CEER

Council of European Energy Regulators

Fostering energy markets, empowering **consumers**.

LNG TF

Removing LNG barriers on gas markets

CEER report

Ref: C17-LNG-32-03
1 December 2017

Council of European Energy Regulators asbl
Cours Saint-Michel 30a, Box F – 1040 Brussels, Belgium
Arrondissement judiciaire de Bruxelles – RPM 0861.035.445

INFORMATION PAGE

Abstract

The main objective of this report is to identify barriers on LNG markets, regarding the services offered by the terminals and the tariffs applied, and suggest ways to overcome them.

The report contains a preliminary outlook of LNG market at world and European level, looks specifically at the services provided by EU LNG terminals and the tariffs applied. The report points out the diversity and the great differences between terminals, whose services and tariffs have been established according to particular national circumstances and without a wider European gas market focus.

CEER has identified some barriers, primarily related to: the lack of transparency in both, services and tariffs; the difficulties to understand the particular conditions of services at each terminal; the lack of services development and underline the differences between tariffs.

The findings of this report are intended to improve access to LNG terminals and to facilitate the role of LNG in the European market.

Target Audience

European Commission, National Regulatory Authorities, Member States, energy suppliers, traders, gas customers, gas industry, consumer representative groups, LNG and other network operators, academics and other interested parties.

Keywords

Gas; liquefied natural gas; LNG terminal; LNG services; LNG tariffs; National Regulatory Authorities; European Commission; LNG barriers.

If you have any queries relating to this paper please contact:
Mr Andrew Ebrill
Tel. +32 (0)2 788 73 30
Email: brussels@ceer.eu

Related Documents

- "Removing barriers to LNG and to gas storage product innovation", CEER, October 2016.
- "Communication from the Commission to the European Parliament, the Council, the European economic and social committee and the committee of the regions on an EU strategy for liquefied natural gas and gas storage", EC, February 2016
- "CEER Analysis on the role of LNG to improve security of supply", CEER, February 2016, Ref: C15-LNG-25-03.
- "CEER Status Review on monitoring access to LNG terminals in 2009-2013", CEER, September 2014, Ref: C14-GWG-111-03.
- "CEER Monitoring Report on Implementation of the Transparency Template in the European LNG Terminals", CEER, 20 December 2013, Ref.C13-GWG-102-04.
- "CEER Status Review and evaluation of access regimes at LNG terminals in the EU", CEER, 12 March 2013, Ref. C12-LNG-15-03.

Table of Contents

EXECUTIVE SUMMARY

Background

Imports of natural gas account for more than 70% of total EU gas supply, of which 12% is LNG (Liquefied natural gas). Domestic conventional EU production is in continuous decline. As import dependence increases, the EU market becomes more heavily exposed to global gas market dynamics. In this context, LNG terminals can play an important role in the European gas market. LNG import capacity contributes to security of supply and diversification, provides flexibility to the system and allows for greater competition both in the upstream and downstream gas market.

The role played by LNG demand in Europe differs from one country to another, depending mostly on supply characteristics, geographical situation, capacity of the LNG terminals, level of gas demand and downstream market developments. How to enjoy LNG benefits at EU level must be further explored.

Objectives and Contents of the Document

The main objective of this report is to identify barriers on LNG markets regarding the services offered by the terminals and the tariffs applied and suggest ways to overcome them.

This report starts with an outlook of LNG markets at both world and European level. Even though the focus is on existing terminals, it also contains a particular consideration of new LNG terminals in Eastern Europe.

The report continues with an analysis of the main technical characteristics of existing EU terminals, as well as a compendium of the services provided by them. The services can be either bundled or unbundled. The analysis of the services is followed by an analysis of the tariffs applied at regulated LNG terminals. Each section concludes with some considerations and barriers identification concerning both services and tariffs.

Finally, the report contains a summary of the views gathered from stakeholders on existing/potential barriers with regard to access LNG across EU, according to the result of the public consultation conducted with that purpose.

Brief summary of the conclusions

Based on the findings of this report, evidence of barriers on gas markets regarding the services offered by LNG terminals and the tariffs currently applied have been identified.

Concerning the services provided by LNG terminals, we have noticed that even though some information is available for users, in many cases it is not easily accessible, not in English, difficult to understand or, simply, it is not updated.

CEER considers that transparency is a key issue to improve access to LNG terminals that contributes to foster the use of these infrastructures and liquidity. We encourage NRAs to address this issue with LSOs, assuring the publication of the information in both, national and English languages, in a comprehensive and accessible way, including explanatory documents, with examples of each service. The information should be regularly and appropriately updated.

Although there is a high disparity on the type and number of services offered, CEER considers the lack of standardization not to be bad per se, as services heavily depend on the particular circumstances of each terminal. Nevertheless, the provision of additional services to the extent possible would result in a higher degree of flexibility for users enhancing market competition.

Additionally, LNG services shouldn't be static but adapt to the changing conditions and, as LNG market evolves, new services could arise, contributing to facilitate the emergence of possible LNG hubs/markets at European level.

CEER encourages National Regulatory Agencies (NRAs) and LNG System Operators (LSOs) to evaluate the services offered at their terminals and to value the necessity and possibility of broadening the catalogue, either to increase the flexibility of existing services or as additional services. Conducting analysis of the services offered by the rest of EU terminals and public consultations would be valuable tools for this purpose.

