of the Czech Republic, Slovakia and Hungary to Romania (19 November) represented three important milestones for the further implementation of the ETM.

239 For a detailed explanation, a report from the Agency on capacity mechanisms is available here [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf).

240 Based on the Eurostat supply category of 'electricity available for the internal market'; see section 2.2.1 for more details.

Figure 62: Evolution of cross-border traded electricity (DA nominations) for a selection of borders in Europe – 2008–2014 (GWh)

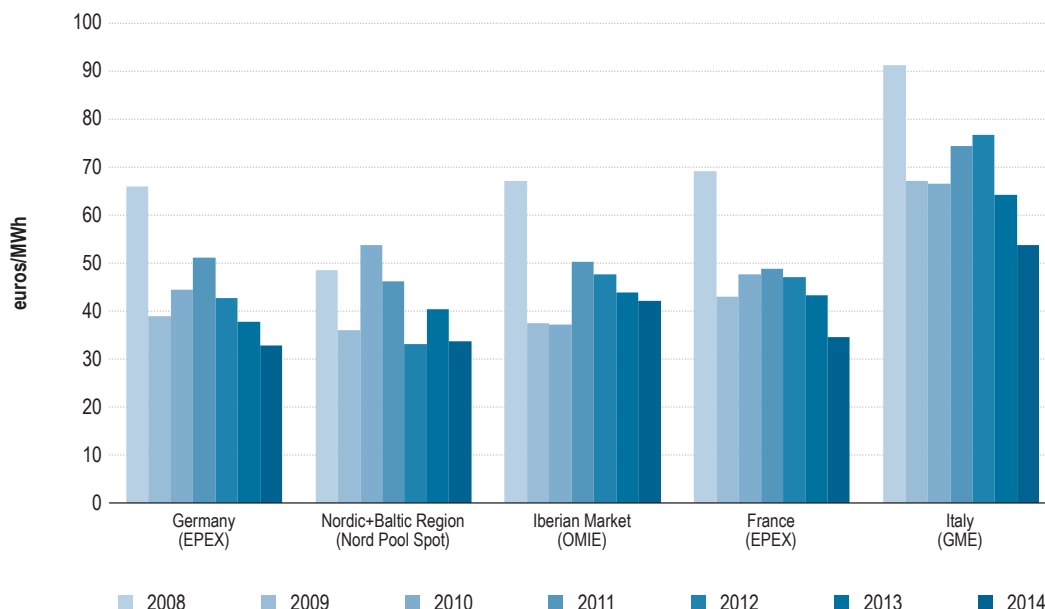


Source: Energy market observatory system (EMOS) and ENTSO-E (2014).

Note: 30 borders for which data were available for the whole 2008-2014 period are included in the figure.

370 In 2014, nearly all EU DA electricity wholesale prices prolonged the downward trend that has been observed since 2011, as illustrated in Figure 63. This is explained by the increasing penetration of renewables, as presented in Figure 64, combined with the availability of cheap coal on international markets and declining demand. In 2014, the decline in gas prices contributed to further reducing electricity wholesale prices.

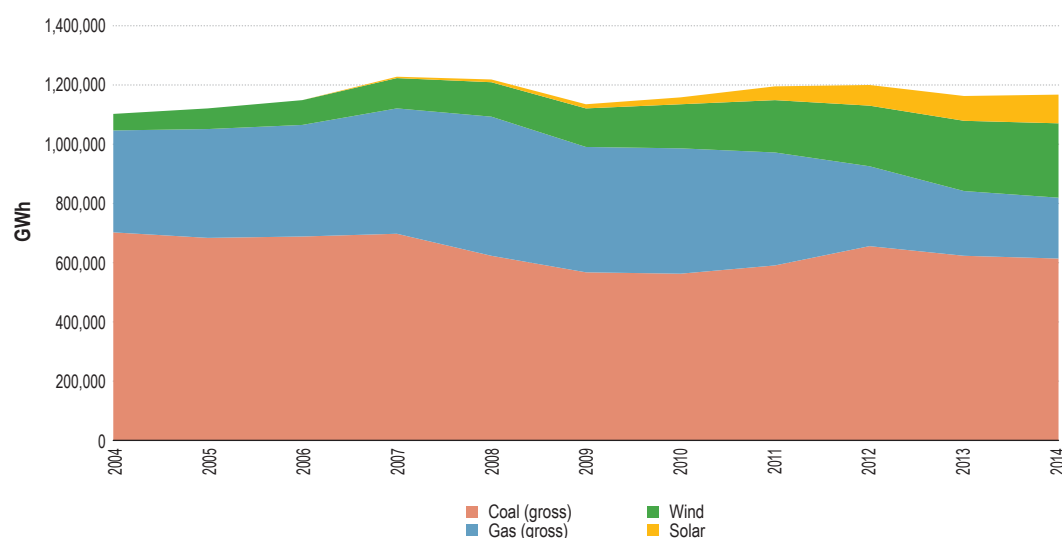
Figure 63: Evolution of European wholesale electricity prices at different European electricity exchanges – 2008–2014 (euros/MWh)



Source: EMOS, Platts, PXs and data provided by NRAs through the ERI (2015) and ACER calculations.

371 Production by thermal generation plants has significantly decreased since 2008. In fact, the penetration of renewables in combination with falling electricity demand has led to (DA) prices being lower than the marginal costs of thermal plants in an increasing number of hours, crowding them out of the electricity dispatch merit order. This has impacted gas-fired electricity plants in particular, as shown in the declining trend in electricity generation from gas in Figure 64. During the same period, coal-based generation remained essentially unchanged, due to low coal and carbon prices.

Figure 64: Evolution of generation from wind, solar and gas-fired electricity plants in Europe – 2004–2014 (GWh)



Source: Eurostat and ENTSO-E (2015).

Note: The figures on wind and solar generation are based on the Eurostat categories 'Net electricity generation-Wind' and 'Net electricity generation-Solar', respectively. The figures on generation from coal and gas are based on the Eurostat categories 'Gross electricity generation-Main activity electricity only-coal' and 'Gross electricity generation-Main activity electricity only-gas', respectively. For 2014, the figures are based on 2013 Eurostat figures and the relative change in 2014 compared to 2013 recorded by ENTSO-E in its equivalent categories.

## 4.3 Improving the functioning of the internal electricity market

372 In order to recommend improvements to the performance of the IEM, this section focuses on the following key topics: cross-zonal capacity calculations (Section 4.3.1), distortive flows such as UFs (Section 4.3.2), forward markets (Section 4.3.3), DA markets (Section 4.3.4), ID markets (Section 4.3.5), BMs (Section 4.3.6) and the state of play regarding capacity mechanisms (Section 4.3.7).

### 4.3.1 Cross-zonal capacity calculation

373 The central question in this section is how more cross-zonal capacities can be made available for trade through better coordination between TSOs. To answer this question Section 4.3.1.1 presents how the level of net transmission capacity values (NTCs) have developed in recent years; Section 4.3.1.2 assesses how much the level of NTC values could potentially increase.; and Section 4.3.1.3 presents indicators that assess the efficiency, coordination and equal treatment of electricity lines in TSO's capacity calculation methods, and points to improvements.

#### 4.3.1.1 Evolution of NTC values

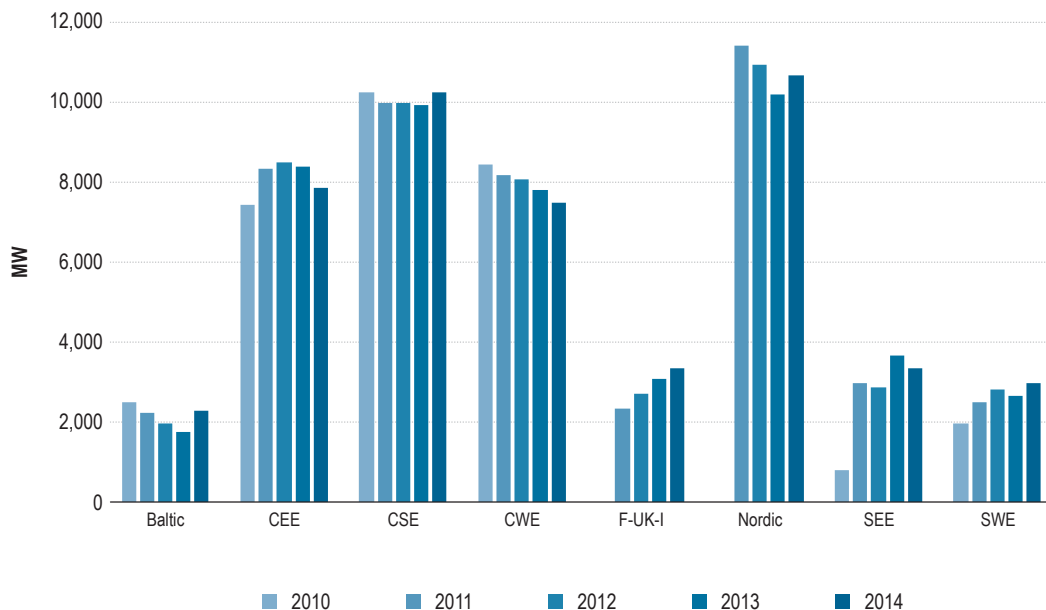
374 This section presents the evolution of commercial cross-border capacity offered to the market between 2010 and 2014. During this period, different trends are observed between the regions.

375 Figure 65 presents average cross-zonal NTC values aggregated per region from 2010 to 2014. The starting year, 2010, was selected because of limited data availability for some borders prior to 2010. The figure shows no significant change in the aggregated NTC value in the Central-South Europe (CSE) region, whereas in Central-East Europe (CEE) region NTC values increased until 2012 and decreased since then. In the observed period, an increase in NTC value is noted in the France-UK-Ireland (F-UK-I), South-East Europe (SEE) and South-West European (SWE) regions, whereas a slight decrease is noted in the Baltic and Nordic regions. In the Central-West (CWE) region, the downward trend continued throughout the period, with the aggregated NTC value in 2014 being 11% lower than in 2010.

376 A number of factors can impact the level of NTC values (see paragraph (384)); however, the declining NTC values in the CWE region may be additionally affected by an increasing imbalance of low variable

cost electricity generation between Northern and Southern Germany. As shown in a discussion paper<sup>241</sup> from DIW Berlin<sup>242</sup>, this imbalance is caused especially by the higher growth of renewable (wind) generation in northern Germany compared to southern Germany and also by a regional shift in low-variable cost conventional generation, after eight nuclear electricity plants were decommissioned in 2011. Because the regional imbalance in the least-cost generation dispatch is increasing, it increases internal congestion problems within Germany. This, in addition to higher need for re-dispatching (re-dispatch volumes in Germany increased by 25.6% in 2014<sup>243</sup>), results in higher amounts of UFs (see Section 4.3.2 to read more about UFs) which in turn limit commercial cross-zonal capacities.

Figure 65: NTCs (averages of both directions) on cross-zonal borders aggregated per region – 2010–2014 (MW)



Source: EMOS, ENTSO-E, CAO, Nord Pool Spot and Energinet.dk.

Note 1: NTC values for all regions are available from 2011 with some exceptions: in the Nordic region data for cross-zonal capacity between Finland and Norway are not available during the whole period; in the SEE region, on the Bulgarian-Romanian border, in 2013 data are available only for the direction from Bulgaria to Romania. Additionally, data for 2010 are available for the Baltic, CEE, CSE, CWE and SWE regions. Data from January 2010 are available on the Austrian-Czech, Austrian-Italian, Czech-German, Czech-Polish, German-Polish, German-Dutch, French-Italian, Swiss-Italian, Italian-Slovenian and Slovenian-Croatian borders, whereas for other borders in these regions, data are available only from September 2010 onwards.

Note 2: Only includes interconnectors, i.e. transmission lines which cross or span a border between countries and which connect the national transmission systems of the countries.

377 The most significant network expansion investments that contributed to increases in cross-zonal capacity in Europe between 2012 and 2014<sup>244</sup> were:

- the Estlink 2 cable, between Finland and Estonia, operational since 6 February 2014, which increased the electricity transmission capacity between these countries nearly threefold, from 350 MW to 1,000 MW. The project is a high-voltage direct current (HVDC) link of 450 kV consisting of converter stations in Anttila (Finland) and Püssi (Estonia);
- a new 400 kV line between Spain and Portugal, commissioned in May 2014. With this southern interconnection the exchange capacity from Spain to Portugal increased from 2,300 MW to 2,700 MW; and
- the reinforcement of the interconnection between France and Italy in 2013, which increased the capacity in the France-to-Italy direction.

241 See: [http://www.diw.de/documents/publikationen/73/diw\\_01.c.497246.de/dp1451.pdf](http://www.diw.de/documents/publikationen/73/diw_01.c.497246.de/dp1451.pdf).

242 DIW stands for “Deutsches Institut für Wirtschaftsforschung”, or German Institute for Economic Research.

243 See Table 13 for re-dispatch volumes per country in 2014.

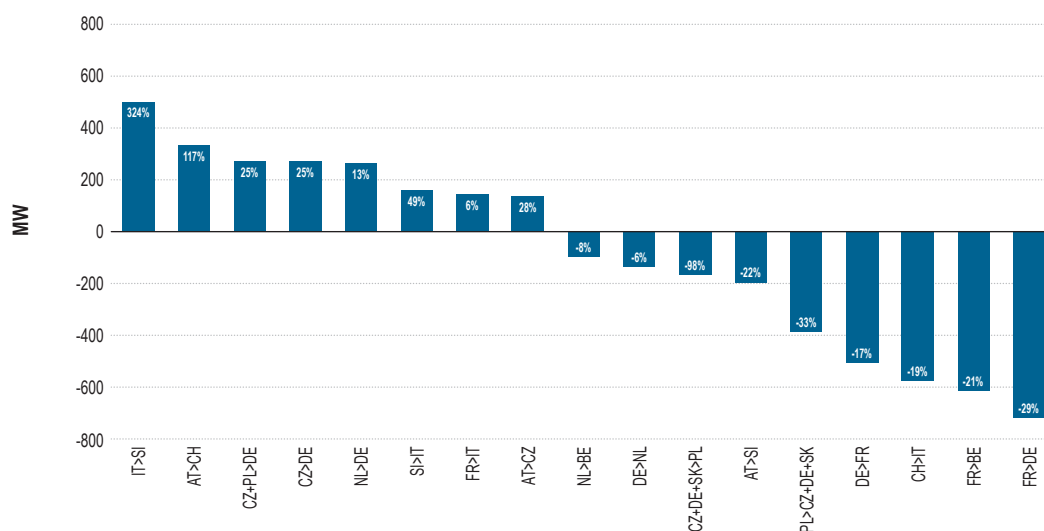
244 For network expansion investments before 2012, refer to the MMR 2013, page 64.

378 In addition, some countries commissioned internal projects between 2012 and 2014. The key aims of these projects were to remove internal congestion constraints, contributing to the integration of renewable-based generation and/or improving security of supply. However, in some cases as a positive secondary effect these projects increased capacity on certain borders.

379 For example, the Italian and Slovenian internal investments increased cross-zonal capacity between the two countries. The Spanish-Portuguese border also benefited from enhancing internal exchange capacity due to national projects.

380 Figure 66 presents the change in NTC capacity offered for trade between 2010 and 2014 for borders in the CWE, CSE and CEE regions. The largest increases of capacity are observed on the borders from Italy to Slovenia and Austria to Switzerland in the CSE region, and from the Czech Republic to Germany in the CEE region. The three borders with the highest NTC decreases are France to Germany, France to Belgium in the CWE region, and Switzerland to Italy in the CSE region. Borders on which the NTC levels remained relatively unchanged (i.e. where changes were lower than 10%) include borders from the Netherlands to Belgium, from Germany to the Netherlands, and from France to Italy.

Figure 66: Change in NTC value per border in the CSE, CWE, and CEE regions – 2010–2014 (MW and %)



Source: EMOS, ENTSO-E (2015) and ACER calculations.

Note: The analysis initially included 46 border directions in the CSE, CWE and CEE regions. The figure excludes border directions where the difference in NTC was lower than 100 MW. The border between Italy and Greece was omitted as HVDC cable was under maintenance for a big part of 2014. The vertical axis represents the change (MW) between 2010 and 2014 and the percentage – presented above each bar – shows the change relative to the average NTC value in 2010. Same data restrictions as in the notes under Figure 65 apply.

### 4.3.1.2 Defining scope for improvement

381 A number of factors impact the potential level of NTC values. These include: reinforcements of the grid at the national and cross-zonal level; (de)commissioning of electricity plants; increasing penetration of renewable-based generation; maintenance of lines; and the presence of UFs. In the Agency’s view, improving the capacity calculation methodology and the associated cooperation between TSOs could make a significant contribution to improving the efficiency in the use of existing transmission infrastructure across all trading timeframes (i.e. forward, daily, ID and balancing).

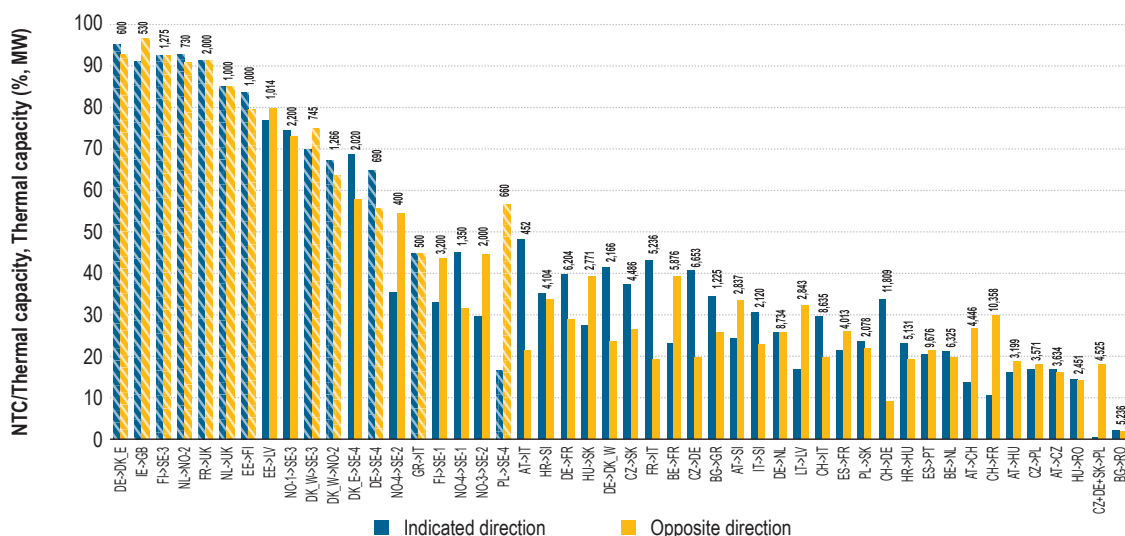
382 The relationship between NTC and the thermal capacity of interconnectors on cross-zonal borders can be used to assess the potential scope for increasing NTC values through improvements to the capacity calculation methodology.

383 Figure 67 presents the ratio between the average yearly NTC (separately for both border directions) and the aggregated thermal capacity of cross-zonal interconnectors in 2014. When looking at this ratio it is



important to be aware that the thermal capacity of interconnector, while being mainly determined by the physical properties of the network elements, is also affected by the environment in which it operates (i.e. temperature, wind, solar radiation, etc.). Bars coloured in solid fill refer to high voltage alternating current (HVAC) interconnectors, while bars coloured in pattern fill refer to HVDC interconnectors. The latter have higher ratio values, which can partly be explained by the fact that these interconnectors are not impacted by UFs. However, HVDC interconnectors can still be limited by congestions on electricity lines or network components inside bidding zones. Internal congestion is believed to be the main factor for the low ratio on HVDC interconnectors on the Polish-Swedish and German-Swedish borders, whereas for the interconnector between Greece and Italy the ratio was low due to maintenance for a large part of 2014.

Figure 67: Ratio between available NTC and aggregated thermal capacity of interconnectors – 2014 (% , MW)



Source: Data provided by NRAs through the ERI (2015), EMOS, ENTSO-E (2015) and ACER calculations.

Note: Values used as thermal capacity of interconnectors between the countries were provided by TSOs through the ERI questionnaire and are displayed in the figure above the columns. If data provided by both TSOs differed, the average reported value was used. In addition, if thermal capacity was provided for winter and summer conditions, or as more values at different temperatures, the average of these values was used. Further, columns coloured in pattern fill are HVDC interconnectors, HVAC in solid fill. 48 cross-borders were included in the analysis. Data on the thermal capacity of interconnectors between Finland and Norway was not provided.

384 Figure 67 shows that on some borders, in particular those on the right side of the figure, the actual NTC values are significantly lower than what would be expected. This is true even after taking into account that the thermal capacity of interconnectors needs to be reduced for operational security criteria (e.g. N-1)<sup>245</sup> and the uncertainty of capacity calculation (i.e. reliability margin). Further, analysis shows that in nearly 70 per cent (33 out of 48) of all the assessed borders the thermal capacities are at least twice as high as the NTC. These results indicate that on the borders on the right side of the figure either the internal congestions are shifted to the border, or those borders are affected by a significant amount of UFs. Nevertheless, it would normally be expected that UFs lead to a reduction in the NTC value in the direction of the UFs, and to its increase in the opposite direction.

### 4.3.1.3 Capacity calculation methods

385 The target model for capacity calculation as defined in the CACM Regulation specifies that TSOs need to apply a flow-based capacity calculation method<sup>246</sup>, except in cases where the electricity networks are not meshed and such a method would not add value compared to a coordinated NTC capacity calculation method. Both capacity calculation methods should be based on an EU-wide common grid model and need to be applied in a coordinated way within capacity calculation regions.

245 It is worth mentioning that operational security criteria such as N-1 do not equally impact HVAC and HVDC lines.

246 See Case study 10 to read more about FBCM. Further information on the flow-based methodology is available here: <http://www.elia.be/en/products-and-services/cross-border-mechanisms/transmission-capacity-at-borders/flow-based-marktkoppeling-centr-w-europa>.

386 In view of this, this section assesses the level of TSO coordination in the capacity calculation process and in which timeframes TSOs perform the calculation. Further it assesses how these two factors impact the values of cross-zonal capacity available for trade. On 20 May 2015, the CWE region was the first to apply flow-based capacity calculation, i.e. flow-based market coupling (FBMC) was introduced. Other regions in Central Europe (i.e. CEE and CSE) should shortly follow in order to meet the requirements of Regulation (EC) No 714/2009 and, in particular, the deadlines specified in the CACM Regulation. For now, other regions are expected to perform the comparison between flow-based and NTC capacity calculation methods. Where the comparison analysis shows that flow-based method can deliver higher welfare gains, it will be expected that the flow-based capacity calculation is implemented.

### Case study 10: Test results of FBMC in CWE in 2014

FBMC is a key element in the implementation of the target model for capacity calculation and allocation in the DA timeframe as described in the regulation on CACM, which is expected to enter into force in June/July 2015<sup>247</sup>.

FBMC is a capacity calculation and allocation method which, by considering the network, accounts for the impacts of cross-border exchanges on network security constraints. The FB capacity calculation method represents an improvement on the ('traditional') available transmission capacity (ATC) method, as the FB method usually increases the capacity offered to the market. The ATC method (also referred to as NTC method) delivers only one cross-border trading possibility for a given supply domain security, because TSOs must decide *ex-ante* on the available commercial cross-border capacity on the relevant borders. The FB method considers multiple possibilities by analysing the interdependency between commercial flows and physical congestion on affected transmission network elements i.e. on 'critical branches' (CB). Further, the FB mechanism optimises social welfare by allocating capacity where it is most valuable<sup>248</sup>.

The advantage of the FB method over the ATC method is particularly significant for highly meshed and highly interdependent grids, because the ability of TSOs to estimate the 'adequate' commercial cross-border capacities on the relevant borders is nowhere near as good as calculating them by means of the FB method. For simpler grids, the difference between both methods may be rather small and the costs of implementing the complex FB method might offset the potential benefits.

FBMC was launched on 20 May 2015 in the CWE region. Its development was inspired by the Annex of Regulation (EC) No 1228/2003 and started in 2006. Since the go-live of FBMC in the CWE region, a patch for the market coupling algorithm, referred to as Flow-Based Intuitive (FBI), has been applied. FBI ensures that the solution does not lead to counter-intuitive outcomes, e.g. results where a country with the lowest cost generation is importing or where a country with the most expensive generation is exporting. FBI adapts the market coupling algorithm so as to avoid such outcomes.

FBMC has been tested through parallel runs which, based on the FBI patch, computed the transmission capacity domain and the resulting market outcomes every day, as if FBMC – instead of the existing ATC-based capacity calculation and allocation mechanism – had been applied. The current case study compares the 2014 FBMC parallel run with the existing ATC-based results used by the market coupling system during the entire year. The focus of this analysis is to compare the impact of the two models on import/export possibilities (cross-border capacity), price convergence and social welfare.

247 The CACM-related timings mentioned in this paper represent only the estimate of CWE NRAs, and do not necessarily fit the official and effective implementation planning.

248 More information on FBMC can be found on <http://www.casc.eu/en/Resource-center/CWE-Flow-Based-MC> or in the published decision on each of the CWE regulators' websites.

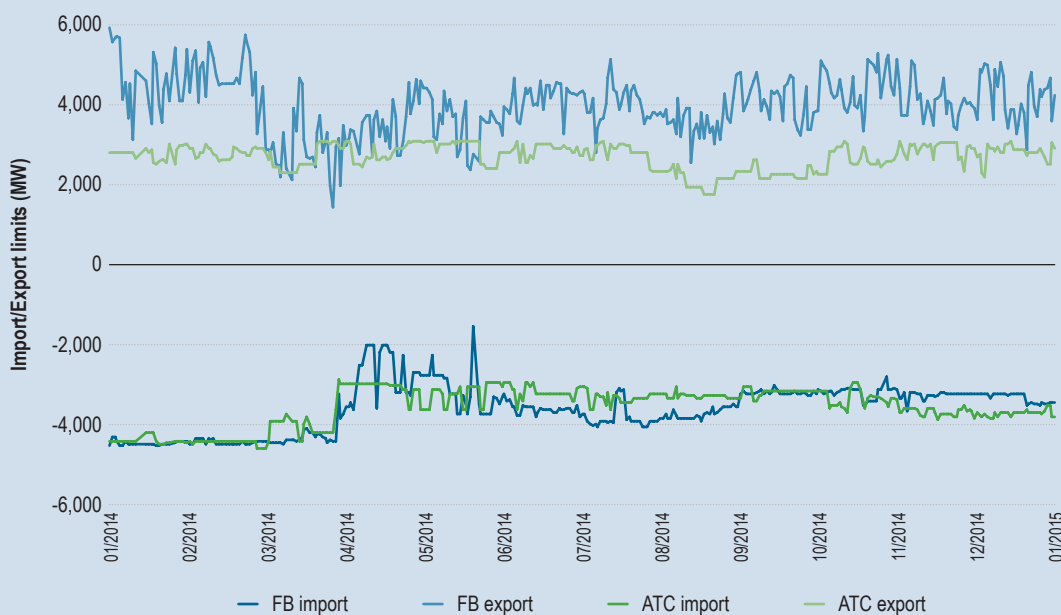
### Import/export possibilities per country

Under FBMC, transmission capacity is determined at the same time as capacity allocation in order to optimise the use of the available transmission capacity in DA. The FBMC is based on the technical characteristics of the network; therefore, in theory, more import and export possibilities should be available in FBMC compared to the ATC method.

The following figures point to the technical import and export constraints in 2014, which in the case of the ATC method, were calculated by adding up NTC values on all concerned borders. For example, the Belgian import constraint under ATC is the sum of the NTC values for France to Belgium and the Netherlands to Belgium. The import limitation under the FBMC parallel runs is calculated by the model and represents the group of constraints that limit import possibilities, including CBs and other external constraints that are not linked to a specific CB.

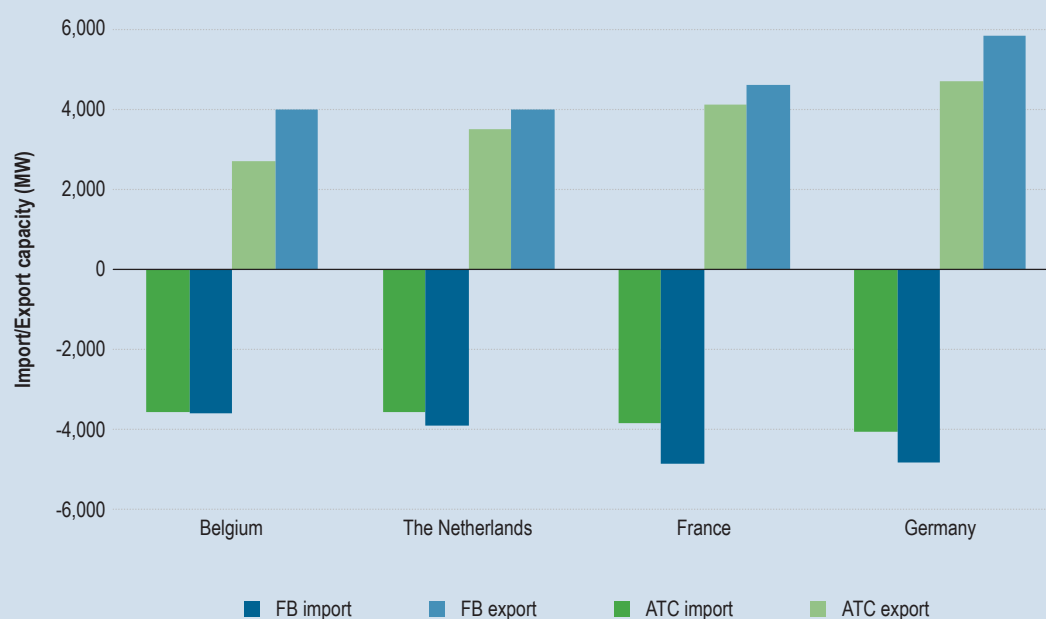
Figure (i) below compares the daily average of import and export possibilities for Belgium under FBMC and ATC method. The daily averages for France, Germany and the Netherlands show a similar result during 2014, i.e. enhanced trading capacities under FBMC.

Figure (i): Resulting import and export constraints (maximum net positions) under ATC and FBMC for Belgium. Daily averages – 2014 (MW)



Source: CASC (2015).

Figure (ii): Average import and export capacities for Belgium, the Netherlands, France and Germany, comparing FBMC and ATC – 2014 (MW)



Source: CASC (2015).

On average, the FBMC method offers more capacities for both import and export for all four countries. This is depicted in Figure (ii). For Belgium, the average import possibilities for FBMC in 2014 were only marginally higher than when applying the ATC method. However, there are considerable differences on a day-to-day basis. On some occasions the ATC-method results in considerably lower import or export possibilities than FBMC, while the FBMC parallel runs show considerable lower import or export capacities on other days.

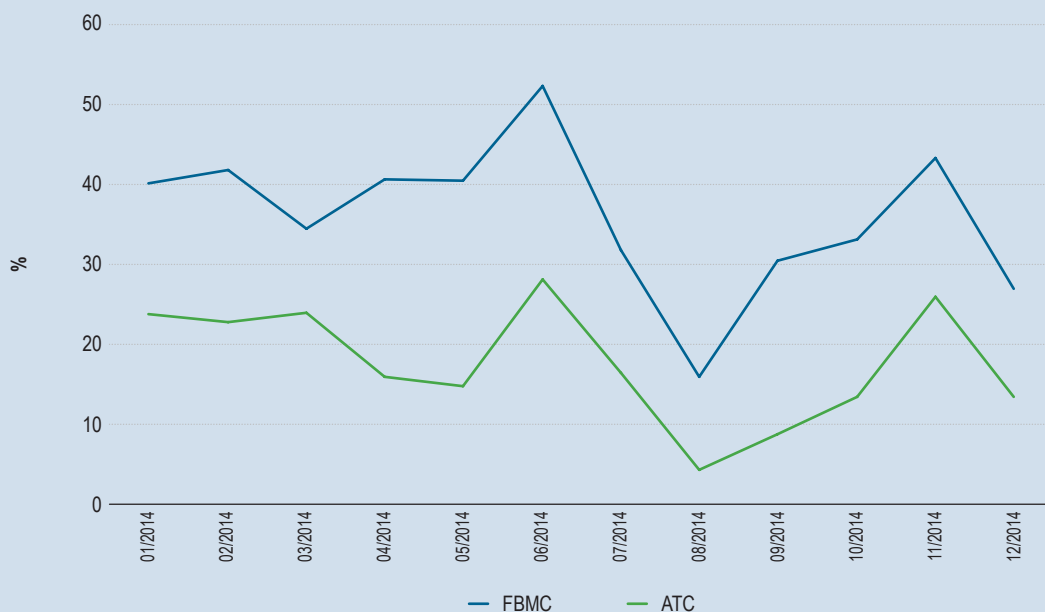
### Price convergence

Price convergence can indicate the level of market integration in both models. The 2014 parallel run results show that full price convergence<sup>249</sup> increases with the application of the FBMC method. Figure (iii) indicates the average price convergence per month for the ATC and the FBMC methods. With the FBMC method, full price convergence would have been approximately twice as high as with the ATC method. Under ATC, approximately 17.5% of the hours in 2014 reached full price convergence. In the FBMC parallel runs, the percentage of hours in 2014 with full price convergence in the total number of hours increased to approximately 36%.

Under FBMC, prices tend to full convergence in the region when no CB is limiting exchanges, or to full divergence when a CB is limiting exchanges. Partial convergence, with some countries sharing the same price and others not (e.g. same price in Belgium and France and different prices in the Netherlands and Germany), occurs only occasionally.

<sup>249</sup> In this case study, full price convergence means that for a given hour prices are the same in all four markets included in the CWE region.

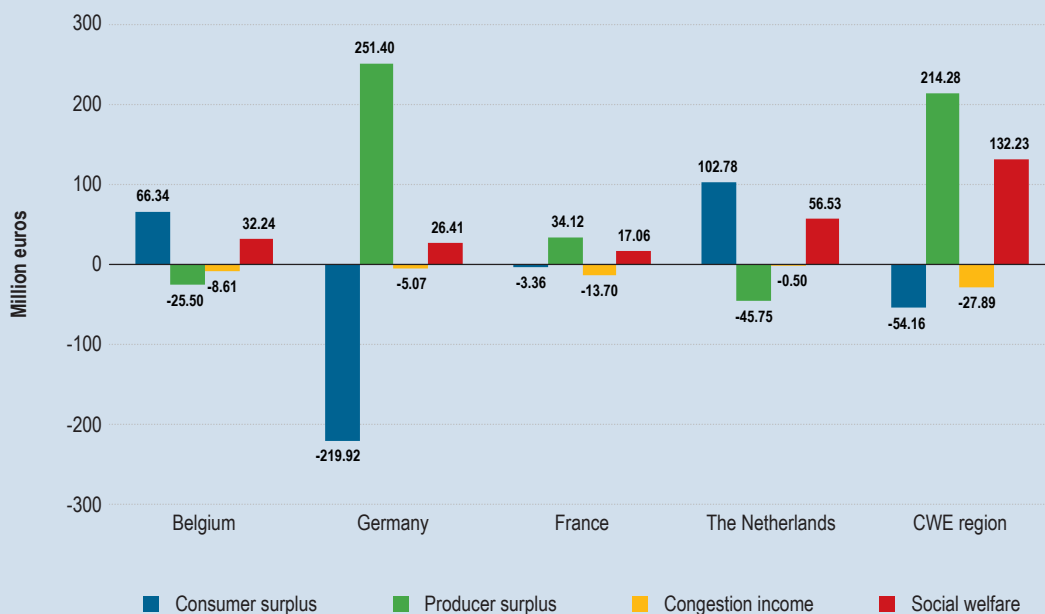
Figure (iii): Full price convergence between CWE countries, applying the ATC and FBMC method – 2014 (%)



Source: CASC (2015).

### Welfare comparison

Figure (iv): Welfare increase of FBMC parallel runs compared to ATC market outcome – 2014 (million euros)



Source: FBMC project and CREG's calculations (2015).

Figure (iv) shows that welfare would increase under FBMC compared to the ATC-based market outcome. This is consistent for all four CWE countries. Overall, welfare increase in 2014 under FBMC was simulated to amount to 132 million euros.

Further, the comparison shows that the welfare gains under FBMC are on the consumer's side for Belgium and the Netherlands, while increased producer surpluses are the dominant factor in the welfare increase

in France and Germany. A logical consequence of the better utilisation of transport capacities is that the number of hours with congestion decrease, and/or if there is congestion, the price differences are smaller in FBMC compared to the ATC-based market coupling.

It is important to note that a country's welfare might not necessarily increase. In 2013, the welfare from the FBMC parallel runs showed lower values for Belgium when compared to the ATC-based market outcome. However, market integration is about improving the social welfare benefits from a region and beyond that.

### Conclusion

The monitoring of the FBMC parallel runs and their comparison to the results deriving from the ATC method in 2014 show that parallel runs can provide for a comprehensive comparative analysis of the impact of the two models on import and export capacity, price convergence and social welfare.

For the year 2014, FBMC is shown to provide on average better results during the day-ahead than with the ATC method, with more import and export capacities available for day ahead; doubled full price convergence (i.e. from 17.5% to 36%) and increased social welfare in day ahead (by 132 million euros).

### Level of TSO coordination

- 387 Coordination among the TSOs is of key importance for the implementation of coordinated capacity calculation, as well as for ensuring operational security. The coordination is essential when trading activities or TSO actions in one TSO area significantly influence physical flows and operational security in another TSO area. To accommodate such coordination among TSO areas, Regulation (EC) No 714/2009 established regions for the coordination of capacity calculation, capacity allocation and secure network operation. These regions are further developed as capacity calculation regions in the CACM Regulation. It requires coordination in capacity calculation within and between capacity calculation regions, regardless of whether they apply the same methods for capacity calculation or not (i.e., FBMC or Coordinated NTC).
- 388 Pursuant to Regulation (EC) No 714/2009 and the CACM Regulation, the coordination of capacity calculation within capacity calculation regions requires the establishment of a common methodology and a coordinated capacity calculator for capacity calculation by TSOs. The process of coordinated capacity calculation is as follows:
- a) TSOs calculate capacity calculation inputs based on commonly agreed methods and submit them to the coordinated capacity calculator. These capacity calculation inputs are: reliability margins, operational security limits, contingencies relevant to capacity calculation, allocation constraints, generation shift keys (GSK) and remedial actions to be considered in capacity calculation;
  - b) The coordinated capacity calculator calculates cross-zonal capacity using the inputs provided by TSOs and according to a commonly agreed calculation methodology, including common rules for avoiding undue discrimination between internal and cross-zonal exchanges; and
  - c) TSOs validate the cross-zonal capacity calculated by the coordinated capacity calculator.
- 389 In 2014, the actual degree of coordination in capacity calculation had not yet reached the level required by the CACM Regulation, despite similar requirements already being applicable since 2006, when Regulation (EC) No 1228/2003, with its Annex I on conditions for access to the network for cross-border exchanges in electricity was adopted. Instead of flow-based capacity calculation, TSOs applied the NTC based capacity calculation method. In recent years, TSOs have improved their coordination within different regions established under the Electricity Regional Initiatives (ERI); however, progress in coordinated capacity calculation is very limited and varies from region to region.

- 390 To present how TSOs see their cooperation with each other, the Agency asked each TSO, in a questionnaire circulated in the context of the Electricity Regional Initiative (ERI) to describe the capacity calculation method they applied in 2014. TSOs were required to categorise their applied methodology in one of the four options listed below, presented from relatively low to high coordination:
- a) Pure bilateral NTC calculation (BIL) – Capacity calculation on a given border is completely independent from capacity calculation on any other border. Usually, each TSO on a border calculates an NTC value on its border based only on its own network information and subsequently the lower of the two values is given to capacity allocation;
  - b) Partially coordinated NTC calculation (PC) – Capacity calculation on a given border is partly dependent on capacity calculation on at least one other border. TSOs calculate NTC value together considering at least two borders together, although not all significantly affected borders and networks are considered;
  - c) Fully coordinated NTC calculation (FC) – The calculation of NTCs values is performed together on all borders of a specific region by the relevant TSOs, by including the conditions of all significantly affected networks in the calculation process; and
  - d) Flow-based capacity calculation (FB) – This process leads to the definition of flow-based parameters, i.e. the Power Transfer Distribution Factors (PTDFs), describing how cross-zonal exchanges influence flows on critical network elements, and the available margins on those network elements, describing how much the flows on those elements can further increase due to cross-zonal exchanges. Flow-based capacity calculation in combination with market coupling results in welfare-maximising exchanges between bidding zones, given the capability of the network, which is assessed in a coordinated way.
- 391 Table 10 presents an overview of capacity calculation methods applied by TSOs during 2014. The information is provided for each bidding zone border (except for internal bidding zone borders) in Europe and for each timeframe (yearly, monthly, daily and ID). The answers were provided by TSOs, and when two different answers were provided for the same border, the answer with the lower level of coordination was assumed to be the relevant one, as naturally the coordination on a given border is as strong as its weakest part. However, the evaluation of the applied capacity calculation methodology against the definitions in paragraph (393) is qualitative by nature and therefore may suffer from different interpretations by TSOs. This should be taken into account when comparing regional or country specific performance in coordinating the capacity calculation procedure. Improvements or additional clarifications within the definitions might therefore be needed to minimise the resulting inconsistencies in future evaluations. The resolution of capacity calculation in DA and ID timeframe was also evaluated, having in mind that TSOs should calculate 24 distinct values of capacities from 24 different common grid models.
- 392 The information in Table 10 should be evaluated in the light of the legal requirements with regard to capacity calculation. These requirements are laid down in Regulation (EC) No 714/2009, Commission Regulation (EU) 543/2013 as well as in the CACM Regulation. The CACM Regulation requires the implementation of flow-based capacity calculation on all bidding zone borders, whereas coordinated NTC may be applied in the F-UK-I region, the Nordic and Baltic region, within Italy, the SWE region, as well as on all direct current (DC) interconnectors. Although the CACM Regulation was only recently adopted and its capacity calculation requirements do not apply yet, similar requirements are already applicable based on Regulation (EC) No 714/2009 and Commission Regulation (EU) 543/2013. They require fully coordinated capacity calculation (either flow-based or coordinated NTC) in all timeframes (yearly, monthly, daily and ID). For this reason, the benchmarking of actual capacity calculation methods against these requirements is justified.
- 393 To benchmark performance per border, a number of points was assigned to the cross-zonal border for each timeframe, depending on the capacity calculation method applied. The methodology applied for scoring is further explained in the note below the table.

Table 10: Application of capacity calculation methods on different borders at different timeframes – 2014 (%)

Border	Y	M	D	ID	D/ID res.	Score	Border	Y	M	D	ID	D/ID res.	Score
AT-CH	BIL	BIL	BIL		<24	15.6%	EE-FI	BIL	BIL	BIL	BIL	24	33.3%
AT-CZ	BIL	BIL	BIL		<24	15.6%	EE-LV	PC	PC	PC	PC	<24	58.3%
AT-HU	PC	PC	PC		<24	34.4%	ES-FR	PC	PC	PC		<24	45.8%
AT-IT	FC	FC			<24	37.5%	ES-PT	PC	PC	PC		<24	45.8%
AT-SI	BIL	BIL	BIL		<24	15.6%	FI-SE1	PC	PC	PC	PC	<24	58.3%
BE-FR	BIL	BIL	PC		<24	21.9%	FI-SE3	PC	PC	PC	PC	24	66.7%
BE-NL	BIL	BIL	BIL		<24	15.6%	FR-IT	FC	FC			<24	37.5%
BG-GR	PC	PC			<24	25.0%	FR-UK	BIL	BIL	BIL	BIL	24	33.3%
BG-RO	PC	PC			<24	25.0%	GR-IT	BIL	BIL			<24	16.7%
CH-DE	PC	PC	PC		<24	34.4%	HR-HU	BIL	BIL			<24	12.5%
CH-FR	PC	PC	PC		<24	34.4%	HR-SI	BIL	BIL			<24	12.5%
CH-IT	FC	FC			<24	37.5%	HU-RO	PC	PC			<24	25.0%
DE-PL	PC	PC	PC		<24	34.4%	HU-SK	PC	PC	PC		<24	34.4%
CZ-DE	PC	PC	BIL		<24	28.1%	IT-SI	FC	FC			<24	37.5%
CZ-PL	BIL	BIL	BIL	BIL	<24	18.8%	LT-LV	BIL	BIL	BIL	BIL	<24	25.0%
CZ-SK			BIL		<24	3.1%	NL-NO2	BIL	BIL	PC	BIL	24	41.7%
DE-DKE	BIL	BIL	BIL		24	25.0%	NL-UK	BIL	BIL	BIL	BIL	24	33.3%
DE-DKW	BIL	BIL	BIL		<24	20.8%	NO1-SE3	PC	PC	PC	PC	24	66.7%
DE-SE4			PC		24	16.7%	NO3-SE2	PC	PC	PC	PC	<24	58.3%
DE-FR	PC	PC	PC	PC	<24	43.8%	NO4-SE1	PC	PC	PC	PC	<24	58.3%
DE-NL	BIL	BIL	BIL	BIL	<24	18.8%	NO4-SE2	PC	PC	PC	PC	<24	58.3%
DKE-SE4	BIL		BIL		24	16.7%	PL-SE4			BIL		24	8.3%
DKW-NO2			BIL		24	8.3%	PL-SK	PC	PC	PC		<24	34.4%
DKW-SE3	BIL		BIL		24	16.7%	IE-UK	BIL	BIL	BIL	BIL	24	33.3%

Source: Data provided by NRAs through the ERI (2015), EMOS, ENTSO-E (2015) and ACER calculations.

Note: Scoring: NA: not applied (0 points), BIL: bilateral NTC (1 point), PC: partially coordinated NTC (2 points), FC: fully coordinated NTC (3 points), FB: flow based (4 points). If the resolution of capacity calculation values in DA and ID timeframe was less than 24 hours (e.g. based on 24 different common grid models), the points for DA and ID timeframe were decreased by half a point. In the case of DC interconnections, a resolution of 24 hours was a priori assumed (except for GR-IT where there is no DA or ID capacity calculation), as the values are unlikely to vary from hour to hour. The sum of points for each border is divided by the maximum possible sum of points, which is 16 for borders where flow-based capacity calculation should be applied and 12 on borders where fully coordinated NTC capacity allocation should be applied.

- 394 The results in Table 10 show a rather poor level of TSO compliance as regards capacity calculation. Two concerns stand out the most. First, on many borders, capacity calculation is not even applied in a specific timeframe; for instance, ID capacity calculation is absent on many borders. Second, on most borders, either a bilateral or partly coordinated capacity calculation method is applied. A fully coordinated NTC calculation was applied only for the Italian northern borders with other MSs. Based on these findings, it can be concluded that there is significant scope for improvements in the area of capacity calculation coordination and that the inefficiency of the current methods is probably one of the main obstacles to further market integration, as it significantly limits the efficient use of the existing infrastructure.
- 395 The challenges to fully implementing coordinated capacity calculation within regions (as specified in Annex I to Regulation (EC) No 1228/2003 as well as in Annex I to Regulation (EC) No 714/2009) are not negligible and vary across regions. For example, the application of flow-based capacity calculation in highly meshed network is a much bigger challenge than, for example, implementation of coordinated NTC capacity calculation in non-meshed networks or DC interconnectors. The scoring in Table 10 should thus also be read in this perspective.



Table 11: Regional performance based on fulfilment of capacity calculations requirements – 2014 (%)

REGION	Score
SWE region	45.8%
BALTIC region	38.9%
NORDIC region	37.2%
F-UK-I region	33.3%
CSE region	31.9%
CWE region	25.0%
CEE region	23.0%
SEE region	20.0%

Source: Data provided by NRAs through the ERI (2015) and ACER calculations.

Note: Rating in the table was calculated by summing the scores of borders according to the region of which they are part and dividing them by the maximum score possible. The maximum score per border was set according to the CACM Regulation.

396 Based on data in Table 10, the scoring of individual regions<sup>250</sup> was calculated and is presented in Table 11. The scoring is calculated such that for a given region, the number of assigned points for each of its borders is summed and divided by the maximum possible number of points on those borders. Based on this scoring, only three regions exceed a fulfilment level of 1/3, which indicates that there is more work still to be done by TSOs to increase the coordination in capacity calculation.

397 The CACM Regulation should contribute to improving this coordination, as it defines those requirements in a more detailed and structured way. With the maturity of market coupling in the DA and ID timeframes, efficient and coordinated capacity calculation (including perhaps the definition of bidding zones) appears to be the main element missing from the structure of the integrated electricity market. For this reason, the Agency plans to intensify its monitoring activities of these aspects in the next MMRs.

### Equal treatment of electricity exchanges – inside and between bidding zones

398 In Europe, wholesale electricity markets are structured in bidding zones featuring equal prices within each of them. Within each bidding zone, any consumer is allowed to contract electricity with any generator without limitations, hence disregarding any possible physical limitation of the transmission network to transport the exchanged energy. However, this simplification, which aims at facilitating trade within limited geographical areas (i.e. bidding zones), is often made at the expense of electricity trading between bidding zones. Because TSOs cannot limit exchanges within bidding zones, the only way for them to ensure operational security is to limit exchanges between bidding zones. For the latter, TSOs indeed apply capacity calculation and allocation, by which they *ex-ante* limit the amount of available cross-zonal capacity to ensure that physical flows on the network inside and between zones remain within the operational security limits.

399 In capacity calculation, TSOs forecast the flows caused by exchanges inside zones. The remaining available capacity of the network elements are then offered to the market for cross-zonal trade. Therefore, exchanges inside zones cause flows on network elements that are prioritised over flows from cross-zonal exchanges. This prioritisation and discrimination is inherent in the zonal market design. However, Regulation (EC) No 714/2009, and in particular the CACM Regulation, require that capacity calculation and allocation should not result in undue discrimination between internal and cross-zonal exchanges. The question of undue discrimination essentially translates into how the capacity of the network elements (either internal or interconnectors) are allocated to internal and cross-zonal exchanges.

250 For the purpose of the analysis, cross-zonal borders were grouped into regions which are defined in accordance with Annex I of Regulation (EC) No 714/2009 (OJ L 211, 14/8/2009), with some slight modifications. The definition applied in this section is as follows: the Baltic region (LT-LV, EE-LV, EE-FI), the CEE region (CZ-DE, CZ-SK, HU-SK, AT-SI, AT-HU, AT-CZ, CZ-PL, PL-SK), the CSE region (CH-DE, CH-IT, CH-FR, FR-IT, AT-CH, GR-IT, IT-SI, AT-IT), the CWE region (DE-NL, DE-FR, BE-FR, BE-NL), the F-UK-I region (FR-UK, NL-UK, IE-UK), Nordic (NO1-SE3, DKE-SE4, FI-SE1, FI-SE3, DKW-NO2, DE-DKW, NO3-SE2, NL-NO2, DKW-SE3, DE-DKE, NO4-SE1, DE-SE4, PL-SE4, NO4-SE2), the SWE region (ES-PT, ES-FR) and the SEE region (SI-HR, HR-HU, BG-GR, HU-RO, BG-RO).

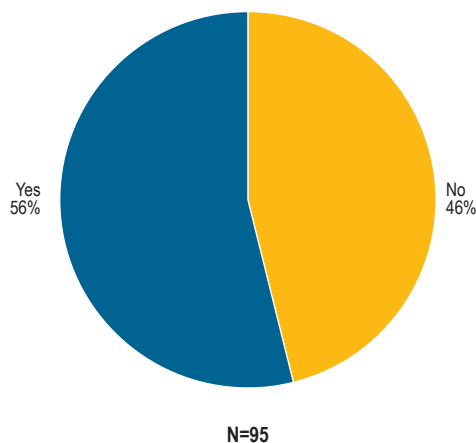
400 Two typical examples of discrimination between internal and cross-zonal exchanges are considered below:

- a) When cross-zonal capacity is limited by the capacity of interconnectors and the capacity of those interconnectors is reduced not only for the application of N-1 criteria and a reasonable level of reliability margin, but also to accommodate flows resulting from internal exchanges (i.e. loop flows, LFs) and flows resulting from non-coordinated capacity allocation on other borders (i.e. UAFs); and
- b) When cross-zonal capacity is limited by the capacity of internal network elements and when the capacity of those internal network elements is disproportionately allocated for internal exchanges and very little capacity is allocated to cross-zonal exchanges<sup>251</sup>.

401 In the ERI questionnaire, TSOs were not explicitly asked about discrimination, but whether the cross-zonal capacity was limited by the limited capacity of interconnectors or by the limited capacity of the internal network elements. This question by itself does not allow to identify any discrimination, but only provides an overview of the extent to which TSOs limit cross-zonal capacity in order to solve congestion inside the bidding zones. In this context, the Agency sees the need to establish clear criteria and thresholds to define “undue” discrimination between internal and cross-zonal exchanges in the near future<sup>252</sup>.

402 Figure 68 shows the results of TSO responses to the question of whether they, at any time, limit their cross-zonal exchanges in the process of capacity calculation in order to solve internal congestion. TSOs were asked to provide an answer separately for each external cross-zonal border that forms part of their control area. The answer was positive in more than 45% out of the total 95 answers received. This confirms that TSOs at times indeed limit NTC values in order to solve congestion inside their control area.

Figure 68: Interconnection is limited to solve congestions inside the TSO control area – 2014 (%)



Source: Data provided by NRAs through the ERI (2015).

Note: The percentages were calculated from 95 answers received through ERI template. The question was: “Is interconnection capacity limited at any time in order to solve congestions inside the TSO control area?”.

403 One example where TSOs are alleged of prioritising internal congestion is elaborated in a recent report<sup>253</sup> published by the Swedish Energy Markets Inspectorate. The findings in the report conclude that there have been frequent limitations on interconnectors between the Nordic countries and Germany due to internal congestion. The report claims that interconnectors between Sweden and Germany and Denmark-West and Germany are especially affected. However, the report also notes that urgent market messages published via the Nord Pool frequently include wording like (“...considerable wind power production and maintenance work...”) to describe the cause for capacity limitation and it is therefore impossible, in a con-

251 According to Point 1.7 of the Annex I to Regulation (EC) No 714/2009 such a situation may be tolerated only as a temporary solution.

252 [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Market%20Report%20on%20Bidding%20Zones%202014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Report%20on%20Bidding%20Zones%202014.pdf).

253 See: <http://ei.se/en/Publications/annual-report/capacity-limitations-between-the-nordic-countries-and-germany-ei-r2015-12/>.

sistent way separate cross-zonal limitations caused by technical problems and maintenance from those caused by internal bottlenecks. Agency notes that considerable wind production would fall into a category of changes in generation and load pattern, whereas technical problems and maintenance work would be considered as changes in network topology. As the maintenance of the network is a regular TSO activity, it cannot explain long-term and persistent limitations of cross-zonal capacity.

404 Relating these findings to Figure 67, it can be seen that the ratio between NTC and the thermal capacity values of the HVDC cable between Germany and Sweden (i.e. DE-SE4) indeed shows a lower than expected level in 2014 even though no major maintenance of the interconnector was reported that year. Figure 67 shows that the interconnector between Germany and Denmark-West (i.e. DE-DK\_W), which was also reported to be frequently limited has an NTC/thermal capacity ratio value comparable to other high voltage alternating-current (HVAC) interconnectors.

405 It is worth mentioning that, for historical reasons, the bidding zones' boundaries mostly correspond to the borders of EU MSs, although some MSs (e.g. Italy and Sweden) are split into several bidding zones. Introducing more appropriate bidding zones which may not correspond to the borders of MSs may lead to the more efficient use of the network infrastructure. While this is a politically sensitive and complex issue, it is important to note that the evolution of physical congestions is a very dynamic process which may not be suitable to be resolved solely by investments, which require long implementation times. A framework is needed that allows the configuration of appropriate bidding zones to adapt to changes in the evolution of congestions, which, in turn, change more frequently due, for instance, to the increasing proportion of intermittent production and increasing demand response. Furthermore, dedicated rules on avoiding discrimination between internal and cross-zonal exchanges would also be beneficial for the further integration of electricity market in Europe.

#### 4.3.1.4 Conclusion

406 The results of this section, which has focussed on the approach to capacity calculation applied by TSOs on the bidding zone borders in Europe today, show that there is scope for the electricity network to be used in a more efficient way. For instance, on many borders, capacity calculation is simply not performed in some specific timeframes, and the level of coordination in capacity calculation is still very far from the legal requirements (and an optimal level). After the very limited progress achieved in the context of the Electricity Regional Initiative, more improvements in the process of capacity calculation are now expected, as the issue is gaining fresh momentum with the implementation of the CACM Regulation. TSOs should adopt and implement flow-based capacity calculations or coordinated NTC, where its efficiency is demonstrated, and should move beyond bilateral or partial coordination when determining cross-zonal capacity. At present, non-coordinated capacity calculation seem to be one of the main missing elements for the achievement of efficient use of the network infrastructure and of Internal Electricity Market in general. Moreover, better definitions of appropriate bidding zones and framework for preventing undue discrimination between cross-zonal and internal electricity trade are important preconditions for achieving a truly integrated electricity market.

#### 4.3.2 Unscheduled flows and loop flows

407 UFs usually reduce the cross-zonal capacities made available for trade. By monitoring these 'distortive flows' (i.e. locate where they are in the network and show their magnitude) adequate remedies can be recommended.

408 This section briefly first summarises relevant definitions – of which some are updated with respect to those provided in previous MMRs – of different flows and the methodology applied to divide UFs into UAFs and LFs. The structure of this Section is as follows. Section 4.3.2.1, presents the evolution of UFs, while Section 4.3.2.2 assesses their likely impact on cross-zonal capacities and presents estimates of the welfare losses associated with LFs and UAFs on the basis of a counter-factual social welfare loss analysis. Section 4.3.2.3 presents the implications of the applied remedial actions, such as re-dispatching.

- 409 Although this section applies the same definitions of physical flows as in the previous MMRs, a slight change in naming is introduced. It was agreed between ENTSO-E and the Agency to rename transit flows (TFs) to allocated flows (AFs<sup>254</sup>) and unscheduled transit flows (UTFs) to unscheduled allocated flows (UAFs). The reasoning behind the renaming lies in the fact that the new name better represents the meaning of these flows, i.e. they all result from capacity allocation.
- 410 The definitions<sup>255</sup> include three primary flow definitions, i.e. physical flows (PFs), schedules (SCHs<sup>256</sup>) and allocated flows (AF), and three secondary definitions. PFs are measured, and SCHs are provided by market participants, whereas AFs need to be calculated from the final net position of each bidding zone and the PTDF values. The secondary definitions refer to flows which are calculated on the basis of primary flows, as presented in Table 12.

Table 12: Calculation of secondary definitions

The secondary definitions
$UF = PF - SCH$
$LF = PF - AF$
$UAF = AF - SCH = UF - LF$

- 411 While SCHs represent an administrative flow resulting from capacity allocation, UAFs represent the difference between actual flows and those administrative flows. Therefore, UAFs stem mostly from insufficient and inefficient capacity calculation and allocation, but could also be the result of a scheduling methodology which does not follow the physical flows resulting from capacity allocation. LFs originate from electricity exchanges inside bidding zones and are inherent in the zonal market design with highly meshed AC networks. In both cases (i.e. UAF and LFs) the affected TSOs are not directly notified to handle these physical flows and therefore they face additional challenges when maintaining network security, which in turn can affect market efficiency.
- 412 While facilitating cross-border wholesale trade is a key objective of the IEM, the negative impact of UFs is twofold: (i) they may cause TSOs to reduce the capacity available for cross-border trade; and (ii) they may induce more need for remedial security actions by TSOs. The first impact may lead to a loss of social welfare, which corresponds to the foregone added-value with respect to a situation in which this cross-border capacity was available for cross-border trade. The second impact relates to network security and the efficiency of the market in general, and may contribute to more re-dispatching, counter-trading and/or curtailment cost. Additionally, if remedial security actions were not available (e.g. due to insufficient coordination among TSOs or lack of flexible generation), UFs could lead to insecure grid operation.
- 413 While the data on PFs and SCHs are publicly available, the data on AFs were, as in previous years, provided to the Agency by ENTSO-E. AFs were calculated with hourly resolution with some simplifications. First, only three different sets of PTDF factors representing different seasons (Winter 2014, Summer 2014, Winter 2015) were used. Second, the resulting flows on each interconnector were aggregated per border<sup>257</sup>. Third, PTDFs were calculated using the proportional GSK. The obtained AFs data can thus be considered only as a proxy for the total amount of AFs (and indirectly LFs and UAFs) observed on borders.

254 Denoted as  $CF_b$  in ENTSO-E's technical report on bidding zones review process.

255 For more on physical power flow definitions currently being used in the ENTSO-E community, please see [https://www.entsoe.eu/Documents/MC%20documents/150929\\_Joint%20Task%20Force%20Cross%20Border%20Redispatch%20Flow%20Definitions.pdf](https://www.entsoe.eu/Documents/MC%20documents/150929_Joint%20Task%20Force%20Cross%20Border%20Redispatch%20Flow%20Definitions.pdf).

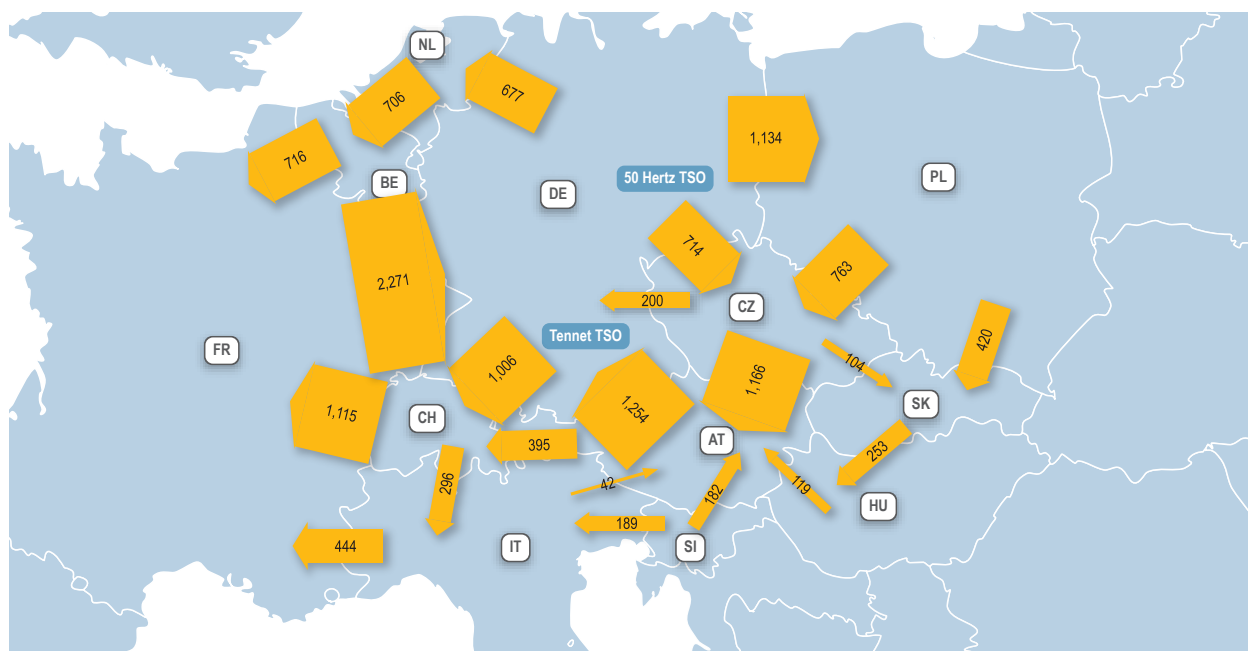
256 SCH is a declared flow resulting from a scheduling process and is subject to an electricity exchange between two different control areas and/or bidding zones.

257 If one border contains differently located interconnectors, the aggregated result might not reflect the nature of the flows, as they can flow in different directions in a specific hour, e.g. the Czech-German border. If the aggregations are made per bidding zone instead of per border, the situation grows even less clear, e.g. Czech-(DE+AT) bidding zone.

### 4.3.2.1 Unscheduled flows

414 Figure 69 shows the average UFs in the CEE, CSE and CWE regions<sup>258</sup>, except Greece<sup>259</sup>, in 2014. The level of this indicator on each border is expressed by the width of the arrow<sup>260</sup>. The overall pattern mirrors last year’s findings, showing significant UFs exiting north Germany east and west, flowing through Poland, the Czech Republic, the Netherlands, Belgium and France and then entering southern Germany and Austria. In addition, significant UFs can be observed in a loop France-Germany-Switzerland-France. A more in-depth analysis of how UFs impact cross-border tradeable capacities in the CEE region is presented in the recently adopted Opinion<sup>261</sup> No 09/2015 from the Agency.

Figure 69: Average UFs for three regions – 2014 (MW)



Source: Vulcanus (2015) and ACER calculations.  
 Note: Average UFs are averaged hourly values in 2014.

415 While average UF values provide information about the prevailing directions of UFs, Figure 70 shows the evolution of the aggregated sum of UFs in the CEE, CWE and CSE regions in 2013 and 2014<sup>262</sup>. The proportion of UFs between regions changed somewhat as UFs increased in the CEE region by 15.8% or 8.2 TWh, and declined slightly in the other two regions. The total volume for all three regions increased by 5.8% from 128.8 TWh in 2013 to 136.2 TWh in 2014. For the comparison, the total amount of scheduled flows in these regions in 2014 was 191.5 TWh.

416 Between 2013 and 2014, the level of UFs changed notably on some borders. UFs increased the most on the German-Polish (+35%), Austrian-Czech (+26%), Austrian-German (+16%), Polish-Slovakian (+16%) and Czech-Polish (+21%) borders. Significant reductions can be observed on the Austrian-Swiss (-30%) and Czech-Slovakian (-25%) borders.

417 When it comes to separating UFs into LFs and UAFs, the aggregated absolute value of LFs amounted to

258 In Regulation (EC) No 714/2009 regions are defined in terms of countries; therefore, the German-Austrian border could be attributed to the CEE region and CSE region. While on this border no capacity allocation takes place, UFs can be calculated. For the purpose of this Report, these flows have been assigned to the CEE region. Moreover, within a bidding zone, UFs cannot be divided into LF and UAF and therefore the German-Austrian border has not been included in the subsequent analysis in this chapter.

259 Greece is connected to the south of Italy only through a DC cable and therefore is not relevant for further UFs analysis.

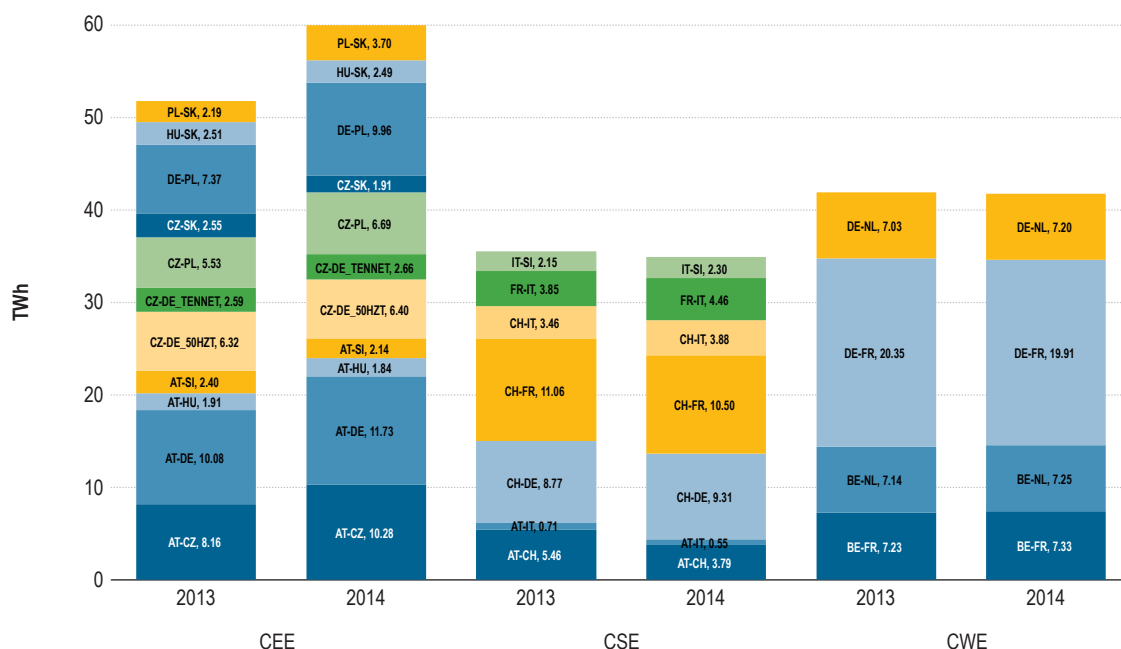
260 For a comparison with the previous year, see MMR 2013, page 149.

261 The Opinion is available for download at: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Opinions/Opinions/ACER%20Opinion%2009-2015.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Opinions/Opinions/ACER%20Opinion%2009-2015.pdf).

262 For a comparison with previous years, see the MMR 2012, page 100 and MMR 2013, page 150.

69.7 TWh in 2011, 70.7 TWh in 2012, 67.8 TWh in 2013 and 86.5 TWh in 2014, while UAFs kept increasing from 85 TWh to 87.6 TWh to 94.7 TWh and 96.3 TWh over the same period. These flows, combined with the uncertainty associated with them, contribute to reducing the overall amount of cross-zonal capacity offered to the market.

Figure 70: Absolute aggregate sum of UFs for three regions – 2013–2014 (TWh)



Source: Vulcanus (2015) and ACER calculations.

Note: The calculation methodology used to derive UFs is the same as that used for previous MMRs. The UFs are calculated with an hourly frequency; the absolute values are then summed across the hours and aggregated for borders belonging to the relevant regions.

#### 4.3.2.2 The loss of social welfare induced by unscheduled flows

418 In theory, UFs (LFs and UAFs) can be expected to decrease or increase cross-zonal capacity offered to the market (depending on their direction and volume), while in practice only reductions can be observed. Two reasons for this can be identified. The first is that cross-border capacity is not only influenced by the volumes of UFs, but also by uncertainty about their levels and the related reliability margins (RMs). The second reason is that capacity calculation always implies modelling and forecasting errors which to some degree can be reduced with better coordination, more accurate common grid modelling, and better forecasting and calculation of uncertainties.

419 A starting point for assessing the effect of UFs on cross-zonal capacity are the thermal limits of a given network element and the N-1<sup>263</sup> security criterion. The actual capacity available for cross-zonal trading deviates from the thermal capacity, reduced by the amount required to comply with the security criterion for two reasons. First, in the capacity calculation process, TSOs start by forecasting the amount of flows caused by internal exchanges in all bidding zones (i.e. LFs and internal flows), and second, they forecast the amount of flows caused by cross-zonal exchanges on other borders not included in coordinated capacity calculation (UAFs). Both calculations together result in the forecasted UFs, and the tradable capacity is then reduced accordingly. However, as the forecasts of UFs, like any other forecasts, are not deterministic, the reduction of capacity must also take into account the RMs, which reflect the uncertainty of these forecasts.

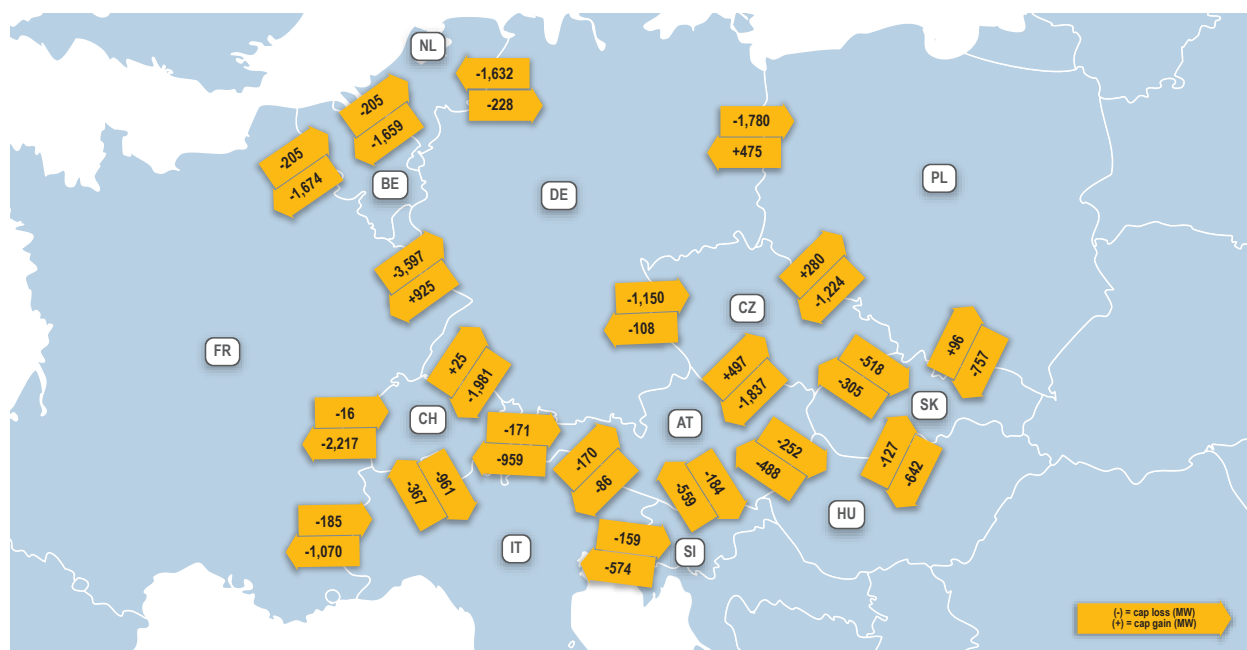
263 N-1 refers to a situation in which at least one Contingency from the Contingency List can lead to deviations from Operational Security Limits even after the effects of Remedial Actions. In other words, when multiple transmission lines are delivering electricity to the same point and one of the lines goes suddenly out of service, respecting N-1 will ensure that remaining lines are able to serve the demand (source: ENTSO-E ICS methodology from 8 May 2014).

### Loss of cross-zonal capacity due to unscheduled flows

- 420 As more detailed data become available over time, the methodologies for calculating the capacity loss and its corresponding social welfare loss are also being adapted, such that they can better represent the reality of the overall loss.
- 421 In the 2013 MMR, the loss of cross-zonal capacity in a specific border direction and specific hour due to UFs was assumed to be equal to the actual value of UF in that hour if UF was flowing in the same direction. If the UF was flowing in the opposite direction, no capacity loss or gain was assumed. The main problem with that assumption is that at the time of capacity calculation (e.g. at D-1), the realised values of UFs are not known.
- 422 The new methodology<sup>264</sup> used in this MMR takes into account that TSOs need to forecast UFs at the time of capacity calculation (i.e. D-1) and apply the RM to take into account the uncertainty of these forecasts. Therefore, the actual capacity loss has two parts, i.e. the forecasted UF and the RM. Forecasted UF is calculated using the assumption that it is equal to the observed UF on the reference day (e.g. one day or one week before). To calculate the RM, the differences between forecasted UF and realised UF for the same hour are recorded for a sufficient period in the recent past. This gives a probability distribution of the forecast errors (with a mean value close to zero) and, applying the standard significance level of 5% to both tails of the distribution, gives the level of RM for both border directions which covers 90% of the uncertainty.
- 423 The split of UF allows the division of the capacity loss into LF and UAF components. The forecasted LF and forecasted UAF are calculated using the same assumption (i.e. the forecasted LF/UAF is equal to the observed LF/UAF on the reference day i.e. one day or one week before). RMs are also calculated for LFs and UAFs and then scaled such that their sum equals RMs of UFs. At the end of the process, the capacity loss has four components, two related to LFs (forecasted LF volumes and RMs for LFs) and two related to UAFs (forecasted UAF volumes and RMs for UAFs).
- 424 The key difference between the two methodologies is that, last year, the calculation of the capacity loss induced by UFs was based on the realised UFs in the direction of its flow and disregarded any further reduction in capacity due to the uncertainty of UFs (i.e. the RMs). The new methodology takes the latter into account. This provides additional accuracy when calculating capacity and welfare loss, as it removes one of the underestimates listed in last year's report.
- 425 In order to show the magnitude of the impact of UFs in terms of capacity losses or, in some cases, theoretical gain, Figure 71 presents both values separately for all border directions. The figure shows that many borders recorded a significant loss in cross-zonal capacity in 2014. The highest values of capacity loss are noted on borders with a high level of UFs, in the east on the DE-PL, DE-CZ and CZ-AT borders and in the west on the DE-NL, NL-BE and BE-FR borders. High capacity loss is also observed on the FR-DE, CH-FR and DE-CH borders. Theoretical capacity gains were noted on some borders with the highest UFs in the opposite direction, i.e. on the DE-FR, AT-CZ and PL-DE borders.

264 For a detailed description of the methodology for calculating welfare losses due to unscheduled flows, see Annex 10.

Figure 71: UFs mostly negatively impacting cross-zonal trade – 2014 (average capacity loss/gain in MW)



Source: Vulcanus, EMOS, ENTSO-E (2015), and ACER calculations.

Note: Read the results as follows: on the German-Polish border UFs are having a negative impact on cross-border capacity in the direction from Germany to Poland (-1.780 MW) and a positive impact in the direction from Poland to Germany (450 MW). The capacity losses/gains can be observed in both directions, because the uncertainty of forecasted unscheduled flows requires that reliability margins are taken in to account in both directions of the interconnection. See the methodology in Annex 10 for details.

426 The capacity losses shown in Figure 71 are much higher than the actual level of UFs, which are presented in Figure 69. Both figures show that, on average, the value of the RM tends to be approximately similar to the average volume of UFs, but some noticeable differences among borders can be observed. While the DE-NL, NL-BE and BE-FR borders are much more affected by the uncertainty of UFs (i.e. RMs), the DE-PL, PL-CZ and CZ-AT are more affected by the absolute value of UFs rather than their uncertainty. Finally, when the capacity losses on the borders are added to the actually observed NTC values, they still account for much less than the observed thermal capacity of the interconnectors. This indicates that the calculated capacity losses are not overestimated and that, besides these capacity losses, there are other factors that significantly further reduce the cross-border capacity offered for trade.

427 As shown in Figure 71, the UFs can cause capacity loss or gain; however, as noted above, the capacity gain induced by UFs is only theoretical and has not materialised in practice. For this reason, theoretical net capacity gains were not considered in the subsequent analysis of welfare losses. Nevertheless, when capacity losses due to UFs are divided into LF and UAF parts, one of the two parts can actually create capacity gains, which are considered in the following analysis.

### Loss of welfare due to unscheduled flows

428 The capacity loss resulting from UFs was split into its LFs and UAFs components. Using these volumes, multiplied by the positive price difference between the zones, the welfare loss can be calculated separately for each contributing component.

429 It is important to mention that the overall calculated social welfare impact is:

- underestimated, since the analysis includes only the existing aggregated borders, whereas including all interconnectors and 'internal' lines would provide a more accurate estimate;
- underestimated, since lowering the amount of LFs on the negatively influenced borders would imply a different bidding zone configuration with lower prices in the source areas of LFs, higher prices in



sink areas of LFs, and hence increased price spreads; and

- c) overestimated, as the price spread – against which the result is calculated – decreases with each additionally traded unit of transmission capacity until a (possible) complete price convergence occurs, i.e. only so-called dead-weight losses should be taken into account, not the current price spread multiplied by the volume.
- d) overestimated, in case intraday capacity calculation provides additional cross-zonal capacities to the market due to lower uncertainty of forecasted unscheduled flows in the intraday timeframe compared to day-ahead timeframe.

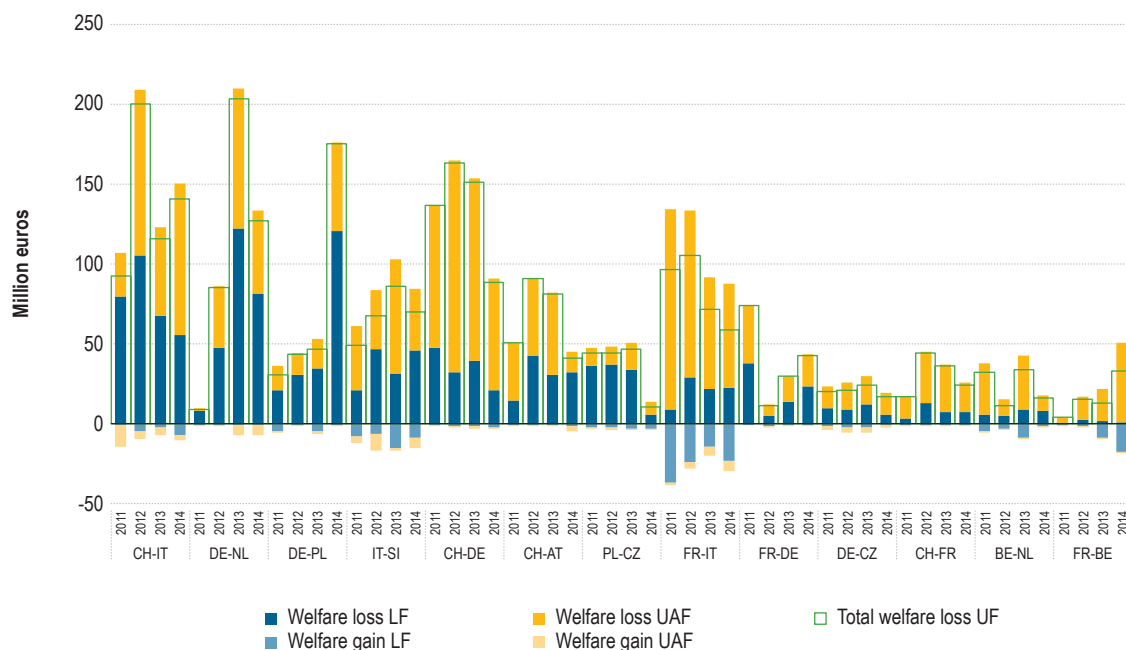
The extent to which these under- and overestimates can influence the results may be significant and is hard to gauge.

- 430 The results<sup>265</sup> of welfare losses induced by UFs, LFs and UAFs are shown in Figure 72 for a selection of highly impacted borders in the CEE, CSE and CWE regions. The calculation shows that the total welfare loss due to UFs was 793 million euros in 2011, 1,081 million euros in 2012, 1,093 million euros in 2013 and 983 million euros in 2014. This indicates a 24% increase in welfare losses between 2011 and 2014, although a 10% reduction occurred between 2013 and 2014. The increase in welfare loss between 2011 and 2013 was mostly caused by increased price differences between the price zones and, to a much lesser degree, by changes in the volumes of UFs. In 2014, welfare losses most notably decreased compared to 2013 on the CH-DE (-63 million euros), CH-AT (-41 million euros) and DE-NL (-77 million euros) borders, whereas the most notable increase can be observed on the DE-PL border (+ 129 million euros). Considering that the total amount of UFs increased in 2014, the decrease in welfare losses can be mostly attributed to a greater price convergence, whereas an increase on the DE-PL border is attributable mostly to a greater price divergence and partly also to the higher level of UFs. The share of welfare losses due to LFs was 41% in 2011, (323 million euros), 48% in 2012 (523 million euros), 41% in 2013 (446 million euros) and 45% in 2014 (445 million euros).
- 431 When welfare losses and gains are accounted for separately, the welfare loss induced by LFs amounted to 389 million euros in 2011, 580 million euros in 2012, 515 million euros in 2013 and 519 million euros in 2014, and were partially offset by the LF induced welfare gains of 66 million euros, 57 million euros, 69 million euros and 73 million euros for the same years, respectively. Positive effects have been observed on a few borders only, most notably on the FR-IT and, to a lesser extent, also on the IT-SI and the AT-IT borders. The detailed statistics on flows and welfare effects are presented in the tables in Annex 11.
- 432 Due to the different methodology used to calculate capacity losses induced by UFs, the results of this year's calculation of welfare losses in the period 2011 to 2013 have more than doubled compared to the results in the previous MMR<sup>266</sup>. This suggests that the underestimate in last year's MMR due to disregarding RMs was very significant and that uncertainty on the level of UFs, as taken into account by TSOs, substantially reduces the cross-border capacity for trade, close to, or by even more than, the amount of UFs.

265 See: Table A-8 in Annex 11.

266 See: MMR 2013, Annex 12, page 269.

Figure 72: Estimated loss of social welfare due to UFs on selected borders in the CEE, CSE and CWE regions – 2011–2014 (million euros)



Source: Vulcanus, EMOS, ENTSO-E (2015), and ACER calculations.

Note: The German-Austrian border is omitted, as Austria and Germany form a single bidding zone and have one common price reference. The German-Czech border uses one aggregated value of flows not resulting from capacity allocation for both of its interconnectors. LFs and UAFs then partially offset one another in volumes and thereby the presented result cannot be meaningfully interpreted.

### 4.3.2.3 Re-dispatching, counter-trading and capacity curtailments

433 To ensure operational security, different remedial actions are applied by TSOs to relieve congestion caused by physical flows resulting from both domestic and cross-border trade. Some remedial actions do not result in significant costs and are preventive (e.g. changing grid topology), while others come at a cost to the system or to TSOs, and may be either preventive (e.g. offering less cross-border capacity) or curative (e.g. re-dispatching and counter-trading, and curtailment of capacity already allocated).

434 Table 13 shows the volumes and costs of congestion-related remedial actions, reported separately for re-dispatching and counter-trading for the year 2014<sup>267</sup>. The comparability of these data is seriously hampered by the possibility that NRAs could have had a different understanding of the questions underlying the ERI questionnaire which were used to collect the data. For instance, values provided by the Spanish NRA include the costs of all remedial actions applied, which may explain the relatively high numbers for Spain. Furthermore, in Germany Internal Security Sales (SiV)<sup>268</sup> and renewable generation feed-in management are also considered as remedial actions, but the costs of these are not included in Table 13. Therefore, it is still hard to compare the total cost of remedial actions between MSs, despite the fact that the Agency has worked with NRAs over the last four years to unify these definitions. The Agency will seek ways further to improve reporting on this matter.

267 For comparison with the previous year, see MMR 2013, page 159.

268 Sicherheitsbedingte regelzoneninterne Verkäufe (SiV) – Measures taken by the German TSO 50Hertz in the light of the risk that the (N-1) security criterion could be violated due to overload on the interconnection lines. Usually when the generated renewable-based energy (mostly wind) cannot be transported due to a violation of (N-1) criteria or congestion.