As far as tariffs are concerned, and similar to what was found about services, there is a lack of transparency on the relevant information. Nevertheless, a few terminals provide tariff simulation tools, which proves to be very useful for existing and potential users.

CEER considers transparency as a prerequisite to facilitate and enable users to understand and value the costs of the services offered at each LNG terminal. We encourage NRAs to address this issue, assuring the publication of the relevant information in both, national and English languages, in a comprehensive and accessible way. Furthermore, the information should be regularly updated and complemented with examples and simulation tools. These are considered to be not only very useful but a crucial instrument to understand the application of the tariffs under any circumstance.

Concerning the level of the tariffs applied to LNG services, there are notable differences between terminals. In fact, for the case of study analysed in this document, tariffs vary from 0.1 to almost 4 €/MWh. Some countries also apply multipliers which widen these differences.

CEER acknowledges that the remarkable differences on LNG tariffs can be due to many reasons. As long as tariffs respect all the regulatory relevant tariff principles and relevant European regulation in place, in particular avoiding unjustified cross-subsidies between users and/or countries, we would not identify any fundamental barrier on this matter.

1 INTRODUCTION

In 2015, imports of natural gas accounted for 72% of total EU gas supply, of which 12% was LNG. Domestic conventional EU production is in continuous decline. As import dependence increases, the EU market becomes more heavily exposed to global gas market dynamics. In this context, LNG terminals can play an important role in the European gas market. LNG import capacity contributes to security of supply and diversification, provides flexibility to the system, and allows for greater competition both in the upstream and downstream gas market.

The role played by LNG demand in Europe differs from one country to another, depending mostly on supply characteristics, geographical situation, capacity of the LNG terminals, level of gas demand and downstream market developments. How to enjoy LNG benefits at EU level must be further explored.

In 2016, the CEER LNG TF activities were focused on gathering views from stakeholders on existing/potential barriers, in particular with regard to bringing LNG volumes into the EU, access to LNG and how to spread LNG across EU. A questionnaire was launched by CEER in July. A workshop was also held in September in Athens, where some structural and operational barriers were identified. In January 2017 an Evaluation of Responses (EoR) document was produced, which summarised the key messages from stakeholders and CEER views.

Also in 2016, on 16 February, the European Commission (EC) published a package of proposals focusing on gas security of supply. This package included a Communication on an EU strategy for liquefied natural gas (LNG) and gas storage. The Commission's strategy aims to exploit the potential of LNG and storage to make the EU gas system more diverse and flexible, thus contributing to the key Energy Union objective of a secure, resilient and competitive gas supply. In order to achieve this goal, it focuses on three main themes: completing missing infrastructure, completing the internal gas market, and the EU as a player on international gas markets. The underlying principle guiding the strategy is that well-functioning markets should deliver this diverse and flexible gas system. This aligns with the principles set out in the CEER response to the Commission's consultation on the strategy and other recent CEER documents, such as the Storage Vision and the CEER analysis of the role LNG to improve security of supply. CEER therefore welcomes the Commission's focus on ensuring access to liquid markets as the main driver to ensure European gas flexibility markets work in the interests of consumers.

Following the LNG and storage strategy Communication, EC has commissioned a follow-up study to LNG and storage strategy. A consortium of external consultancies has been appointed with the aim of helping to further define specific actions identified in the LNG and storage strategy in order to support their timely implementation. The underlying assessment should cover the internal EU side – both infrastructure and regulatory assessment in terms of barriers to seamless regional cooperation and access to infrastructure – and international aspects. The study has been followed-up by a steering committee where CEER has actively participated through their representatives from LNG and storage task force.

In this context CEER LNG task force has developed the current analysis, focused on how to remove LNG barriers on gas markets regarding the services offered by LNG terminals and the tariffs currently applied, in order to contribute to the EC LNG and storage strategy.

2 LNG MARKETS OUTLOOK

With the development of important regasification capacities all over the continent, LNG has been an important driver for competition in the EU. The flexibility offered by new terminals and the regulatory arrangements facilitating spot deliveries contributed to develop hub-based price references offering a discount upon oil-indexed contracts. Nevertheless, since 2011, global LNG trades have been affected by important fluctuations related to the relative attractiveness of different markets. Asia has appeared as the main alternative destination for LNG; when additional gas is needed, Asian importers offer premiums which push prices upwards and reduce deliveries to Europe. For the past few years, the EU has provided flexibility to the global market mainly absorbing shocks on demand.

While the current report mainly addresses internal barriers to LNG, it is important to have a view to potential developments beyond Europe to assess the potential availability of LNG and how to best support EU's attractiveness.

2.1 World LNG markets

Historically, the LNG market has been animated by a small "club", with only a handful of exporting and importing countries. LNG trade has however progressively grown, now representing a total amount of 264 million tons, being transported around the globe by a fleet of 478 vessels. In 2016, there were 19 exporting countries and 39 importing countries, and new ones are regularly joining the list, for instance with Bangladesh recently signing its first LNG import contract with Qatar, to be supplied via a Floating Storage and Regasification Units (FSRU) expected for April 2018.

LNG trade occurs mainly within two regions: the Atlantic basin and the Pacific basin. There are relatively few connections between these two basins because of logistical constraints and shipping costs. As a result, the LNG market is not global by nature, but holds strong regional characteristics. This is illustrated in the map below which gives an overview of major flows observed in 2016.

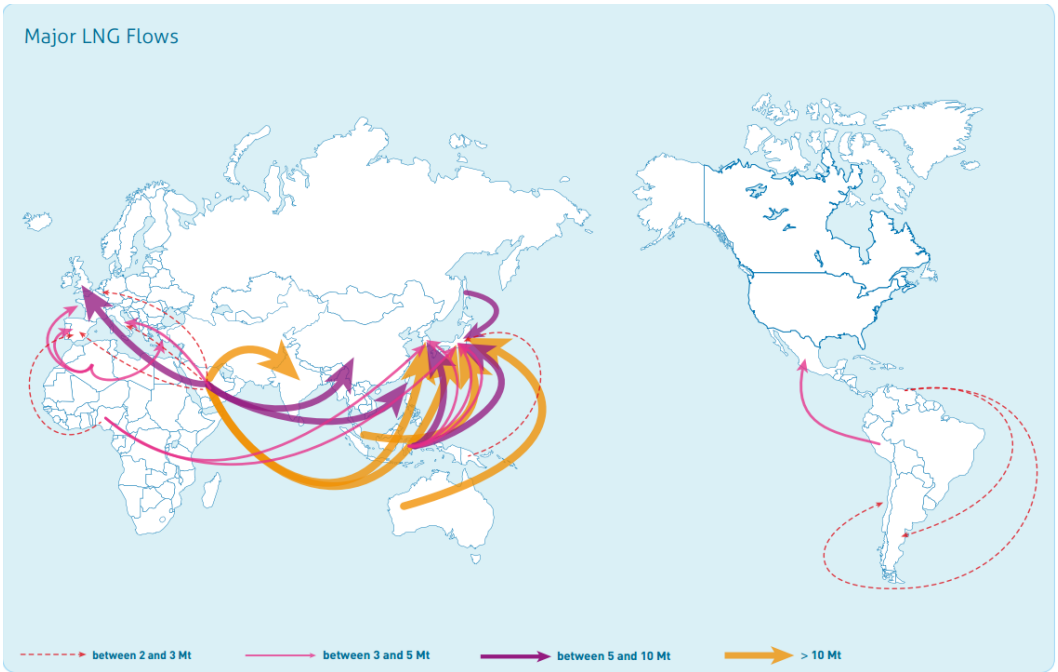


Figure 1 – Major LNG flows observed in 2016. Source: GIIGNL

Demand

As displayed in the LNG trade map, Asia has the highest concentration of LNG imports. The LNG consumption in Asia has historically emerged following security of supply[1] and environmental considerations. It now represents the bulk of the global demand with 73% of total LNG imports in 2016. Japan, South Korea and China represent the top 3 importing countries, accounting respectively for 32%, 13% and 10% of the world total in 2016. Other large importing countries are India and Taiwan, representing respectively 7% and 6% of global demand.

Asian demand is thus a major driver for global LNG trade. Following the Fukushima nuclear incident, Japan's demand for gas substantially increased. Japan developed important spot LNG sourcing, paying a high premium on prices. These premiums affected the European market: high prices on LNG led to high wholesale prices in regions depending on LNG for their supplies, including the Iberian Peninsula and the south of France. This tension has been easing as from 2014 thanks to the restart of nuclear power and a slower economic growth in China.

Europe is the second largest importing region, accounting for 15% of total LNG demand in 2016. Nowadays, Europe can be seen as a relatively small importer, with only a few countries significantly relying on LNG (Spain, UK, France, Italy), even though pipeline imports remain dominant. The EU is in fact characterised by a strong competition between LNG and pipeline gas coming from a few external producers (Russia, Norway, Algeria, Libya).

After sharp decrease until 2014, the European demand for gas has regularly increased in the last years. In spite of more competitive prices, LNG imports have not fully recovered and they remained 40 % lower in 2016 than in 2010, when they peaked at 82 bcm.

Supply

According to the recent developments, LNG supply is expected to strongly increase with the expected commissioning of important liquefaction capacities, mainly in Australia and in North America. By 2020, the total export capacity could reach 600 bcm compared to 415 bcm in 2015. This trend results from different factors: increase in gas production through the development of unconventional resources, anticipation on high prices before the oil price turmoil in 2014 and expected developments on demand, mainly in Asia.

[1] This trend started in Japan in the 1970's – until then strongly dependent on the oil supply from the Middle East – following the 1st oil crisis.