Table 13: Network congestion related volumes and costs of remedial actions – 2014 (GWh, thousand euros)

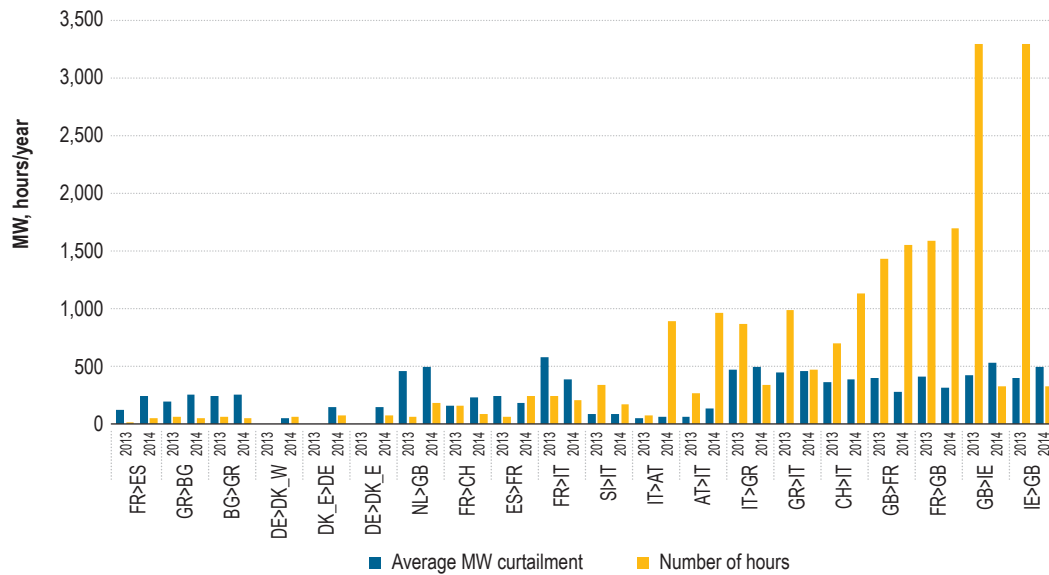
Country	Re-dispatching		Counter-trading		Other thousand euros	Contributions from other TSOs thousand euros	Total cost 2014 thousand euros
	GWh	thousand euros	GWh	thousand euros			
ES	9,460	809,148	0	116	0	62	809,202
GB	5,402	164,626	89	4,184	90,242	0	259,053
PL	7,560	106,169	382	23,858	0	18,583	111,444
DE	2,593	108,161	52	1,327	1,083	380	110,191
NO	NA	32,209	NA	1,525	1,077	360	34,451
NL	293	11,753	9	0	0	0	11,753
FI	NA	1,651	NA	8,477	0	2	10,126
FR	0	6,018	0	0	0	0	6,018
AT	1,089	4,413	0	0	174	0	4,587
CZ	54	334	2	0	4	-2,437	2,776
EE	0	0	23	717	0	0	717
LV	6	0	8	709	0	0	709
PT	0	0	0	0	0	0	0
HR	0	0	0	0	0	0	0
SK	0	0	11	0	0	0	0
LU	0	0	0	0	0	0	0
SI	0	0	2	-15,244	0	0	0
DK	0	NA	113	NA	0	2,310	-2,310
IT	11	NA	66	NA	0	0	NA
CH	6	NA	75	NA	0	0	NA

Source: Data provided by NRAs through the ERI questionnaire (2015).

Note: For 2014, the Agency requested data for congestion-related remedial actions. Positive euro values for remedial actions refer to costs incurred to TSOs, and negative values to their revenues, whereas positive values for contributions refer to money received from other TSOs and negative to money paid to other TSOs. Denmark, Italy, Switzerland, did not provide details on costs or did not have the data available. Norway reported only on the costs of remedial actions. Denmark reported only the total compensation received from other TSOs. Countries that are not present in the table did not submit any remedial action data.

- 435 When dealing with emergency situations in which TSOs must act in an expeditious manner and when re-dispatching or countertrading is not possible, TSOs may curtail day-ahead allocated capacity after the day-ahead firmness deadline. Regulation (EC) No 714/2009 and the CACM Regulation require that, in the case of *force majeure*, market participants owning the curtailed capacity should be reimbursed, whereas in all other cases market participants should be compensated for curtailed capacity. Such compensation should be equal to the market price difference between the zones concerned in the relevant timeframe (market spread compensation).
- 436 Figure 73 shows, for a selection of borders, the number of hours for which cross-border capacity was curtailed in 2013 and 2014, together with information on the average curtailed MW capacity in these hours.

Figure 73: Average curtailed capacity and number of curtailed hours per border – 2013 and 2014 (MW and hours/year)

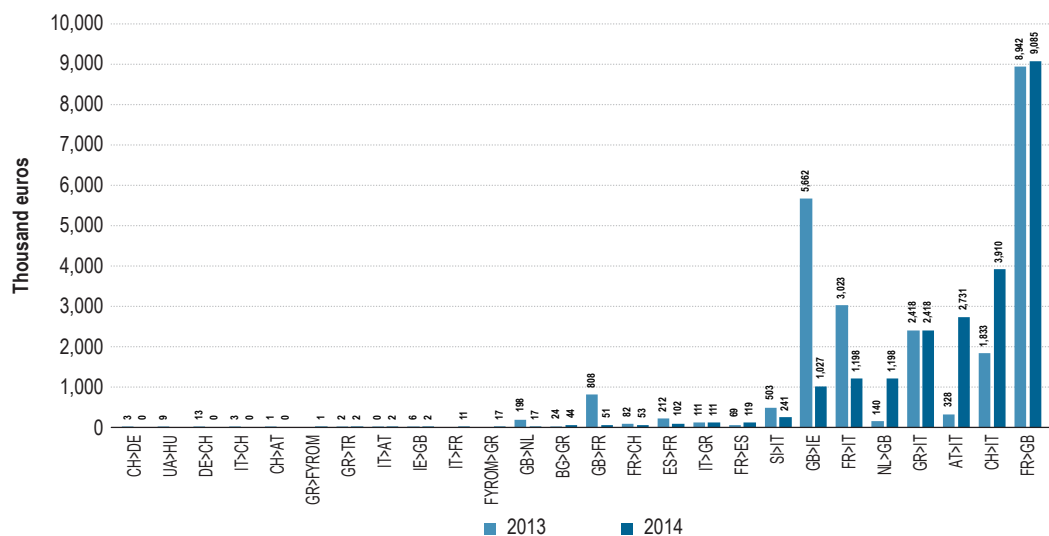


Source: Data provided by NRAs through the ERI questionnaire (2015).

Note: In this figure, 'curtailment' is defined as 'LT capacity curtailment'; it refers to a situation in which the sum of monthly and yearly auctioned capacity is higher in a specific hour than the DA NTC value in the same hour. For some borders, the data provided on the two sides of the borders were not identical; in such cases, average MW capacity curtailed and average number of hours curtailed are reported. Only borders with more than 24 hours of curtailments per year are included. Data for GB-IE refers to the East-West interconnector.

437 Capacity curtailment of Long Term Transmission Rights (LTTR) if implemented by a TSO is followed by a compensation payment paid to the holders of cross-zonal TRs. Compensation schemes across EU borders differ much less than they used to, as common compensation rules for TRs auctioned through CASC and CAO auction offices are used. Most common are either compensation equal to the value of the DA price differential (usually with a cap) or reimbursement equivalent to the original price of the TRs (plus a small premium in some cases). There still remain some borders where no compensation is provided to the holder of TRs. Figure 74 shows the curtailment costs in 2013 and 2014 for a selection of borders.

Figure 74: Total curtailment costs per border – 2013 and 2014 (thousand euros)

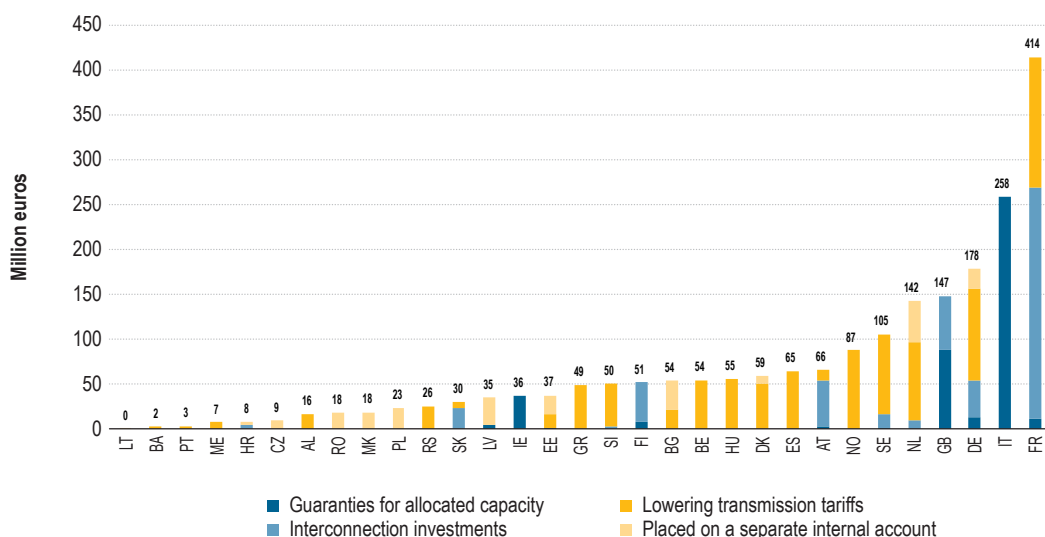


Source: Data provided by NRAs through the ERI questionnaire (2014, 2015) and ACER calculations.

Note: For the borders of CH-AT, ES-FR, FR-ES, FR-CH, FR-GB, GR-IT, IT-GR, SI-IT and GB-FR in 2013 and ES-FR, FR-ES, FR-CH, GR-IT, IT-GR, FR-GB, GB-FR, IT-AT, AT-IT, IT-FR and FR-IT in 2014 the data provided on the two sides of the borders were not identical and average total curtailment costs are reported. Data for GB-IE refers to East-West interconnector.

- 438 On borders linked with HVDC interconnectors, and especially those with sub-sea cables, higher costs relating to cross-border capacity curtailments could be observed, as the duration of curtailments on these borders is usually longer than on borders with HVAC interconnectors. Curtailment costs may also increase significantly on borders with market-spread compensation when the curtailment takes place in hours with a higher price spread between bidding zones compared to the original cross-border capacity auction price paid. Curtailment costs are usually split between the TSOs proportionally to the congestion revenue received by each TSO.
- 439 The total congestion revenue received by TSOs in 2014 increased by 317 million euros, or by almost 16% compared to 2013, and amounted to 2,314 million euros. The highest year-to-year income increase was reported by TSOs in Sweden, Great Britain and France, whereas the highest income decrease was reported by TSOs in Germany, the Netherlands and Italy. Figure 75 shows the total congestion revenues in 2014 and their decomposition, depending on how TSOs spent them.

Figure 75: Congestion revenues – 2014 (million euros)



Source: Data provided by ENTSO-E (2015).

- 440 As already noted, not all the measures and methods used to obtain the data mentioned earlier in this chapter have been unified among TSOs. This might cause slight discrepancies between one country and another. Therefore, more and deeper cooperation is needed among all the involved parties (the Agency, NRAs, TSOs and ENTSO E) in order to improve definitions and ways of collecting data, especially from TSOs, who have the core information. The Transparency Regulation<sup>269</sup> should help to increase transparency with regard to remedial actions applied by the TSOs to ensure efficient cross-border trade.

#### 4.3.2.4 Conclusion

- 441 In line with the findings of the previous MMRs, UFs are a challenge for the further integration of the IEM. Their persistence reduces tradable cross-border capacity, market efficiency and network security. Welfare losses due to UFs calculated with an updated methodology show an increasing trend between 2011 and 2013, whereas a slight decrease is noted in 2014. Despite last year's decrease, social welfare losses amounted to around a billion euros each year, without taking into account any of the under/overestimates listed in paragraph (432). The magnitudes of welfare losses due to LFs and UAFs and their proportions, at around 45% and 55%, respectively, largely confirmed last year's results.
- 442 The calculation of welfare losses caused by UFs was built on the assumption that cross-border capacity loss due to UFs is equal to the volume of forecast UFs and the RM that is associated with the uncertainty

269 Commission Regulation (EU) No 543/2013 of June 2013 on the submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council.

of UFs. In some cases, LFs or UAFs flow in the opposite direction to UFs, which means they induce a positive effect on cross-border capacity.

443 The impact of UAFs can be mitigated with further TSO coordination in capacity calculation (implementation of flow-based methods), while the impact of LFs can be mitigated by improving the bidding zone configuration in the medium term, and by making investments in the transmission network in the longer term. Moreover, the calculated welfare losses due to LFs provide a starting point for developing a short-term solution for addressing the distributional effects of LFs. In the Agency's view, a comprehensive review of bidding zones, leaving open the possibility of redesigning the current system which is mainly based on political borders, could further mitigate inefficiencies due to LFs and hence reduce the true welfare losses caused by the sub-optimal bidding zone configuration. Further, improved transparency should allow data on distortive flows, such as LFs to be tracked. This would provide an important basis for more adequately assessing the welfare impacts of reductions in cross-zonal capacity.

### 4.3.3 Forward markets

444 Forward electricity markets offer (potential) market participants hedging opportunities against short-term (e.g. DA) price uncertainties. Efficient hedging opportunities are important, for example, to facilitate market entry which improves the level of cross-zonal competition. This section reports on the liquidity level of European forward markets (Section 4.3.3.1) and the risk premium paid for the available instruments for cross-border hedging in Europe (Section 4.3.3.2).

445 Different types of participants may expect different benefits from forward markets:

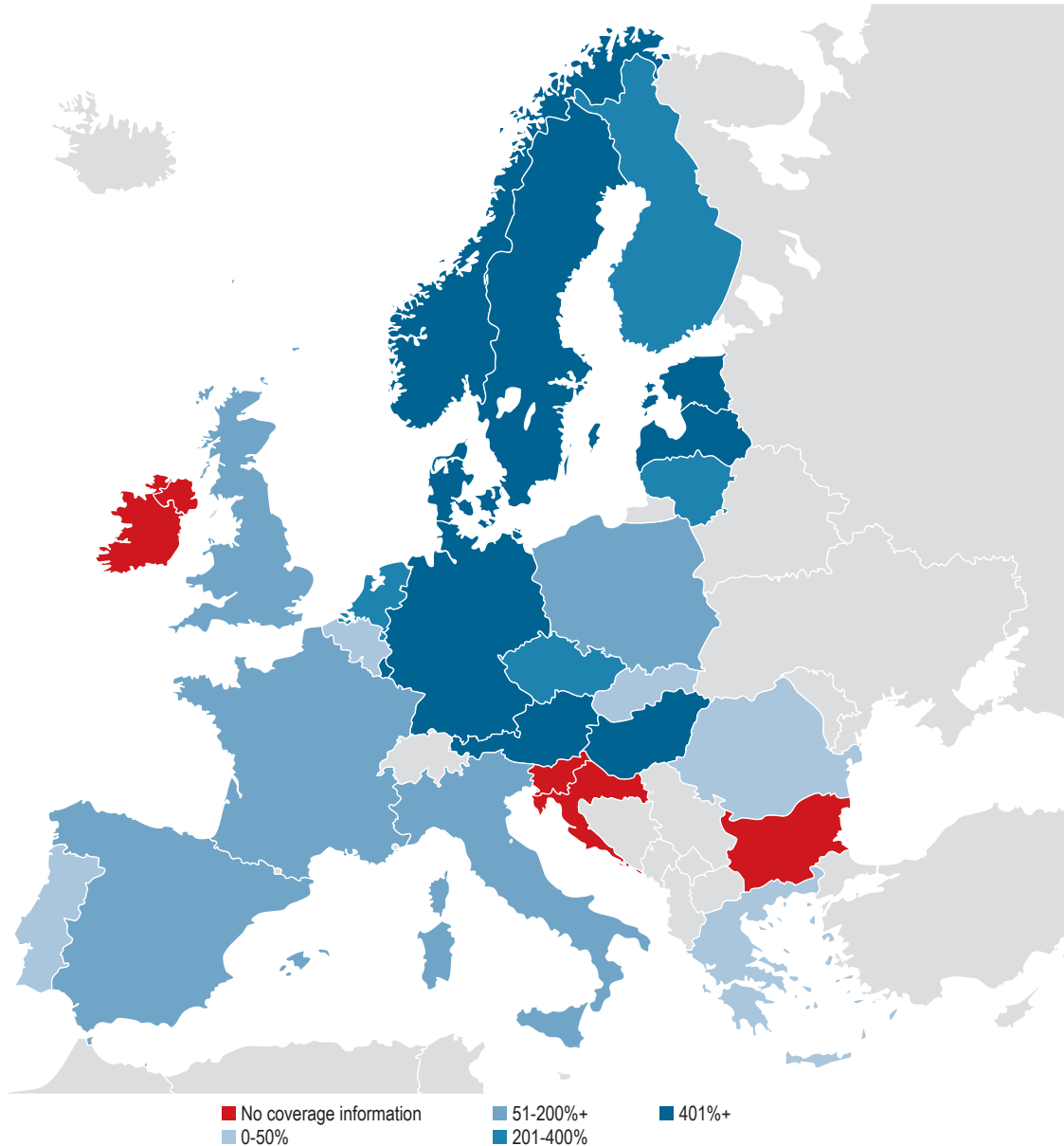
- a) Established players will see forward markets as an additional tool for managing their risk. They usually hold various forms of physical options (including generation units, permanent or semi-permanent customer bases, etc.), which can act as hedging instruments to protect against future price changes;
- b) New entrant generation businesses will be looking to lock long-run prices in to cover for their fixed-cost exposure to investment sunk costs; such players will look for hedging instruments which lock in prices over the investment timeframe (up to 15 years or even more);
- c) New entrant supply businesses will be looking to lock in wholesale prices, for instance up to two years ahead, to match the expected revenues from their projected customers base; and
- d) Commodity traders will see forward energy products as part of a larger risk management portfolio. Their core business is speculation – taking market positions and profit from fluctuations in the price of the underlying assets – and they contribute to the liquidity in forward markets.

#### 4.3.3.1 Liquidity in European forward markets

446 The level of competition and liquidity across forward markets in Europe determines whether market participants are able efficiently to hedge the short-term price risks. A variety of forwards, futures, options, swaps, contracts for differences, etc. have been developed and are traded on various platforms. However, in most markets (with the Nordic market as the main exception), the majority of forward trades are brokered rather than being conducted on exchanges<sup>270</sup>. Additionally to the volumes traded through exchanges and brokers, vertically integrated parties will self-supply, relying on internal hedges to protect their positions. Other parties will engage in longer-term bilateral contracts arranged without support of exchanges or brokers. Therefore, the publicly available information on the volumes traded in forward timeframes does not fully reflect the reality.

447 Based on the results of a study recently commissioned by the Agency<sup>271</sup>, Figure 76 presents the level of liquidity of forward markets in Europe, expressed as a percentage of demand and classified in four groups. The figure displays a large disparity in liquidity for the different European markets.

Figure 76: Approximate forward market volume (traded through exchanges and brokers) as a percentage of demand in Europe – 2014 (%)



Source: *European Electricity Forward Markets and Hedging Products – State of Play and Elements for Monitoring*, Economic Consulting Associates (2015).

448 In the context of a limited number of liquid forward markets in Europe, the cross-border access to these markets becomes particularly important. The cross-border access to forward markets depends on the market design. In Europe, two forward market designs have emerged. The first design, implemented in the Nordic and Baltic countries and within Italy<sup>272</sup>, relies mainly on the market and a variety of products developed through the various market platforms. This design contains a set of hedging contracts for a group of bidding zones, and these contracts are linked to a hub (or system) price, which represents either a physi-

271 *European Electricity Forward Markets and Hedging Products – State of Play and Elements for Monitoring*, Economic Consulting Associates (2015), see [http://www.acer.europa.eu/Electricity/Market%20monitoring/Documents\\_Public/ECA%20Report%20on%20European%20Electricity%20Forward%20Markets.pdf](http://www.acer.europa.eu/Electricity/Market%20monitoring/Documents_Public/ECA%20Report%20on%20European%20Electricity%20Forward%20Markets.pdf).

272 In the case of Italy, there is also a specific role for the TSO, which auctions FTRs.

cally unconstrained DA price, as in the case of the Nordic and Baltic areas, or some sort of an average DA price within this group of zones, as in the case of the Italian area (multi-zone hub). In this design, market participants can hedge the bidding zone price risk by combining a forward product in order to hedge the hub price, with a contract for differences which covers the difference between the hub price and the bidding zone price. Examples of contract for differences are the Electricity Price Area Differentials (EPADs<sup>273</sup>) in the Nordic market or financial TRs (FTRs) within Italy. Contracts for differences are particularly needed when the hub and bidding zone prices are not sufficiently correlated.

- 449 The second design, implemented in nearly all MSs in Continental Europe, is based on a set of hedging contracts for each bidding zone which are linked to the DA clearing price of this bidding zone (single-zone hub). These contracts may be sufficient to hedge the price risk of market participants. However, some market participants located in a given bidding zone may want to use a hedging contract of a neighbouring bidding zone in order to hedge their exposure to risk. This could be a sufficient hedge if prices in the two zones are highly correlated. Otherwise, they would need an additional hedging tool to cover the price differential between the two zones. In this context, the second design gives an additional and specific role to TSOs. They are responsible for calculating LT capacities in a coordinated way and for auctioning (either physical or financial) TRs (PTRs or FTRs), enabling market participants to hedge against the specific risk of short-term zonal price differentials. It is worth mentioning that in Continental Europe the pending establishment of the Single Allocation Platform for allocating LT TRs will replace the current local or regional ones.

#### 4.3.3.2 Risk premiums of cross-border hedging instruments in Europe

- 450 As presented in the 2013 MMR, the consistency of the price of these products and the related DA price differentials can be used to compare the relative performance of the various markets, TRs or EPADs. A measure of this consistency can be provided by the observed ex-post risk premia. This is defined as the difference between the price of the product (TR or EPAD) and the realised delivery-dated spot price differentials, i.e. the expected value or cash flow which a product can deliver to a buyer of the product<sup>274</sup>
- 451 There is no consensus on what an adequate risk premium level should exactly be. High risk premia may be driven by the (high) volatility of prices, but may also be an indication of inefficiencies or of limited competition. It is, however, widely accepted that relatively high (positive or negative) risk premia are a reason for concern, because the associated costs are likely to be borne by end-consumers or may act as a barrier for new suppliers.
- 452 In Europe, largely negative risk premia (i.e. hedging instruments tend to be under-priced) are primarily observed in the case of TRs, and largely positive risk premia are mainly recorded in some cases of EPADs. The respective undesired effects are presented below.
- 453 TRs are issued directly by TSOs (or an entity acting on their behalf) and auctioned for different timeframes (usually yearly and monthly). The revenues from the auctions are allocated to TSOs as part of their congestion rents. When risk premia are largely negative, this reduces TSOs' congestion revenues<sup>275</sup>. This reduction in TSOs' revenues is likely to be socialised and borne by network users through network tariffs.
- 454 EPADs are sold by market participants. Any interested market player may issue a contract for differences in the form of EPADs. The sellers of EPADs are mainly generators, who seek to hedge their revenues, and the buyers are usually suppliers, who aim to hedge their procurement costs, or fairly large consumers buy-

273 EPADs are financial products that allow market participants to hedge against the area price risk, i.e. the risk that the area price differs from the system price when there are constraints in the transmission grid.

274 In theory, ID prices could also be considered in the analysis, as the ID price differentials represent the value of cross-border capacity closer to real time. However, the number of liquid ID markets with reliable ID prices is limited in Europe, so the comparison was made with DA prices.

275 In order to assess this accurately, one would need to perform a counterfactual analysis for a scenario in which all capacity is allocated in DA. If more capacity is allocated in DA, the DA price differentials could decrease and lower congestion revenues. However, in many EU borders, this effect should not be too relevant, as most of the capacity allocated in the long term is not nominated, but offered again in the DA timeframe. This is because most capacity holders do not nominate, but exercise the Sell-It option. For more information on the percentage of nominated long-term capacity, see Appendix 4 at [https://www.entsoe.eu/fileadmin/user\\_upload/\\_library/consultations/Network\\_Code\\_CACM/20120619\\_Educational\\_Paper\\_on\\_Risk\\_Hedging\\_Instruments\\_review5.pdf](https://www.entsoe.eu/fileadmin/user_upload/_library/consultations/Network_Code_CACM/20120619_Educational_Paper_on_Risk_Hedging_Instruments_review5.pdf).



ing their energy in the wholesale market, for the same reason. They both aim to protect themselves from the difference between the bidding zone price (where their generation assets or customers are based) and the system (hub) price. When risk premia are high, they may act as a barrier to independent (including new) suppliers who are not able to compete with the already established market participants (e.g. local incumbents with generation assets in a bidding zone), as it may be too expensive for them to hedge their procurement costs.

- 455 In what follows, the ex-post risk premia for TRs and EPADs are assessed. Since these two groups of products have their own characteristics, the results are presented and discussed separately.

### Risk premia of transmission rights

- 456 When calculating risk premia for TRs, the following aspects need to be considered. First, a sufficient number of observations per product is necessary. Second, the products must feature similar times-to-maturity<sup>276</sup>. In the analysis, monthly products were used, as they meet these two characteristics. Third, the nature of the different products needs to be carefully considered. PTRs are usually issued in the form of options. This implies that only the positive DA price differentials are part of the expected and realised cash flows. When the price differentials are negative, the option is not executed and the cash-flow is zero. However, TRs in the form of obligations can yield either positive or negative cash flows depending on price differentials. Finally, the unavailability periods need to be removed from the sample (the buyer neither pays nor holds any cash-flow rights for that period).
- 457 Table 14 presents risk premia for the different TRs traded in Europe from 2009 to 2014. It shows that, on most borders, PTR auction prices are on average below the recorded DA price spreads.

Table 14: Discrepancies between the auction price of TRs (monthly auctions) and the DA price spreads for a selection of EU borders – indicated periods (euros/MWh)

Border-direction	DA CB allocation	Period analysed	Average-auction price (euros/MWh)	Average price spread (euros/MWh)	Ex-post risk premium	Ratio lost revenues due to lack full firmness/CB Nominations
GR>IT	Explicit	2012-2014	5.7	16.7	-10.9	2.94
FR>IT	Explicit	2011-2014	15.8	20.0	-4.2	0.03
CH>IT	Explicit	2011-2014	12.3	15.9	-3.6	0.12
AT>HU	Explicit	2011-2014	5.6	9.1	-3.5	0.00
IT>GR	Explicit	2012-2014	0.4	3.8	-3.4	3.99
AT>SI	Explicit	2011-2014	5.8	9.0	-3.2	0.00
AT>IT	Explicit	2012-2014	19.7	22.9	-3.2	-0.06
FR>ES	Implicit (1)	2014	12.0	15.1	-3.1	0.00
PL>SK	Explicit	2011-2014	2.0	3.8	-1.8	0.09
AT>CZ	Explicit	2011-2014	0.0	1.8	-1.8	0.00
PL>CZ	Explicit	2011-2014	1.7	3.4	-1.8	0.00
DE>CZ	Explicit	2011-2014	0.1	1.7	-1.6	0.00
CZ>AT	Explicit	2011-2014	0.8	2.3	-1.5	0.00
CZ>DE	Explicit	2011-2014	0.7	2.1	-1.4	0.00
SK>HU	Implicit	2011-2014	4.7	6.1	-1.3	0.00
PL>DE	Explicit	2011-2014	2.8	4.1	-1.2	0.00
DE>NL	Implicit	2009-2014	4.9	6.1	-1.2	0.00
DK1>DE	Implicit	2011-2014	3.0	4.2	-1.1	0.00
HU>AT	Explicit	2011-2014	0.4	1.4	-1.0	0.00
CH>AT	Explicit	2011-2014	0.0	1.0	-1.0	0.00
CH>DE	Explicit	2011-2014	0.1	1.0	-0.9	0.00
SI>AT	Explicit	2011-2014	0.1	1.0	-0.9	0.00
DK2>DE	Implicit	2014	2.1	2.8	-0.7	0.00
BE>NL	Implicit	2009-2014	2.0	2.6	-0.6	0.00
DE>CH	Explicit	2011-2014	6.2	6.8	-0.6	0.00
AT>CH	Explicit	2011-2014	6.2	6.8	-0.6	0.00

276 Time to maturity is defined as the remaining life of a debt instrument. Usually, different times to maturity imply the different risk premiums that are requested by the buyers of a debt instrument.

Border-direction	DA CB allocation	Period analysed	Average auction price (euros/MWh)	Average price spread (euros/MWh)	Ex-post risk premium	Ratio lost revenues due to lack full firmness/CB Nominations
HU>SK	Implicit	2011-2014	0.1	0.5	-0.4	0.00
SI>IT	Implicit	2011-2014	14.1	14.5	-0.4	0.03
FR>DE	Implicit	2009-2014	1.2	1.5	-0.4	0.00
IT>FR	Explicit	2011-2014	0.3	0.6	-0.3	0.00
ES>PT	Implicit	2014	0.1	0.4	-0.2	0.00
NL>DE	Implicit	2009-2014	0.2	0.3	-0.2	0.00
BE>FR	Implicit	2009-2014	1.1	1.2	-0.1	0.00
DE>DK1	Implicit	2011-2014	1.1	1.2	-0.1	0.00
IT>CH	Explicit	2013-2014	0.1	0.1	-0.1	0.00
FR>BE	Implicit	2009-2014	2.0	2.0	-0.1	0.00
ES>FR	Implicit (1)	2014,0	1.7	1.7	0.0	-0.02
IT>AT	Explicit	2012-2014	0.1	0.1	0.0	0.04
DE>FR	Implicit	2009-2014	4.3	4.3	0.0	0.00
PT>ES	Implicit	2014	0.2	0.1	0.1	0.00
IT>SI	Implicit	2011-2014	0.2	0.0	0.2	0.00
NL>BE	Implicit	2009-2014	1.4	1.0	0.4	0.00
DE>DK2	Implicit	2014	2.9	2.1	0.8	0.00

Source: CAO, CASC and Platts (2015) and ACER calculations.

Note 1: The analysis covers the periods indicated for each border. The average auction price is the average value of all monthly auctions in the period. The average price spread is the average difference of DA prices for all the hours when the price differential was in the economic direction (otherwise, the value taken is zero, since the analysed PTRs are options). For the average price differential, the hours during unavailability periods are excluded. The ex-post risk premium is the difference between the two previous columns.

Note 2: The last column represents the impact of a lack of full firmness in the actual cash flows that the product can deliver. It is calculated as the difference between the compensation received by a holder of a TR and its theoretical value based on DA price spreads, evaluated for the hours of curtailment of cross-border capacity. In order to improve comparability across borders, the values are presented as "lost revenues" per MW of nominated capacity.

Note 3: On the Spanish-French border, market coupling was launched in May 2014. On the Spanish-Portuguese market, the values are based on the results of the quarterly auctions of FTRs.

458 The systematic undervaluation of TRs compared to price differentials can be explained by several factors. First, the result of the auction depends on the perceived economic value of the product for the different market participants who buy TRs. Participants with physical assets can be seeking to hedge their physical portfolio, i.e. to lock-in their stream of revenues (generators) or procurement costs (suppliers). Some may be willing to pay a premium on top of the expected DA price differential. This could be the case of a supplier buying a forward in market A and a TR from market A to market B in order to hedge against the procurement costs for its supply in market B. In a market dominated by such participants, positive risk premiums could be expected.

459 However, other participants<sup>277</sup>, such as speculative traders, may perceive the product as an opportunity to benefit from the difference between the auction price and the expected cash flows that the product can deliver<sup>278</sup>. The maximum price these traders are prepared<sup>278</sup> to pay is obviously below this expected cash flow. If most buyers of TRs are (or act as) speculative traders, then the price of TRs will tend to be systematically lower than the market estimate of the expected value. Essentially, those participants would be providing a hedge for TSO's congestion revenues<sup>279</sup>. If the expected cash flow could be observed, the difference between the TR price and the expected cash-flow can be defined as the risk premium the TSO must pay because of the requirement to auction TRs. As the observed risk premiums are negative, this may indicate that the offered amount of TRs exceeds their actual demand from fundamental market participants (generators, suppliers and consumers) or that the characteristic of the products being offered do not fully meet their needs and that a significant share of TRs are used for speculative trading. Further investigation is required.

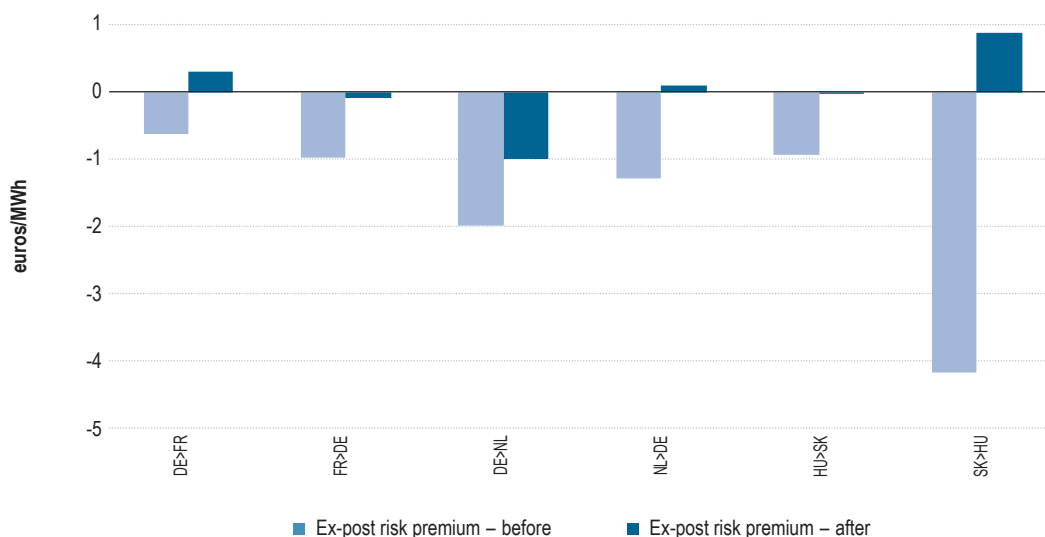
277 This may include market participants with or without generation assets or supply obligations.

278 This is due to the Use-or-Sell-It (UIOSI) condition. UIOSI means an automatic application whereby the underlying capacity of the non-nominated PTRs is made available for DA cross-zonal capacity allocation and whereby PTR holders that do not nominate to use their rights receive a pay-out corresponding to any positive (usually DA) market spread.

279 Speculative traders can provide a hedge for TSO's congestion revenues, as they guarantee a fixed TSO's rent equal to the expected (DA) congestion revenues, less a risk premium.

- 460 Second, the value of TRs is related to the perceived uncertainty of the associated cash flows. This relates mainly to the level of firmness of the product, i.e. the amount of compensation received by the TR holder in the case of a curtailment of the allocated cross-border capacity. The usual practice in Europe, in the event of curtailments<sup>280</sup>, is for market participants to be compensated with an amount based on what they have paid for the product (i.e. the auction price or the auction price plus a small premium) or based on the actual DA price spread, usually with a cap. Full firmness, i.e. compensation that equals the DA price differential, is not a common practice. This creates some uncertainty in the expected cash flows for market participants, reducing their estimate of the value of the TR.
- 461 When the probability of curtailment is higher, the impact of the lack of full firmness on the price of the TR becomes more evident. The last column in Table 14 shows the capacity holder’s revenue losses due to curtailments per border (for the calculation methodology, see note below Table 14). It suggests that on borders with the highest level of ‘lost revenues’ due to curtailments, the largest risk premia are observed, which confirms the existing correlation between the two variables, i.e. that market participants are willing to pay a lower or negative premium when some curtailments can be expected and they are not fully compensated for that. However, the scale of risk premia is frequently higher than the ‘loss’ caused by curtailments, which suggests that there are additional factors determining the magnitude of risk premia.
- 462 The presence (or lack) of market coupling also plays an important role through uncertainty. On borders where market coupling is applied, the assessed risk premia reflect the expected gross profits of a TR holder, since the latter can decide at any moment to exercise the ‘Sell-it’ option and receive the positive DA price spread. On borders without market coupling, the TR owner is faced with additional uncertainties<sup>281</sup>. The results in Table 14 show that on borders where market coupling is applied, the risk premia are lower, suggesting that market coupling portrays efficiency benefits in this regard.
- 463 Further to the evidence provided in Table 14, Figure 77 shows that on borders where market coupling has been implemented, the average risk premia are considerably lower following the implementation of market coupling.

Figure 77: Discrepancies between the auction price of PTRs (monthly auctions) and the DA price spreads, before and after market coupling, for a selection of EU borders – various periods (euros/MWh)



Source: CAO, CASC and Platts (2015) and ACER calculations.

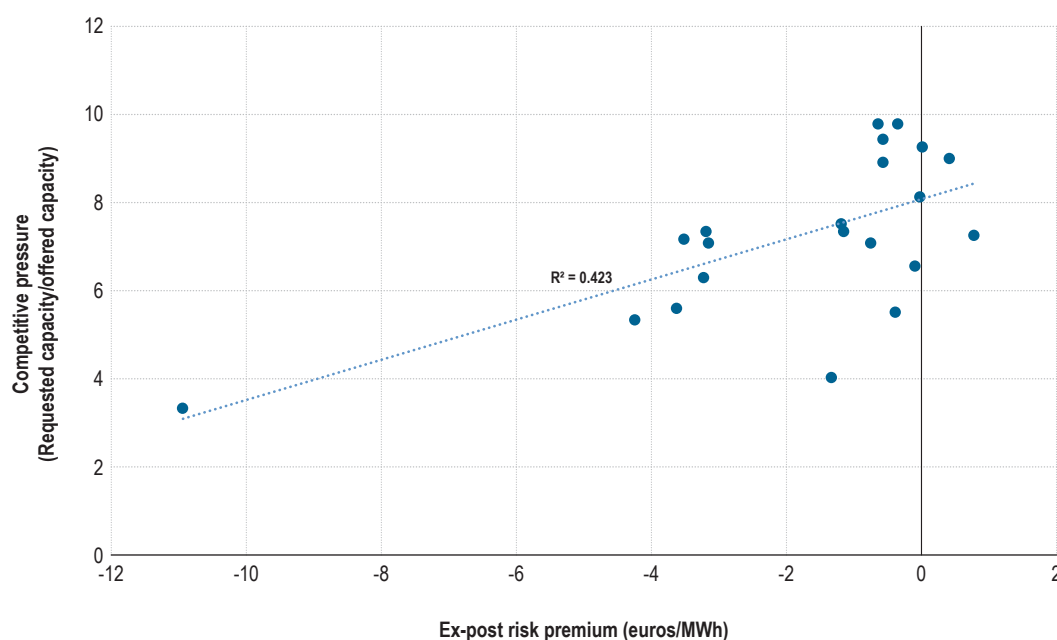
Note: The ‘ex-post risk premium-before’ is calculated as the average risk premiums for the months before market coupling was implemented on a border (e.g. up to November 2010 for the German borders with France and the Netherlands and up to September 2012 for the Hungarian-Slovakian border). The ‘ex-post risk premium-after’ is calculated as the average risk premiums for the period after market coupling and up to December 2014.

280 See section 4.3.2.3 for more details on capacity curtailments.

281 On borders with explicit auctions, a capacity holder faces two additional risks. First, if it decides to use the capacity, it could nominate in the wrong direction and would make a loss equal to the negative price spread. Second, if it decides to use the sell-it option, it would receive the price of the daily cross-border capacity auction, which may be different from the actual DA price differentials. One would also need to estimate the losses incurred due to these factors in order to estimate the true profits from arbitrage.

464 Third, the level of competition in the auctioning of TRs is an important explanatory factor of the size of risk premia. Usually, the level of competition depends on the number of market participants both on the supply and the demand side. In the case of TRs, supply is characterised by the inelastic offer of a single supplier, usually the TSO. Therefore, the level of competition depends exclusively on the existing demand compared to the offered rights. When the demand for TRs is high compared to the offered capacity, this should contribute to a better alignment of the auction price with the expected cash flows (hence reducing the risk premium a TSO would pay for hedging its congestion revenues). This reduction increases congestion revenues and may contribute to reducing network tariffs. Figure 78 confirms this assumption, suggesting a moderate correlation (factor 0.65) between the level of competition in the auction (measured as the ratio between the volume of bids and the offered capacity) and the observed risk premia.

Figure 78: Relation between the ratio of requested/offered capacity and risk premia for a selection of TRs in Europe – 2009–2014 (euros/MWh)



Source: CAO, CASC and Platts (2015) and ACER calculations.

Note: The observations represent the average risk premia of the monthly auctions and the ratio between total requested and total offered capacity in the assessed period. Only those TRs with an average auction price above one euro/MWh and with a ratio between requested and offered capacity above one are included in the sample.

465 Fourth, the profile of certain offered products can influence the level of demand for these products. On some borders (e.g. on the Northern Italian borders), in order to maximise the amount of TRs offered to the market, the profiles of monthly products are frequently irregular compared to e.g. standard baseload profiles. This reflects the fact that the cross-border capacity on the Northern Italian borders is often (totally or partially) unavailable during a fragment of the trading period. This could undermine the attractiveness of the product, as market participants need to find alternatives to fully cover their risks during periods of unavailability. According to the Italian NRA, this aspect may indeed represent the most important element factored in by market participants when bidding at a discount with respect to the expected market spread.

466 Lastly, the presence of transaction costs impacts the observed risk premia, as they are naturally incorporated into the bids. These costs may include clearing fees, bank guarantees, upfront payments and explicit charges for importing energy. For example, in the past, importing traders to Italy – as well as any conventional producer connected to the Italian network – were subject to the obligation of buying green certificates. The related costs were likely to be factored into the bids to procure TRs, reducing the value of the product compared to the expected price differential. The obligation to buy green certificates was applied only to volumes above a 100 GWh threshold. As a consequence, the vast majority of traders procuring TRs on the Italian borders decided to split procurement into two or more different companies to elude the green certificate obligation. This company split is likely to have induced some administrative costs that

were factored in the bids for PTRs. Other causes of inefficiency, e.g. insufficient liquidity in forward energy markets, may be less obvious. The nature and magnitude of the costs associated to these inefficiencies can differ significantly per border and should be investigated further.

467 Some of the inefficiencies in the auctioning of TRs can be avoided. This includes the implementation of market coupling and of a stronger firmness regime. Some other costs need to be identified and further reduced or eliminated. Moreover, where risk premia remain largely negative after applying those measures, it would be advisable to adjust the products offered by TSOs to the hedging needs of market participants.

### Risk premiums of EPADs

468 A similar risk premium analysis was performed for the EPADs that are traded in the Nordic market. Even though EPADs are offered in different timeframes, only the analysis of monthly products was performed due to the TR-related reasons presented above.

469 For the purpose of this analysis, EPADs were valued at the volume-weighted average of the (Nasdaq OMX) closing prices during the trading period<sup>282</sup>. This average price was compared with the price differential between the system price and the relevant bidding zone's price. As with the TRs, the difference between the two values was considered to be the risk premium of EPADs.

470 Table 15 shows the risk premium for these products for the different bidding zones where they are offered. It shows that risk premia are positive in most cases. The sign of the premia depends on how much the demand exceeds the supply for hedging<sup>283</sup>. The supply and demand for EPAD-contracts is usually dependent on the market participants' expectations about future electricity prices. In the Nordic market, this is driven, among other factors, by hydrologic forecasts and the expected availability of cross-border transmission capacities. The absolute value of the risk premia can be similarly explained by market fundamentals, e.g. it may reflect a higher volatility of price differentials, but can also be an indication of low liquidity and limited competition for these products. In some cases (e.g. in Sweden 4 and Denmark East) these risk premia are almost two times higher than the average risk premia in the region.

Table 15: Discrepancies between the price of EPADs (monthly products) and the DA price spreads between the system price and the relevant price in the area – 2011–2014 (euros/MWh)

Bidding area	Sample size (number of monthly products)	Average EPAD price (euros/MWh)	Average dif SYS-BA price (euros/MWh)	Average risk premium (euros/MWh)	Period
SE-4	38	4,7	2,5	2,2	2011–2014
DK_E	48	4,9	3,2	1,7	2011–2014
SE/SE-3	48	2,9	1,3	1,6	2011–2014
NO-1	48	0,2	-1,3	1,4	2011–2014
FI	48	5,5	4,3	1,2	2011–2014
DK_W	48	3,0	2,0	1,0	2011–2014
EE	24	5,0	4,3	0,7	2013–2014
SE-1	38	1,4	1,1	0,3	2011–2014
NO-4	24	0,9	0,7	0,2	2013–2014
SE-2	38	1,3	1,1	0,2	2011–2014

Source: CAO, CASC and Platts (2015) and ACER calculations.

282 EPADs are continuously traded for 45 days or more before delivery, as opposed to TRs, which are auctioned, usually only once.

283 For example, a study by Petr Spodniak et al (2014) found several examples of negative risk premiums in the Nordic EPAD- market (e.g. for the Oslo and Helsinki area), covering the period 2000–2013 with both yearly, monthly and quarterly contracts. See [http://tiger-forum.com/Media/speakers/abstract/261405pm/petr\\_spodniak.pdf](http://tiger-forum.com/Media/speakers/abstract/261405pm/petr_spodniak.pdf).

- 471 As explained above, high positive risk premia should be a reason for concern from a competition perspective, as they may act as a barrier to new suppliers entering the market<sup>284</sup>. In a recent report<sup>285</sup>, the Swedish NRA (Ei) assessed the performance of electricity markets in Sweden, which has been intensively debated since the division of the market into four bidding zones as of 1 November 2011. After assessing the spot and the future (financial) markets, the report concludes that the overall competition in the wholesale Swedish market remained unchanged after the introduction of the bidding zones, in spite of some concerns expressed about the functioning of the markets where EPAD contracts are traded.
- 472 The relatively high risk premia in bidding zone 4 in Sweden (Sweden 4) are partly explained by the high concentration of baseload generation capacity in that area. This means that it is only for a relatively small part of the generation potential that the actors in Sweden 4 have the financial security to issue EPAD contracts, which results in a more concentrated seller side of EPADs in the affected areas<sup>286</sup>. Furthermore, the decreasing demand in recent years has increased the relative weight of importing capacity to Sweden 4 (from Sweden 3) and hence lowered the price area risk. Failing to anticipate this change might have contributed to higher risk premia for the EPAD contracts (particularly at the end of 2011 and during 2012), while a decreasing trend in risk premia has been observed since 2013.
- 473 The upcoming draft Guideline on Forward Capacity Allocation will regulate the conditions under which financial markets are considered as sufficiently efficient to offer the involved parties the opportunities for the area price hedging that they need. In this context, the view of Ei is that the development of the EPADs' market should be studied and evaluated further and that it might be too early to suggest additional measures in order to offload risk from market participants. In the future, if liquidity remains weak, different solutions (e.g. by giving additional roles to TSOs such as acting as or supporting market makers) may need to be explored.

#### 4.3.3.3 Conclusion

- 474 In conclusion, the monitoring results on forward markets show that the various cross-border hedging tools in Europe present different challenges. TRs (mainly physical, PTRs) are usually priced below the actual price differentials. This is largely due to the nature of the product; profit-maximising speculative traders will always bid below the expected cash flows originating from the TR. Large negative risk premia (such as, for example, on the Italian borders with Greece, France and Switzerland and on the border between Austria and Hungary) can be considered as an undesirable outcome, as they are inefficient. The magnitude of the negative risk premia is impacted by the uncertainty (risk exposure) in the expected cash flows for market participants, as this in turn reduces their estimate of the value of the TR. The Report shows that market coupling contributes to reducing uncertainty (hence the magnitude of risk premia) and indicates that stronger firmness regime may also contribute to their reduction. Furthermore, there are indications that the presence of irregular profiles of TRs on particular borders (e.g. on the Northern Italian ones) may be a relevant driver of large risk premia. Some other causes of inefficiency may be less obvious (e.g. liquidity of forward energy markets) and need to be investigated further on a border-by-border basis. Finally, the magnitude of risk premia can be reduced by improving competition in the auctioning of TRs, for example by adjusting the products offered by TSOs to the hedging needs of market participants.

284 However, they could also act as an incentive for new generators which would enter the market and would contribute to increasing competition and liquidity in the supply of EPADs over time. This, in turn, would lower the observed risk premiums in the long-run.

285 EPADs are usually sold by generators who are in the relevant area and are willing to hedge their revenues. In exchange, they are requested to make a payment equal to the actual difference between the price of the area and the system price. If the realised price differential is lower than expected, the transaction will be particularly profitable for them. If the realised price differential is higher than expected, they will generate enough revenues from the DA market to fulfil their pay-off obligations. However, this may not hold for all type of generators. Some renewable generators (e.g. from wind) may not be producing during peak hours (when the price differentials are typically higher than on average). As a consequence, such renewable generators are not protected against higher than expected price differentials and are unlikely to be interested in selling EPADs.

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475 EPADs in the Nordic and Baltic markets are usually traded with a positive risk premium compared to the price spread between the system and the area price. In some cases (such as in Sweden 4 and Denmark East), high risk premiums are observed. They may act as a barrier to new suppliers, as it may be too expensive for them to hedge their procurement costs. The cases of high risk premiums are associated with low liquidity and a highly concentrated supply of EPADs in the affected areas. The limited liquidity and competition in the supply of EPADs requires further monitoring, and where liquidity remains weak, different solutions (e.g. giving additional roles to TSOs, such as acting as or supporting market makers) need to be explored.

#### 4.3.4 DA markets

476 DA markets are considered the most developed timeframe for trade across borders. In line with the last year's MMR, this section presents the level of price convergence mainly at regional level and the key factors impacting price convergence (Section 4.3.4.1), the progress of implementing market coupling (Section 4.3.4.2) and the gross welfare benefits of the incremental expansion of interconnectors (Section 4.3.4.3).

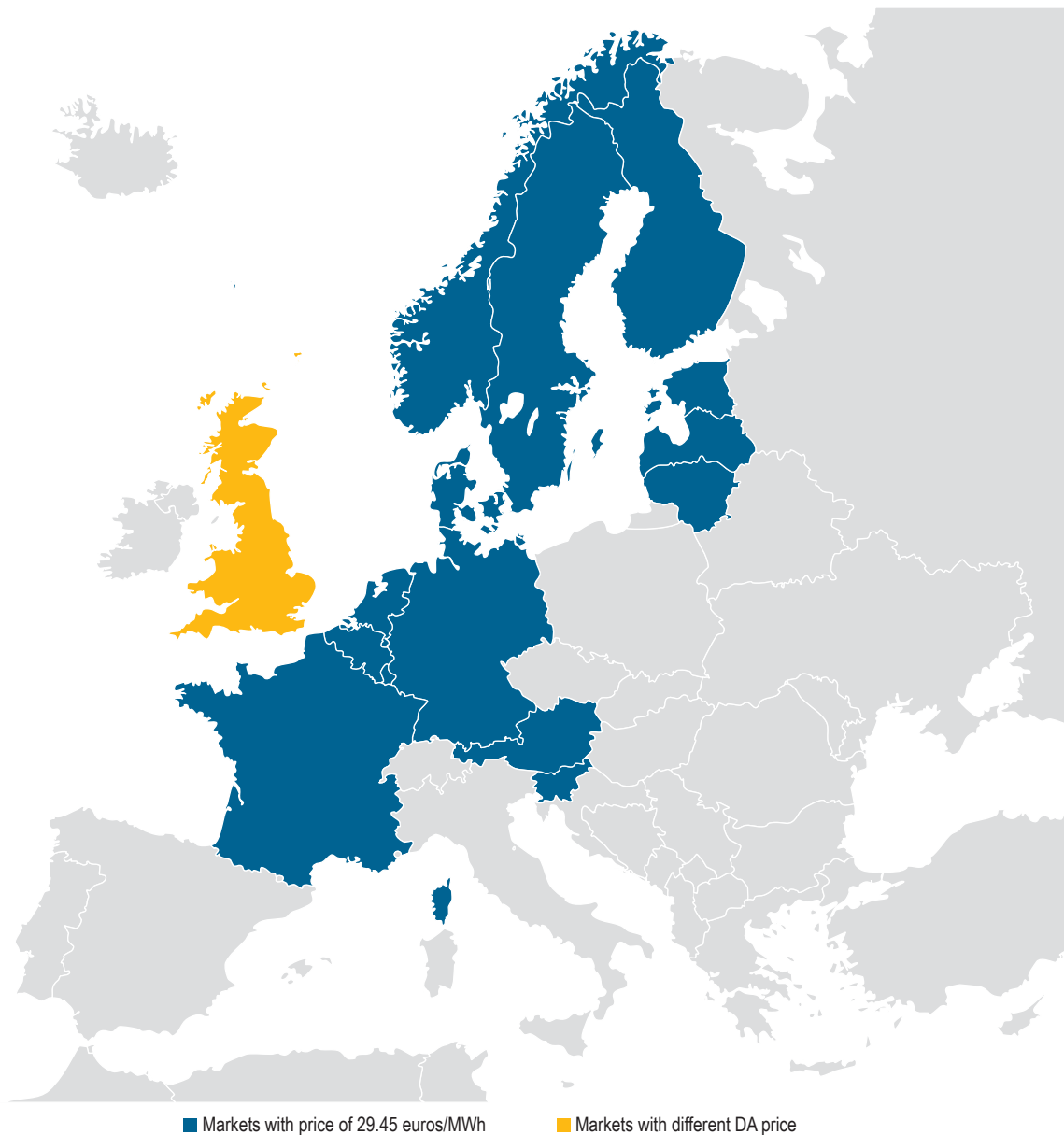
##### 4.3.4.1 DA price convergence

477 This section focuses on the price convergence of DA markets within and across different regions<sup>287</sup>. The convergence of wholesale electricity prices can be regarded as an indicator of market integration, even though the optimal level of market integration does not necessarily requires full price convergence.

478 The launch of price coupling in NWE, its extension to the SWE region in 2014 and to the Italy-Slovenia border in 2015 is expected progressively to enhance price convergence over the next few years. It is to be noted that this project will mainly improve price convergence across different regions and not necessarily within regions, as borders within the regions participating in the NWE project have already been coupled for some years. An illustrative example of the potential contribution of the NWE project to price convergence is represented in Figure 79, showing a strong price convergence recorded on 11 February, hour 3, when the NWE region witnessed one hour with only two price areas. The price for all the NWE countries (comprising 19 bidding zones), except Great Britain, was 29.45 euros/MWh.

287 For the purpose of the analysis, countries were grouped into regions, defined in accordance with Annex I of Regulation (EC) No 714/2009 (OJ L 211, 14/8/2009), with some slight modifications to facilitate the analysis of price convergence. Therefore, the definition applied in this section is as follows: the Baltic region (Estonia, Latvia and Lithuania), the CEE region (the Czech Republic, Hungary, Poland and Slovakia), the CSE region (Greece, Italy, Slovenia and Switzerland), the CWE region (Belgium, France, Germany, and the Netherlands), the F-UK-I region (United Kingdom and the Republic of Ireland), Nordic (Denmark, Finland, Norway and Sweden) and the SWE region (Portugal and Spain).

Figure 79: Markets with equal DA wholesale prices in NWE countries – hour three on 11 February 2014 (euros/MWh)



Source: EMOS, Platts, PXs and data provided by NRAs through the ERI (2015).

479 The remaining of this section explains the reasons for the most relevant changes in price convergence recorded in 2014, both within and across regions.

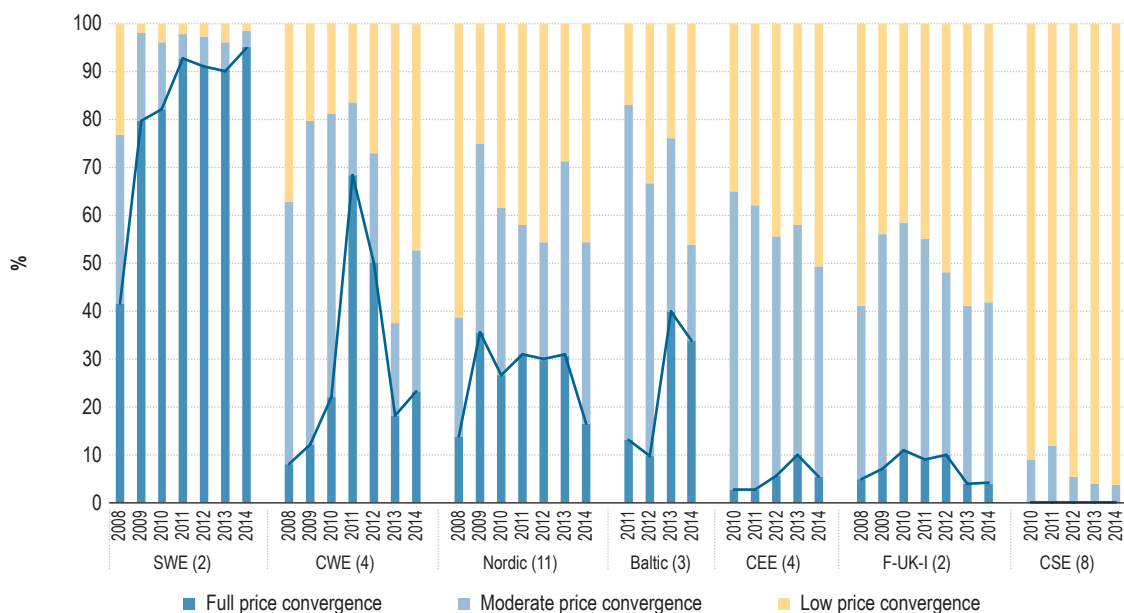
### DA price convergence within regions

480 Figure 80 provides an overview of the development of hourly price convergence<sup>288</sup> within EU regions from 2008 to 2014.

288 The level of price convergence is calculated by using the recorded price differentials. These are calculated as the hourly difference between the maximum and minimum price of the assessed bidding zone prices. The results are presented as a percentage of all hours in three categories: the number of hours with a price differential: (i) of less than 1 euro/MWh (i.e. 'full price convergence'); (ii) from 1 to 10 euros/MWh (i.e. 'moderate price convergence'), and (iii) of more than 10 euros/MWh (i.e. 'low price convergence'). Note that the results are affected by the number of bidding zones in a given region (i.e. price convergence is easier to achieve in regions with fewer bidding zones).



Figure 80: DA price convergence in Europe by region (ranked) – 2008–2014 (% of hours)



Source: EMOS, Platts, PXs and data provided by NRAs through the ERI (2015) and ACER calculations.

Note: The numbers in brackets refer to the number of bidding zones per region included in the calculations.

481 In 2014, the SWE and CWE regions experienced a slight increase in price convergence (95% and 23% in 2014 compared to 90% and 18% in 2013, respectively). The most significant decline in price convergence was observed in the Nordic region, with a drop of 14% (17% in 2014 compared to 31% in 2013). In the Baltic and the CEE regions, a price convergence decrease of 6% and 5%, respectively, was observed in 2014 compared to 2013. In the F-UK-I region, price convergence remained essentially unchanged, while it remained virtually non-existent in the CSE region.

### CWE Region

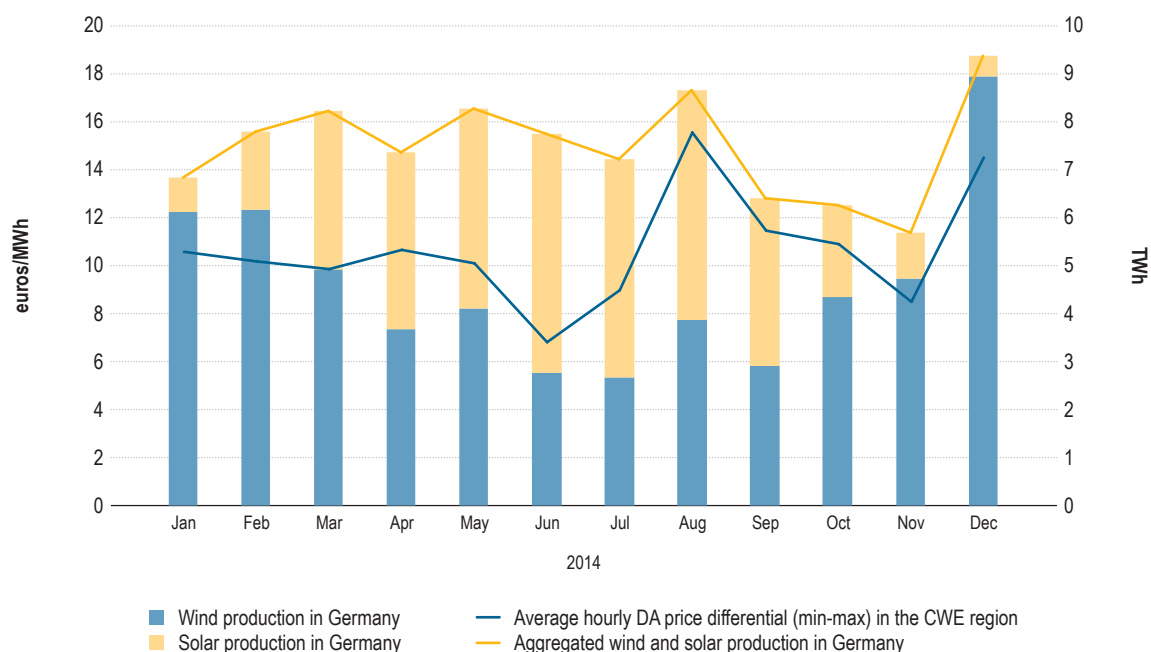
482 Compared to 2013, price convergence increased significantly in the CWE region during the first half of 2014. This is explained by the decrease in gas prices in the first half of 2014, which drove wholesale electricity prices down in the Netherlands and contributed to more frequent price convergence within the region. However, price convergence decreased significantly in the second half of 2014. This can be explained by a combination of factors.

483 First, gas prices started to rise at the beginning of autumn 2014. This contributed to the increase in the Dutch electricity prices<sup>289</sup>. Second, in Belgium, three nuclear reactors, accounting for 3 GW (around one quarter of the total generation capacity of the country) were offline for several months, due to which Belgian prices rose during the second half of 2014. Third, the increasing share of wind and solar power in Germany continued to drive German wholesale prices down in 2014, more than elsewhere in the region. All these elements caused high price spreads in the region in the second half of 2014. Figure 81 shows the correlation between price differentials in the CWE region and aggregated solar and wind generation in Germany. The correlation was particularly strong in the second half of 2014<sup>290</sup>.

289 In the Netherlands, gas-fired power plants account for around 70% of installed capacity.

290 The correlation coefficient was 0.49 for the whole of 2014 and 0.83 for the second half of 2014.

Figure 81: Monthly aggregated wind and solar production in Germany compared to price differentials in the CWE region – 2014 (euros/MWh and TWh)



Source: EMOS, Platts, ENTSO-E (2015) and ACER calculations.

Note: The price differentials are calculated as the hourly difference between the maximum and minimum price of the bidding zones of the CWE region. In 2014, the lowest price was recorded in Germany for around 83% of the hours in 2014.

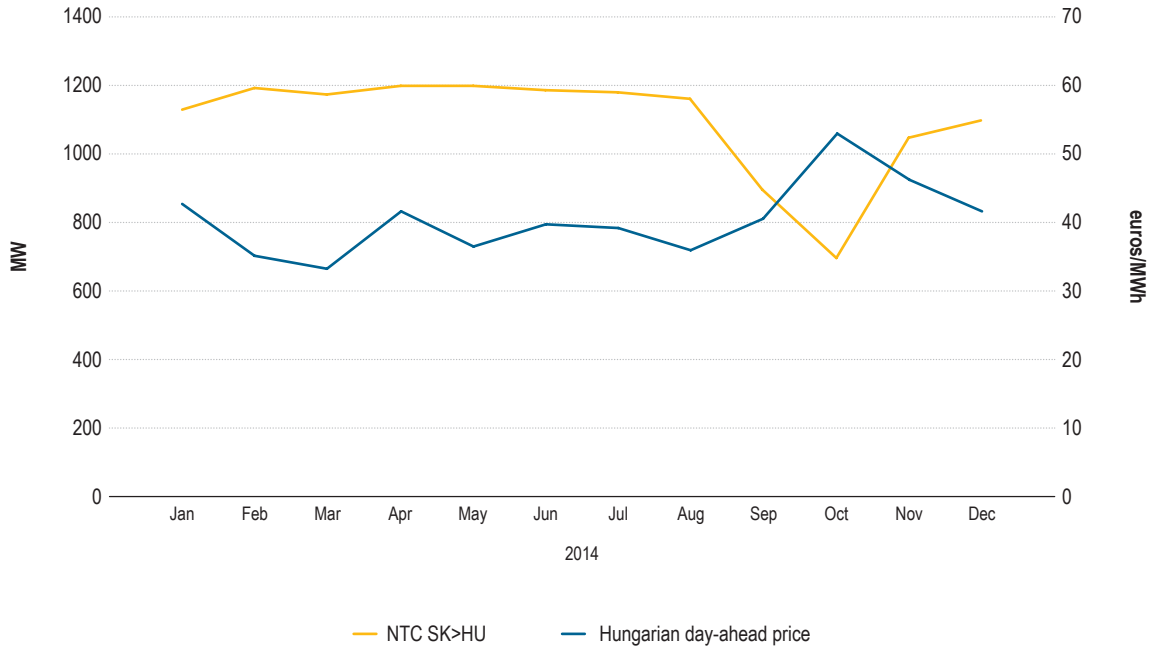
## Nordic Region

484 In 2014, price convergence in the Nordic market was lower than in 2013. The reduced price convergence was mostly caused by the decoupling of the Finnish prices from (lower) prices in neighbouring zones. Excepting Finland, average prices in the Nordic bidding zones were around 30 euros/MWh (or even below) in 2014. This was caused by warmer weather, reduced consumption and hydro reservoirs above normal levels in 2014. Instead, Finnish prices continued to be affected by reduced imports from Russia during peak-demand hours. Until 2011, imports from Russia played a crucial role in fulfilling the peak demand in Finland. Since the introduction of a CRM in Russia during peak hours, designed to support the development of new generation, the cross-border trade from Russia has significantly decreased (the utilisation rate of the interconnector dropped from 100% in 2010 to 33% in 2014). As a consequence, imports from Russian during those hours are replaced by more expensive gas- and oil-based generation in Finland.

## CEE Region

485 Price convergence in the CEE region decreased from 10% in 2013 to 5% in 2014. This was mainly due to the increasing electricity wholesale prices in Poland and Hungary as opposed to the Czech and Slovakian prices, which continued to fall. In Poland, the increase in electricity prices was caused by prolonged outages at some of the country's biggest electricity plants (including a 858 MW unit at Bełchatów Power Station) in combination with the steadily decreasing aggregated import capacity from Germany, Slovakia and the Czech Republic which was made available to the market (see Section 4.3.2 on the impact of UFs on cross-zonal capacity for the reasons for this decrease). In addition, the relative isolation of the Polish electricity market increases the risk of local generators exerting market power, which might contribute to raising Polish wholesale prices further. The Hungarian electricity price increase was also affected by the reduced import capacity from Slovakia, particularly in October, when the effect of limited available cross-border capacity on Hungarian prices was sharper on that border (see Figure 82).

Figure 82: Monthly average available cross-border capacity (NTC) from Slovakia to Hungary and Hungarian wholesale electricity prices – 2014 (MW and euros/MWh)

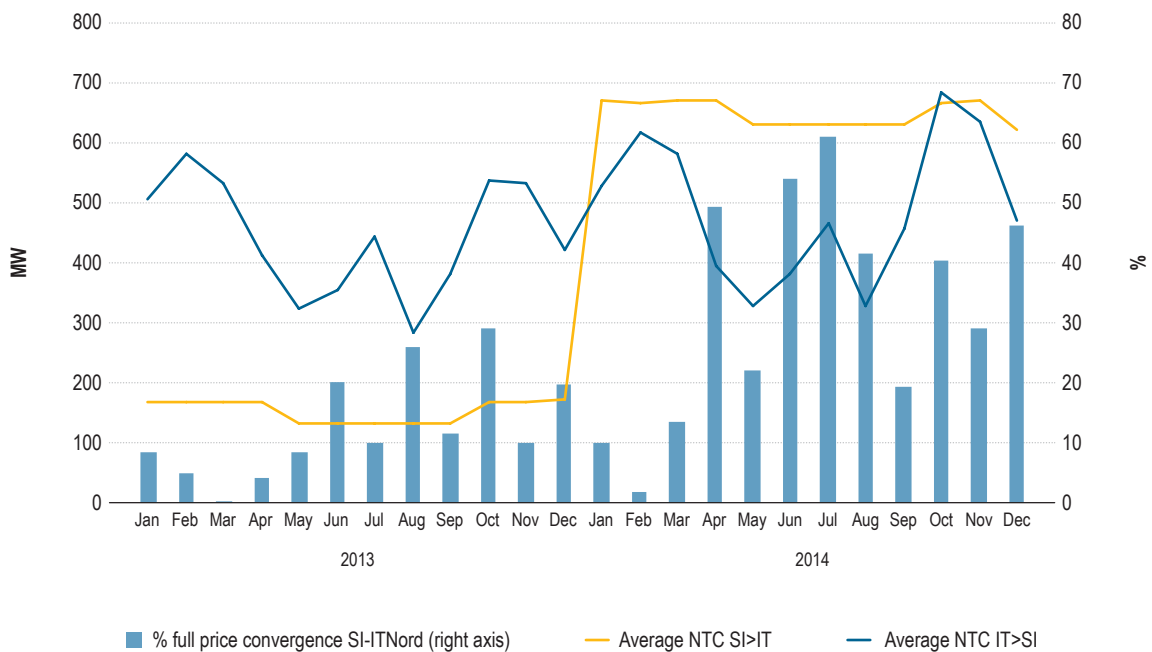


Source: EMOS, Platts, ENTSO-E (2015) and ACER calculations.

### CSE Region

486 In the CSE region, the overall price convergence remained almost non-existent in 2014. However, a significant increase in price convergence was observed between the coupled areas of Northern Italy (Italy-Nord bidding zone) and Slovenia (Figure 83). This increase was supported by the larger amount of cross-border capacity made available (Section 4.3.1) to the market on that border in 2014 compared to 2013.

Figure 83: Monthly average price convergence between Slovenia and Italy Nord bidding zones compared to average available cross-border capacity – 2013–2014 (MW and %)



Source: EMOS, Platts, ENTSO-E (2015) and ACER calculations.

## SWE Region

487 A similar effect was observed in the SWE region, where price convergence between Portugal and Spain was 5% higher in 2014 than in 2013. The increased price convergence was partly due to a rise of approximately 250 MW in the cross-border capacity offered to the market between Spain and Portugal after the commissioning of a new interconnector line between the two countries.

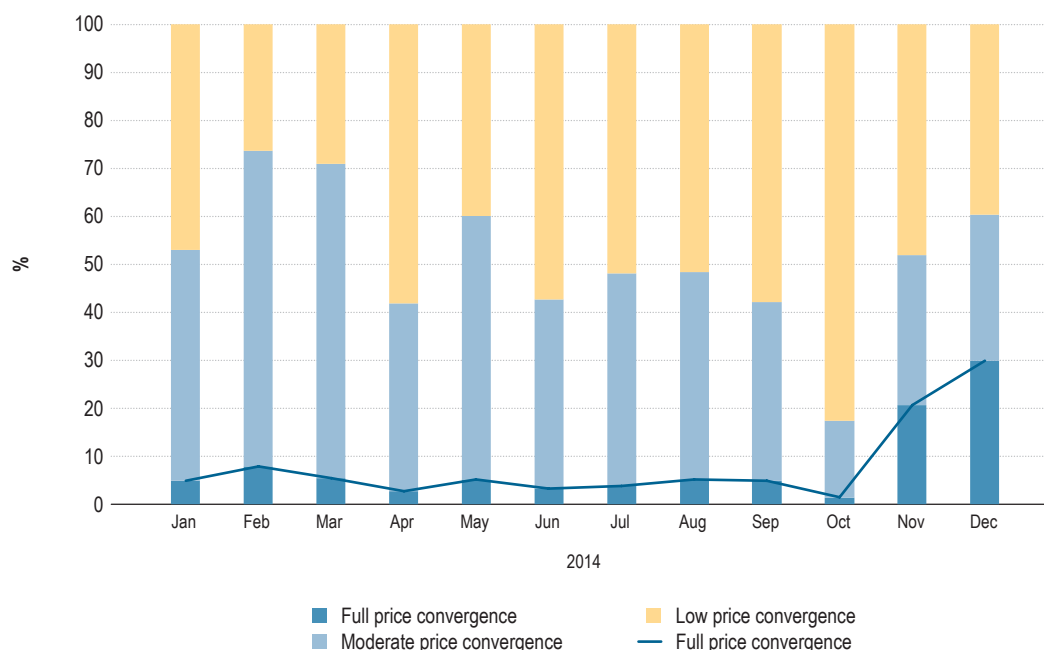
## Baltic Region

488 In the Baltic region, the decreased price convergence (6% lower in 2014 than in 2013) was related to the different evolution of Estonian electricity prices compared to the prices in Latvia and Lithuania. In 2014, cross-border capacity between Finland and Estonia increased (see more details in the next section on price convergence across regions), which contributed to the reduction in Estonian prices, as the Nordic electricity is frequently cheaper due to favourable hydro resources. However, the transmission capacity between Estonia and Latvia is relatively lower and limits the supply of relatively cheap Nordic electricity to Latvia.

## Price convergence across regions

489 The most remarkable improvement in price convergence across regions occurred between Romania and the neighbouring trilateral market coupling of the Czech Republic, Slovakia and Hungary. Romania joined the trilateral market coupling on 19 November 2014, which produced an immediate effect in price convergence among the four markets. Figure 84 shows that price convergence was below 5% in October and climbed to approximately 30% in December 2014, immediately after the extension of market coupling to Romania.

Figure 84: Monthly evolution of price convergence among the Czech Republic, Slovakia, Hungary and Romania – 2014 (%)



Source: EMOS, Platts, ENTSO-E (2015) and ACER calculations.

490 A noticeable increase in price convergence was also recorded between Estonia and Finland, where equal prices were witnessed during 92% of the hours in 2014, compared to 72% in 2013. The increase can be mainly attributed to the commissioning of the new 650 MW Estlink2 cable, in operation since 6 February 2014, which increased the cross-border capacity between Estonia and Finland up to 1,000 MW.

- 491 The effect of the NWE project on the newly coupled borders between Spain and France and between France and Great Britain was less perceptible, as their respective prices evolved differently in 2014. In Spain, DA prices were significantly lower than in France and other European markets in the first half of 2014, partly due to the rapidly increasing hydro availability in Spain. The opposite trend was observed in the second half, when French prices were the lowest in Europe due to, among other reasons, abundant nuclear electricity supply, and relatively mild weather in France. As a consequence of these diverging trends, price convergence between Spain and France remained at similar levels in 2014 as in 2013.
- 492 In Great Britain, prices decreased significantly, mainly due to declining gas prices and increasing production by renewables in 2014. Further, the coupling of France with Great Britain probably contributed to the lower British prices in 2014; however, the 2014 price differentials between the two markets remained substantial and the percentage of hours with equal prices in the two zones was essentially unchanged compared to 2013.

#### 4.3.4.2 Progress in market coupling

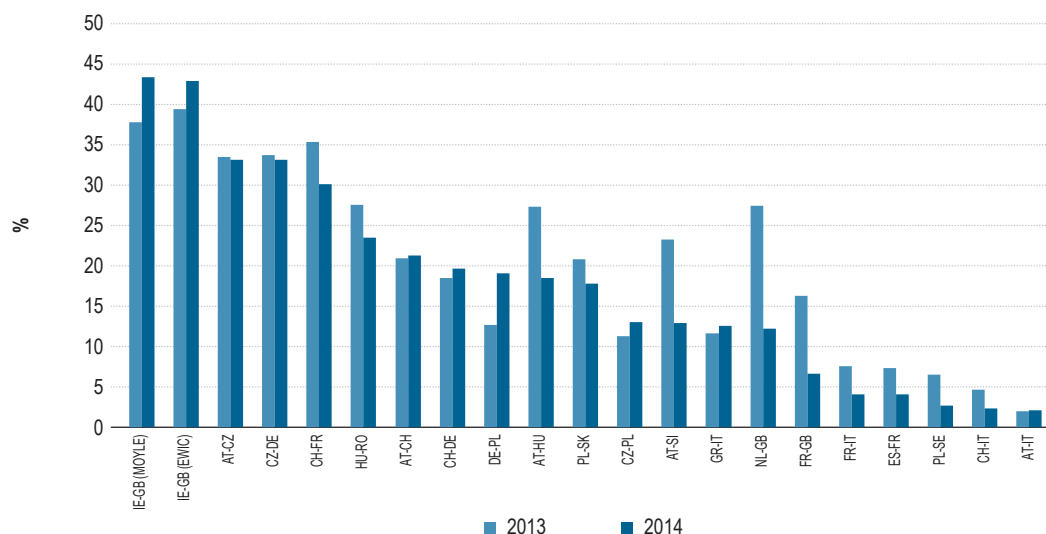
- 493 This section provides an update on the efficient use of existing cross-border transmission capacity throughout Europe in the DA timeframe. It assesses the economic efficiency of market coupling (implicit capacity allocation), which is gradually replacing the explicit allocation of cross-border capacity across Europe.
- 494 The ETM for the DA market envisages a single European price coupling applied throughout Europe, which eliminates the remaining 'wrong-way flows'<sup>291</sup> and hence improves the use of cross-border capacities for trade. Figure 85 shows the evolution of 'wrong-way flows' between 2013 and 2014 on EU borders where market coupling has not yet been implemented. It indicates that 'wrong-way flows' are still present on slightly less than one third of all EU borders. In 2014, the most remarkable share of hours with 'wrong-way flows' were recorded between Great Britain and Ireland, the Swiss borders, and on borders within the CEE region.
- 495 More importantly, Figure 85 shows that 'wrong-way flows' drastically decreased on the British borders with France and with the Netherlands<sup>292</sup>, due to the launch of the NWE project, and between Spain and France, due to the extension of the project to the SWE region in 2014<sup>293</sup>. The reduction of 'wrong-way flows' is less perceptible between Hungary and Romania because market coupling was extended to Romania only in late 2014. Some other reductions (e.g. between France and Italy) may be due to more accurate forecasts of traders than in the preceding year.

291 A 'wrong-way flow' hour is considered as such when the final net nomination on a given border takes place from the higher to the lower price zone, with a price difference of at least one euros/MWh.

292 The British and Dutch markets were coupled before the launch of the NWE project. However, the most liquid DA price reference in the British market (N2EX) was different from the price formed as a result of the implicit auction (APX price). Due to this, some 'wrong-way flows' were observed when N2EX prices were used before the go-live of the NWE project. Since then, the N2EX price in Great Britain is formed as a result of market coupling and 'wrong-way flows' have been completely eradicated.

293 The remaining 'wrong-way flows' on the French-Spanish, British-Dutch and British-French borders in 2014 correspond to the period before market coupling was extended to those borders.

Figure 85: Percentage of hours with net DA nominations against price differentials per border – 2013–2014 (%)

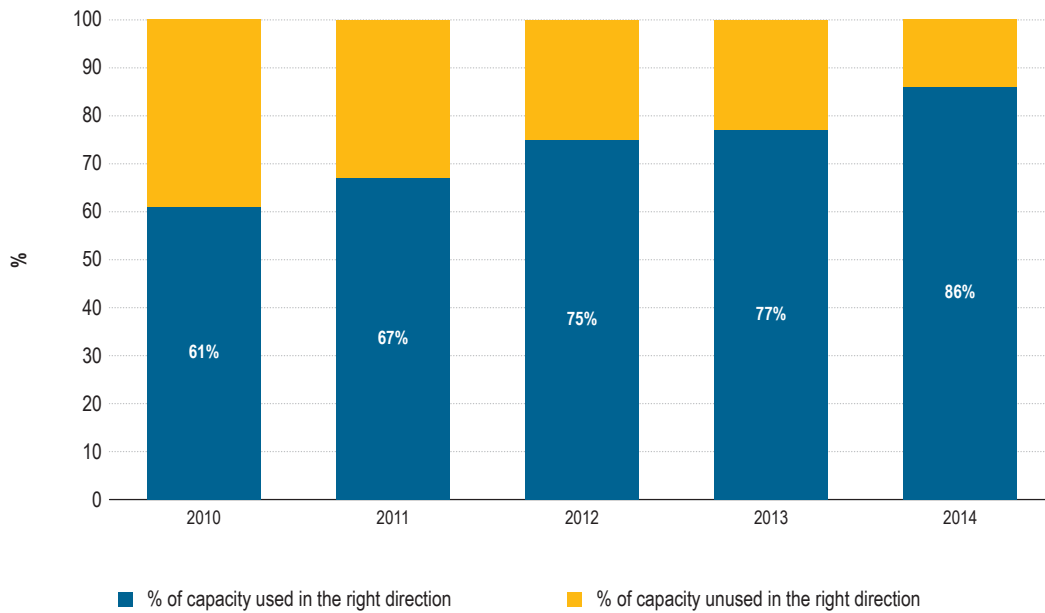


Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2015) and ACER calculations.

Note: Only borders with ‘wrong-way flows’ during more than 2% of the hours of 2013 and 2014 are shown. Wrong-way flows are not present on borders which are already coupled (not shown in the figure), with the exception of the borders between Poland and Sweden. This border presents ‘wrong-way flows’ when they are calculated on the basis of the most liquid DA price reference in the Polish market. These prices are different from those formed as a result of the implicit auctions. On the French-Spanish, British-Dutch and British-French borders, the residual ‘wrong-way flows’ correspond to the first part of 2014 before market coupling was extended to those borders. Further, IE-GB (EWIC) refers to the East West Interconnector which links the electricity transmission grids of Ireland and Great Britain. NI-GB (MOYLE) refers to the Moyle Interconnector, which links the electricity grids of Northern Ireland and Great Britain.

496 The absence of ‘wrong-way flows,’ although necessary, is not sufficient to guarantee the efficient use of interconnections in the DA market. When prices diverge across a border, the full utilisation of the cross-border capacity in the ‘right direction’ is also essential for achieving efficient use of an interconnection. Indeed, the utilisation level of an interconnector in the ‘right direction’, in the presence of price differentials, is a suitable indicator of the efficient use of cross-border capacities. Figure 86 shows that, overall, the efficient use of European electricity interconnections has increased from around 60% in 2010 to 86% in 2014, following the implementation of market coupling at several borders since 2010. The remaining 14% improvement will be achieved as soon as market coupling is implemented on all the borders with explicit auctions at the end of 2014 (some already coupled during the course of 2015, as illustrated at the end of this section).

Figure 86: Percentage of available capacity (NTC) used in the ‘right direction’ in the presence of a significant price differential, all EU electricity borders – 2010–2014 (%)



Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2015) and ACER calculations.

Note: 2010 only includes the fourth quarter.

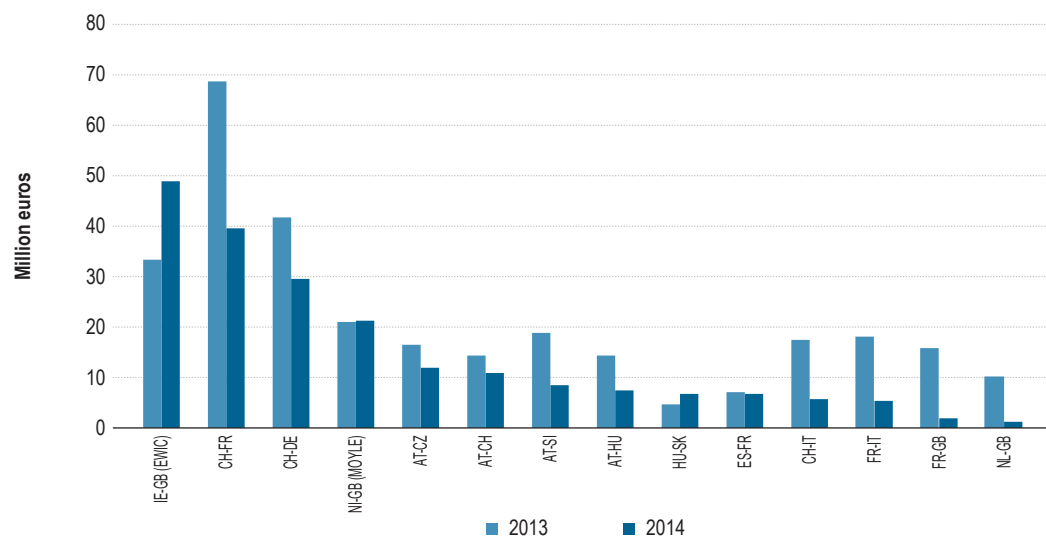
497 Due to the implementation of market coupling on 28 out of 40 borders, the EU has been able to reap significant efficiency gains (and hence improved social welfare) for the benefit of EU consumers. The potential gain from the extension of market coupling to all European borders was estimated at more than 1 billion euros/year in the 2013 MMR<sup>294</sup>. Figure 87 shows that, from that amount, more than 200 million euros per year are still to be obtained when market coupling is implemented on all remaining borders.

498 In Figure 87, the EU borders are ranked by the ‘loss in social welfare’ due to the absence of market coupling in 2013 and 2014. It indicates that the borders between Great Britain and Ireland and the French and German borders with Switzerland continued to have the highest loss in total surplus. It also shows that on borders where market coupling was implemented in early 2014 losses virtually disappeared<sup>295</sup>.

294 [http://www.europarl.europa.eu/meetdocs/2014\\_2019/documents/itre/dv/acer\\_market\\_monitoring\\_report\\_2014\\_/acer\\_market\\_monitoring\\_report\\_2014\\_en.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/documents/itre/dv/acer_market_monitoring_report_2014_/acer_market_monitoring_report_2014_en.pdf).

295 The remaining ‘losses’ on the French-Spanish, British-Dutch and British-French borders in 2014 correspond to the period before market coupling was extended to those borders.

Figure 87: Estimated 'loss in social welfare' due to the absence of market coupling, per border – 2013–2014 (million euros)



Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2015) and ACER calculations.

Note: Only non-coupled borders are shown, with the exception of the borders between Poland and Sweden. See note under Figure 85. Further, the borders within the CEE region with 'multilateral' technical profiles are not included in this figure; since the methodology applied to the other borders, based on NTC values, is not applicable to these CEE borders for this figure. Figure 85 shows that in 2013 on those borders (CZ-DE, DE-PL, PL-SK) capacity was underutilised, as they were affected by 'wrong-way flows'.

499 The values of losses due to inefficient DA allocation methods shown above illustrate the urgent need to finalise the implementation of the ETM. In this regard, two important steps towards an integrated European electricity market were completed in the first half of 2015. On 24 February, the Italian-Austrian, Italian-French and Italian-Slovenian DA markets were coupled with the Multi-Regional Coupling (MRC), which now covers 19 countries from Finland to Portugal. Further, as mentioned above, FBMC was launched in the CWE region on 20 May; the test results for this region are illustrated in a case study presented in Section 4.3.1.

#### 4.3.4.3 Gross welfare benefits of interconnectors

500 Market integration is expected to deliver several benefits, one of which is enhanced economic efficiency, allowing the lowest cost producers to serve demand in neighbouring areas. This section shows the additional benefit of an incremental increase of interconnector capacity on a bidding zone border, using the 'gross welfare benefits' indicator. The indicator is based on the same methodology introduced in the first edition of the MMR.

501 Gross welfare benefit includes, first, 'consumers' and 'producers' surplus gained by consumers and producers who participate in power exchanges (welfare is measured as the difference between the prices bid into the market and the obtained matched prices multiplied by the quantity) and second, congestion rents. The first component measures the monetary gain (saving) that could be obtained by consumers (producers) because they are able to purchase (sell) electricity at a price that is lower (higher) than the highest (lowest) price they would be willing to pay (offer) as a result of changes in cross-border transmission capacity. The second component corresponds to price differences between interconnected markets multiplied by hourly aggregated nominations<sup>296</sup> between these markets. It is important to note that gross welfare benefits, as opposed to net welfare benefits, exclude all costs incurred by TSOs for making this cross-border capacity available to the market.

<sup>296</sup> Due to mainly ramping constraints on an interconnector, congestion rents are more accurately assessed by means of nominations rather than cross-border capacity.



- 502 For the purpose of this section, several European Power Exchanges<sup>297</sup> were asked to perform a simulation in order to estimate these gross welfare benefits for the year 2014. The algorithm used for the simulations originates from the Price Coupling of Regions (PCR) Project, which is a joint effort between seven power exchanges, APX, BELPEX, EPEX SPOT, GME, NORD POOL SPOT, OMIE and OTE, aiming for the implementation of a single European DA price coupling of power regions.
- 503 There are a few caveats underlying the results presented in this section. For example, the gross welfare benefits include merely the electricity traded in organised DA exchanges, thus excluding, for instance, forward products such as week-ahead, year-ahead and all OTC trade. As a consequence, the estimated surpluses cannot be considered as the whole welfare benefit in a given country. Moreover, not all borders in Europe are included. A strong assumption underlying these simulations is that bids submitted in each market are maintained the same, irrespective of the scenario in terms of available cross-border capacity (all else being equal). Furthermore, the results refer to one year (e.g. 2014), and they can change from year to year due to factors such as the amount of wind-based generation, the dynamics of hydroelectricity affected by precipitation levels and market fundamentals. Finally, market price boundaries as well as (supply and demand bid) curve shapes have a strong influence on the calculated total welfare. This makes it very difficult to compare total welfare between different scenarios in which the cross-border capacity is modified while assuming unchanged order books<sup>298</sup>.
- 504 The gross welfare benefits for 2014 were computed for two scenarios:
1. Historical scenario: The gross welfare benefit for 2014 calculated on the basis of detailed historical information such as network constraints, the exchange participants' order books (that is, supply and demand bids) and available cross-border capacity. For the latter, the ATC has been used as a proxy of capacity effectively made available for trade on 24 borders;
  2. Incremental scenario: The same as in the Historical scenario, with the ATC values for each border increased by 100 MW<sup>299</sup>. As explained above, the assumption is that all other elements (market bids, network constraints, market rules, etc.) remain unaltered.
- 505 Figure 88 shows the so-called 'Incremental Gain' for 2014, which is the difference between the gross welfare benefit from the Incremental scenario and the Historical scenario and which borders would benefit the most from making extra capacity available. For comparability, the figure also presents the results from the previous MMRs, i.e. the ones in 2011, 2012 and 2013<sup>300</sup>. Note that extra capacity in this context is not necessarily associated with more investments, but could instead be related to more efficient methods of calculation capacity.

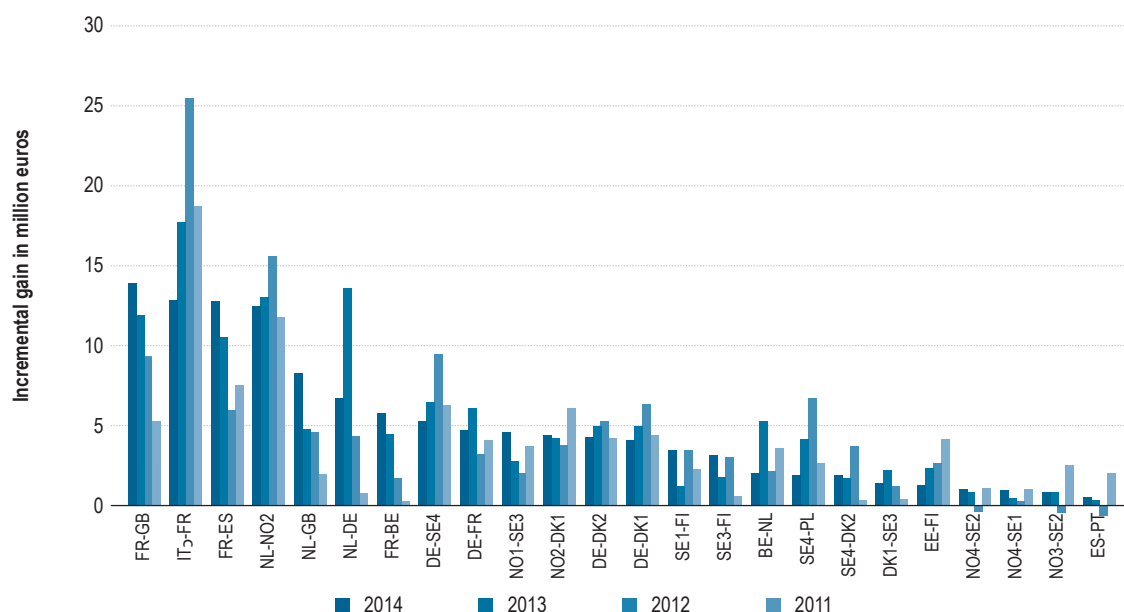
297 APX, BELPEX, EPEX SPOT, Nord Pool Spot, GME, OMIE and OTE. These were the same Power Exchanges which performed the simulations and provided the results shown in this section.

298 Due to time constraints, the simulations were obtained with the criterion of ceasing the algorithm when the first valid solution was found, whereas in reality the ceasing criterion will be determined by a time limit.

299 It can be argued that the 100 MW threshold used is to some extent an arbitrary value. Absolute values allow for the comparison of a border across the EU, although 100 MW is relatively large for some interconnectors and small for others. Also, this value is mentioned in Article 9 of Regulation (EU) No 543/2013 of 14 June 2013 as a threshold from which changes in transmission capacity should be reported. See OJ 2013 L 163/1, 14 June 2013; <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:163:0001:0012:EN:PDF>.

300 Different versions of algorithm were used for the two years.

Figure 88: Simulation results: gross welfare benefits from incremental gain per border – 2011–2014 (million euros)



Source: PCR project, including APX, EPEX SPOT, Nord Pool Spot, GME, OMIE.

Note: ⌐ indicates that the zone is a GME zone; DK, NO and SE with a number refers to the different bidding zones in Denmark, Norway and Sweden. Results for 2014 exclude the period from 1 January to 5 February.

506 As for previous years, the figure indicates that additional capacity between Italy and France would yield high social welfare increases, albeit other French borders in 2014 also show high social welfare gains (i.e. the France-Great Britain and France-Spain borders). Other interconnectors where greater capacity would have delivered significant welfare gains in 2014 include the borders between the Netherlands and Germany (on this border, the increase in social welfare nearly tripled between 2012 and 2013 from 4 million euros per year to 13 million euros, although between 2013 and 2014 it decreased by half), the Netherlands and Norway and Germany and Sweden.

507 This indicator should be further developed to become a monitoring tool which can be used to assess the utilisation of the existing network and to track the progress of market integration.

#### 4.3.4.4 Conclusion

508 In conclusion, the DA monitoring results show an increase in the efficient use of European electricity interconnections from around 60% in 2010 to 86% in 2014, following the implementation of market coupling on several borders since 2010. The remaining 14% improvement will be achieved as soon as market coupling is implemented on the remaining borders (22 out of 40 borders). The significant efficiency gains for EU consumers from implementing market coupling demonstrate the importance of extending it to other borders without delay. Moreover, on 20 May 2015, FBMC was launched in the CWE region and, based on the presented evidence, it is expected that FBMC will deliver additional efficiency gains. Lastly, simulation results show that the Italian-French border would, relatively to other borders, benefit the most from more capacity becoming available.

#### 4.3.5 ID markets

509 The importance of ID markets<sup>301</sup> for electricity in Europe is increasing together with the growing need for short-term adjustments due to the penetration of intermittent generation from RES. The intermittency of wind and solar power leads to so-called forecast errors i.e. deviations between scheduled generation (usually marketed the day before delivery or earlier) and the electricity actually delivered. The market posi-

301 An ID market is a market that operates between the gate closure of the DA market and the ID gate closure time (GCT), i.e. the point in time when energy trading for the ID timeframe is no longer permitted).

tion of renewable-based generators may be adjusted to correct for any forecast error, and other positions may be modified to reflect unplanned electricity plant outages and the load forecast error, in the ID market. An adequately functioning ID market enhances system security by relieving the balancing mechanism. Furthermore, all market participants have a monetary interest in correcting imbalances on ID markets, as this is less costly than paying imbalance charges (provided that these charges reflect the costs of procuring costly balancing services).

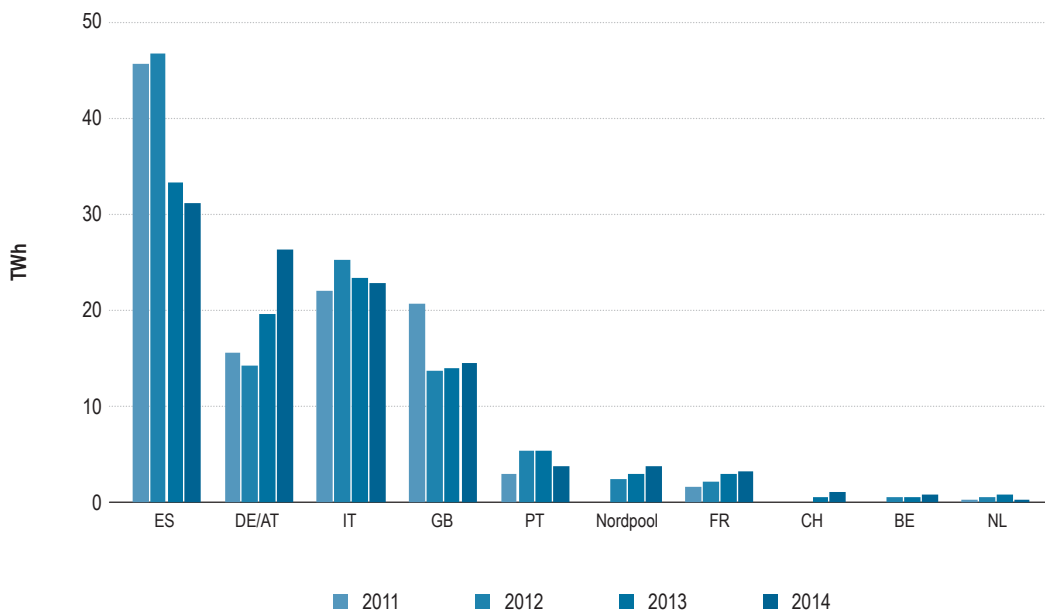
510 Compared to the significant progress achieved in DA market coupling in Europe in 2014, the project for the implementation of an EU ID target model is experiencing significant delays, mainly due to technical issues and difficulties in reaching consensus among the project parties<sup>302</sup>.

511 Furthermore, the solid progress of the EU ID project requires attracting sufficient liquidity to ID markets, which is relatively low in the majority of national markets. As liquidity is a vital element in supporting competition and efficiency in a market<sup>303</sup>, this section first reports the liquidity level for several MSs and the factors contributing to ID liquidity (Section 4.3.5.1) and then the use of cross-border transmission capacity during the ID timeframe (Section 4.3.5.2).

### 4.3.5.1 ID liquidity

512 The ID traded volumes can be regarded as an ID liquidity indicator, but with the caveat that the indicator is only an approximation of ‘true’ liquidity, i.e. the traded volumes which contribute to improved competition<sup>304</sup>. Figure 89 presents the absolute ID traded volumes (in the national organised markets) across a selection of MSs. In more than half of the MSs, the volumes show an upward trend over the past three years.

Figure 89: ID traded volumes in a selection of EU markets – 2011–2014 (TWh)



Source: PXs and the CEER national indicators database (2015)

513 The most notable increases in liquidity observed in Figure 89 since 2010 appear to be due to regulatory-driven developments in the relevant markets. In France, ID liquidity more than doubled since 2010, following the implementation of implicit cross-border ID trading between France and Germany in December 2010.

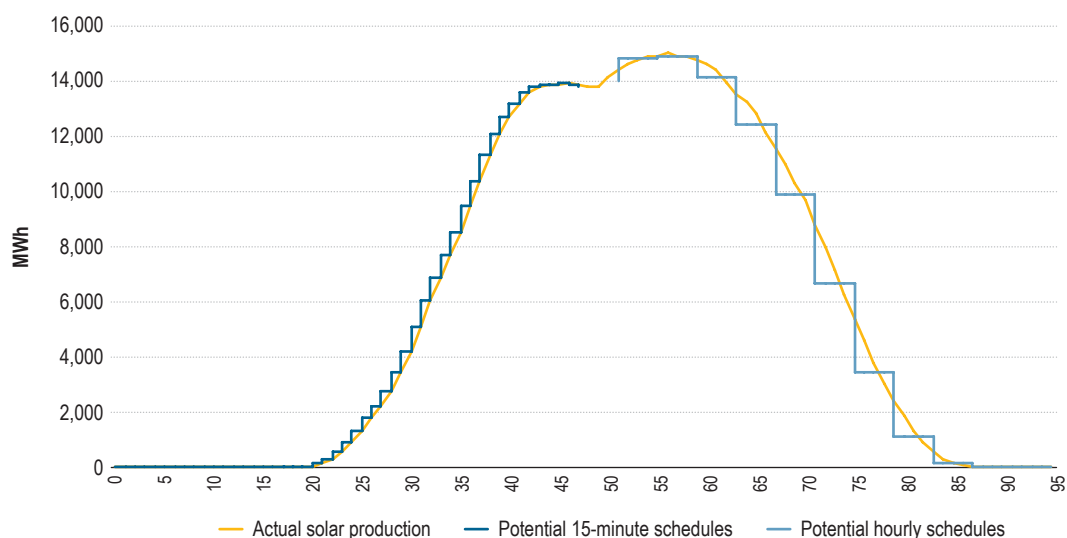
302 See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Regional%20Initiatives%20Status%20Review%20Report%202014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Regional%20Initiatives%20Status%20Review%20Report%202014.pdf).

303 ID liquidity is dependent on many factors (see 2013 ACER/CEER MMR, section 3.3.1), which are assessed and recommended on in this section. While increasing ID liquidity should not be considered as an objective in itself, increased ID liquidity can contribute to a more efficient balancing of the electricity system.

304 Some examples of situations where more volumes do not contribute to increased competition are discussed further below.

- 514 In Portugal, the increase observed in 2012 was driven by the obligation to sell the renewable production under the feed-in tariff system in the market. In Portugal, renewable-based generation under the feed-in tariff system is bought directly by the Supplier of Last Resort (SoLR). Up until 2012, the amount of energy bought was directly subtracted from the demand volumes procured by the SoLR. However, since then, it has to be sold directly on the market. Following the upward trend in 2012 and 2013, ID liquidity decreased by around 30% in 2014. This is explained, among others, by better forecasting of the share of renewable-based generation sold by the SoLRs, which reduced the need for adjustments in the ID timeframe.
  
- 515 In Germany, a 34% increase in ID liquidity was recorded in 2014 compared to 2013. Contributing factors include the following. First, aggregated solar and wind generation increased by around 10%<sup>305</sup> during the same period, which increased the overall need for ID products. Second, in line with the provisions of the new Renewables Act<sup>306</sup> which entered into force in 2014, more renewable generators have become balancing responsible parties (BRPs), due to the fact that the number of plants which continue to be eligible for the feed-in tariff regime that exempts renewable generators from balance responsibility was reduced<sup>307</sup>. Third, the German NRA (BNetzA) implemented a calculation method for imbalance charges in October 2012, aiming to prevent imbalance charges from being below the prices in the preceding markets. This avoids the incentive to participate in ID market being constrained; however, balancing charges could be further improved (see Section 4.3.7.3).
  
- 516 A fourth factor contributing to ID liquidity in Germany is the increasing interest of market participants in 15-minute-products, which were introduced in the organised market in December 2011. They are offered in addition to the standard hourly products, allowing market participants to balance their portfolios every 15 minutes. This is relevant as long as the 15-minute ID market time unit is aligned with the imbalance settlement period (ISP), i.e. the time unit for which the imbalance of BRPs is calculated. For example, Figure 90 below illustrates how German producers can reduce their imbalances in real time by using 15-minute-products to refine their schedules, hence limiting the deviation from their real production. The figure shows that schedules are more accurate when they are refined on a 15-min basis (left side of the figure) than on an hourly basis (right side of the figure).

Figure 90: Comparison of (potential) 15-minute schedules versus hourly schedules of electricity generation from solar energy in Germany on 21 June 2014 (MWh)



Source: ENTSO-E transparency platform (2015).

Note: For illustration purposes, the displayed 15-minutes and hourly products schedules are estimated schedules based on a perfect forecast.

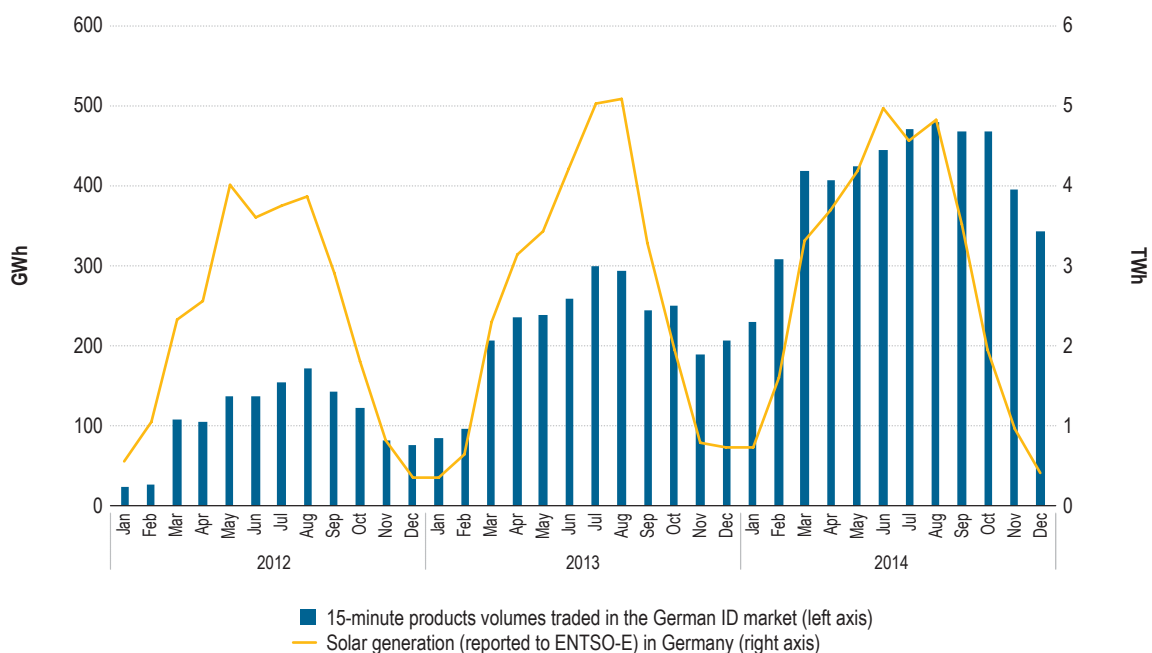
305 Based on the aggregated wind and solar generation reported to ENTSO-E.

306 The legal act entered into force on 1 August 2014. For more details, see <http://www.bmwi.de/EN/Topics/Energy/Renewable-Energy/2014-renewable-energy-sources-act.html>.

307 Before the enforcement of this Act, the TSOs were already responsible for the imbalances of renewable generation under the feed-in tariff regime and used to refine the associated schedules in the ID market; however, they did not bear any financial responsibility for the imbalances.

517 Figure 91 shows the correlation of the 15-minute-contracts traded with the amount of solar generation in Germany from the end of 2011 onwards. 15-minute-products are highly attractive for solar generators due to the significantly higher level of predictability of instantaneous solar production than of generation from other intermittent sources. Furthermore, Figure 91 shows a steady increase in 15-minute ID-traded volumes since 2011 and confirms the importance of promoting ID products that relate to the ISP. Currently, 15-minute products are traded only within national markets, because cross-border flows are normally scheduled on an hourly basis. In the future, the alignment of imbalance settlement periods to 15 minutes should allow for scheduling cross-border flows and exchange ID products on a 15-minute basis across the borders.

Figure 91: Evolution of ID 15-minute volumes in Germany – 2012–2014 (GWh and TWh)



Source: EPEX (2015).

518 A fifth factor that improved liquidity in Germany relates to the 15-minute ID auctions launched in Germany at the end of 2014. This aims to concentrate liquidity and to create a more robust price reference<sup>308</sup>. The auction takes place daily at 15h00 hours<sup>309</sup> and covers all the 96 15-minute periods for the next calendar day. In January-February 2015, 15-minute ID-traded volumes increased by approximately 10% compared to the same period in 2014. In any case, the recently launched auctions seem attractive for some parts of the market, e.g. for smaller renewable generators who might find such participation less demanding than continuous trading. The development suggests that, in some contexts, auctions can be valuable for attracting liquidity in ID markets.

519 In the Nordic and Baltic areas too, the overall ID-traded volumes have increased by almost 50% since 2012. The increase was most likely affected by the increased penetration of generation from renewable sources, e.g. in Sweden, where the installed wind generation capacity alone has increased by more than 50% since 2012.

520 The most remarkable reduction in ID liquidity was observed in Spain in 2013 (compared to 2012), which can be explained by some ‘local behavioural aspects’. In the past, an important part of ID liquidity in the Spanish market was driven by thermal generators which were out of the merit order in the DA timeframe. Some of these plants could be called by the TSO in order to relieve internal congestion during a limited number of hours, which resulted in a sub-optimal schedule for these plants. In order to solve this, these

308 See: [https://www.epexspot.com/en/press-media/press/details/press/\\_Successful\\_launch\\_of\\_15-Minute\\_Intraday\\_Call\\_Auction\\_in\\_Germany](https://www.epexspot.com/en/press-media/press/details/press/_Successful_launch_of_15-Minute_Intraday_Call_Auction_in_Germany).

309 Immediately before the opening of the continuous ID market for 15-minute contracts at 4 pm.

plants used to optimise their programmes by offering their extra-available capacity in the ID timeframe. This contributed to the increase in ID volumes. However, the owners of thermal power plants have learned from this and so factor in a potential TSO's request to relieve congestion in their offers into the DA market. They aim to sell energy volumes close to the technical minimum of their plants. This, in turn, allows these plants to submit offers in the re-dispatching timeframe at a lower price than the plants which need to be started-up from zero. This reduces the need to schedule additional generation for a reduced number of hours and, consequently, the energy volumes traded in the ID market.

521 On the basis of the country-by-country developments mentioned above, Table 16 attempts to assess in a more systematic way which factors could explain the differences in the national liquidity levels. The table ranks national ID markets according to their level of liquidity (expressed as a share of the ID-traded volumes in demand<sup>310</sup>) in 2014 against the main factors underlying liquidity classified into two groups. The first group (columns 3 to 7) includes national market design elements and the second group (columns 8 to 11) includes the elements of cross-border and national ID trade that are envisaged in the ID target model<sup>311</sup>.

Table 16: Liquidity in organised markets and the main characteristics of market design in a selection of European ID markets – 2014

Market	Nationally specific elements of ID markets						Elements of (national and cross-border) intraday trade that are envisaged in the intraday target model			
	Ratio ID volumes/demand	Intermittent generation (% installed capacity)	ID auctions	Exclusive (no alternative to organised market)	Portfolio bidding/Unit bidding	Market time unit (in the organised market)	Balance responsibility for RES	Implicit allocation of cross-border capacity	Close-to-real-time gate closure (1 hour or less, national market)	Standard and non-standard products available
Spain	12,1%	22%	Yes	Yes	Unit bidding	1 hour	Yes	On one border	No (2-3 hours)	Yes
Italy	7,4%	18%	Yes	Yes	Unit bidding	1 hour	Not fully	No	No (2-3 hours)	Yes
Portugal	7,6%	21%	Yes	Yes	Unit bidding	1 hour	No	Yes	No (2-3 hours)	Yes
Germany	4,6%	28%	Yes (for 15 min. product)	No	Portfolio bidding	1 hour and 15 min	Not fully	On one border	Yes (45 minutes)	Yes
Great Britain	4,4%	12%	No	No	Portfolio bidding	30 min	Yes	No	Yes (1 hour)	Yes
Slovenia	1,0%	7%	No	No	Portfolio bidding	1 hour and 15 min	No	No	Yes (1 hour)	Yes
Belgium	1,0%	19%	No	No	Portfolio bidding	1 hour	Yes	On one border	Yes (5 minutes)	No
Sweden	1,0%	11%	No	No	Portfolio bidding	1 hour	Yes	Yes	Yes (1 hour)	Yes
Lithuania	1,0%	8%	No	No	Portfolio bidding	1 hour	No	Yes	Yes (1 hour)	No
France	0,7%	10%	No	No	Portfolio bidding	1 hour	No	On one border	Yes (45 minutes)	Yes
Czech Republic	0,7%	10%	No	No	Portfolio bidding	1 hour	Yes	No	Yes (1 hour)	No
The Netherlands	0,2%	10%	No	No	Portfolio bidding	1 hour (standard) and 15 min	Yes	On some borders	Yes (5 minutes)	Yes
Poland	0,1%	9%	No	No	Portfolio bidding	1 hour	Yes	No	No (Gate closure at 14:30)	No

Source: ACER survey on ID liquidity, ENTSO-E, data provided by NRAs through the ERI and CEER national indicators (2015).

Note: The ID markets presented in this table represent more than 95% of ID liquidity in Europe. Further, non-standard ID product means a product for continuous ID coupling, not for constant energy delivery or for a period exceeding one market time unit, with specific characteristics designed to reflect system operation practices or market needs, such as orders covering multiple market time units or products reflecting production unit start-up costs. The ratio ID volumes/demand shown for Sweden and Lithuania is an average value in the Nordic and Baltic taken all together. Lastly, in Germany, the gate closure time (GCT) was reduced from 45 to 30 minutes on 16 July 2015.

310 A frequently used indicator of liquidity is the churn rate (i.e. the number of times electricity generated in a market is subsequently traded). The churn rate is also calculated as the ratio between the volume of all trades in all timeframes executed in a given market and its total demand. In particular, ID liquidity can be expressed as the ratio between ID-traded volumes and demand.

311 This includes balance responsibility for renewable-based generators, implicit allocation of cross-border capacity, close-to-real-time gate closures (1 hour or less) and the possibility of trading non-standard products.

- 522 Several conclusions can be drawn from Table 16. For example, the three markets with the highest ID liquidity (Italy, Portugal and Spain) are characterised by a high penetration of renewable-based generation, the presence of exclusive ID auctions and obligatory unit bidding.
- 523 The impact of the different characteristics of national markets must be carefully interpreted. For instance, in exclusive markets, ID volumes can be traded only in the organised ID market (typically the electricity exchange). In non-exclusive ID markets, an important share of ID volumes can be traded through bilateral contracts, often within a vertically integrated group of companies, thus reducing the ID liquidity observed in the organised ID markets, while the overall liquidity may be higher.
- 524 In addition, the impact of unit bidding needs to be interpreted correctly. Where unit bidding is obligatory, generators have to submit a separate market bid for each of their generating units. This is different from portfolio bidding, where a market participant can send one bid for energy in a single bidding zone, covering all of its production assets and any demand it is responsible for. Under portfolio bidding, a market participant may correct any imbalance by rearranging its schedules within its portfolio without bidding in the ID market, or by submitting a reduced number of bids and offers in the ID market. However, under obligatory unit bidding, the same market participant would probably submit a larger number of bids and offers (one per physical unit), which increases the observed ID volumes.
- 525 In sum, where markets are exclusive and/or where unit bidding is obligatory, more ID volumes are recorded. This contributes to transparency, because all trades, including volumes traded within vertically integrated companies, which are typically opaque, are visible in the market. However, the contribution of the bilateral trades to increased competition is not obvious and depends mainly on the price of the associated bids and offers. When prices are set at a 'competitive' level<sup>312</sup>, then those trades contribute to enhance competition. When prices of bids and offers are pre-arranged to ensure cross-trades<sup>313</sup>, then the associated traded volumes do not contribute to increasing competition in the market. In the end, the contribution to competition depends on the proportion of 'competitive' and 'non-competitive' bids and offers associated with additional (typically bilateral) trades.
- 526 The presence of local or regional ID implicit auctions seems to attract ID liquidity and may play a role in improving ID competition. In Italy, Spain and Portugal, the precise impact of ID auctions in liquidity is uncertain and difficult to disentangle from other factors, as their respective ID markets also present exclusivity and unit bidding, which is unique in Europe. The recent developments presented above for Germany would confirm that auctions may contribute to increased liquidity and competition in the ID market.
- 527 At the other end, Belgium shows the lowest level of liquidity among the markets, with a high penetration of renewable-based generation. The cross-border ID trade between Belgium and the Netherlands is based on an implicit allocation of capacity. All cross-border trades on the Belgian-Dutch border are also recorded as ID volumes in Belgium. The cross-border ID trade between France and Belgium is based on an explicit (so-called pro-rata) allocation of capacity. Most of the volumes traded across this border are not, however, passed through the organised Belgian ID market. This effect is particularly important in a relatively small market such as the Belgian ID market<sup>314</sup>, compared to the volumes traded across the French-Belgian interconnector. The integration of the national and cross-border ID trade on all Belgian borders will – through the implementation of the ID target model – most likely bring more liquidity and competition to the organised ID market in Belgium.
- 528 The second group of factors contributing to liquidity presented in Table 16 are the elements envisaged in the ID target model. Their full implementation will attract more liquidity to the ID market timeframe and help balance the system more efficiently. These factors include the balance responsibility of renewable generators, the implementation of implicit continuous cross-border ID trade, the length and coordination of cross-border and national ID gate closure times (GCTs) and the existence of ID products tailored to the needs of market participants.

312 For example, offers based on the marginal cost of generation power plants or bids based on the maximum willingness to pay.

313 Trades for which the same companies, or companies within the same vertically integrated group of companies are on the buy and sell side.

314 According to the NRA in Belgium (CREG) 1,549 GWh of ID trade were recorded on the Belgian-French border, whereas only 768 GWh were recorded in the organised Belgian ID market in 2014.

- 529 As explained above, some progress towards ensuring the balance responsibility of renewable generators has been observed in Germany over recent years; by the end of 2014, only 48% of all German renewable-based generation capacity remained under the feed-in tariff regime without balance responsibility.
- 530 Renewable generators are not subject to standard balance responsibilities in at least <sup>315</sup>, France, Germany<sup>316</sup>, Italy, Lithuania, Portugal and Slovenia. In some cases, NRAs who intended to phase out exemptions for balance responsibilities, found legal obstacles to implementing the necessary legal provisions. For example, in 2012, the Italian NRA (AEEGSI) issued a provision to allocate balancing costs to renewable producers, which was then overruled by the Italian high court, which found that renewable generators should not face the same level of imbalance charges as conventional plants. Finally, AEEGSI issued a new provision, setting different thresholds for the application of imbalance charges<sup>317</sup>. Similar legal obstacles also faced the French and Lithuanian NRAs. These obstacles could constitute a barrier to the development of ID markets.
- 531 In 2014, the European Commission issued a communication with Guidelines on State aid for environmental protection and energy for the 2014–2020 period<sup>318</sup>, requesting that from 1 January 2016 onwards all beneficiaries of new aid schemes and measures for the promotion of renewable energies be subject to standard balancing responsibilities, unless no liquid ID market exists. The evolution of ID liquidity in EU markets shown in Figure 89 indicates that ID liquidity develops when an adequate ID market design is in place and when renewable plants cease to be safeguarded from balance responsibility. This suggests that it may be more efficient to have balance responsibility for renewable generation first (together with an adequate ID market design), rather than waiting for the development of ID liquidity.
- 532 Another barrier to improving the liquidity level in ID markets is the persistence of uncoordinated and heterogeneous ID GCTs. According to the CACM Regulation, “...One intraday cross-zonal gate closure time shall be established for each market time unit for a given bidding zone border and it shall be at most one hour before the start of the relevant market time unit ...”. In practice, this requires the implementation of 24 GCTs, each one hour prior to real time for the ID timeframe. However, the existing ID gate closures differ greatly across markets and across bidding zone borders. For example, in the Netherlands, the national ID GCT is five minutes ahead of delivery, while different GCTs are in place on their borders: on their border with Great Britain, there are two auctions, each with three nomination GCTs, which can be up to eight hours from real time; on their border with Belgium, there are 12 GCTs 90 or 150 minutes ahead of real time; on their border with Germany, 24 GCTs 75 minutes ahead of real time; and on their border with Norway 24 GCTs 120 minutes ahead of real time. The scope for harmonising GCTs across Europe is evident.
- 533 A wider, more innovative portfolio of ID products is often mentioned<sup>319</sup> as an instrument to improve ID liquidity. The suggestion includes products with higher time resolution (time units shorter than one hour) and non-standard products, which can contribute to a more efficient balancing of renewable and other generator’s portfolio. This becomes more evident when the ISP is shorter than the ID market time unit, as confirmed by developments in the German ID market shown above. Non-standard products, e.g. orders covering multiple market time units or products reflecting production unit start-up costs, might further contribute to liquidity, although evidence in support of this has not been found.
- 534 The importance of ID cross-border capacity calculation should be carefully considered. When this calculation is meticulously performed, i.e. including a reassessment of network conditions, this may make it possible to offer some additional cross-border capacity to the market in the ID timeframe. This would allow for additional cross-border ID trade and contribute to improving national ID liquidity. However, Table 10 in Section 4.3.1 shows that a complete reassessment of network conditions for capacity calculation in the ID timeframe is still rare in Europe.

315 Based on the ACER survey on ID liquidity. 15 NRAs participated in the survey.

316 Only renewable generators in the feed-in-tariff system are not subject to balance responsibilities.

317 See more details at <http://www.autorita.energia.it/it/docs/15/308-15.htm>.

318 See: [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628\(01\)&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014XC0628(01)&from=EN).

319 It was mentioned by several NRAs in the ACER survey on ID liquidity.



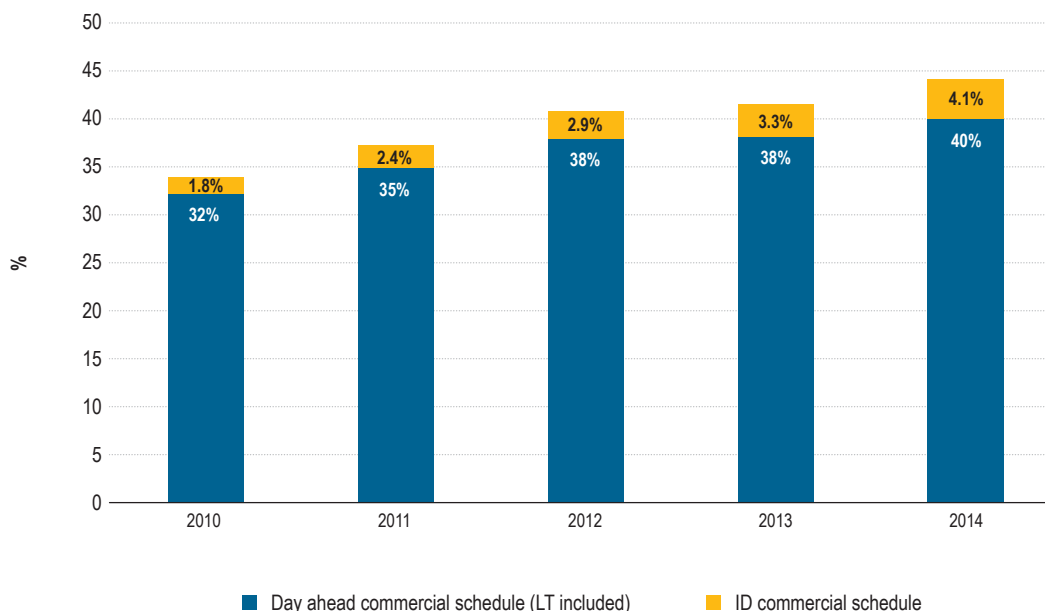
535 In 2014, a simple recalculation of ID capacity was introduced on the Dutch borders with Belgium and Germany. The recalculation constituted an agreement between the respective TSOs to reassess the DA calculations in the ID timeframe. In normal conditions, the agreement envisages that the reduced uncertainty in the ID timeframe allows for adding up to 200 MW of capacity on the Dutch-Belgian border and up to 100 MW on the Dutch-German border. Figure 93 confirms that this extra capacity resulted in significantly increased liquidity on these borders in the ID timeframe.

536 Lastly, the Agency believes that an important barrier to developing ID liquidity exists when market prices do not fully reflect the value of flexibility, shielding market participants from imbalance risks. Currently, the value of flexibility is conditioned by several aspects of market design. First, the procurement of balancing capacity includes clauses that frequently constrain the fluctuation of balancing energy prices. Second, the introduction of capacity remuneration mechanisms (see Section 4.3.7) smoothens energy prices (including balancing energy prices) and third, imbalance charges often do not reflect the costs of balancing the system fully (see Section 4.3.6.1). Among other consequences, constrained imbalance charges provide the wrong incentive to market participants, as they may prefer not to balance their portfolio by using ID markets, where the underlying marginal costs are typically lower than in the balancing timeframe. A move in the direction of more cost-reflective imbalance prices would ease the progress towards efficient national and cross-border ID markets.

#### 4.3.5.2 Utilisation of cross-border capacity in the ID timeframe

537 Figure 92 shows the relatively low, but fast-growing utilisation levels of ID EU cross-border capacity compared to the DA timeframe (including LT nominations) between 2010 and 2014. In 2014, the utilisation of cross-border capacity in the ID timeframe was approximately 25% higher than in 2013 and more than double the value recorded in 2010. A more detailed analysis, including price information, is required to assess the level of efficiency in the use of cross-border capacities. The consistency of ID price differentials with ID cross-border trade is one of the elements analysed in what follows.

Figure 92: Evolution of the annual level (average values) of commercial use of interconnections (DA and ID) as a percentage of NTC values for all EU borders – October 2010–2014 (%)

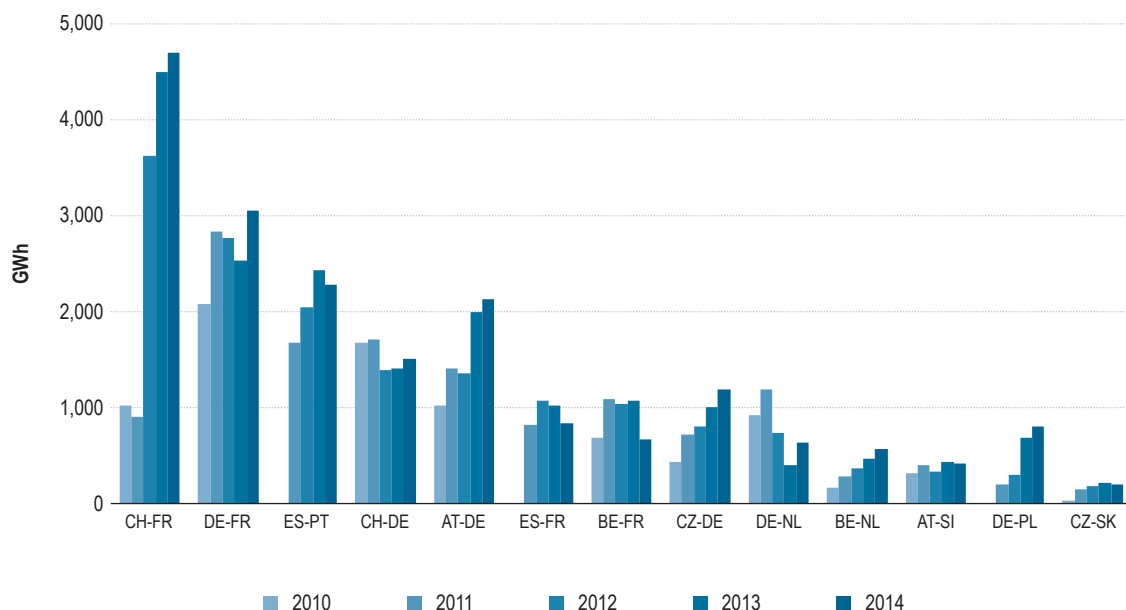


Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2014) and ACER calculations.

Note: More than 40 EU borders were included in the analysis.

538 Figure 93 shows an upward trend in traded volumes since 2010 in the ID timeframe for a majority of borders. In 2014, the most significant progress compared to the year before was recorded on the border between France and Germany. This is consistent with the increased liquidity observed in both markets and confirms the added value of the ID target model in allowing market participants to have access to a wider selection of counterparts with complementary balancing needs.

Figure 93: Level of ID cross-border trade: absolute sum of net ID nominations for a selection of EU borders – 2010–2014 (GWh)



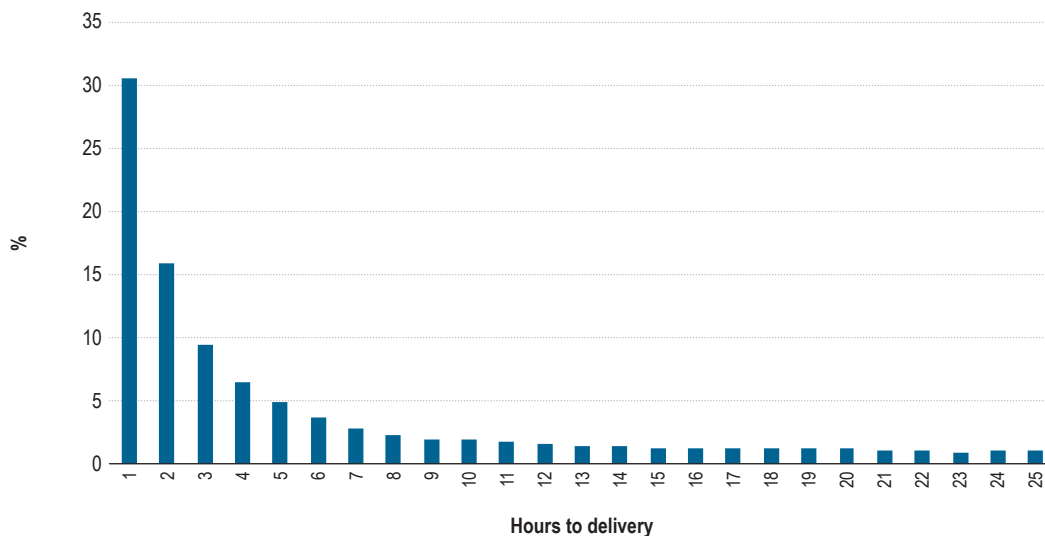
Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2014) and ACER calculations.

Note: The reported values are the sum of the (absolute) net hourly ID cross-border schedules. As there could be trades in both directions for a specific market time unit, the reported values may be a slight underestimate of the total cross-border traded volumes in the ID timeframe. Further, the figure shows only borders with aggregated net ID nominations above 200 GWh in 2014.

539 For the ID timeframe, the ETM envisages an implicit cross-border capacity allocation mechanism using continuous trading on electricity markets, with reliable pricing of ID transmission capacity reflecting congestion. This model is intended, among other things, to provide market participants with a fast and flexible way of adjusting their portfolio, which is particularly important given the increasing share of variable renewable-based generation, and to allow for the efficient use of the available ID cross-border capacity.

540 The ability of cross-border ID trade to allow close-to-real-time trading can be regarded as an indicator of flexibility. Figure 94 confirms that GCTs closer to real time appear to be valued by the market. According to this figure, on the French borders with Germany and Switzerland<sup>320</sup> more than half of the ID cross-border capacity (56%) in 2014 was requested and allocated between one and three hours prior to delivery. Whilst this is merely an example, it suggests that well-designed ID markets serve the balancing needs of renewable-based generators.

Figure 94: Allocation of ID cross-border capacity according to the time remaining to delivery for the French borders with Germany and Switzerland – 2014 (%)

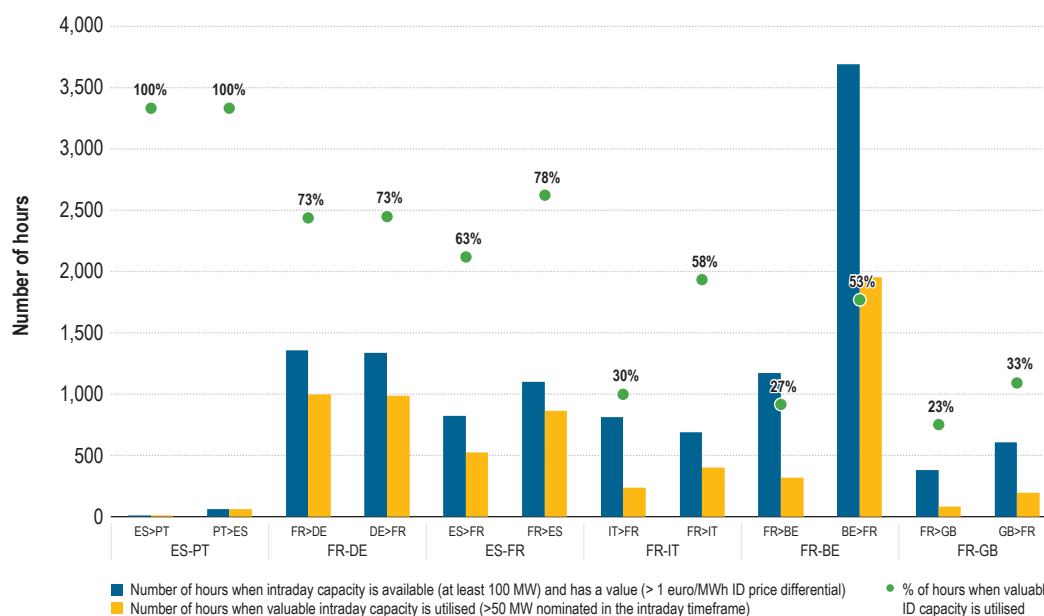


Source: CRE (2015).

- 541 Assessing the level of efficiency of cross-border capacity in the ID timeframe is not straightforward. The analysis below is based on the same methodology, indicators and assumptions as presented in the 2013 MMR.
- 542 Figure 95 shows the consistency of ID price differentials with net ID nominations. First, it illustrates the potential of cross-border ID trade per border by showing the number of hours with a price differential of more than 1 euro/MWh and more than 100 MW of capacity available in the ‘right economic direction’. According to this indicator, all borders included in the analysis have the potential to be used in the ID timeframe. Even on the French-Italian border, usually congested in the France to Italy direction in the DA timeframe, cross-border ID trade in that direction would have been valuable during more than 700 hours in 2014. Second, the figure illustrates the efficiency of cross-border ID trade by showing the share of hours when the capacity available at the ID timeframe is used in the ‘right’ direction<sup>321</sup>. It shows that borders featuring implicit cross-border allocation methods rank highest in delivering an efficient use of the interconnectors. The French-British border featuring explicit cross-border auctions records the lowest efficiency in the use of ID cross-border capacity.

321 A threshold of 50 MW of cross-border capacity used in the ‘right’ direction was taken.

Figure 95: Level of utilisation of cross-border capacity in the ID timeframe when it has a value, for a selection of borders – 2014



Source: ENTSO-E, data provided by NRAs through the ERI, Vulcanus (2015) and ACER calculations.

Note: Since in some markets ID liquidity (volumes traded) is relatively low, an arbitrary threshold of 50 MW was used for the analysis. The percentages indicate the share of the hours when capacity is used in the right direction (>50 MW used) with ID price differentials of at least 1 euro/MWh and a sufficient availability of cross-border capacity (at least 100 MW).

#### 4.3.5.3 Conclusion

543 In conclusion, the following elements have contributed to increasing ID liquidity in the recent years: first, the implementation of implicit continuous cross-border ID trade (e.g. in France); second, the measures to ensure that renewable generation is sold directly in the market (e.g. in Portugal); and third, a combination of factors in the German market. In Germany, ID liquidity is being driven by a decreasing number of renewable plants exempted from balancing responsibility, the implementation of higher imbalance charges, the increasing interest in 15-minute products and the recently launched regional ID implicit auctions. Furthermore, the Report shows that several barriers to develop ID liquidity further still remain. This includes the persistence of uncoordinated and heterogeneous ID GCTs, lack of balancing responsibility for renewable generation and infrequent recalculation of cross-border capacities in the ID timeframe.

544 As regards cross-border trade, this section shows that: first, interconnector capacity does not appear to be the main impediment to developing ID cross-border trade; second, the combined analysis of available ID cross-border capacity and ID price differentials shows that a significant amount of cross-border capacity remains underutilised; third, the period of time between one and three hours prior to delivery is highly valued for trading by market participants. Finally, the analysis confirms that implicit allocation of cross-border capacity in the ID timeframe contributes to the more efficient utilisation of available capacity (i.e. when it has a value).

#### 4.3.6 Balancing markets

545 Electricity system balancing includes all those actions and processes performed by a TSO in order to ensure that total electricity withdrawals (including losses) equal total injections in a control area at any given moment<sup>322</sup>. In view of this, TSOs maintain the system frequency within predefined stability limits by drawing on balancing services, which include balancing reserves<sup>323</sup> and balancing energy. In addition, TSOs are responsible for organising BMs and strive for their integration, keeping the system in balance in the most efficient manner.

322 However, this section does not address the issue of system adequacy, which refers to the ability of the system to meet electricity demand at all times in the future.

323 They can be contracted balancing reserves (usually referred to as balancing capacity) or non-contracted balancing reserves.

- 546 Currently, BMs in Europe are generally national in scope, and supplying balancing energy (or reserves) across a border to an adjacent MS is not common practice. Insufficient coordination among TSOs, the absence of EU-wide regulatory rules for the cross-border exchange of balancing services and the lack of harmonisation of the main aspects of BMs are among the main factors causing the lack of progress observed in the integration of BMs. In addition, some other challenges are frequently present in national BMs, including an insufficient level of competition due to high market concentration, which may result in higher balancing costs, which will probably be borne by end-users.
- 547 The integration of BMs has the potential to deliver significant efficiency gains at both the regional and EU levels. First, it lowers market concentration, hence reducing the scope for exercising market power. Second, by integrating BMs, resources are better utilised, yielding a decrease in overall costs for balancing services. The integration of balancing requires the harmonisation of the main aspects of national BMs. This is not an objective in itself, but should help minimise potential distortions and prevent inefficient exchanges of balancing services.
- 548 The aim of this section is to assess the performance of national BMs (Section 4.3.6.1) and the scope to further exchange balancing services across EU borders (Section 4.3.6.2) in order to make a recommendation on the further integration of BMs.

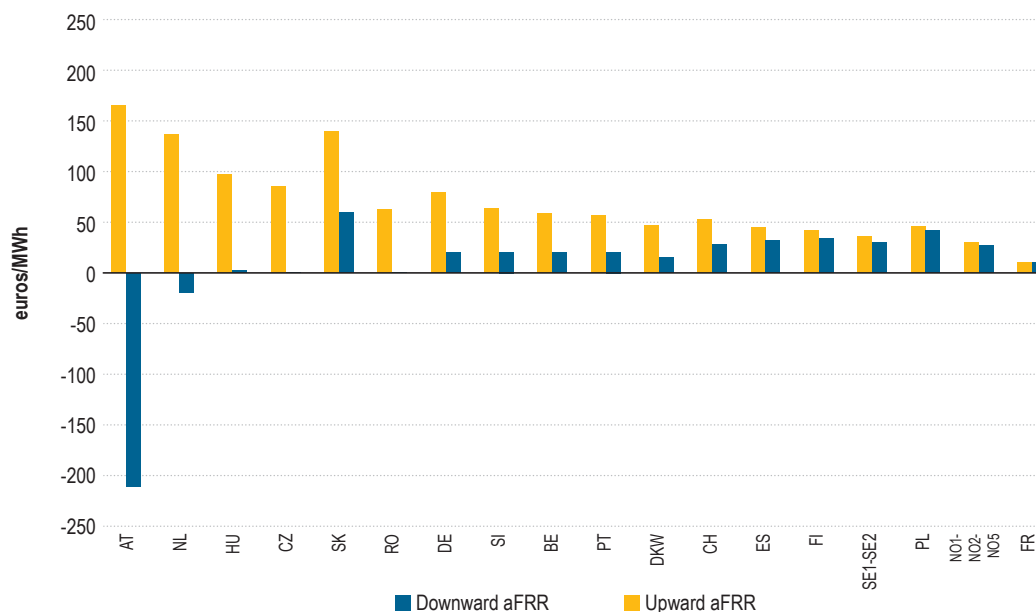
#### 4.3.6.1 Performance of national balancing markets

- 549 In order to deal with imbalances, TSOs have three types of balancing resources available, which are part of a sequential process based on successive layers of control. These are Frequency Containment Reserves (FCR), Frequency Restoration Reserves (FRR), which can be automatically (aFRR) or manually activated (mFRR) and Replacement Reserves (RR). The balancing services associated with these resources can be traded in the market in the form of balancing capacity or balancing energy.
- 550 If properly standardised, all these services can potentially be exchanged across borders. The efficiency gains from the cross-border trade of the different balancing services depend mainly on the maximum amount that can be exchanged (i.e. within security limits and subject to available cross-border capacity) and the price differentials across markets.

#### Prices of balancing services

- 551 Figure 96 shows the average prices of balancing energy activated from aFRR in different European markets in 2014. They are ranked according to the price spread between the average prices of upward and downward activated balancing energy. The larger the spread, the more costly the provision of balancing energy (from aFRR) (e.g. in Austria, the average price spread is above 350 euros/MWh, while in Norway it is below 3 euros/MWh).

Figure 96: Weighted average prices of balancing energy activated from aFRR (upward and downward activation) in a selection of EU markets – 2014 (euros/MWh)



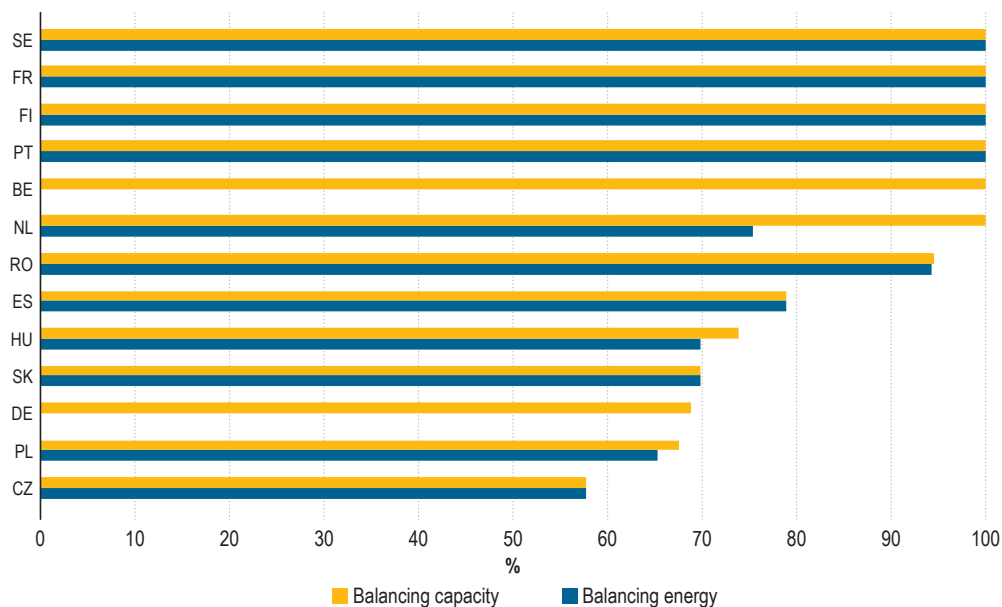
Source: Data provided by NRAs through the ERI (2014).

Note: The prices shown for the Netherlands are based on the activation of both balancing energy from aFRR and mFRR as a 'cross-product marginal price' is applied.

552 From this figure, the following conclusions can be drawn. First, it shows large disparities in balancing energy prices in Europe, including significant price differences between neighbouring countries (e.g. there is a price spread of more than 80 euros/MWh between Austria and Hungary). These differences are significantly higher than in the preceding timeframes (forward, DA and ID markets). The significant level of price dispersion across MSs suggests that important efficiency gains can be obtained from a further exchange of balancing energy, subject to available cross-border capacity and security limits.

553 Second, the presence of considerably high average prices needs to be carefully considered. On the one hand, this can be due to balancing energy prices reflecting the 'true' value of flexibility, which would allow setting adequate incentives (through cost-reflective imbalance charges) for BRPs to correct imbalances in the less costly preceding markets. On the other hand, Figure 96 suggests that competition in balancing energy markets is often limited, partly as a result of highly concentrated BMs. This is confirmed in Figure 97, which shows that the cumulative market shares of the three largest suppliers are above 70% in most countries, a frequently higher concentration than in the overall wholesale market<sup>324</sup>. The high concentration level in BMs confirms the urgent need to integrate BMs, not least as a way of increasing the number of market participants and thereby reducing the scope for market power.

Figure 97: Level of concentration (CR3) in the provision of balancing services from aFRR (capacity and energy) for a selection of MSs – 2014 (%)



Source: Data provided by NRAs through the ERI (2014).

554 Third, Figure 96 shows very significant negative prices for the downward activation of balancing energy in Austria. This means that generators that reduce production, or consumers<sup>325</sup> who increase their consumption in response to system imbalances, are systematically being remunerated for these actions. While this occurs in many markets (where negative prices are allowed) during a number of hours, it is exceptional for this takes to happen on a permanent basis. In theory, negative prices could reflect the ‘true’ value of flexibility in those markets. However, negative prices are usually associated with highly inflexible electricity generation that cannot easily be regulated or shut down. In markets dominated by hydro generators (such as in Austria), which are among the most flexible technologies, it is counter-intuitive to systematically remunerate generators for producing less.

555 Some aspects of market design could be revised in order to mitigate the impact of negative prices on the overall costs of balancing. First, demand-side participation in balancing energy markets should be enabled and negative balancing energy prices used as an incentive to promote participation. It is highly likely that some end-consumers are capable and willing to offer downward regulation (i.e. to increase consumption) by paying a ‘reasonable low’ positive price when there is a ‘surplus’ of energy in the system. This would reduce the procurement costs of downward balancing energy.

556 Second, the balancing services procurement mechanism should be designed to optimise efficient balancing energy price formation. For example, in Austria, only those offers from Balancing Service Providers (BSPs) awarded in the tender for capacity reserves are included in the merit order curve for the provision of balancing energy. This potentially provides BSPs with an incentive to lower their balancing capacity prices in order to be awarded contracts in the tender for capacity reserves, thereby taking priority over other BSPs with higher balancing capacity prices, but potentially lower balancing energy prices. The impact of this potentially perverse incentive on the overall costs of balancing warrants investigation, as in principle any prequalified BSP, with or without a contract for reserve capacity, should have the right to submit balancing energy bids to its connecting TSO<sup>326</sup>. Currently, the mechanism for the procurement of balancing services in Austria is under review.

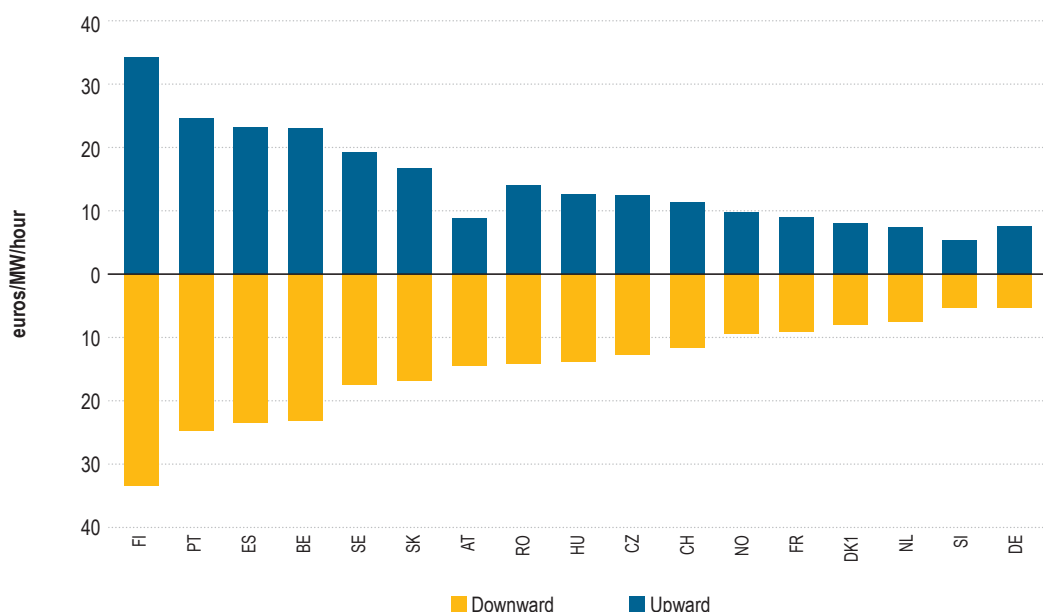
325 Where demand is allowed to participate in the provision of balancing services. Furthermore, generators can also provide downward regulation by increasing their own consumption.

326 As envisaged in Article 27(6) of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing. See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Recommendations/ACER%20Recommendation%2003-2015.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Recommendations/ACER%20Recommendation%2003-2015.pdf).

557 Figure 98 shows that the procurement of balancing capacity (from aFRR) also presents important price differentials across countries, albeit less marked than the differences in balancing energy prices. The procurement of balancing capacity is also characterised by highly concentrated markets, exacerbated by insufficient demand participation and limited cross-border exchanges (Section 4.3.6.2). As with balancing energy, there is scope for improvement in the procurement of balancing capacity.

558 The competition in the procurement of balancing capacity can be constrained, among other reasons, when the upward and downward balancing capacities are simultaneously procured or when TSO’s procurement periods are relatively long. This partly explains the relatively high concentration in the procurement of reserves shown in Figure 97, e.g. the cumulative market shares of the three largest suppliers in the Netherlands is 100%, albeit this could be mitigated with shorter procurement periods. Furthermore, long procurement periods involve an early commitment of balancing capacity, when uncertainty about fuel costs and resulting DA or ID prices is high; this uncertainty is likely to be factored into the capacity prices offered by BSPs, as these prices are based on their estimated opportunity costs<sup>327</sup>.

Figure 98: Average prices of balancing capacity aFRR (upward and downward reserve capacity) in a selection of EU markets – 2014 (euros/MW)



Source: Data provided by NRAs through the ERI (2014).

Note: The figure does not include countries where a ‘central dispatching’<sup>328</sup> model is applied (e.g. Poland and Italy). Furthermore, in some markets the procurement of upward and downward capacity is performed simultaneously, and the price resulting from the tender represents the provision of 1 MW of upward balancing and 1 MW of downward balancing capacity. In these markets, (i.e. the Czech Republic, France, the Netherlands Switzerland, Slovakia and Slovenia) the values resulting from the tender have been divided by two.

559 Further, the price differences shown in Figure 98 suggest that important efficiency gains could be obtained from the development of a further exchange of balancing capacity. It should be noted that an efficient exchange of balancing capacity is slightly more complex than the exchange of balancing energy, as it usually requires some reservation of cross-border capacity and the related co-optimisation with the exchange of energy<sup>329</sup>.

327 See Articles 37(2) and Article 37(3) of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing, which envisage a separate procurement of upward and downward balancing capacity and shorter procurement timeframes, in order to help increase the number of market participants able to engage in the provision of balancing reserves. See link in footnote 327.

328 In some countries, TSOs apply a ‘central dispatching’ model. One of the main characteristics of a ‘central dispatching’ model is that balancing, congestion management and reserve procurement is performed simultaneously in an integrated process. As a consequence, the respective TSOs are not always able to report on the specific procurement costs of reserves (e.g. in Italy). In Poland, the TSO has only reported figures on the procurement costs of upward aFRR and RR.

329 Article 48 of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing stipulates that “...No later than two years after the entry into force of this Network Code Regulation all TSOs shall jointly develop a methodology for a co-optimised Capacity Allocation...”. See link in footnote 327.

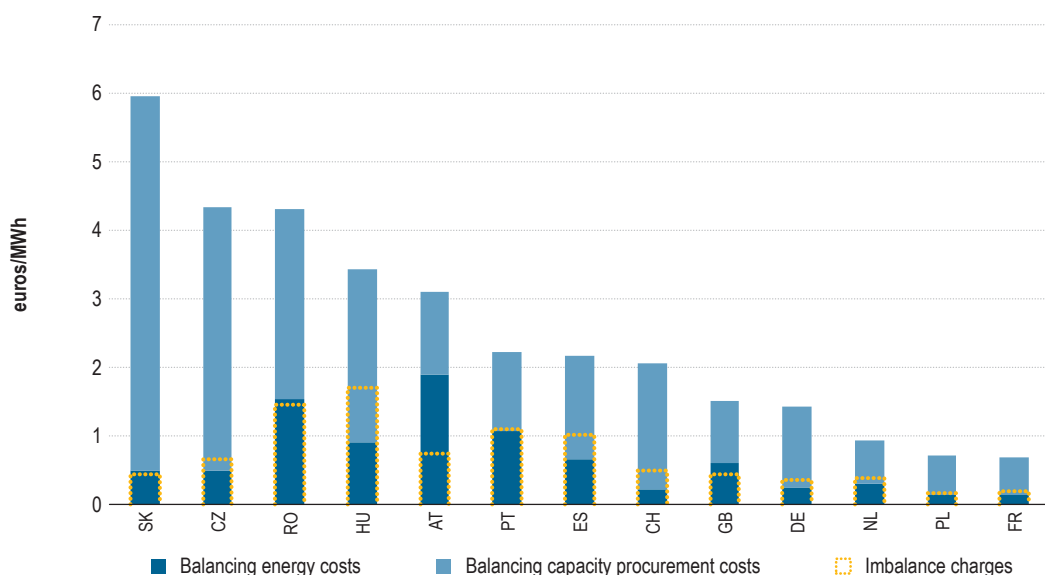


### Overall costs of balancing and imbalance charges

560 The overall costs of balancing can be calculated as the procurement costs of balancing capacity and the costs for activating balancing energy (based on the activated energy volumes and the prices of the different products)<sup>330</sup>. Furthermore, in order to take account of the different sizes of markets, the overall costs can be compared with the electricity demand in the system. This allows a meaningful comparison of the overall costs of balancing services in different European markets.

561 Figure 99 ranks MSs according to the impact of procuring balancing services in one MWh of demand, which represents an approximation of the average costs of balancing for end-consumers. It shows large disparities among MSs, e.g. the costs in Slovakia exceed the average cost in the selected markets by more than 100%.

Figure 99: Overall costs of balancing (capacity and energy) and imbalance charges over national electricity demand in a selection of European markets – 2014 (euros/MWh)



Source: Data provided by NRAs through the ERI, Platts and ACER calculations (2015).

Note: Poland applies central dispatch, and the procurement costs of reserves reported by the TSO are only a share of the overall costs of reserves in the Polish electricity system.

562 The reasons for the differences in balancing costs across MSs depend on both the volumes of balancing capacity and energy procured and their prices. The level of the volumes required in different MSs are often dependent on obvious factors, such as the penetration level of renewable-based generation, or less evident factors, such as the efficient dimensioning of balancing reserves by TSOs. For example, relatively smaller systems are likely to require a larger amount of reserves in relation to demand, due to the application of the N-1 criteria in the dimensioning of the reserves. While this can partly explain the relatively higher procurement costs of balancing capacity shown in Figure 99 for Slovakia, and the Czech Republic, this should be an incentive to promote an efficient share or exchange of reserves across their borders.

563 The prices of balancing services also depend on many other factors, such as the underlying costs of the available resources to provide flexibility and the level of competition in the markets. As indicated above, competition is frequently limited, due to high concentration in national markets. This could be mitigated by cross-border participation or by introducing (more) demand-side participation through amendments to

330 The balancing energy price should be related to the DA electricity price in order to indicate the actual costs of activating balancing energy. This is because the difference between these two prices can be regarded as the opportunity costs for BRPs for not balancing their portfolio on the day before delivery (assuming that these costs are fully reflected in imbalance charges). This price difference is a useful indicator of the social costs of balancing, and can be applied both for upward and downward balancing energy. In theory this comparison should be made with the ID market price, as this is the nearest alternative for BRPs to balance their portfolio before real time. However, the number of liquid ID markets with reliable ID prices is limited in Europe, so the comparison was made with DA prices.

the national provision of balancing services. As regard the latter, in 2014, demand-side participation was possible or planned to be introduced in 50% of MSs<sup>331</sup>.

- 564 Further, an adequate regulatory framework can help balance the system more efficiently. Adequate pre-qualification rules<sup>332</sup>, which do not unduly discriminate among technologies, participation of demand and optimised procurement of balancing capacity are elements that can increase competition in the provision of balancing services. Moreover, the Agency recommends that NRAs monitor the costs of balancing systems closely and that TSOs be efficiently incentivised to ensure least-cost balancing of the electricity systems.
- 565 Lastly, the experience gained through BMs integration projects has proved that the benefits largely exceed the implementation costs<sup>333</sup>. This should be an incentive for all NRAs and TSOs to speed up the integration process, in particular for those located in markets with the highest overall costs of balancing services (i.e. Austria, the Czech Republic, Hungary, Romania and Slovakia).
- 566 Figure 99 also indicates the proportion of capacity and energy costs in the overall costs of balancing per market. It shows that in most European markets, the procurement of balancing capacity represents the largest proportion. The excessive weight of the balancing capacity procurement costs may suggest that the procurement of capacity is not always optimised, or that the terms for its procurement do not allow the balancing energy prices to fluctuate freely. Further, in some MSs (see Figure 104 in Section 4.3.7.3), this may also be due to the lack of marginal pricing preventing energy prices from adequately reflecting the scarcity value of balancing resources.
- 567 This emphasises the importance of optimising the procurement costs of balancing capacity, including separate procurement of upward and downward balancing capacity and shorter procurement timeframes, as described above. Moreover, any distorting impact of reserve procurement on energy price formation should be minimised. In some markets, the TSO's procurement of balancing capacity reduces the scope for the price of balancing energy fluctuates freely. For example, in Germany, offers for balancing energy (from aFRR and mFRR) are submitted together with offers for reserve capacity and cannot be modified closer to real time. Furthermore, only the energy offers from BSPs awarded in the tender for capacity are included in the merit order list for the activation of balancing energy. These arrangements prevent balancing energy prices from revealing the close-to-real-time value of flexibility, and this should be avoided<sup>334</sup>. Finally, the pricing method for balancing energy should be based on marginal pricing.
- 568 The overall procurement costs are normally transferred to end-consumers<sup>335</sup>, partly through imbalance charges to BRPs and partly socialised in the network charges. Imbalance charges represent the effective prices that out-of-balance BRPs pay (or receive) for deviations from their schedules. They should ensure that BRPs are incentivised to keep and/or help restore system balance in an efficient and cost-reflective way.
- 569 Figure 99 shows the proportion of balancing costs that are covered with imbalance charges. It indicates that, in most cases, imbalance charges cover the costs of activated balancing energy and a negligible or small share of the balancing capacity procurement costs. The main exception is Austria<sup>336</sup> where imbalance charges account for less than 40% of the costs of activating balancing energy, minimising the incentive for BRPs to balance their portfolio ahead of real time.

331 See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/References/DSF\\_Final\\_Report.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/References/DSF_Final_Report.pdf).

332 The pre-qualification stage refers to a possible step for a TSO to test and validate the capacity of a potential BSP to actually provide the balancing services considered.

333 See an example in footnote 346.

334 Article 27.7 of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing. See link in footnote 327.

335 However, in competitive retail markets, it should be expected that less efficient BRPs are not able to transfer all their imbalance charges to their consumers.

336 This also occurs to a lesser extent in Great Britain, where, for a number of reasons, the imbalance price and balancing costs do not align. One contributory factor is that some upward actions (recorded as balancing) are taken to compensate some downward system actions which may be connected with overloading protection or with the relief of network congestion which are not recorded as balancing actions.

- 570 Even where imbalance charges are sufficient to cover the costs of activated balancing energy, this might not be a sufficient incentive for BRPs to support an efficient balancing of the system, because in a majority of MSs the largest share of balancing costs is made up by the procurement costs of balancing capacity, as shown in Figure 99. These are not charged directly to BRPs through imbalance prices, but are normally socialised, typically through network charges.
- 571 As presented above, priority should be given to optimising the procurement costs of balancing capacity by enhancing the procurement rules. However, where the proportion of balancing capacity procurement costs in the overall costs of balancing remains significantly larger than the proportion of balancing energy costs, the socialisation of the capacity-related costs may constrain the incentive for BRPs to support an efficient balancing of the system. Additional incentives for BRPs should be explored. For example, in Great Britain, a review of imbalance prices was undertaken following concerns that inaccurate imbalance prices undermine efficiency in balancing and security of supply<sup>337</sup>.
- 572 Article 55 of the draft Network Code included in Annex II of the Agency Recommendation on the Network Code on Electricity Balancing states that “the imbalance settlement principles shall ensure that imbalances are settled at a price that reflects the real-time value of energy”. However, it also envisages the possibility that TSOs develop a proposal for an additional settlement mechanism in order to ensure that the charges for BRPs reflect the full costs of balancing<sup>338</sup>.
- 573 Additionally, some other elements may impede imbalance charges reflecting the flexibility value adequately. For example, the procurement of balancing services in some cases is combined with re-dispatching measures to relieve internal congestion (e.g. in Italy, Great Britain and Poland). If the costs of balancing and congestion management are not properly disentangled<sup>339</sup>, this is likely to distort the cost reflectivity of imbalance charges.
- 574 Lastly, the different imbalance charges in different markets are largely caused by heterogeneous imbalance settlement mechanisms, as presented in a recent ENTSO-E survey<sup>340</sup>. When the cross-border trade in balancing services becomes more frequent, the lack of harmonisation in the settlement of imbalance charges may reduce the efficiency of BMS’ integration. This is because BRPs would be facing different price incentives according to their location. As stated in the Agency Recommendation on the Network Code on Electricity Balancing<sup>341</sup>, all TSOs must develop a proposal for harmonising the main features of Imbalance Settlement.

#### 4.3.6.2 Cross-border exchange of balancing services

- 575 An integrated cross-border BM is intended to maximise the efficiency of balancing by using the most efficient balancing resources, while safeguarding operational security.
- 576 The exchange of balancing services across borders may involve the cross-border trade of balancing energy (including imbalance netting<sup>342</sup>) and of balancing capacity. The core element for the integration of

337 Following this review, the British NRA (Ofgem) set out reforms for improving imbalance prices. This includes proposals to ensure a more marginal imbalance price; include a cost for disconnections and voltage reduction based on the Value of Lost Load (VoLL); price in the use of contracted reserve using a new Reserve Scarcity Pricing function; and a single imbalance price. Further information can be found in Ofgem’s Final Policy Decision: <https://www.ofgem.gov.uk/publications-and-updates/electricity-balancing-significant-code-review-final-policy-decision>

338 See Article 55(3) of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing. See link in footnote 327.

339 In Great Britain, the TSO must publish an annual report on the accuracy of disentangling balancing and congestion management actions. For the latest version of the System Action Flagging Report see <http://www2.nationalgrid.com/UK/Industry-information/Electricity-transmission-operational-data/Report-explorer/Performance-Reports/>.

340 See: [https://www.entsoe.eu/Documents/Publications/Market%20Committee%20publications/150127\\_WGAS\\_Survey\\_2014.pdf](https://www.entsoe.eu/Documents/Publications/Market%20Committee%20publications/150127_WGAS_Survey_2014.pdf).

341 See Article 24 of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing.

342 Imbalance netting is intended to prevent the counteracting activation of balancing energy by off-setting opposing imbalances between adjacent imbalance areas. The netting of imbalances results in an effective energy exchange from an area with an excess of energy (surplus) to an area with a deficit (shortage) subject to available cross-border capacity.

EU BMs are the models for cross-border exchanges of balancing energy that should emerge in different geographical areas and gradually be integrated into a single European platform where all TSOs would have access to different types of balancing energy, subject to the availability of cross-border transmission capacity. The more efficient procurement and use of balancing capacity is also foreseen.

577 The target model for the exchange of balancing energy is based on a multilateral TSO-TSO model<sup>343</sup> with a CMO list for mFRR and RR. An equivalent concept is envisaged for aFRR. The draft Network Code on Electricity Balancing also provides a set of rules for the standardisation and harmonisation of balancing products, balancing energy pricing and imbalance pricing. These are considered prerequisites to full market integration. The roles and responsibilities of TSOs, BSPs and BRPs also need to be harmonised to a large degree to achieve a level playing field for competition in different MSs.

578 Figure 100 and Figure 101 show, respectively, the share of activated balancing energy and of balancing capacity procured abroad compared to system needs in 2014. The figures take account only of products that are currently frequently exchanged across borders (i.e. balancing energy from mFRR and balancing capacity from FCR). It illustrates that the exchange of balancing services (excluding imbalance netting) across EU borders is currently limited.

Figure 100: EU balancing energy activated abroad as a percentage of the amount of total balancing energy activated (upward) from mFRR in national BMs – 2014 (%)

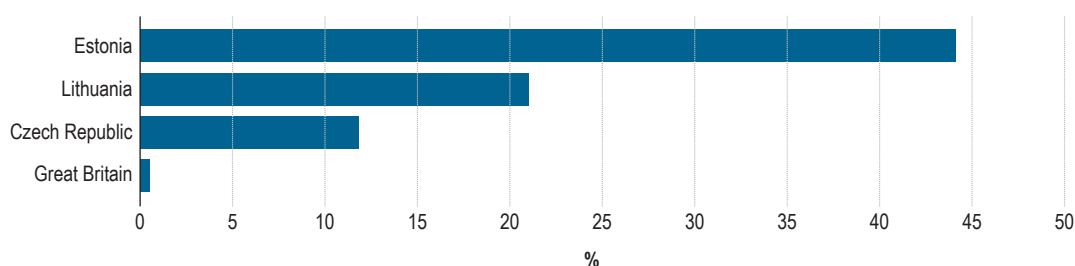
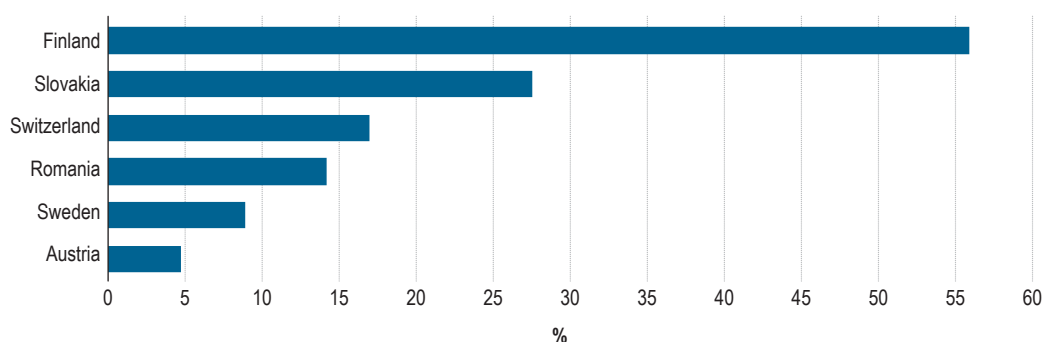


Figure 101: EU balancing capacity contracted abroad as a percentage of the system requirements of reserve capacity (upward FCR) – 2014 (%)



Source: Data provided by NRAs through the ERI, Platts and ACER calculations (2015).

Note: Only those countries which reported any level of cross-border exchange are shown in the figure.

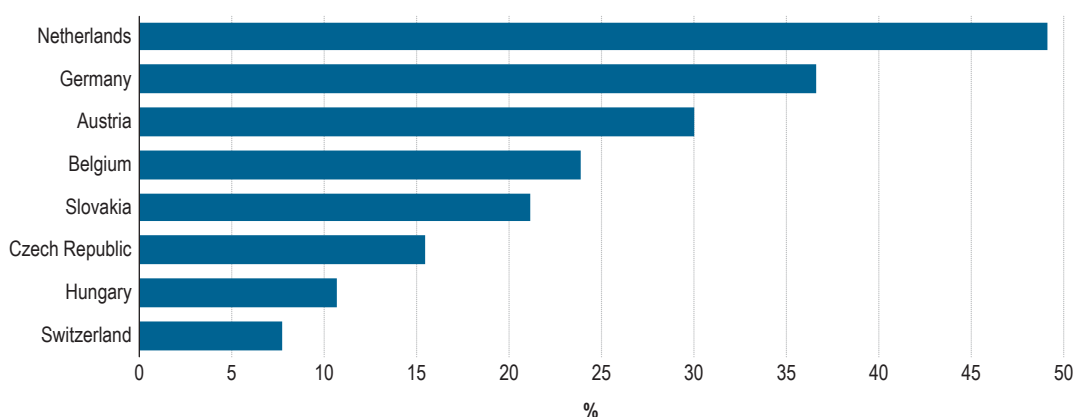
579 The markets with a relatively high exchange of balancing services include Estonia, Lithuania, and the Czech Republic, where the share of balancing energy contracted abroad was 44%, 21% and 12%, respectively, of the total activated balancing energy from upward aFRR in 2014, and Finland, Slovakia, Switzerland and Romania, where the amount of reserves contracted abroad was 56%, 28%, 17% and 14%, respectively, of the system requirements for reserve capacity for upward aFRR in 2014. The cross-border exchange of balancing services from reserves of other types than those shown in Figure 100 and

343 A TSO-TSO model is a model for the exchange of balancing services exclusively by TSOs. It is the standard model for exchanging balancing services. A TSO-BSP model is a model for the exchange of balancing capacity or the exchange of balancing energy, where the contracting TSO has an agreement with a BSP in another responsibility or scheduling area.

Figure 101 is marginal<sup>344</sup>. It should be noted that in the Nordic region, balancing energy markets are currently integrated. However, the actual exchange of balancing energy across borders within the region is not included in Figure 100 because the Nordic electricity systems are balanced as one single responsibility area and, the cross-border exchange of balancing energy cannot be easily disentangled from imbalance netting across borders and from system imbalance at the (national) TSO level.

580 An increased utilisation of imbalance netting has been recently observed in Europe. Figure 102 shows that imbalance netting currently covers an important share of the needs of balancing energy in several European markets. In the Netherlands, imbalance netting avoided almost 50% of the electricity system's needs of balancing energy in 2014. It should be noted that in the Nordic area, imbalance netting across borders is currently used to balance the electricity systems. However this is not shown in Figure 102 for the reasons explained in the previous paragraph.

Figure 102: Imbalance netting as a percentage of the total needs of balancing energy (activated plus avoided activation due to netting) from all types of reserves in national BMs – 2014 (%)



Source: Data provided by NRAs through the ERI, Platts and ACER calculations (2015).

Note: Only those countries which reported any level of cross-border exchange are shown in the figure.

581 An important part of the imbalance netting shown in Figure 102 is performed in the context of the International Grid Control Cooperation (IGCC) initiative, with the participation of the 10 TSOs from Austria, Belgium, the Czech Republic, Denmark, Germany, the Netherlands and Switzerland. Some other initiatives involve the Austrian and Slovenian TSOs through the Imbalance Cooperation (INC), the Czech Republic, Slovakian and Hungarian TSOs, through the eGCC project, the four German TSOs (GCC) and the TSOs within the Nordic Region. They all aim to perform automatic netting of electricity imbalances across control area borders. This enables all participating TSOs to reduce their activation of balancing energy and increase their disposable balancing reserves to ensure system security. According to the TSOs involved in the IGCC initiative, the efficiency gains from imbalance netting are significant, .e.g., around 50 million euros per year<sup>345</sup>.

582 While imbalance netting is important in itself<sup>346</sup>, it is worth noting that it accounts for only a part of the potential efficiency gains from the exchange of balancing energy, and in a wider sense, from BM integration. In the 2013 MMR, the potential benefits from imbalance netting and a further exchange of balancing energy were estimated at slightly more than 0.5 billion euros for a selection of 15 European borders. Based on the estimates included in the 2013 ACER Report combined with estimates included for specific borders in the Impact Assessment on European Electricity BMs prepared for the European Commission (2013)<sup>347</sup>

344 An exception is France where around 35% of the system requirements for (upward) balancing energy from mFRR and RR were fulfilled abroad in 2014.

345 See: [https://www.entsoe.eu/Documents/Network%20codes%20documents/Implementation/Pilot\\_Projects/141217\\_CBB\\_pilot\\_projects\\_overview.pdf](https://www.entsoe.eu/Documents/Network%20codes%20documents/Implementation/Pilot_Projects/141217_CBB_pilot_projects_overview.pdf).

346 Furthermore, according to Articles 21 and 22 of the draft Network Code included in Annex II to the Agency Recommendation on the Network Code on Electricity Balancing, it is envisaged that the imbalance netting process will become obligatory in the future. See link in footnote 327.

347 Report EC DG ENER/B2/524/2011, see [https://ec.europa.eu/energy/sites/ener/files/documents/20130610\\_eu\\_balancing\\_master.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/20130610_eu_balancing_master.pdf).

a recent study<sup>348</sup> has estimated that these efficiency gains, calculated for the whole of Europe, would be as high as 1.3 billion euros annually.

#### 4.3.6.3 Conclusion

- 583 In conclusion, large disparities in the prices of balancing services are observed in Europe, which suggests that further integration of (national) BMs would deliver efficiency savings. Cases of very high (average) balancing energy prices have been observed at the national level (e.g. in Austria and Hungary). This is related to highly concentrated BMs, which is not mitigated by demand or cross-border participation. Imperfections in the design of national markets can also be shown to reduce the level of competition.
- 584 The overall costs of balancing also present significant differences across countries when they are related to the level of demand. The highest overall costs of balancing compared to demand volumes are observed in Austria, the Czech Republic, Hungary, Romania and Slovakia. Although the overall costs of balancing depend, among other things, on the penetration level of renewable-based generation or the underlying costs of the available resources to provide flexibility, an adequate regulatory framework can help balance the system more efficiently. This includes, among other measures, adequate prequalification rules, which do not unduly discriminate among technologies, enable demand participation, optimise the procurement of balancing capacity (e.g. separate procurement of upward and downward balancing capacity and shorter procurement timeframes) and implement a pricing method based on marginal pricing for balancing energy.
- 585 Imbalance charges in most countries are sufficient to cover the costs of activated balancing energy and a relatively small share of the costs of balancing capacity. However, this may not be a sufficient incentive for BRPs to support an efficient balancing of the system, because the largest share of balancing costs is made up by the procurement costs of balancing capacity, which are not charged directly to BRPs through imbalance prices, but are likely to be socialised, typically through network charges. In order to address this, the priority should be given to enhance the capacity procurement rules, which should not prevent the price of balancing energy from fluctuating freely. Further, where the proportion of balancing capacity procurement costs in the overall costs of balancing remains significantly larger than the proportion of balancing energy costs, the Agency encourages NRAs and TSOs to evaluate the proposal for an additional settlement mechanism in order to ensure that the charges for BRPs reflect the full costs of balancing
- 586 The exchange of balancing services across European borders is currently very limited, particularly the cross-border activation of balancing energy and cross-border trade in balancing capacity. However, imbalance netting is significantly more widely utilised (e.g. in the Netherlands, it covers virtually 50% of balancing energy needs), and currently delivers important efficiency gains (e.g. savings of more than 50 million euros per year were reported by the 10 participating TSOs in the IGCC project). The value of further harmonisation of national designs, imbalance netting and the exchange of balancing energy in Europe is estimated at several hundred million euros per year. All in all, substantial benefits can be achieved from the exchange of balancing services and may be even higher in view of the ambitious decarbonisation target for the EU energy market. This reinforces the argument that Europe should pursue the further harmonisation and integration of BMs. The implementation of the Network Code on Electricity Balancing, once approved, should contribute to increasing the level of competition and integration of currently national or regional BMs in Europe.

#### 4.3.7 Capacity mechanisms

- 587 Several MSs have intervened or intend to intervene soon in their electricity market design by introducing a capacity mechanism (Section 4.3.7.2). While this is a reality, there remains a range of fundamental challenges (Section 4.3.7.1) that need to be addressed if these mechanisms are to be successfully implemented without introducing distortive effects on the functioning of the IEM. Moreover, pending the introduction of these often complex mechanisms, there are several important and persistent barriers (Section 4.3.7.3), such as price caps, to competitive wholesale electricity markets, which can sometimes be neglected in the policy debate. In the Agency's view addressing these issues would help inform the assessment of the

348 The benefits of integrating European electricity markets, David Newbery, Goran Strbac and Ivan Viehoff (2015), see <http://www.eprg.group.cam.ac.uk/wp-content/uploads/2015/02/EPRG-WP-1504.pdf>.

need for, and design of, the capacity mechanisms presently attracting significant attention.