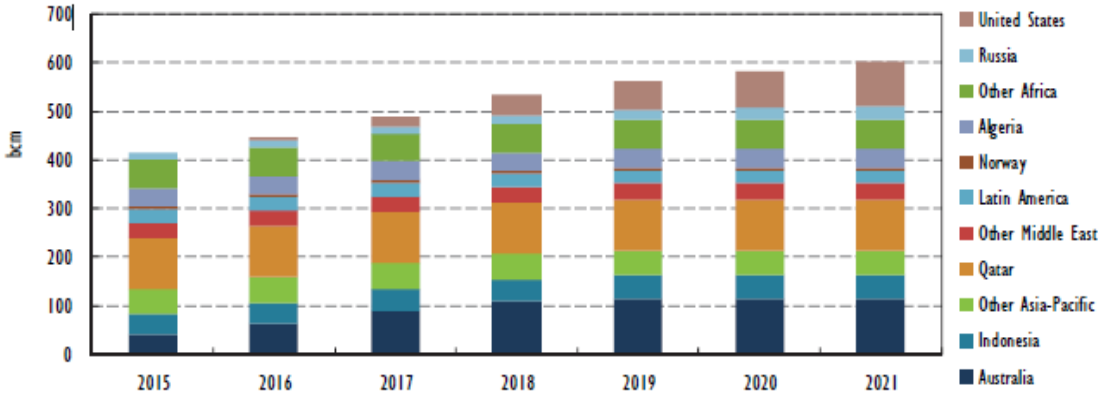


Figure 2 – Expected evolution of LNG export capacity. Source: IEA

Qatar has been the 1st LNG exporter for several years now. The recent period has been marked by the diplomatic crisis it faced with its regional neighbours, resulting in particular in a terrestrial blockade. This crisis created uncertainty in Qatar's exports, however Qatar could keep its LNG supplies. It even announced its intention to increase in the short term its production cap from 77 Mt/year to 100 Mt/year.

In Australia, numerous projects have reached FID. If all these projects were to be completed, Australia would become the 1st LNG exporting country (currently 2nd) by 2020, mainly targeting the Asian markets, the pacific Basin being the "natural" destination for Australian LNG. Nevertheless, as a result of this strategy which consists in maximizing LNG exports, gas prices are pushed upwards on Australia's domestic market, with negative impacts on power prices and security of supply. In response, the Australian government announced that it envisaged to restrict gas exports[2]. It is yet to see if this perspective materialises and if it has a detrimental effect on LNG projects.

The shale gas revolution in North America has led to a very strong increase in domestic gas production. As a result, the US are turning from a net importer to an exporter, with the development of important liquefaction capacity, in particular on sites initially dedicated to regasification. The Sabine Pass terminal was the first one to be commissioned, with first shipments in 2016, and more projects are expected to come online in the coming years, mostly on the Atlantic side of the US. So far, the main destinations of American LNG were South America and Asia, Europe being more marginal in terms of number of cargoes.

Trade – Pricing of LNG & contracts

After several years characterised by high LNG prices driven by increased demand in Japan, the prices of LNG have eased with the restart of nuclear power plants in Japan. The global situation of the LNG market, with a sharp increase in supply, is likely to continue to put a downward pressure in prices.

On the contracts side, a trend towards shorter term/spot and more flexible LNG contracts has been observed in the recent years, which contrasts with the traditional long term contractual

[2] This should be examined every year based on forecasts of energy demand and of security of supply.

structures (typically 20 years) historically associated with LNG infrastructures[3]. Market pricing of LNG is still not the norm but increasing, as it represented 31% of traded volumes in 2015.

This trend is supported by the dynamics of supply and demand. On the demand side, more flexibility is needed to accommodate rapid variations in gas demand, as a result of the liberalization of energy markets in Europe – and more recently in Japan – the development of trading hubs and of the suppression of destination clauses under the impulsion of the European Commission. This combination of events makes the case for re-exporting LNG on the spot market, to manage overcontracted volumes or to take opportunity of higher prices in another region. On the supply side, shorter term/spot trading can be useful to market spare capacity and to manage redirection of cargoes in response to contracting demand.

In this context, new LNG projects are expected to proceed without full coverage of long-term contracts. Even though they will still be needed to a large extent, they may be signed for a shorter timeframe – e.g. 10 years.

This trend goes alongside an evolution in terms of commercial conditions, namely FOB (free on board) and DES (delivered ex ship) conditions. With FOB contracts, buyers take responsibility of the LNG cargo when it is loaded – and thus assume shipment risk – whereas with DES contracts this risk is assumed by the seller who transfers property of the LNG at the delivery point. While DES contracts still represent 2/3 of long-term contracts, an increase in the share of FOB contracts can be observed.

2.2 European LNG markets

When looking specifically at the European market, the first thing to observe is the relatively low share of LNG in total gas demand. As a whole, LNG imports covered 13% of total EU gas imports in 2016, approximately the same as in 2015. Behind this average figure, the share of LNG varies strongly among Member States. For instance, in Spain LNG share was 44% in 2016 (with a historical high point at 77 %), in UK LNG was responsible for 14% of 2016 gas demand in the country (in 2015 this value was 19%), 9% in Italy, 17% in France or 25% in Belgium.

This low penetration of LNG is not a matter of insufficient infrastructure, since the EU is generally well equipped (section 3 gives an overview existing terminals), with numerous terminals being utilized well below technical capacity. However, some regions of the EU are less equipped. It is rather explained by market trends, with Europe acting as a market of last resort for LNG and consequently European LNG imports being highly dependent on situations in other regions.

In spite of this current situation, a general expectation is that LNG will take a greater role in the future of Europe supply, driven by several factors:

- Large availability of LNG regasification terminals, illustrated by the low utilization rate of existing infrastructures.
- Availability of additional LNG volumes due to the expected wave of LNG projects – even though not all these volumes will be targeted to Europe.
- Decrease of the indigenous gas production – in particular from the Netherlands.
- Increased gas demand for electricity production.