#### 4.3.7.1 Challenges: making capacity mechanisms work

- 588 The key priority for the further integration of the IEM is to fully implement the ETM and to remove the remaining barriers which are preventing the European electricity market from functioning properly. In the Agency's view, establishing a well-functioning European electricity market, and the benefits this would entail, should take priority over considerations of additional capacity mechanisms. Furthermore, where the introduction of a capacity mechanism is considered necessary, it should be based on a robust and coordinated regional resource adequacy<sup>349</sup> assessment, taking into account the contribution of (cross-zonal) interconnections and identifying the cause of any current or prospective adequacy problem.
- 589 The contribution of interconnections to adequacy is particularly challenging in terms of TSO cooperation as it requires TSOs on each side of the interconnection i) to agree *ex-ante* on a reliable amount of cross-border capacities available for cross-border trade throughout the year(s); and ii) to agree *ex-ante* on the treatment of local adequacy providers in the case of a widespread shortage emergency situation (i.e. a situation in which a shortage emergency situation affects at least two countries simultaneously).
- 590 At present, several MSs have a capacity mechanism in place, or plan to, which, in the Agency's view, does not take full account of these considerations. The rationale behind these interventions usually rests on two main principles: the precautionary principle (some MS fear that market price signals alone will not deliver sufficient capacity to meet future demand at all times) and the subsidiarity principle (some MSs argue that the contribution of interconnections cannot be fully reliable as long as security of supply remains a solely national prerogative).
- 591 Should an MS decide to implement a capacity mechanism, in the Agency's view it is imperative that this does not distort the functioning of the IEM. Possible distortions include the following: in the short term, a capacity mechanism may lead to distortions if its design affects natural price formation in the energy market (e.g. bids for energy); in the long term, a capacity mechanism may, if contributions from cross-border capacity are not appropriately taken into account, lead to over-procurement of capacity in countries implementing capacity mechanisms, with a detrimental impact on consumers.
- 592 Therefore, if, after a coordinated assessment of resources adequacy, the introduction of a capacity mechanism is still considered necessary, in the Agency's view the capacity mechanism should be market-based and have regional scope, or at least allow cross-border participation by resources located in other jurisdictions. To facilitate and implement this cross-border participation, a high degree of cooperation between TSOs, and probably NRAs and MSs, is essential.

#### 4.3.7.2 State of play

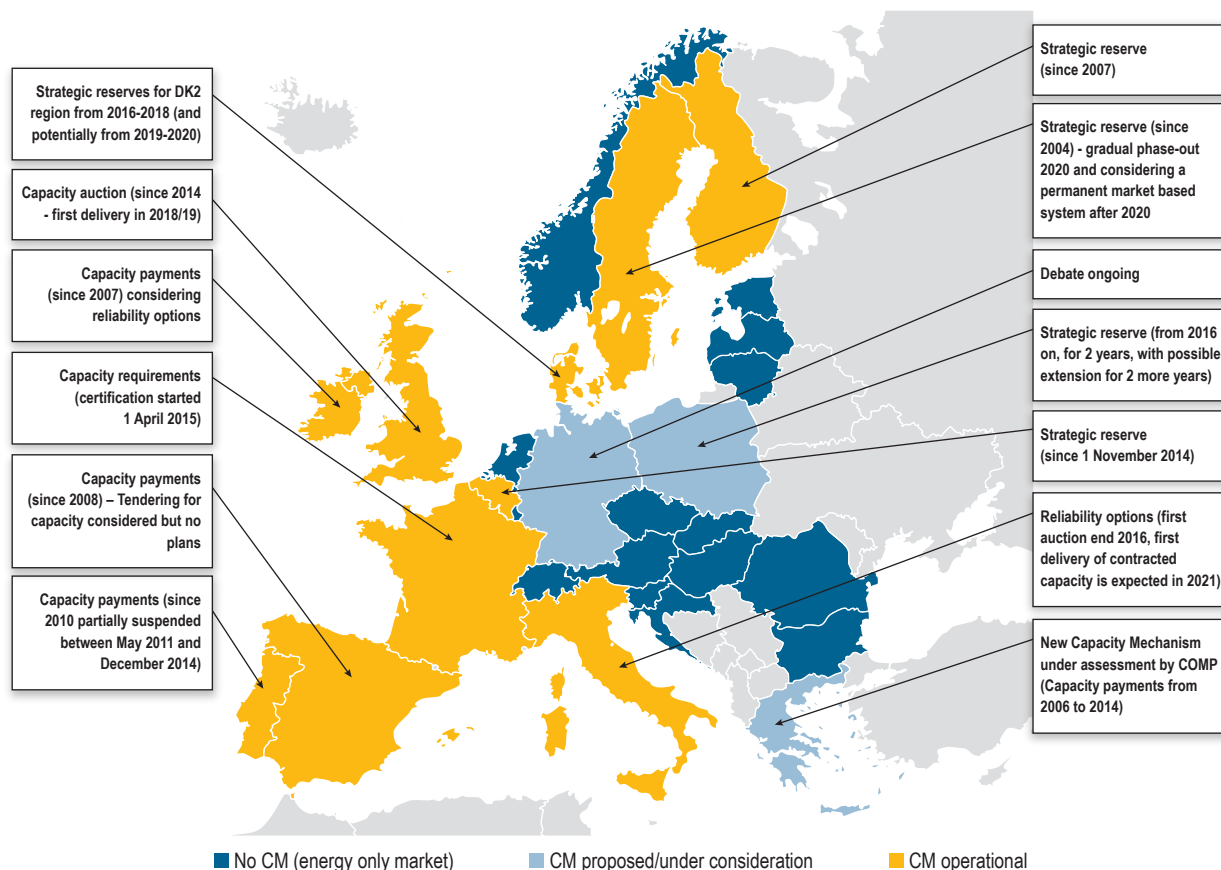
- 593 Figure 103 presents an overview of the types of capacity mechanisms<sup>350</sup> in place or under consideration in Europe, and shows that Ireland and Northern Ireland, Italy, Finland, Greece, Portugal, Spain, Sweden have already implemented a capacity mechanism. Italy, Ireland and Greece had previously used less sophisticated capacity schemes and intend to introduce a more advanced scheme, i.e. Ireland and Italy intend to introduce (central) reliability options. Regulatory changes in a market design can create uncertainties for investors, in generation, for example. To counteract this, a robust and enduring market design should be implemented which minimises the need for frequent or further modifications. France, Great Britain and Poland have also introduced a scheme, and Belgium is considering doing so.
- 594 The figure also illustrates the diversity of approaches from one MS to another. Capacity Payments tend to

349 MSs can, and should be, allowed to require different levels of adequacy. However, the level of adequacy is not directly related to the design of a capacity mechanism and falls outside the scope of this section.

350 A variety of capacity mechanisms have been proposed. They can be classified according to whether they are volume-based or price-based. Volume-based capacity mechanisms can be further grouped into targeted and market-wide categories. For the taxonomy of main capacity mechanisms, see: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/CRMs%20and%20the%20IEM%20Report%20130730.pdf).

be phased out (Italy, Ireland and Greece) while strategic reserves, (centralised) reliably options and capacity obligations (decentralised) appear to be the most frequently applied schemes. These three schemes can be characterised as market-based and quantity setting.

Figure 103: Capacity Mechanisms in Europe – 2015



Source: NRAs (2015).

Note: In Germany, on 10 July 2015 Bundesnetzagentur informed the Agency that according to their assessment of a white paper<sup>351</sup> it is not clear whether the envisaged 'Capacity and Climate Reserves' (CCR) could be considered a capacity mechanism. In Poland: The mechanism in Poland envisaged for after 2016 includes generation units tendered by the TSO, which would definitely have been decommissioned by the end of 2015. This scheme has the characteristic of a strategic reserve capacity mechanism.

595 To date, no MS has introduced a scheme that accommodates explicit<sup>352</sup> cross-border participation. The immediate consequence of this is that foreign adequacy providers are likely to be discriminated against national adequacy providers. However, the capacity mechanisms in France and Great Britain have organised cross-border participation implicitly<sup>353</sup> and France is preparing an explicit scheme for future implementation. In Great Britain, interconnectors will be included in the mechanism for the first time as part of the 2015 auctions for delivery in winter 2019/2020. Consequently, interconnectors will bid into the capacity auction in a similar way as generators and DSR. In the forthcoming Italian scheme, cross-border participation is implicitly organised and it is envisaged to enable foreign capacity providers to contribute to the national system adequacy on an equal basis with the domestic resources as of 2021<sup>354</sup>. By contrast, Belgium, Denmark, Spain, Portugal and Poland have purely national schemes.

351 See: <http://www.bmwi.de/DE/Mediathek/publikationen,did=718200.html> and a version in English is available here <http://www.bmwi.de/English/Redaktion/Pdf/weissbuch-englisch,property=pdf,bereich=bmwi2012,sprache=en,rwb=true.pdf>.

352 Explicit participation means that foreign adequacy providers can directly participate in a capacity mechanism in a given MS and receive remuneration.

353 Implicit cross-border participation refers to an approach of calculating probabilistic contributions of imports to the generation adequacy standards. Foreign adequacy providers do not receive remuneration.

354 See: [http://www.autorita.energia.it/allegati/pubblicazioni/150610\\_SectorInquiry.pdf](http://www.autorita.energia.it/allegati/pubblicazioni/150610_SectorInquiry.pdf).



### 4.3.7.3 Barriers to a well-functioning European electricity market

- 596 In a well-functioning electricity market, prices should be allowed to vary unhindered in a way which optimises EU generation schedules in the short term and efficiently determines the optimal composition of the energy mix in the long term, including during shortage situations<sup>355</sup>.
- 597 During such shortage situations, the margin between available capacity and (peak) demand may tighten, and electricity prices will rise above marginal operating costs to include a ‘scarcity premium’, potentially up to the ‘value of lost load’ (VoLL)<sup>356</sup>. During these hours, all generating plants in the merit-order (e.g. base-load, intermediate and peaking plants) receive a price which contributes to the recovery of their fixed costs<sup>357</sup>.
- 598 In a well-functioning electricity market, the occurrence and magnitude of scarcity prices should be sufficient to attract the required level of investment. In the absence of such price spikes and without any other revenues (e.g. from the provisions of ancillary services), existing peak plants might exit the market without being replaced. This would simultaneously increase the frequency of scarcity conditions and scarcity prices, while reducing the market’s ability to respond.
- 599 Where demand is sufficiently price responsive, a well-functioning electricity market will deliver full adequacy, albeit at the cost of some demand ‘voluntarily’ reducing consumption when, during (rare) shortage situations, prices are allowed to reach VoLL levels. This is because, given the definition of VoLL, no consumer is willing to pay a price for energy higher than VoLL.

#### Price caps

- 600 The way a well-functioning electricity market theoretically achieves market equilibrium and adequacy may be politically sensitive in some MSs. The message that occasional price spikes can safeguard security of supply and deliver lower prices in the long run can be a difficult one to convey. The same sensitivities may have motivated some MSs to introduce wholesale prices-caps<sup>358</sup> in the past to protect consumers from being exposed to extremely high prices.
- 601 Price caps are sometimes a regulatory response to the fact that it can be difficult to discriminate between price spikes that are a result of scarcity during times of system stress and price spikes that are the result of suppliers exercising market power. The same arguments that consumers could be exposed to such risks are now being used in connection with capacity markets, but in the Agency’s view the same arguments can be used to counter this fear, namely that concerns over the abuse of market power should be addressed by adequate (competition) enforcement efforts, rather than introducing additional market interventions.

#### Balancing markets

- 602 Electricity market deficiencies in individual countries (rather than deficiencies in the functioning of energy only markets per se) may imply that the market does not meet its security of supply obligations through sufficient capacity, at least not in the most efficient way. For instance, as shown in Figure 104, some MSs such as Austria, Belgium, Croatia, Germany, Italy, Slovakia and Slovenia apply “Pay as bid” rules in energy balancing regimes. This provides weak incentives, as opposed to marginal pricing, where prices can be much higher and therefore better able to compensate for the fixed costs of peak plant. During the balancing timeframe, it is important to have prices which reflect the adequate value of electricity in order to send the appropriate scarcity signals to the market and ensure that supply responds to demand.

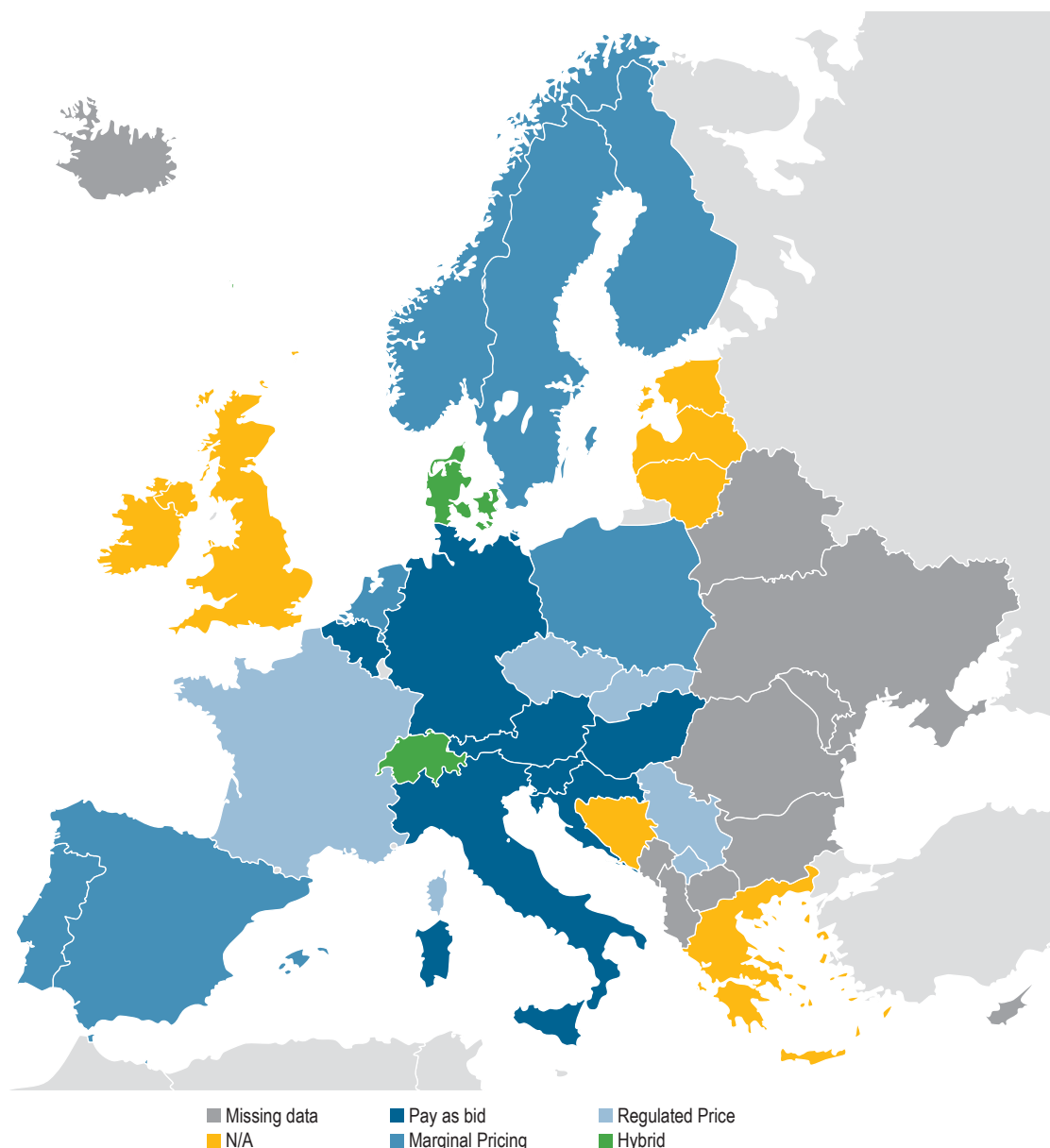
355 For an elaborate explanation of how well-functioning electricity markets contribute to adequacy, see footnote 351.

356 VoLL is defined as the value attributed by consumers to unsupplied energy. Therefore, it represents the maximum price that consumers are willing to pay to be supplied with energy, and at that price they will be indifferent between, on the one hand, being supplied and paying the price and, on the other hand, not being supplied (and pay nothing). VoLL is typically quite high (e.g. several thousands of euros per MWh) and not necessarily the same for each (group of) consumer, thus enabling voluntary DSM activation by consumers before the VoLL is reached.

357 Even in the absence of scarcity, most dispatched plants receive an “infra-marginal rent” (i.e. the difference between the market price and the variable cost of the plant) which can be used to cover fixed costs.

358 In retail markets, MSs may have also introduced regulated retail prices to protect consumers.

Figure 104: Settlement rules for balancing payments for energy



Source: ENTSO-E (2013); [https://www.entsoe.eu/fileadmin/user\\_upload/library/publications/entsoe/ENTSO-E\\_2013\\_Survey\\_on\\_AS\\_Procurement\\_and\\_EBM\\_design.pdf](https://www.entsoe.eu/fileadmin/user_upload/library/publications/entsoe/ENTSO-E_2013_Survey_on_AS_Procurement_and_EBM_design.pdf), page 35.

603 Moreover, the penetration of renewable generation has challenged the investment paradigm based on a well-functioning electricity market. Due to penetration, the hours during which thermal generators produce are decreasing. Although thermal generation contributes to cover demand during periods of low renewable generation, it is becoming increasingly viewed as a risky investment, as revenues are squeezed into fewer hours of operation.

604 With fewer hours of operation for thermal plants, it becomes increasingly important that prices can fluctuate freely and reflect the true price for energy in any given timeframe. This should include prices at very high levels during rare moments of scarcity. However, due to the aforementioned pay-as-bid regimes, energy prices do not always rise to reveal the true value of electricity during the balancing timeframe. This impacts the profitability of these thermal operators, which further reduces the robustness of the contribution of a well-functioning electricity market to adequacy.

605 Moreover, appropriate price formation should attract DSR. This refers to the changes consumers make to their energy use in response to some form of signal, such as prices, that help manage the electricity

system. While this needs to be assessed further, more active participation of demand in the system should contribute to more efficient balancing of the system i.e. consumers reduce demand before scarcity prices are reached. In addition, a permanent participation of DSR should smooth the load curve, i.e. reduce the level of peak demand and contribute to less costly long-term adequacy. A well-functioning market and an appropriate regulatory framework are the key elements in promoting DSR participation. Interventions which artificially adjust prices prevent this efficient market discovery.

606 Another (regulatory) intervention impacting the well-functioning of electricity markets stems from the fact that, in several MSs, renewable-based generators do not need to balance, i.e. these market participants are not held financially responsible for their positions in the balancing timeframe. Table 16 shows in the eighth column that four out of 13 Member States exclude renewable-based generators from balance responsibility, and in three MSs renewable-based generators are only partially balance responsible<sup>359</sup>. Making renewable-based generators balance responsible will correctly incentivise them, and sufficient liquid ID markets would facilitate this.

#### 4.3.7.4 Conclusion

607 The capacity mechanism results show that important barriers to a well-functioning electricity market remain, including wholesale price caps and a lack of marginal pricing in some BMs. Removing these barriers will contribute to efficient price formation, thereby attracting all available resources for adequacy, including DSR resources. Moreover, at present, a patchwork of different capacity mechanisms based on uncoordinated adequacy assessment methodologies is applied across the EU. This inhibits efficient price discovery and adequacy investment.

## 4.4 Recommendations

608 There is significant scope to improve cross-zonal capacity calculations to use interconnectors more efficiently. The Agency recommends TSOs to implement FBMC, execute more frequently capacity calculation computations near gate closure time, and when doing so, coordinate better these calculations among TSOs regionally.

609 UFs continue to distort the functioning of the IEM. The impact of UAFs can be mitigated by improving cross-zonal capacity calculations and to mitigate LFs, the Agency recommends a comprehensive review of bidding zones, although leaving the possibility of redesigning the current system open.

610 The monitoring results for forward markets show that the various cross-border hedging tools occasionally display large risk premia, which can be considered as an inefficient market outcome. Largely negative risk premia are observed on some borders where TRs are offered, e.g. on the Italian borders with Greece, France and Switzerland and on the border between Austria and Hungary. The Agency recommends monitoring these markets, to implement stronger firmness regimes and market coupling. Moreover, where competition in the auctioning of TRs remains weak after applying these measures, it would be advisable to adjust the products offered by TSOs to the hedging needs of market participants. Cases of significant positive risk premia are observed in the contract for differences (EPADs) that are traded in the Nordic and Baltic markets, e.g. in Sweden 4 and Denmark East. These significant risk premia may act as a barrier to new suppliers, reducing the scope for competition, in retail markets, for instance. The cases of high risk premia are associated with low liquidity and concentration in generation and in the supply side of EPADs in the affected areas. Both elements require further monitoring, and where liquidity remains weak, different solutions (e.g. by giving additional roles to TSOs, such as acting as or supporting market makers) need to be explored.

611 The significant welfare gains for EU consumers from DA market coupling show once again that market coupling should be extended without delay to the remaining 12 out of 40 EU borders.

359 See also CEER paper C10-SDE-16-03 on the regulatory aspects of integrating wind generation, see [http://www.energy-regulators.eu/portal/page/portal/EER\\_HOME/EER\\_PUBLICATIONS/CEER\\_PAPERS/Electricity/2010/C10-SDE-16-03\\_CEER%20wind%20conclusions%20paper\\_7-July-2010.pdf](http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/2010/C10-SDE-16-03_CEER%20wind%20conclusions%20paper_7-July-2010.pdf).

- 612 To attract more ID liquidity in order to provide more robust price signals, several measures are suggested. Cross-border GCTs should be moved to at least one hour before real time, and national GCTs should be moved to as close to real time as possible. More ID product variety should be offered, including products with shorter market time units (15-minute-products). Balancing responsibility for renewable generators should be implemented, while making sure that imbalance charges reflect the full costs of balancing the electricity system. An adequate capacity recalculation should be performed in the ID timeframe in order to increase ID cross-border capacity. Furthermore, the potential contribution of regional ID implicit auctions to increasing liquidity should be explored.
- 613 The Report shows large disparities in the prices of balancing services and in the average costs – including energy and capacity components – of balancing for end-consumers in Europe. Factors that explain these disparities include the underlying costs of the available resources to provide flexibility and the level of competition in BMs, which are often national in scope. Competition could be improved by improving adequate prequalification rules which do not unduly discriminate among technologies, including demand-side flexibility. Further improvements include optimising the procurement of balancing capacity, which should not interfere with balancing energy price formation, and implementing a pricing method based on marginal pricing for balancing energy. Lastly, the Agency encourages NRAs and TSOs to consider an additional settlement mechanism in order to ensure that the charges for BRPs reflect the full energy and capacity costs of balancing.
- 614 In addition to improving the performance of BMs at national level, the Report shows that further benefits could be obtained through increased cross-border exchanges of balancing energy, (including imbalance netting), which are estimated at several hundred million euros per year and may even be higher in view of the ambitious decarbonisation aims of the EU energy market. The implementation of the Network Code on Electricity Balancing, once approved, should contribute to balancing the systems more efficiently and to increasing the level of competition and integration of BMs in Europe.
- 615 As regards long-term adequacy, the Agency recommends that system adequacy analysis should be performed regionally (to strengthen cooperation among TSOs) and should encompass cross-border flows and their impact on system adequacy. It is important that coordinated adequacy assessments properly take into account the real contribution of (cross-zonal) interconnections and prevent discrimination between foreign and local adequacy providers. Moreover, fully removing remaining barriers to the well-functioning of electricity market remains a key priority. These barriers include wholesale price caps and lack of marginal pricing in some BMs.

## 5 Gas wholesale markets and network access

### 5.1 Introduction

616 The EU gas IEM is dependent on the development of a number of liquid and competitive wholesale markets. If wholesale markets are well integrated via sufficient interconnection capacity and appropriate access mechanisms, then competition will work to the benefit of all consumers, putting downward pressure on end-user retail prices and ensuring the security of energy supply.

617 The responsibilities of the Agency, as set out in the 3<sup>rd</sup> Package, are primarily concerned with facilitating the IEM. The Gas Target Model (GTM) proposes a hub-to-hub trading frame, aimed at promoting competition and sharing its benefits across the EU<sup>360</sup>. The provisions enshrined in the gas Framework Guidelines (FGs) and Network Codes (NCs) support this model. At the same time, the EU Infrastructure Package<sup>361</sup> contributes to the establishment of integrated wholesale markets by promoting the development of adequate cross-border transmission infrastructure. In addition, and in order to mitigate the lack of transparency in wholesale markets, REMIT<sup>362</sup> prohibits insider trading and market abuse and aims at deterring them through the establishment of a surveillance regime for wholesale energy trading.

618 This chapter first explores, in Section 5.2, the main developments that impacted EU gas wholesale markets during 2014 and continues by discussing, in Section 5.3, price evolution, competition and liquidity indicators, highlighting reasons behind the EU market areas varying degrees of functionality. The same section also presents estimates of the theoretical welfare losses that each individual MS faces due to lack of a fully integrated gas IEM. Network access issues such as cross-border capacity utilisation, gas flows, and transmission tariffs are tackled in Section 5.4. This section also provides a detailed analysis of the evolving role of gas storage. Particular focus this year is dedicated to the progress of reverse flow capability in the Central Eastern European region (Section 5.4.2) and to the gas market implications of the Russia–Ukraine dispute (Section 5.4.3). Finally, recommendations are proposed in Section 5.5.

### 5.2 Gas wholesale developments

619 This section focuses on EU-specific and selected relevant international market developments in demand, price (5.2.1) and supply (5.2.2).

#### 5.2.1 Demand and price developments

620 EU gas consumption totalled 4.460 TWh in 2014, falling by almost 11% compared to 2013. There are a number of reasons for this decline. First of all, 2014 gas demand was influenced by milder weather conditions, particularly during the first part of the year. However, a series of more structural<sup>363</sup> causes also explain the continued fall: slow economic recovery, relocation of energy-intensive industrial production outside of the EU, energy-efficiency improvements and lower gas demand for electricity generation, given weak gas-to-power economics. The latter was influenced by more competitive coal prices<sup>364</sup>, increasing RES penetration and stagnating electricity demand.

360 The GTM envisages a competitive and integrated European gas market constituted of entry-exit market zones with liquid virtual trading points in them; market integration is served by the right amount of infrastructure, utilised efficiently, which enables gas to move freely between market areas to where it is valued highest. The 2011 GTM was updated in 2014. It defines a number of parameters for assessing wholesale market performance.

361 See Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure : <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:en:PDF>.

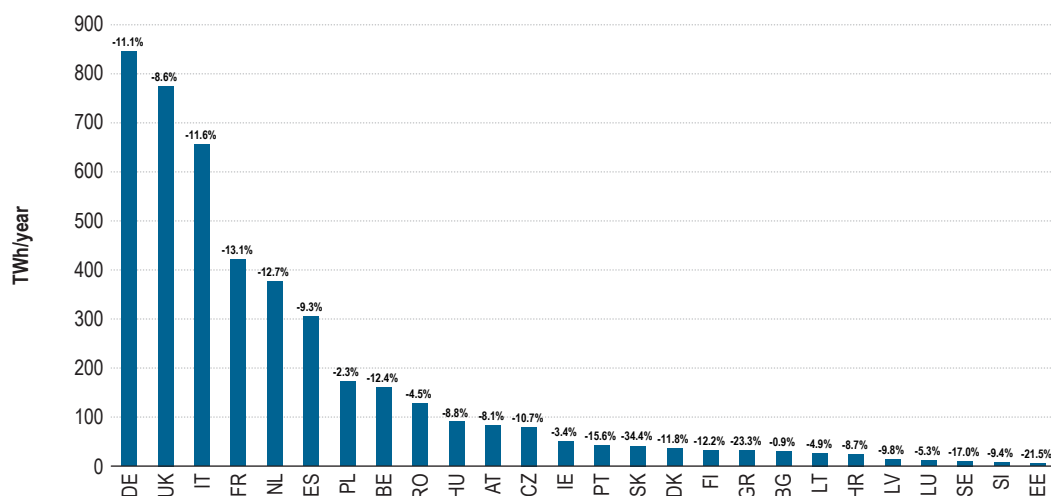
362 Regulation (EU) No 1227/2011 on wholesale energy market integrity and transparency <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32011R1227>.

363 EU gas consumption decreased year-on year by 1.2% in 2013, 2.2% in 2012 and 10.5% in 2011.

364 Overall, the availability of cheap coal imports and the low price of CO<sub>2</sub> allowances caused gas to remain less profitable than coal-fired generation during the year.

621 The extent of the demand decline varied among countries, with large gas users like Germany, Italy, France and the Netherlands showing more than 10% falls.

Figure 105: EU gross inland consumption – 2014 (TWh/year and % variation with respect to 2013)



Source: Eurostat (Data series nrg\_103m, July 2015).

622 Apart from macroeconomic parameters, energy efficiency achievements and (relative) energy prices, future EU gas demand evolution will also depend on policy actions, notably CO<sub>2</sub> pricing, taxation of fuels and environmental goals.

623 According to the IEA, gas consumption in Europe may only return to 2010 levels in the early 2030s<sup>365</sup>. European Commission projections<sup>366</sup> envision flat gas demand at 2010 levels up to 2030, driven by increasing RES penetration and strong energy-efficiency improvements.

624 There are, however, prospects that certain innovative technological developments, in combination with environmental legal requirements, could counteract the decline in EU gas consumption<sup>367</sup>. These developments particularly point to an increase of gas use in land and marine transportation, in both liquefied (LNG) and compressed (CNG) forms, and they could account for between 3% and 15% of EU gas demand in 2025. This potential growth area will be driven by market and regulatory issues, including gasoline/diesel vs gas price dynamics, taxation levels, infrastructure availability<sup>368</sup> and market uptake.

625 Lower demand is one of the leading contributors to the significant wholesale prices reductions observed during most of the year. As a result of lower demand, trading positions of both over-contracted shippers and spare capacity producers were affected. Hub price falls during the summer months were also likely to have been driven by relatively low gas storage injections, itself a consequence of relatively high gas storage stock levels due to the warm 2013/2014 winter season (see Section 5.4.4). Prices recovered to some extent in autumn, probably due to market risk sentiments linked to the Russia–Ukraine crisis and winter demand recovery.

626 Lower prices were not only noticeable in hub products, but also in long-term contracts, as these tend to be increasingly linked to hub prices. This will be illustrated further in Section 5.3.1. In fact, the downward trend

365 See IEA World Energy Outlook 2014 fact sheet: [http://www.iea.org/media/news/2014/press/141112\\_WEO\\_FactSheet\\_FossilFuels.pdf](http://www.iea.org/media/news/2014/press/141112_WEO_FactSheet_FossilFuels.pdf).

366 See European Commission 2013 PRIMES energy demand modelling up to 2050: [https://ec.europa.eu/energy/sites/ener/files/documents/trends\\_to\\_2050\\_update\\_2013.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/trends_to_2050_update_2013.pdf).

367 For a review of the developments, technical features and growth forecasts, see the ACER study by Kantor: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/Regulatory%20Implications%20of%20New%20Developments%20in%20the%20Gas%20Supply%20Chain.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/Regulatory%20Implications%20of%20New%20Developments%20in%20the%20Gas%20Supply%20Chain.pdf).

368 See EU map of gas filling stations current availability here: <http://www.ngvaeurope.eu/european-ngv-statistics>. Italy and Germany have the highest uptake in absolute numbers.

was also probably a consequence of the ongoing renegotiation of existing long-term contracts. Producers are showing an increased willingness to break open these contracts (when not forced by arbitration settlements), presumably as a strategy to preserve market share in a progressively more competitive market. They do so in response to shippers' demand to more closely align the price paid for gas contracts with hub prices<sup>369</sup>. This involves adding more hub indexation elements to the contract or price adjustments via rebates in order to compensate for the gap. Moreover, some producers are also offering reductions in the minimum off-take volumes. Furthermore, there is evidence that Norwegian<sup>370</sup> and Dutch producers are quite actively trading on hubs with the goal of gaining more direct influence on price formation. Gazprom is also gradually increasing its direct trading presence on EU hubs<sup>371</sup>, which, according to some market analysts, is modifying its traditional oil-indexed long-term export business strategy. However, on the whole, Gazprom and other key producers like Sonatrach and several LNG exporting companies continue to prefer long-term bilateral contracting. Their argument is that stability of long-term contracts is crucial for financing gas fields and transmission infrastructure development, and that they also provide higher supply security and volume flexibility<sup>372</sup>.

- 627 Another key factor explaining lower EU gas prices was the decrease in international oil prices, which happened in the context of weaker demand and increased competition among producers<sup>373</sup>. The reduction in oil prices reduced the charges applicable to oil-indexed gas contracts<sup>374</sup> and this exerted further downward price pressure on hubs. Oil price reductions were observed in the second half of 2014. As gas prices track oil prices with a lag of several months, their effects are further observable in 2015 (Figure 109). Expectations about further price reductions in oil-indexed long-term gas contracts are encouraging shippers to delay the purchase of the amounts of gas acquired under these contractual supply mechanisms<sup>375</sup>.
- 628 The global price of LNG also has a bearing on EU gas wholesale prices. The global price of LNG declined in 2014 due to several factors: lower than expected demand in Japan, Korea and China<sup>376</sup>; growing supply competition from newly commissioned liquefaction capacity in the Asian-Pacific basin (and soon from the US<sup>377</sup>); and falling oil prices reducing oil-indexed LNG long-term contract charges<sup>378</sup>. This put downward pressure on EU gas prices for two reasons. First, by lowering the prices of oil-indexed LNG supply contracts commonly found in the Mediterranean region, and second, as significant volumes of price competitive and destination flexible LNG – previously attracted to Asian markets – came to shore in Europe, in a market already characterised by oversupply and storage glut. This scenario was mainly observed at the end of 2014 and primarily affected the UK. As spot-priced LNG vessels are one of the important elements in setting marginal hub prices, they reinforced EU hub price reductions and exerted competitive pressure on pipeline imports.

369 Renegotiated terms may be applicable only during certain periods. Arbitration tribunals have generally supported shippers' petitions to renegotiate prices downwards with the argument that contracts are intended to allow buyers to resell the gas at a certain profit.

370 Statoil announced in late 2013 that by 2015, 75% of its supply contracts to the EU would be hub-linked priced, though reducing in return the volume flexibilities. The company is also increasing its direct trading presence on hubs.

371 Gazprom delivered in 2013 11bcm of gas at EU hubs, additional to 162bcm in long-term contracts. See: [http://www.gazprom.com/files/posts/28/866895/gazprom\\_investor\\_day\\_presentation\\_2014\\_-\\_ny.pdf](http://www.gazprom.com/files/posts/28/866895/gazprom_investor_day_presentation_2014_-_ny.pdf).

372 According to market analysts, Gazprom will continue to deliver most gas through bilateral long-term contracts, even if those volumes are expected to be gradually more indexed to gas hub prices. Sonatrach has been willing to make concessions on volume or price levels, but is less keen to modify the oil price linkage.

373 Spot oil prices declined from 115 to 58 dollars/barrel from June to December 2014. The supposed main reasons are: weaker global oil demand, rising US domestic production and the Saudi response to keep market share, USD appreciation and lower oil forward-price value expectations.

374 Oil values linked to EU long-term gas contracts are usually priced in USD, hence the USD/Euro exchange rate impacts the price formation of supplies. USD appreciation during 2014 moderated the impact of falling oil prices.

375 See an analysis of the implications of reduced oil-indexed prices over hub price formation and volume profiling here: <http://www.timera-energy.com/commodity-prices/european-hub-prices-under-pressure-in-2015/>.

376 Asia accounts for two thirds of global LNG deliveries. Japan's intention to reopen nuclear plants in 2015, increasing RES and coal power generation, modest economic growth and mild weather conditions contributed to falling demand.

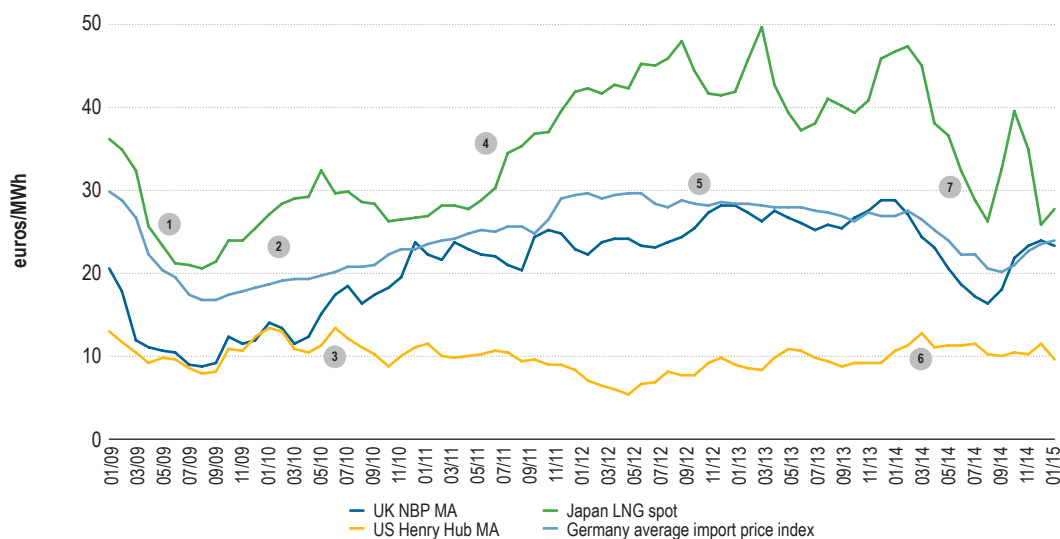
377 US LNG exports could commence at the end of 2015.

378 LNG global supplies, particularly Asian LNG markets, are chiefly sourced under oil-indexed long-term contracts. Asian LNG prices typically show a 3 to 5 month lag to oil prices. Anticipating lower LNG oil-indexed prices at the onset of 2015, purchases were reduced at the end of 2014, freeing up gas volumes that traded in spot markets with a discount.

629 The price reduction registered in European wholesale markets reduced the gas price spread with the US market<sup>379</sup>. However internal shale gas production and greater market competition keeps US wholesale prices as low as half of those in the EU on average. In the future, if US LNG export capacity becomes available, Henry-Hub prices, adjusted for liquefaction, shipment and regasification costs, may provide an extra signal for EU gas price formation<sup>380</sup>.

630 Figure 106 provides an overview of international wholesale gas price evolution in recent years, using most representative continental price indicators. It puts in context the 2014 market events referred to in previous paragraphs.

Figure 106: International wholesale gas price evolution – 2009 to 2014 (euros/MWh) and event analysis



Source: Platts, Thomson Reuters, BAFA and ACER calculations.

Notes: Numbers point to key market events impacting gas prices: 1 – Falling demand, triggered by the global economic slowdown, putting downward pressure on international prices. 2 – Rising oil prices and growth in emerging markets led to increases in oil-indexed gas long-term contract prices. 3 – Domestic US shale gas production large enough to have a downward impact on internal gas price. 4 – Fukushima disaster, leading to the closing of Japanese nuclear plants and a rise in natural gas demand, pushing gas prices up. 5 – Shippers' pressure on upstream producers to renegotiate long-term gas contract prices and linking them further to hub references; the price gap between hubs and long-term contract prices being reduced. 6 – Dollar appreciation resulting in higher US prices quoted in euros. 7 – Falling Asian and EU demand and the initial decline in oil prices put downward pressure on gas prices.

## 5.2.2 Supply developments

631 With regard to supply contracts, bilateral long-term contracts still form the basis of gas procurement in the majority of EU MSs. These contracts increasingly contain hub elements in their price indexation formulas. References to other commodities such as oil are still quite common, however. According to the International Gas Union<sup>381</sup>, hub-price-linked long-term contracts, together with physical volumes purchased on hubs, comprise 61% of supplies across the European continent. Nonetheless, substantial differences exist between MSs (see Section 5.3).

379 US prices went up at the beginning of the year, mainly due to weather patterns, and stabilised from the second quarter at similar to 2013 values. The appreciation of the dollar versus the euro contributed to reduce the US-EU spread. See: <http://www.eia.gov/forecasts/steo/report/natgas.cfm>.

380 According to the estimates of some market analysts, the investment decision on new LNG liquefaction projects for exporting gas from the US into the EU would require an expectation of a Henry Hub–EU price spread of about 7-8 euros/MWh (i.e. about 30% of present EU price levels). This spread is taken as the threshold, which should compensate for the LNG exports value-chain cost: tolling fees plus liquefaction, shipment and regasification costs. Nonetheless, LNG value-chain costs are very project-specific, depending on a number of technical, contractual and financial aspects. See, for example, an analysis of the topic on: [http://www.igu.org/sites/default/files/node-page-field\\_file/IGU%20-%20World%20LNG%20Report%20-%202014%20Edition.pdf](http://www.igu.org/sites/default/files/node-page-field_file/IGU%20-%20World%20LNG%20Report%20-%202014%20Edition.pdf).

381 See IGU 2015 price survey: [http://www.igu.org/sites/default/files/node-page-field\\_file/IGU%20Whole%20Sale%20Gas%20Price%20Survey%20Report%20-%202015%20Edition.pdf](http://www.igu.org/sites/default/files/node-page-field_file/IGU%20Whole%20Sale%20Gas%20Price%20Survey%20Report%20-%202015%20Edition.pdf).



- 632 Long-term contracts in the EU are estimated to make up 70% of volumes delivered to the market. Because of their ‘Take or Pay’ obligations, these contracts can be considered as relatively inflexible mechanisms of supply, because the volumes committed cannot vary substantially in response to temporary changes in prices<sup>382</sup>. The importance of long-term contracts differs by MS<sup>383</sup>, but overall their share is decreasing.
- 633 For several years, a robust hub development market trend, whereby hubs play the role of central venues for gas trading and physical hedging of supply portfolios, has been observed. EU gas hubs’ liquidity significantly increased again in 2014. The reasons for this include: gas hubs, helped by the presence of adequate entry-exit transportation systems and virtual trading point (VTP<sup>384</sup>) configurations, facilitate liquidity concentration; hub price-formation more closely follows short-term gas market fundamentals, mirroring better final consumers’ price expectations; hub hedging allows shippers to manage their financial exposure to long-term contracts and facilitates price risk management; hubs used for balancing operations attract spot liquidity; and, last but not least, EU regulation supports gas hub trading. Section 5.3.1 provides a more detailed analysis of these factors.
- 634 Against this background, a market dynamic has emerged over recent years that imposes competitive price pressure on midstream companies. These companies are often forced to purchase significant shares of gas through prevailing, often more expensive, long-term contracts. However, they may need to adjust their selling prices to hub price references to meet consumers’ expectations. Furthermore, they may also be increasingly competing with upstream producers that are selling gas on hubs. Consequently, the margins of wholesale commodity sales are reduced. This compels midstream companies to adapt their contract portfolios and sales strategies<sup>385</sup> and to ask for the renegotiation of their contract terms.
- 635 As a consequence of these factors, EU gas price formation is more closely responding to gas-on-gas competition. Further market integration combined with increasing competition among upstream suppliers could further bring down sourcing costs. However, EU gas prices are higher<sup>386</sup> than those in US, Australia, the Middle East, Central Asia and most of South America, and this is not expected to change in the short term. A significant reason for this may be the relatively limited domestic production of gas in the EU, which means EU consumers tend to be price takers rather than price setters. Expanding EU domestic production, and the downward pressure this could exert on EU gas wholesale prices, is one of the factors that advocates of developing shale gas cite in its favour.
- 636 Figure 107 presents recorded international gas traded volumes during 2014, with a focus on the EU, and underlines EU dependency on gas imports.

382 A distinctive aspect of long-term contracts is that they contain annual contracted procurement quantities (ACQs). Take-or-pay yearly obligations (ToP) typically range round 70–80% of the ACQ, and also upward purchases are usually allowed until 110–120%. It is also usually possible to carry forward the non-procured gas to following years. Contracts also usually provide the option of daily swing flexibilities – nominated volumes – within a certain range.

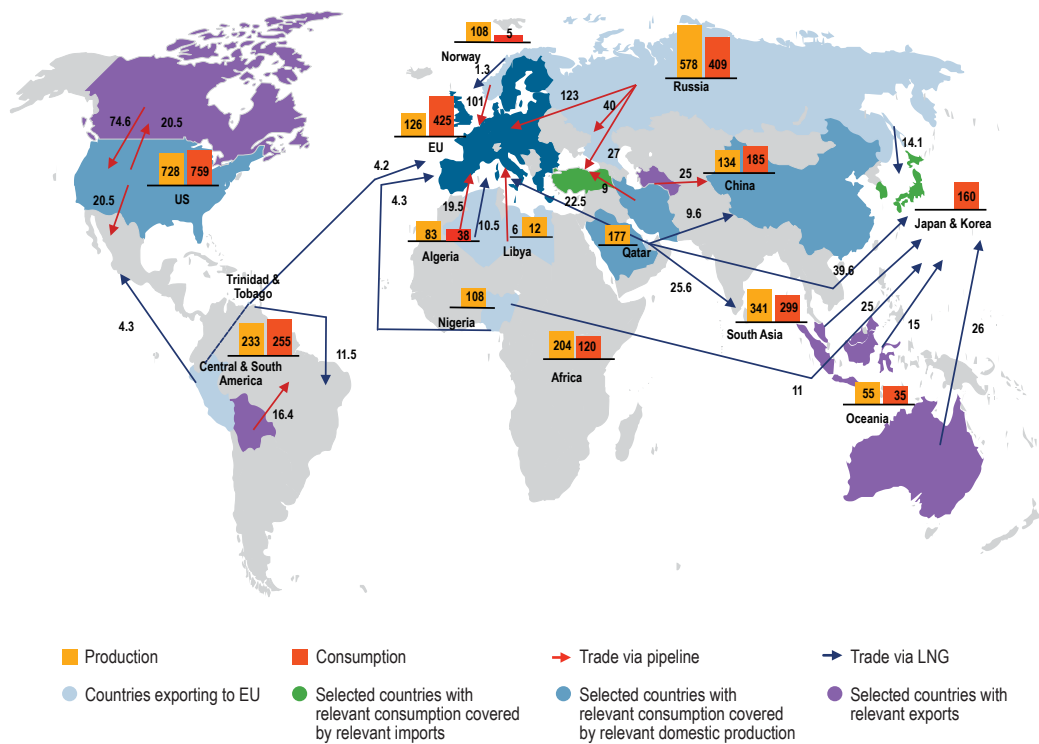
383 The figure is hard to assess in the absence of individualised data and varies significantly between MSs. Relevant volumes procured via long-term contracts may also be resold at hubs. Flexible supply mechanisms allow, on the contrary, purchases to more closely respond in time to the variation of prices, particularly spot hub ones. See Timera energy paper on the structure of EU gas supplies and the key drivers of hub prices: <http://www.timera-energy.com/uk-gas/a-framework-for-understanding-european-gas-hub-pricing/>.

384 The term VTP refers to an entry/exit system where gas can be traded independently of its location and which offers users the possibility to transfer the title of gas and/or swap imbalances. Each VTP has an operator that tracks the ownership of traded gas and handles gas balancing aspects. Trading is facilitated by the establishment of organised exchanges and/or OTC platforms that attract traders by offering different products and services, thus creating a liquidity pull, all this constituting a ‘gas hub’. See a more detailed analysis of the matter in Section 5.3.1.

385 For example, by offering clients product innovation and more service-oriented business models in addition to the base services that they provide: procuring the gas, volume flexibility, capacity contracting and transmission, balancing, etc. See, for example: McKinsey working papers on risk number 54: European gas wholesale markets.

386 See a gas price comparison among world areas in the IGU 2015 report page 22 (study link on footnote 387). In 2014, the EU imported 53% of its energy (close to 70% of its gas), making it the largest energy importing region in the world. Total energy imports cost a total of 400 billion euros/year, the bulk for oil and approx.20% for gas.

Figure 107: International gas consumption, production and key trade movements during 2014 (bcm/year)



Source: IEA, BP Statistical review (2015) and ACER calculations.

637 At an aggregate level, the EU relies on a number of external gas source origins, Russia being the most important, with a supply share of around 30%, followed by Norway and Algeria. However, some MSs are largely dependent on only one source, putting them in a vulnerable position<sup>387</sup>, pending the completion of a fully integrated EU gas wholesale market. Domestic conventional EU production accounts for more than 30% of EU gas supplies, but is progressively decreasing (-10% in 2014 compared to 2013, approx. 15bcm less). According to some estimates<sup>388</sup> local production will cover less than 20% of EU demand in 2030. This reduction can be attributed in particular to a decline in the Dutch production fields<sup>389</sup>. Most forecasts predict a continuing downward trend, but unconventional gas and biogas developments could help slow the reduction, with some estimates suggesting they could make up around 20% of current demand<sup>390</sup> by 2030.

638 LNG imports totalled around 10% of EU supplies in 2014<sup>391</sup>. This figure is expected to rise in the future, given new LNG terminal developments in the EU and rising competition in the LNG upstream market. During 2014, an overall reduction of LNG imports was observed (-3% compared to 2013), but this was less pronounced than in 2013 (-30% compared to 2012). Still, utilisation rates of regasification capacity were below 20% for the year. A falling European-Asian price spread reduced the preceding years' trend for EU shipments diversion, although this was still apparent during the first half of the year.

387 See MMR 2013 Figure 70 for a country base comparison of supply shares per geographical origin.  
 388 See, for example, ENTSGO 10YNDP, page 84: [http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog\\_TYNDP2015\\_main\\_report\\_lowres.pdf](http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog_TYNDP2015_main_report_lowres.pdf).  
 389 In 2014, it was announced that Groningen field outputs were to be further reduced over the next two years in connection with seismic activity. Dutch production declined by 20% during the year to 42.5bcm. Domestic UK gas production – comparatively lower – registered an increase driven by enhanced production efficiency.  
 390 According to the IEA, indigenous resources from unconventional gas could deliver 80 bcm/year by 2030 in the EU. See: <http://www.iea.org/Textbase/npsum/EU2014SUM.pdf>. The European Biogas Association roadmap estimates that 20 bcm/year could be produced in the same horizon. See: [http://european-biogas.eu/wp-content/uploads/2014/02/GGG\\_European-Biomethane-Roadmap-final.pdf](http://european-biogas.eu/wp-content/uploads/2014/02/GGG_European-Biomethane-Roadmap-final.pdf).  
 391 The reduction in EU demand in recent years has mostly been absorbed by a drop in EU LNG imports, indicating LNG is more expensive than pipeline imports. The ships' diversion to higher-priced Asian markets also played a role.

- 639 Increased intra-EU traded volumes<sup>392</sup> have been observed in recent years, thanks to enlarged hub activity, enhanced cross-border interconnection and new reverse flow possibilities. Their share comprises around 20%<sup>393</sup> of all EU gas market traded volumes.
- 640 The Russia–Ukraine conflict impacted EU gas markets during the year on multiple fronts. In June, Gazprom halted gas deliveries destined for Ukrainian domestic use due to disputes over the contractual terms with the Ukrainian national gas company Naftogaz<sup>394</sup>. After negotiations under the umbrella of the European Commission<sup>395</sup>, the parties agreed at the end of October on a revised price to resume flows at least during the winter season and on debt payment conditions. EU reverse flow gas deliveries were tested and increased to partially supply Ukrainian domestic demand, mainly through Slovakia, and also across Poland and Hungary. This is one of the reasons why increased gas storage withdrawals were observed in these MSs during the year. Section 5.4.2 provides a detailed analysis of the topic.
- 641 The temporary cessation of deliveries triggered discussions at political level on EU dependency on Russian gas supplies and on the EU's strategy for the security of gas supplies<sup>396</sup>. A variety of strategies to increase security of supply are under discussion. Overall, market-based instruments remain the preferred solution to security of supply issues.
- 642 Nonetheless, the options of significantly reducing Russian gas imports in the medium-term may be limited by contractual obligations, but also by physical network configurations. At present there are long-term contractual commitments that compel European buyers to purchase – and Gazprom to deliver – significant gas volumes until 2025-2030<sup>397</sup>, even assuming a lower level of ToP obligations. Further, in 2013 the EU accounted for more than 70% of all Russian gas exports<sup>398</sup> and there are proposed projects to further expand the interconnection capacity to the Union<sup>399</sup>. These facts underline that the symbiotic energy relationship between Russia and EU is likely to endure for some time to come.
- 643 It is also known that Russia is trying to diversify its export portfolio by targeting Asian markets more. In 2014 Russia and China, signed a high-level agreement for Gazprom to supply the Chinese incumbent CNPC with up to 68 bcm/year of gas<sup>400</sup>. Russia also plans to increase Turkish gas deliveries via new interconnection capacity. This would also serve as transit pipes to supply gas to Southern Europe, bypassing Ukraine<sup>401</sup>. The Russian agreement with Turkey followed the Russian decision at the end of the year to abandon the construction of the South Stream supply route, a project that was initially designed<sup>402</sup> to deliver gas up to a total capacity of 63 bcm/year via a corridor across the Black Sea and then through several South-Eastern European countries to Austria, and on to the larger market in Italy.
- 644 Despite these events, Gazprom's share in EU markets in 2014 remained comparable to 2013. A reduction of 9% in the absolute volumes delivered was registered mainly as a consequence of declining demand,

392 The term refers to those cross-border trades that have their underlying volumes either at an EU MS exported domestic production or at an adjacent EU hub. In the latter case, the physical origin of gas can be an external country.

393 See European Commission study of energy security, p. 46 [https://ec.europa.eu/energy/sites/ener/files/documents/20140528\\_energy\\_security\\_study.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/20140528_energy_security_study.pdf).

394 See chronological analysis in this Bruegel report: <http://www.bruegel.org/publications/publication-detail/publication/862-rebalancing-the-eu-russia-ukraine-gas-relationship/>.

395 See Oct 2014 Barroso press conference: <http://ec.europa.eu/avservices/focus/index.cfm?sitelang=en&focusid=401>

396 See European Commission energy security strategy documents: [http://ec.europa.eu/energy/security\\_of\\_supply\\_en.htm](http://ec.europa.eu/energy/security_of_supply_en.htm).

397 See a comprehensive analysis of the topic in the OIES paper Reducing European Dependence on Russian Gas: <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/10/NG-92.pdf>.

398 See Eurostat analysis: <http://ec.europa.eu/eurostat/en/web/products-statistics-in-focus/-/KS-SF-14-013>.

399 As detailed below, Turkish Stream or the potential expansion of Nord Stream lines.

400 See: <http://www.platts.com/latest-news/natural-gas/singapore/china-russia-sign-new-30-bcmyear-framework-gas-27813010>.

401 According to several market analysts, the Turkish Stream project may be difficult to consolidate; the planned project envisions four lines, although some analysts are more inclined to a final development of only two. Reservations arise because Gazprom-EU shippers' existing contracts have precise and distinct delivery points that are to be maintained in the coming years, and because the SSE region current infrastructure would not be sufficient to accommodate such quantities of new gas. There are also ongoing discussions on the price discounts that Gazprom will grant to Ankara in the context of the back-up to the project. See, for example: <http://www.icis.com/resources/news/2014/12/02/9843742/russia-turkey-gas-hub-plans-create-uncertainty-over-import-figures/>.

402 See: <http://www.gazprom.com/about/production/projects/pipelines/south-stream/>.

comparatively high EU underground storage reserves, and higher ToP flexibilities. A significant shift in Russian gas supply routes took place, however. Russian exports through the Nord Stream pipeline increased, at the expense of transit through Ukraine, and delivery routes through the Czech Republic – into Slovakia, Austria and Italy – were used more intensively (see Section 5.4.1).

### 5.2.3 Conclusion

645 Gas demand in the EU remained depressed during the year due to, but not exclusively, slow economic recovery and weak gas-to-power economics. This situation, together with price formation, that more closely responded to gas-on-gas competition elements – given the increasing role of hubs – and decreasing international oil prices exerted overall downward pressure on prices. EU domestic gas production is declining, and this increases dependency on external imports. In this context, further market integration advances are being sought also to enhance security of supply. International market dynamics and events like the Russia–Ukraine conflict impacted EU gas markets on multiple fronts.

## 5.3 State of integration of gas markets

646 This section assesses progress on the integration of EU gas markets. It aims to look at whether liquidity at hubs has increased (5.3.1), at whether prices in different MSs are further converging (5.3.2) and at the welfare losses and possible welfare gains due to imperfect integration (5.3.3).

### 5.3.1 Level of integration: liquidity evolution

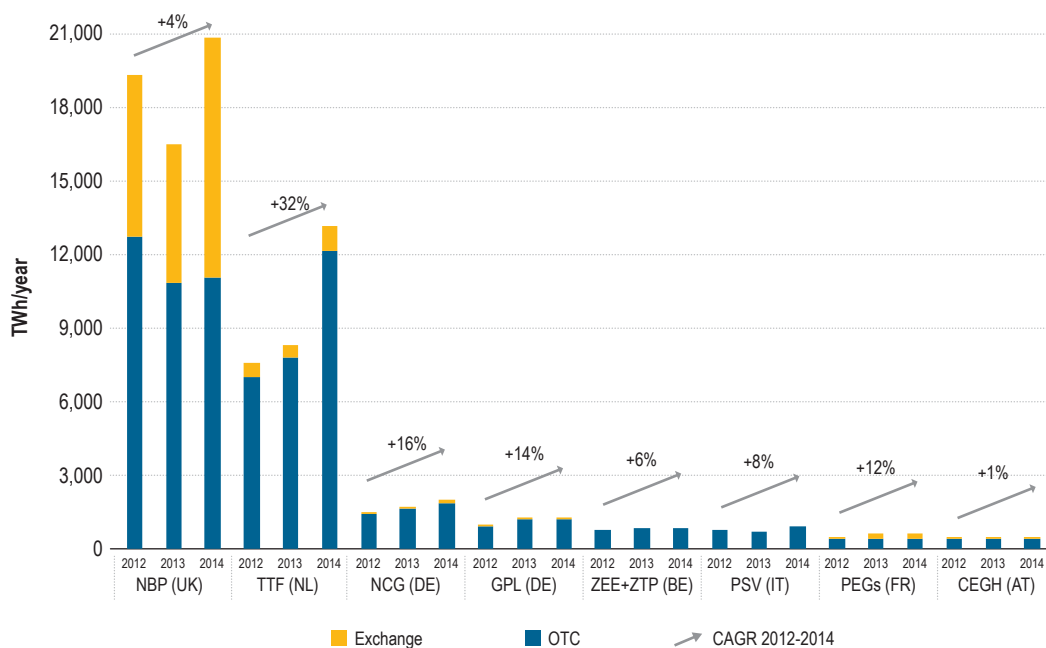
647 This section provides an analysis of the main trends in gas hub functionality in the context of the GTM. It also looks at the conditions and design features that make a hub liquid and competitive, and thus better able to support hedging and gas price risk management.

648 In the majority of EU MSs, most physical gas is procured via bilateral long-term supply contracts. This situation will continue for some years because of the remaining duration of existing contracts<sup>403</sup>. Over recent years, however, there has been a move towards more short-term hedging of gas supplies on hubs. This has resulted in an increase in hub-traded volumes over a number of years, either as financial arbitrage, price risk hedging or as physical gas sourcing operations. As liquidity and competition have a strong bearing on the efficiency of price formation in gas markets, the development of hubs is positive. Competitive hubs are increasingly attracting market participants and providing more options to source and hedge supplies. This exerts downward pressure on gas prices, which should translate into benefits for retail markets. The trend is the clearest in NWE markets, where it began, but is gradually emerging in other EU regions like CEE and the Mediterranean.

649 Figure 108 compares traded gas volumes across all products at the main EU hubs. It demonstrates that traded volumes increased. The hubs represented in figure 4 showed an increase in 2014 of more than 25% compared to 2013, reaching record highs.

403 See an appraisal of the duration of EU gas supply contracts in the European Commission in-depth study of energy security of supply, page 52. See link to footnote 394.

Figure 108: Traded volumes at main EU hubs and CAGR – 2012 to 2014 (TWh/year and %)



Source: GTS (NL), Huberator (BE), Gaspool (DE), NCG (DE), GRTgaz (FR), CEGH (AT), Snam (IT), Trayport (GB).

Note: Over-the-counter trade (OTC) refers to volumes traded among parties via brokers, either the parties managing credit risk or trading being cleared by the broker. Exchange execution refers to those volumes supervised and cleared by an organised central market operator.

- 650 Besides suppliers moving towards shorter-term sourcing and price risk management around hubs, increased hub liquidity in 2014 was also probably a consequence of developments in the wider market context. These include: oversupplied shippers, comfortable gas storage reserves, and producers’ spare capacity – all driven by reduced demand, and all of which are likely to have encouraged parties to look further for trading opportunities on hubs. Moreover, as bilateral long-term contract prices were higher than spot hub prices during most of the year, shippers were enticed to buy or sell on hubs to the extent that their ToP flexibilities allowed<sup>404</sup>.
- 651 Other events that also probably contributed to enhance hub liquidity during the year were: covering forward price risk positions following the Russian–Ukrainian crisis; the propensity of upstream producers to trade more actively on hubs; the arbitrage opportunities between future and prompt products given their extended spreads during summer months; the further utilisation of hubs for network balancing, and the establishment of hub-price components in certain MSs’ regulated prices<sup>405</sup>.
- 652 Table 17 provides a benchmark of major EU gas hubs, showing the various degrees of development. Overall, total traded volumes at the main NWE EU hubs<sup>406</sup> in 2014 accounted for around seven times the total EU physical gas consumption. Of the two main trading mechanisms, OTC brokering and exchange trading, OTC remained the dominant type. OTC volumes’ dominance over exchange cleared volumes can be explained by larger firms’ presence, narrower bid-ask spreads, and larger volumes, but also because trading via brokers is generally cheaper than on the exchange. Traders without a network of bilateral master agreements may experience more difficulties in trading in OTC markets. Exchange volumes are progressively increasing, however, particularly on NBP, GPN, TTF and PEGs, as this trading mechanism may serve to better address counterparty risks for longer-dated products in the current financial context, and they may streamline the entry into the market of purely financial traders. Additionally the use of spot exchange products by TSOs for the physical balancing of the network is playing an increasingly relevant role in supporting liquidity on exchanges.

404 In the last quarter of the year and since the beginning of 2015, the drop in international oil prices is making long-term oil-indexed contracts more price competitive than in the past and limiting some of these arbitrage trades.

405 France, Hungary and Italy have introduced such regulatory provisions.

406 NBP (UK), TTF (NL), GSP and NCG (DE), ZEE and ZTP (BE), PEGs (FR), VTP (AT) and PSV (IT) considered.

- 653 NBP and TTF are the most competitive hubs in terms of broader liquidity horizons (indicators 4 and 5) and lower bid-ask price spreads (indicator 6), and act as a reference for price formation on other EU hubs. Consequently, they are used for price-indexations of long-term gas contracts for the whole EU. The liquidity of the British and the Dutch hubs also benefit from the relatively high traded volumes of indigenous production.
- 654 NBP and TTF also recorded the highest traded volumes (indicator 10). With 60% growth in traded volumes during 2014, TTF registered the highest growth for the year, overtaking NBP in terms of negotiated OTC volumes. The growth of TTF liquidity is helped by the fact that TTF tends to be the principal gas price reference for mainland Europe. This is facilitated by the high interconnectivity of the Dutch market, which allows it to attract liquidity and forward price-risk hedging operations from adjacent zones. These metrics explain the leading role for financial trades and forward risk management that TTF and NBP play. However, to put NBP's and TTF's position into perspective, US gas hubs like Henry or Marcellus or related commodity oil hubs tend to have much higher liquidity<sup>407</sup>. German, Belgian, French<sup>408</sup>, Austrian, Italian<sup>409</sup> and to a lesser extent Danish hub liquidities are also increasing and constitute more and more relevant places to hedge supplies, as well as to engage in spot balancing operations. However, the liquidity of these hubs is still comparatively low on longer-dated products and they lack the forward risk management and financial participation levels of NBP and TTF. Nevertheless, overall in 2014 NWE region hub participants found economic value from price arbitrage between hubs, resulting in a higher degree of price convergence.
- 655 In the Czech Republic, Hungary and Poland, the exchanges are expanding market services, and this, together with the recent offering of OTC brokering trading possibilities, is pushing hub liquidity upwards. Arbitrage operations with the adjacent NWE hubs are also on the rise, facilitated by enhanced interconnection capacity and reverse flow possibilities. Obligations imposed on incumbents by NRAs to act as market makers for reselling specific supply volumes via the exchange are also key. Poland and Romania are good examples in this respect. Polish POLPX traded volumes have now an increased order of magnitude as a result of the obligation to the incumbent to sell up to 40% of volumes through the exchange<sup>410</sup>.
- 656 Based on an overview on the status of electricity and gas marketplaces (see Annex 13), it is noticeable that gas hubs are fewer and were often created later than power exchanges. In 2014, some markets, like Iberia, still lacked a gas trading marketplace. However, in the Iberian Peninsula, a pooled organised exchange is expected to be operational by the end of 2015, partly as a response to the new NC balancing requirements. Trading remains at present chiefly executed via swaps between physical shippers – mostly LNG related deals – but a gradual increase in OTC operations has been observed at a market-reflective price. In other markets, like Finland or Lithuania, exchange trading attracts yet limited volumes. Discussions are ongoing to create a Baltic-wide exchange, which, in order to be successful, would have to be accompanied by enhanced interconnections and supply competition. For a complete overview of existing market places in electricity and gas and the products traded, see Annex 13.
- 657 The 2014 GTM established a series of metrics to assess the functionality of EU hubs, aimed at measuring their liquidity, cost-effectiveness and competitiveness<sup>411</sup>. The metrics examine aspects such as total hub-traded volumes, bid-ask spreads, concentration rates and the number of available offers in a given time horizon. Results for 2013 were obtained from the review of exchange operators and broker's platform data<sup>412</sup>. The metrics' values show that, compared to the other EU hubs, NBP and TTF are ahead on most

407 For example, NBP and TTF have churn rates of 25 and 35, respectively, both of which are low compared to Henry Hub, which had a churn rate of several hundred at its peak in 2011, or a related commodity like oil, where churn rates of above 500 are no exception.

408 The planned merger of the three French PEGs could result in a single trading zone by 2018, which should further increase liquidity. The project depends on the final enhancement of the transmission network. See, for example: <http://www.icis.com/resources/news/2014/12/10/9845691/still-no-fid-for-projects-key-to-creating-single-french-gas-hub/>.

409 PSV liquidity increased due to the more active presence of the incumbent ENI in OTC trading, the higher demand for hub-linked priced gas and by increased imports (for example, across the TENP/Transitgas pipeline), facilitating arbitrage operations with NWE market areas. Austrian hub-traded volumes increased to serve demand from the CEE region MSs and Ukraine, and thanks to the consolidation of the VTP.

410 See: <http://www.tge.pl/en/27/rss/364/pgnig-becomes-the-first-direct-polpx-member-on-the-gas-market>.

411 The metric thresholds were set to the average values of the most liquid EU hubs: NBP and TTF.

412 See the comparative review of the GTM 2014 metrics performed by the consultant Wagner & Elbling in this document. The data cover the 2013 period: [http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-/Documents/A14-AGTM-13-03c\\_GTM\\_Annex%205%20-%20Wholesale%20market%20metrics%20results\\_final.pdf](http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-/Documents/A14-AGTM-13-03c_GTM_Annex%205%20-%20Wholesale%20market%20metrics%20results_final.pdf).

parameters. The gap is lower for the spot market metrics, but higher for longer-dated products, as shown for example by the very dissimilar results of those metrics assessing trading horizons liquidity (see indicators 4 and 5 in Table 17 below).

- 658 The GTM 2014 revision suggests that if material gaps remain over time, enhancements, or even potential market integration projects<sup>413</sup> would be needed to achieve hub functioning objectives in all EU market areas. Cost-benefit analyses should validate the feasibility of deeper market integration measures. It would take time for emerging hubs to match the NBP/TTF scores. Two aspects illustrate this. First, there may be a dissimilar prevalence of long-term bilateral gas contracts in different MSs. In some cases, this may reduce the availability of volumes that could be traded on hubs. Second, financial and risk management has been drawn to NBP/TTF over the last number of years, and it is unlikely that this traffic will move easily to other hubs. This situation suggests that merging zones could be the preferred option in certain cases.
- 659 The Agency, national regulators and other stakeholders are considering what structural design features functioning hubs ought to exhibit in order to facilitate liquidity expansion and competitiveness. The process could result in specific proposals about the most appropriate rules for trading and about the structure and services that should be offered in gas hubs.
- 660 It is generally agreed that, as a minimum, the key requirements of a functioning hub are the full implementation of entry-exit transportation systems per market area built on VTP configurations. VTPs are used as unique<sup>414</sup> locations for gas title transfer and for the operation of the balancing accounts. Beyond this, future hub design<sup>415</sup> may involve the standardisation of trading terms across hubs, the possibility for non-physical traders to trade even when not contracting capacity services, and the designation of the hub as an alternate off-take point for bilateral contracts still containing destination clauses to a physical delivery point<sup>416</sup>.

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413 See Section 4.5 of the GTM 2014 revision: <http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-/Documents/European%20Gas%20Target%20Model%20Review%20and%20Update.pdf>.

414 VTPs are possible under multi-node systems (i.e. multiple trading points as in LNG terminals, relevant IPs clusters, storages, or separated high-cal and low-cal systems) but they risk fragmenting the level of liquidity, and should be seen as transitional models.

415 Some of these more detailed provisions are put forward by EFET in a position report on the topic. See: [http://www.efet.org/Cms\\_Data/Contents/EFET/Folders/Documents/EnergyMarkets/GasPosPprs/2005Today/~contents/HJ92XT8KN44RVWXA/EFET-Guide\\_Hub-Features\\_Final.pdf](http://www.efet.org/Cms_Data/Contents/EFET/Folders/Documents/EnergyMarkets/GasPosPprs/2005Today/~contents/HJ92XT8KN44RVWXA/EFET-Guide_Hub-Features_Final.pdf).

416 As favoured on CAM network code provisions.

Table 17: Comparison of the degree of functioning of gas hubs in 2014 (selected indicators refer to 2013 data)

	GTM 2014 revision indicators. All these data refer to values of the year 2013										Primary market and hub data				Performance ratios				
	1. Relative share of forward hub traded volumes	2. Relative share of prompt hub traded volumes	3. Relative share of spot hub traded volumes	4. Average liquid order book horizon with at least 1 order book in the bid side in months	5. Average trading hours at least 8 deals per day in months	6. Average bid-ask spread of products in % of the bid price	7. Median volume in the bid side for prompt products (MW) bid side	8. Top three seller concentration rate in the hub	9. HHI index assessed on the MS - the basis of the companies sourcing gas into the MS	10. Total traded gas volumes in the OTC plus exchange - TWh/year	11. Total physically traded volumes in the hub in 2014 - TWh/year	12. OTC / exchange relative to all products considered	13. Number of participants in the hub in 2014	14. MS gas demand in 2014 - TWh/year	15. Aggregated entry into the country - TWh/year	16. Estimated diversity of supply by origin country	17. Physically delivered volume in the hub divided by country demand	18. Aggregated entry capacity into the hub divided by country demand	19. EFET Scoreboard on design features value from 0 to 20
United Kingdom (NBP)	61%	34%	5%	23.8	22.6	0.2%	872	below 50%	950	18,882	615	57% / 43%	385	775	1,960	7	0.8	2.5	20
Netherlands (TTF)	75%	21%	4%	17.4	24.1	0.2%	479	below 50%	2,488	13,216	430	90% / 10%	125	376	1,274	7	1.1	3.4	19
Germany (NGO)	51%	32%	14%	1.1	5.8	0.4%	197	below 50%	1,982	1,981	530	96% / 4%	314	845	3,506	5	0.6	4.1	15.5
Germany (Gaspool)	62%	27%	12%	0.3	4.4	0.4%	71	50%-75%	1,982	1,159	260	98% / 2%	250	845	3,506	5	0.3	4.1	16
Belgium (ZEE)	55%	32%	13%	0.1	1.2	-	61	50%-75%	1,709	747	187	100% / 0%	83	161	1,168	8	1.2	7.3	18
Belgium (ZTP)	-	10%	3%	0	0	-	0	-	1,709	91	31	-	66	161	1,168	8	0.2	7.3	16
France (PEG Nord)	54%	32%	14%	0	0.2	-	31	50%-75%	1,240	495	167	70% / 30%	132	421	1,499	10	0.4	3.6	16
France (PEG Sud)	42%	47%	17%	0	0	-	0	above 75%	1,240	144	42	-	51	421	1,499	10	0.1	3.6	16
Italy (PSV)	68%	26%	6%	3.3	0.3	1.3%	135	above 75%	2,093	889	235	100% / 0%	150	655	1,387	12	0.4	2.1	10.5
Austria (VTP)	47%	40%	13%	0.8	0.4	0.6%	120	50%-75%	7,500	461	124	95% / 5%	176	82	953	4	1.5	11.6	14
Czech Republic (OTE)	24%	64%	12%	0	0	-	10	above 75%	9,051	33	-	-	78	80	685	4	-	8.6	8
Spain (MS-ATR)	-	-	-	-	-	-	-	below 50%	2,000	520	-	100% / 0%	68	306	1,040	11	0.0	3.4	7
Denmark (GPN)	65%	35%	0%	-	0	-	-	50%-75%	2,570	110	-	0% / 100%	23	36	148	2	-	4.1	9
Poland (POLPX)	74%	21%	5%	-	-	-	-	-	4,550	110	-	0 / 100%	46	173	599	4	-	3.5	4.5
Hungary (MGP)	-	-	-	-	-	-	-	-	3,198	1	-	0 / 100%	20	90	267	6	-	3.0	5

Source: GTM 2014 indicators (2013 data) Wagner & Elbling, ICIS Heren, EFET hubs scoreboard, ENTSO-G, Trajport, Frontier (2013 data), National Grid (UK), GTS (NL), NCG (DE), GASPOOL (DE), Hubera-for (BE), GRTGaz (FR), Snam (IT), CEGH (AT), VTP (CZ), POLPX (PL).

Notes: GTM 2014 metrics data refer to contracts traded on OTC broker platforms, but also cover exchanges data in DE-GPL, DE-NCG, UK-NBP and NL-TTF. Denmark data cover only exchange GPN.

Spot contracts are contracts for delivery in the very near future (day-ahead and within day). Prompt contracts cover periods from one day to one month forward. Forward contracts<sup>417</sup> refer to all other products beyond the prompt market horizon. The bulk of traded volumes in forward products is one quarter ahead, followed by one season ahead and one calendar year ahead. Liquidity is reduced beyond 12 months. OTC / exchange ratios may differ per type of contract product, with exchanges showing relatively higher shares for day-ahead products.

The top three seller market concentration figures that are assessed show the responses from a survey<sup>418</sup> performed in the context of GTM 2014. The HHI is calculated as the sum of the squared market shares of the upstream suppliers sourcing gas into the market.

EFET Scoreboard reflects market design features conditions in March 2013. Maximum score is 20. “-“ means no data available.

417 A future contract is similar in time horizon to a forward contract, but it refers to the delivery of gas traded at an organised exchange. In addition, unlike forward contracts, futures settle daily. As the analysis considers both trading mechanisms – broker platforms and exchanges – the term forward is used here for both.

418 See survey results here: [http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-Documents/A14-AGTM-13-03b\\_GTM\\_Annex%20-%20-%20Stakeholder%20Requirements%20Market%20Inquiry%20Results\\_final.pdf](http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-Documents/A14-AGTM-13-03b_GTM_Annex%20-%20-%20Stakeholder%20Requirements%20Market%20Inquiry%20Results_final.pdf).



- 661 Indicators 11 and 17 on net physical transfer volumes on the hub can be seen as a representation of suppliers' reliance on hubs for physical gas sourcing, as an alternative to procurement via bilateral long-term contracts. It can also be observed that in certain hubs net physical delivered volumes are higher than domestic demand (i.e. NL or AT) due to their role in physical sourcing for adjacent market areas.
- 662 The factors which seem to promote hub development include diversity of gas supply sources, low market concentration and sufficient availability of entry capacity<sup>419</sup> (see indicators 8, 9, 16 and 18). Hub design structured to facilitate trading is also important. This is a characteristic of the majority of NWE hubs and an aspect on which newer developing hubs can still improve. Stakeholders' perceived principal barriers for hub development include<sup>420</sup>: a reluctance among incumbents, or other well-established market participants, to trade, either to limit potential competition, or because they have no need to do so, due to having their position fully covered by prevailing bilateral long-term contracts; poor hub structural design; distortive security obligations, such as excessive gas storage requirements or onerous entry capacity requirements; cross-border and storage capacity hoarding; complex licensing procedures; a lack of market-based balancing procedures – a market-based balancing platform at least provides a daily signal of prices, a minimum requirement for attracting interest in a hub; and, finally, an overall lack of transparency concerning the rules for trading. The case study below on the procedural steps of a typical hub-to-hub trading operation – from the Dutch TTF to the German NCG hub – serves to illustrate the complexity and implications of cross-border hub trading.

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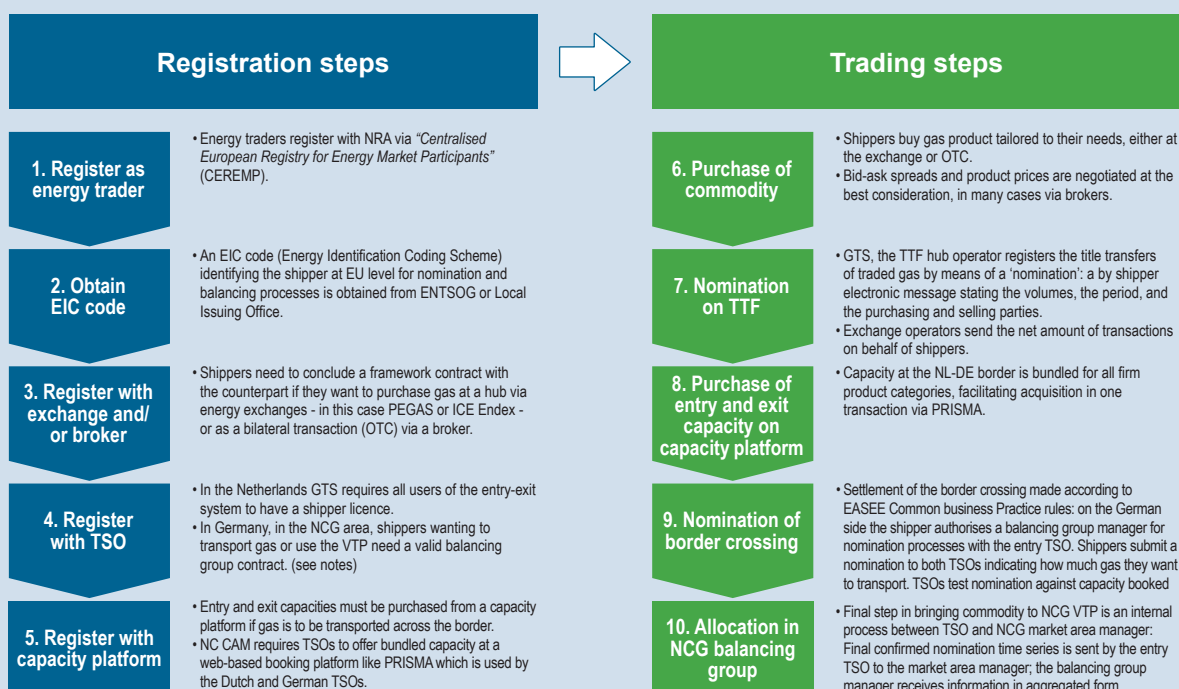
419 Both physical but also purely financial gas trading can be attracted to hubs; in most EU hubs, financial trading does not necessarily require the contracting of entry capacity. Therefore, a high availability of entry capacity into the market is not necessarily a mandatory precondition for liquidity enhancement, although capacity does underline the physical hedging role of hubs and seems for this reason to be a relevant factor.

420 See, for example, EFET analysis linked at footnote 416.

## Case study 11: TTF to NCG hub-to-hub trading steps

In the context of the above-mentioned trends, this case study provides a simplified overview of the steps required to engage in hub-to-hub trading operations. It provides a practical example of hub trading conditions. The example details the implications of a cross-border hub-to-hub trade operation performed between the Netherlands and Germany. In Germany, since 2011, two market areas have existed: NetConnect Germany (NCG) and GASPOOL, each constituting independent hubs. Both German market areas are connected with TTF, the hub in the Dutch market area.

The individual steps of a hub-to-hub transaction are presented in the table below from the shipper's point of view (it is assumed that the shipper is entering the markets concerned for the first time). These can be divided into registration (1-5) and trading steps (6-10). The steps are not necessarily executed in the order presented. Furthermore, it is now mandatory (from October 2015) to provide the Agency with a record of wholesale energy market transactions when a trade is carried out.



Source: BNetzA, ACM.

Notes: In the Netherlands, to perform a hub-to-hub trade, licence A – allowing the shipper to transport gas – is needed. In addition a TTF registration is required. Shippers are responsible for maintaining their balance in the transport network. If shippers' actions are inadequate, a market correction mechanism is brought into play by GTS as the operator. Shippers causing the imbalance have to pay the gas costs to resolve it. In Germany, in the NCG area, shippers who are willing to transport gas or use the VTP need a valid balancing group contract. Accredited balancing group managers can set up a balancing group on a web portal.

PRISMA capacity platform registration requirements are detailed on the platform website.

## Practical example

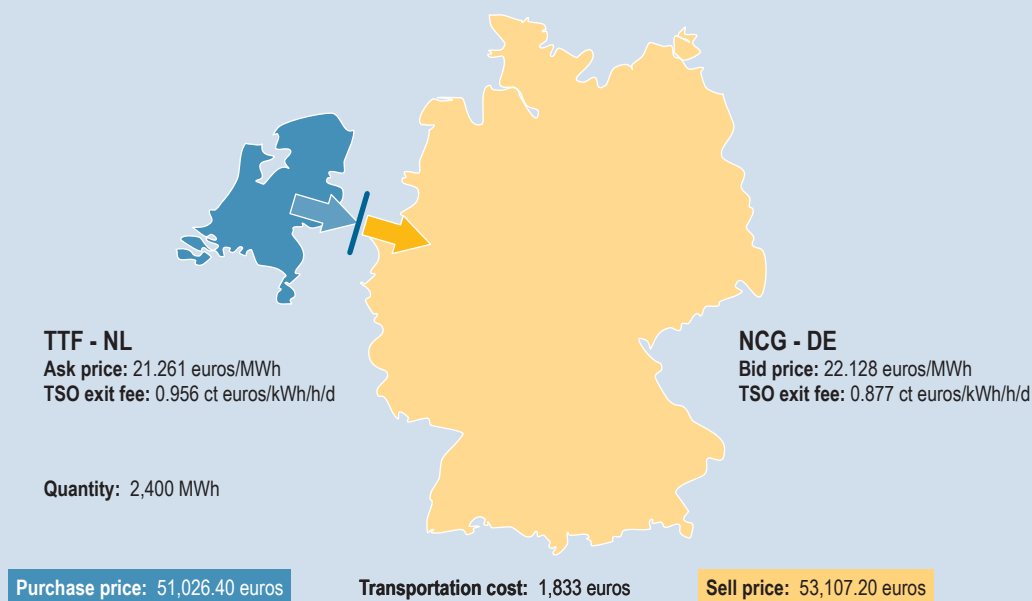
Different types of market participants are active on a hub. The distinction between these groups is quite fuzzy, as one company can be assigned to several groups.

- 1) Producers: sell gas to traders and shippers,
- 2) Network operators: purchase system operation gas and gas to balance the network,
- 3) Traders, either business branches of energy companies or purely financial institutions, buy and sell gas without any physical delivery, for hedging or price arbitrage strategies,

- 4) Shippers: purchase gas and pay the network operators to ship it across borders,
- 5) Suppliers: buy the gas at hubs, structure their portfolios and sell it to consumers,
- 6) End-users: industrial, commercial or household consumers who purchase gas and consume it.

A trade is prompted by actual market conditions. In this case, this means the ask price on TTF plus cross-border transmission costs is lower than the bid price on NCG VTP. The trigger could also be the non-availability of a specific product<sup>421</sup>. Spot capacity cost may not be always such a key determinant, as capacity could be acquired – and paid for – on a longer-term basis, as in the example below.

In this example, on a given day (D-1), a shipper needs 2,400 MWh for its portfolio in Germany for the next gas day (D). This entails a continuous supply of 100 MWh/h throughout the day. Because of a competitive price spread between NCG and TTF, the shipper decides to purchase the gas on the Dutch TTF<sup>422</sup>:



Furthermore, the shipper correspondingly needs to acquire cross-border interconnection capacity between GTS and NCG market areas on PRISMA. This could be at the IP Oude Statenzijk, connecting the grids of GTS and Open Grid Germany. In the example, it is assumed that the shipper bought capacity in a monthly ascending clock auction, submitting a bid for a bundled capacity of 100 MWh/h/d. As the demand for this capacity was lower than the offer, the auction was closed after the first bidding round and the capacity was assigned at the regulated tariff<sup>423</sup>. Because capacity was already booked in advance, its cost will sink unless it can be resold in a shorter-term market; the capacity charges are not determinant for triggering the trade. The shipper pays a fee amounting to 1.833 Euro ct/kWh/h/d<sup>424</sup>. For the day considered, this means that the shipper’s capacity costs are 0.76375 euros/MWh, or a total of 1,833 euros.

Finally, the shipper can sell the commodity for the bid price via a gas exchange or broker. In principle, the price spread of the operation (2.080 euros) would be higher than the transmission costs, making it profitable. Of course, direct delivery to a market customer – an industrial user, for example – is also possible.

421 In terms of runtime or gas quality.

422 In addition, there are fees for exchange/broker and hub operator. Depending on the hubs considered, it is also possible to trade directly with location spreads on the gas exchange.

423 In addition, he could have bid for a day-ahead capacity product, marketed using a uniform price auction algorithm.

424 Because this is a bundled capacity, the fee for the exit TSO (0.956 Euro ct/kWh/h/d) and the entry TSO (0.877 Euro ct/kWh/h/d) are added together.

### 5.3.2 Level of integration: price convergence

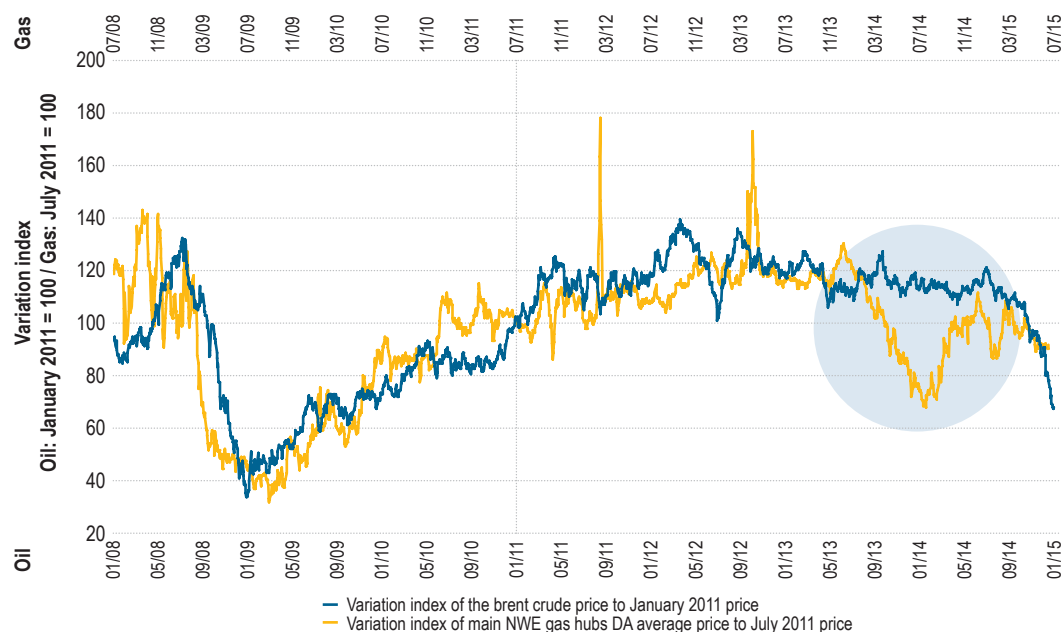
663 An important way of assessing markets integration is to compare the prices at which suppliers' source gas in different areas. Prices vary among suppliers, and over time, depending on procurement mechanisms, sourcing strategies and specific contract conditions. Two instruments are used to calculate the reference value of supply costs: long-term contracts and forward hub prices. Long-term contracts are the reference price-setting element in most EU countries, although over the last few years hub prices have also started to constitute a valid benchmark, especially in the most liquid NWE markets.

664 For long-term contracts, prices are determined by formulas linked to one or more of several indexes, at least one of which usually takes into account macroeconomic factors. Traditionally, the most commonly used approach was oil price indexes; however, as already mentioned, indexes based on hub prices are increasingly common. A six- to nine-month lag is typically applied to calculate an average of indexed values. The resulting prices are adapted in monthly or quarterly periods for the whole purchased volumes.

665 Spot and forward prices on hubs are established as a result of market dynamics, where traders', shippers', suppliers' and producers' actions determine the price based on an aggregation of multiple individual trades.

666 Hub price formation is influenced by a variety of factors, of which long-term contracts are a key parameter through the flexibility component of ToP volumes<sup>425</sup>. This fact, together with the point that oil prices have been historically used as indexation elements on European gas long-term contracts, explains why oil and gas hub prices have traditionally been well correlated, as shown in Figure 109. However, during 2014, the correlation was weaker, particularly during the summer months. The reasons for this de-coupling were oil-indexation elements gradually being substituted by hub elements in long-term contracts and gas fundamentals, which drove down gas spot prices.

Figure 109: Price evolution of oil and gas hubs in Europe – 2008–2014 (index)



Source: Platts (2014) and ACER calculations.

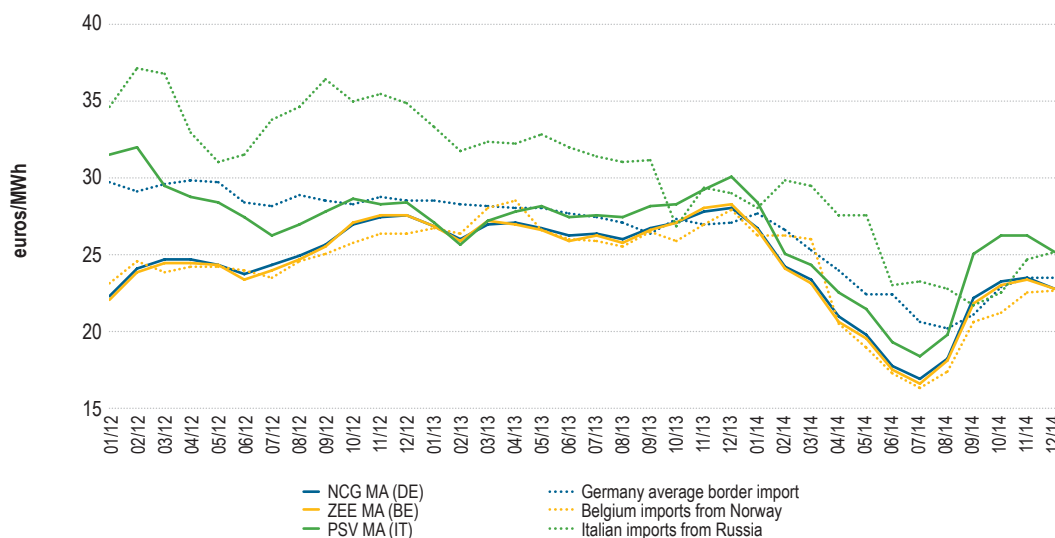
Note: A six-month forward lag is used for gas in the comparison with oil prices, which is the usual practice. The gas price index variation is calculated with average NWE hub gas prices from 1 July 2011 (on the upper X axis). The oil price variation is calculated starting from 1 January 2011 (on the lower X axis).

425 Long-term contracts contain ToP clauses, but also foresee certain flexibilities on procured volumes. Long-term contracts tend to establish a referential band for hub price formation. According to various market analysts, hub spot prices are generally lower than long-term contract ones also because spot contracts do not include the delivery flexibilities of long-term contracts.

667 In addition to the influence of long-term contract prices, there is evidence that hub prices are marginally driven<sup>426</sup> by more flexible sources of supply and by demand variation. Flexible sources of supply include long-term contract volumes not subject to ToP obligations, divertible LNG deliveries, storage withdrawals and the direct hub sales of upstream producers. Short-term demand variation is influenced by evolving weather conditions and by gas consumption for electricity generation. Industrial demand tends to be more stable. Additionally the price that makes the substitution of gas by other commodities (such as coal) cost-effective for electricity generation acts as a price floor while hub prices are usually capped by long-term contract prices.

668 Price drops were observed in most EU gas wholesale markets during 2014<sup>427</sup>. The fall was substantial during the summer months, though prices recovered some ground at the end of the year due to recovering demand, market implications of the Russia–Ukraine conflict and a number of outages in Norwegian production. Price reductions were evident for both hub products and for longer-term contracts (these are gauged in the analysis as border declared import prices) as illustrated in Figure 110. The price gap between them has narrowed as a result of the trend towards renegotiation of long-term contract conditions and the inclusion of more hub-indexation in pricing formulas.

Figure 110: Comparison of selected EU MSs hub and cross-border import prices – 2012–2014 (euros/MWh)



Source: Platts, Eurostat Comext, BAFA (2014).

Note: BAFA provides an estimate of overall German cross-border gas import prices.

669 However, supply price differences persist across the EU market areas. As discussed, the extent of the differences is related to a combination of the predominant type of supply contract, the gas supply source, and the level of liquidity and competition within an MS. All these factors interact with the role and degree of hub development.

670 When looking at EU hub products, price correlation and price convergence<sup>428</sup> are very apparent in the NWE region<sup>429</sup>. Short-term zonal price spreads may still arise in this area, depending on how competitive the hub is, and potentially as a consequence of network factors such as transmission tariff values, capacity

426 For a more detailed analysis of these conditions, see the study linked in footnote 384.

427 NWE hubs day-ahead prices during 2014 were considered as a yearly average, almost 4 euros/MWh lower than in 2013, with a peak difference of approx. 10 euros/MWh in July. Month-ahead prices underwent similar variations. Long-term contract prices also reduced, although slightly.

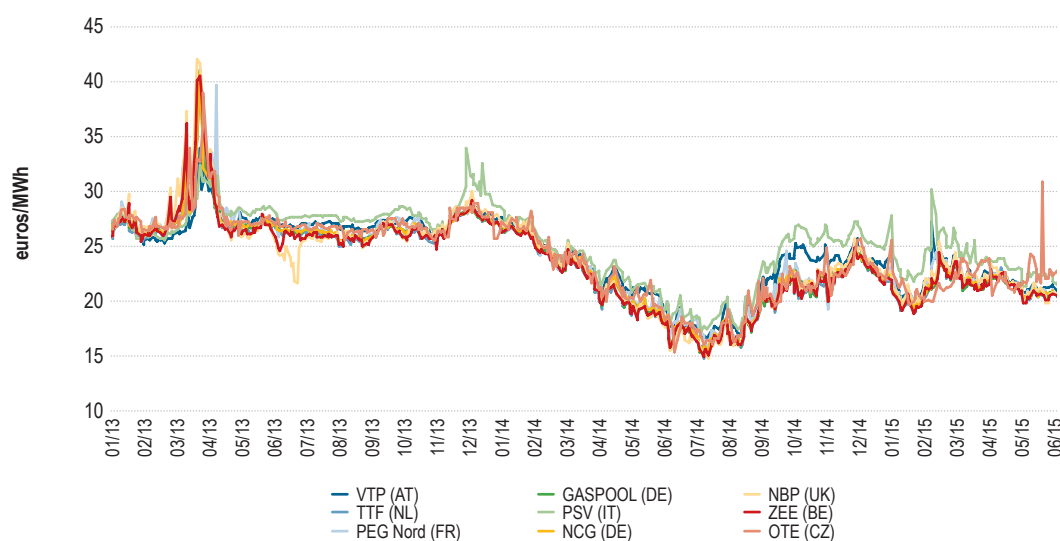
428 Price correlation is not a metric that, by itself, necessarily implies price convergence, but it provides some insights into efficient pricing and market areas' integration.

429 A combination of factors is producing these results; it is a highly interconnected area, featuring increasingly liquid organised markets; network access is generally fair, and suppliers/shippers' and traders' involvement in hub operation is increasing. See an in-depth analysis of the topic in this OIES study, which signals that the correlation showed an improvement in 2014 compared to 2013: <http://www.oxfordenergy.org/2015/09/the-cost-of-price-de-linkages-between-european-gas-hubs-2/>.

constraints, or temporary capacity contractual congestion<sup>430</sup>. Divergences can be higher in spot products due to local and temporary specificities. Price correlation among hub forward products is usually more structural; their price formation is determined by assumptions about a number of market aspects - including referential prices of adjacent hubs - but they are less exposed to shorter-term market dynamics.

- 671 Because of their greater liquidity, TTF and NBP tend to act as reference prices. In this sense, large traded volumes, or a high degree of competition in all hubs, may not be a pre-requisite for price convergence: if a referential market is well interconnected and competitive, it can discipline prices in less competitive locations<sup>431</sup>. This effect seems apparent in the converging prices of some recently established CEE hubs, where a high degree of hub liquidity has not yet been observed. That said, fully integrated markets would more quickly absorb regional price shocks.

Figure 111: Day-ahead prices at NWE EU hubs – 2013 to mid-2015 (euros/MWh)



Source: Platts, OTE.

- 672 To achieve fully integrated market structures is challenging, and even in the NWE region, infrastructure issues could be a constraint on market integration; for example, some IPs lack physical reverse flow capability<sup>432</sup>.
- 673 When comparing long-term contract prices, convergence seems weaker, although a trend towards some convergence has developed. Information on the price of long-term contracts in each EU market area is hard to obtain, but declared import prices collected by custom agencies can be used as a proxy<sup>433</sup>.
- 674 The United Kingdom, the Netherlands, Belgium and Germany are the EU markets where gas import prices are reported to be the lowest. This seems to be a consequence of the greater role that trading hubs play in price formation in these MSs, and most directly, the fact that hub-indexations in long-term import contracts

430 For example, reduced flows across Baumgarten and from North Africa and increasing demand during October increased the PSV and VTP premiums over northern hubs. On certain days, the VTP-NCG DA price spread was more than 3 euros/MWh, significantly higher than the relevant transmission charges. The volatility of this spread means that there are arbitrage opportunities and, consequently, German-Austrian cross-border capacity is frequently congested.

431 A justification for this statement is elaborated, for example, in the Section 4 of this MIT's Center for Energy and Environmental Policy Research paper, which assesses market power in the electricity industry: [http://web.mit.edu/ceepr/www/publications/reprints/Reprint\\_209\\_WC.pdf](http://web.mit.edu/ceepr/www/publications/reprints/Reprint_209_WC.pdf).

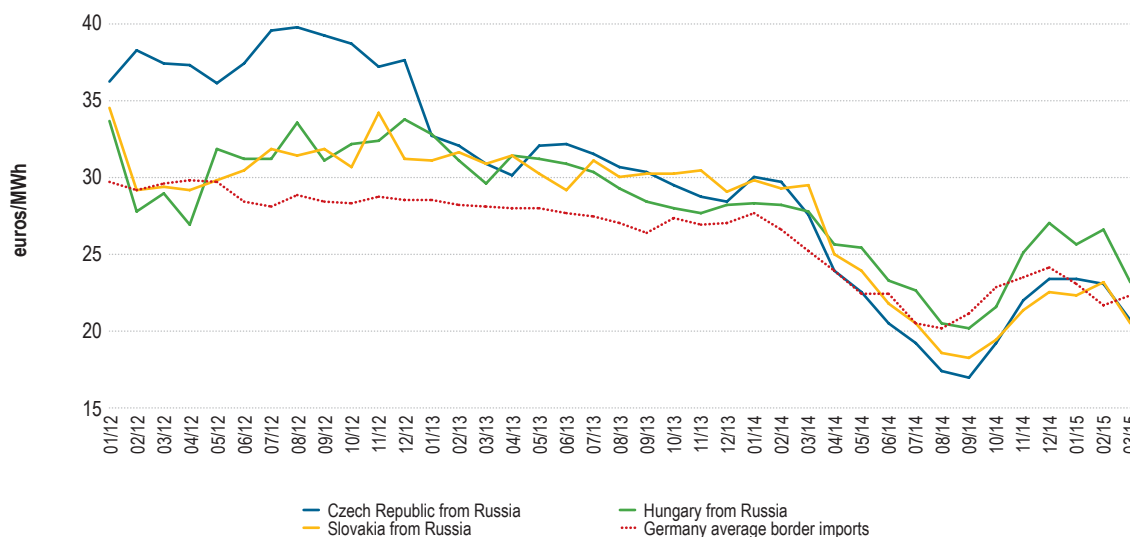
432 For example: the BBL pipeline (UK-NL), which offers virtual reverse flows capability, or Obergai bach/Medelheim IP (FR-DE) – where odourisation issues also need to be tackled – offer physical capacity only in the NL>UK and DE>FR directions. The bidirectional capacity offering from 2018 in the Transgas and TENP systems will contribute to the aim of further integration, and particularly to linking PSV closer to the NWE hubs. See, for example, <http://www.argusmedia.com/News/Article?id=984015>.

433 Eurostat Comext data are deemed to be more representative of long-term contract prices, although statistics refer the actual price of all physical imports declared at the border; they also could include hub direct physical cross-border purchasing. The fact that several MSs – see the list in Annex 6 – are not reporting these data because it may be commercially sensitive is detrimental to this comparison exercise.

are most prevalent here<sup>434</sup>. Further, the relative competitiveness of the wholesale markets in these MSs has an impact on the contract prices offered by the key upstream suppliers supplying the region: Norway, the Netherlands, and Russia.

675 In the UK, Benelux and Germany, import prices tend to be lower than in the adjacent markets of France or Italy<sup>435</sup>, although the gap is reduced as the renegotiation and inclusion of hub price indexations in long-term contracts develops<sup>436</sup>. Reported NWE region import prices also remain lower than in the CEE region, but price convergence has significantly improved in recent years<sup>437</sup> as presented in Figure 112. This is facilitated by the enhancement of cross-border capacity and the creation of physical or, in some cases, virtual reverse flow capability. New interconnection capacity benefits the CEE region in two ways: first, the technical capability creates the possibility of supply from lower priced regions; second, the theoretical possibility exerts competitive pressure on contract prices. Both effects vindicate the benefits of the creation of the IEM.

Figure 112: Comparison of CEE region MSs Russian supplies and average German import prices – 2012–2014 (euros/MWh)



Source: Eurostat Comext, BAFA.

676 Algerian origin and LNG oil-indexed long-term contracts are the most prevalent supply contractual mechanisms in the Mediterranean region. Prices from these sources were more expensive than NWE imports. This helps to explain why French and Italian prices, and to a greater extent Spanish and Portuguese prices, were higher than in Belgium, the Netherlands, Germany and the UK. In the case of the Iberian Peninsula, this high dependence, together with the absence of liquid hubs and the lack of sufficient interconnection with the rest of Europe result in higher prices<sup>438</sup>. The fall in international oil-prices has been reducing the imports price gap since the beginning of 2015.

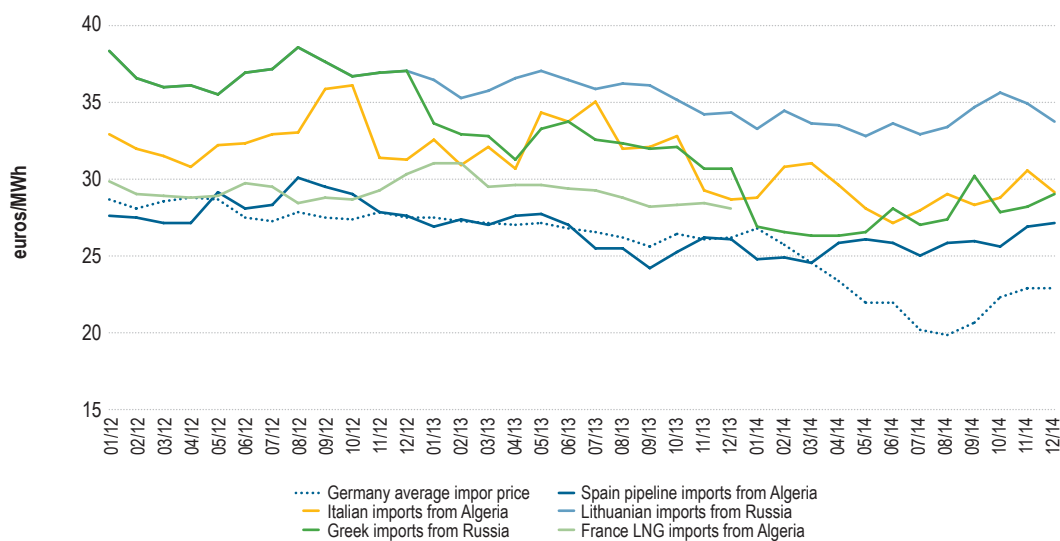
677 The Baltic and SEE regions continue to have some of the highest import prices in the EU. In countries like Romania and Croatia, which have significant domestic gas production, these segments are lower priced than external imports. The higher import prices are primarily linked to dependence on one supply source, namely Russia, but also to lower interconnection levels and the overall reduced competition along the

434 According to the IGU 2015 report; pages 8 and 22. See the report link on footnote 387.  
 435 See also European Commission gas quarterly reports price assessments: [https://ec.europa.eu/energy/sites/ener/files/documents/quarterly\\_report\\_on\\_european\\_gas\\_markets\\_2014\\_q4.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_2014_q4.pdf).  
 436 See, for example, Engie and ENI reported renegotiation of long-term contracts with hub spot orientation: <http://www.bloomberg.com/news/articles/2014-06-04/gdf-suez-to-review-gazprom-gas-contract-in-market-push>.  
 437 In contrast, the varying regional levels of RES deployment for electricity generation are resulting in lower price convergence of the electricity wholesale markets. See electricity chapter, Section 3.2..  
 438 See ENTSOG 10YNDP, page 180: [http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog\\_TYNDP2015\\_main\\_report\\_lowres.pdf](http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog_TYNDP2015_main_report_lowres.pdf).

gas value chain. Lower economies of scale are also likely to reduce the bargaining power of smaller gas-consuming MSs on producers. In such situations, producers can attempt to segment the market and apply potentially discriminatory pricing tactics. In this regard, in April 2015 the European Commission issued a statement of objections in its competition case against Gazprom, where the possibility of the supplier overcharging buyers and hindering competition is investigated<sup>439</sup> (key charges are territorial discrimination, unfair pricing policy and imposing commitments concerning gas transport infrastructure).

678 In January 2015 Estonia, Latvia, and Lithuania agreed to explore the creation of a trading region that could result in enhanced liquidity and competition in the area. Moreover, the entry into operation of the new Lithuania LNG terminal of Klaipeda has exerted downward pressure on current Russian prices and could work as a catalyst for Baltic market integration and better market functioning.

Figure 113: Comparison of selected Mediterranean, South-Eastern and Baltic region MSs with average German import prices – 2012–2014 (euros/MWh)



Source: Eurostat Comext, BAFA.

Note: In 2014, as stated in the case box below, Gazprom offered a retro-active price discount to the main Lithuanian shipper from January 2013. The discount was triggered by the commissioning of the Klaipeda terminal. It is not reflected in the Lithuanian import price in the figure comparison.



### Case box: Market impact of commissioning the Klaipeda LNG terminal

The first LNG terminal on the Baltic Sea started operations in Lithuania's city of Klaipeda in December 2014. The terminal, a floating storage and regasification unit, has a regasification capacity of 4 bcm/year, enough to cover Lithuanian (2.5 bcm/year) as well as up to 90% of the Baltic region's gas demand (4.2 bcm/year). At present, the terminal regasification capacity is restricted to 1 bcm/year and will be until the end of 2016, when wider transmission network conditions will make its full capacity available.

Before the Klaipeda terminal opened, the Baltic States were fully dependent on a single supplier, Gazprom. This situation, among other factors, resulted in the Baltic region's wholesale prices being among the highest in the EU. However, the Lithuanian LNG terminal was not seen to be commercially viable, due to the perceived price flexibility of Russian gas supplies. The Lithuanian Government, needing to improve gas security of supply and appreciating the positive market effects of increased gas sourcing options, developed a legislative framework that could support the operation and construction costs of the Klaipeda LNG terminal.

Regulation (EU) No 994/2010 gave Lithuania the foundation to legislate the funding and operation of the Klaipeda LNG terminal without breaching EU rules on state aid: the fixed capital costs of the project are shouldered by all users of the natural gas transmission system – including final consumers – by a new security of supply tariff, the so-called LNG supplement. This tariff has raised the non-contestable part of consumers' energy bills by 2.15 euros/MWh. Furthermore, to fulfil its security of supply role, the terminal has to be in operation throughout the whole year, ensuring demand for LNG sourced gas. Regulated heat and electricity producers have been designated by law as obligatory purchasers and are required to source an amount of LNG gas that enables the terminal's continuous and stable operation. The quantity (0.54 bcm/year) and the supply service price (1.23 euros/MWh for 2015) are set by the Lithuanian NRA<sup>440</sup>. The market implications of the terminal are twofold:

1. Amplified sourcing options have led to price reductions for consumers; prior to the opening of the LNG facility, and due to competitive pressure, Gazprom offered a 20% price discount<sup>441</sup> to Lietuvos Duju Tiekimas, the main Lithuanian shipper. Gazprom also offered a retrospective discount from 1 January 2013 until the end of March 2014 (this is not reflected in Figure 9). The effect for Lithuanian retail consumers has been significant: household regulated prices fell by 15-23%<sup>442</sup>. Lithuanian heating companies received a 17-20% price discount, when comparing 2015 to 2014 first quarter gas prices.

2. Potential to bolster market integration in the Baltic States through regional cooperation: Litgas, the Lithuanian gas supplier and trader, has announced multiple shipping contracts in Estonia and could be supplying up to 6% of the country's total gas demand in 2015 from Klaipeda, across Latvia<sup>443</sup>. This is a relevant market milestone, as cross-border commercial trades are unusual in the region, apart from those involving flows to the only regional storage site, Incukalns in Latvia. In this respect, it is a drawback that gas market liberalisation in Latvia was delayed in March 2014 until April 2017. It may prevent, for example, the gas storage facility Incukalns from playing a regional security role. Even though the terminal is a first step in the plans to integrate the Baltic markets into a single trading region, significant further steps besides pushing liberalisation are needed, one of them being regional infrastructure projects. There are plans for interconnection upgrades as well as new pipelines to connect the region with Poland and Finland that would clearly benefit regional market integration.

440 The LNG is sourced from Statoil by LITGAS, the state-designated supplier. The price is linked to the NBP index. See: <http://litgas.lt/en/litgas-contract-with-statoil-will-help-to-ensure-operations-of-the-lng-terminal-and-to-develop-new-activities/>.

441 The renegotiated contract has been in force since 1 July 2014 and ends on 31 December 2015, See, for example, <http://sputniknews.com/world/20140515/189839876.html>.

442 See: <http://www.regula.lt/Puslapiai/naujienos/2014-metai/2014-05-29/mazeja-%E2%80%99Lietuvos-dujos-gamtiniu-duju-tarifai-buitiniam-vartotojam.aspx>.

443 See: <http://litgas.lt/en/litgas-obtained-permission-to-trade-in-estonian-gas-market/>.

### 5.3.3 Benefits of market integration

679 Downward gas price convergence continued to advance during 2014 in a significant number of EU markets. In this sense, the realisation of a single continent-wide integrated market where gas flows freely across borders based on competition and the best use of resources is gradually getting closer. However, in some areas, significant wholesale price spreads persist. This suggests that further benefits in terms of lower gas wholesale prices can still be derived from the further integration of EU markets. The sub-sections which follow explore the materiality of some of these benefits in terms of welfare gains.

#### a) Estimates of gross welfare losses

680 This section assesses the theoretical estimated gross welfare losses across the EU caused by the incomplete integration of national gas markets. They are quantified by deducting the TTF sourcing price, which is taken as a price reference from the appraised suppliers' sourcing prices in each of the EU wholesale markets<sup>444</sup>. Suppliers' sourcing prices result from varying contractual mechanisms and purchasing strategies; the considerations taken to gauge the prices per market and the methodology used for the assessment are presented in Annex 6. The results provide an estimate of potential savings that could be achieved if all suppliers' in the EU had comparable gas sourcing prices, as in the TTF hub<sup>445</sup>. This initial exercise does not take into account factors such as transportation costs and necessary investment costs, or elements such as contractual obligations, demand-supply constraints or capacity availability<sup>446</sup>.

681 Figure 114 presents suppliers' sourcing price levels per market. For certain MSs, a range of prices is shown, as explained in Annex 6.

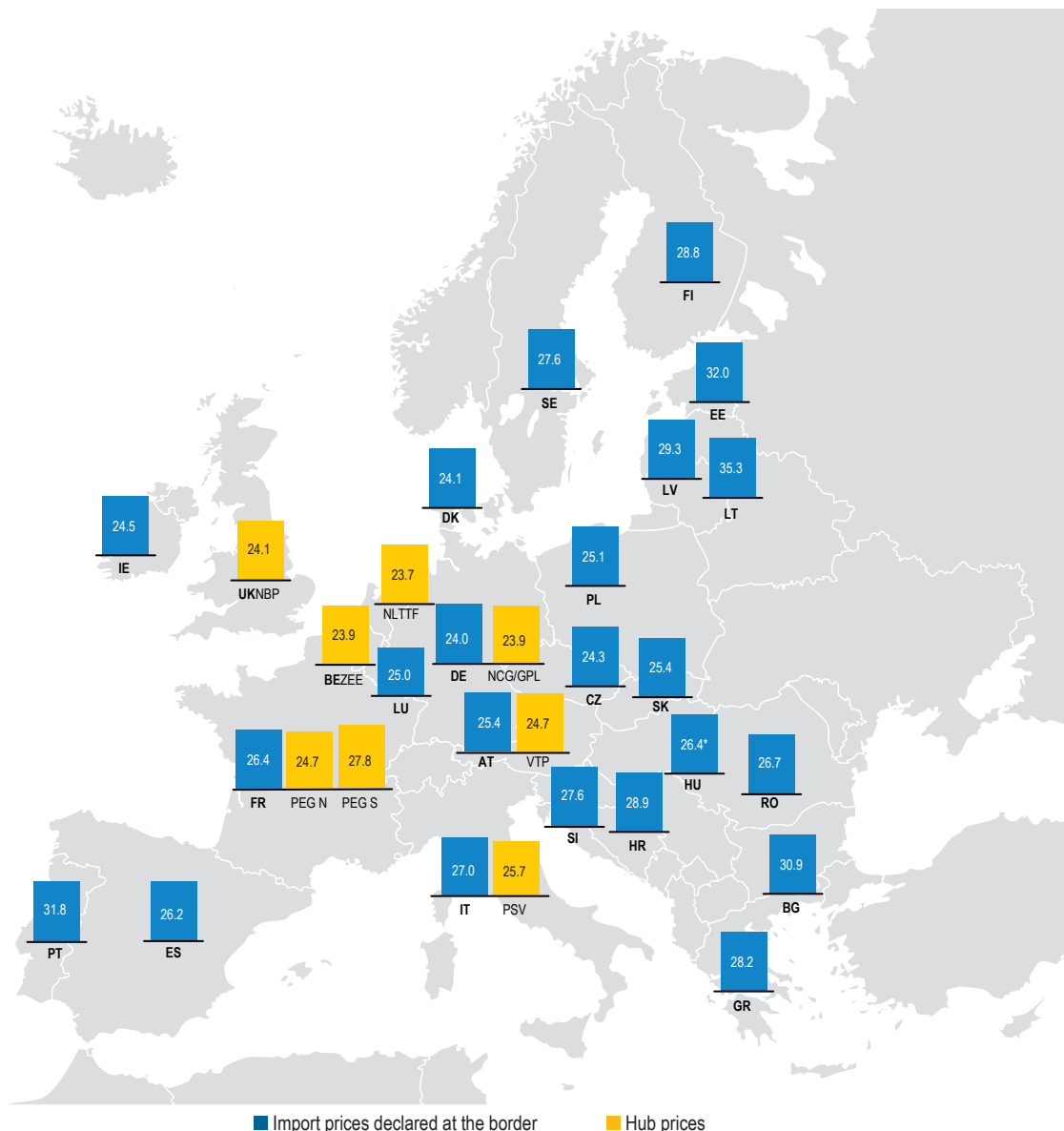
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444 Gross welfare losses are thus calculated as the sum of MSs-TTF gas sourcing price differentials multiplied by demand; monthly price and demand values are used to construct a yearly figure. It is to be noticed that this is a theoretical exercise chosen for practical purposes.

445 The exercise does not make the assumption that the different MSs are being supplied from the Netherlands. It considers that, similar to TTF, factors concur elsewhere in the EU, resulting in a similar price formation. The selection of the Dutch market as the baseline price reference is based on the fact that this market is among the most developed in terms of competition and liquidity (see Table 17), but the formation of similar final prices to TTF is not guaranteed, despite comparable competition levels, because MS market fundamentals in each different MS would play a specific role in the setting of final gas prices.

446 Some of these factors are analysed in the next section.

Figure 114: EU MSs assessed gas suppliers' sourcing prices – 2014 yearly average (euros/MWh)



Source: Eurostat Comext, Platts, NRAs and ACER calculations.

Note: Prices are an estimate of the average suppliers' sourcing price level in each MS, based on available public data and based on the 2014 methodology (see Annex 6 for a detailed explanation of the methodology). In 2014, Gazprom offered a retro-active price discount to the main Lithuanian supplier, which is not reflected in the figure calculations.

682 It is important to emphasise that the presented suppliers' average purchasing prices would differ if the referential market price were solely built on hub spot products. This is because suppliers' use of hub spot products represents only a small proportion of their whole contractual portfolios. However, hub spot products are commonly used by traders and by industrial consumers in all EU MSs with liquid hubs, either for arbitrage brokering or for negotiating the prices of longer-term contracts. If the welfare losses exercise had been performed on the basis of hub spot prices, gross welfare losses would be limited, given the high degree of EU hubs' spot price convergence (see Figure 111).

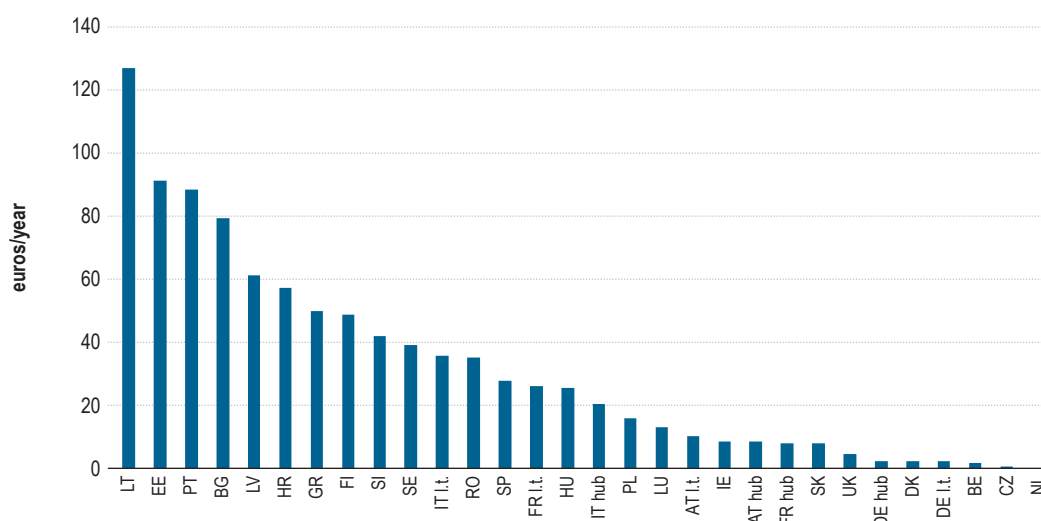
683 On the basis of the gauged suppliers' average sourcing price differences, total EU annual gross welfare losses ranged in 2014 from 5.2 to 6.6 billion euros<sup>447</sup>. Estimated losses have decreased significantly since the Agency started calculating them; if year 2012 is valued at 100%, the indexed welfare losses in 2013

447 The upper figure results from using declared import prices on the border, and the lower figure results from using hub product prices for those MSs where a range of prices was used to assess suppliers' average sourcing costs.

and 2014 were 65% and 52%, respectively. The reduction was mainly driven by two factors: demand reduction (-12.2%, 2014 vs 2012) and downward price convergence triggered by hub development, the latter referring to a larger hub price orientation of long-term contracts in a number of sizeable markets – i.e. France, Italy and the CEE region – and improved convergence among EU hub products prices, in particular between PSV and PEG Nord with TTF<sup>448</sup>. These figures are indicative and intended to show the trend over time. An aspect that needs to be emphasised is that the TTF hub price benchmark used in the estimates constitutes an educated proxy of the sourcing prices that could be overall accessible in a further integrated EU market. Depending on multiple market factors, market prices in EU MSs could converge around a middle point or could be lower overall, thanks to enhanced competition and liquidity levels.

684 Figure 115 shows relative wholesale gross welfare losses in each MS per household consumer. The values point towards significant remaining welfare gains to be captured for consumers in several MSs, in particular the three Baltic States, Portugal and Bulgaria, although the precise values are affected by individual consumption intensities. It is important to understand that the only purpose of this exercise is to show persisting imperfections in gas wholesale markets. The welfare losses give an order of magnitude of the extent to which market functioning could be further enhanced.

Figure 115: Gross welfare losses per average household consumer in the EU by contrasting suppliers sourcing prices in gas wholesale markets – 2014 (euros/year)



Source: Eurostat Comext, Platts, NRAs, CEER Database Indicators data (2014) and ACER calculations.

Note: The EU average household consumption level of 11,000 kWh/year is taken from the CEER National Indicators database 2014. Significant differences in average consumption levels exist among MSs household consumers; actual figures would impact on the values of real welfare losses. For example, in Lithuania, Estonia and Portugal, average consumption levels are below 4,000 kWh/year. 'i.t.' at the right of an MS refers to border import prices and 'hub' to hub prices used in suppliers' gas sourcing costs estimates. In 2014, Gazprom offered a retro-active price discount to the main Lithuanian supplier, which is not reflected in the figure calculations.

## b) Estimates of net welfare gains

685 Building on the above gross welfare loss results, this section focuses on a single<sup>449</sup> concrete example of potential net welfare gains that could be captured. Reference is made here to the impact of optimising existing cross-border capacities by exploiting wholesale price spreads between markets. The hypothesis is that companies sourcing gas for their consumers in lower-priced market areas have a business incentive to expand their sales business into adjacent higher-priced gas zones.

448 Data underlying this trend can be found in the OIES study referred to in footnote 430.

449 The scope of price convergence between EU gas wholesale markets would not only be affected by enhanced competition between adjacent areas' suppliers by means of enhanced infrastructure utilisation, but also by other interrelated means: (re)negotiation of supply prices with upstream producers; progression of the hedging role of hubs; swapping flows between areas; and/or IPs tariffs aspects. These factors are not included in our modelling.

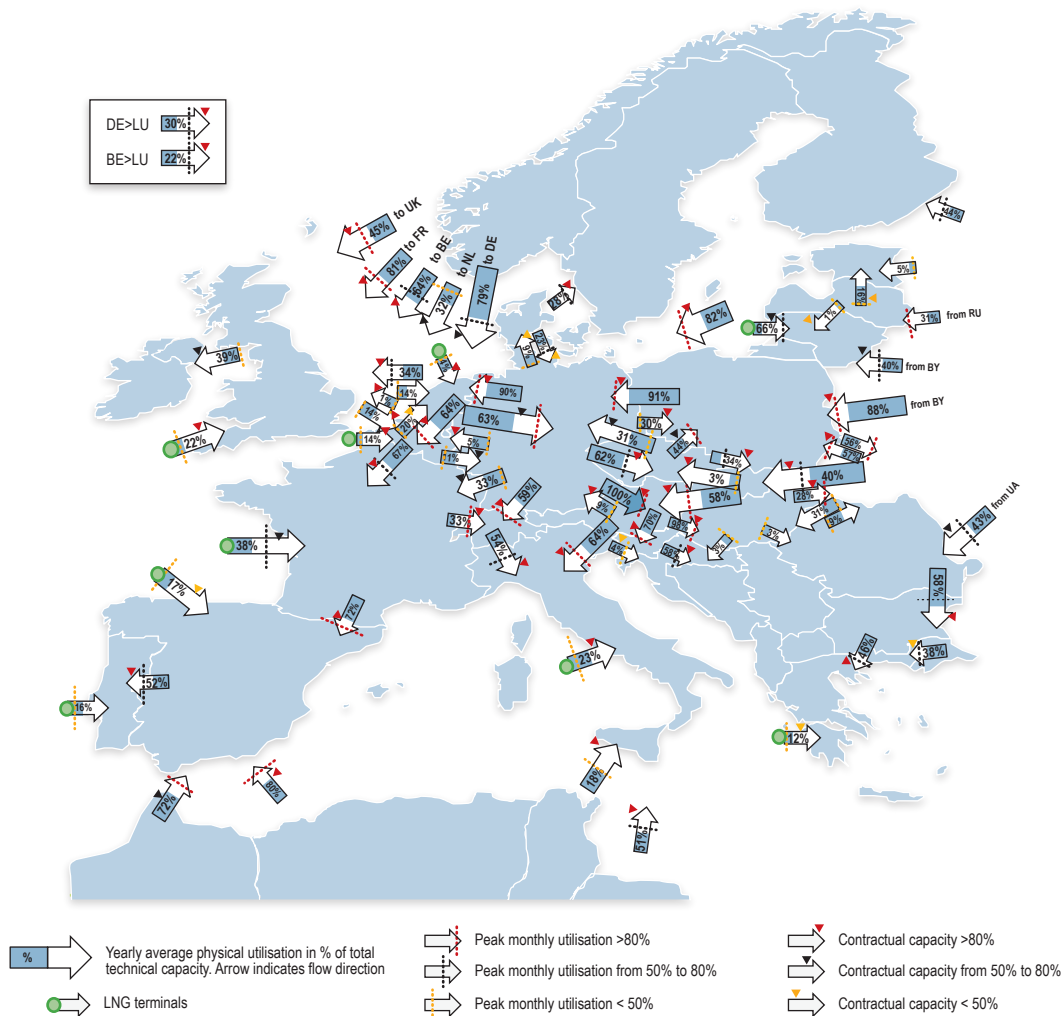
- 686 Suppliers would compete in these adjacent markets by using either unused physical or contractually available capacity at cross-border interconnections. The implication is that new suppliers would put these capacities to use in order to enter neighbouring, higher-priced markets and would undercut prevailing wholesale prices, even when taking into account due transmission charges. Lower-priced gas delivered across unused cross-border capacity should put downward pressure on prices in the targeted markets, because players operating there will be compelled to adapt their selling strategies<sup>450</sup>. Over time, this would result in increased convergence among EU suppliers' gas sourcing prices, hence delivering welfare gains to final consumers.
- 687 However, these calculations constitute a theoretical exercise and the Agency is aware that cross-border capacity contracting and utilisation values may not be determined solely by suppliers' aspirations to compete in adjacent market areas, but that this may also be driven by traders' price arbitrage opportunities between hubs, to cite an example. Moreover, a number of other factors may make optimisation of IPs capacity challenging, including: the physics of gas systems; the lack of sufficiently liquid organised markets and/or of trading counterparts; long-term contractual obligations; suitable granularity of tradable capacity contracts and variable transportation costs per capacity product duration, and the potential displacement effect on initial sourcing prices in one area if purchased volumes change.
- 688 Figure 116 shows that physical and contractual capacity availability at EU cross-border IPs differs significantly. The map indicates that at selected IPs capacity is not fully used, hence it is available. The same is true for the utilisation of IPs at peak moments. These unused capacities are used as a basis to calculate net welfare gains, together with data on suppliers' sourcing prices (see Figure 114), cross-border capacity values, registered flows and transmission tariffs<sup>451</sup>. The methodology is explained in detail in Annex 12.

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450 In a dynamic model – under the consideration that demand at the entry market remains unaltered despite price reductions – a caveat could be made that arguably unused cross-border capacity would remain at similar levels after the entry of the new competitor; this is because capacity initially being used by shippers' sourcing at higher prices would be used afterwards by new shippers sourcing at lower prices (i.e. higher price shippers will release the capacity). Nonetheless, price convergence should rise in this scenario, generating welfare gains.

451 The 2014 cross-border IPs transmission tariffs across the EU used in the exercise were presented in the MMR 2013, page 198. Annex 14 of this MMR 2014 edition displays the EU cross-border IPs transmission tariffs valid in 2015.

Figure 116: EU gas cross-border IPs physical and contractual capacity utilisation – 2014 (%)



Source: IEA, NRA data (2014) and ACER calculations.

Note: Utilisation data refer to the actual physical flows measured as a percentage of the IPs firm technical capacity, and not to the shippers' nominations underlying these flows; if nominations in both directions on a bi-directional IP occur, physical flows are netted by TSOs, which may result in an underestimate of the utilisation values presented. Contractual data refer solely to firm booked capacity. Figures are calculated as yearly averages over daily values. Arrows are depicted only if physical flows were registered in the referred direction during 2014. Values represent the weighted average quantities of all the IPs at each border.

689 The outcome of the analysis reveals that if all physical unused capacities were used in an optimal way following price spread signals, aggregated EU welfare gains could amount to a maximum of 1.3 billion euros. This assumes that the pricing strategy<sup>452</sup> adopted by market entrants foregoes taking any profit (i.e. undercut the entire prevailing price spread, minus transmission charges). This amount would be 0.65 billion euros if the suppliers take a 50% profit (i.e. undercut the prevailing price spread, minus transmission charges by 50%).

690 Under the hypothesis of firm technical minus peak-monthly used capacity utilisation, and again assuming that suppliers pass on all profit to the consumer, welfare gains would amount to approx. 0.75 billion euros. When constructing the comparison on the basis of available contractual capacity, welfare gains drop to 400 million euros in the case without profit taking, and 200 million euros in the case in which suppliers take 50% of the profit. The different results per scenario put the significance of physical, peak and contractual utilisation values into context.

452 The pricing strategies of the new entrants' effect on the total level of assessed EU welfare gains: new entrants' profits constitute in this sense a transfer to suppliers from the theoretical EU maximum gains. See the detailed methodology in Annex 12 explaining the considerations taken for modelling this aspect.

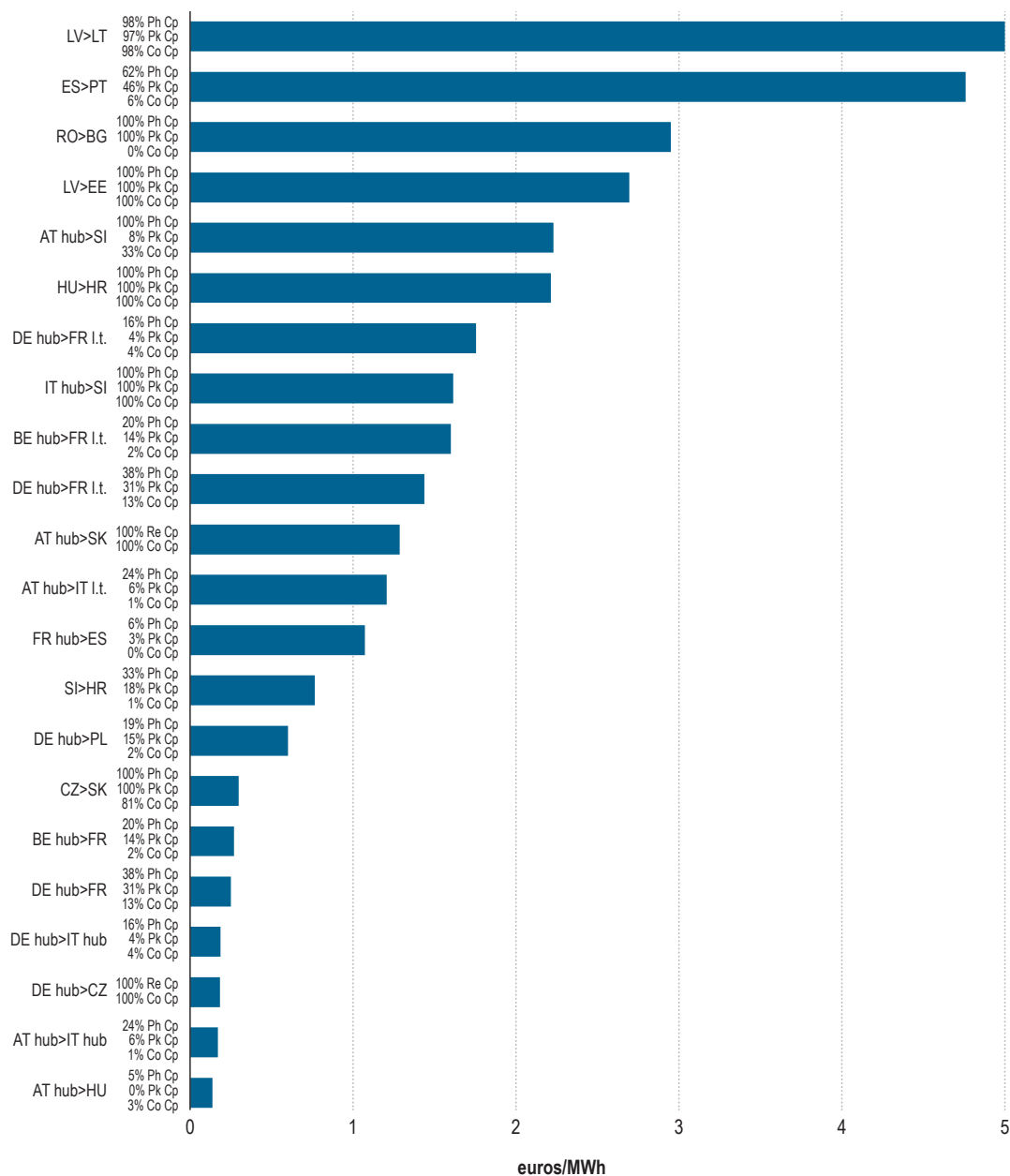
- 691 In absolute values, results indicate (see Figure A-25 in Annex 12) that Italy and France would stand to gain most if suppliers' average sourcing costs were further to converge with NWE adjacent zones by optimising the use of all unused capacities – some zonal price spreads still persist, mostly explained by long-term contracting mechanisms and transportation costs. Absolute gains are brought about by their geographical proximity to even lower-priced NWE markets, significant existing interconnection capacity and the high demand in both countries.
- 692 Considering the unitary net welfare gains, i.e. price spreads, presented in Figure 117, the MSs that could benefit the most are: Lithuania and Estonia served from Latvia; Portugal served from Spain; Bulgaria served from Romania; Slovenia served from Austria, and Croatia served from Hungary. However, from this list, significant amounts of contractually available capacity only seem to be available in the Baltic MSs. In the Baltic region available capacity was not used during the year, partly because technical capacity enhancement was under construction<sup>453</sup>, but also due to competition barriers and commercial constraints<sup>454</sup>.

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453 The capacity of the Latvia–Lithuania Gas Interconnection is used mainly for the delivery of natural gas supplies from the Latvian underground storage to Lithuania. During 2014, capacity was limited for technical reasons associated with the enhancement of the pipeline's capacities. See, for example, <https://www.ambergrid.lt/en/transmission-system/development-of-the-transmission-system/completed-projects/the-Latvia-Lithuania-gas-interconnection>.

454 See, for example, an analysis of the nature of these barriers in: <http://www.energypost.eu/system-unconnected-vessels-gas-market-baltic-states/>.

Figure 117: Unitary net welfare gains considering suppliers sourcing prices in different EU MSs borders – 2014 (euros/MWh)



Source: IEA, Eurostat, Platts, ENTSOG (2014) and ACER calculations.

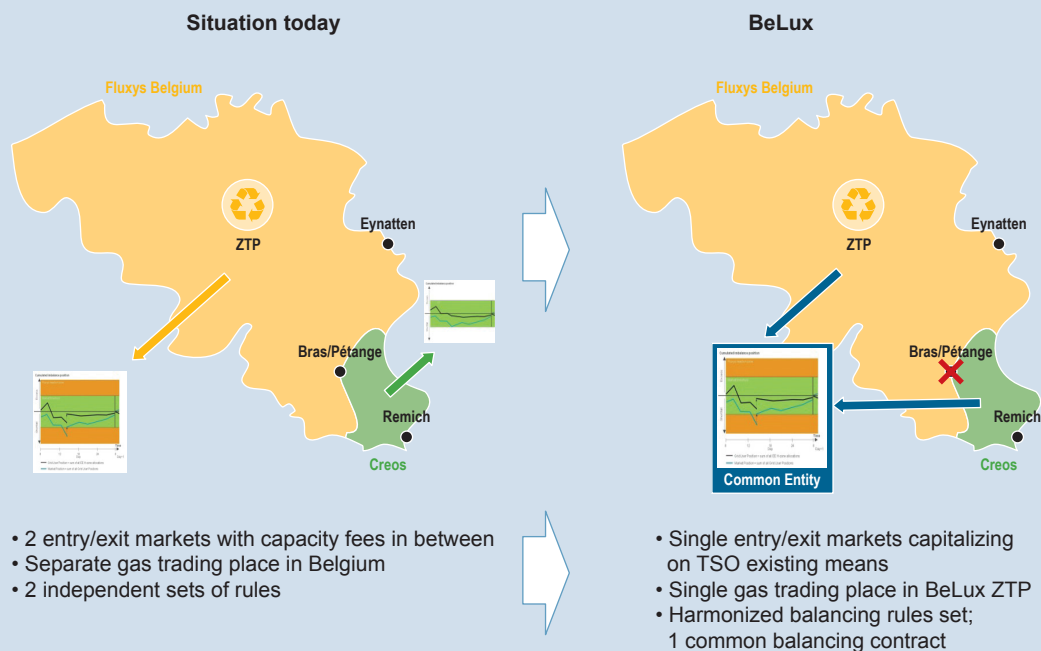
Note: Physical capacities (Ph Cp) refer to the firm technical capacities minus the physical registered flows in 2014. Peak capacities (Pk Cp) refer to the firm technical capacities, minus the peak month flows. Contractual Capacities (Co Cp) refer to the firm contractually available capacities. The percentage numbers at left indicate the share of total yearly MSs demand that could be supplied with the referred unused capacities. Reverse flow capacities are denoted as Re Cp. Italy from Germany (1) refer to capacities and aggregated transmission tariffs through Switzerland. 'LT' at the right of a MS refers to suppliers' sourcing price estimates made on import prices declared at the border and 'hub' to suppliers' sourcing prices built on hub products. For France, hub PEG Nord values were considered. In 2014, Gazprom offered a retro-active price discount to the main Lithuanian supplier, which is not reflected in the figure calculations.



### Belgium-Luxembourg pilot market integration project between two MSs.

In May 2014, the TSOs Creos Luxembourg and Fluxys Belgium, in concert with the respective NRAs ILR and CREG, signed a cooperation agreement for closely working together to advance in the integration of their national gas markets in a sole BeLux market area, which should come into force from October 2015. A single gas balancing area covering the two countries will be set up, by establishing one entry/exit system with a common balancing regime, and one notional trading point (ZTP hub). This initiative constitutes the first market integration project between two European MSs. Figure (i) presents an overview of the project.

Figure (i): The Belgium-Luxembourg cross-border market integration project



At present both markets are independent national entry/exit systems, and access fees apply between them. After the integration, entry-exit access fees between Belgium and Luxembourg will no longer apply and ZTP will become the gas trading point for the sole BeLux market. In addition, the same balancing rules will apply, and a new joint entity has been set up to manage the balancing of the integrated market.

693 Creating cross-border interconnection capacity entails significant capital investment. The actual cost of a specific project depends on a variety of technical and financial aspects and therefore a straightforward calculation is not always feasible. A recent report published by the Agency has for the first time made publicly available a set of indicators and corresponding reference values that would allow for the comparison of unit investment costs in gas infrastructure in the EU. These numbers are expected to be a useful reference for assessing infrastructure costs<sup>455</sup>.

694 If additional interconnection capacity can be shown to reduce supply constraints and facilitate competition, the benefits could exceed the costs, thus producing welfare gains. The identification across the EU of potential projects that could have delivered higher market integration is performed under the TEN-E Regulation<sup>456</sup> governing the development of priority corridors through projects of common interest (PCIs). The criteria for deciding on the final gas projects that may access EU financial support and/or benefit

455 The ACER work methodology and results are accessible here: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/UIC%20Report%20-%20Gas%20infrastructure.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/UIC%20Report%20-%20Gas%20infrastructure.pdf).

456 Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure. See <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF>.

from accelerated licensing procedures require that, besides a positive cost-benefit analysis, they have a relevant<sup>457</sup> cross-border impact for market integration. The EC has recently published an updated list of PCI candidate projects<sup>458</sup>. These projects are also included in ENTSOG's 2015 TYNDP<sup>459</sup>.

### 5.3.4 Conclusion

695 The main EU gas market places saw an increase in traded volumes during the year, with OTC remaining the dominant type of trading. While liquidity at most EU hubs increased, TTF and NBP are still by far the front runners in terms of absolute volumes, broader liquidity horizons and lower bid-ask price spreads. As such, they act as reference beacons for others' hub prices and also for long-term contract indexations. Hubs, primarily in the rest of NWE, are becoming more and more relevant places to hedge supplies. In CEE, hubs also saw an increase in market services that, together with enhanced interconnection capabilities, are lifting their liquidity. This increasing role of hubs is increasing price convergence across the EU. However, hubs' supply role is still partial, and several countries, principally in SSE, the Baltics and the Mediterranean regions, still rely heavily on long-term contracts, usually from a limited number of sources. This resulted in those regions recording comparatively higher prices.

696 Estimated welfare losses due to the incomplete integration of national gas markets were assessed in 2014, ranging<sup>460</sup> from 5.2 to 6.6 billion euros. This represent a decrease compared to 2013, when they ranged from 6 to 9 billion euros. The reduction is mainly the result of further import price convergence with hub prices, but has also been influenced by the lower demand. On a per-household basis, significant remaining welfare gains can be captured for consumers in several MSs, in particular the three Baltic States, Portugal and Bulgaria. As an example, an optimised utilisation of unused border capacity could yield, depending on the definition, several hundreds of millions of euros in welfare gains.

## 5.4 Improving the functioning of the internal gas market

697 This section looks in more detail at the utilisation of cross-border capacity (Section 5.4.1), the market developments in CEE and SSE (Section 5.4.2), including the impact of reverse flows in the context of the Russia–Ukraine conflict (Section 5.4.3), and utilisation of underground storage facilities (Section 5.4.4).

### 5.4.1 Analysis of cross-border capacity utilisation

698 An efficient and non-discriminatory regulatory framework governing access to cross-border interconnection capacity is essential to the realisation of an integrated EU gas wholesale market. Efficient capacity allocation ensures that gas flows are able to respond to price signals, leading to greater price convergence and, ultimately, lower prices for gas consumers.

699 The Capacity Allocation Mechanisms Network Code (CAM NC) and Congestion Management Procedures Guidelines (CMP GL) are designed to facilitate this goal. In the case of the CAM NC, auction mechanisms ensure that capacity is allocated in a transparent and non-discriminatory way. Moreover, the establishment of short-term capacity offering obligations (i.e. less than one year) ensure that market foreclosure cannot take place through long-term capacity bookings. CMP GL deal more directly with the issue of contractual capacity congestion, and in particular those situations in which capacity has been booked, but not necessarily used, thereby preventing other users from accessing the system. This is addressed by rules – congestion management procedures – ensuring that capacity is used in an optimal manner.

700 The ACER 2014 annual report on contractual congestion at interconnection points<sup>461</sup> identified that about

457 For gas transmission, this involves implementing reverse flows or expansion of at least 10% in cross-border flow capacity.

458 See: <http://ec.europa.eu/energy/en/topics/infrastructure/projects-common-interest>.

459 Ten-year network development plan: [http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog\\_TYNDP2015\\_main\\_report\\_lowres.pdf](http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog_TYNDP2015_main_report_lowres.pdf).

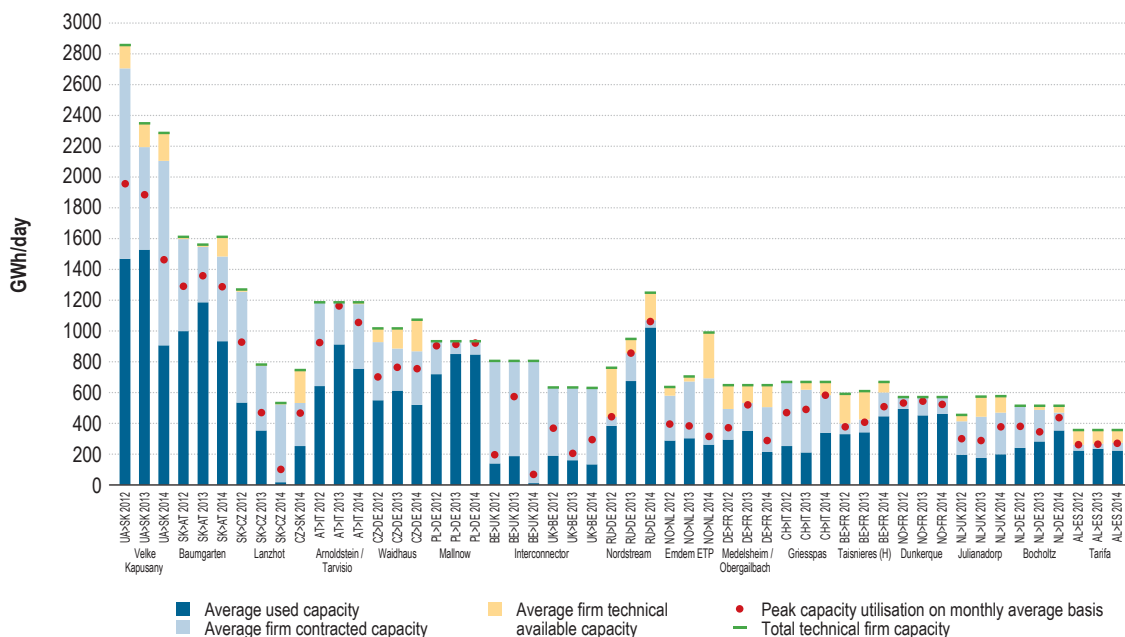
460 See footnote 448.

461 See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/20150529\\_ACER%202015%20Report%20on%20Congestion%20at%20IPs%20in%202014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/20150529_ACER%202015%20Report%20on%20Congestion%20at%20IPs%20in%202014.pdf).

15% of the EU IP sides were contractually congested<sup>462</sup> during 2014. Congestion is mitigated in some EU areas, particularly in the NWE region, via active secondary trading and CMPs application. The most persistent congestion was found in the SSE region, but it also affects key interconnections in other regions<sup>463</sup>, such as the German ones with Poland and the Czech Republic. The ACER 2014 CMP implementation monitoring report<sup>464</sup> also signalled that in 2014 implementation had not been fully completed in the EU, and that the application of CMPs was still limited in some cases.

- 701 Utilisation levels of contracted capacity diverge across Europe. At some IPs, contracted and utilised values are practically aligned. At others, considerable differences exist, and although the underlying reasons are difficult to identify, capacity hoarding can be a cause. However, shippers' sometimes need to contract more capacity than they need in order to have the flexibility to adjust their portfolios at short notice via flow re-nomination, or because profiled bookings are not always as accessible or as economic as yearly flat capacity. The difficulty of surrendering unused long-term capacity in the absence of other shippers willing to contract may also play a role.
- 702 This year, the Agency has analysed again the issue of contractual and physical capacity utilisation in a sample of the most relevant cross-border IPs in the EU. The sample in Figure 118 includes a collection of the main gas flow directions throughout Europe.

Figure 118: Yearly average used versus booked capacity at selected natural gas IPs in the EU – 2012–2014 (GWh/day)



Source: ENTSOG transparency platform and individual TSO data (2014) and ACER calculations.

Note: In those IPs offering reverse flow possibilities, capacities can be nominated in both directions. Utilisation values are shown on the basis of physical flows after their commercial netting. This may result in lower rates than initially received nominations. In those cases where technical capacities at both IP sides do not fully overlap, the lower value has been considered.

462 'Contractual congestion' means a situation where the level of firm capacity demand exceeds technical capacity.

463 The list of contractually congested IPs can be found in the ACER report. It includes entry and exit points between Germany with Poland and the Czech Republic, Austria to Hungary, Romania to Bulgaria, Bulgaria to Greece, Slovenia to Croatia, Belarus and Ukraine into Poland, as well as in some instances within countries' areas in Germany and France. To a lesser extent, it was also identified in some instances between the Netherlands and Germany, and at the Interconnector between the UK and Belgium, although this was mitigated via the application of CMPs. Congested points on the list will have to apply specific day-ahead UIOLI CMP provisions from July 2016 if congestion remains.

464 See: [http://www.acer.europa.eu/Media/News/Pages/ACER-publishes-its-first-Implementation-Monitoring-Report-on-Gas-Congestion-Management-Procedures-\(CMP\).aspx](http://www.acer.europa.eu/Media/News/Pages/ACER-publishes-its-first-Implementation-Monitoring-Report-on-Gas-Congestion-Management-Procedures-(CMP).aspx).

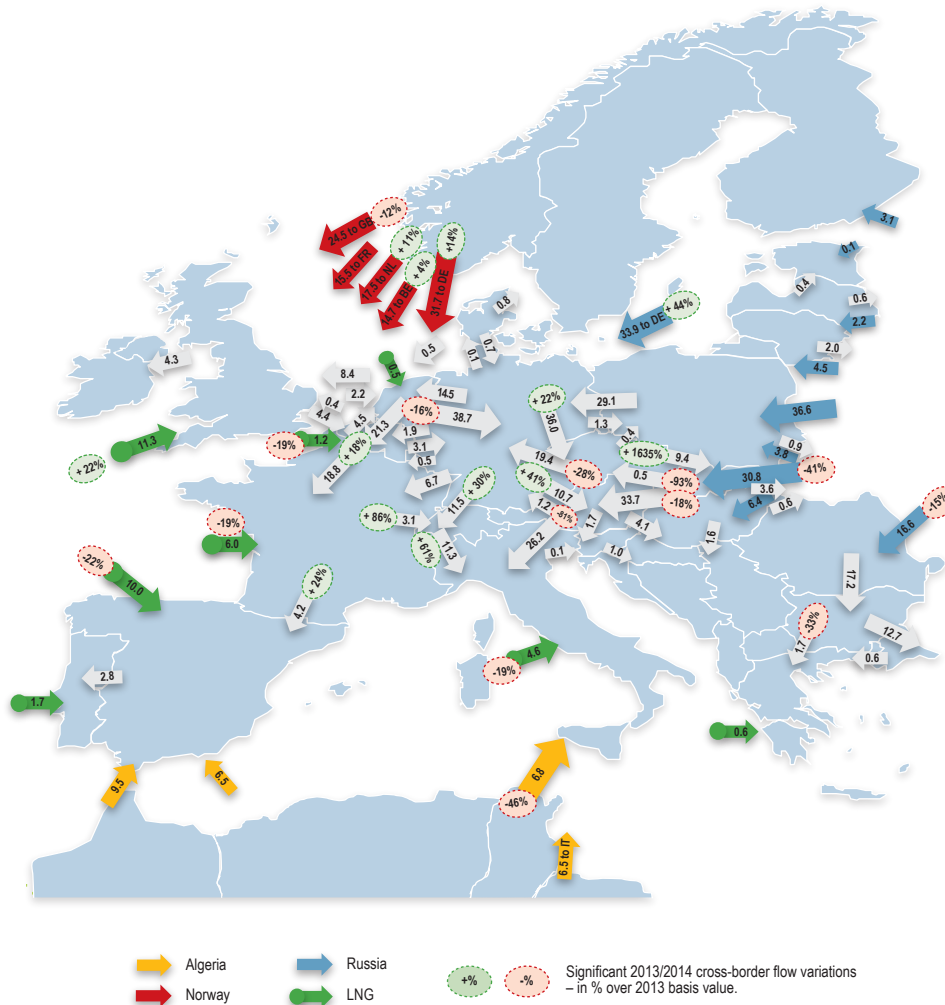
- 703 On the basis of the sample, average<sup>465</sup> booked firm capacity represents 89% of technical (firm) capacity, while – looking at physical flows – the average utilisation rate is 50%, and peak monthly utilisation is 67%. The data indicates that there is unused contracted capacity, even at times of seasonal peak demand flows. All three rates are lower than in 2013, particularly the utilisation rate. This is explained by the lower registered demand during the year and also because enhanced reverse flow possibilities are progressively favouring the netting of nominations received in opposite directions.
- 704 In 2014, a high proportion of IP capacity remained subject to long-term capacity bookings, in part due to previous contractual commitments. In some cases, long-term capacity bookings are necessary to underpin infrastructure investment, and indeed the validation of an economic test, based on financially firm future capacity commitments, is a key component of the incremental capacity section of the Tariff Network Code currently under development.
- 705 Nevertheless, there is evidence that, in locations of surplus capacity and forecast declining demand, the extent of longer-term capacity booking (i.e. beyond 5-10 years) is decreasing. Data that confirm the lower demand for new longer-term capacity can be seen in the limited interest in capacity in a number of recent Open Season tests, and also in the results of last year's PRISMA capacity platform auctions for booking products beyond one year ahead<sup>466</sup>. This may suggest that suppliers and traders are looking at shorter-term auctioned products as a more flexible way to source capacity. However, uncertain demand forecasts may also be a factor.
- 706 Figure 119 shows EU cross-border registered flows during 2014 and gives insights in their variations versus 2013 values, which are significant. The comparison provides a context in which to interpret some of the disparities in cross-border IPs' capacity utilisation values exhibited in Figure 118.
- 707 Among the most significant year-on-year differences, the following stand out: the shift of supply routes of Russian gas into the EU; reverse flow enhancements in the CEE region; yearly recovery of LNG imports in the UK, but ongoing drop in the remaining EU countries; and the tendency of flows to respond better to price signals. The sections below illustrate some of these developments.

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465 Calculations present a simple average of the selected IPs sample.

466 PRISMA auction results show a higher capacity appetite for short-term products, while contracted annual products are low. PRISMA platform only offers those IPs capacities available to be booked. See <https://platform.prisma-capacity.eu/trading/reports.xhtml?conversationContext=1>.

Figure 119: EU cross-border gas flows in 2014 and main variations from 2013 (bcm/year)



Source: IEA (2015) and ACER calculations.

**a) Increase of Nord Stream utilisation and reduction of Russian transit flows via Ukraine**

708 Nord Stream is significantly affecting the flow route of Russian gas into Europe. The interconnector gives Russian gas direct access to the NWE region and also to CEE markets, via Germany. Nord Stream supplies increased again in 2014, driven by onshore connected pipelines capacity enhancements<sup>467</sup> and the Russia–Ukraine conflict implications, resulting in a preferential use of this route by Gazprom to reduce transit dependence across the Ukraine.

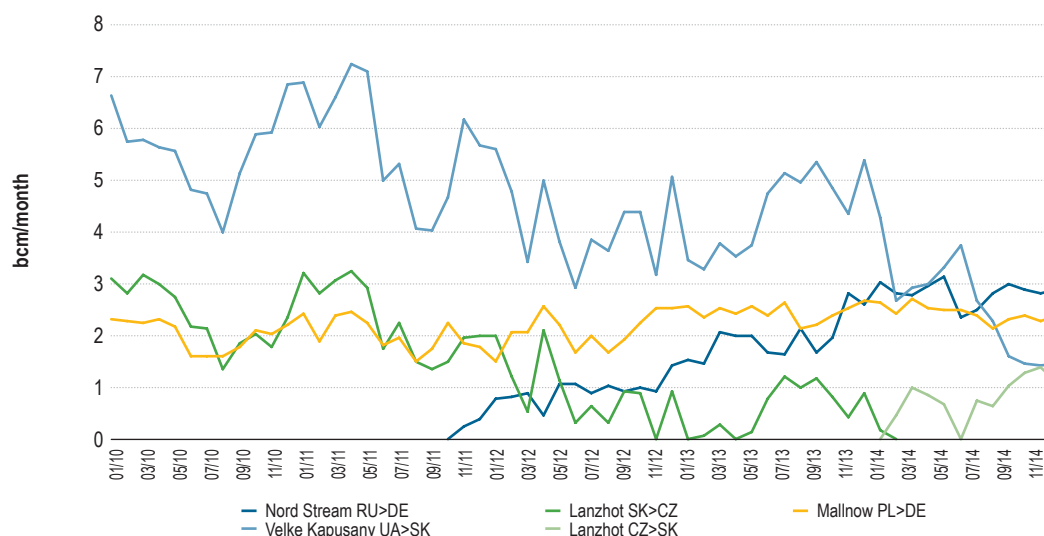
709 The mirror image of this development was that Russian flows via Ukraine and transiting through Slovakia (Velke Kapusany) decreased significantly, more than 40% year-on-year<sup>468</sup>. This situation influenced the configuration of certain CEE and SSE region IPs. Remarkably, in the second half of the year, physical flows across Lanzhot were dominant in the Czech export direction into Slovakia, thus reversing the traditional flow direction. The underlying motives were, on the one hand, the provision of higher deliveries of gas across non-Ukrainian routes into the CEE and SSE regions – i.e. across Nord Stream, via Lanzhot and into Baumgarten – and, on the other hand, the facilitation of physical reverse flows for enhancing physical

467 Nord stream is divided into two main pipelines after its landing point in Greifswald: OPAL towards the South and across the Czech Republic and Germany (again) into France; and NEL towards the Northwest of Germany. Capacities were enhanced in January and November 2013, respectively.

468 As expanded in the next section, Eustream accused Gazprom of flow nomination curtailments during the year. Nonetheless, the share of Russian gas exports into the EU transiting across the Ukraine decreased from 80% of total Russian deliveries in 2005 to 30% in 2014. SSE: [http://www.ewi.uni-koeln.de/fileadmin/user\\_upload/Publikationen/Studien/Politik\\_und\\_Gesellschaft/2015/Ukrainian\\_crisis\\_Europes\\_increased\\_security\\_position\\_final.pdf](http://www.ewi.uni-koeln.de/fileadmin/user_upload/Publikationen/Studien/Politik_und_Gesellschaft/2015/Ukrainian_crisis_Europes_increased_security_position_final.pdf).

supplies into Ukraine, as will be expanded on in Section 5.4.2. Flows transiting across Belarus and Poland into Germany (Yamal pipeline – Mallnow) remained relatively constant, as shown in Figure 120.

Figure 120: Gas flows across a selection of relevant routes in Central Europe – 2010–2014 (bcm/month)



Source: IEA (2015) and ACER calculations.

## b) Cross-border flows responding better to price signals

710 Cross-border flows are gradually responding better to price signals, favoured by the increasing role of hubs in supply hedging. Flows between the UK and continental Europe continued to be mainly driven by short-term price differentials. Interconnector flows were mainly in the UK-to-Belgium direction<sup>469</sup>. At the physically unidirectional BBL pipeline between the Netherlands and the UK, flow registries remained at similar levels as in 2013, in the UK import direction. This interconnection is yet more reliant on long-term supply contracts, although also an increasing utilisation of backhaul capacity is being observed.

711 Exports from the Netherlands into adjacent EU areas decreased by 10%, chiefly those to Germany<sup>470</sup>. The Dutch Groningen field production drop was the key underlying reason. And even though TTF's liquidity increased last year, net physical delivered volumes in the hub slightly decreased, by 4%.

712 In Italy, a reduction took place during the year in physical flows across the Baumgarten-Tarvisio route, and in contrast, higher supplies from hubs in NWE, particularly TTF, across the TENP-Transitgas route interconnections (Griespass) were observed. Falls in Baumgarten flows were driven by the market developments mentioned above. The reduction of Algerian flows – across Tunisia – was partially driven by the shippers' profiling of their oil-indexed contract purchases, anticipating more beneficial prices from the beginning of 2015. A similar incentive was valid in France and Spain.

713 Norwegian export levels increased during the year despite the drop in EU demand. This seems to be explained by falling EU domestic production and by Statoil's strategy to offer hub price linked supplies. Complementarily, the lower flexibility regarding take-or-pay obligations may have played a role.

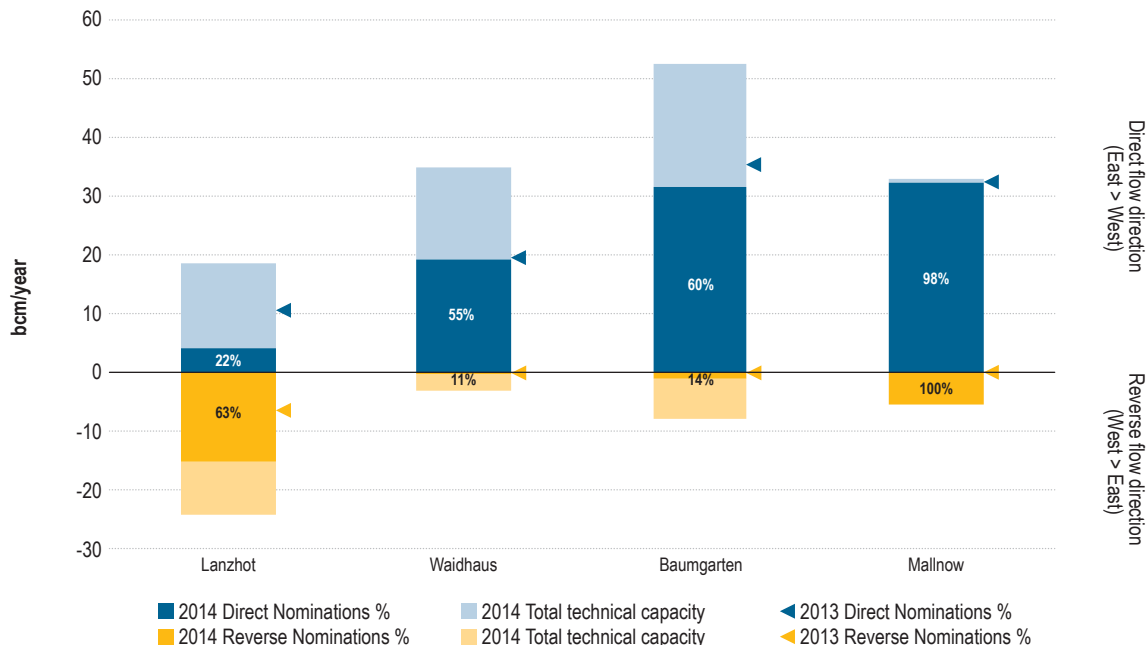
714 In the CEE region, some of the traditional East to West flow patterns have altered. Enhanced cross-border capacities and new reverse flow possibilities increased physical flows from West to East. In addition, and

<sup>469</sup> A flow export direction from UK was also observable at times when the Belgian ZEE hub was priced lower than NBP. According to market analysts, an increase in the commodity charge to enter gas into the UK transmission system made it more strategic to export the gas beaching at UK Bacton terminal across the Interconnector pipeline than introducing it into the UK. See an analysis for this on: <http://www.icis.com/resources/news/2014/04/22/9773518/uk-exports-to-belgium-surge-on-costs-below-commodity-charge/>.

<sup>470</sup> IEA data point to 8 bcm/year 2013/14 decrease in flows from the Netherlands into Germany. Although not fully substitutive, a similar range increase was registered in the entry flows into Germany from Nord Stream.

via commercial netting, a higher share of the traditionally East to West gas flows remained within the CEE countries. This changing dynamic was driven by two drivers: price arbitrage with adjacent NWE hubs and supplies into Ukraine. Figure 121 illustrates this trend, which will be further analysed in the next section.

Figure 121: Reverse flow registries in a sample of NWE-CEE cross-border interconnections



Source: ENTSOG TP, Eustream, Net4Gas and ACER calculations.

### 5.4.2 Market developments in CEE and SSE regions

- 715 This section analyses gas market developments in the CEE region in more detail, and to a lesser extent in the SSE region.
- 716 Overall, CEE MSs are advancing in their gas market integration, albeit from a low base, both among themselves and with the adjacent NWE region’s markets. Examples of these trends are seen in the gradual development of their hubs and in the progression of their interconnection infrastructure. These improvements are facilitating flows and trading opportunities with the NWE area. This trend is gradually reducing their dependence on Russian supplies and helps to lift the region’s competition levels, with specificities in each country, however.
- 717 The region’s gas outlook will not only be shaped by this enhanced integration with the NWE area. On the one hand, large planned pipeline projects are intended to bring supplies to the SSE region from the Caspian states across the so-called Southern Corridor routes: the Trans-Anatolian and Trans-Adriatic (TANAP-TAP) and the Azerbaijan–Georgia–Romania (AGRI) interconnectors<sup>471</sup>. In addition, Turkish-Stream, the planned alternative project to South Stream, is planned to increase Russian flows across Turkey and to create a regional hub at its border with Greece. However, some of these projects are more advanced than others, and there are uncertainties regarding the feasibility of some of them<sup>472</sup>. These large projects could also have a significant impact on the CEE region. The CESEC group was set up to improve the selection and speedy implementation of regional interconnections that would better enable to take advantage of them and contribute to further guarantee secure and diversified supplies<sup>473</sup>.

471 See a map and a summary of these projects features, for example, in: <http://www.naturalgaseurope.com/europe-and-russia-after-south-stream-cancellation>.  
 472 See footnote 402.  
 473 Central East South Europe Gas Connectivity (CESEC). See: [http://europa.eu/rapid/press-release\\_STATEMENT-15-4281\\_en.htm](http://europa.eu/rapid/press-release_STATEMENT-15-4281_en.htm).

- 718 Additionally, the new Baltic LNG terminals in Poland (2016) and Lithuania (end 2014<sup>474</sup>) together with those in Southern Mediterranean shores (Croatia – possibly in 2018 – and Greece) will diversify supply capability and contribute to consolidating the North-South corridor.
- 719 CEE MSs had traditionally lagged behind market integration with NWE areas, for the primary reason that Russian supplies via long-term contracts locked in significant shares of their demand<sup>475</sup>. This reduced the economic incentive to seek alternative supplies. Moreover, low internal competition and small market size also played a role.
- 720 In 2009, the Russia–Ukraine gas dispute and linked disruptions of Russian supplies exposed CEE’s markets vulnerability due to their dependence on a single supplier<sup>476</sup>. One of the outcomes was the adoption, in 2010, of Regulation (EU) No 994/2010 concerning measures to safeguard security of gas supply, which established, on the one hand, the obligation to offer bi-directional capacity at all EU cross-border interconnections and, on the other hand, to enhance alternative interconnection capacity<sup>477</sup>. The 2009 dispute took place in a regulatory context which was pursuing the promotion of competition by implementing unbundling obligations and the setting up of VTP configurations for the growth of hubs. In addition an emergent market interest from adjacent areas’ suppliers to enter the region was observed.
- 721 Regulation (EU) No 994/2010 promotes the construction of new cross-border interconnections and the enabling of reverse flow capabilities on existing ones. Most of the investments were financed by EU programmes<sup>478</sup>. Figure 122 presents an evolution of the region’s capacity developments in recent years. The graph shows that at most CEE borders, capacity increased via enabling reverse flow capability and, in certain instances, through new IPs. Market dynamics, as explained above, altered flows on a few routes, notably in Slovakia and the Czech Republic, where, as a result, the technical capacity offered was reduced.

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474 See Case study 10 on Section 5.3.2.

475 The broader network of Brotherhood and Yamal systems cross Slovakia-Czech Republic and Poland, respectively. Long-term supply and transit agreements with Russia will remain valid for the coming years.

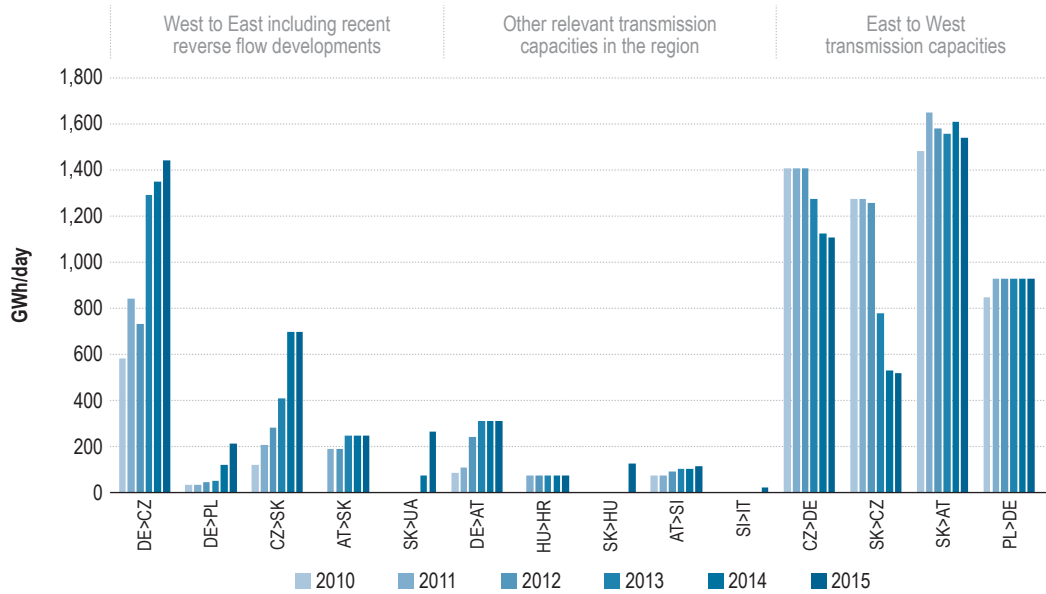
476 The impact analysis of a theoretical Ukrainian transit supply disruption prepared by ENTSG at the request of the European Commission in 2014 indicated that the region would still remain vulnerable, although significant improvements have been achieved. See: [http://www.entsog.eu/public/uploads/files/publications/Outlooks%20&%20Reviews/2014/SO0008-141103\\_WinterSupplyOutlook2014-15\\_Review2013-14.pdf](http://www.entsog.eu/public/uploads/files/publications/Outlooks%20&%20Reviews/2014/SO0008-141103_WinterSupplyOutlook2014-15_Review2013-14.pdf).

477 See: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:295:0001:0022:EN:PDF>.

478 The European Energy Programme for Recovery mobilised 1.3 billion euros for gas projects. See: [http://ec.europa.eu/energy/eepr/projects/files/gas-interconnections-and-reverse-flow/gas-eepr-summary\\_en.pdf](http://ec.europa.eu/energy/eepr/projects/files/gas-interconnections-and-reverse-flow/gas-eepr-summary_en.pdf). For comparison, the Connecting Europe Facility, established to co-finance projects during 2014-2020 has 5.8 billion euros of funds (See: [http://inea.ec.europa.eu/en/cef/cef\\_energy/cef\\_energy.htm](http://inea.ec.europa.eu/en/cef/cef_energy/cef_energy.htm)) including for the selection of Projects of Common Interest.



Figure 122: Interconnection capacity developments on selected CEE and SEE borders – 2010–2015 (GWh/day)

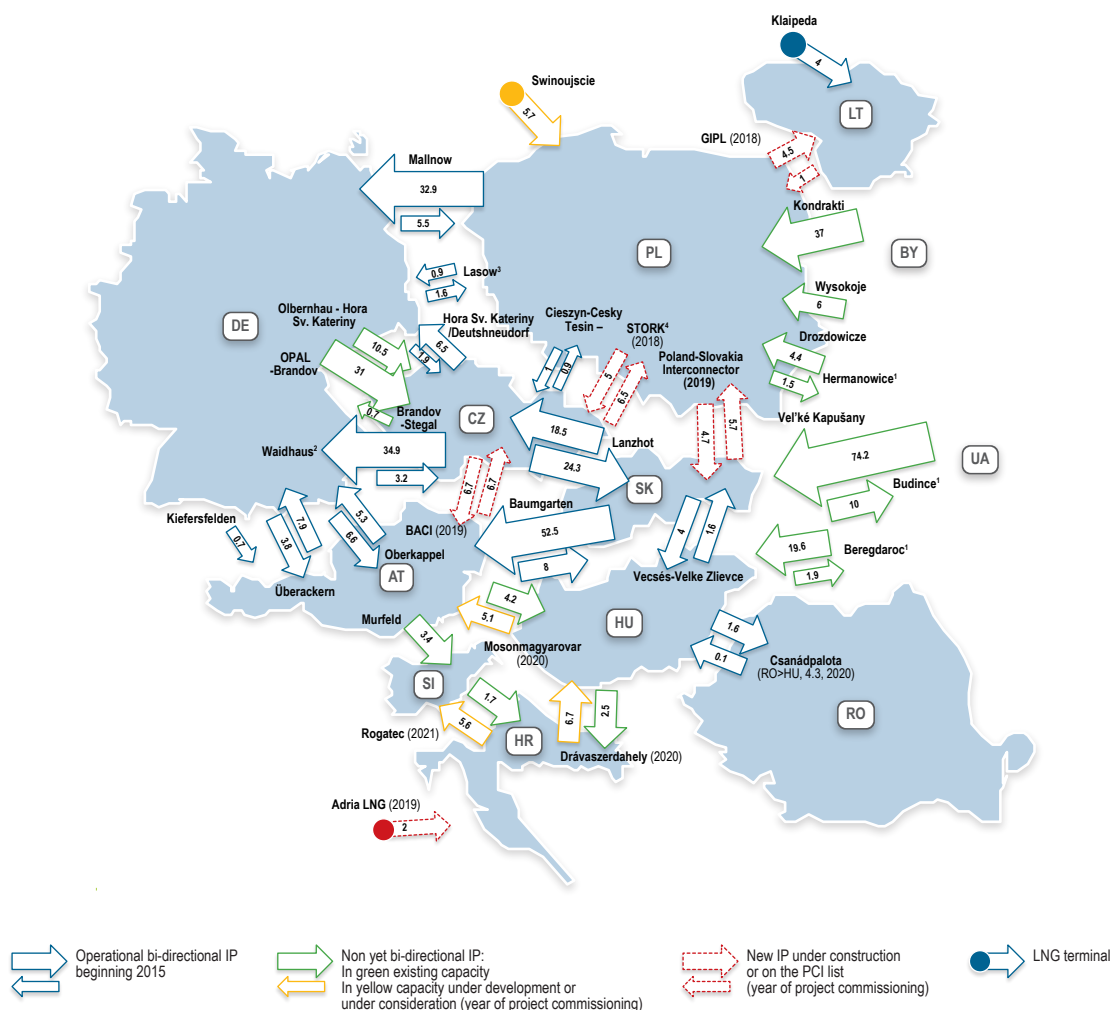


Source: ENTSOG capacity maps and TSOs.

Note: Data show capacity values at May-June of each year. Developments taking place after this month are accounted for in the following calendar year.

722 Figure 123 gives an overview of existing cross-border interconnection capacity and interconnection capacity to be commissioned.

Figure 123: CEE region cross-border technical capacities in 2014 (bcm/year)



Source: ENTSOG Transparency Platform, ENTSOG capacity map and NRAs.

Notes: Bi-directional capacity contemplates either physical or virtual reverse capacity projects. There may be differences between the type of reverse capacity and the firmness of the service offered by TSOs on each side of the border. See ENTSOG TP for more detailed data per TSO.

<sup>1</sup>The main trunk interconnections between Ukraine and Hungary, Poland and Slovakia are unidirectional delivering Russian gas to the EU. Direct flows into Ukraine are enabled through smaller complementary pipelines closer to them: Beregdaróc-Testvéríség (HU), Hermanowice (PL) and Budince (SK), on an interruptible basis. The Polish and Ukrainian TSOs signed an agreement to explore the possibility of developing a new bidirectional pipeline in 2018 for up to 8 bcm/year, not incorporated into the map<sup>2</sup>. Exit from DE side: 91.6 GWh/day of interruptible capacity. Entry in CZ side: 450 GWh/day of firm capacity; <sup>3</sup> Exit from PL side: 48.2 GWh/day. Entry in DE side 27.4 GWh/day. Both interruptible capacities<sup>4</sup>; ongoing plans for new bidirectional interconnection between Poland and the Czech Republic in Hat scheduled for 2018: CZ>PL 6.5 bcm/year. PL>CZ 5 bcm/year.