[3] By providing certainty on future cash flows, these long term contracts help securing the financing of capital intensive LNG infrastructures.

The increased penetration of LNG in Europe is also supported by the European Commission, which sees an opportunity to improve security of supply though greater diversification of supply.

There are however several factors of uncertainty associated to this expectation.

Regarding demand, we are yet to see if a perspective of increased gas demand in Europe is reasonable. For instance, some of the latest scenarios by ENTSOG in the Ten-Year Network Development Plan (TYNDP) retain a decreasing perspective, which corresponds to EU policy objectives. In these scenarios, the increased use of gas-fired power plants to accommodate the variability of renewable production does not compensate the increased use of electricity.

Furthermore, the availability of LNG surpluses for Europe will depend on the effective realization of additional liquefaction projects as well as the demand in other regions and particularly in Asia.

The attractiveness of the European market for LNG will mostly be driven by market prices, with competition with pipe gas and the interaction with Russian imports being particularly important. If European market prices remain at a level lower than other regions, there may not be a case for increased LNG supply to Europe. Conversely, in a scenario of sustained low LNG where Gazprom pursues a market share strategy, LNG could put a downwards pressure on prices for Russian gas with a positive impact on the European gas bill.

Last but not least, another critical factor to take into account are the respective market characteristics, in particular market depths and market liquidity. The possibility of actually selling the entirety of LNG cargoes may be at least as important as the price associated. For small markets, the lack of trading opportunities for large volumes of gas, and the impact of such volumes on prices may represent a risk which hinders the willingness of LNG suppliers to reach them, even though spot market prices would justify it.

2.3 Eastern Europe new LNG terminals

The question of LNG penetration takes a different note when looking specifically at Eastern Europe. In this region characterised by high dependency on Russian imports for gas demand, the perspective of supply diversification through LNG import is particularly thought after, both for geopolitical(limit the economic influence of Russia) and economic reasons, with prices in this region being generally higher than those in other European countries.

In this perspective, new LNG terminals have been commissioned in the recent years in Lithuania (Klaipeda) and in Poland (Świnoujście) and other terminals are planned in the region. These terminals are expected to give access to diversified sources of gas for these countries and for their neighbours.

It is worth noting that these new terminals saw the arrival of first shipment of American LNG in summer 2017. These punctual events have taken a particular connotation in the context of the new US strategy of so-called “energy dominance”, which corresponds to increased energy exports, in particular in Eastern Europe and in Asia. The possibility of long-term contracts between the US and Poland has been raised in this context.

In any case, future flows of LNG in these terminals will depend on market conditions rather than political considerations and on the willingness of Eastern Europe countries to pay a premium for a sustained period of time.

A more certain perspective is that they are likely to have a positive effect on the bargaining power of these countries towards Russia, enabling them to negotiate lower prices for future contracts.

3 TAKING THE PULSE OF STAKEHOLDERS: KEY MESSAGES

LNG TF activities have also been focused on gathering views from stakeholders on existing/potential barriers, in particular with regard to bringing LNG volumes into the EU, access to LNG and how to spread LNG across EU. With this aim, in 2016 CEER launched a public consultation and held a workshop on 12 September in Athens, trying to identify some structural and operational barriers. Below we summarise the conclusions of both processes, reflecting the key messages of the stakeholders related to both services and tariffs.

In summary, the barriers identified for LNG in Europe include both structural and operational barriers. Structural barriers are related to European regulation in relation to infrastructure and SoS, and national regulation that some say potentially clash with the rational of a single liquid European gas market (easy to access and therefore attractive for LNG or any other gas source). The operational barriers are related to the particular rules at each terminal (mainly for access), lack of flexible products adapted to market needs, both in the terminals but mostly in the transmission networks, problems related with new gas quality requisites, tariff regimes, etc.

There are barriers related to the way terminals offer the access to different services. Some shippers mentioned that key terminal documents are not in English or the various rules to access the slots of the LNG terminals increase the difficulty to ship LNG in the EU. Concerning transparency, Gas LNG Europe (GLE) template is considered to be a very useful tool, but users encourage LSOs to duly fulfil with and update it on a permanent basis.

Some stakeholders complained about the complexity of the services offered by LSOs, stating that their lack of harmonisation introduces an additional difficulty to access some terminals where, only decoupled LNG products are offered. In other terminals, more unbundling should be permitted to increase the flexibility of LNG. In this sense, they suggest a minimum set of standardised products proposed by LSOs and, when it doesn't exist, to develop at least a bundled (full package service) product.

It is generally considered that LSOs are already developing new services to respond to the changing market conditions and underlined that there is a strong demand for additional services such as cargo reloading, bunkering, truck loading, transhipment or additional send out flexibility. LNG terminals are competing with each other, therefore it is in their commercial interest to meet market demand. Moreover, through the provisions of new services LSOs are also reducing the risk of financial losses due to the low utilization rate of their terminals. Although LNG operators are able to adapt to changing market conditions, a few stakeholders underlined that the speed to which they are able to change is also an important aspect.