723 In subsequent paragraphs, a succinct overview of the main developments at IPs by CEE and SSE MSs is provided.

724 In Poland, the April 2014 backhaul capacity enhancements in the Yamal pipeline (Mallnow) and the upgrading of the Lasów IP enabled an increase in both virtual and physical gas imports from Germany. The new Świnoujście LNG terminal, estimated now to start operations in the second half of 2016, will contribute further to a major diversification of supplies, all factors which help to raise competition in the Polish market<sup>479</sup>. The planned interconnection with Slovakia in 2018 should aid the consolidation of the North-South corridor. Furthermore, the future GIPL project connecting Poland with Lithuania in 2019 is expected to further promote integration with the Baltic area.

725 In Slovakia, reverse flow nominations from Austria were boosted during 2014, taking advantage of the

backhaul cross-border capacity at Baumgarten. As mentioned, during the second half of the year, physical flows were in an import direction from the Czech Republic into Slovakia, via Lanžhot IP. This situation represents a milestone, as the traditionally dominant flow direction had been for years from Slovakia into the Czech Republic. The change was mainly triggered to enable physical exports into Ukraine and due to replacing flows through Velke Kapusany by Nord Stream ones (see Section 5.4.1). The same phenomenon caused a decline in transit flows of Russian gas avoiding Ukrainian transit routes. Eustream also accused Gazprom of curtailing exports; however, the latter stated that this was due to technical aspects. This can be also observed on the reduction of the offered East-West capacities at some key IPs (see Figure 116). Yet there are plans by the Slovakian NRA and TSO to recover its transit role in the years to come if the country could play a bridging role between its existing transmission infrastructures into Western markets and the next large planned pipeline projects reaching into the SSE region.

- 726 The Czech-German interconnections have been considerably upgraded with the development of the Nordstream-OPAL<sup>480</sup> route that enters the Czech Republic at a pipeline cluster situated on the border<sup>481</sup>. From here, gas can either be transferred back into Germany – using a virtual service<sup>482</sup> – and transit, to enter Germany later at Waidhaus<sup>483</sup> or arrive at the Slovakian border via Lanžhot. The increasing utilisation of enlarged interconnection capacities with Germany<sup>484</sup> has contributed to diversifying Czech gas supply<sup>485</sup>.
- 727 In addition, there are agreements to expand the Czech-Polish bi-directional capacity<sup>486</sup>. The construction of a new interconnector with Austria (BACI project) seems more uncertain, since, according to the latest market consultation, there does not seem to be sufficient market interest to support the project. This project may in the end not be needed if the market integration initiative<sup>487</sup> under discussion in the GRI SSE region to integrate Austria, Slovakia and the Czech Republic markets takes place.
- 728 In Hungary, the new bi-directional interconnector with Slovakia is expected to lift the liquidity of the Hungarian hub from 2015. The current Mosonmagyaróvár IP enabling flows from Austria (via the HAG pipeline) is congested, limiting imports from the adjacent VTP hub. Two PCI projects have been proposed, both contributing to increase the country's regional significance as a CEE-SSE regions link: Csanádpalota (RO-HU) and Drávaszerdahely (HU-HR). The latter would enable reverse flows from Croatia into Hungary. It would provide Hungary access to Mediterranean gas markets and could improve the overall diversification potential of gas sources in the region. This assumes that the Krk LNG terminal project goes ahead. In spite of Hungarian efforts over the last few years to reduce the country's dependence on a sole supplier by improving the gas infrastructure, there could be concerns as to how the renationalisation and vertical integration of the gas (and electricity) sectors may affect overall market competition in the country<sup>488</sup>.
- 729 Enlarging the outlook to the adjacent markets of Romania and Bulgaria, these countries generally fall behind in their integration and competition levels. The reason seems to be the pending completion of some bi-directional interconnection capacities and pending liberalisation progress. Romania is slowly augment-

480 OPAL is an interconnector pipeline connected to the German grid. This allows shippers other than Nordstream capacity holders to nominate flows into the Czech Republic. The OPAL pipeline was granted an exemption at 50% of its capacity, but the rest has to be offered under Third-Party Access rules.

481 Comprising the interconnection points of Brandov, Hora Sv. Kateřiny and Olbernhau: See: <http://www.net4gas.cz/en/transmission-system/>.

482 See: [http://www.net4gas.cz/en/media/Service\\_of\\_redirecting\\_VBP\\_Brandov.pdf](http://www.net4gas.cz/en/media/Service_of_redirecting_VBP_Brandov.pdf).

483 Via the TPA-exempted Gazelle pipeline connecting later with the MEGAL network to France. The Czech TSO (Net4Gas) offers significant firm entry reverse flow capacity in Waidhaus, but the service is only matched in minor volumes and on an interruptible basis by German TSOs (OGE and GRTGaz Deutschland).

484 According to some market analysts, for some shippers, the German–Czech hubs narrowed price spreads during 2014 have made gas purchasing and transmission from Germany into the Czech Republic less attractive than in previous years; conversely this has encouraged more buying directly from the Czech hub. This situation can be considered an outcome of advanced market integration.

485 The Czech Republic has traditionally been slightly less dependent on Russian-origin supplies than other CEE region MSs thanks to its late 90's long-term supply agreements with Norway. Norwegian gas is usually delivered via German pipelines swapped for Russian gas.

486 The original cross-border interconnection (STORK I) has been in place since 2011. A new bi-directional pipeline would be commissioned in 2019 with a capacity of more than 5 bcm/year.

487 See: <http://www.e-control.at/en/publications/studies/cross-border-market-integration>.

488 Concerns about this were identified in the ACER report on cross-border entry barriers. See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/References/Barriers\\_to\\_cross\\_border\\_entry\\_Final\\_Report.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/References/Barriers_to_cross_border_entry_Final_Report.pdf).

ing the liquidity of its wholesale market. The country has significant domestic production accounting for around 80% of its demand<sup>489</sup>. A new regulation is forcing producers to auction 20% of the volumes<sup>490</sup> via the exchanges. Despite this, most wholesale gas is purchased at regulated prices. On the infrastructure side, there are plans to expand the country's bi-directional interconnection capacities with Bulgaria and Hungary, which would enable further to diversify its supplies (in particular, once the Greek-Bulgaria interconnector is completed<sup>491</sup>).

- 730 The Bulgarian market needs to take significant liberalisation steps to implement a truly liquid and transparent wholesale market. The European Commission is investigating<sup>492</sup> whether the gas incumbent and the TSO – both subsidiaries of the state-owned energy holding – have abused their dominant position by denying access to the system to external competitors. The European Commission also suspects that Gazprom may have abused its dominant position in the country<sup>493</sup>. Regarding infrastructure developments, linking with the projects mentioned in the above paragraph, the country is showing interest in enhancing its bridging role between the Southern Corridor, with the potential Turkish Stream projects and the CEE region. This could be done, for example, via the Eastring<sup>494</sup> project, connecting these new large pipelines with the existing Slovak western transit routes.
- 731 During 2014, gas flows across the CEE region seemed to have responded better overall to economic signals. Figure 124 examines direct and reverse capacity availability, nominations and gas flow evolution during the year at two key IPs: Waidhaus and Baumgarten. Together with Figure 121, the analysis shows that 2014 saw an increased tendency for reverse capacity utilisation, with in one case a dramatic reversal of the dominant flow between Slovakia and the Czech Republic.
- 732 The trend was caused by two developments: price arbitrage between market zones<sup>495</sup>, and supply exports to the Ukraine after the summer. Western direction physical flows are still clearly dominant across the CEE-NWE borders, given the network's configuration and the scale of transit volumes destined to supply NWE markets. These volumes are usually supplied under long-term contracts and may contain obligations on precise delivery points<sup>496</sup>, or arguably restrictions on reselling gas on a hub. However, from Figure 124 it is clear that nominations in the Eastern direction are progressively increasing. As a result, total physical Western flows are gradually being reduced via commercial netting of nominations (see the orange colour band). This has the potential to improve market functioning in CEE countries.

489 Conventional gas reserves are expected to last around 15 years.

490 This obligation will be raised to 35% from 2015.

491 The countries have agreed to develop a bi-directional gas corridor. Volumes are expected to flow mainly from Greece, either from the Revithoussa LNG terminal or in the future also from Azeri gas via the Trans-Adriatic pipeline.

492 See: [http://europa.eu/rapid/press-release\\_IP-15-4651\\_en.htm](http://europa.eu/rapid/press-release_IP-15-4651_en.htm).

493 See European Commission competition case against Gazprom referred in footnote 440.

494 See: <http://www.eastring.eu/page.php?page=routing>.

495 The case could also be that price arbitrage operations do not always impact physical nominations over IP capacities, as some could be purely financial, affect other different entry-exit points, or constitute external commercial swaps not nominated to the TSOs.

496 In several cases, it is the upstream supplier that has the booked transit capacity and maintains ownership of the gas until the border delivery point.

Figure 124: Gas flow developments in Waidhaus (CZ<>DE) and Baumgarten (SK<>AT) in 2014 (GWh/day)



Source: ENTSOG TP.

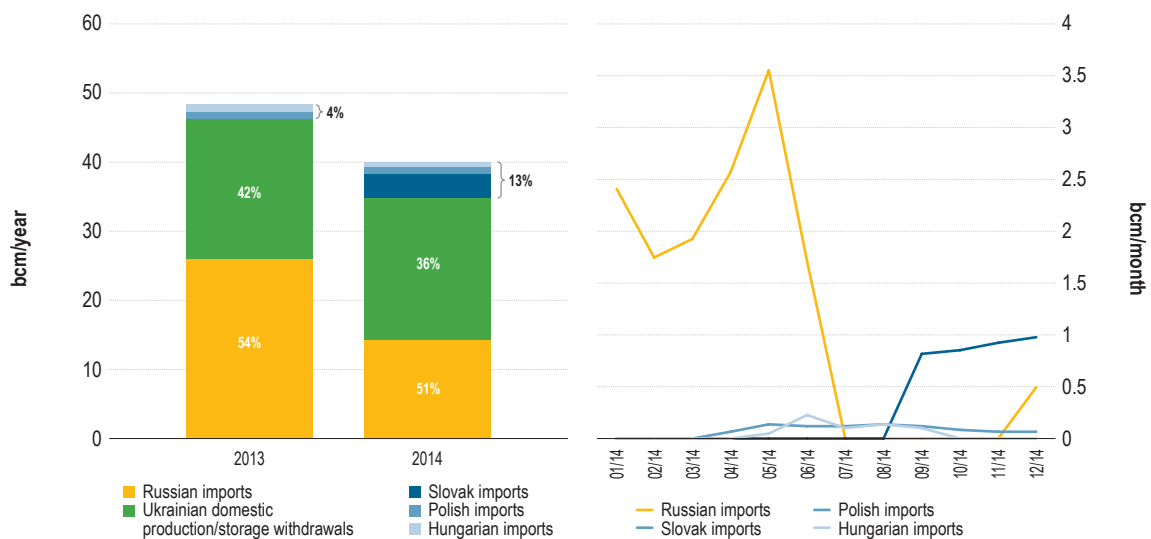
Note: At Waidhaus, IP entry capacity to the CZ side is 450 GWh/day. Exit from the DE side is 91.6 GWh/day on an interruptible basis.

### 5.4.3 Use of reverse flows into Ukraine

733 Ukraine, an Energy Community Contracting Party<sup>497</sup> which was hitherto the main gas transit country to the EU, effectively became part of that market itself in 2014. Throughout the year, but mostly after June, the country imported 5.1bcm of gas from the EU, a volume that is larger than the consumption of each of the individual 14 EU MSs with smallest gas demand. These developments explain why this topic is included in this chapter.

734 Demand in Ukraine amounted to 40bcm, a dramatic fall of 8bcm compared to 2013. Russian exports to Ukraine took a dive, from 25.8bcm in 2013 to 14.5bcm in 2014. EU supplies represented 12.7% of 2014 demand, up from 4.3% the previous year. Ukraine relied heavily on domestic production and storage withdrawals, for a total of 20.4bcm in 2014 (see Figure 125).

Figure 125: Ukraine gas monthly imports during 2014 and yearly comparative with 2013 (bcm/month, bcm/year)



Source: ENTSOG TP, Ukrtransgaz, IEA, ICIS Heren.

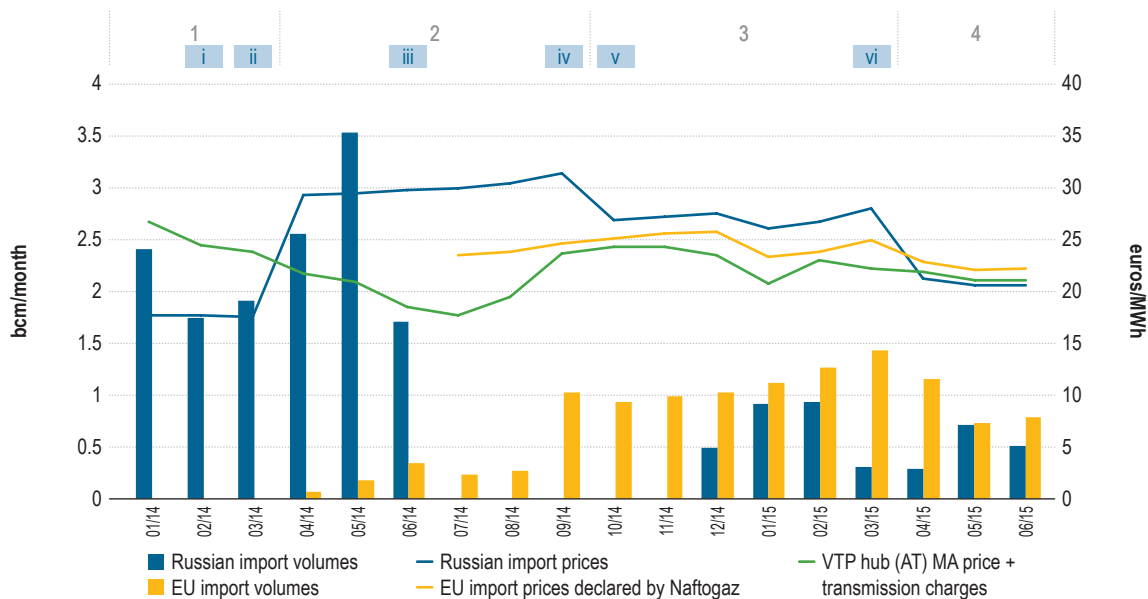
497 The Energy Community (EnC) is an organisation aimed at incorporating fully existing EU energy legislation into neighbouring MSs from the SSE and Black Sea regions. See the EnC members list and major goals at: [https://www.energy-community.org/portal/page/portal/ENC\\_HOME/MEMBERS](https://www.energy-community.org/portal/page/portal/ENC_HOME/MEMBERS).

- 735 The need to partially source itself from alternative suppliers than its historical supplier, Gazprom, arose from deteriorating trading conditions and the limited availability of those gas supplies. Russian gas flows destined to serve Ukrainian domestic demand were disrupted in June 2014 due to disputes about the price terms of the supply contracts and the accumulated debt of Naftogaz vis-à-vis Gazprom. The trade dispute took place in the context of the annexation of Crimea by Russia and a military conflict in the eastern part of Ukraine (Donbass area). The Ukrainian Government asked the European Commission to mediate in the trade dispute and to incentivise the physical gas flow possibilities from the EU into the country<sup>498</sup>.
- 736 Following the supply disruption, Ukraine sourced supplies from the EU across its cross-border interconnections with Hungary, Poland and Slovakia, this last one providing the bulk of the capacity. Some of these volumes were contracted on NWE gas hubs or were contracted directly from major EU players. This was facilitated by prevailing market conditions, whereby EU shippers could provide alternative supplies, given their over-contracted portfolios and high storage reserves.
- 737 In October, following trilateral talks directed by the European Commission, a winter package agreement was signed. The Russia–Ukraine supply contracts were reset at least during the winter season interim period with revised conditions<sup>499</sup>. Naftogaz anticipated purchasing 4bcm of gas until the end of 2014 in this contractual framework. However, it procured significantly lower quantities of Russian gas (less than 1bcm). Instead, besides more intensive use of its gas underground storage reserves, higher quantities were delivered from Poland and Slovakia.
- 738 The Agency has assessed whether there was a market reason for Ukraine to source gas from the EU at negotiated market prices, besides a security of supply concern. A high-level analysis indicates that there was indeed a commercial reason for Naftogaz to source gas from the EU. Figure 126 shows that supplies sourced via the EU were, after the Russian price increases in spring, more competitively priced than those from Gazprom. Towards the end of 2014 and the beginning of this year, EU and Gazprom prices show a converging trend. Given the reverse-flow possibilities which are now operational, Ukraine finds itself in the position of being able, to some extent, to choose the cheapest option from the two sources. It remains to be seen if this situation recurs, as prices seem to have aligned at the beginning of 2015. Given their emptying storage reserves, it is also expected that the country would need to import progressively higher volumes.

498 See, for example, <http://en.itar-tass.com/economy/747408>.

499 The agreement stipulated the payment of 3.1 billion dollars of Naftogaz's debt and the option for the Ukrainian supplier to purchase gas from Gazprom following advance monthly payments. The EU acts as a guarantor of payments via the offer of loans to Ukraine. The initial price was below 385 dollars per 1000 cubic metres, and it would vary according to the terms of the oil price-formula indexation. There were no take-or-pay obligations. Naftogaz guaranteed an uninterrupted transit of gas to the EU. The agreement was implemented via an addendum to the existing supply contract. See: <http://ec.europa.eu/energy/en/news/eu-ukraine-russia-talks-agree-46-billion-secure-gas-supplies>.

Figure 126: Estimated monthly Ukrainian gas import prices during 2014 to June 2015 (euros/MWh)



Source: volumes from ENTSOG TP, Ukrtransgaz and IEA data. Import prices: ACER estimates based on Naftogaz (since July 2014), EnergyPost.eu and ICIS Heren data.

Note: Import prices are customarily negotiated in dollars, but are expressed here in euros using the average dollar/euro exchange rates at each month.

Main events:

1 – January 2014 – March 2014: Russian imports preferential price granted since December 2013.

i – February 2014: Yanukovich government falls. ii – 31 March 2014: Termination of the Ukrainian-Russian Kharkiv agreement for stationing the Russian Black Fleet in Crimea granting a gas prices discount (export duties exemption).

2 – April 2014 – September 2014: Russian import price escalation. Beginning of April, cancellation by Gazprom of the December 2013 gas deal, previous contract price prevails.

iii – June 2014: Russian flows halted. iv – September 2014: Physical flows via Budince IP enabled. Relevant gas flows from Slovakia imported into UA.

3 – October 2014 – March 2015: Winter Package agreement terms apply (see footnote 500).

4 – April 2015 – October 2015: Summer Package agreement terms apply.

v – October 2014: Winter package agreement signed. vi – March 2015: Summer Package agreement signed on similar terms as Winter Package.

739 The higher reliance on EU supplies during the last months of 2014 was also driven by Naftogaz’ plan to postpone higher volume purchases from Gazprom until 2015. This was due to the expectation that decreasing international oil prices would allow purchases from Gazprom at a reduced price, given their oil-indexed price contract conditions.

740 Physical flows from the EU into Ukraine were enabled since spring 2014 through smaller sized pipelines closer to the main trunk interconnection points with Ukraine: Beregdaroc-Testvériség in Hungary (trunk pipeline of Beregdaroc), Hermanowice in Poland (close to Drozdowicze) and Budince in Slovakia (close to Veľké Kapušany). The capacities of these smaller pipelines were offered on an interruptible basis, as shown in Figure 123.

741 Slovakia has technically the largest pipeline capacity to deliver large quantities to neighbouring Ukraine. In 2014, reverse flows amounted to 3.6bcm. They were initiated in September after completion of the works on the previously unused pipeline from the Vojany power station (Budince IP) near the Ukrainian border. This outcome was also made possible by the European Commission, which played a facilitating role in negotiating an MoU between Eustream and UkrTransgaz. Capacities were expanded further in January 2015, up to 14.5 bcm/year. This interconnection could potentially deliver around 35% of Ukrainian 2014 consumption if used to its full capacity. Capacities at this IP are now fully booked until 2019, with Naftogaz contracting most of it. Deliveries to the Ukraine via the Slovakian route were supported by arrangements to increase reverse flow capacities from the Czech Republic into Slovakia via the Lanžhot IP.

- 742 However, the Slovakian TSO Eustream considers that physical and virtual reverse flows into Ukraine across the main pipeline of Veľké Kapušany are not possible, as this would breach its current transportation contract with Gazprom<sup>500</sup>. The Russian company contracts most of the transportation capacity. The pipeline has spare physical spare, however, in part because transit flows have been diverted to Nordstream. Additional aspects are in play, such as the investment cost of enabling reverse flows and technical and contractual obstacles also on the Ukrainian side. In this regard, the Ukrainian transmission infrastructure bordering the EU transporting gas from Russia (Urengoy-Pomary-Uzhgorod pipeline) will be upgraded via a joint EIB-EBRD loan<sup>501</sup> agreed in December 2014, with the aim of also further allowing reverse flows from the EU into Ukraine.
- 743 Supplies from Poland to the Ukraine totalled approx. 1bcm in 2014. Lower flows than Gazprom's nominations from Russia led to the temporary suspension of supplies from Poland to the Ukraine for a few days in September<sup>502</sup>. The context of these flow reductions is not completely clear: some market observers considered them as a political message in the tense situation. This reading was contested by Gazprom, arguing that the total volumes were in line with the availability of its resources<sup>503</sup> and within the flexibility offered by the nomination agreements. The Ukrainian and Polish TSOs signed an agreement in December to explore the feasibility of developing a new bi-directional pipeline, up to a capacity of 8 bcm/year, which would also grant the Ukraine access to the new Polish LNG terminal<sup>504</sup>.
- 744 Gas supplies into Ukraine across the Hungarian Beregdaróc-Testvéríség interconnection point were sporadic during 2013–2014. They peaked in June 2014 and stopped at the end of September due to a somewhat unexpected increase in shippers' import flow requirements from the Ukraine through these parallel lines. The Hungarian TSO FGSz cited a technical problem to maintain physical exports in the eastern direction<sup>505</sup>. During 2014, total supplies from Hungary reached a mere 0.6bcm. Physical supplies to Ukraine were, however, restored in January 2015 to approximately 3 mcm/day.
- 745 The 2014 Russian-Ukrainian supply disruption had lower security of supply impacts on EU gas markets than the 2009 supply crisis. This can be attributed to the abundance of gas available due to lower demand, rising storage and LNG capacities, greater transit route diversification, as well as a higher level of agility of EU gas markets in reacting to adverse security of supply events. Market integration between EU MSs – and also with neighbouring countries such as the Ukraine – has improved and is further improving, thanks to infrastructure upgrades and the harmonisation of rules<sup>506</sup>.

500 Gazprom-Eustream transport contracts typically contain ship-or-pay clauses, by which Gazprom agrees to pay for the contracted transportation capacity, regardless of the actually transported gas volumes. This implies that the Slovak TSO ensures maximum contracted transmission capacity available at all times in the direction into Slovakia. Moreover, matching metering of flows may be required to guarantee that all initially nominated volumes pass through the country and are physically delivered to shippers. In the absence of non-matching physical flow through a metering station (due to a gas-swap in the context of a virtual reverse flow), Gazprom could arguably find itself in an unwilling position that could have implications for the charging of deliveries. If such clauses are considered valid, a breach of them would entail a contractual liability for the Slovakian TSO. Regardless of the previous considerations, there is an explicit legal provision stemming from Regulation 994/2010 that establishes the obligation to facilitate physical bi-directional capacity at all EU IPs, although it is not automatically applicable to the interconnections with the Energy Community Contracting Parties. This should change as the Ukraine approves legislation implementing the EU's 3rd Energy Package. Therefore, there are ongoing legal discussions about the question of whether some of the aforementioned contractual clauses constitute a virtual reverse flow restriction. The compromise solution employed until now has been the facilitation of gas supply through a dedicated pipeline, although in comparatively lower volumes. See, for example: [http://www.eustream.sk/en\\_media/en\\_news/representatives-of-eustream-ukrtransgaz-and-the-european-commission-express-interest-in-signing-the-memorandum-of-understanding-on-monday](http://www.eustream.sk/en_media/en_news/representatives-of-eustream-ukrtransgaz-and-the-european-commission-express-interest-in-signing-the-memorandum-of-understanding-on-monday).

501 See: <http://www.ebrd.com/news/2014/ebd-finances-key-gas-pipeline-in-ukraine-.html>.

502 See <http://www.naftogaz-europe.com/article/en/sjiopuy>.

503 See, for example: <http://en.gaz-system.pl/press-centre/news/information-for-the-media/artykul/201940/>. These reductions might also have been caused by unrelated technical issues, such as the works at the Zambrow compressor station, started on 8 September, and technical problems in Belarus.

504 See for example: <http://www.naturalgaseurope.com/ukraine-poland-gas-pipeline-system-expansion>.

505 According to the information of the Hungarian NRA, the Hungarian TSO, FGSZ, suspended reverse flows towards Ukraine because the surge in nominations in the main westerly direction made physical easterly flows technically impossible. The key reason behind the rise in Ukrainian imports was an increasing demand for storage requests that could apparently only be facilitated by an extension of the injection period. Moreover, Hungarian production near one of the storage sites and transit requirements into Serbia had to be supported by further gas imports from Ukraine, given network configuration aspects. Although the identities of Hungarian UGS facilities users are confidential, according to certain specialised media, Gazprom solicited the storage of up to 700 mcm in Hungarian underground storage sites. See <http://fgsz.hu/en/content/fgsz-ltd-temporarily-suspends-gas-transmission-ukraine>.

506 An assessment of the resilience of the European gas system in 2014 in the event of Ukrainian supply disruption was performed by the European Commission: [http://ec.europa.eu/energy/sites/ener/files/documents/2014\\_stresstests\\_com\\_en.pdf](http://ec.europa.eu/energy/sites/ener/files/documents/2014_stresstests_com_en.pdf).



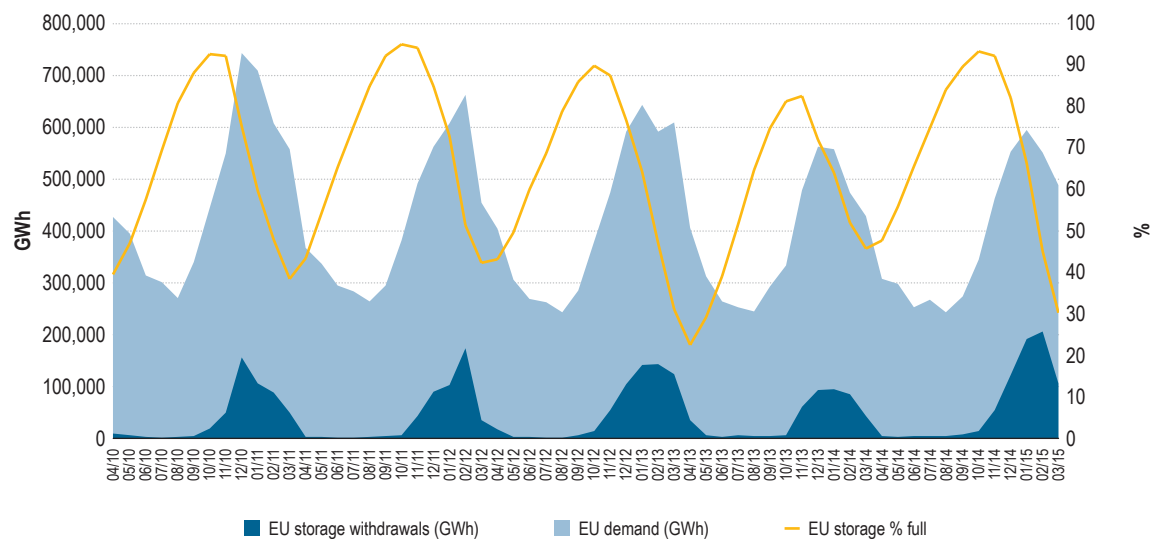
- 746 There is still room for progress to enhance further market integration within EU MSs, but also with neighbouring countries as Energy Community Contracting Parties. The need for further progress is evidenced by the impossibility of facilitating the entire Ukrainian gas import requests during the year across its EU borders. The origin of the limitations may have been of a legal, technical or economic nature. More transparency on technical and pricing aspects is needed to understand the underlying restrictions and to improve the functioning of the market.
- 747 The ongoing effort of the EU to build an internal energy market has allowed the Ukraine at a critical time to tap into some of the benefits of market integration via the reverse-flow capabilities and hub trading options. However, besides upgrading reverse-flow capabilities with the Ukraine, it is also important that enhanced flow capabilities from Austria and Croatia into Hungary or from Greece into Bulgaria be addressed, so that the security of supply of all EU MSs in that region are further improved. In addition, a further integration in the Ukrainian gas market into the EU begs the question of potential implications on EU MSs gas price levels. Ukraine consumes 40 bcm/year, half of it supplied via domestic production. At the moment, given lower than forecast gas demand and the over-supplied contract portfolios of EU suppliers, the additional gas demand originating from the Ukraine seems unlikely to exert upward price pressure on EU markets. But conditions may change in the future. Moreover, significant interconnection capacity enhancements at the EU-UA borders would require relevant investments, but their utilisation would not necessarily be recurrently high, given technical operation factors of the systems and distances, and the competitive capacity of Gazprom to adapt its prices.

#### 5.4.4 Utilisation analysis of underground storage facilities

- 748 The role of gas storage in meeting EU gas demand played an increased role in winter 2014/15 compared to preceding years. Indeed, storage withdrawals during the period reached their highest level since 2010 when aggregated data collection began. Over the four winter periods October–March 2010/11 to 2013/14, gas storage withdrawals averaged approximately 15% of EU gas demand<sup>507</sup>. In winter 2014/15 this figure reached approximately 25%.
- 749 The annual gas storage cycle generally involves larger injection values and increasing storage levels during the spring and summer months in order to cover higher autumn-winter demand when gas is withdrawn. Storage gas is therefore not a primary source of gas supply, but because it allows the consumption of gas supplied in the summer months to be deferred, it can in effect increase the diversity of available gas supply over peak-demand periods. Therefore, the availability of gas storage can improve the liquidity of the gas market, potentially putting downward pressure on gas prices during peak-demand months.
- 750 Figure 127 confirms the positive relationship between gas demand and gas storage withdrawals over the period October 2010 to March 2015; however it is worth noting that storage withdrawals for winter 2014/15 increased significantly compared to winter 2013/14, despite gas demand being relatively stable over the two years.

507 The gas storage and demand data in this section have been adjusted to exclude Croatia, Ireland, Latvia, Romania, the Netherlands and Sweden for the period April 2010 to March 2014, and Ireland, Romania and Sweden for the period April 2010 to March 2015. These MSs do have gas storage, very small amounts in the case of Sweden, but aggregated data on gas storage withdrawals for these MSs is not available from Gas Infrastructure Europe for these periods.

Figure 127: EU gas demand versus gas storage withdrawals and gas storage stock levels – 2010–2015 (GWh)



Source: Eurostat, and Gas Infrastructure Europe.

- 751 The above-average gas storage withdrawals during winter 2014/15 are likely to have been influenced by the much higher than average gas storage stock levels at the beginning of the season. End-of-summer stock levels between 2010 and 2013 averaged approximately 65.1bcm (87.4% of 2010–2013 storage capacity). In 2014, this figure rose to 76.2bcm (91.7% of 2014 storage capacity). Above-average withdrawals were likely also supported by shippers' expectation to purchase gas at lower prices during the upcoming 2015 summer months taking advantage of expected lower oil-linked long term contract prices. This provided an incentive to make space to inject cheaper gas during the summer of 2015.
- 752 The increased stock levels at the beginning of 2014/15 winter season are likely to have been a consequence of a combination of factors. First of all, end-of-season winter 2013/14 stock levels were also relatively high. This contributed to lower gas wholesale prices during summer 2014, which, in combination with the developing Russia-Ukraine dispute, provided economic and strategic incentives, particularly in central European MSs, to increase injections towards the end of the summer. The higher start-of-season stock level meant that despite the higher storage withdrawals, stock levels at the end of winter 2014/15 were approximately 6bcm higher than the end of winter 2012/13, when low stock levels were a concern<sup>508</sup>.
- 753 Aggregate EU gas storage data highlights the broad trends in the market, but to some extent masks the very diverse experience among MSs. Six MSs do not have gas storage facilities<sup>509</sup>. By contrast, in winter 2014/15, gas storage contributed more than 10% of demand in 13 MSs. Figure 128 illustrates the extent of the diversity among MSs<sup>510</sup>. In particular, the figure indicates the extent of the increase in gas storage withdrawals among Central European MSs. It is likely that a significant amount of gas storage in these MSs is used for exports to other MSs or potentially outside the EU. This is most obviously the case in Latvia (not included in the figure), where gas storage withdrawals in winter 2014/15 were approximately 180% of domestic demand. A major factor influencing this trend is likely to have been the continued importance of gas supplies to the EU from Russia. In this regard, Gazprom has confirmed its strategy of contracting significant amounts of capacity in gas storage facilities with third-party access in the EU<sup>511</sup>.

508 Concern about the low end-of-season stock level for winter 2012/13 was identified by CEER in its November 2013 interim report 'Changing storage usage and effects on security of supply'.

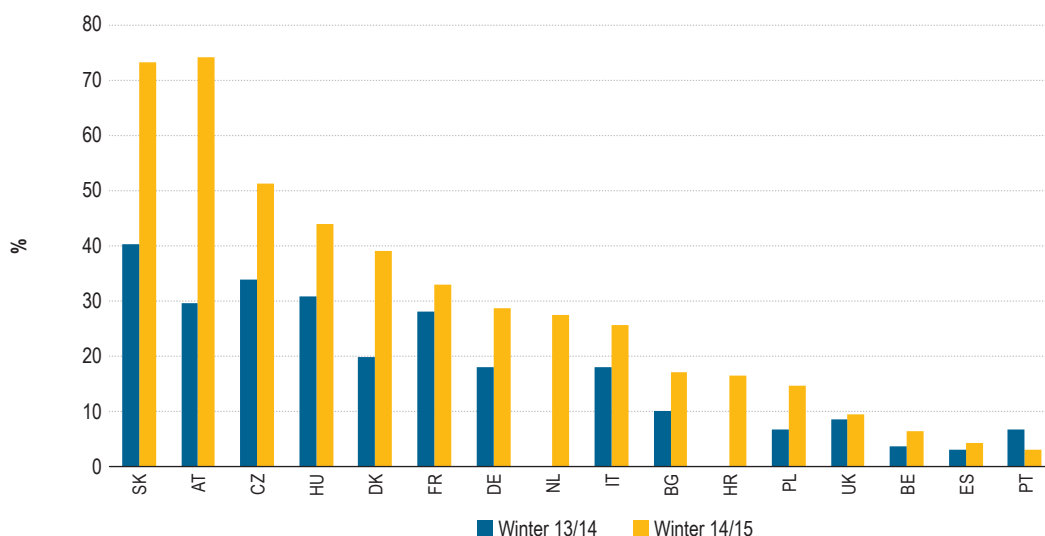
509 The definition of gas storage excludes LNG facilities.

510 Those MSs without gas storage are not listed in this figure. Sweden, Ireland and Romania are not listed because gas storage data for these MSs is not available from Gas Infrastructure Europe. Croatia, Latvia and the Netherlands are included, but data for these MSs is only available from 2014/15 onwards.

511 See: <http://www.gazprom.com/press/conference/2015/export-to-europe/?from=rss>.

754 Of those MSs where gas storage withdrawals represented the largest percentage shares of domestic demand, summer 2014 gas storage injections increased very significantly compared to summer 2013 in Austria, Hungary and Poland, and in Hungary high injections continued into October 2014, again a possible response to the Russia-Ukraine dispute. Summer 2013 storage injection data was not available for Latvia. Conversely, although storage withdrawals for winter 2014/15 increased as a percentage of demand in North West Europe, summer 2014 gas storage injections fell in Belgium, Denmark, France, Germany and the Netherlands, perhaps reflecting already high gas storage stock levels, modest winter-summer gas price spreads, and the competitiveness of hub-related products and alternative gas supply sources such as LNG. This was less the case in GB, where storage injections and withdrawals increased during summer 2014 as gas storage users sought to take advantage of lower summer prices.

Figure 128: Storage withdrawals as % of domestic winter demand among EU MSs



Source: Eurostat and Gas Infrastructure Europe.

### Factors affecting storage utilisation

755 Decision making about the extent to which storage is used is based on a mix of economic, commercial and regulatory considerations. On the supply side, factors which can affect gas storage injections include: availability of storage capacity (including any restrictions on cross border use); mandatory storage obligations at MS level; forward gas supply contracts held by gas storage users; storage capacity charges and the extent of storage capacity product flexibility and innovation, transmission network tariffs for putting gas into storage, as well as forecast winter-summer<sup>512</sup> gas price spreads. On the demand side, factors which can affect gas storage withdrawal include: regulation of gas storage prices at MS level; long-term gas storage contracts and the terms and conditions for the use of those contracts; transmission network tariffs for withdrawing gas from storage; the level of gas demand generally and the price of storage gas relative to spot prices and prompt prices. The balance between the factors affecting gas storage utilisation varies between MSs; therefore, specific gas storage utilisation rates at a MS level can only be fully understood within this context.

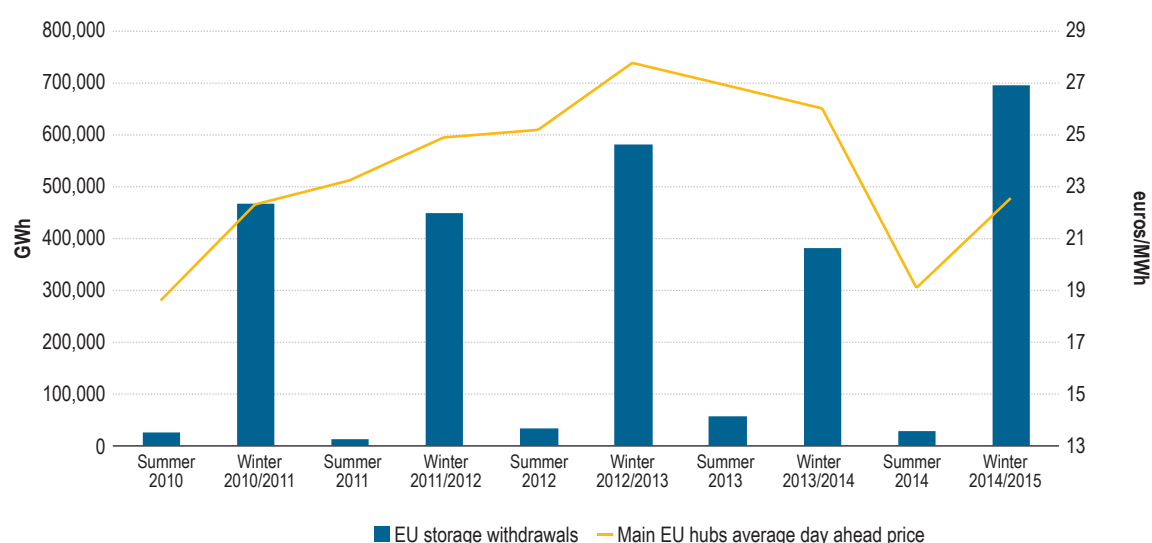
756 Figure 129 compares seasonal average day-ahead gas prices for eight of the main EU hubs<sup>513</sup> and EU seasonal storage withdrawals for the period October 2010 to March 2015. The most obvious trend, con-

512 The winter-summer gas price spread at a given hub can be calculated as the difference between the average price for a given gas supply contract at that hub over the months October to March and the average price of the same contract over the months April to September. Where the price spread is expected to be low, the attractiveness of holding gas in storage is reduced because, other things being equal, the margin between the price at which the gas can be sold at market (in winter) and the price paid for it (in summer) is reduced. Similarly, where an anticipated winter-summer spread does not materialise, demand for gas in storage is also reduced, because the price saving in buying storage gas instead of at the hub is reduced.

513 Austria (CEGH VTP), the Netherlands (TTF), Italy (PSV), France (PEG Nord), Germany (Gaspool and Net Connect Germany); UK (NBP); and Belgium (Zeebrugge).

firmed particularly for winter 2014/15, is that storage withdrawals are correlated to the difference between winter day-ahead and summer day-ahead gas prices. The three seasons with the highest storage withdrawals – winter 2010/11, winter 2012/13 and winter 2014/15 – coincide with the three seasons with the largest winter-summer price differentials. This data seems to be a strong indication of demand-side factors affecting gas storage utilisation. In each of these three seasons, the gas in storage, if it was bought and injected into storage in the preceding summer, could be exported and sold at a favourable price on the winter day-ahead market. This would not have been true in winter 2013/14, when day-ahead prices were lower than in summer 2013. In last year's report the Agency also considered that overall gas demand was correlated to gas storage withdrawals. Clearly, higher demand should lead to higher winter day-ahead prices, which could make gas already in storage more attractive. However, in contrast to the dramatic increase in storage withdrawals for 2014/15, the relatively stable winter demand between 2013/14 and 2014/15 shows that this relationship is not linear.

Figure 129: EU storage withdrawals and average seasonal day-ahead prices for the main hubs in Europe – 2010 to 2015 (GWh and euros/MWh)



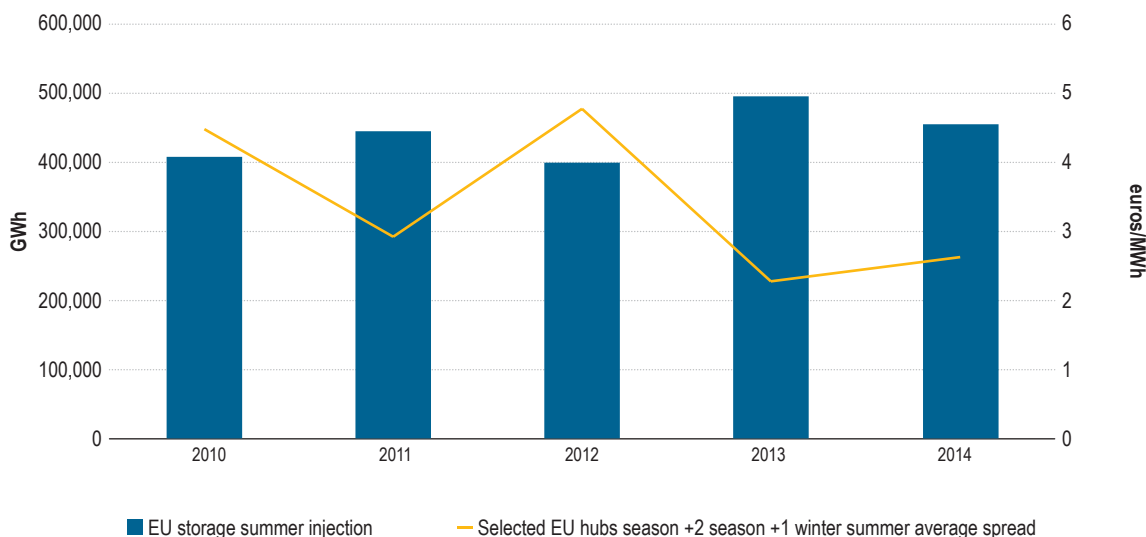
Source: Platts (2015) and Gas Infrastructure Europe.

- 757 From a supply perspective, season-ahead gas prices are considered to be a strong driver of gas storage capacity bookings. Shippers tend to make decisions over how much storage capacity to buy in quarter one each year, ahead of the gas storage year, which runs from April or May in many EU MSs. If the quarter-one price differential between season +2 and season +1 contracts – ‘the winter-summer spread’ – is favourable, this can act as a signal that putting gas in storage could be profitable.
- 758 The Agency does not have access to aggregated storage capacity bookings, but on the basis that storage capacity is a prerequisite for storage injections, and that, as well as acting as a signal for storage capacity bookings, some physical gas is bought using season-ahead contracts, it might be expected that aggregate storage injections and the winter-summer spread are correlated.
- 759 Figure 130 compares aggregate summer gas storage injections with the average winter summer spread at two major EU trading hubs<sup>514</sup> between 2010 and 2014. Over a longer time horizon (dating back to 2008), winter-summer season-ahead gas price spreads have been falling, but the data for 2010 to 2014 shows some variation, albeit within quite a narrow range – approximately 2.28 – 4.77 euros/MWh.
- 760 Perhaps counter-intuitively, a negative relationship between winter-summer prices spreads and storage injections can be observed. A number of factors could explain this, including that for 2012, the year with the lowest summer injections, end-of-winter stock levels were already relatively high, and perhaps more

<sup>514</sup> The data is based on average season +1 and season +2 prices for NBP and TTF. The spread for each day of Q1 2010 -2014 was calculated and the average taken.

importantly, the Summer 2012 average day ahead gas price at the main EU hubs was actually higher than the previous winter (see Figure 26), meaning that anticipated lower summer prices did not materialise. The reverse is true for 2014, when low spreads were forecast based on season-ahead prices, but lower than expected summer hub prices developed, creating an extra incentive to put gas in storage. This data would suggest that while season-ahead prices are likely to influence storage capacity bookings, as with storage withdrawals, it is day-ahead prices that have a stronger bearing on storage injections.

Figure 130: EU aggregate summer gas storage injections and average season +2/season +1 winter/summer price spread (GWh and euros/MWh)



Source: Platts (2015) and Gas Infrastructure Europe.

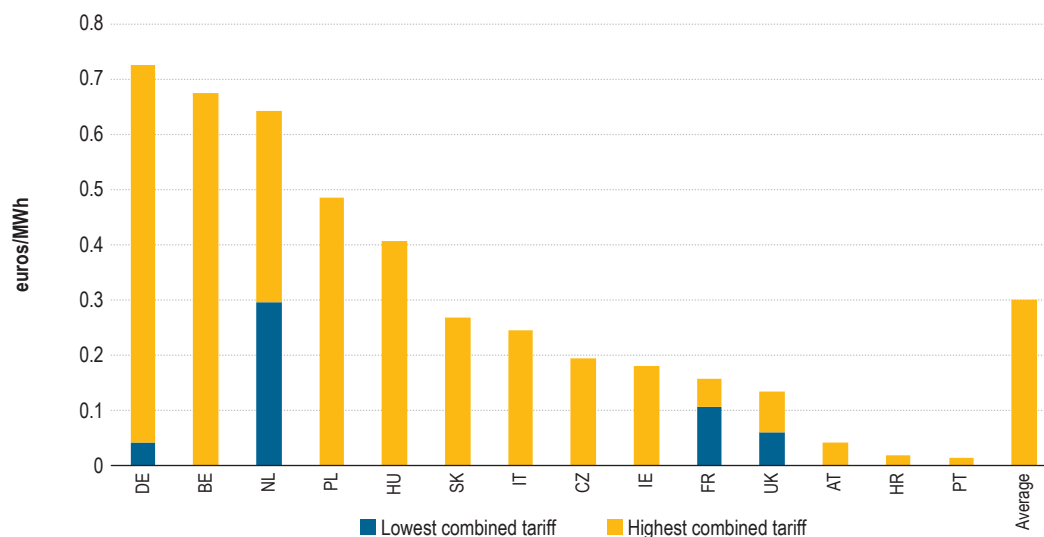
### Other gas storage costs

- 761 Winter-summer price spreads indicate the potential profitability of putting gas in storage, but these spreads have to be compared against the other costs of doing so. A significant cost that shippers face when utilising gas storage are, besides gas stocking fees, capacity charges paid to storage operators for putting gas in and out of storage facilities.
- 762 Shippers also often face gas transmission charges payable directly to the Transmission System Operator (TSO) for transporting gas to and from the transmission system, in and out of gas storage. The Network Code on Harmonised Transmission Tariff Structures for Gas is scheduled for implementation in 2017. The current draft requires that, among other things, transmission tariffs for storage facilities reflect the net benefits that storage facilities may provide to the transmission system. Taking account of these benefits may mean that transmission tariffs for gas storage are discounted.
- 763 Figure 131 provides an indication of the size of gas transmission tariffs currently levied at storage entry and exit points across the EU<sup>515</sup>. In some countries, no storage tariffs are levied; in others, either no entry or no exit tariffs are levied, while in others still, entry and or exit tariffs are discounted. In addition, some MSs levy different tariffs at different storage points. This is particularly the case in Germany, where a relatively high number of TSOs operate. The data presented in Figure 131 comprises an estimate of the highest combined transmission cost of transporting 1 MWh of gas in and out of storage in each MS, based on transmission tariffs prevailing on 1 October 2014.

515 The data are a calculation of the highest total transmission cost of flowing 1MWh of gas in and out of gas storage based on prevailing tariffs on 1 October 2014. Where differentiated transmission tariffs are levied at different network points, an estimate of the highest and lowest tariff is shown. The figures are estimates of all entry and exit capacity and commodity tariffs levied where applicable. In some MSs, additional network charges, such as for balancing and gas quality conversion may apply. For comparability purposes, these were not included in the calculation. Conversion assumptions were made for currency and volume to power in some cases. The data were sourced from a combination of NRAs (following a questionnaire) and TSO websites where NRA data were not available. Given the approximations made, the data is intended as indicative rather than definitive.

764 The average<sup>516</sup> combined transmission cost of transporting 1 MWh of gas in and out of storage among MSs where transmission tariffs are levied on storage is approximately 0.3 euros/MWh. In Winter 2014/15, the average day-ahead price of gas in North West Europe was 22.54 euros/MWh. On average, the materiality of transmission tariffs levied on gas storage is relatively low; however, when winter-summer gas price spreads are very low, it is possible that transmission tariffs in some MSs have a bearing on the competitiveness of gas in storage.

Figure 131: Aggregate transmission tariffs levied at gas storage points among EU MSs where storage transmission charges are applied (euros/MWh)



Source: TSOs and NRAs.

### Gas storage outlook

765 At the end of winter 2012/13, low end-of-season stock levels raised concern in some quarters regarding the adequacy of EU gas storage stocks. The end-of-season stock level for winter 2013/14 returned to the levels seen in winters 2010/11 and 2011/12, allaying these concerns, at least in the short term. This pattern has been confirmed in 2014/15.

766 At the end of winter 2013/14, the most obvious question in respect of gas storage was whether the much lower withdrawal volumes witnessed were indicative of a new trend in favour of lower storage utilisation. The data for 2014/15 strongly suggests that this is not the case. Despite low season-ahead winter-summer gas price spreads, the volume of storage withdrawals across the EU, almost without exception, were much higher than in the preceding year. It is likely that the combination of lower than average summer 2014 gas prices and relatively high winter 2014/15 gas prices made gas in storage attractive. The data for 2014/15 would therefore suggest that the key role of gas storage in meeting EU winter gas demand is set to continue. Nevertheless, in the Agency's view, the impact that recent trends in season-ahead gas prices may be having on the stability of the traditional gas storage model is also worth monitoring. Although storage utilisation remains high, some storage operators are reporting lower storage capacity prices which, over a period of time, could lead to underinvestment in the industry.

### 5.4.5 Conclusion

767 Cross-border flows responded better to zonal price signals across the EU. This can be linked to the developing market role of hubs and to a larger availability of capacities, given new infrastructure investments and progressive implementation of NCs. A notable illustration of this is the increasing incidence of flow resulting from price arbitrage opportunities between CEE and NWE markets. Enhanced reverse-flow

<sup>516</sup> The figure is the average of each of the MSs applying transmission tariffs to storage. The figure is based on the Agency's estimate of the highest tariff payable in each MS and is not weighted according to capacity size.

capacities are improving the sourcing flexibility in the CEE region and others. The commissioning of new interconnections has also been a contributing factor, allowing reverse use of supply routes. This is clear for the intensified use of Nordstream at the expense of the Ukrainian-Slovak transit route. The SSE region situation remains more static pending the availability of new infrastructure and in certain cases, complete liberalisation.

- 768 During the year, EU gas markets exhibited a higher level of agility, as tested by the Russia-Ukraine supply disruption. This can be attributed to enhanced market integration, recent reverse-flow enhancements, rule harmonisation and greater route and supply diversification. For the first time, sizeable gas volumes flowed into Ukraine from EU markets. It is estimated that these flows were priced lower than Gazprom deliveries.
- 769 The role of underground gas storage further increased during 2014. Withdrawals reached their highest level since 2010, accounting for around 25% of 2014/15 winter demand. Stock levels were also at their highest compared to 2010. While gas storage economics continues to be on the weaker side, as is evident from a low season-ahead winter-summer spread, it did not impact storage utilisation at this stage.

## 5.5 Recommendations

- 770 Progress towards the completion of a European internal gas wholesale market continued during 2014. The vision of a single, EU-wide integrated market, where gas flows freely across borders based on competition and the best use of resources, is progressively materialising, albeit more rapidly in some EU regions like NWE. As the chapter's analysis illustrates, while all MSs can advance, some still need significant improvements in order to overcome persisting barriers that hinder the integration and well-functioning of their gas markets. Key barriers are persistent: the execution of steps to liberalisation, selected gas transportation infrastructure bottlenecks, predominance of less flexible bilateral long-term commitments for gas supply in the absence of functioning hubs and an ongoing lack of transparency in wholesale price formation. In view of this, the following recommendations are made:

- 771 *Push selected investments to alleviate infrastructure bottlenecks:*

- The prevalence of low diversity of supply sources in selected MSs should continue to be addressed as a priority as competition is more difficult to achieve in the absence of adequate gas sourcing diversity. In this respect, the Baltic countries, Finland, Bulgaria, Ireland and Slovakia do not meet the GTM objective of three sources. Lithuania made good progress with the commissioning of the Klaipėda LNG facility.
- Investments enabling reverse flows on IPs at selected MSs' borders are still to be fully implemented or enhanced. Significant progress has been achieved – the CEE region is a good example of this – and these new flow capabilities clearly contribute to security of supply and combined with backhaul services also to market integration. Given the importance of these measures, existing exemptions for TSOs from the obligation to enable permanent bi-directional capacities on all cross-border interconnections between MSs may have to be reconsidered. Furthermore, expanding this cooperation to neighbouring EU and Energy Community countries will bring additional benefits in terms of more competitive and secure gas markets.

- 772 *Have a regional perspective, not exclusively a national focus, when launching infrastructure projects:* More regional cooperation is needed when it comes to investment decisions in infrastructure projects where there are cross-country impacts or synergies to be expected. For example, in the Baltic region, a common regional approach to, for example, infrastructure development (e.g. LNG) would lead to cost synergies and bring down prices for sourcing gas faster. In this respect, the Poland-Lithuania Interconnector GIPL case could serve as an example.

- 773 *Facilitate further the shift of gas supply mechanisms from bilateral and long-term contracts with limited flexibility to shorter-term hub-based transactions:* Although suppliers' and producers' sourcing contractual mechanisms are a matter of independent commercial decision, regulators can contribute to promoting the market role of hubs by, for example, further indexing still existing regulated prices to hub references or by promoting the transfer of prevailing physical delivery points at the flange into VTPs. This shift may have to be gradual, given existing contractual commitments.

- 774 *Eliminate barriers hindering hub progression and new market entry:* This may also fit into the broader setting of an unfinished liberalisation process. For example, in MSs where incumbent players seem to have limited incentives to provide hub liquidity, gas resale obligations could initially trigger competition, as the Polish POLPX and Romanian exchange examples illustrated last year. Other barriers to hub development relate to setting up market oriented designs. These can be achieved, for example, by simplifying access terms and licensing (or removing licensing obligations for trading), or by removing excessive security of supply obligations, in occasions also applied to purely financial entities (i.e. excessive storage obligations, unduly proof of ability of contracts for acquiring capacity). Lack of liquidity and transparency may also create conditions for market manipulation; therefore REMIT provisions are essential to limit and sanction insider trading and market abuse.
- 775 *Market players should further promote the development of trading products at hubs, especially, but not exclusively, forward markets:*
- There is a large discrepancy among MSs when it comes to the level of development of hubs. TTF and NBP are clearly the leading hubs in the EU. Whereas on the other hand hubs in SSE, Iberia and the Baltic regions, where in operation, would benefit from the deeper liquidity. In this respect, certain hubs or MSs without a well-performing hub may opt for regional solutions and follow one of the merger models proposed by the GTM.
  - The NBP and TTF hubs in particular are at a distance from other hubs in terms of larger forward liquidity and lower transaction price spreads, two factors contributing to their leading role for supply and price risk-hedging management. As such, to date only these two trading places offer a market of critical mass for forward products, even though they themselves can further advance as well. Other hubs should strive to either develop or expand these types of products. Increased product offering and hub size is beneficial for suppliers sourcing gas and deepens competition
- 776 *Foster cross-country hub cooperation:* Regulators should assist the process by establishing gas system configurations and structural hub designs that simplify trade. In this aim, they should *inter alia*: foster cooperation among TSOs; back interconnection capacity developments when projects are economically viable following a cost-benefit analysis; and implement harmonised market access rules, based on the Network Codes, to guarantee fair access to the network systems. If over time significant gaps remain among hubs, the GTM calls for hub integration efforts. In this regard, the number of well-functioning gas hubs that will make the IEM successful should be decided by market-based decisions. Integration projects like the Belux case create larger market zones, promoting competition.
- 777 *Implement fully all NCs provisions without delay in order to facilitate competition and well-functioning gas markets.* The harmonisation of cross-border access conditions is also of key relevance for the forecast future creation of supra-national market areas. The monitoring report on the CMP GL showed that not all stipulations are implemented everywhere, since the obligation arose in October 2013. CAM and Balancing NCs should be implemented in October and November 2015, although several interim measures may apply to specific countries afterwards. Recent Roadmaps on implementation show overall progress, but certain delays can be observed in selected MSs.
- 778 *Push transparency in terms of data availability of gas markets.* Market stakeholders should strive to increase data availability in the interest of better market functioning and competition.



# Annex 1: Typical electricity and gas consumer characteristics per country

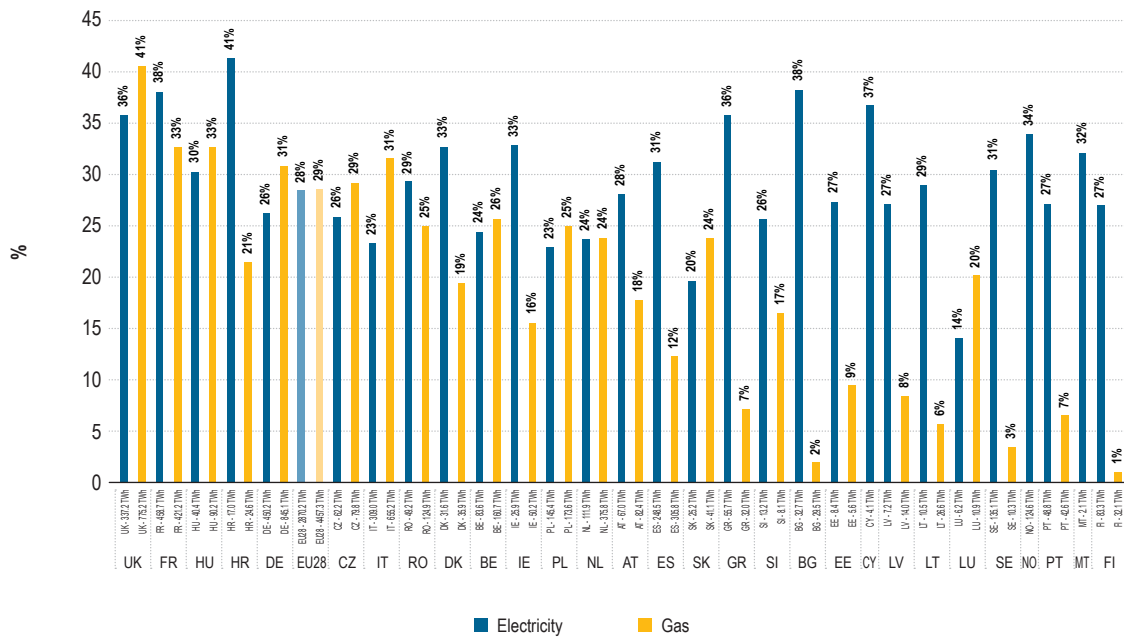
Table A-1: Electricity and gas consumption and consumer characteristics in Europe – 2014 (TWh, kWh and number of households)

Country	Electricity consumption						Gas consumption					
	Number of electricity household consumers		Average electricity household consumption (kWh)		Total electricity household consumption (TWh)		Number of gas household consumers		Average gas household consumption (kWh)		Total gas household consumption (TWh)	
	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014	2014
Austria	4,356,486	1,651,807	2,986	13	44	1,270,947	78,011	12,890	16	62,493		
Belgium	4,299,400	827,447	3,660	16	26	2,221,155	309,087	25,600	34	45,180		
Bulgaria	4,314,525	524,250	2,476	11	10	71,706	6,135	11,400	1	24,96		
Croatia	2,155,147	216,999	2,800	6	9	599,476	50,173	8,603	5	16,826		
Cyprus	433,072	121,502	3,239	1	3	NAP	NAP	NAP	NAP	NAP		
Czech Republic	5,109,441	789,578	2,860	14,1	38	2,642,898	206,264	8,041	21	54,3		
Denmark	2,750,000	NA	3,000	NA	NA	388,000	18,500	19,800	8	NAP		
Estonia	526,492	34,223	3,500	2	6	48,551	2,092	3,200	1	5,0		
Finland	3,200,000	400,000	6,874	23	61	26,200	4,300	3,860	NA	NA		
France	31,383,000	5,093,000	2,400	145	278	10,621,000	669,000	17,000	125	341,2		
Germany	46,786,085	3,291,139	2,717	120	367	12,511,854	1,325,403	20,000	224	577,138,912,525		
Great Britain	27,645,618	2,469,242	3,200	107	197	21,010,404	758,705	12,500	287	195		
Greece	5,746,273	1,678,971	3,600	17	32	305,047	19,946	10,221	3	NA		
Hungary	5,036,507	310,549	2,500	10	10	3,241,510	202,188	10,120	30	NA		
Ireland	2,024,382	211,935	4,081	8	16	639,763	25,425	10,785	7	10,2		
Italy	29,599,583	7,531,487	1,951	57	190	20,062,412	1,322,920	7,301	170	501,61		
Latvia	999,147	126,303	1,730	2	6	432,500	10,900	3,620	1	NA		
Lithuania	1,526,446	129,545	1,644	3	7	558,541	6,733	13,062	1	22,6		
Luxembourg	228,588	57,868	4,000	1	5	80,957	4,828	36,325	3	8,2		
Malta	232,009	51,798	2,650	1	NA	NAP	NAP	NAP	NAP	NAP		
Netherlands	6,885,587	857,635	3,331	26	NA	6,233,660	743,645	12,836	10	NA		
Norway	2,539,100	361,100	16,000	39	42	NAP	NAP	NAP	NAP	NAP		
Poland	15,274,785	1,661,188	2,031	31	100	6,868,294	229,112	2,754	41	116,39		
Portugal	6,017,870	57,733	2,996	18	26	1,369,556	4,564	9,140	4	44,236		
Romania	8,556,650	600,000	1,358	12	33	3,193,708	178,851	20,000	29	87,79		
Slovakia	2,162,493	291,008	2,281	5	13	1,426,360	79,753	8,115	13	33,27		
Slovenia	831,185	105,698	3,336	3	9	119,025	14,205	8,079	1	6,7		
Spain	27,976,345	849,117	2,405	72	154	7,543,729	4,925	15,000	61	240,8		
Sweden	4,625,770	720,240	20,000	NA	NA	34,000	7,000	12,836,4	0	NA		

Source: CEER DB (2014).

Notes: There might be discrepancies with the Eurostat data reported by different countries' authorities. For some countries, data refer to previous year.

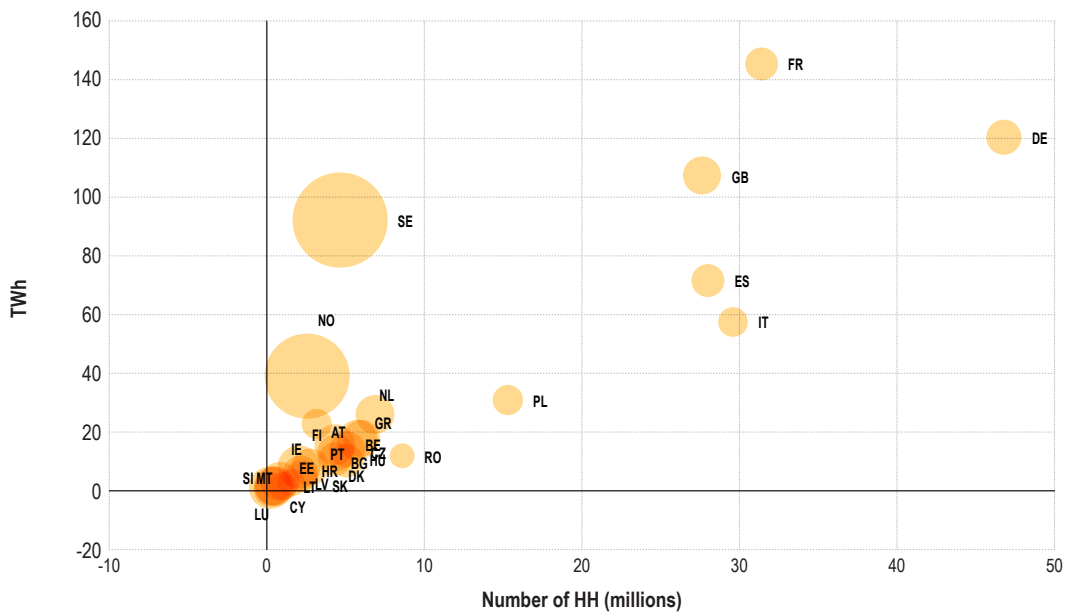
Figure A-1: Energy household consumption as a percentage of total consumption across Europe – 2014 (%)



Source: Eurostat (15/9/2015) and ACER calculations.

Note: Percentages refer to the 2013 data, while figures for consumption reflect the sum of the monthly figures for electricity available for the internal market and gross inland gas consumption for the year 2014. According to IRL, in 2014, 26% of total gas consumption in Luxembourg was consumed by households.

Figure A-2: Annual and average annual electricity household consumption in Europe – 2014 (TWh)

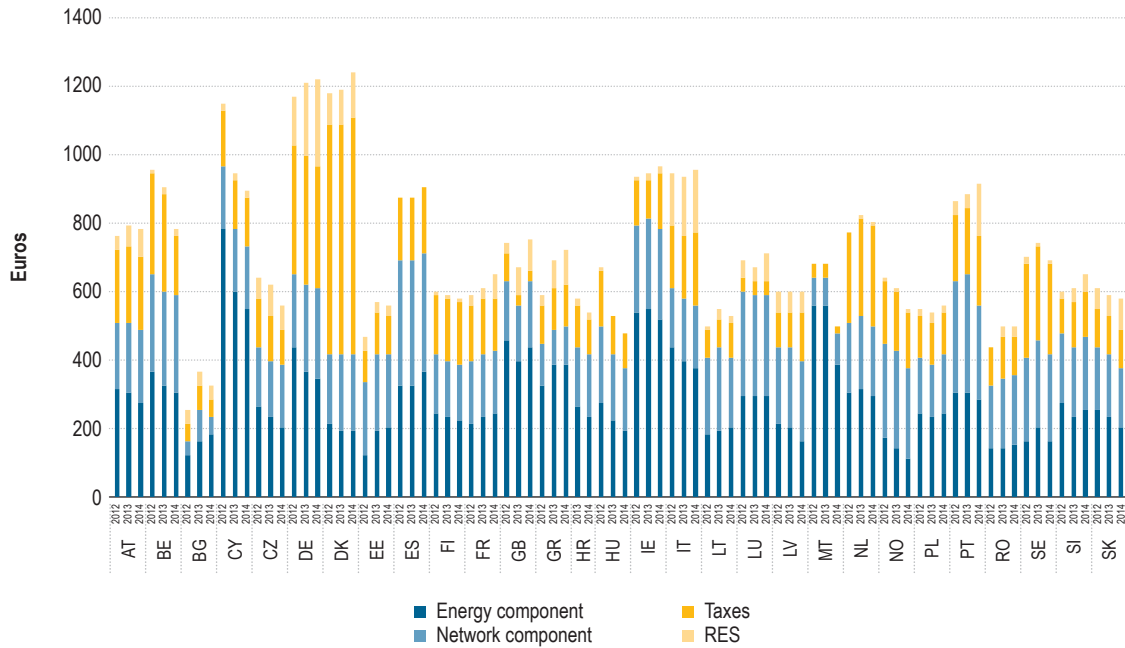


Source: Eurostat (15/9/2015) and CEER Database (2014).

Note: Bubble size represents average annual electricity household consumption per country.

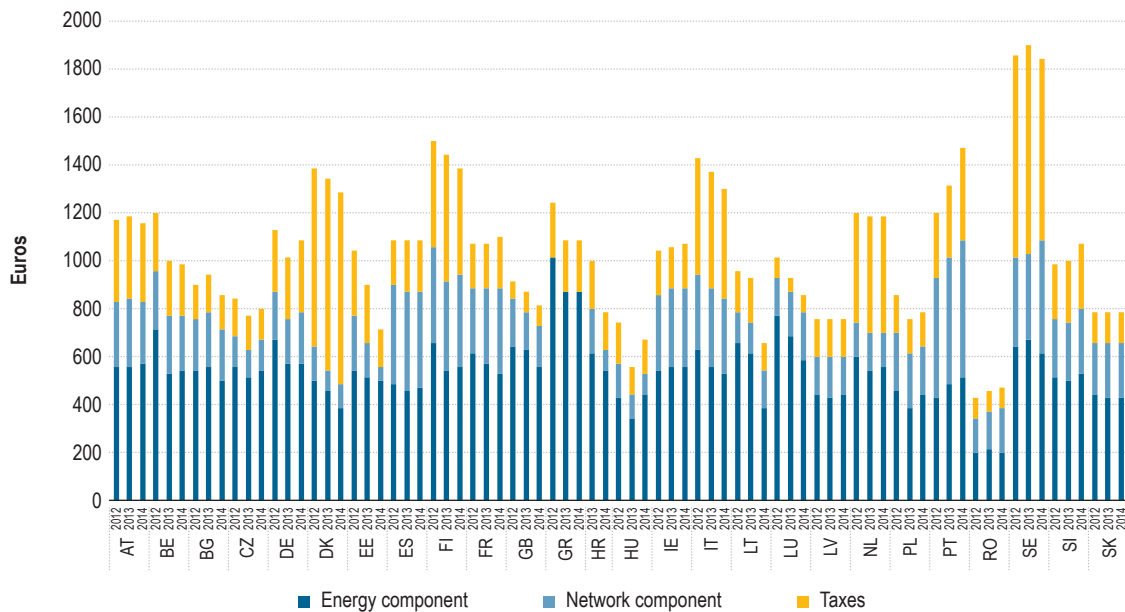
# Annex 2: Electricity prices and break-down of offers, Europe, 2008-2014

Figure A-3: POTP electricity break-down – incumbents’ standard offers for households in capital cities – 2012-2014 (euros)



Source: ACER Retail Database and information from NRAs (2014).

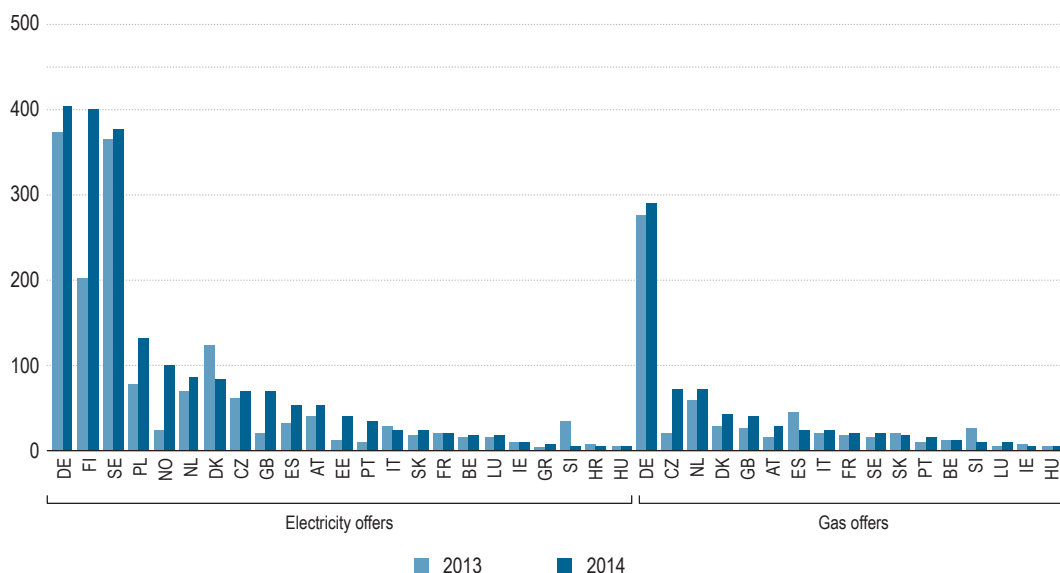
Figure A-4: POTP gas break-down – incumbents’ standard offers for households in capital cities – 2012-2014 (euros)



Source: ACER Retail Database and information from NRAs (2014).

## Annex 3: Non-price-related elements of offers

Figure A-5: Number of electricity and gas offers from price comparison tools in ACER database, capital cities – November-December 2013 and 2014



Source: ACER Database (November-December 2013 and 2014) and ACER calculations.

Note: For the capitals of Cyprus, Malta and Norway, information on gas offers was not collected. The data refer to capital cities, except for the Swedish natural gas offers, where the data refer to a very limited area of Sweden with an existing natural gas network – the Gothenburg area. Only one electricity and gas offer was obtained from the regulators of Bulgaria, Cyprus, Lithuania, Latvia, Malta and Romania. Only one gas offer was available for Athens and Warsaw. In the case of Sweden, the number of electricity offers included in the analysis reflect the offers of the most representative types in the price comparison tool offered by the Swedish suppliers, although the number of all offers is estimated to be higher than 600. The number of offers shown in the figure for Dublin does not include the lifestyle choice prepayment offers available to consumers and other varieties of payment options, which are popular in Ireland. In total, approximately 64 single-fuel electricity and gas offers were available to consumers in Dublin at the end of 2014. In the case of electricity offers in Copenhagen (end of 2014), the regulator estimates the number of offers is estimated to be higher (i.e. at the level of 2013). Dual-fuel offers are not included in the Figure.

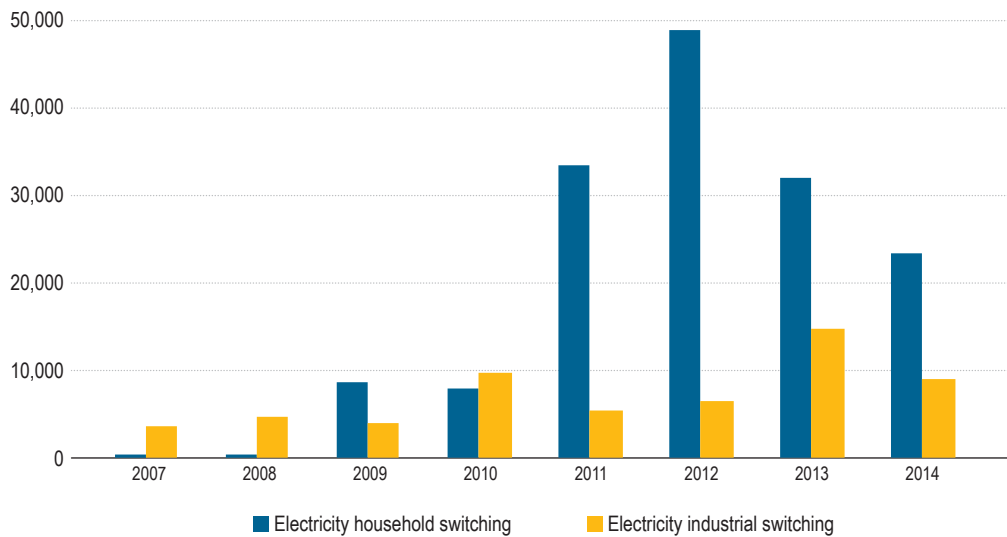
Table A-2: Price comparison websites for the offer data analysis in capital cities

Country	Electricity	Gas
AUSTRIA	<a href="http://www.e-control.at/haushalts-tarifkalkulator">http://www.e-control.at/haushalts-tarifkalkulator</a>	<a href="http://www.e-control.at/haushalts-tarifkalkulator">http://www.e-control.at/haushalts-tarifkalkulator</a>
BELGIUM	<a href="http://www.brusim.be/">http://www.brusim.be/</a>	<a href="http://www.brusim.be/">http://www.brusim.be/</a>
BULGARIA	Information from NRA	Information from NRA
CROATIA	<a href="https://kompare.hr/">https://kompare.hr/</a>	Supplier's site: <a href="http://www.gpz-opskrba.hr/">http://www.gpz-opskrba.hr/</a>
CZECH REPUBLIC	<a href="http://kalkulator.ery.cz/">http://kalkulator.ery.cz/</a> and <a href="http://www.cenyenergie.cz">http://www.cenyenergie.cz</a>	<a href="http://www.cenyenergie.cz">http://www.cenyenergie.cz</a>
CYPRUS	Information from NRA	n.a.
DENMARK	<a href="http://www.elpristavien.dk/">http://www.elpristavien.dk/</a>	<a href="http://gasprisguiden.dk">http://gasprisguiden.dk</a>
ESTONIA	<a href="https://minuelekter.ee/calc">https://minuelekter.ee/calc</a>	Supplier's site: <a href="http://www.gaas.ee">http://www.gaas.ee</a>
FINLAND	<a href="http://www.sahkonhinta.fi/">http://www.sahkonhinta.fi/</a>	<a href="http://www.gasum.fi/Yksityisille/Kodin-lammitys/hinnasto/">http://www.gasum.fi/Yksityisille/Kodin-lammitys/hinnasto/</a>
FRANCE	<a href="http://www.energie-info.fr">www.energie-info.fr</a>	<a href="http://www.energie-info.fr">www.energie-info.fr</a>
GERMANY	<a href="http://www.verivox.de">www.verivox.de</a>	<a href="http://www.verivox.de">www.verivox.de</a>
GREECE	NRA	<a href="http://www.aerioattikis.gr/default.aspx?pid=34&amp;la=1&amp;artid=135">http://www.aerioattikis.gr/default.aspx?pid=34&amp;la=1&amp;artid=135</a>
HUNGARY	Information from NRA and other offers from 3 suppliers	<a href="http://www.vasarlocsapat.hu">http://www.vasarlocsapat.hu</a>
IRELAND	<a href="http://www.bonkers.ie/compare-gas-electricity-prices/electricity/">http://www.bonkers.ie/compare-gas-electricity-prices/electricity/</a>	<a href="http://www.bonkers.ie/compare-gas-electricity-prices/gas">http://www.bonkers.ie/compare-gas-electricity-prices/gas</a>
ITALY	<a href="http://trovaofferte.autorita.energia.it/">http://trovaofferte.autorita.energia.it/</a>	<a href="http://trovaofferte.autorita.energia.it/">http://trovaofferte.autorita.energia.it/</a>
LATVIA	Information from NRA	Information from NRA
LITHUANIA	Information from NRA	Information from NRA
LUXEMBOURG	<a href="http://www.calculix.lu">www.calculix.lu</a>	<a href="http://www.ilr.public.lu/gaz/fournisseurs/">http://www.ilr.public.lu/gaz/fournisseurs/</a>
MALTA	Information from NRA	n.a.
NETHERLANDS	<a href="http://www.energieleveranciers.nl/energie-vergelijken">http://www.energieleveranciers.nl/energie-vergelijken</a>	<a href="http://www.easyswitch.nl/energie">http://www.easyswitch.nl/energie</a>
NORTHERN IRELAND	<a href="http://www.consumerCouncil.org.uk/energy/price-comparison/">http://www.consumerCouncil.org.uk/energy/price-comparison/</a>	n.a.

Country	Electricity	Gas
NORWAY	<a href="http://www.konkurransetilsynet.no/en/Electricity-prices/Check-power-prices/">http://www.konkurransetilsynet.no/en/Electricity-prices/Check-power-prices/</a>	n.a.
POLAND	<a href="http://ure.gov.pl/ftp/ure-kalkulator/ure/formularz_kalkulator_html.php">http://ure.gov.pl/ftp/ure-kalkulator/ure/formularz_kalkulator_html.php</a>	Information from NRA
PORTUGAL	<a href="http://www.erse.pt / Simulador de Preços de Energia Elétrica">http://www.erse.pt / Simulador de Preços de Energia Elétrica</a>	<a href="http://www.erse.pt / Simulador de Preços des Gas Natural">http://www.erse.pt / Simulador de Preços des Gas Natural</a>
ROMANIA	Information from NRA	Information from NRA
SLOVAKIA	<a href="http://www.urso.gov.sk:8088/CISRES/Agenda.nsf/KalkulackaElektrinaNewWeb">http://www.urso.gov.sk:8088/CISRES/Agenda.nsf/KalkulackaElektrinaNewWeb</a>	<a href="http://www.urso.gov.sk:8088/CISRES/Agenda.nsf/KalkulackaPlynNewWeb">http://www.urso.gov.sk:8088/CISRES/Agenda.nsf/KalkulackaPlynNewWeb</a>
SLOVENIA	<a href="http://www.agen-rs.si/primerjalnik/index.php?kalkulatorelektrika/kalkulator/action/lzbiraOdjemalca/redirected/1/">http://www.agen-rs.si/primerjalnik/index.php?kalkulatorelektrika/kalkulator/action/lzbiraOdjemalca/redirected/1/</a>	<a href="http://www.agen-rs.si/primerjalnik/index.php?kalkulatorplin/kalkulator/action/korak2/redirected/1/">http://www.agen-rs.si/primerjalnik/index.php?kalkulatorplin/kalkulator/action/korak2/redirected/1/</a>
SPAIN	<a href="http://comparadorofertasenergia.cnmc.es/comparador/">http://comparadorofertasenergia.cnmc.es/comparador/</a>	<a href="http://comparadorofertasenergia.cnmc.es/comparador/">http://comparadorofertasenergia.cnmc.es/comparador/</a>
SWEDEN	<a href="http://www.ei.se/elpriskollen/">http://www.ei.se/elpriskollen/</a>	<a href="http://www.enerjimarknadsbyran.se/Gas/Dina-avtal-och-kostnader/Gaspriskollen/">http://www.enerjimarknadsbyran.se/Gas/Dina-avtal-och-kostnader/Gaspriskollen/</a>
UNITED KINGDOM	<a href="http://www.ukpower.co.uk/">http://www.ukpower.co.uk/</a>	<a href="http://www.ukpower.co.uk/">http://www.ukpower.co.uk/</a>

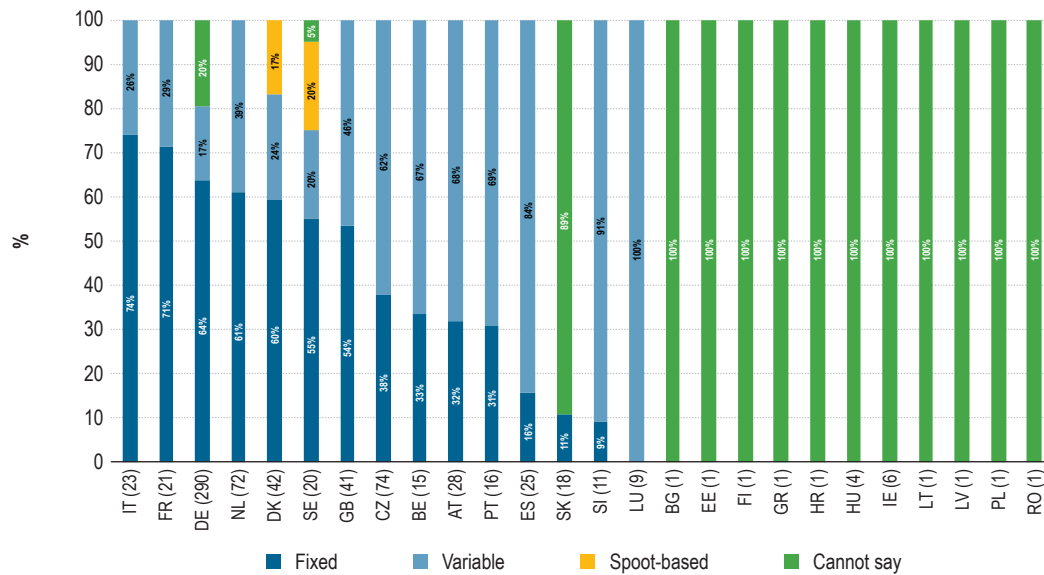
Source: ACER, November–December 2014.

Figure A-6: Number of Slovenian electricity household and industrial consumers who have switched supplier – 2007–2014



Source: AGEN-RS and ACER calculations (May 2015).

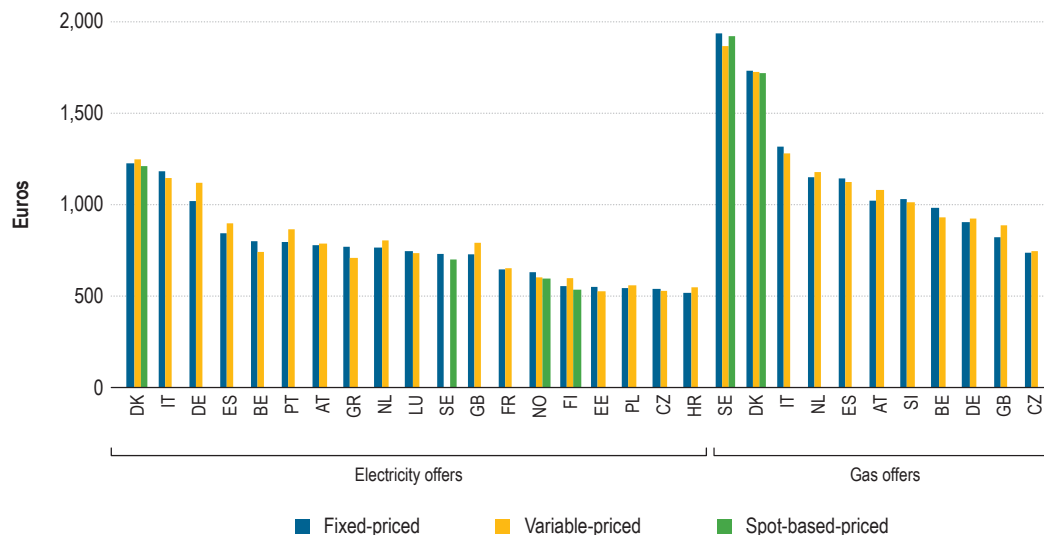
Figure A-7: Type of energy pricing of gas-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)



Source: ACER Retail Database (November-December 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. In Budapest, the type of offer could not be determined from the price comparison tool, while this is partly true for the offers in Bratislava, Stockholm and Berlin. In Dublin too the type of offer could not be identified for the offers displayed, which do not include the lifestyle choice prepayment offers available to consumers and other varieties of payment options, which are popular in Ireland. One gas offer of an unknown type was obtained from the regulator or supplier in Bucharest, Warsaw, Riga, Vilnius, Zagreb, Athens, Helsinki, Tallinn and Sofia. In the case of Belgium, all offers obtained are gas dual-fuel offers.

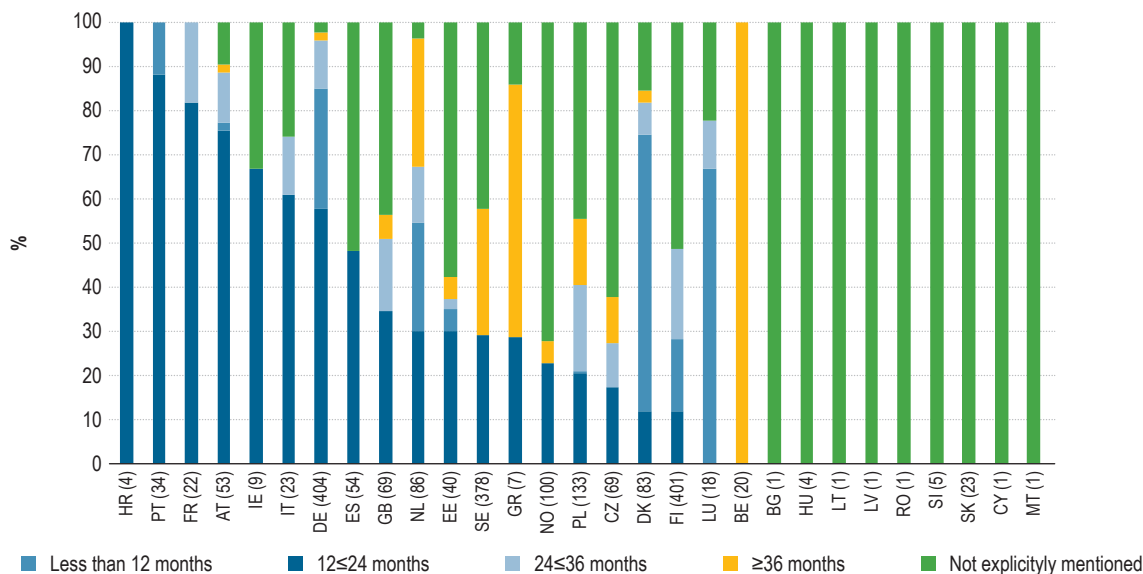
Figure A-8: Average final offer price for electricity and gas per type of energy pricing – European capital cities – November–December 2014 (euros)



Source: ACER Database (November-December 2014) and ACER calculations.

Note: Refers to offers for annual electricity consumption of 4,000 kWh and annual gas consumption of 15,000 kWh. 'Other' electricity and gas offers are not presented in the chart. In Stockholm, the price of 'other' electricity offers is significantly higher than fixed-price and spot-based offers. 'Other' electricity offers in Stockholm relate to offers of suppliers of last resort, which are estimated to be mostly variable. In Dublin, electricity variable-price offers were on average lower than other offers. In Rome and in Warsaw, 'other' electricity offers were on average the same as variable-price offers. In Berlin and Stockholm, 'other' gas offers are on average the most expensive offers by type of energy pricing. In Bratislava and Paris, 'other' offers are on average at the same level as fixed-price offers.

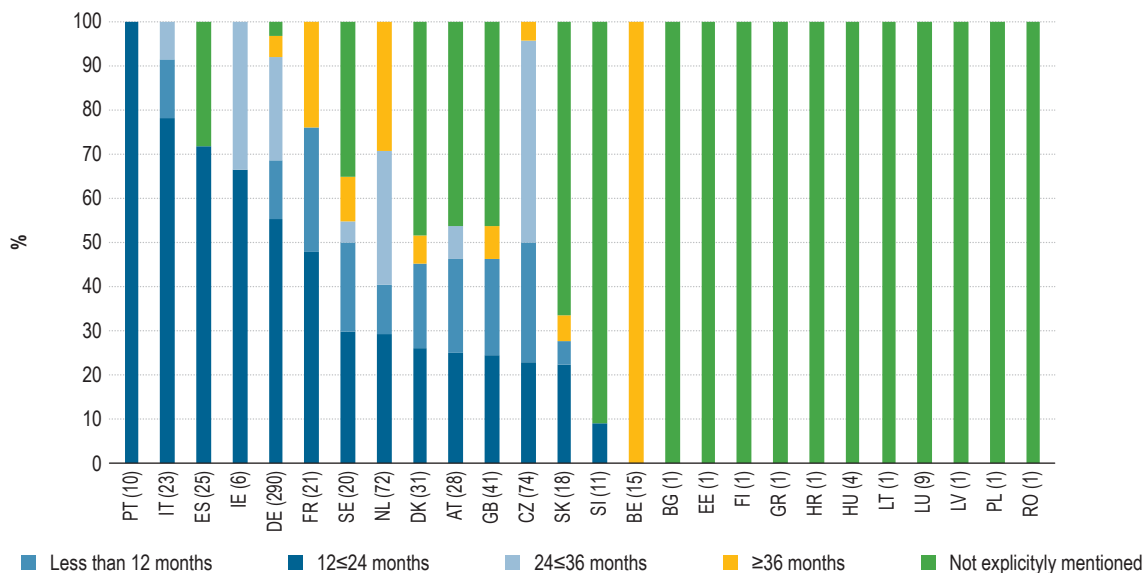
Figure A-9: Contract duration of electricity-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)



Source: ACER Retail Database (November-December 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. Where no information could be found in the price comparison tool on the duration of offers, these offers are considered to most likely be evergreen. In Athens, there is one offer for which contract duration is not explicitly mentioned, but rather specified upon completion of the application from the household consumer and subject to special provisions which apply to small electricity consumers. All contracts shown, as with over 36-month duration in Athens, relate to evergreen contracts. The number of offers shown in the figure for Dublin does not include the lifestyle choice prepayment offers available to consumers and other varieties of payment options, which are popular in Ireland. In total, approximately 64 single-fuel electricity and gas offers were available to consumers in Dublin at the end of 2014.

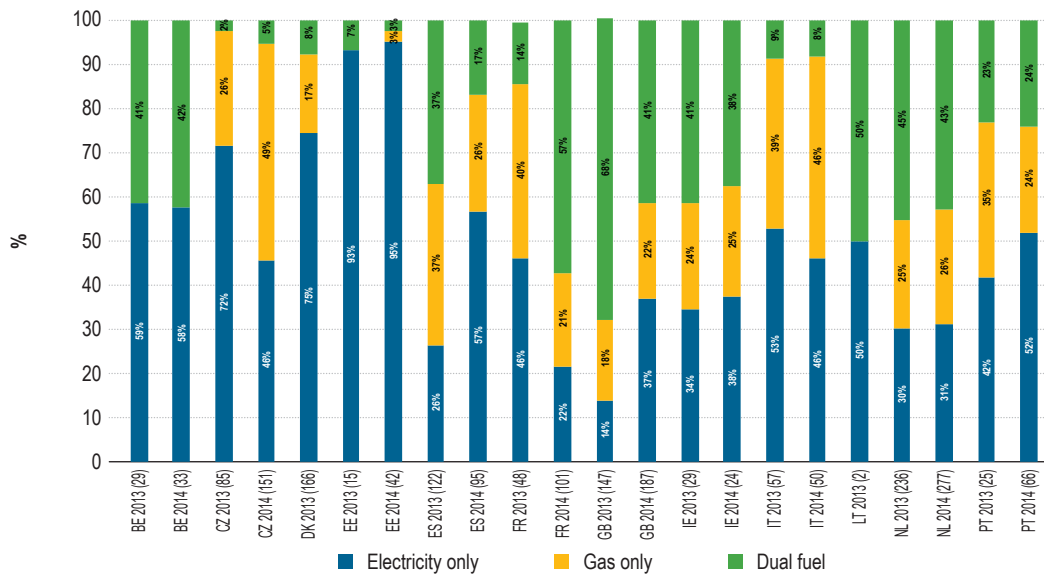
Figure A-10: Contract duration of gas-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)



Source: ACER Retail Database (November-December 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. Where no information could be found in the price comparison tool on the duration of offers, these offers are considered to most likely be evergreen.

Figure A-11: Share of dual-fuel offers in the total number of offers for a selection of capital cities where dual-fuel offers appear in price comparison tools – 2013–2014 (%)

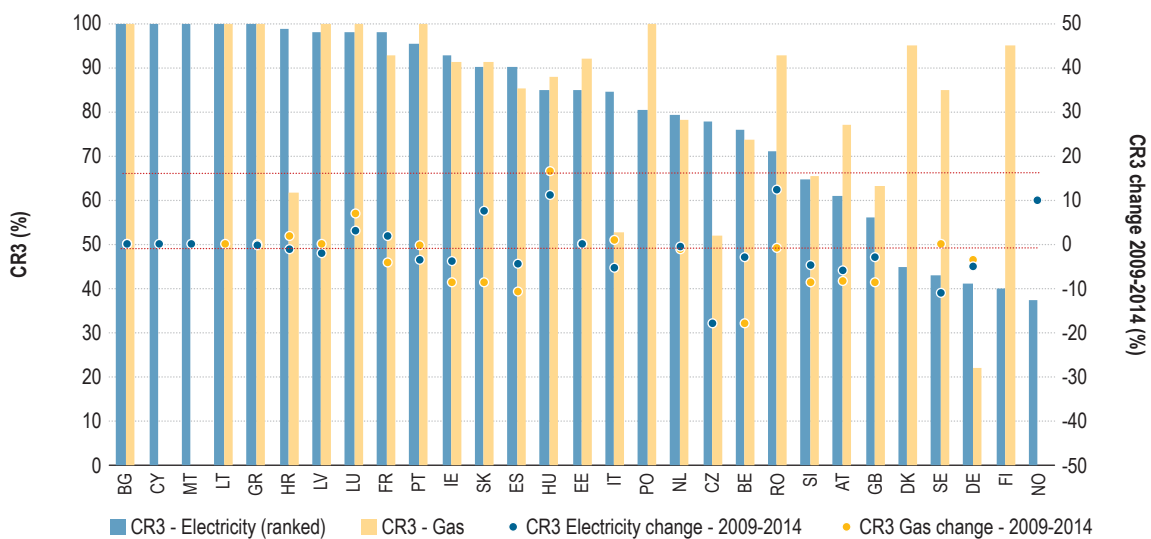


Source: ACER Retail Database (November-December 2013 and 2014) and ACER calculations.

Note: The number next to the country code refers to the number of offers in the database. At the end of 2014, no dual-fuel offers were appearing in the Danish price comparison tool. The only gas offer in Lithuania at the end of 2013 was a dual-fuel offer. The number of dual-fuel offers in 2013 in the Netherlands offered to electricity consumers is estimated to be similar to the number of dual-fuel offers to gas consumers, i.e. higher than captured in the analysis. According to the Austrian regulator, in Vienna, dual-fuel offers are provided by two suppliers; however, they do not appear in the price comparison tool. The number of dual-fuel offers in Paris in 2013 is estimated to be similar to those in 2014; however, for 2013, only those dual-fuel offers are shown which included discounts. The number of offers shown in the figure for Dublin does not include the lifestyle choice prepayment offers available to consumers and other varieties of payment options, which are popular in Ireland. In total, approximately 64 single-fuel electricity and gas offers and more than 30 dual-fuel offers were available to consumers in Dublin at the end of 2014.

## Annex 4: Market structure

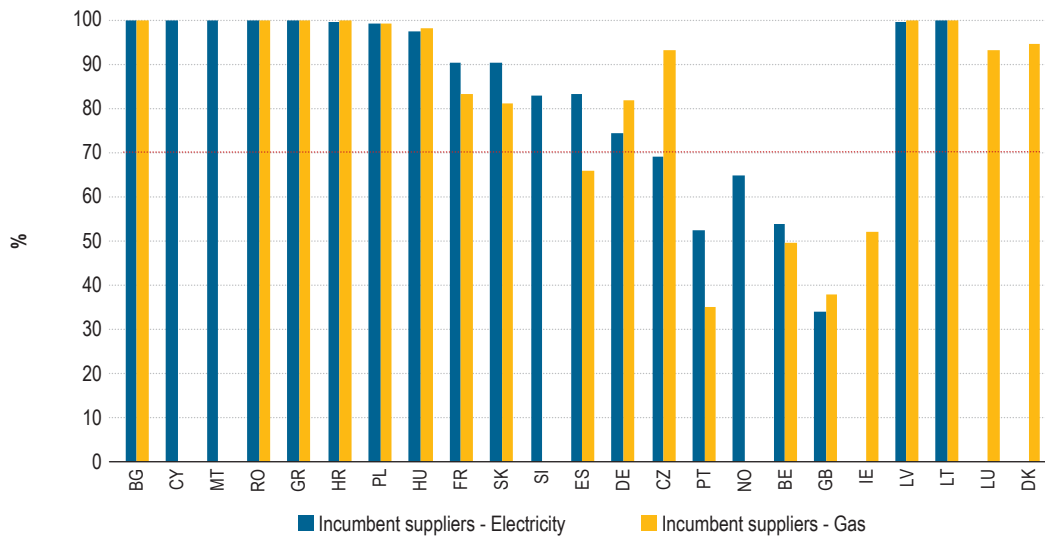
Figure A-12: CR3 in the retail electricity and gas markets for households in the EU MSs and Norway – 2014 and change from 2009–2014 (%)



Source: CEER National Indicators Database (2015).



Figure A-13: Market shares of incumbent suppliers in the electricity and gas markets for households in the EU MSs and Norway in 2014 (%)

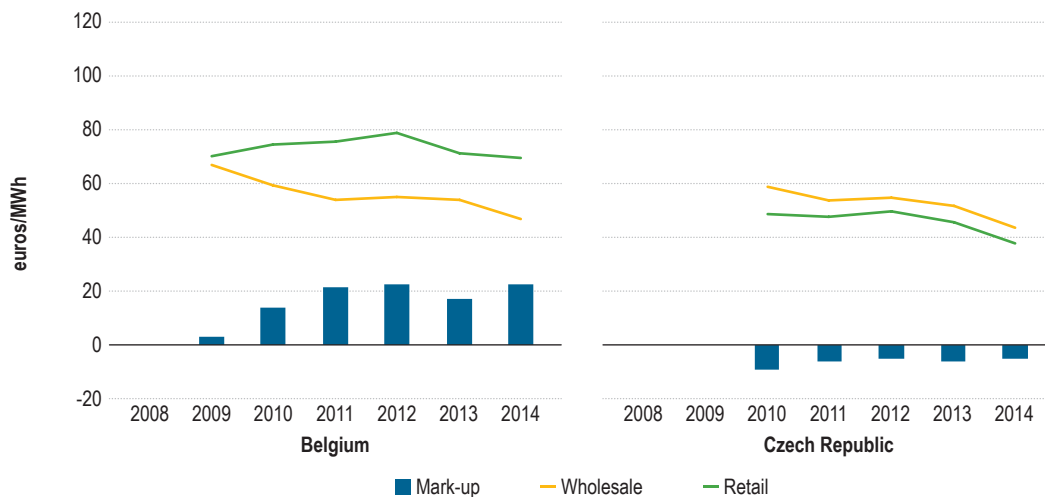


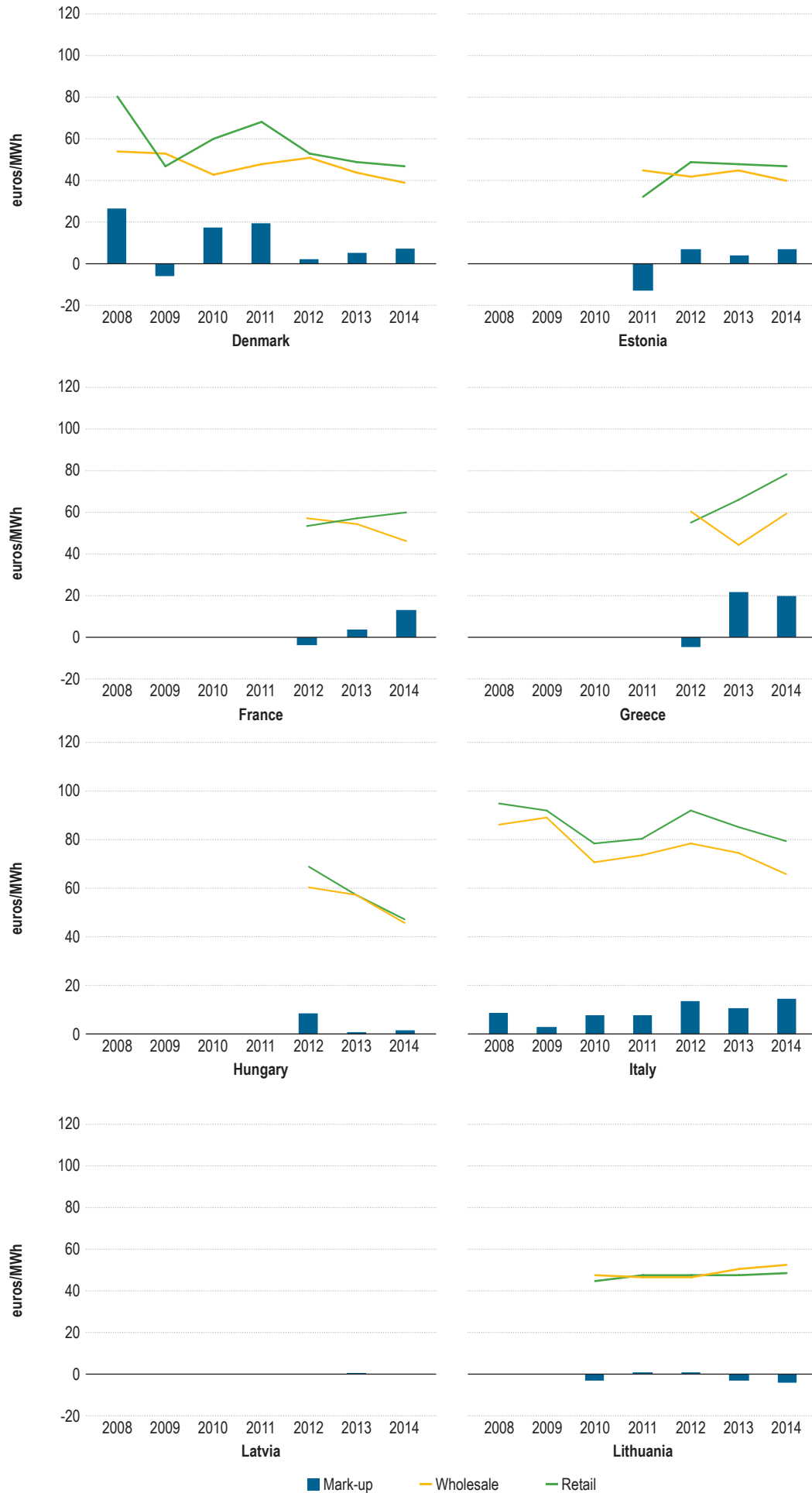
Source: Source: CEER National Indicators Database (2015).

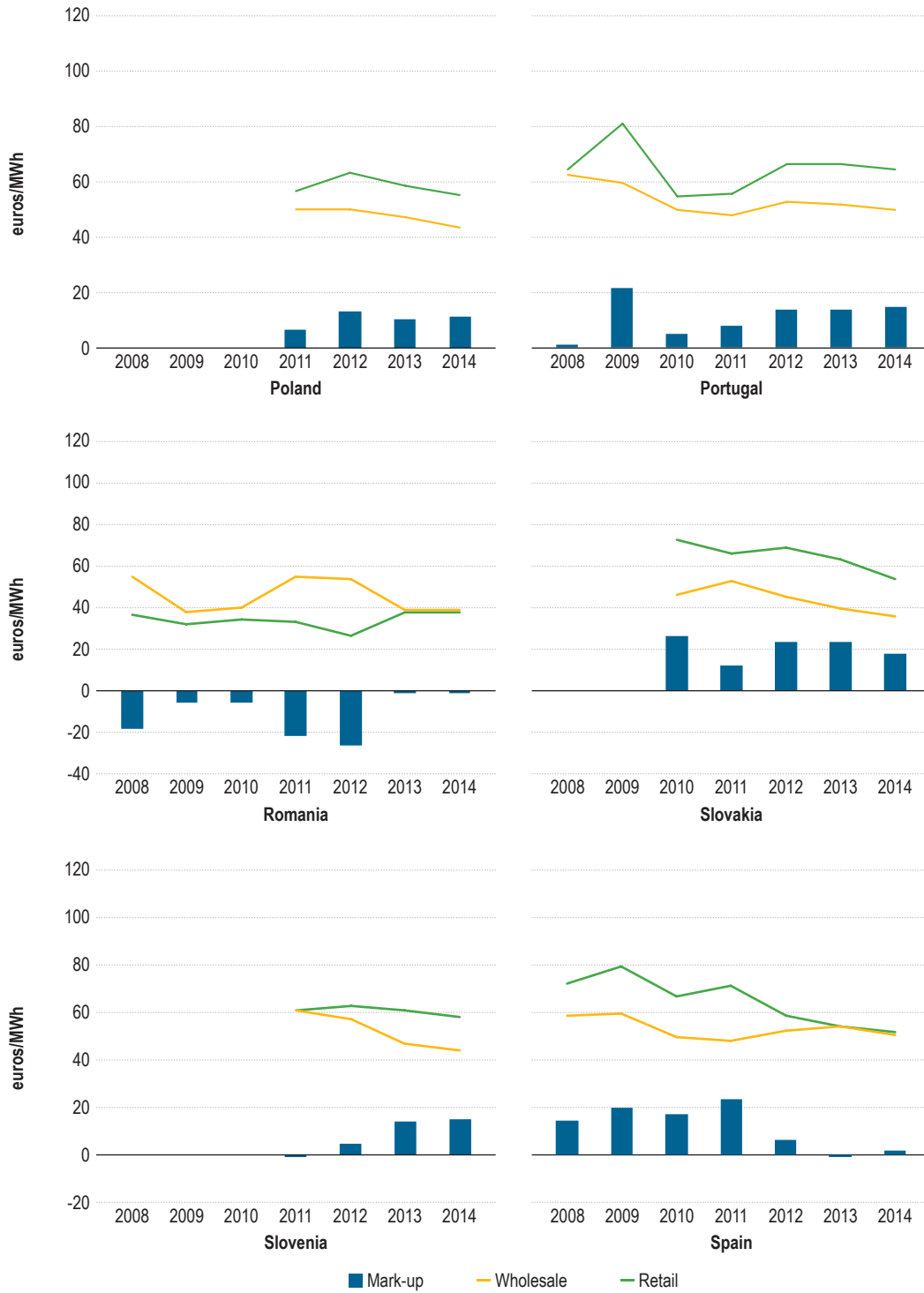
Note: For several countries and/or markets, data are not available (i.e. countries/markets with zero values). For Belgium, the electricity figure is based on data for Flanders only (representing around 58% of the overall electricity market) while the gas figure is based on data for Flanders and Wallonia (representing 86% of the overall gas market).

## Annex 5: The relationship between wholesale and retail prices

Figure A-14: The relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in retail electricity household markets 2008–2013 (euros/MWh)

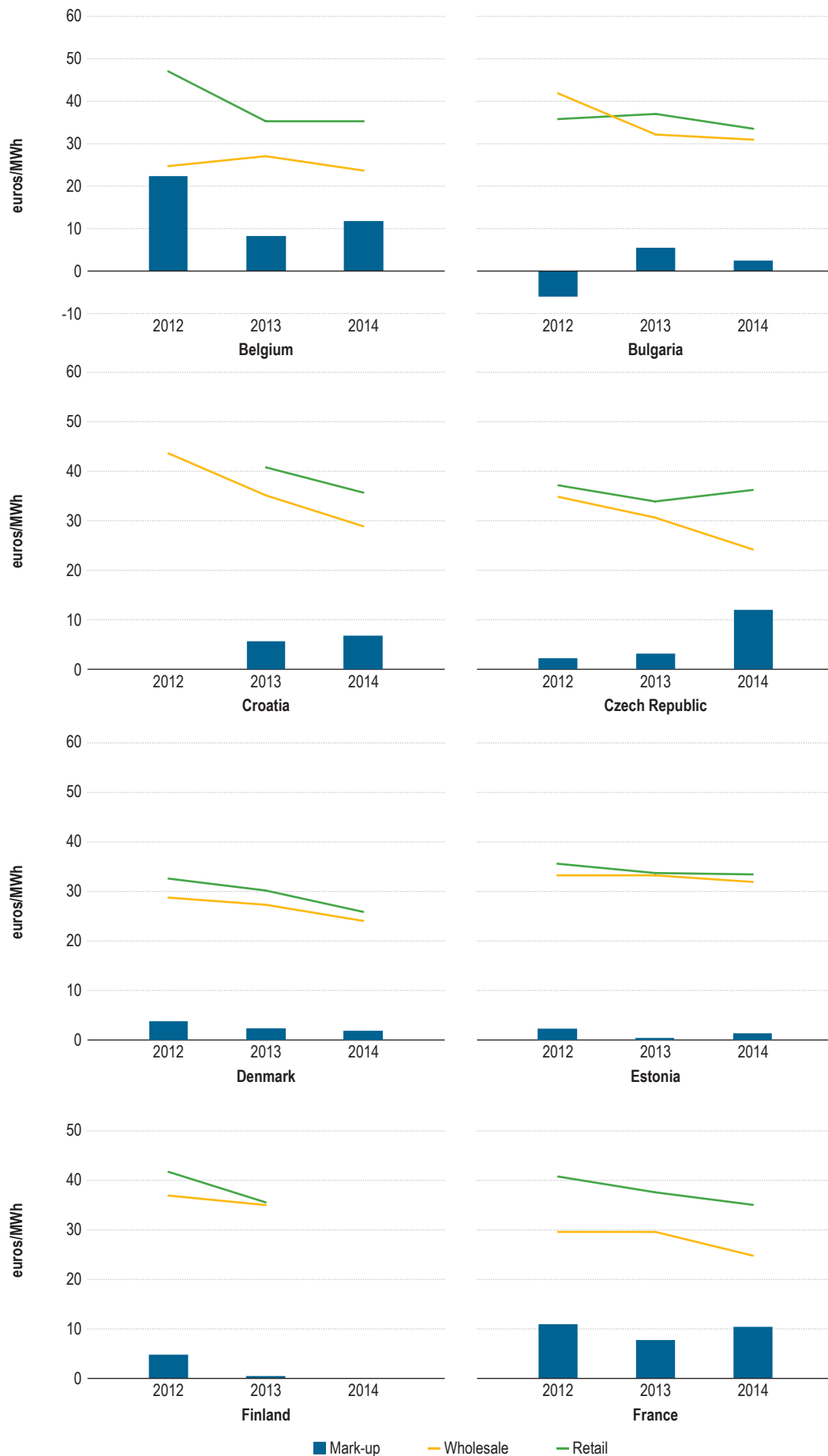


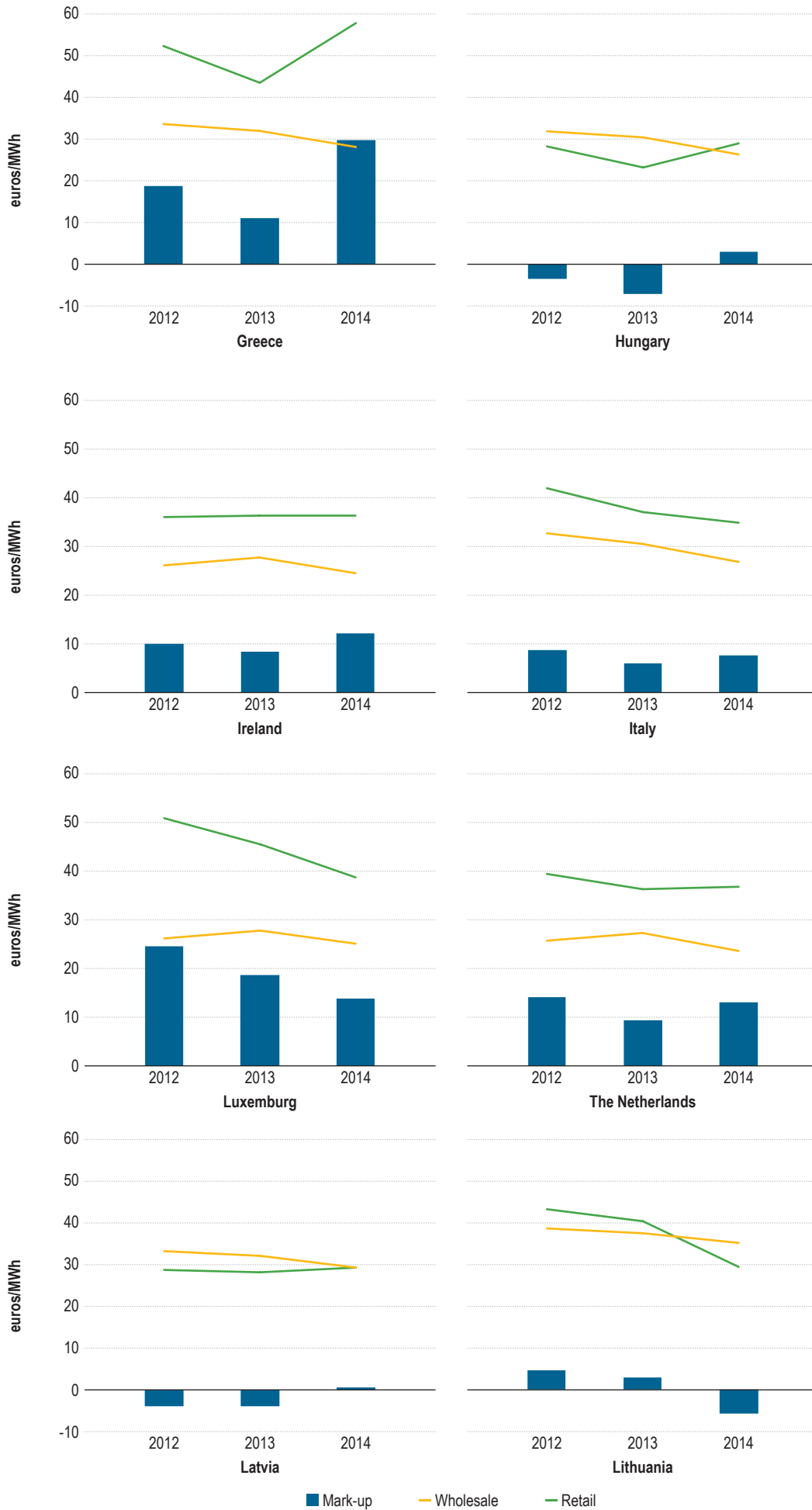




Source: NRAs and European power exchanges data (2015) and ACER calculations.

Figure A-15: The relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in retail gas household markets 2012–2014 (euros/MWh)





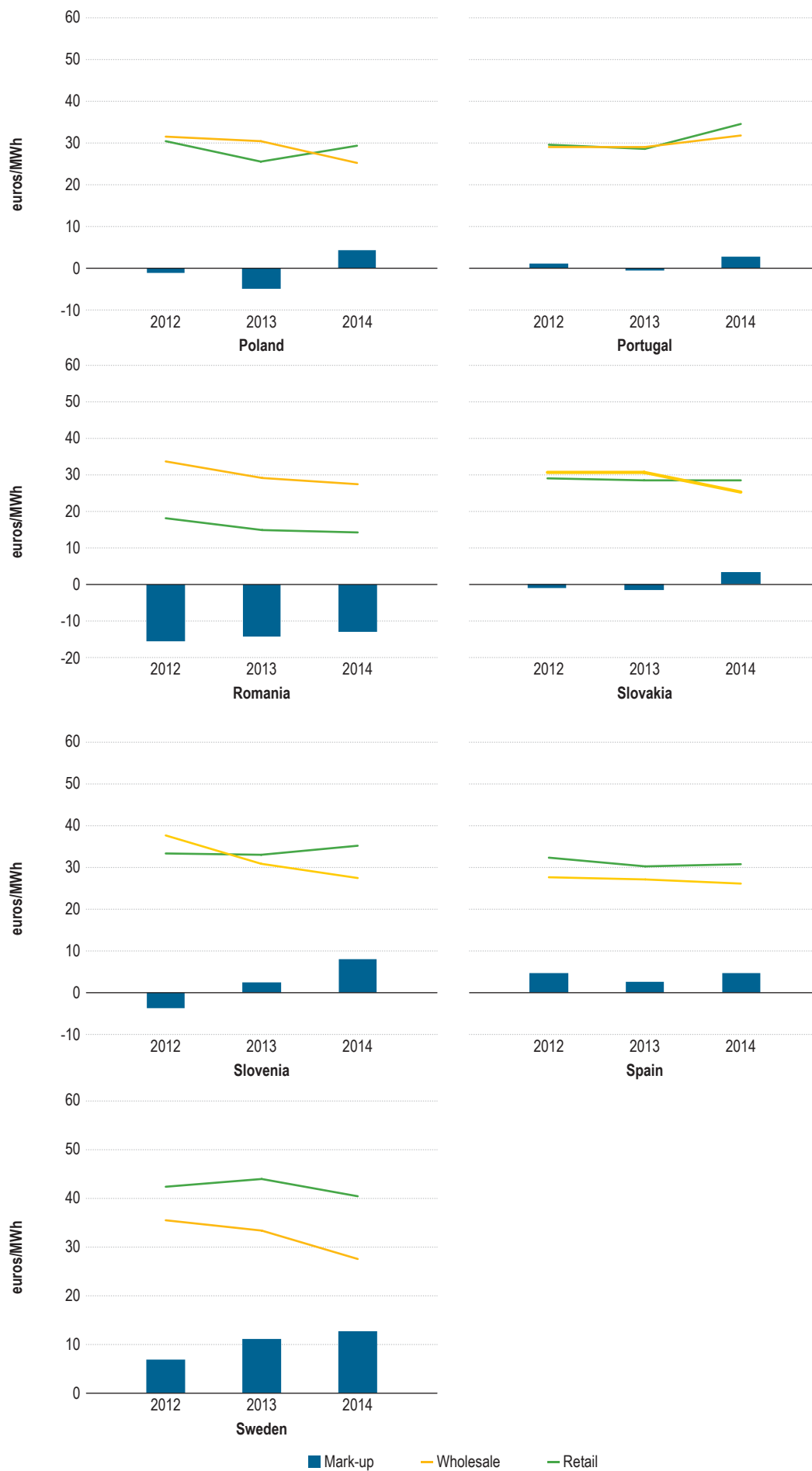
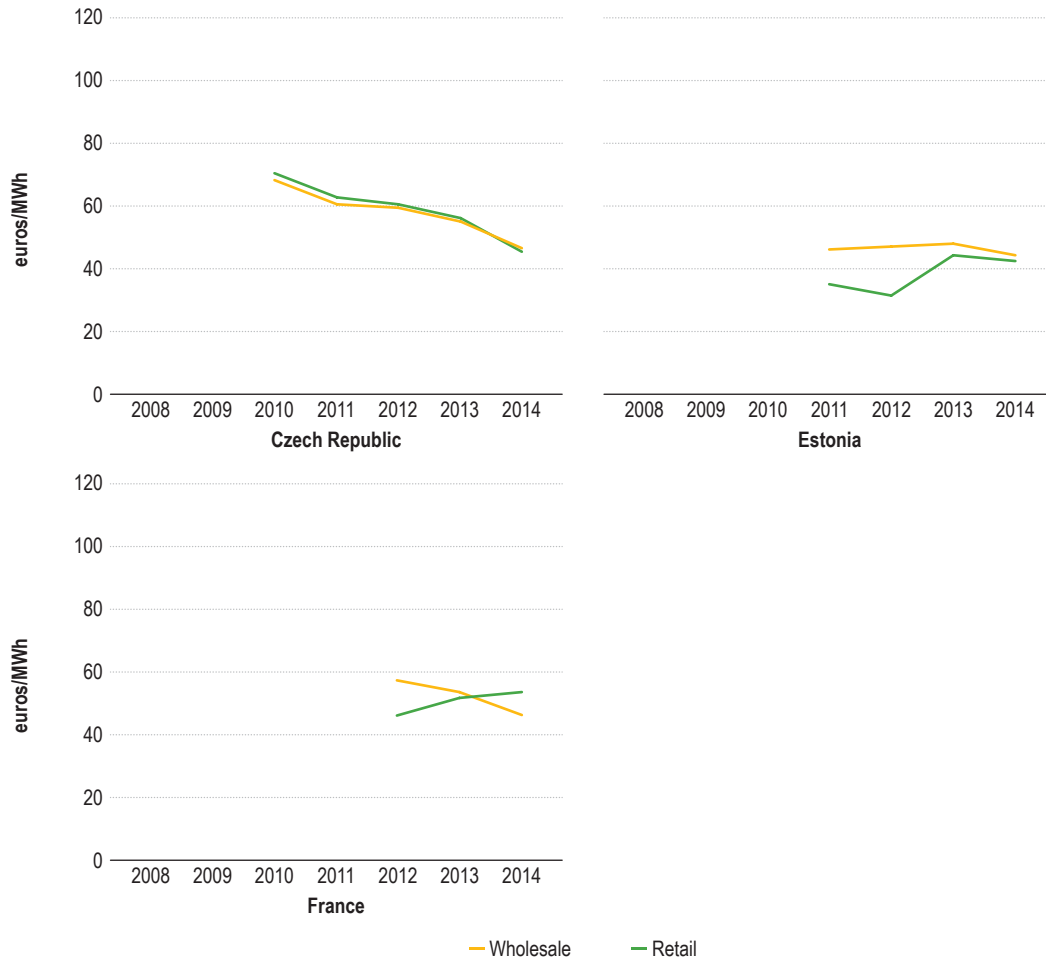


Figure A-16: Relationship between the wholesale price and the energy component of the retail electricity price in the industrial segment – 2008–2014 (euros/MWh)



Source: NRAs and European power exchanges data (2015) and ACER calculations.

## Annex 6: Methodology and data underlying mark-ups retail markets

This annex explains the scope, methodology (i.e. the retail energy component and the wholesale price) and data requirements employed in the calculation of mark-ups in gas and electricity retail markets, as discussed and agreed with NRAs.

The mark-up is defined as the difference between the cost of the retail energy component and the wholesale price.

The 2<sup>nd</sup> MMR presented average annual mark-ups in Europe's retail gas markets for households<sup>517</sup>. In the 3<sup>rd</sup> edition of the MMR, this was also extended to retail electricity markets for households<sup>518</sup>, while in the 4<sup>th</sup> edition, it is envisaged to repeat the exercise and to further expand it to cover the electricity industrial segment.

### Scope

The estimated mark-ups are not intended to mimic or assess retail (profit) margins from suppliers in different MSs. However, the evolution of mark-ups may serve as an indication of the level of retail competition and the 'responsiveness' of retail to wholesale prices over time, provided sufficient long time series are available.

The mark-ups assessment in MMR 2014 covers household consumers in both electricity and gas markets<sup>519</sup>, as well as electricity industrial consumers<sup>520</sup>.

### Retail energy component cost

The data available for this exercise differ between electricity and gas, which is why different approaches are taken to reflect the retail energy component.

#### Electricity

- Consumption level: The DC Eurostat consumption band (2,500-5,000 kWh/year) is applied for household consumers. For industrial consumers, a weighted average of IA-IF industrial bands (< 20-150,000 MWh/year) is applied, as this is assumed to be a more representative approach for the industrial segment;
- Eurostat's prices breakdown (i.e. the energy component) is used. These are available for a longer period and for all MSs. Eurostat data are cross-checked for inconsistencies with the ACER database on retail offers and other relevant data.

#### Gas

- Consumption level: the ACER database on retail offers consumption level (15,000 kWh/year) will be applied. This exercise is not performed for industrial users, due to lack of data;
- Energy component: ACER database on retail offers breakdown is applied, since Eurostat does not provide a detailed component breakdown in gas.

517 See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER%20Market%20Monitoring%20Report%202013.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER%20Market%20Monitoring%20Report%202013.pdf), page 146, figure 54.

518 See: [http://www.acer.europa.eu/Official\\_documents/Acts\\_of\\_the\\_Agency/Publication/ACER\\_Market\\_Monitoring\\_Report\\_2014.pdf](http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/ACER_Market_Monitoring_Report_2014.pdf), page 58, figure 20.

519 In MMR 2014, the mark-up for electricity is estimated for the 2008-2014 period, while for gas it covers 2012-2014.

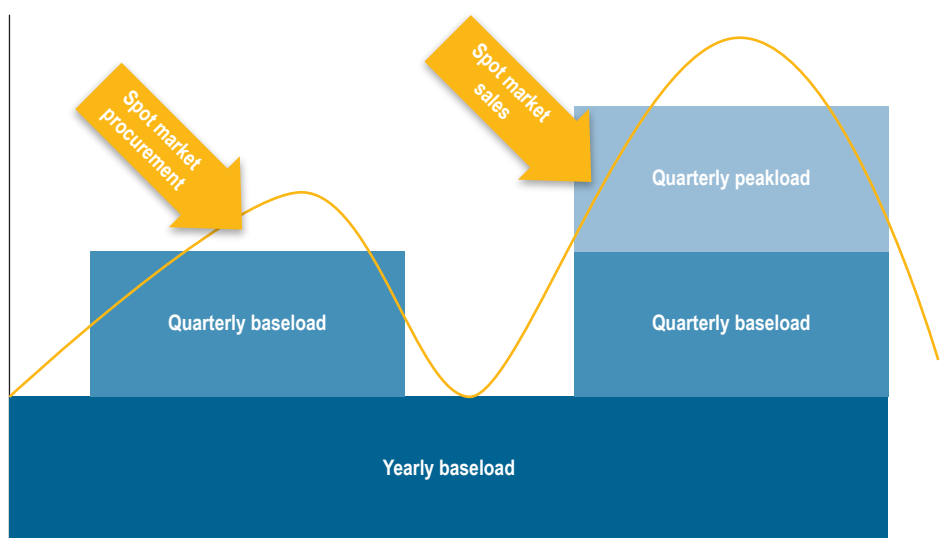
520 Due to the lack of data, the calculation of mark-ups is not performed for the gas industrial segment.



## Methodology to identify the wholesale price

The energy costs suppliers incur when buying electricity to supply customers at retail level depend on several factors. The wholesale energy costs vary between suppliers and over time with changing wholesale prices and procurement strategies (Figure 1). The latter include hedging strategies against volatile short-term prices (day-ahead). Hedging strategies are characterised by<sup>521</sup>, among other things i. the portfolio of products used to hedge; ii. the point in time when firms start to purchase energy ahead of time of delivery (e.g. 12, 18, 24, etc. months) and iii. the point in time when firms stop purchasing energy (e.g. 12 or 6 months ahead of time of delivery, immediately before delivery, etc.).

Figure A-17: A schematic representation of a procurement model



Source: E-Control<sup>522</sup>.

Products for hedging, if available to market participants in an MS, include yearly (base/peak), quarterly (base/peak), monthly (base/peak) and swaps. Hedging can also be achieved by means of long-term bilateral contracts. In electricity, the prices of bilateral contracts are usually not known. In gas, long-term bilateral contracts' prices may be indexed to different commodities, mainly oil, or also to hub prices. The individual conditions of each particular contract make it difficult to assess final gas prices. Nevertheless, even when firms use bilateral contracts, market-based prices can be used to estimate their value, since the energy of bilateral contracts can be valued at the price that firms are able to sell the energy on the wholesale market.

Provided that suppliers in an MS have access to markets with sufficient liquidity in forward markets, suppliers need to balance between the amount of forward and spot products that are to be procured to fulfil the contractual obligations downstream. For example, a 'short' strategy would mean most of the hours in the year the supplier needs to buy in the spot market to meet the demand to be served. A 'balanced' strategy (E-Control) would mean that additional electricity has to be bought on the spot market half of the time in a year, while during the other months the supplier needs to sell excess electricity on the spot market. A strategy whereby 100% of the energy is procured on the spot market seems unlikely, as it would entail a high risk for suppliers. An exception would be those markets where suppliers offer products which are directly linked to hourly DA prices, as is the case of electricity suppliers in some Nordic markets, such as in Norway.

521 According to the approaches taken by E-Control, Ofgem or CNMC.

522 Source: E-Control Market Report 2012, National Report to the European Commission, A better deal – wherever energy is exploring new paths, page 57: <http://www.e-control.at/documents/20903/-/-/a82a9499-94ce-483c-b9a2-9c4744f75740>.

## Approach to electricity household segment

As explained above, procurement strategies feature many hedging strategy steps and data. However, due to data and time constraints, this note proposes to simplify the methodology, reducing it to the following steps:

- a) Assessing if hedging is in principle possible by means of forward products. If:
  - insufficient hedging products are available, the analysis is based on the best available information (usually day-ahead prices);
  - sufficient liquid organised forward markets are available, the assessment of wholesale price is based on one selected hedging strategy, combined with limited procurement of day-ahead products to match demand;

Where sufficient liquid organised forward markets are present in an MS, the following simplified hedging strategy is envisaged:

- b) The proposed hedging strategy is based on the procurement of yearly base-load and day-ahead products. Yearly base-load products are available in almost all forward markets, so their use in the analysis facilitates a unified and more comparable approach across most MSs;
- c) The starting and finishing point of energy procurement for forward products is assumed to start 18 months<sup>523</sup> ahead of delivery and finish immediately before delivery takes place<sup>524</sup>. The incurred cost of yearly base-load products is assumed to be smeared across the buying period and assumes a constant rate of purchase; and
- d) The amount of electricity contracted forward to supply downstream is determined by demand on the day with the lowest observed consumption during a year in an MS, which is defined by hourly load profiles. In other words, forward procurement is designed to meet consumption on the day when demand is at the lowest observed level during the year. Once the amount of forward procurement is established, and in order to satisfy the remaining hourly demand exactly, it is assumed that the outstanding quantity is sourced (by buying or selling) day-ahead. Day-ahead procurement is determined by weighing with hourly consumption, specified by the hourly household load profiles<sup>525</sup>. Figure 2 presents a schematic representation of the share of yearly base-load product procurement versus day-ahead products, using hourly household load profiles for Luxembourg<sup>526</sup>, based on ACER's calculations.

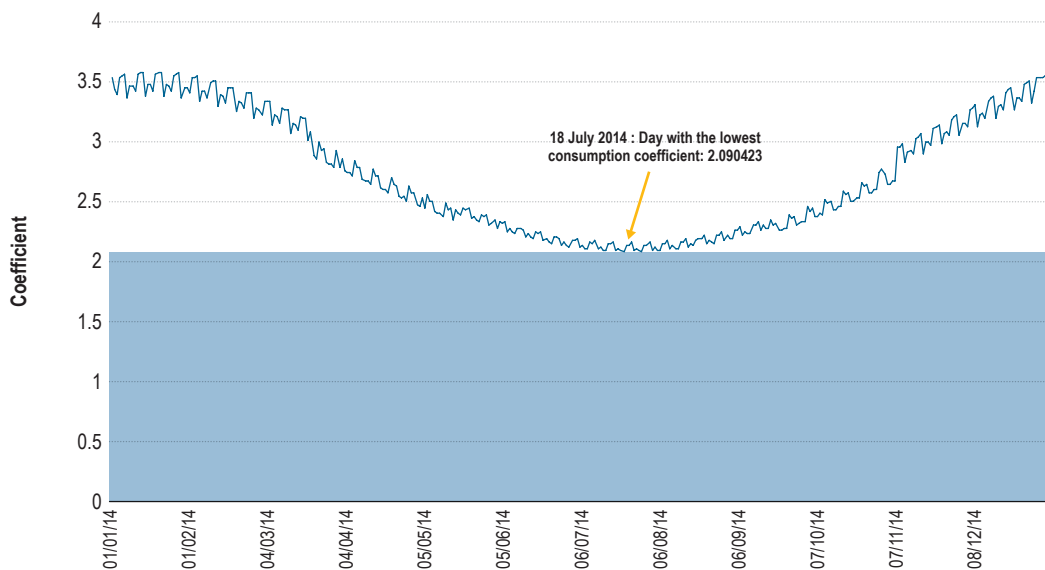
523 For some MSs these contracts may not be available, in which case the best alternative will be selected (i.e. procurement starts 12 months ahead of delivery and finishes just before delivery).

524 This has been proved a reasonable strategy to be used (e.g. based on Ofgem's work).

525 For the demand profile, national household consumption profiles are used where available. Where country specific load profiles are not available, the analysis is based on standard household load profiles.

526 As explained above, country specific household hourly profiles are normally used, where available.

Figure A-18: Schematic representation of the proposed calculation of the share of forward procurement, based on demand data for Luxembourg – January–December 2014 (hourly demand, MWh)



Source: ACER.

In view of the above methodological steps, it is envisaged to apply the following approaches to the different MS:

Approach	Country
Procurement based on hedging (X% yearly base load, 100 - X% DA)	Austria, Belgium, the Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Italy, Luxembourg, the Netherlands, Poland, Portugal, Spain.
Procurement 100% based on DA	All the other MSs with non-existent or illiquid forward markets provided that organised day-ahead markets are available. Also, MSs where prices correlate much better with DA prices: this includes Norway and Sweden.

### Approach to gas household segment

The price at which suppliers source themselves in European gas wholesale markets varies between suppliers and over time, depending on their specific contractual conditions and on the procurement products and strategies. Two main mechanisms aid referential price setting for gas: long-term supply contracts and organised markets (hubs).

- a) In long-term supply contracts the gas price is determined by a formula linked to a referential index evolution. Oil prices used to be the most commonly used indexes, but hub-prices are also used. Retroactive (6- to 9-month lag) averages of the indexed values are typically used in gas pricing formulas, and the resulting gas prices are usually applied constantly in monthly or quarterly periods. Long-term contracts are legally binding on both contractual parties; they vary from 5 to 35 years in duration and contain take-or-pay (ToP) clauses that require buyers to pay for a minimum annual quantity of gas, regardless of whether they take that quantity. Contracts usually also contain daily swing flexibilities on the nominated volumes.

In the majority of EU MSs most physical gas volumes are still deemed to be acquired via long-term bilateral contracts. Given the prevailing extension of their commercial obligations, this situation is expected to remain for several years yet.

- b) In organised markets (hubs) prices are established by means of the spot and forward trading of gas. Both physical and financial participants are active on hubs. Prices are driven by the traders', shippers' and producers' views on the current and anticipated market fundamentals and commercial dynamics.

Hub prices are determined by the interaction of a series of demand and offer elements. First, long-term contracts provide a price reference band for hub price evolution. Hub prices are marginally driven by other more flexible segments of supply: long-term contracts' swing volumes (i.e. contractual flexibility above ToP obligations); hub-linked LNG deliveries; storage withdrawals; and upstream producers' direct sales into hubs. Gas hub prices are also interconnected with the switching price to other electricity generation commodities, such as coal.

Net volumes delivered to hubs for physical supply are gradually increasing, although they comprise a comparatively lower portion than volumes traded in financial operations. Hub products vary in extension; from within day products up to three year-ahead ones. The types of products acquired in hubs respond to the parties' individual supply hedging strategies. The different products prices vary, and this has an effect on the final cost of the supplies.

It is essential when analysing the level of EU market integration to estimate a reference price for gas in each market area. MMR 2014 establishes three distinct approaches to assessing reference gas wholesale prices in diverse areas; consequently, it groups MSs into three clusters with similar price formation characteristics:

- If a MS has no hub, or where hubs have been recently created and so still have low liquidity, wholesale prices will be referenced solely to the import prices declared at the border obtained from the Eurostat Comext database. These import prices are commonly associated with long term contracts prices, but in principle they should indicate the actual average price of all types of imports<sup>527</sup>. For those MSs where Eurostat Comext data are not available, alternative proposals will be sought in consensus with the NRA. If MS domestic production is significant relative to total demand, domestic production prices will be also taken into account.
- In those MSs with high hub liquidity in forward products (i.e. products with longer extension) and where physical delivered volumes on the hub cover a high share of the country's total demand, the assessment of wholesale prices will be exclusively based on hub products. The consideration made for those MSs is that suppliers significantly rely on hub trading to hedge their supply portfolios and also that their lasting long-term contracts are more closely indexed to hub prices<sup>528</sup>.
- In those MSs with instituted hubs, however, with still low forward product liquidity on them<sup>529</sup> and where physically delivered volumes on the hubs cover a lower proportion of the final demand – correspondingly, a significant share of physical supply still relies on long-term contracts and the role of hubs for physical gas supply is still partial - both declared import prices and hub product prices will be used for the reference price assessment. The methodology proposes setting a range of two prices: one price will result from pure gas hub sourcing activity, and the other will result from imports declared on the border.

In the case of import prices, the following steps are envisaged:

- a) Declared monthly import prices will be obtained from the Eurostat Comext Database<sup>530</sup>.
- b) These prices will be weighted against volume and origin of supply to obtain a single monthly average price for all gas imports into the country.
- c) A single-year reference price will finally be estimated; this will be done by calculating a weighted average, taking into account the country's monthly demand and the monthly import prices estimated in b).

527 Though Eurostat Comext data are deemed to be more representative of long-term contracts' import prices, they should indicate the actual price of all types of supply-imports declared on the border. Therefore, if gas were imported into an MS from, for example, an adjacent market area through a shorter-term supply contract at a hub price reference, this supply product should be also declared, incorporated into the average calculations and reflected in the Eurostat Comext border import-price assessments.

528 See IGU 2015 report in footnote 382.

529 Sufficient forward liquidity has been measured on the basis of the metric values estimated in the GTM 2014 revision See:[http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-/Documents/A14-AGTM-13-03c\\_GTM\\_Annex%20-%20Wholesale%20market%20metrics%20results\\_final.pdf](http://www.acer.europa.eu/Events/Presentation-of-ACER-Gas-Target-Model-/Documents/A14-AGTM-13-03c_GTM_Annex%20-%20Wholesale%20market%20metrics%20results_final.pdf)). In some hubs, forward products are also offered, but they are not considered as sufficiently representative of an in-hub hedging strategy due to their limited tradability.

530 The Eurostat Comext database displays the distinct prices declared on the border per origin of supply, with a monthly granularity.

In the case of hub prices, the following simplified 'hedging' steps are envisaged:

- a) **Products:** The proposed hedging strategy relies on only four products: year-ahead<sup>531</sup>, season-ahead, month-ahead and day-ahead. The consideration is that these four products are sufficiently representative of the whole diversity of products traded on hubs<sup>532</sup>.
- b) **Timing of hub product acquisition:** Procurement of the calendar year-ahead product will be assumed to start 12 months before of the beginning of the year of delivery (2014) and will finish the month before the year of delivery. Season-ahead products are considered as being contracted during the season before delivery takes place (see c)). For month-ahead products, the purchase is considered to take place one month before of delivery. For day-ahead products, the purchase is made on the day before delivery.
- c) **Timing of hub product delivery:** The year-ahead product is considered as being delivered during the whole year 2014<sup>533</sup>. Three distinct season-ahead products are considered as being delivered during the year: March 2013 to October 2013 season-ahead acquired product is considered as being delivered during 2014 from January to March. October 2013 to March 2014 season-ahead acquired product is considered as being delivered during 2014 between March and October. March 2014 to October 2014 season-ahead acquired product is considered as being delivered during 2014 from October to December. Month-ahead products are considered as being delivered in the following month to the product acquisition. Day-ahead products are considered as delivered during each day of the month when their acquisition takes place.
- d) **Price of products:** The reference price for each of the products is calculated as follows:
  - The price of the year-ahead product results from the simple average of all the daily year-ahead products during the preceding year. The single figure will be applied equally to all months in 2014.
  - The prices of the three distinct season-ahead products used will result from the simple average of the daily season-ahead product prices of the preceding six months. They will be applied equally in all months of the season of delivery.
  - The price of the twelve distinct month-ahead products will result from the simple average of the daily month-ahead products prices of the preceding month and will be applied to each month of delivery.
  - The price of the day-ahead products results from the simple average of all the daily day-ahead prices during a given month, which is applied to the same month.
- e) **Amount of gas purchased with each product:** The proposed methodology approach is intended, in a simplified manner, to coarsely match the actual record of contracted products - all market participants - in EU hubs identified in the GTM2014 revision works<sup>534</sup>.
  - The amount of gas purchased via year-ahead products is considered to cover 10% of total yearly demand. The absolute amount contracted each month is flat.
  - The amount of gas purchased with season-ahead products is considered to cover 20% of total yearly demand. The absolute amount contracted each month is flat.
  - The amount of gas purchased with day-ahead products is considered to cover 15% of total yearly demand. The absolute amount contracted each month is flat.
  - Month-ahead products are considered to cover the remaining 55% of total yearly demand. The amount contracted each month may vary to complete the monthly demand not covered with the three previous products.

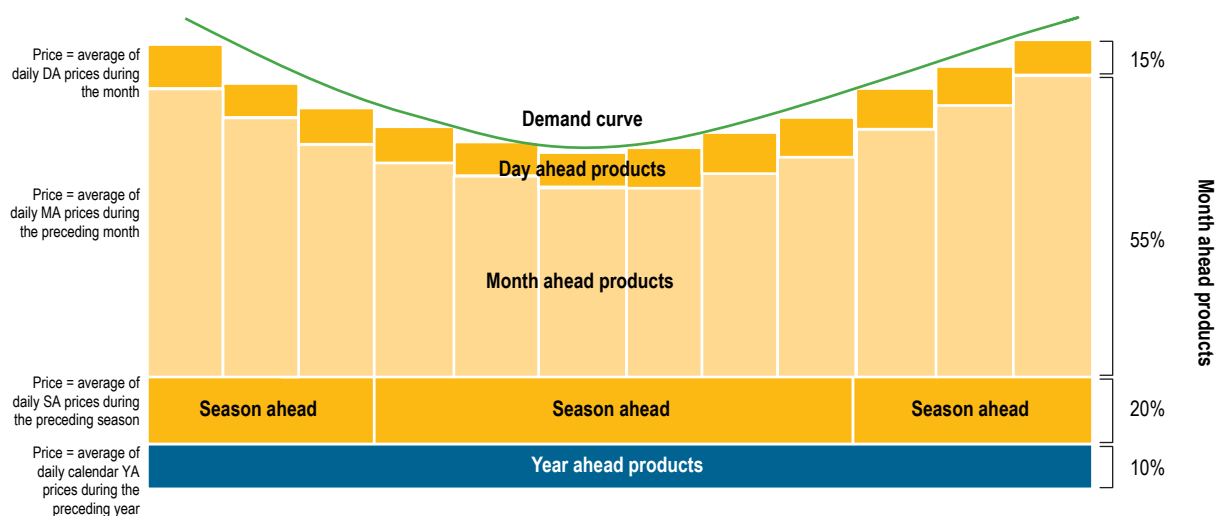
531 Calendar year products considered.

532 Year-ahead products would act as a reference of all traded products with a duration beyond a year (i.e. one year-ahead, but also two- or three-year-ahead products both valid for calendar and gas year products), season-ahead products will serve as the reference for products beyond one season's duration, and inferior to one-year, month-ahead products will represent all monthly and quarterly products negotiated with a duration inferior to six months, and day-ahead will serve as a proxy for all negotiated spot products with inferior duration to one month (i.e. within-day, daily, weekly, weekend...). In the latter case of spot products, these are usually contracted more to cover unbalanced positions than for supply hedging.

533 All hub products are delivered on a daily basis: for example, the contracting of a year-ahead product implies the delivery of a constant quantity of gas every day of a whole year at the fixed price.

534 See a split of hub products and volumes on page 6 of WEC GTM2014 revision study: <http://www.acer.europa.eu/Media/Events/3rd-Gas-Target-Model-Stakeholders-Workshop/Documents/04.%20Wagner%20WEC%20-%20Functioning%20of%20Gas%20Markets%20-%20Albrecht%20WAGNER%20140515.pdf>

Figure A-19: Schematic representation of a procurement model



- f) **Final yearly referential price calculation:** Twelve distinct monthly referential prices will be calculated by using the product prices and the procured volumes discussed above. A final unique yearly price reference will be calculated by means of a weighted average of these twelve monthly prices against monthly demand.

In view of the above methodological steps, it is envisaged to apply the following approaches to these different MS:

Approach	Country
Procurement based on import prices	All others
Two procurement strategies: import prices and hub hedging	France, Austria, Italy, Germany (NCG + GASPOOL)
Procurement based on hub hedging	UK, the Netherlands, Belgium

*Note: The Romanian, Hungarian and Croatian prices displayed are the Eurostat Comext declared ones on border imports; their indigenous production prices could be inferior: for example, in Romania, it is estimated to be 30% lower. The Eurostat Comext database provides no data on gas import prices for Austria, Denmark, Finland, France, Germany, Luxembourg, the Netherlands and Poland. Following indications by the respective NRAs, the German import price corresponds to the BAFA imports index; the Danish one is also similar to BAFA; Luxembourg matches the Belgian price, plus transmission charges; the Finish one is based on public gas tariffs information. French border import prices were gauged on the basis of the values reported to Eurostat Comext in 2013, by considering a similar variation on them to the average one experienced in Italian and German 2013/2014 import prices; the Polish price corresponds to the average price results of gas auctions that took place in the POLPX exchange during the year. The Austrian price corresponds to IGU 2015 price survey estimates.*

### Approach to the electricity industrial segment

The methodology followed for the calculation of the mark-up for the industrial segment in electricity<sup>535</sup> is similar to the one used in the analysis of the electricity household segment, although it has significant differences.

### Retail Energy Component Cost

In order to have a representative price for the energy component cost of the retail industrial prices in each MS, a national weighted average of IA-IF<sup>536</sup> Eurostat industrial consumption bands is used for the analysis, as is also stated above. Therefore, according to this approach, the retail price of the industrial mark-ups in the electricity market is calculated by weighting Eurostat’s retail price (energy and supply component) for each of the industrial bands with the corresponding consumption per band, as this is also reported to Eurostat.

535 As stated above, due to the lack of data available, the analysis is not performed for gas, but only for electricity for the period 2008-2014.

536 The IG band (> 150 000 MWh) was excluded from the weighted average calculations, as there were insufficient data available across MSs.

As in the case of the household segment, sub-components such as ‘capacity charges’, ‘network losses’, ‘green energy costs’, etc, are recorded differently across MS, and as a result, they might be incorporated within the energy and supply component of the retail price. These are therefore removed accordingly, following consultation with the relevant NRAs.

## Wholesale price

Industrial electricity users comprise base-load and peak-load consumers, both of which form part of the analysis. Base-load consumers are assumed to have flat consumption throughout all hours in the year (i.e. total of 8760 hours), while for peak-load consumers, flat consumption during peak hours (i.e. hours 8:00-20:00 during week-days) is assumed, with no consumption at all during off-peak hours.

For the purposes of the MMR 2014 wholesale price calculations, a combination of 80% forward products – yearly base-load product for base-load consumers and yearly peak-load product for peak-load consumers – and 20% of day-ahead products for each of the two consumers’ categories, are applied in the analysis. In almost all cases analysed for the industrial segment, yearly base-load products are available across MSs, as in the case of the electricity household mark-up calculations. Thus, if data availability allows for the use of forward products, procurement begins 18 months ahead of delivery and finishes immediately before delivery starts, and the incurred cost is assumed to be spread across the 18 months<sup>537</sup> buying period, at a constant rate of purchase. Nevertheless, in cases where insufficient data are available for either yearly base-load or yearly peak-load products, the analysis is based only on day-ahead prices for the respective consumers, as these are the next best data available.

To facilitate the calculation of final wholesale market prices for industrial consumers, three different scenarios are used, each comprising a different proportion of base-load and peak-load consumers. The proportions chosen for testing for the three scenarios encompass a combination of either (1/3, 2/3), (0.5, 0.5) or (2/3, 1/3) base-load/peak-load consumers<sup>538</sup>, resulting in slightly different wholesale procurement costs in each case. For each MS, the scenario which returns the highest correlation between the wholesale procurement cost and the energy component of the retail price is selected.

Day-ahead hourly products which form the other 20% share of the wholesale price are based on day-ahead prices. For base-load consumers, this is simply the arithmetic average of day-ahead prices (of all 24 hours), while for peak-load consumers, day-ahead hourly products are represented by the arithmetic average of day-ahead prices during peak-load hours (i.e. hours 8 to 20 in weekdays).

In view of the above methodological steps, it is envisaged to apply the following approaches to the different MS:

Approach	Country
Procurement based on hedging (80% forward products, 20% DA products) for both base-load and peak-load consumers.	Austria, Belgium, Czech Republic, France, Germany, Great Britain, the Netherlands, Portugal.
Procurement based on hedging (80% forward products, 20% DA products) for base-load consumers, and 100% based on DA products for peak-load consumers.	All the other MSs with non-existent or illiquid forward markets for peak-load consumers, provided that organised day-ahead markets are available.

537 For some MSs these contracts may not be available, in which case the best alternative will be selected (i.e. procurement starts 12 months ahead of delivery and finishes just before delivery).

538 This methodology could be improved in future MMRs by using specific load profiles of the representative industrial consumers for each MS, provided the required data are available.

## Annex 7: Methodology for assessing the level of competition in retail energy markets

The proposed methodology for the development and dissemination of a composite index comprises three main steps<sup>539</sup>:

- selecting the indicators;
- combining the indicators; and
- presenting the results

The individual indicators included in the composite index, as shown in Table A 4, are a reflection of this and previous MMRs, and the structure, conduct and performance framework used to assess the relative level of competition.

The choice of indicators balances the potential indicators against the various aspects of competition that are relevant<sup>540</sup>. These potential indicators have been assessed by means of a correlation matrix in order to see if they might measure the same. For some indicators, and especially for the 'number of suppliers active in the market', the choice to use the 'number of suppliers with a market share >5%' was driven by data reliability. For example, some observations received by the Agency of the 'number of nationwide active suppliers' reported the number of licences issued to supply gas or electricity in a MS. Applying this indicator in the ARCI would render an over-estimate for some MSs. For future editions of the ARCI, the Agency will attempt, data permitting, to transform this indicator into a 'number of nationwide active suppliers' - divided by the number households – so as to fully reflect its value. All in all, the Agency is committed, and will strive, to further improve the data collection process, comparability and integrity. The latter remains the responsibility of providers of data.

Moreover, there are suggestions future editions to potentially include a few additional indicators, such as the correlation between the energy prices component and wholesale prices. In addition, compiling the ARCI over time has been considered to make it rolling over time i.e. less static. This will be further explored in the future. Furthermore, following the sensitivity assessment, which has shown that the use of weighted and equally weighted indicators did not show a significant change in the scoring of the MSs, the final methodology is based on equal weights given to each indicator. In most cases, the scope of the individual indicators is based on nationwide information, except for one indicator which covers capital city level figures (see Table A-3).

539 For the purposes of this project, the focus is on the household segment, as data are more readily available. However, the same framework and indicators are applicable also to industrial segment and the whole retail market.

540 In practice, some indicators capture more closely than others the aspects of competition of interest. Moreover, whilst data series for indicators were selected, in part, based on their availability, data within these series were sometimes incomplete. The method involves identifying these gaps and filling them either with current proxy data or historical data, where available.



Table A-3: Competition indicators included and the assessment framework for the composite index

Indicator	Scope	Low score = 0	High score =10	Weight	MMR reference Section/Figure
Concentration ratio, CR3	National	Market share of three largest suppliers 100%	Market share of three largest suppliers 30% or less	10	2.3.120
Number of suppliers with market share > 5%	National	Low number of suppliers	High number of suppliers	10	2.3.1/19
Ability to compare prices easily	National	Difficult to compare prices	Easy to compare prices	10	2.3.3/39
Average net entry (2012-2014)	National	Net entry zero	Net entry of five or more nationwide suppliers	10	2.3.1/22
Switching rates (supplier + tariff switching) over 2010-2014	National	Annual switching rate zero	Annual switching rate 20% or more	10	2.3.2/26, 28
Non-switchers	National	None have switched	All have <1/3 not switched	10	2.3.2/27
Number of offers per supplier	Capital city	One offer per supplier	Five or more offers per supplier	10	2.2.3/A-5(Annex 3) 2.3.1/19
Does the market meet expectations	National	Market does not meet expectations	Market fully meets expectations	10	2.3.3/39
Average mark-up (2012–2014) adjusted for proportion of consumers on non-regulated prices	National	High mark-up	Low mark-up	10	2.3.3/34,36 and A-14, A-15 (Annex 5)

Source: IPA Advisory and ACER.

ARCI does not have a regulated prices component indicator, but incorporates regulated prices in the average mark-up. The difference between the wholesale price and the energy component of the retail price are used as a proxy for the mark-up. Hence, a low mark-up, other things being equal, indicates more competition. However, low mark-up could also be the result of the application of price regulation. To correct this, the ARCI multiplies the inverse mark-up by the percentage of household consumers served under regulated tariffs.

To combine individual indicators into a composite index, choices had to be made as to how data (which are in different units of measurement) should be normalised and weighted before being aggregated. To some extent, these choices are subjective. The data for each indicator are normalised into a range of zero to 10, depending on the values they take. This largely removes the effect of outliers, allows for some measure of comparative performance between countries, and allows scores to more closely reflect the expected implications for competition. Where data are missing (to avoid biasing the composite index downwards), weights for other indicators for that country are increased.

The gaps in the data underlying the individual indicators are filled with previous years' values or proxies (e.g. data that relates to the whole retail market). Where data on an indicator for a particular country were still missing, the weights of the other indicators in the same category are increased (i.e. structure, conduct or performance) for that country so that they sum to the proposed category weights (i.e. 33.3% for structure, 44.4% conduct, and 22.2% for performance). For this year's edition, the number of data gaps is very small (less than 5%), hence the impact this may have on confidence in the final CI results is limited.

The extent of data imputation and missing data is converted into confidence ranking per country which is based solely on data completeness, as shown in Table A-4 below.

Table A-4: Imputed and missing data by country, 2014 data (9 indicators)

	Electricity				Gas			
	Imputed	Missing	Confidence score		Imputed	Missing	Confidence score	
Austria	2	1	4	M	2	1	4	M
Belgium	3	0	3	M	3	0	3	M
Bulgaria	2	1	4	M	2	0	2	H
Croatia	2	1	4	M	2	0	2	H
Cyprus	2	1	4	M	n.a.	n.a.	n.a.	n.a.
Czech Republic	2	0	2	H	3	0	3	M
Denmark	3	2	7	L	4	0	4	M
Estonia	2	1	4	M	3	1	5	L
Finland	3	1	5	L	n.a.	n.a.	n.a.	n.a.
France	2	0	2	H	2	0	2	H
Germany	2	0	2	H	2	0	2	H
Great Britain	2	0	2	H	2	0	2	H
Greece	2	0	2	H	2	0	2	H
Hungary	2	0	2	H	2	0	2	H
Ireland	2	1	4	M	2	0	2	H
Italy	2	1	4	M	2	1	4	M
Latvia	2	0	2	H	2	0	2	H
Lithuania	2	0	2	H	2	0	2	H
Luxembourg	2	1	4	M	2	1	4	M
Malta	2	1	4	M	n.a.	n.a.	n.a.	n.a.
Netherlands	2	1	4	M	2	1	4	M
Norway	2	0	2	H	n.a.	n.a.	n.a.	n.a.
Poland	2	0	2	H	2	0	2	H
Portugal	2	0	2	H	2	0	2	H
Romania	2	0	2	H	2	0	2	H
Slovakia	2	0	2	H	2	0	2	H
Slovenia	2	0	2	H	2	1	4	M
Spain	2	0	2	H	2	0	2	H
Sweden	2	2	6	L	n.a.	n.a.	n.a.	n.a.

Source: IPA Advisory and ACER.

Notes: Confidence score: H - High; M - Medium; L - Low; n.a. - not applicable.

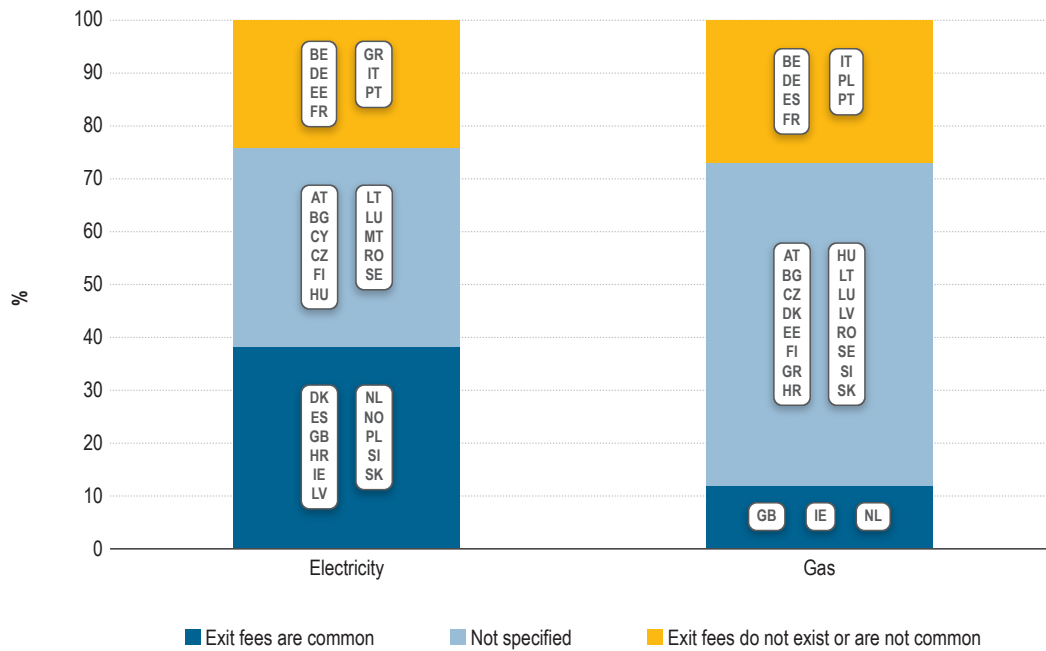
The ranking attributes one point for each indicator which is imputed and two points for each indicator that is missing. Ranking of high, medium, or low are then attributed based on the following points:

- High (H): 2 points or less (equivalent to one missing or two imputed indicators);
- Medium (M): 2-4 points; and
- Low (L): 5 points or more.

The great majority of the imputed data relates to the two indicators which are based on DG Justice and Consumer's survey (i.e. 'Ease of comparing prices' and 'Whether the market meets expectations'). This data is available only every second year and for the purpose of this Report 2013 survey data is used (the data is available for all countries and there are no data gaps for these two indicators).

## Annex 8: Consumer switching behaviour

Figure A-20: Existence of exit fees imposed by suppliers when switching offers – 2014 (%)



Source: ACER Questionnaire (February–April 2015) and ACER Database (November–December 2014).

Notes: Based on the offer data shown or as indicated by the respondents in the Questionnaire. Although MSs are listed in the Figure, the information drawn from the offer data may refer only to the capital city.

Figure A-21: Results of collective switching campaigns from 2011–2015 led by BEUC members

Country	BEUC Member	Sectors covered	Year of the campaign	Number of consumers who signed up for the campaign	Number of consumers who switched in the campaign	Total estimated direct savings in million euros
Netherlands	Consumentenbond	Electricity and gas	2011	135,227	58,294	14,147,915
			2012	308,508	110,186	34,731,266
			2013 (1st campaign)	81,399	21,637	6,539,198
			2013 (2nd campaign)	61,729	20,080	7,306,819
			2013 (3rd campaign)	139,273	18,830	2,250,789
			2014 (1st campaign)	65,178	9,679	1,542,300
			2014 (2nd campaign)	55,327	7,657	1,354,444
			2014 (3rd campaign)	78,737	12,255	3,321,105
Belgium	Test-Achats/Test-Aankoop	Electricity and gas (Gas only contracts were not possible)	2012	151,586	46,753	16,947,575
			2013	138,299	32,995	6,780,371
			2014 (1st campaign)	70,008	14,766	3,111,749
			2014 (2nd campaign)	94,787	19,117	3,766,238
United Kingdom	Which?	Electricity and gas	2012	287,365	38,000	11,813,000
Portugal	DECO	Electricity	2013	587,080	40,433	700,000
		Electricity and gas	2014	176,030	28,160	1,800,000
Italy	Altroconsumo	Electricity and gas	2013	197,000	40,000	9,055,015
		Electricity and gas (no dual fuel)	2014	84,000	13,000	1,755,000
Spain	OCU	Electricity	2013	486,254	27,300	1,400,000
		Electricity and gas	2014	120,000	15,000	400,000
France	UFC	Gas	2013-2014		71,000	13,700,000
			2015 (gas only)		60,000	5,000,000
Austria	VKI	Electricity and gas	2013-2014	260,584	70,000	12,600,000
		Electricity and gas	2015	48,410	12,500	2,800,000
Slovenia	ZPS		2014-2015		12,300	1,000,000
<b>Total</b>	<b>10 Members</b>		<b>2011-2015</b>		<b>829,410</b>	<b>173,605,830</b>
<b>Average</b>					<b>30,719</b>	<b>6,944,233</b>

Source: BEUC, June 2015.

Note: During the first Spanish campaign, no suppliers were offering gas or a dual-fuel offers. No information is available on the organisation of the 2011 and 2012 collective switching campaigns in the Netherlands. In Austria, 68,000 electricity and 30,000 gas consumers switched during the first campaign (2013-2014), comprising 70,000 households in total. In the 2015 campaign, 11,700 electricity consumers and 5,300 gas consumers switched (in total, 12,500 households).

## Annex 9: Minimum technical and other requirements of smart meters

Table A-5: Minimum technical and other requirements of smart meters

	Electricity		Gas	
	Legal point of view	Practical point of view	Legal point of view	Practical point of view
Information on actual consumption	AT, BE, ES, FI, FR, GB, IT, NL, NO, PT, RO	AT, BE, DK, ES, FI, FR, GB, IE, IT, MT, NL, SE, SI,	AT, BE, DK, FR, GB, IT, NL, PT	AT, BE, DK, FR, GB, IE, IT, NL
Information on cost	ES, GB, HU, NO	DK, ES, GB, NL	DK, GB	DK, GB, NL
Access to information of consumption on customers' demand	AT, BE, ES, FI, GB, HU, IT, NL, NO, PT, RO	AT, BE, DK, ES, FI, GB, IE, IT, MT, NL, SE, SI	AT, BE, GB, NL, PT	AT, BE, GB, IE, NL
Remote power capacity reduction/increase	AT, BE, ES, FI, FR, GB, HU, IT, NL, NO, PT, RO	AT, BE, ES, FI, FR, IT, MT, NL, SI	BE, FR, GB, NL, PT	BE, DK, FR, NL
Remote activation/de-activation of supply	AT, BE, ES, FR, GB, IT, NL, NO, PT, RO	AT, BE, ES, FI, FR, GB, IE, IT, MT, NL, SE, SI	BE, FR, GB, IT, NL, PT	BE, FR, GB, IE, IT, NL
Timely adaptation to customers' demand	BE, ES, FR, NL, PT	DK, ES, FR, NL, SE	BE, FR, NL, PT	DK, FR, NL
Easier supplier switching process	AT, BE, FR, IT, NO	AT, DK, FI, FR, IE, IT, NL, SE, SI	AT, BE, FR, IT	AT, FR, IE, IT, NL
Customer control of metering data	AT, BE, FR, GB, HU, IT, NL, NO, PT	AT, BE, DK, FR, GB, IE, IT, MT, NL, SE, SI	AT, BE, FR, GB, IT, NL, PT	AT, BE, DK, FR, GB, IE, IT, NL
Bills based on actual consumption	AT, BE, ES, FI, FR, GB, IT, NL, NO, PT	AT, BE, ES, FI, FR, GB, IE, IT, MT, NL, SE, SI	AT, BE, FR, GB, IT, NL, PT	AT, BE, DK, FR, GB, IE, IT, NL
Alert in case of non-notified interruption	AT, GB, NO	AT, MT, NL	GB	NL
Alert in case of exceptional energy consumption	IT, NO, PT	GB, IT, MT, NL	PT	GB, NL
Interface with the home	AT, BE, FI, FR, GB, IT, NL, NO, PT	AT, FI, FR, GB, IE, IT, NL, SI	BE, FR, GB, IT, NL, PT	FR, GB, IE, NL
Other	BE, ES, FI, NL, SI	FI, NL	BE, FI, NL	FI, NL

Source: CEER Database, National Indicators (2015).

## Annex 10: Methodology for calculating welfare losses due to unscheduled flows

### 1. Introduction to definition of unscheduled flows

Unscheduled flow (UF) is defined as the difference between the physical flow and commercial exchange (schedule) on the bidding zone borders resulting from the capacity allocation. It has two components:

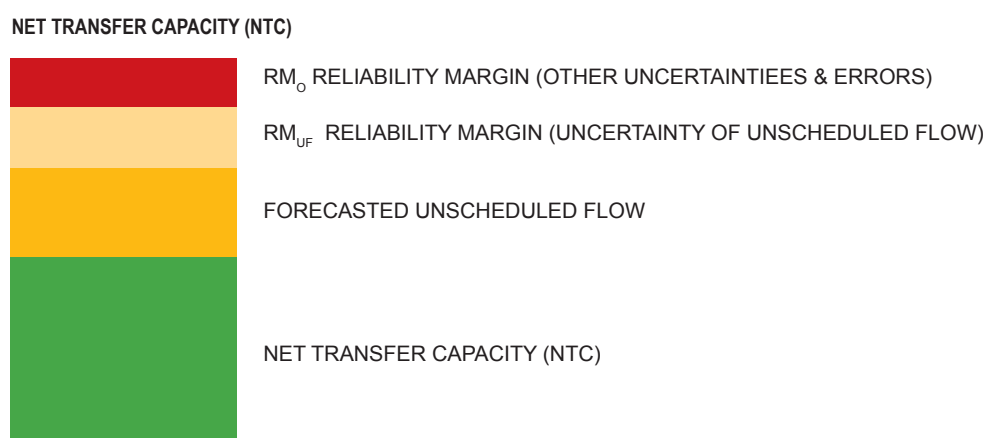
1. Loop flow (LF) – flows resulting from exchanges inside all bidding zones (flows not resulting from any capacity allocation)
2. Unscheduled allocated flow (UAF) – flows resulting from capacity allocation on other bidding zone borders (not reflected in the commercial schedule on the observed bidding zone border).

UFs on a specific bidding zone border affect the cross-zonal capacity on that border. This is because TSOs have no means to control the volume of UFs on a specific border. To ensure that physical flows on the border comply with operational security standards, TSOs can only adjust the cross-zonal capacity. This provides some certainty that, at least, the physical flows resulting from the commercial exchange on that border will not exceed a certain limit.

### 2. The impact of unscheduled flows on cross-zonal capacity

When assessing the effect of UFs on the amount of cross-zonal capacity, it is assumed that there is a maximum value for cross-zonal capacity on each border that represents the thermal limits of given network elements and the N-1 security criterion (i.e. Total Transfer Capacity). The actual capacity available for cross-zonal trading (i.e. NTC), however, deviates from the TTC capacity for two reasons. First, in the capacity calculation process, the TSOs try to forecast the amount of UFs (i.e. flows resulting from all internal exchanges and flows from capacity allocation from other borders). Both calculations together result in the forecasted UF, and the maximum capacity is then reduced accordingly. Second, as the capacity calculation is essentially a forecasting process with significant uncertainties, TSOs further reduce capacity with the reliability margin (RM), which represents the uncertainty of all the forecasts and modelling. The reliability margin can be split into two components. The first is the RM<sub>UF</sub>, representing the uncertainty of UFs, and the second is the RM<sub>O</sub>, representing all other forecast and modelling errors in capacity calculation process. Different components of total transfer capacity are illustrated in the figure below.

Figure A-22: Components of total transfer capacity



### 3. Calculation of the welfare loss

The welfare loss due to UF is equal to:

$$\text{Welfare loss} = \text{Capacity loss} * (\text{positive}) \text{ Price difference}$$

where the assumption in the improved methodology is that the capacity loss due to UF is equal to:

$$\text{Capacity loss} = \text{Forecasted unscheduled flow (reference day)} + \text{Reliability Margin}$$

#### 3.1 Calculation of forecasted unscheduled flow

In this methodology, it is assumed that cross-zonal capacity is calculated in a process where 24 hourly values of cross-zonal capacity for day D are calculated early in the morning (e.g. 9 a.m.) of day D-1. In this process, TSOs use 24 common grid models, which represent the expected generation, load and network topology for each hour of day D. When making these forecasts, TSOs use their own forecasts for topology, but the forecast for generation and load is based on a simple assumption that generation and load on day D will be the same as on the reference day, where the reference day is:

- a) for Tuesday to Friday: the previous day;
- b) for Saturday and Sunday: the Saturday and Sunday of the previous week;
- c) for Monday: the last Friday.

Based on these forecasts, TSOs then calculate the amount of UFs (flows resulting from all cross-zonal exchanges and flows resulting from capacity allocation on other borders). This means that the forecasted UF for day D is actually the realised UF on the last reference day (e.g. previous day).

#### 3.2 Calculation of reliability margin due to unscheduled flow

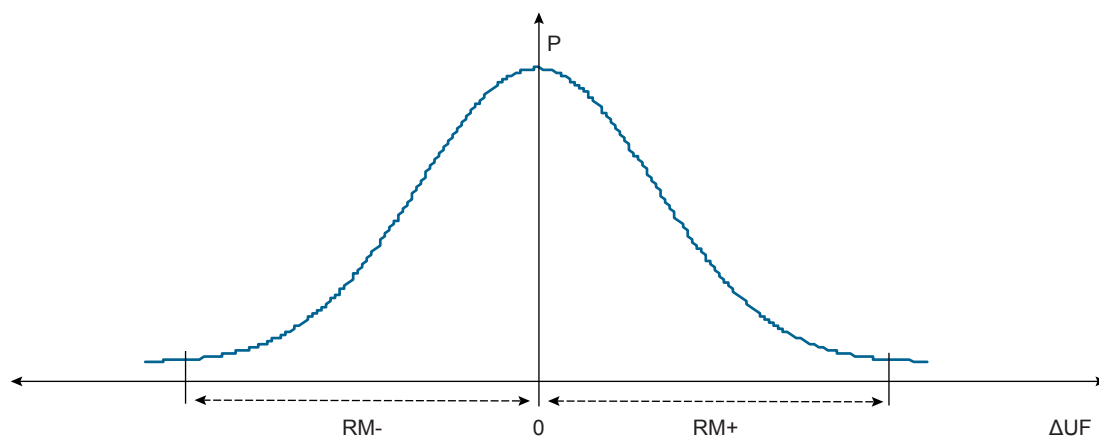
What remains in order to calculate the NTC value is to calculate the RM due to uncertainty of UF and RM due to the uncertainty of other forecasts and modelling errors. Using the CACM Regulation, the general approach to calculating the RMs is to record the differences between the forecasted (expected) power flows at the time of capacity calculation and realised (observed) power flows in real time. In an attempt to calculate the influence of UF on cross-zonal capacity, the specific interest is to calculate the first part, i.e. the RM due to the uncertainty of UF.

The methodology used to calculate the RM due to the uncertainty of UF follows the principles outlined in the CACM Regulation and consists of the following steps:

1. In the first step, the differences between the UF on day D and the reference day are calculated using a sufficient period in recent history (i.e. the last three years). These differences represent the historical forecast errors. Here, the differences must be calculated using the exact corresponding hour (i.e. hour 13 of day D and hour 13 of the reference day).
2. In the second step, the differences calculated in the first step are transformed into a probability distribution (histogram), which will normally have a mean value of zero (i.e. there are equal amounts of positive and negative differences).
3. In the third step, the values of RMUF+ and RMUF- are drawn from the probability distribution by using a standard significance level, such as 5% and 95%. This significance level means that the actual forecast error of UF will be higher than RMUF only in 10% of observations.

The following figure demonstrates the process of drawing the value of RM from the probability distribution.

Figure A-23: Drawing the value of the reliability margin from the probability distribution



Using the above methodology to calculate the RMs related to the uncertainty of UF from the data in recent history (the last three years) results in the two tables below. RMs later used to calculate the cross-zonal capacity loss in the years 2011 to 2013 are presented in Table A-6, whereas those used to calculate capacity loss in 2014 are presented in Table A-7.