Regarding the easiness to acquire capacity at LNG terminals, for some stakeholders, parties interested in acquiring slots at LNG-terminals often face various national rules that often differentiate between primary and non-primary capacity holders. Whereas terminal users consider that access procedures to terminals and to the secondary market should be harmonised, LSOs consider that a full harmonization of access conditions could result in reducing competition among terminals

The regulation, or the role of the regulators, is to be facilitators of the market development. Stakeholders consider there is no need for further regulation: warnings were even raised regarding future potential regulatory barriers that could have a negative influence on LNG volumes being shipped to the EC. So the role of regulators should be first and foremost to standardise, harmonise (when relevant) and implement current regulation and best practices.

With regard to tariffs, stakeholders complained about high regasification and transmission tariffs. They generally consider that LNG contribution to SoS is not enough taken into account (mechanisms are solely based on storages) and there should be a level playing field among the different flexibility sources. Nevertheless, there is no full consensus among users about this issue, as some propose a discount on entry tariffs of LNG into the network so that LNG can be more competitive, while others consider this option as “discriminatory and that could create cross subsidies between network users as not all players are users of LNG or not at the same proportion”.

Some users consider that while the question of LNG tariffs is a global issue, there are also local issues linked to these tariffs, in particular, when the boundaries between LSO, TSO and Storage System Operator (SSO) are not clear.

In relation with new terminals, when taken the decision to invest in a new infrastructure, there are many influencers apart from the company willing to do it: the political support, the Projects of Common Interest (PCI) list and the decision of the regulator that, in the end, for the regulated terminals is the one that needs to make sure that the economics will work. All this criteria influence the final tariffs to access the terminal.

Some shippers are worried about the possibility that when long term access contracts end, the tariffs will increase in order to recover the cost of the infrastructure, which will have a negative impact on the LNG volumes being shipped to the EU.

There is also an issue linked with cross-border tariffs in Europe, as some stakeholders say that it might prevent a seamless access to LNG arriving from other entry-exit zones. The tariff issue will become central for market players that do not have a direct access to a LNG terminal within their entry-exit area (tariff pancaking effect).

Several additional ideas and problems regarding tariffs of the terminals were mentioned:

a. how to finance an infrastructure that is built mainly for SoS reasons, whose utilization is not assured on normal basis;
b. if there are cross subsidies between infrastructures, namely regasification and transmission, how is it possible to foster the use of the regasification terminals, how to access inner countries (the problem being the harmonisation/simplicity of access rules to cross borders, avoiding pancaking of tariffs);
c. how can regulators assure that the national/neighbouring countries demand is in place, justifying the decision to build;

d. if the regulated regime is the more suitable one, it is preferable to develop the terminal only if there is a market demand (therefore a long term commitment would give certainty to both the infrastructure developers that will recover the investment, and to the suppliers assuring they are going to be able to access the market in the long term).

4 ACCESS TO EUROPEAN LNG PLANTS: SERVICES AND TARIFFS

4.1 Update on existing EU regasification plants

The first European LNG plant was built in Spain (Barcelona terminal) where, in 1969, an LNG unloading, storage and regasification operation took place in Europe for the first time. This was the starting point to a new way of natural gas supply to Europe, allowing at the beginning a country far away from significant production regions to access this energy and, later on, allowing Europe to diversify the supply routes and sources.

During the seventies, two more terminals started to operate, one in 1971, in Italy (Panigaglia terminal), and other in 1972, in France (Fos Tonkin terminal). During the eighties there were four new terminals, while in the nineties none, and it wasn´t until the beginning of the 21st century that LNG infrastructures started to significantly grow. Between years 2000 and 2010 nine new terminals started to operate and from 2010 up to now nine more.

At the time of writing this report (by mid - 2017), there are **25 LNG regasification terminals in the European Union** in commercial operation.

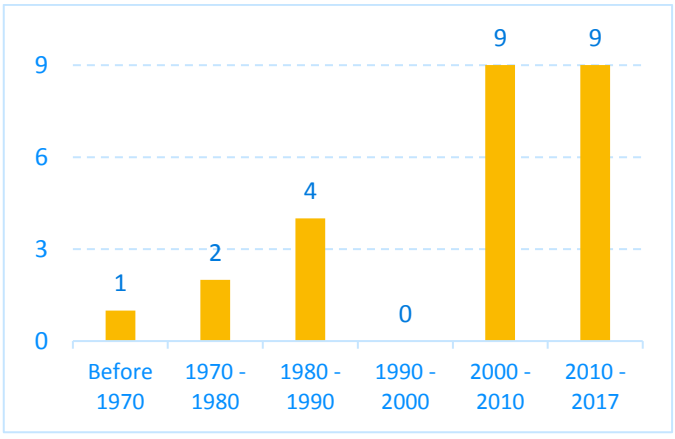


Figure 3 – Number of European LNG terminals starting the commercial operation in the different decades.

Spain is the country with the highest number of LNG plants, accounting for 6 terminals, followed by France, with 4, Italy and United Kingdom, with 3 each of them, Sweden with 2 terminals and Belgium, Finland, Greece, Lithuania, The Netherlands, Poland and Portugal, with just 1 terminal each of them.

Apart from the existing 25 terminals, there is also 1 additional plant in hibernation status (in Spain) and many other new LNG projects (in different development phases), which are not considered in this report.

Technical characteristics of the terminals are very diverse, in terms of regasification capacity, LNG storage, maximum docking capacity or truck loading capacity.

Concerning regasification, the total capacity of EU terminals amounts to almost 7.000 GWh/day (considering nominal send-out terminal's values). This regasification capacity would be enough to cover up to 51% [4] of European natural gas demand in 2016 (assuming sufficient transportation capacity).

As for LNG storage, the total European capacity amounts to 9.2 million of LNG cubic meters, which in terms of consumption would be capable to supply only between 4 and 5 days of the European gas demand (considering the average daily demand).

In terms of docking capacity, the majority of the terminals are already prepared to receive up to Q-Max cargoes (266,000 m^3 LNG), although some of them can only receive small to medium ships, up to 75,000 m^3 LNG cargoes.

Most of the terminals are onshore plants, with three exceptions: Porto Levante terminal (Italy) which is an offshore terminal, Klaipèda (Lithuania) and Toscana (Italy) which are Floating Storage and Regasification Units (FSRU).

Concerning other technical parameters:

- Minimum LNG storage capacity - This parameter, also referred as heel, is the minimum level of LNG that tanks must, for technical reasons, retain in order to be able to operate. The values depend on the tanks, age, technology, etc., and typically, they use to be between the interval of 2 % to 10%, although exceptionally reach 25%.

- Minimum send-out rate - This parameter is the minimum regasification value that guarantees the terminal's normal operation. It is quite variable, and varies a lot between terminals, from 1% of the nominal send-out capacity to more than 50%.

- Regasification pressure - It depends very much on the standard maximum pressure values established in each country, and it is between 54 and 90 bars.

- Ship unloading capacity - This parameter refers to the maximum flow (m^3 LNG / h) or speed at which the LNG can be unloaded from ships to the terminal. It used to be greater than the opposite operation (ship loading capacity), and it is between 5,000 and 14,000 m^3 LNG / h.

- Ship loading capacity - This parameter is the maximum flow (m^3 LNG / h) or speed at which the LNG can be loaded from the terminal to ships. At EU terminals this is normally between 500 and 9,000 m^3 LNG / h.

- Lay time - This parameter refers to the amount of time allowed for loading or unloading operations. It strongly depends on the vessel size, plant technologies and the nature of the operations (loading or unloading), ranking from 12 to 60 hours.

[4] Preliminary data of natural gas consumption in Europe in 2016, provided by Eurogas. Source: http://www.gasnaturally.eu/mediaroom/download/164/document/eurogas-press-release---more-gas-use-in-2015-and-2016-makes-co2-emissions-tumble.pdf

- Trucks loading capacity - Among those terminals which currently offer truck loading services, the capacity ranges from 8 to 50 trucks per day.

Concerning the access conditions, most of the terminals have a Regulated Third Party Access Regime in place, while five of them have been granted an exception and have negotiated access conditions (Dunkerque, Gate and the three UK terminals). Another terminal has an *"hybrid"* access regime (Porto Levante terminal, with both regulated - 20% - and negotiated TPA - 80%) and three of them are not connected to their national transmission networks (1 terminal in Finland and 2 in Sweden). In terms of send-out capacity, 62 % of total capacity is subject to a regulated TPA regime, while 37% is exempted, and only 1% off-grid.

Moreover a regulated terminal (Montoir-de-Bretagne) has been allowed to market trans-shipment services in a non-regulated manner, provided it does not impact the regulated activities. The commercialization of such trans-shipment services in a non-regulated framework is conditional to the implementation of the following principles:

- With regard to the organisation:
  - The creation of a dedicated subsidiary.

- With regard to the practicalities of re-invoicing the costs:
  - 100 % allocation to the trans-shipment services of the additional costs that result from said services.
  - Due allocation of the costs resulting from the mutual use of assets and of the operating costs currently covered by the tariff for utilization of regulated activities using allocation formulas that are objective and auditable.

- With regard to operations:
  - Keep the programmed slots untouched.
  - Implementation of modalities for programming.

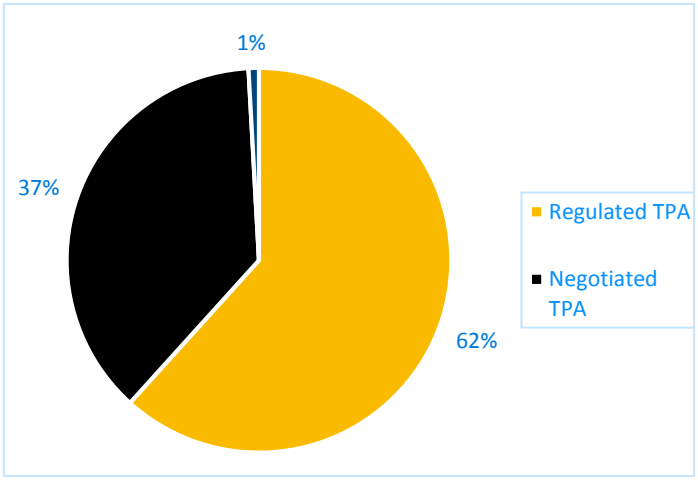


Figure 4 – Access regimes in place to LNG send-out capacity in EU terminals (in % vs. total send-out capacity).