Table A-6: RMs caused by UFs calculated from 2011–2013 data (MW)

Border	CH-APG	CH-DE	CH-FR	CH-IT	APG-SHB	FR-BE	FR-DE	FR-IT	IT-APG	IT-SHB
$RM_{UF+}$	508	959	991	644	359	839	1264	627	139	348
$RM_{UF-}$	-503	-959	-1010	-650	-366	-867	-1270	-615	-137	-352
Border	BE-NL	DE-NL	DE-PL	DE-CZ	AT-CZ	AT-HU	PL-CZ	PL-SK	CZ-SK	SK-HU
$RM_{UF+}$	829	854	634	615	659	367	463	307	406	379
$RM_{UF-}$	-849	-829	-652	-616	-639	-365	-490	-309	-405	-379

Table A-7: RMs caused by UFs calculated from 2012–2014 data (MW)

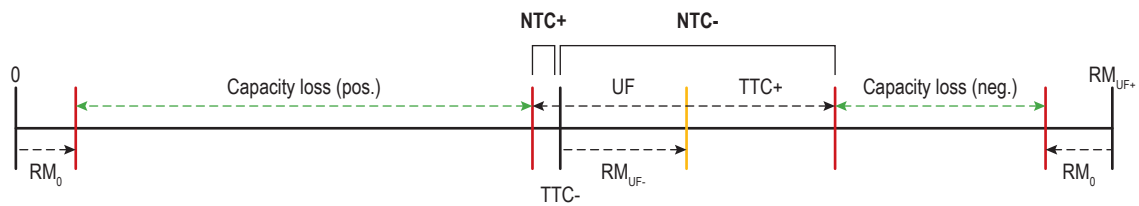
Border	CH-APG	CH-DE	CH-FR	CH-IT	APG-SHB	FR-BE	FR-DE	FR-IT	IT-APG	IT-SHB
$RM_{UF+}$	566	980	1100	669	366	922	1325	626	128	385
$RM_{UF-}$	-564	-976	-1133	-659	-377	-957	-1347	-629	-128	-384
Border	BE-NL	DE-NL	DE-PL	DE-CZ	AT-CZ	AT-HU	PL-CZ	PL-SK	CZ-SK	SK-HU
$RM_{UF+}$	916	944	645	632	674	369	461	330	410	385
$RM_{UF-}$	-948	-916	-660	-626	-666	-371	-483	-331	-413	-384

### 3.3 Calculation of capacity loss

The figure below shows the different components of capacity calculation and how capacity loss is calculated for positive and negative directions.



Figure A-24: Capacity loss calculation



#### 4. Splitting of capacity loss into LF and UAF components

In the above methodology, the capacity loss consists of the volume of forecasted UF and RM. The forecasted UF can be easily split into LF and UAF components by using the LF and UAF values for the same reference day and hour. Splitting the RM into LF and UAF component is not so straightforward. Applying the same methodology as in section 3.2 for LF and UAF, yields RMs where the sum of the two does not equal the RM for UFs. For this reason, the obtained RMs for LF and UAF are scaled to the extent that their sum equals the RM for UFs. At the end, each value of capacity loss has four components:

1. Forecasted LF
2. Forecasted UAF
3. RM for LF
4. RM for UAF

Based on these four components, the capacity loss due to UFs can easily be split into capacity loss due to LF and UAF.

#### 5. Summary

The methodology for calculating welfare losses is as follows:

$$\text{Welfare loss} = \text{Capacity loss} * (\text{positive}) \text{ price difference}$$

$$\text{Capacity loss} = \text{Forecasted unscheduled flow (reference day)} + \text{Reliability Margin}$$

The results of welfare loss calculation based on this methodology are presented in the table in Annex 11.

# Annex 11: Estimated loss of social welfare and capacity due to loop flows and unscheduled allocated flows in the CEE, CSE and CWE regions and flow statistics 2011–2014

Table A-8: Estimated loss of social welfare due to UFs, LFs and UAFs – (million euros)

Welfare losses (million euros) <sup>1)</sup>	year	Welfare	CH-AT	CH-DE	CH-FR	CH-IT	AT-SI	FR-BE	FR-DE	FR-IT	IT-AT	IT-SI	BE-NL	DE-NL	DE-PL	DE-CZ	DE-AT	AT-CZ	AT-HU	PL-CZ	PL-SK	CZ-SK	SK-HU	TOTAL	Grand Total	% of WL induced by LF (UAF) <sup>2)</sup>
			CH-AT	CH-DE	CH-FR	CH-IT	AT-SI	FR-BE	FR-DE	FR-IT	IT-AT	IT-SI	BE-NL	DE-NL	DE-PL	DE-CZ	DE-AT	AT-CZ	AT-HU	PL-CZ	PL-SK	CZ-SK	SK-HU	TOTAL	Grand Total	% of WL induced by LF (UAF) <sup>2)</sup>
UFs	2011	loss	50.88	136.73	16.93	92.93	12.21	4.09	74.49	96.70	16.99	49.44	32.92	9.04	31.25	20.57	0.00	28.03	13.62	44.61	25.88	1.41	34.16	792.91	982.51	79.2%
	2012	loss	91.00	163.45	44.57	200.23	21.35	15.57	11.32	105.95	26.12	67.72	12.04	85.26	43.56	21.58	0.00	27.70	16.76	44.37	21.82	3.30	57.29	1,080.96	1,080.96	100.0%
	2013	loss	81.82	151.31	36.71	116.89	17.02	13.49	30.02	72.20	18.21	86.36	34.16	203.92	46.96	24.25	0.00	34.59	18.42	47.19	25.18	3.70	31.51	1,092.92	1,092.92	100.0%
	2014	loss	40.99	88.73	24.22	140.79	20.02	33.23	43.02	58.81	16.76	70.66	16.62	127.17	175.89	17.54	0.00	21.45	22.91	10.47	11.06	2.12	40.04	982.51	982.51	100.0%
LFs	2011	loss	14.78	47.64	3.70	80.15	6.39	0.08	38.43	8.90	23.78	21.45	6.37	8.06	21.32	10.00	0.00	8.86	9.37	36.44	13.58	1.25	28.38	388.92	388.92	100.0%
	2012	loss	-0.25	-0.09	-0.16	-0.55	-3.91	-0.52	-0.04	-36.98	-0.69	-8.05	-4.65	-0.09	-4.48	-1.40	0.00	-0.13	-0.42	-2.38	-0.38	0.00	-0.89	-66.06	322.86	40.7%
	2013	loss	42.62	32.16	13.10	105.31	12.48	3.15	5.05	29.06	26.36	47.22	5.40	47.49	31.12	9.34	0.00	7.41	28.10	37.12	14.02	5.99	76.41	579.90	579.90	100.0%
	2014	loss	-0.21	-1.03	-0.50	-4.63	-4.58	-1.47	-1.05	-23.67	-2.00	-5.91	-2.85	-0.05	-0.62	-1.83	0.00	-0.08	-1.43	-1.69	-1.56	-0.02	-2.18	-57.36	522.55	48.3%
UAFs	2011	loss	31.27	39.47	7.78	67.96	9.44	1.86	14.33	22.08	15.39	31.50	9.19	122.42	34.97	12.15	0.00	9.05	8.35	34.20	14.47	3.25	26.00	515.17	446.39	40.8%
	2012	loss	-0.48	-1.47	-0.21	-2.26	-3.34	-8.36	-0.34	-14.15	-0.69	-14.57	-8.46	-0.03	-4.79	-1.73	0.00	-0.28	-4.02	-3.22	-0.37	0.00	-0.01	-68.78	446.39	40.8%
	2013	loss	36.49	89.35	13.89	26.81	10.74	4.53	36.11	125.61	4.82	40.01	31.47	2.13	15.08	13.89	0.00	19.43	6.96	11.40	13.15	0.37	10.42	512.66	445.43	45.3%
	2014	loss	-0.14	-0.17	-0.51	-13.48	-1.01	0.00	0.00	-0.82	-10.92	-3.97	-0.27	-1.06	-0.67	-1.92	0.00	-0.13	-2.29	-0.84	-0.46	-0.20	-3.75	-42.62	470.04	59.3%
UAFs	2011	loss	48.69	133.13	32.67	104.23	14.84	14.12	7.33	104.52	11.65	36.98	9.94	38.58	13.12	17.09	0.00	20.77	6.83	11.18	10.92	0.10	7.62	644.30	558.42	51.7%
	2012	loss	-0.09	-0.80	-0.69	-4.68	-1.39	-0.23	0.00	-3.95	-9.88	-10.57	-0.46	-0.77	-0.06	-3.01	0.00	-0.40	-17.75	-2.24	-1.56	-2.77	-24.56	-85.88	581.04	51.7%
	2013	loss	51.12	114.35	29.83	55.16	12.84	20.14	16.06	69.58	6.54	71.54	33.73	87.96	18.42	17.58	0.00	25.93	15.15	16.58	11.46	0.57	6.48	681.04	646.53	59.2%
	2014	loss	-0.09	-1.05	-0.69	-4.97	-1.92	-0.16	-0.03	-5.32	-3.02	-2.11	-0.29	-6.43	-1.65	-3.75	0.00	-0.11	-1.07	-0.37	-0.39	-0.12	-0.96	-34.51	578.17	59.2%
UAFs	2014	loss	12.79	70.22	18.50	94.69	10.52	49.36	19.83	65.05	8.28	39.23	9.79	52.54	55.44	13.29	0.00	13.77	18.20	7.51	5.33	0.36	13.47	578.17	537.08	54.7%
UAFs	2014	loss	-3.26	-0.76	-0.92	-3.17	-1.60	-0.23	-0.20	-6.76	-4.20	-6.17	-0.23	-6.91	-0.33	-1.23	0.00	-0.04	-0.39	-0.05	-1.04	-0.77	-2.81	-41.09	537.08	54.7%

Table A-9: Estimated capacity loss (-) and capacity gain (+) due to UFs, LFs and UAFs – (MW)

"Capacity loss/gain (MW)"	year	direction	CH>AT	CH>DE	CH>FR	CH>IT	AT>SI	FR>BE	FR>DE	FR>IT	IT>AT	IT>SI	BE>NL	DE>NL	DE>PL	DE>CZ	DE>AT	AT>CZ	AT>HU	PL>CZ	PL>SK	CZ>SK	SK>HU	
UFs	2011	indicated	-80	517	-2,703	-838	-166	-742	-3,310	-392	-187	-261	-733	-951	-1,448	-821	-570	42	-328	-1,076	-506	-524	-414	
		opposite	931	-2,435	701	-456	-559	-964	775	-850	-89	-439	-945	-732	161	-410	-1,813	-1,340	-404	123	-110	-287	-344	
	2012	indicated	132	80	-2,287	-1,031	-118	-70	-3,672	-284	-186	-186	-346	-66	-1,604	-1,613	-940	-321	182	-152	-1,180	-569	-604	-585
		opposite	-1,143	-1,998	285	-263	-607	-1,636	1,137	-958	-90	-354	-1,612	-79	326	-291	-2,062	-1,460	-580	227	-47	-207	-173	
	2013	indicated	52	-75	-2,216	-873	-187	-86	-3,591	-282	-196	-171	-88	-1,577	-1,437	-1,142	-397	243	-291	-1,078	-502	-641	-599	
		opposite	-1,063	-1,843	214	-421	-538	-1,620	1,056	-960	-80	-529	-1,590	-106	150	-89	-1,986	-1,541	-441	125	-114	-170	-169	
	2014	indicated	-171	25	-2,217	-961	-184	-205	-3,597	-185	-170	-195	-205	-1,632	-1,780	-1,150	-18	497	-252	-1,224	-757	-518	-642	
		opposite	959	-1,981	-16	-367	-559	-1,674	925	-1,070	-86	-574	-1,659	-228	475	-108	-2,503	-1,837	-488	280	96	-305	-127	
		indicated	-110	118	-490	-696	170	203	-1,461	154	-42	-238	201	-835	-1,177	37	-67	-46	-92	-92	-966	-283	-424	-482
		opposite	323	-794	-78	74	-504	-834	775	-631	-133	-183	-826	197	495	-495	-668	-413	-231	436	-25	39	92	
		indicated	98	-340	-402	-542	49	405	-1,399	-10	-97	-183	397	-1,021	-1,104	55	-225	-82	-222	-1,005	-335	-701	-722	
		opposite	-532	336	-165	-81	-383	-1,036	714	-467	-78	-185	-1,022	382	422	-513	-500	-377	-100	474	28	317	331	
LFs	2013	indicated	49	-374	-340	-509	93	422	-1,257	-138	-110	-261	410	-1,025	-1,180	19	-136	-54	37	-938	-311	-398	-459	
		opposite	483	-302	227	-113	-427	-1,053	571	-340	-65	-107	-1,035	387	498	-476	-589	-405	-360	407	4	13	69	
	2014	indicated	177	-482	-351	-418	-15	478	-1,406	-110	-90	-118	494	-1,153	-1,279	-148	-118	144	23	-1,026	-340	-429	-524	
		opposite	-660	-195	236	-215	-327	-1,151	651	-385	-64	-290	-1,165	463	611	-348	-661	-660	-371	512	20	47	135	
	2011	indicated	31	399	-2,214	-142	-336	-944	-1,849	-546	-145	-23	-934	-115	-271	-858	-503	88	-237	-109	-224	-100	-100	68
		opposite	-608	-1,641	779	-529	-56	-130	-1	-218	43	-309	-119	-929	-334	84	-1,154	-927	-173	-313	-85	-326	-436	
	2012	indicated	34	420	-1,886	-489	-167	-474	-2,272	-274	-89	-163	-463	-583	-508	-995	-96	264	70	-175	-233	97	137	
		opposite	-611	-1,662	451	-182	-224	-600	423	-491	-13	-169	-590	-462	-96	222	-1,562	-1,103	-480	-247	-75	-523	-504	
	2013	indicated	3	299	-1,875	-364	-281	-508	-2,334	-144	-86	91	-498	-551	-257	-1,161	-261	296	-328	-140	-191	-243	-140	
		opposite	-581	-1,541	441	-307	-111	-566	484	-620	-15	-422	-555	-493	-348	387	-1,397	-1,135	-82	-282	-118	-183	-227	
	2014	indicated	-348	507	-1,866	-544	-169	-683	-2,191	-75	-80	-77	-699	-479	-501	-501	100	354	-275	-199	-417	-89	-118	
		opposite	299	-1,786	220	-152	-231	-524	274	-686	-21	-285	-495	-691	-136	240	-1,842	-1,177	-117	-332	76	-352	-263	

Table A-10: Flow statistics – (MW, GWh)

Flows (MW)	year	CH>AT	CH>DE	CH>FR	CH>IT	AT>SI	FR>BE	FR>DE	FR>IT	IT>AT	IT>SI	BE>NL	DE>NL	DE>PL	DE>CZ	DE>AT	AT>CZ	AT>HU	PL>CZ	PL>SK	CZ>SK	SK>HU	
Average	2011	-160	-83	-2,697	2,679	423	660	269	1,836	-170	-454	381	629	-284	-1,068	1,385	-429	149	235	142	732	891	
SCHs	2012	-267	-58	-2,005	2,422	752	1,362	-993	1,720	-175	-422	280	1,726	-309	-981	1,994	-326	456	170	136	926	958	
	2013	-243	-22	-1,906	2,313	331	1,476	-1,119	1,753	-227	-412	351	2,045	-241	-1,322	1,789	-286	116	149	152	584	726	
	2014	-207	-221	-1,927	2,398	481	1,880	-677	2,204	-214	-388	-37	2,052	-92	-793	2,440	-164	348	17	-27	959	812	
Average	2011	-107	-454	250	312	-237	-454	1,155	-444	-89	-30	-448	449	731	-266	-296	-184	-3	633	93	186	229	
LFs	2012	-317	6	159	163	-127	-662	1,090	-275	-50	-77	-651	640	661	-283	-136	-147	-42	622	40	191	227	
	2013	-267	35	140	93	-124	-629	968	-174	-50	-31	-614	595	676	-248	-227	-177	-101	568	100	139	175	
	2014	-424	142	58	99	-152	-805	1,034	-137	13	-84	-816	789	952	-101	-272	-398	-200	774	179	236	326	
Average	2011	-320	-1,017	1,453	-115	41	356	882	211	138	-54	351	-351	90	475	-360	-525	-39	-16	110	-68	-193	
UAFs	2012	-322	-1,039	1,133	224	-113	-115	1,320	-69	77	74	-121	117	317	611	-746	-695	-175	94	223	8	-21	
	2013	-293	-921	1,089	133	-47	-119	1,358	-170	108	-148	-124	123	127	775	-577	-727	27	48	97	94	45	
	2014	28	-1,148	1,057	196	-29	90	1,237	-306	29	-105	110	-112	182	619	-982	-768	81	-11	246	-132	-73	
Flows (GWh) <th>year</th> <th>direction</th> <th>CH&gt;AT</th> <th>CH&gt;DE</th> <th>CH&gt;FR</th> <th>CH&gt;IT</th> <th>AT&gt;SI</th> <th>FR&gt;BE</th> <th>FR&gt;DE</th> <th>FR&gt;IT</th> <th>IT&gt;AT</th> <th>IT&gt;SI</th> <th>BE&gt;NL</th> <th>DE&gt;NL</th> <th>DE&gt;PL</th> <th>DE&gt;CZ</th> <th>DE&gt;AT</th> <th>AT&gt;CZ</th> <th>AT&gt;HU</th> <th>PL&gt;CZ</th> <th>PL&gt;SK</th> <th>CZ&gt;SK</th> <th>SK&gt;HU</th>	year	direction	CH>AT	CH>DE	CH>FR	CH>IT	AT>SI	FR>BE	FR>DE	FR>IT	IT>AT	IT>SI	BE>NL	DE>NL	DE>PL	DE>CZ	DE>AT	AT>CZ	AT>HU	PL>CZ	PL>SK	CZ>SK	SK>HU
Total	2011	indicated	331	3,600	2	23,465	4,082	6,636	7,556	16,080	0	4	5,475	8,006	106	78	13,325	54	2,414	2,145	1,271	6,555	7,813
SCHs	2012	opposite	1,735	4,329	25,373	2	378	854	5,004	2	1,490	3,982	2,135	2,494	2,593	9,430	1,195	3,814	1,113	86	23	144	13
	2013	indicated	313	3,647	310	21,276	6,641	13,079	2,378	15,150	1	10	5,036	15,730	12	139	17,656	122	4,168	1,511	1,200	8,145	8,419
	2014	opposite	2,658	4,154	17,919	5	32	1,118	11,102	40	15,34	3,719	2,577	572	2,722	8,756	141	2,988	165	17	5	13	2
	2013	indicated	698	4,451	187	20,302	3,571	13,842	2,737	15,384	4	23	5,885	18,010	128	54	17,345	86	1,875	1,365	1,412	5,317	6,404
	2014	opposite	2,824	4,646	16,883	39	675	917	12,540	28	19,96	3,634	2,806	94	2,242	11,632	1,671	2,591	862	57	84	199	41
	2014	indicated	1,177	6,146	385	21,034	4,383	16,609	3,741	19,325	4	171	3,247	18,022	163	664	21,863	300	3,205	214	224	8,459	7,144
	2013	opposite	2,987	4,211	17,263	30	166	62	9,674	20	18,79	3,572	3,575	47	973	7,609	487	1,734	153	64	461	57	28
Total LFs	2011	indicated	223	166	2,468	2,978	68	80	10,116	89	185	876	78	4,009	6,404	169	492	172	427	5,548	1,013	1,733	2,058
	2012	opposite	1,165	4,146	275	245	2,144	4,061	0	3,982	964	1,141	4,005	79	0	2,500	3,083	1,786	452	0	199	102	51
	2013	indicated	94	1,355	1,814	2,160	319	42	9,570	216	252	665	37	5,668	5,802	106	1,086	237	321	5,467	805	1,838	2,066
	2014	opposite	2,881	1,304	421	728	1,438	5,854	0	2,629	517	1,340	5,756	44	1	2,595	2,280	1,529	669	0	458	162	88
	2013	indicated	87	1,524	1,731	1,651	352	26	8,492	486	118	1,142	21	5,245	5,924	466	757	393	112	4,983	1,019	1,436	1,645
	2014	opposite	2,426	1,222	502	836	1,440	5,535	9	2,013	557	1,416	5,398	30	6	2,636	2,744	1,941	998	6	141	215	110
	2011	indicated	158	2,334	1,305	1,861	502	95	9,101	906	447	1,153	11	6,928	8,361	667	840	68	179	6,788	1,660	2,245	2,981
	2012	opposite	3,867	1,090	796	991	1,834	7,151	39	2,109	337	1,886	7,162	15	21	1,548	3,223	3,553	1,933	9	95	175	125
	2013	indicated	90	36	12,729	1,188	1,141	3,445	7,832	2,907	1,283	986	3,395	319	1,741	4,264	1,839	93	868	707	1,254	689	321
	2014	opposite	2,892	8,943	0	2,194	784	326	110	1,056	77	1,455	319	3,398	954	106	4,905	4,688	1,210	848	290	1,288	2,015
Total UAFs	2011	indicated	117	30	10,142	2,630	313	1,333	11,673	1,434	791	1,398	1,297	2,337	2,933	5,401	474	6	274	1,148	1,975	893	627
	2012	opposite	2,948	9,159	193	667	1,305	2,343	79	2,036	115	747	2,356	1,310	147	37	7,022	6,106	1,814	326	21	821	813
	2013	indicated	177	67	9,708	2,189	1,086	1,831	11,990	1,232	1,007	720	1,814	2,894	2,164	6,818	1,830	94	944	1,175	1,233	1,349	999
	2014	opposite	2,739	8,135	171	1,020	1,497	2,875	97	2,719	63	2,020	2,898	1,813	1,053	26	6,881	6,466	706	756	388	523	607
	2011	indicated	1,595	19	9,614	2,630	669	2,901	10,942	1,130	448	841	2,972	2,025	2,029	5,618	424	19	1,011	669	2,208	598	726
	2012	opposite	1,348	10,077	356	909	926	2,114	109	3,813	191	1,761	2,008	3,008	431	199	9,025	6,747	298	767	50	1,752	1,363
	2013	indicated	1,595	19	9,614	2,630	669	2,901	10,942	1,130	448	841	2,972	2,025	2,029	5,618	424	19	1,011	669	2,208	598	
	2014	opposite	1,348	10,077	356	909	926	2,114	109	3,813	191	1,761	2,008	3,008	431	199	9,025	6,747	298	767	50	1,752	1,363
	2011	Grand Total	331	3,600	2	23,465	4,082	6,636	7,556	16,080	0	4	5,475	8,006	106	78	13,325	54	2,414	2,145	1,271	6,555	7,813
	2012	Grand Total	313	3,647	310	21,276	6,641	13,079	2,378	15,150	1	10	5,036	15,730	12	139	17,656	122	4,168	1,511	1,200	8,145	8,419
	2013	Grand Total	698	4,451	187	20,302	3,571	13,842	2,737	15,384	4	23	5,885	18,010	128	54	17,345	86	1,875	1,365	1,412	5,317	6,404
	2014	Grand Total	2,824	4,646	16,883	39	675	917	12,540	28	19,96	3,634	2,806	94	2,242	11,632	1,671	2,591	862	57	84	199	41
	2011	Grand Total	223	166	2,468	2,978	68	80	10,116	89	185	876	78	4,009	6,404	169	492	172	427	5,548	1,013	1,733	2,058
	2012	Grand Total	1,165	4,146	275	245	2,144	4,061	0	3,982	964	1,141	4,005	79	0	2,500	3,083	1,786	452	0	199	102	51
	2013	Grand Total	94	1,355	1,814	2,160	319	42	9,570	216	252	665	37	5,668	5,802	106	1,086	237	321	5,467	805	1,838	2,066
	2014	Grand Total	2,881	1,304	421	728	1,438	5,854	0	2,629	517	1,340	5,756	44	1	2,595	2,280	1,529	669	0	458	162	88
	2011	Grand Total	158	2,334	1,305	1,861	502	95	9,101	906	447	1,153	11	6,928	8,361	667	840	68	179	6,788	1,660	2,245	2,981
	2012	Grand Total	3,867	1,090	796	991	1,834	7,151	39	2,109	337	1,886	7,162	15	21	1,548	3,223	3,553	1,933	9	95	175	125
	2013	Grand Total	90	36	12,729	1,188	1,141	3,445	7,832	2,907	1,283	986	3,395	319	1,741	4,264	1,839	93	868	707	1,254	689	321
	2014	Grand Total	2,892	8,943	0	2,194	784	326	110	1,056	77	1,455	319	3,398	954	106	4,905	4,688	1,210	848	290	1,288	2,015
	2011	Grand Total	117	30	10,142	2,630	313	1,333	1														

## Annex 12: Methodology for calculating net welfare gains in gas markets

This annex describes the methodology used to calculate the net welfare gains elaborated in the gas chapter, Section 5.3.3. It itemises in more detail the assumptions taken and particularises the results per market area.

The whole exercise constitutes a theoretical and static analysis of potential impacts of enhanced suppliers' competition within the context of a further progressive construction of the IEM<sup>541</sup>. The methodology gauges the economic impact of optimising existing cross-border capacities by exploiting wholesale price spread signals among gas market areas. The hypothesis is that companies sourcing gas in lower priced market areas would naturally seek to expand their business by selling gas into adjacent higher-priced gas zones by using either unused physical or contractually available cross-border capacity. Over time, a new market entrant offering a lower price should also compel prevailing players to adapt prices due to competitive pressure.

Unused physical capacity is defined as cross-border IPs firm technical capacity, minus physical registered gas flows. It is an indicator of the maximum volume of additional new supply that could flow into an adjacent market. The underlying assumption is that all non-nominated contractual capacity would be made available on the secondary market<sup>542</sup>. Contractually available capacity is defined as firm technical capacity, minus firm booked capacity.

Unused capacities are also segregated in the assessment at two levels: yearly aggregated unused physical capacity and technical capacity, minus peak-month idle capacity. As unused capacities are not uniformly distributed during the year, peak utilisation constitutes a relevant factor for inclusion in the analysis<sup>543</sup>.

The results are based on 2014 data about suppliers' sourcing prices (see Figure 114), cross-border capacity values and registered flows (Figure 116) and transmission tariffs<sup>544</sup>. Calculations are presented on an aggregated yearly basis, but were performed using monthly price, capacity availability and gas demand data per MS<sup>545</sup>. The wholesale prices that could be offered by a hypothetical new competitor entering a higher priced market are assessed by applying varying gross profit margins to the initial zones' price spread (transmission tariffs included). Two different percentages are considered: a new entrant selling gas without a profit – a theoretical approach that maximises welfare gains - and the supplier making a profit of 50% of the existing price spread<sup>546</sup>.

The pairs of MSs appraised on the y-axis of Figure A-25 were selected on the basis of the co-existence of theoretically profitable suppliers' sourcing price spreads between adjacent zones and coincident unused and/or contractually available capacity. Some of the specified borders and flow directions over which the net welfare assessments were performed do not coincide with the predominant physical flow directions registered in 2014. In these cases, the analysis was assessed on the basis of reverse flow capacity availability.

541 I.e. the examined factors' interdependence could change over time, resulting in different welfare gain values in the future. The estimates presented here are built on the basis of recorded 2014 values

542 The exercise is performed on the basis of physical registered flows, not on the basis of nominations. This could result in an underestimate of the implications of netting nominations received in opposite directions.

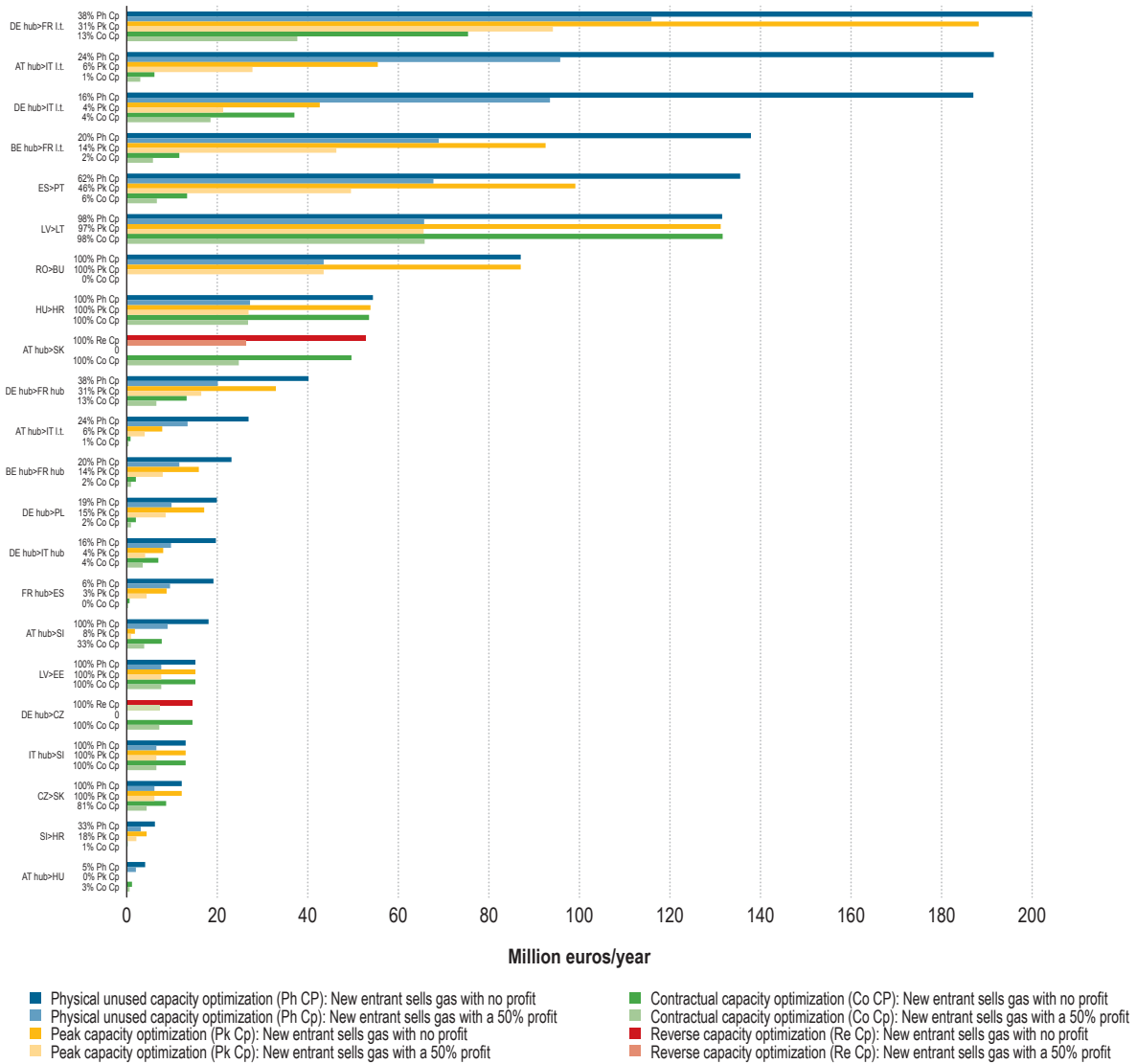
543 IPs contractual values are in part determined by the peak utilisation levels during the year anticipated by shippers.

544 2014 cross-border IPs transmission tariffs across the EU were presented in the MMR 2013, page 198. Annex 14 provides this same calculation for 2015.

545 I.e. monthly welfare gains are assessed as: [(entry zone price – exit zone price) - transmission tariff] \* monthly available capacity, with the upper limit of serving the entry zone monthly demand. Yearly gains are obtained as the sum of all monthly results.

546 Example: exit market A features a price of 24 euros/MWh and entry market B a price of 27 euros/MWh. Transmission tariffs are set at 1 euro/MWh. Initial price spread, including transmission tariffs is 2 euros/MWh. In the established scenario, the new entrant would buy gas in A, pay transmission charges and sell the gas in B, applying a profit percentage over the initial spread. This means it would sell the gas either at a) 25 euros/MWh (0% profit:  $24 + 1 + 2 \cdot 0\% = 25$ ) or b) 26 euros/MWh (50% profit:  $24 + 1 + 2 \cdot 50\% = 26$ ).

Figure A-25: Potential annual net welfare gains in different EU MSs if available cross-border capacities were fully utilised following suppliers sourcing prices spreads – 2014, monthly combined (million euros/year)



Source: IEA, Eurostat, Platts, ENTSOG (2014) and ACER calculations

Note: Physical unused capacity (Ph Cp) refers to firm technical minus physical flows. Peak unused capacity (Pk Cp) refers to firm technical minus peak-month flow. Contractual unused capacities (Co Cp) refers to firm technical capacity available to be booked. Reverse flow available capacities are denoted as Re C. The percentage numbers next to the border identification indicate the share of total yearly MSs demand that could be supplied with unused capacities. DE > IT refers to capacities and transmission tariffs through Switzerland. 'l.t.' at the right of a MS refers to suppliers' sourcing cost estimates made on border import prices, 'hub' to suppliers' costs built on hub products.

## Annex 13: Assessment of the state of development of electricity and gas market places

### 1. Introduction

- Regulation (EU) No 1227/2011 concerns the Agency's obligations on wholesale energy market integrity and transparency, otherwise known as REMIT. Article 7 of Regulation (EU) No 1227/2011 obliges the Agency to 'assess the operation of different categories of market places and ways of trading' and specifies that the report on such findings may be combined with the report referred to in Article 11(2) of Regulation (EC) No 713/2009, namely the annual market monitoring report to which this annex is attached.
- Because of the interconnectedness of the obligations specified in Article 7 of Regulation (EU) No 1227/2011, and the gas and electricity wholesale sections of this Report, the Agency has decided to combine the two as provided for in the Article. Hence, with this annex the Agency fulfils the obligations under Article 7 by listing organised market places at which energy trade was enabled or has taken place, together with products and volumes traded during 2014. The Agency's principal obligations under Regulation (EU) No 1227/2011 are carried out independently of this Report. More information on these activities can be found at the Agency's dedicated REMIT portal: <https://www.acer-remit.eu/portal/home>.
- Table A-11 of this annex lists exchanges and hubs where electricity and gas were traded, Table A-12 where only electricity was traded, and Table A-13 where only gas was traded. In order to illustrate further ways of trading, Table A-14 lists other organised market places, and Table A-15 lists broker platforms, but products and volumes traded are not listed for these categories. The names of all organised marketplaces, including their MIC codes and Country Codes, are listed on the dedicated REMIT portal as referenced above. The tables have been prepared on the basis of the data available in June 2015.
- Since directly comparable data to the data presented in these tables for 2014 was not available in 2013, it has not been possible to compile an aggregate annual comparison. Nevertheless, for exchanges and hubs where data was available for 2013, 13 have reported increased traded electricity volumes against six reported decreases. In gas, nine exchanges or hubs reported increased traded volumes, and only one reported a decrease. These numbers do not sum to the total number of hubs and exchanges, as not all of them provided 2013 data. It is further noted that for some organised market places, the data on 2014 traded volumes includes registered traded volumes of OTC or bilateral trade which could not be excluded due to the way it is compiled. It is also noted that no 2014 data was available on volumes traded for 3 derivative exchanges, namely NASDAQ OMX, Borsa Italiana and CME).

### 2. Organised energy markets in the EU

- In total, organised energy markets in the EU consisted of 39 Energy Exchanges, 16 Energy Broker Platforms and three Other Organised Market Places which were active at the beginning of 2015 (data: ACER List of Organised Market Places', rev. 1.9, 30 April 2015).
- Tables A-11 – A-15 list organised market places in the EU.

Table A-11: Organised marketplaces at which electricity and gas were traded

Organised Market Place Name	Location	Volumes traded	Products traded
Českomoravská komoditní burza Kladno, ČMKBK	Kladno	<b>Electricity:</b> 2.57 TWh (+49% re. 2013) <b>Gas:</b> 3.54 TWh (+22.4% re. 2013)	<b>Electricity:</b> With or without composite electricity supply services, from HV and LV grids <b>Gas:</b> Natural gas delivered to delivery points with off-take above or up to 630 MWh/a
CME Europe Limited	London		<b>Electricity:</b> base- and peak-load futures: German Power (EPEX Spot), French Power (EPEX Spot), Italian Power (GME) and Spanish Power (OMIP) <b>Gas:</b> daily and monthly futures in UK, NL, DE, AT and IT
OTE a.s.	Prague	<b>Electricity:</b> • Organised short-term market in Czech Republic: BM: 0.009 TWh DM: above 13 TWh IM: 0.443 TWh • MC with HU, SK, RO: DAM: 15.11 TWh in 2014, +16.3% re. 2013 <b>Gas:</b> Total: 143.1 TWh (+5.9% re. 2013) Intra-day: 0.66 TWh (+146% re. 2013)	<b>Electricity:</b> Block market (continuous trading of base-load, peak and off-peak products, BM), Day-ahead market (DM), Intra-day (IM), Balancing, Day-ahead market coupling with SK, HU, RO <b>Gas:</b> Day ahead, Intra-day
ICE Endex Derivatives BV	Amsterdam	<b>Electricity:</b> 130.96 TWh <b>Gas:</b> 1,772.22 TWh	<b>Electricity:</b> Dutch, Belgian, German Power Futures <b>Gas:</b> TTF, NCG, Gaspool Gas Futures, TTF Gas Options
ICE Futures Europe	London	<b>Electricity:</b> 4.41 TWh (-36.27% re. 2013) <b>Gas:</b> 363,161,005,000 Therms (+81.84% re. 2013)	<b>Electricity:</b> UK Electricity base (Gregorian), UK Electricity base, UK Electricity Peak, UK Electricity Peak (Gregorian) <b>Gas:</b> UK Natural Gas TAS, UK Natural Gas Daily Futures, UK Natural Gas Futures
Gestore dei mercati energetici - GME	Rome	<b>Electricity:</b> Spot: 319.59 TWh (-2.1 re. 2013) Forward: 32.27 TWh (-21.5% re. 2013) <b>Gas:</b> Spot: 41.63 TWh (+1.8% re. 2013), futures were not traded 2014, in 2013 only 0.62 TWh in PGAS royalties	<b>Electricity:</b> Spot: Day ahead, Intraday, Ancillary Services; Futures: Base-Load and Peak-Load, with monthly, quarterly and yearly delivery periods <b>Gas:</b> Spot: Day ahead, Intraday; Forward: yearly/thermal year, yearly/calendar year, half-yearly, quarterly, monthly and Balance-of- Month (BoM)
NASDAQ OMX Oslo ASA	Oslo		Electricity derivatives <ul style="list-style-type: none"> <li>• Nordic electricity</li> <li>• Dutch electricity</li> <li>• German electricity</li> <li>• UK electricity</li> <li>• Gas derivatives</li> <li>• UK natural gas</li> </ul>
Polish Power Exchange, POLPX	Warsaw	<b>Electricity:</b> Spot: 23.82 TWh, Forwards: 162.98 TWh <b>Gas:</b> Spot: 6.57 TWh, Forwards: 105.08 TWh	<b>Electricity:</b> Spot: day-ahead, intraday; Forwards (with physical delivery): Week, Month, Quarter, Year <b>Gas:</b> Spot: Day-ahead, Intraday; Forwards: Week, Month, Quarter, Season, Year
Powernext S.A.	Paris	Its operations are included in EEX (electricity) and PEGAS (gas)	
Romanian gas and electricity market operator, OPCOM S.A.	Bucharest	<b>Electricity:</b> Spot market: 21.56 TWh; - DAM: 21.5 TWh (+31.51% re. 2013); - IDM: 0.064 TWh (+0.28% re. 2013); Term market: 75.50 TWh (different products with delivery in 2014-2029) <b>Gas:</b> 0,00 TWh	<b>Electricity:</b> Spot: Day-ahead, Intraday Term market: instruments: day, week, month, quarter, half-year, year; organised in a Centralized Market for Bilateral Contracts for electricity with different products <b>Gas:</b> Centralized Market for Natural Gas (in a combined process of auctions and negotiation) Electricity and gas products are amended in 2015

Source: Exchanges, organisations and ACER calculations.



Table A-12: Organised marketplaces at which only electricity was traded

Organised Market Place Name	Location	Volumes traded	Products traded
APX Commodities Ltd	PX operates from offices in Amsterdam (headquarters), Brussels, and London	<b>Electricity:</b> Total 26.1 TWh (+15% re. 2013)	<b>Electricity:</b> Day-ahead (DA) Auctions, Continuous (Intraday)
APX Power B.V.	PX operates from offices in Amsterdam (headquarters), Brussels, and London	<b>Electricity:</b> Day-ahead: 44.5 TWh (-6% re. 2013) Intraday: 1 TWh (+41% re. 2013)	<b>Electricity:</b> Day-ahead (DA), continuous (Intraday)
Belpex NV	Brussels	<b>Electricity:</b> Total 20.6 TWh; DA: 19.8 TWh (+15% re. 2013), Intraday: 0.8 TWh (+19% re. 2013) continuous market CIM	<b>Electricity:</b> Day-ahead, continuous (Intraday)
Borsa Italiana S.p.A., IDEM - IDEX segment	Milan		<b>Electricity:</b> Base-load and peak-load Monthly, Quarterly and Yearly futures
BSP d.o.o.	Ljubljana	<b>Electricity:</b> Total: 6.38 TWh (+9.20% re. 2013) DA: 6.25 TWh (+8.58% re. 2013), ID: 0.13 TWh (+52.13% re. 2013)	<b>Electricity:</b> Day-ahead (DA), Intraday (ID)
Energy Exchange Austria, EXAA	Vienna	<b>Electricity:</b> Total 7.85 TWh (+0.38% re. 2013) spot (DA): 7.825 TWh (+0,32% re. 2013; Green: 0.024 TWh (+26% re. 2013)	<b>Electricity:</b> Day-ahead (DA), Intraday, Green
European Energy Exchange, EEX AG	Leipzig	<b>Electricity:</b> Derivatives market: 1,570 TWh, (+24% re. 2013),	<b>Electricity:</b> Futures (DE/AT), Options (DE/AT), French Power Futures (FR), Dutch Power Futures (NL), Belgian Power Futures (BE), Italian Power Futures (IT), Romanian Power Futures (RO)*, Nordic Power Futures (NO, SW, FI, DK, EST, LVA, LTU)*, Swiss Power Futures (CH)*, Spanish Power Futures (ES)*, Greek Power Futures (GR)* (* only trade registr.)
European Power Exchange, EPEX SPOT	Paris with offices in Bern, Leipzig and Vienna	<b>Electricity:</b> Total: 382 TWh DA: 351.2 TWh (day-ahead auction markets) ID: 30.7 TWh (continuous intraday markets), and 0.09 TWh (auction intraday market)	<b>Electricity:</b> Day-ahead, Intraday for markets: Germany/Austria, France, Switzerland
Hungarian Power Exchange Ltd., HUPX	Budapest	<b>Electricity:</b> DA: 12.67 TWh (+39.58% re. 2013); Futures: 3.64 TWh	<b>Electricity:</b> DA; Physical futures
LAGIE S.A.	Athens	<b>Electricity:</b> 49.85 TWh (-0.34% re. 2013)	<b>Electricity:</b> Day-ahead Auction
MEFF Sociedad Rectora del Mercado de Productos Derivados, S.A.	Madrid	<b>Electricity:</b> 2014: 32 TWh (-4,0% re. 2013)	<b>Electricity:</b> Base Derivatives - Futures: Annual, Quarterly, Monthly, Weekly, Week-end. - Swaps: Annual, Quarterly, Monthly, Weekly, Week-end, Daily Peak Derivatives - Futures: Quarterly, Monthly, Weekly, - Swaps: Quarterly, Monthly, Weekly, Daily
N2EX/Nord Pool Spot AS	London	<b>Electricity:</b> 135.5 TWh	<b>Electricity:</b> Day-ahead
Nord Pool Spot AS	Lysaker, offices in Stockholm, Helsinki, Roskilde, Tallinn	<b>Electricity:</b> Nordic and Baltic day-ahead market 361 TWh (+3.5% re. 2013); Nordic, Baltic and German intraday market 4.9 TWh (+16.7% re. 2013)	<b>Electricity:</b> Day-ahead (DA), intraday (ID)
OMIP - Pólo Português, S.G.M.R., S.A.	Lisbon	<b>Electricity:</b> Spot total: 219.38 TWh (-7.06 % re. 2013), of which 48.61 TWh in PT and 170.77 TWh in ES) Derivatives: 102.42 TWh (+19.37% re. 2013)	<b>Electricity:</b> Futures in ES and PT; Base-load (24 h) and spot charge (12 h) with maturities of days, weekends, weeks, months, quarters and years; in addition, ES only: forwards, swaps
OMI-Polo Español S.A, OMIE	Madrid	<b>Electricity:</b> Total: 258.65 TWh (-5.43% re. 2013) DA: 223.84 TWh (-4,7% re. 2013) ID: 34.81 TWh (-9.8% re. 2013)	<b>Electricity:</b> Day-ahead, intraday
Organizátor krátkodobého trhu s elektrinou, OKTE, a.s.	Bratislava	<b>Electricity:</b> 6.68 TWh (+19.76 % re. 2013)	<b>Electricity:</b> Day ahead

Organised Market Place Name	Location	Volumes traded	Products traded
Power Exchange Central Europe, PXE a.s.	Prague	<b>Electricity:</b> 2014: 20.67 TWh (-24% re. 2013) exchange trade	<b>Electricity:</b> Spot: Day-ahead (DA), Intraday (ID); daily, hourly; Futures: Annual, quarterly, and monthly
Single Electricity Market Operator, SEMO	Dublin, Belfast	<b>Electricity:</b> 29.14 TWh	<b>Electricity:</b> Ex-Post market (pool)

Source: Exchanges, organisations and ACER calculations.

Table A-13: Organised marketplaces at which only gas was traded

Organised Market Place Name	Location	Volumes traded	Products traded
Central Eastern European Gas Exchange Ltd., CEEGEX	Budapest	<b>Gas:</b> Spot: all products together 0.300576 TWh (in 2013 volumes negligible) Futures: 0.0216 TWh, only months product traded	<b>Gas:</b> Spot: Day-Ahead (DA), Saturday (SA), Sunday (SU), Weekend (W/END), Holiday (HD) Physical futures: Months (3 consecutive months), Quarters (4 consecutive quarters)
Central European Gas Hub, CEGH, Wiener Börse AG	Vienna	<b>Gas:</b> Total: 21.27 TWh traded volumes (+61% re. 2013); - Spot Market 18.95 TWh, - Futures Market 2.32 TWh In addition, 439.89 TWh of natural gas were nominated at the CEGH-Virtual Trading Point, +12% re. 2013	<b>Gas:</b> Spot: Day-ahead, Weekend, Within-day: rest of day; Futures: Front Month (1 – 3), Front Quarter (1 – 4), Front Season (1 – 3), Front Year (1 – 2)
Gaspoint Nordic	Brøndby, Denmark	<b>Gas:</b> 10.3 TWh (+9.9% re. 2013)	<b>Gas:</b> Day-ahead, Within-day; Weekend and Month-ahead contracts
GET Baltic, UAB	Vilnius	<b>Gas:</b> Total: 1.13 TWh (+189.15% re. 2013): - Previous day: 0.65 TWh - Within-day: 0.11 TWh - Days ahead (+1 until +50): 0.37 TWh	<b>Gas:</b> 1) Previous day 2) Within-day 3) After days (days ahead)*
ICE Endex Gas B.V.	Amsterdam	<b>Gas:</b> 17.34 TWh	<b>Gas:</b> TTF Gas Spot, ZTP Gas Spot
ICE Endex Gas Spot Ltd.	London	<b>Gas:</b> 4,429,049,000 Therms	<b>Gas:</b> UK Gas Spot (OCM), Centrica Rough Gas Storage
Kaasupörssi Oy	Espoo	<b>Gas:</b> 1.891 TWh (-7% re. 2013)	<b>Gas:</b> Gas Physical Forwards, delivery within min 1 hr, max 90 days, continuous hourly trading
PEGAS	Paris	<b>Gas:</b> Spot market: 196 TWh (+142% re. 2013) Derivatives market: 85 TWh (+193% re. 2013)	<b>Gas:</b> Spot: Within-Day (WD), Day-Ahead (DA), Weekend (WE), Individual Days (ID) at NCG, Gaspool, TTF; Derivatives: Month, Quarter, Season, Calendar Year, at NCG, Gaspool

Source: Exchanges, organisations and ACER calculations.

General notes:

1. Apart from the trades in electricity and gas indicated in the tables, many exchanges or trading places also organise trade in energy-related certificates, especially green certificates and emission certificates (e.g. OPCOM).
2. Some exchanges also register bilateral OTC trading contracts and count such traded volumes in overall trade. These volumes are not excluded in all marketplaces in the tables above. Many marketplaces do not explicitly list these volumes in their publications. It is difficult to assess the impact this has on the totals, but it is known that in some cases they make up a significant proportion.
3. It should be noted that TTF is the only physical gas hub. All other organised market places where gas is traded act as virtual trading points.
4. Some exchanges offer trade with cross-border transmission rights. These products are not listed here.
5. For Intra-day trading at some organised marketplaces, particularly those where gas is traded, the term within-day trade is used. Continuous trading is possible at some marketplaces, which can result in within-day nominations. These products are treated as a form of intra-day trading.
6. Day-ahead and intra-day trading is understood as spot trading; in some cases balancing and other related short-term products also form part of the spot trading.
7. The tables above also list annual growth rates of volumes traded per market place with respect to the year 2013.

Notes related to specific exchanges:

8. In 2014 GET Baltic UAB enabled trading of up to 150 days ahead.
9. OTE: registered bilateral trade in electricity is not mentioned in the table (it accounts for over 97 TWh); trades relating to the BM are not listed either.

10. SEM-O: the traded volume includes only the Irish electricity market in the pool, but excludes trade through interconnectors which account for additional day-ahead traded volumes as follows: 4.85 TWh import and 1.02 TWh export, and in the case of intra-day traded volumes: 4.86 TWh import and 0.49 TWh export.
11. EEX performs gas operations at PEGAS and electricity spot operations in EPEX SPOT.
12. In addition to exchanges in the tables above, BaltPool UAB operates as a biomass exchange operator. In the past, it was an exchange for electricity and gas. However, electricity trading activity at BALTPPOOL was discontinued before 2014. Gas activity is also currently suspended and will be discontinued soon. This market- place is listed in this annex because it was listed on the List of organised market places (ACER web page)
13. Data for Borsa Italiana S.p.A., IDEM – IDEX segment can be found on its web page, see <http://www.borsaitaliana.it/borsa/derivati/index-futures/lista.html?lang=en>.
14. Data for NASDAQ OMX Oslo ASA for electricity and gas products can be found at its web page, see <http://www.nasdaqomx.com/transactions/markets/commodities>.
15. CME enables trading futures at other European electricity and gas exchanges. Data for CME Europe Limited can be found at its web pages for electricity (<http://www.cmegroup.com/europe/products/energy/power.html>) and for gas (<http://www.cmegroup.com/europe/products/energy/european-gas-products.html>).

Table A-14: Other organised marketplaces

Organised Marketplace Name	Country
BRM (Bursa Romana de Marfuri)	RO
Iberian Gas Hub (Sociedad Promotora Bilbao Gas Hub, S.A.)	ES
OMEL Diversificación, S.A.U.	ES

Source: Exchanges, organisations.

Table A-15: Broker Platforms

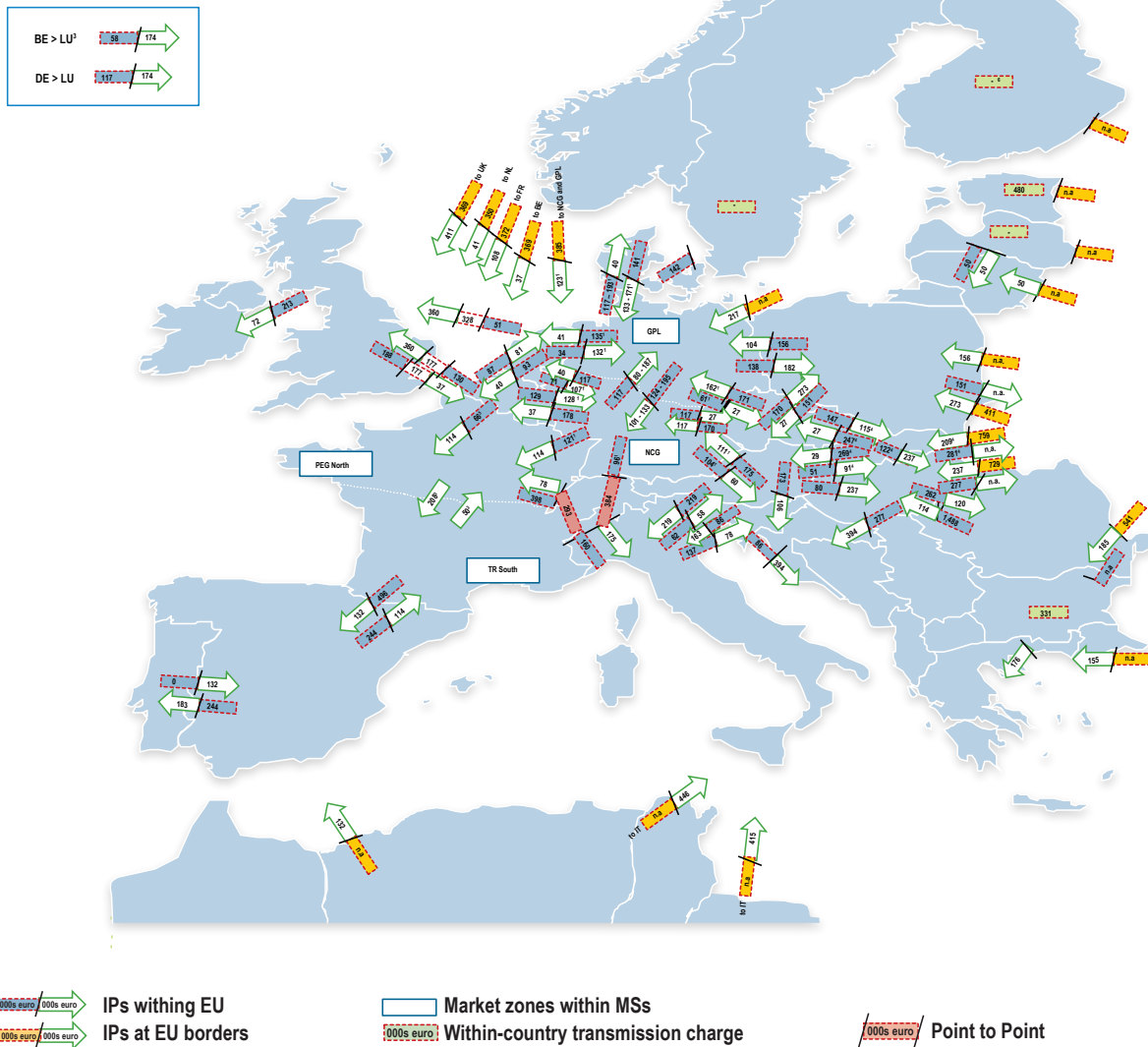
Organised Marketplace Name	Country
42 Financial Services	CZ
BGC Brokers L.P.	GB
Broker Affairs GmbH Energy Services (BAES)	DE
CommErg B.V.	NL
Corretaje e Información Monetaria y de Divisas Sociedad de Valores SOCIEDAD ANONIMA, CIMD SV	ES
Enterprise Commodity Services Limited	UK
GFI Brokers Limited	GB
Griffin Markets Limited	GB
HWh Energimegling AS	NO
ICAP Energy AS	NO
ICAP Energy Limited	GB
Marex Spectron Group Ltd	GB
OTCex SA	FR
Shard Capital Partners LLP	GB
SPX, s.r.o.	SK
Svensk Kraftmäkling, SKM	SE
Tradition Financial Services Ltd	GB
Tullett Prebon (Europe) Limited	GB
Tullett Prebon (Securities) Limited	GB
WSEInfoEngine S.A.	PL

Source: Exchanges, organisations and ACER calculations.

# Annex 14: Benchmark of average gas cross border transportation tariffs

Figure A-26: Benchmark of average gas cross-border transportation tariffs – April 2015

Exit/Entry charges for flowing 1 GWh/day/year in thousand euros



Source: ENTSOG, individual TSOs (2015) and ACER calculations

Notes:

The exercise has been executed on the basis of ENTSOG and TSOs publicly available information. Most IPs charges have been validated by individual TSOs. Nonetheless, in certain instances, there may be missing data or imprecisions in the calculation.

Charges for simulated flows were estimated on the basis of a yearly contract duration signed in April 2015, using units of measurement published by TSOs. In those cases when tariffs units of measurement are not published in yearly basis and/or they differ per period length, direct conversions were performed.

At those market zones borders' featuring more than one cross-border IP - but with dissimilar tariffs - a single charge was appraised per border as the weighted average according to offered capacity per IP and/or distinct TSO. For example, cross-border flows in and out German market zones frequently attract different charges depending on the IP and/or TSOs. The following values present the range (min-max) of charges at German market zones - NCG and GPL - either at their entry or exit sides.

<sup>1</sup> BE to NCG: 60 – 117, NL to NCG: 64 – 133, NL to GPL: 45 – 171, GPL to NL: 123 – 197, CZ to GPL: 137 – 187, GPL to CZ: 36 – 142, AT to NCG: 99 – 133, NCG to AT: 98 – 162, NCG to FR: 117 – 125, NCG to CH: 70 – 162, DE to DK: 117 (from NCG) and 193 (from GPL), DK to DE: 133 (to NCG) and 171 (to GPL), GPL to PL: 127 – 176, NO to DE: 108-133 (to NCG) and 129 (to GPL). For those flows between GPL and NCG the map displays the maximum and minimum E/E values.

In Germany, in certain instances, more than one TSO may be offering capacity in a given IP where the total aggregated capacity is published but the capacity split among TSOs isn't (i.e. Zevenaar IP). The assumption has been made in those cases that capacities

are uniformly shared between TSOs.

<sup>2</sup> On April 2015 a common market area made up of the GRTgaz South and TIGF areas was set up under the name Trading Region South (TRS). Shippers have no longer to subscribe capacities between the two networks. The map displays the present PEG North to TR South and TR South to PEG North charges; just a unique payment – presented here as an entry – is necessary.

<sup>3</sup> The integration of the Luxembourg and Belgian hubs since October 2015 has resulted in the abolition of the BE/LU E/E tariffs. Values displayed correspond to 1st half of 2015.

<sup>4</sup> At Slovakian IPs only a range of potential E/E tariffs can be provided by the TSO since the final price is a function of booked capacity (e.g. without the provision of confidential information it is not possible to calculate an average tariff). The values displayed in the map correspond to maximum possible rates; nonetheless they could be reduced - close to half value - under a different function of capacity bookings for tariffs assessment.

<sup>5</sup> Only high calorific value charges taken into consideration in Blaregnies IP.

<sup>6</sup> E/E tariff model still does not apply in Finland; there is a derogation recognized in the 3rd Gas Directive.

## List of figures

Figure 1:	Overall demand for electricity and gas in the EU-28 (TWh) in relation to GDP (%) – 2008–2014	22
Figure 2:	Share of households with gas, average annual gas consumption per household and overall household consumption – 2014 (MWh and %)	24
Figure 3:	Electricity and gas POTP trends for household and industrial consumers in Europe – 2008–2014 (euro cents/kWh)	25
Figure 4:	Electricity and gas POTP and PTP for households in Europe – 2014 (euro cents/kWh)	25
Figure 5:	Electricity and gas POTP and PTP for industrial consumers – Europe – 2014 (euro cents/kWh)	26
Figure 6:	The year-on-year change in the electricity POTP, energy component and non-contestable part of POTPs for households in Europe – 2013–2014 (%)	27
Figure 7:	The compounded annual growth rate (CAGR) of the electricity POTP, energy component and non-contestable part of POTPs for households in Europe – 2008–2014 (%)	28
Figure 8:	The compounded annual growth rate (CAGR) of the electricity POTP, energy component and non-contestable part of POTPs for industry in Europe – 2008–2014 (%)	29
Figure 9:	The 2008–2014 compounded annual growth rate (CAGR) and 2013–2014 change year-on-year of the gas POTP for household consumers in Europe (%)	30
Figure 10:	The 2008–2014 compounded annual growth rate (CAGR) and 2013–2014 change year-on-year of the gas POTP for industrial consumers in Europe (%)	31
Figure 11:	POTP electricity break-down – incumbents' standard offers for households in capital cities – November–December 2014 (%)	32
Figure 12:	RES component changes in POTP break-downs of offers for a selection of capital cities with the most pronounced growth trends, 2012–2014 (euros and %)	35
Figure 13:	Annual average change in RES charges and the energy component in capital cities – CAGR 2012–2014 (%)	36
Figure 14:	POTP gas break-down – incumbents' standard offers for households in capital cities – November–December 2014 (%)	37
Figure 15:	Energy component changes in the POTP break-downs of gas offers for a selection of capital cities with the most pronounced trends – 2012–2014 (euros and %)	38
Figure 16:	Type of energy pricing of electricity-only offers in capital cities as a percentage of all offers – November–December 2014 (%)	41
Figure 17:	Presence of green electricity- and gas-only offers in capital cities – November–December 2014	43
Figure 18:	Differences in the average dual-fuel offer and combined average single-fuel offers per European capital – November–December 2014	44
Figure 19:	Overall number of suppliers and number of nationwide suppliers active in the retail electricity and gas markets for households in the EU MSs and Norway – 2014	53
Figure 20:	Market share of three largest suppliers (CR3) and the number of main suppliers and number of nationwide suppliers in retail markets for households – 2014.	54
Figure 21:	CR3 in the retail electricity and gas markets for non-households in EU MSs and Norway – 2014 (%)	55

Figure 22:	Entry/exit activity of nationwide suppliers (3-year average) in retail markets for households – 2012–2014 (%)	56
Figure 23:	Dispersion in the energy component of retail prices for households in capitals – December 2014 (euros/year)	58
Figure 24:	POTP price spread and annual savings available from switching from the incumbent standard offer to the cheapest offer on the market in capital cities in December 2014 – (euros/year and %/year)	59
Figure 25:	Number of offers in capital cities and years since market liberalisation – 2014	61
Figure 26:	Switching rates for electricity and gas household consumers in 2014, annual average 2008–2013 and change 2014–2013 (%)	63
Figure 27:	Proportion of electricity and gas consumers with a different supplier than their incumbent supplier – December 2014 (%)	64
Figure 28:	Internal switching rates for electricity and gas household consumers in 2013 and annual average – 2010–2012 (%)	65
Figure 29:	Relationship between switching rates and annual savings available in capital cities – 2014 (%)	66
Figure 30:	Relationship between switching rates and time since market liberalisation – 2014 (%)	67
Figure 31:	Consumer perception of choice of suppliers and the switching process – 2013	68
Figure 32:	Average annual mark-ups in electricity and gas retail markets for households from 2008 to 2014 for electricity and from 2012 to 2014 for gas – (euros/MWh)	72
Figure 33:	Electricity and gas mark-ups in a selection of countries with non-regulated retail prices from 2008 to 2014 for electricity and from 2012 to 2014 for gas (euros/MWh)	73
Figure 34:	Relationship between the wholesale price and the energy component of the retail price and evaluation of mark-up in household segments in countries with non-regulated retail prices from 2008 to 2014 for electricity and from 2012 to 2014 in gas (euros/MWh)	75
Figure 35:	Relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in electricity the household segment in a selection of countries with non-regulated retail prices from 2008 to 2014 – (euros/MWh)	76
Figure 36:	Relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in gas household segments in a selection of countries with non-regulated retail prices from 2012 to 2014 – (euros/MWh)	78
Figure 37:	Relationship between the wholesale price and the energy component of the retail electricity price in the industrial segment in a selection of countries with non-regulated prices – 2008–2014 (euros/MWh)	79
Figure 38:	Overall performance of markets for electricity and gas services by country – 2013 and change on 2012 (index)	82
Figure 39:	Consumer's expectations, trust and perceived offer comparability in retail electricity and gas household markets – 2013	83
Figure 40:	ACER Retail Competition Index (ARCI) for electricity and gas household markets – 2014	85
Figure 41:	The relationship between the level of competition and time since market liberalisation – 2014 (score, years)	86
Figure 42:	The existence of regulated prices in the EU MSs and Norway – December 2014	88
Figure 43:	The difference between regulated POTP price and the cheapest offer in markets with regulated prices – December 2014 (euros/year)	94
Figure 44:	Average switching rates in countries with and without regulated electricity and gas prices – 2008–2013 and 2014 (%)	95
Figure 45:	Factors influencing consumer switching behaviour – 2014 (1 – not at all important; 10 – very important)	97
Figure 46:	Factors preventing electricity and gas consumers from switching – 2014 (1 – not at all important, 10 – very important)	97
Figure 47:	Potential effect of exit fees on annual savings to be made from switching away from the incumbent in Europe – 2014 (% and euros)	99
Figure 48:	Share of electricity disconnections due to non-payment – 2013–2014 (%)	115
Figure 49:	Share of gas disconnections due to non-payment – 2013–2014 (%)	116
Figure 50:	Share of vulnerable customers in electricity – 2013–2014 (%)	120

Figure 51:	Share of vulnerable customers in gas – 2013–2014 (%)	120
Figure 52:	Single point of contact – 2014 (number of countries)	122
Figure 53:	Choice of payment methods – 2014 (number of countries)	123
Figure 54:	Choice of contract terms relating to payment by country – 2014 (number of countries)	124
Figure 55:	Information on household customer bills in MSs – 2014 (number of countries)	124
Figure 56:	Information on household customer bills in MSs – 2014 (number of information elements)	125
Figure 57:	Share of household customers equipped with smart meters for electricity – 2014 (%)	126
Figure 58:	Duration of supplier switching in electricity – 2014 (working days)	127
Figure 59:	Mean share of classification of final household customer complaints directly addressed to NRAs weighted by the total number of complaints (electricity, in total 62,728 complaints)	131
Figure 60:	Share of classification of final household customer complaints addressed to NRAs (electricity, total number of complaints given in brackets) for available countries	132
Figure 61:	Share of classification of final household customer complaints addressed to NRAs (gas, total number of complaints given in brackets) for available countries	133
Figure 62:	Evolution of cross-border traded electricity (DA nominations) for a selection of borders in Europe – 2008–2014 (GWh)	149
Figure 63:	Evolution of European wholesale electricity prices at different European electricity exchanges – 2008–2014 (euros/MWh)	149
Figure 64:	Evolution of generation from wind, solar and gas-fired electricity plants in Europe – 2004–2014 (GWh)	150
Figure 65:	NTCs (averages of both directions) on cross-zonal borders aggregated per region – 2010–2014 (MW)	151
Figure 66:	Change in NTC value per border in the CSE, CWE, and CEE regions – 2010–2014 (MW and %)	152
Figure 67:	Ratio between available NTC and aggregated thermal capacity of interconnectors – 2014 (% , MW)	153
Figure 68:	Interconnection is limited to solve congestions inside the TSO control area – 2014 (%)	162
Figure 69:	Average UFs for three regions – 2014 (MW)	165
Figure 70:	Absolute aggregate sum of UFs for three regions – 2013–2014 (TWh)	166
Figure 71:	UFs mostly negatively impacting cross-zonal trade – 2014 (average capacity loss/gain in MW)	168
Figure 72:	Estimated loss of social welfare due to UFs on selected borders in the CEE, CSE and CWE regions – 2011–2014 (million euros)	170
Figure 73:	Average curtailed capacity and number of curtailed hours per border – 2013 and 2014 (MW and hours/year)	172
Figure 74:	Total curtailment costs per border – 2013 and 2014 (thousand euros)	172
Figure 75:	Congestion revenues – 2014 (million euros)	173
Figure 76:	Approximate forward market volume (traded through exchanges and brokers) as a percentage of demand in Europe – 2014 (%)	175
Figure 77:	Discrepancies between the auction price of PTRs (monthly auctions) and the DA price spreads, before and after market coupling, for a selection of EU borders – various periods (euros/MWh)	179
Figure 78:	Relation between the ratio of requested/offered capacity and risk premia for a selection of TRs in Europe – 2009–2014 (euros/MWh)	180
Figure 79:	Markets with equal DA wholesale prices in NWE countries – hour three on 11 February 2014 (euros/MWh)	184
Figure 80:	DA price convergence in Europe by region (ranked) – 2008–2014 (% of hours)	185
Figure 81:	Monthly aggregated wind and solar production in Germany compared to price differentials in the CWE region – 2014 (euros/MWh and TWh)	186
Figure 82:	Monthly average available cross-border capacity (NTC) from Slovakia to Hungary and Hungarian wholesale electricity prices – 2014 (MW and euros/MWh)	187
Figure 83:	Monthly average price convergence between Slovenia and Italy Nord bidding zones compared to average available cross-border capacity – 2013–2014 (MW and %)	187
Figure 84:	Monthly evolution of price convergence among the Czech Republic, Slovakia,	

	Hungary and Romania – 2014 (%) .....	188
Figure 85:	Percentage of hours with net DA nominations against price differentials per border – 2013–2014 (%) .....	190
Figure 86:	Percentage of available capacity (NTC) used in the ‘right direction’ in the presence of a significant price differential, all EU electricity borders – 2010–2014 (%) .....	191
Figure 87:	Estimated ‘loss in social welfare’ due to the absence of market coupling, per border – 2013–2014 (million euros) .....	192
Figure 88:	Simulation results: gross welfare benefits from incremental gain per border – 2011–2014 (million euros) .....	194
Figure 89:	ID traded volumes in a selection of EU markets – 2011–2014 (TWh) .....	195
Figure 90:	Comparison of (potential) 15-minute schedules versus hourly schedules of electricity generation from solar energy in Germany on 21 June 2014 (MWh) .....	196
Figure 91:	Evolution of ID 15-minute volumes in Germany – 2012–2014 (GWh and TWh) .....	197
Figure 92:	Evolution of the annual level (average values) of commercial use of interconnections (DA and ID) as a percentage of NTC values for all EU borders – October 2010–2014 (%) .....	201
Figure 93:	Level of ID cross-border trade: absolute sum of net ID nominations for a selection of EU borders – 2010–2014 (GWh) .....	202
Figure 94:	Allocation of ID cross-border capacity according to the time remaining to delivery for the French borders with Germany and Switzerland – 2014 (%) .....	203
Figure 95:	Level of utilisation of cross-border capacity in the ID timeframe when it has a value, for a selection of borders – 2014 .....	204
Figure 96:	Weighted average prices of balancing energy activated from aFRR (upward and downward activation) in a selection of EU markets – 2014 (euros/MWh) .....	206
Figure 97:	Level of concentration (CR3) in the provision of balancing services from aFRR (capacity and energy) for a selection of MSs – 2014 (%) .....	207
Figure 98:	Average prices of balancing capacity aFRR (upward and downward reserve capacity) in a selection of EU markets – 2014 (euros/MW) .....	208
Figure 99:	Overall costs of balancing (capacity and energy) and imbalance charges over national electricity demand in a selection of European markets – 2014 (euros/MWh) .....	209
Figure 100:	EU balancing energy activated abroad as a percentage of the amount of total balancing energy activated (upward) from mFRR in national BMs – 2014 (%) .....	212
Figure 101:	EU balancing capacity contracted abroad as a percentage of the system requirements of reserve capacity (upward FCR) – 2014 (%) .....	212
Figure 102:	Imbalance netting as a percentage of the total needs of balancing energy (activated plus avoided activation due to netting) from all types of reserves in national BMs – 2014 (%) ..	213
Figure 103:	Capacity Mechanisms in Europe – 2015 .....	216
Figure 104:	Settlement rules for balancing payments for energy .....	218
Figure 105:	EU gross inland consumption – 2014 (TWh/year and % variation with respect to 2013) .....	222
Figure 106:	International wholesale gas price evolution – 2009 to 2014 (euros/MWh) and event analysis ..	224
Figure 107:	International gas consumption, production and key trade movements during 2014 (bcm/year) ..	226
Figure 108:	Traded volumes at main EU hubs and CAGR – 2012 to 2014 (TWh/year and %) .....	229
Figure 109:	Price evolution of oil and gas hubs in Europe – 2008–2014 (index) .....	236
Figure 110:	Comparison of selected EU MSs hub and cross-border import prices – 2012–2014 (euros/MWh) .....	237
Figure 111:	Day-ahead prices at NWE EU hubs – 2013 to mid-2015 (euros/MWh) .....	238
Figure 112:	Comparison of CEE region MSs Russian supplies and average German import prices – 2012–2014 (euros/MWh) .....	239
Figure 113:	Comparison of selected Mediterranean, South-Eastern and Baltic region MSs with average German import prices – 2012–2014 (euros/MWh) .....	240
Figure 114:	EU MSs assessed gas suppliers’ sourcing prices – 2014 yearly average (euros/MWh) .....	243
Figure 115:	Gross welfare losses per average household consumer in the EU by contrasting suppliers sourcing prices in gas wholesale markets – 2014 (euros/year) .....	244
Figure 116:	EU gas cross-border IPs physical and contractual capacity utilisation – 2014 (%) .....	246
Figure 117:	Unitary net welfare gains considering suppliers sourcing prices in different EU MSs borders – 2014 (euros/MWh) .....	248



Figure 118: Yearly average used versus booked capacity at selected natural gas IPs in the EU – 2012–2014 (GWh/day)	251
Figure 119: EU cross-border gas flows in 2014 and main variations from 2013 (bcm/year)	253
Figure 120: Gas flows across a selection of relevant routes in Central Europe – 2010–2014 (bcm/month)	254
Figure 121: Reverse flow registries in a sample of NWE-CEE cross-border interconnections	255
Figure 122: Interconnection capacity developments on selected CEE and SEE borders – 2010–2015 (GWh/day)	257
Figure 123: CEE region cross-border technical capacities in 2014 (bcm/year)	258
Figure 124: Gas flow developments in Waidhaus (CZ<->DE) and Baumgarten (SK<->AT) in 2014 (GWh/day)	261
Figure 125: Ukraine gas monthly imports during 2014 and yearly comparative with 2013 (bcm/month, bcm/year)	261
Figure 126: Estimated monthly Ukrainian gas import prices during 2014 to June 2015 (euros/MWh)	263
Figure 127: EU gas demand versus gas storage withdrawals and gas storage stock levels – 2010–2015 (GWh)	266
Figure 128: Storage withdrawals as % of domestic winter demand among EU MSs	267
Figure 129: EU storage withdrawals and average seasonal day-ahead prices for the main hubs in Europe – 2010 to 2015 (GWh and euros/MWh)	268
Figure 130: EU aggregate summer gas storage injections and average season +2/season +1 winter/summer price spread (GWh and euros/MWh)	269
Figure 131: Aggregate transmission tariffs levied at gas storage points among EU MSs where storage transmission charges are applied (euros/MWh)	270
Figure A-1: Energy household consumption as a percentage of total consumption across Europe – 2014 (%)	274
Figure A-2: Annual and average annual electricity household consumption in Europe – 2014 (TWh)	274
Figure A-3: POTP electricity break-down – incumbents' standard offers for households in capital cities – 2012-2014 (euros)	275
Figure A-4: POTP gas break-down – incumbents' standard offers for households in capital cities – 2012-2014 (euros)	275
Figure A-5: Number of electricity and gas offers from price comparison tools in ACER database, capital cities – November-December 2013 and 2014	276
Figure A-6: Number of Slovenian electricity household and industrial consumers who have switched supplier – 2007–2014	277
Figure A-7: Type of energy pricing of gas-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)	278
Figure A-8: Average final offer price for electricity and gas per type of energy pricing – European capital cities – November–December 2014 (euros)	278
Figure A-9: Contract duration of electricity-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)	279
Figure A-10: Contract duration of gas-only offers in capital cities as a percentage of all offers, European capital cities – November–December 2014 (%)	279
Figure A-11: Share of dual-fuel offers in the total number of offers for a selection of capital cities where dual-fuel offers appear in price comparison tools – 2013–2014 (%)	280
Figure A-12: CR3 in the retail electricity and gas markets for households in the EU MSs and Norway – 2014 and change from 2009–2014 (%)	280
Figure A-13: Market shares of incumbent suppliers in the electricity and gas markets for households in the EU MSs and Norway in 2014 (%)	281
Figure A-14: The relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in retail electricity household markets 2008–2013 (euros/MWh)	281
Figure A-15: The relationship between the wholesale price and the energy component of the retail price and the evolution of the mark-up in retail gas household markets 2012–2014 (euros/MWh)	284
Figure A-16: Relationship between the wholesale price and the energy component of the retail electricity price in the industrial segment – 2008–2014 (euros/MWh)	287
Figure A-17: A schematic representation of a procurement model	289

Figure A-18: Schematic representation of the proposed calculation of the share of forward procurement, based on demand data for Luxembourg – January–December 2014 (hourly demand, MWh) .....	291
Figure A-19: Schematic representation of a procurement model .....	294
Figure A-20: Existence of exit fees imposed by suppliers when switching offers – 2014 (%) .....	299
Figure A-21: Results of collective switching campaigns from 2011–2015 led by BEUC members .....	300
Figure A-22: Components of total transfer capacity .....	302
Figure A-23: Drawing the value of the reliability margin from the probability distribution .....	304
Figure A-24: Capacity loss calculation .....	305
Figure A-25: Potential annual net welfare gains in different EU MSs if available cross-border capacities were fully utilised following suppliers sourcing prices spreads – 2014, monthly combined (million euros/year) .....	310
Figure A-26: Benchmark of average gas cross-border transportation tariffs – April 2015 .....	316

## List of tables

Table 1:	Year of full market opening and percentage of household and non-household consumers supplied under regulated prices – December 2014 (%)	89
Table 2:	Explicit definitions of the concept of vulnerable customers - 2014	117
Table 3:	Measures to protect vulnerable customers in the EU - 2014	119
Table 4:	Time point of information about energy price changes – 2014	121
Table 5:	Frequency of billing information based on actual consumption – 2014	126
Table 6:	Available number of final household customer complaints per 100,000 inhabitants (electricity and gas) in 2014 received by	129
Table 7:	General information about ADR handling procedures within the MSs	134
Table 8:	DSO services quality monitoring in 2014	145
Table 9:	DSO Service Quality Indicators	146
Table 10:	Application of capacity calculation methods on different borders at different timeframes – 2014 (%)	160
Table 11:	Regional performance based on fulfilment of capacity calculations requirements – 2014 (%)	161
Table 12:	Calculation of secondary definitions	164
Table 13:	Network congestion related volumes and costs of remedial actions – 2014 (GWh, thousand euros)	171
Table 14:	Discrepancies between the auction price of TRs (monthly auctions) and the DA price spreads for a selection of EU borders – indicated periods (euros/MWh)	177
Table 15:	Discrepancies between the price of EPADs (monthly products) and the DA price spreads between the system price and the relevant price in the area – 2011–2014 (euros/MWh)	181
Table 16:	Liquidity in organised markets and the main characteristics of market design in a selection of European ID markets – 2014	198
Table 17:	Comparison of the degree of functioning of gas hubs in 2014 (selected indicators refer to 2013 data)	232
Table A-1:	Electricity and gas consumption and consumer characteristics in Europe – 2014 (TWh, KWh and number of households)	273
Table A-2:	Price comparison websites for the offer data analysis in capital cities	276
Table A-3:	Competition indicators included and the assessment framework for the composite index	297
Table A-4:	Imputed and missing data by country, 2014 data (9 indicators)	298
Table A-5:	Minimum technical and other requirements of smart meters	301
Table A-6:	RMs caused by UFs calculated from 2011–2013 data (MW)	304
Table A-7:	RMs caused by UFs calculated from 2012–2014 data (MW)	304
Table A-8:	Estimated loss of social welfare due to UFs, LFs and UAFs – (million euros)	306
Table A-9:	Estimated capacity loss (-) and capacity gain (+) due to UFs, LFs and UAFs – (MW)	307
Table A-10:	Flow statistics – (MW, GWh)	308
Table A-11:	Organised marketplaces at which electricity and gas were traded	312
Table A-12:	Organised marketplaces at which only electricity was traded	313
Table A-13:	Organised marketplaces at which only gas was traded	314
Table A-14:	Other organised marketplaces	315
Table A-15:	Broker Platforms	315

## List of abbreviations

Acronym	Definition
AC	Alternating current
ACER	Agency for the Cooperation of Energy Regulators
ACM	Autoriteit Consument & Markt (the Dutch regulator)
ADR	Alternative Dispute Resolution
AEEGSI	Autorità per l'energia Elettrica il Gas e il Sistema Idrico (the Italian regulator)
AF	Allocated Flow
AFM	De Autoriteit Financiële Markten (the Dutch Authority for the financial markets)
aFRR	Automatically Activated Frequency Restoration Reserves
AGEN-RS	Agencija za Energijo (the Slovenian regulator)
ANRE	Antoritatea Națională de Reglementare în domeniul Energiei (Romanian Energy Regulatory Authority)
AQC	Annual Quantity Contracted
ARCI	ACER Retail Competition Index
ARENH	Acces Regule a l'électricité Nuclearie Historique
ATC	Available Transmission Capacity
AWT	Average Waiting Time
BAFA	Bundesamt für Wirtschaft und Ausfuhrkontrolle
BEUC	Bureau Européen des Unions de Consommateurs
BM	Blancing Market
BMJV	Bundesministerium der Justiz und für Verbraucherschutz (German Federal Ministry of Justice and Consumer Protection)
BNetzA	Bundesnetzagentur
BRPs	Balance Responsible Parties
BSP	Balancing Service Provider
CACM	Capacity Allocation and Congestion Management (electricity)
CAE	Electricity Acquisition Contracts
CAGR	Compound Annual Growth Rate
CAM	Capacity Allocation Management (gas)
CAO	Central Allocation Office
CASC	Capacity Allocating Service Company
CB	Critical Branch
CCR	Capacity and Climate Reserves
CEE	Central-East Europe (electricity region)
CEER	Council of European Energy Regulators
CEGH	Central European Gas Hub (Austrian gas hub)
CER	Commission for Energy Regulation (the Irish regulator)
CESEC	Central East South Europe Gas Connectivity
CHP	Combined Heat and Power
CMA	Competition Markets Authority
CMEC	Costs for the Maintainance of Contractual Equilibrium
CMO	Congestion Management Procedures (gas)
CMP	Common Merit Order
CNG	Compressed Natural Gas
CNMC	Comisión Nacional de los Mercados y la Competencia (Spanish National Commission for Markets and Competition)
CPAS	Centre Public d'action Sociale (The Belgian Public Centre for Social Welfare)
CRE	Commission de Régulation de l'Énergie (the French regulator)
CREG	Commissie voor de Regulering van de Elektriciteit en het Gas
CRM	Capacity Remuneration Mechanism
CSE	Central-South Europe (electricity region)
CSI	Consumer Satisfaction Index
CWE	Central-West Europe (electricity region)
DA	Day-ahead
DC	Direct Current
DECC	Department of Energy and Climate Change, Government of the United Kingdom
DECO	Associação Portuguesa Para a Defesa do Consumidor (Portuguese Consumer Association)
DG	Directorate General
DSF	Demand-side Flexibility
DSO	Distribution System Operator
DSR	Demand-side Response
EBRD	European Bank for Reconstruction and Development
ECB	European Central Bank
EEX	European Energy Exchange

Acronym	Definition
EFET	European Federation of Energy Traders
EIB	European Investment Bank
EMOS	Energy Market Observatory System
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
EPAD	Electricity Price Area Differentials
ERGEG	European Regulators' Group for Electricity and Gas
ERI	Electricity Regional Initiative
ETM	Electricity Target Model
EU	European Union
FB	Flow Based
FBI	Flow-based Intuitive
FBMC	Flow Based Market Coupling
FCR	Frequency Containment Reserves
FG	Framework Guidelines
FGSZ	Hungarian NRA
FRR	Frequency Restoration Reserves
FTR	Financial Transmission Right
GCT	Gate Closure Time
GDP	Gross Domestic Product
GGP	Guidelines of Good Practice
GL	Guidelines
GPKE	Geschäftsprozesse für die Kundenbelieferung mit Elektrizität (German Decision setting the standard for supplier switching)
GPN	Danish Gas Exchange
GRAPA	Guaranteed Income for Elderly Persons and the Income Guarantee for the Elderly (GRAPA)
GRI	Gas Regional Initiatives
GSK	Generation Shift Keys
GTM	Gas Target Model
HHI	Herfindahl-Hirschman-index
HVAC	High-voltage Alternating Current
HVDC	High-voltage Direct Current
ID	Intraday
IEA	International Energy Agency
IEM	Internal Energy Market
IGGC	International Grid Control Cooperation
IGU	International Gas Union
ILR	Luxembourg NRA
IMF	International Monetary Fund
IP	Interconnection Point
IPA	IPA Advisory Limited
IQT	Total Quality Index
ISEE	Indicatore Della Situazione Economica Equivalente (equivalent economic status indicator, Italy)
ISP	Imbalance Settlement Period
LF	Loop Flow
LNG	Liquefied Natural Gas
LS	Level of Service
LT	Long-term
LTTR	Long-term Transmission Rights
mcm	Million Cubic Metres
mFRR	Manually Activated Frequency Restoration Reserves
MMR	Market Monitoring Report
MPC	Mandatory Procurement Component
MPC	Mandatory Procurement Component
MPI	Market Performance Index
MS	Member State
NBP	National Balancing Point (GB gas hub)
NC	Network Code
NCG	Net Connect Germany (one of Germany's gas hubs)
NRA	National Regulatory Authority
NTC	Net Transfer Capacity

Acronym	Definition
OCU	Organización de Consumidores y Usuarios (Spanish Organisation of Consumers and Users)
OPCOM	Societatea Operatorul Pieței de Energie Electrică și Gaze Naturale "OPCOM" S.A. (Romanian gas and electricity market operator)
OTC	Over-the-counter
PA	Partial Score Related to Access to Service
PCI	Project of Common Interest
PCR	Price Coupling Region
PCT	Price Comparison Tools
PEG	Point d'Echange de Gaz (the name of France's gas hubs; Nord, Sud and TIGF)
POLPX	Polish Gas Exchange
POTP	Post-tax Total Price
PPA	Power Purchase Agreement
PQ	Partial Score Related to Quality of Service
PRISMA	Platform for European Gas Capacity Booking
PSC	Partial Score Related to the Call-back Survey
PSO	Public Service Obligation
PSV	Punto di Scambio Virtuale (the Italian gas hub)
PTDF	Power Transfer Distribution Factor
PTP	Pre-tax Total Price
PTR	Physical Transmission Right
PVPC	Precio Voluntario al Pequeño Consumidor
PX	Power Exchange
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
RES	Renewable Energy Sources
RM	Reliability Margin
RMR	Retail Market Review (UK)
RR	Replacement Reserve
SA	Service Accessibility
SCH	Schedule
SEE	South-East Europe (electricity region)
SEPA	Single Euro Payments Area
SoLR	Supplier of Last Resort
SSE	South-South East
SWE	South-West Europe (electricity region)
TEN-E	Trans-European Energy Networks
TF	Transit Flows
TOS	Taxa de Ocupacao de Subsolo
TPA	Third-party Access
TR	Transmission Right
TSO	Transmission System Operator
TTF	Title Transfer Facility (the Dutch gas hub)
TUR	Tarifa de Último Recurso (Tariff of Last Resort)
TYNDP	Ten Year Network Development Plan
UAF	Unscheduled Allocated Flow
UF	Unscheduled Flow
UGS	Underground Gas Storage
UIOLI	Use-It-or-Lose-It
UIOSI	Use-It-or-Sell-It
URE	Urząd Regulacji Energetyki (the Polish regulator)
UTF	Unscheduled Transit Flow
VAT	Value Added Tax
VKI	Verein für Konsumenteninformation (Consumer Association of Austria)
VoLL	Value of Lost Load
VREG	Vlaamse Regulator van de Elektricitets- en Gasmarkt (the Flemish regulator)
VTP	Virtual Trading Point
ZEE	Zeebrugge-Beach (the Belgian physical interconnection point)
ZPS	Zveza Potrošnikov Slovenije (Slovenian Consumer Association)
ZTP	Zeebrugge Trading Point, the New Belgian Gas Hub



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