It is worth noting that the exempted terminals are among the most recent ones. Indeed the Directive 2009/73/EC in its article 36 provides that major new gas infrastructure, i.e. interconnectors, LNG and storage facilities, may, upon request, be exempted, for a defined period of time, from the provisions of Articles 9, 32, 33 and 34 and Article 41(6), (8) and (10) under the following conditions:

a) the investment must enhance competition in gas supply and enhance security of supply;

b) the level of risk attached to the investment must be such that the investment would not take place unless an exemption was granted;

c) the infrastructure must be owned by a natural or legal person which is separate at least in terms of its legal form from the system operators in whose systems that infrastructure will be built;

d) charges must be levied on users of that infrastructure; and

e) the exemption must not be detrimental to competition or the effective functioning of the internal market in natural gas, or the efficient functioning of the regulated system to which the infrastructure is connected [5].

[5] Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC

Country	Nr	Terminals	Operator	Type	TPA Regime	LNG storage (m^3 LNG)	Regasification (GWh/day)	Max. Docking (m^3 LNG)	Trucks loading (GWh/day)	Year of Start-up
Belgium	1	Zeebrugge	Fluxys LNG	Onshore	Reg. TPA	384,500	544	266,000	3.4	1987
Finland	1	Pori	Skangas	Onshore	Off - grid	30,000	n.a.	n.a.	n.a.	2016
France	4	Dunkerque	Dunkerque LNG	Onshore	Exempted	600,000	520	267,000	n.a.	2016
		Fos Cavau	Elengy	Onshore	Reg. TPA	330,000	265	267,000	n.a.	2010
		Fos Tonkin	Elengy	Onshore	Reg. TPA	80,000	96	75,000	2.5	1972
		Montoir-de-Bretagne	Elengy	Onshore	Reg. TPA	360,000	337	267,000	4.0	1980
Greece	1	Revithoussa	DEFSA	Onshore	Reg. TPA	130,000	163	150,000	In the future	2000
Italy	3	Toscana (Livorno)	OLT Offshore LNG Toscana	FSRU	Reg. TPA	134,500	165	180,000	n.a.	2013
		Porto Levante (Rovigo)	Terminale GNL Adriatico	Offshore	Exempted (80%) Reg. TPA (20%)	250,000	229	152,000	n.a.	2009
		Panigaglia	GNL Italia	Onshore	Reg. TPA	100,000 (1)	120	70,000	n.a.	1971
Lithuania	1	Klaipėda	SC Klaipėdos Nafta	FSRU	Reg. TPA	170,000	122	160,000	n.a.	2014
Netherlands	1	Gate (Rotterdam)	Gate Terminal	Onshore	Exempted	540,000	408	267,000	13.9	2011
Poland	1	Świnoujście	Polskie LNG	Onshore	Reg. TPA	317,294	158	217,351	2.5	2016
Portugal	1	Sines	REN Atlântico	Onshore	Reg. TPA	390,000	321	216,000	11.0	2004
Spain	6	Barcelona	Enagás	Onshore	Reg. TPA	760,000	544	266,000	15.0	1969
		Cartagena	Enagás	Onshore	Reg. TPA	587,000	377	266,000	15.0	1989
		Huelva	Enagás	Onshore	Reg. TPA	619,500	377	173,400	15.0	1988
		Bilbao	Enagás	Onshore	Reg. TPA	450,000	223	270,000	4.5	2003
		Sagunto	Enagás	Onshore	Reg. TPA	600,000	279	270,000	15.0	2006
		Mugardos	Reganosa	Onshore	Reg. TPA	300,000	115	266,000	10.5	2007
Sweden	2	Lysekil	Skangas	Onshore	Off - grid	30,000	n.a.	n.a.	n.a.	2014
		Nysahamn LNG	AGA Gas	Onshore	Off - grid	20,000	n,a.	n.a.	n.a.	2011
United Kingdom	3	Dragon	Dragon LNG	Onshore	Exempted	320,000	252	217,500	n.a.	2009
		Isle of Grain	Grain LNG	Onshore	Exempted	1,000,000	645	266,000	10.8	2005
		South Hook	South Hook LNG Terminal Co.	Onshore	Exempted	775,000	650	267,000	n.a.	2009

TOTAL	**25 Terminals**	**9,177,794 m^3 LNG**	**6,910 GWh/day**

(1) Only one of the tanks is currently in operation, i.e. 50.000 m^3 LNG

Table 1 – Technical characteristics of the European LNG Terminals.

Figure 5 – LNG terminals and capacity in the EU.

4.2 LNG services

There are many factors that have definitely influenced the way how LNG services have developed and organised in the different LNG terminals. Factors such as the historical evolution and gas sector development in each country, level of interconnection with other markets, national political decisions, different choices concerning access regimes, market structure, etc. In fact, some terminals were built to allow some countries, far away from natural gas sources, to access this energy, others have been installed, even in very mature gas markets, with the intention to diversify supply origins, or for economic or logistic reasons, and some of them have been built specifically to supply a local or particular demand (i.e. an off-grid industrial zone).

In this section there is a compilation of the services offered by European LNG plants, both in a bundled or unbundled way, as well as an analysis about them.

4.2.1 Bundled services: regasification as a whole (unloading, operational storage and regasification)

There is only one type of bundled services offered by all the terminals, either subject to regulated TPA regime or exempted terminals, which is the bundled ship unloading + LNG storage + regasification (send-out) service. This service includes the three activities that constitute the essence of an LNG terminal, which is to allow LNG ships to berth and unload, to convert the LNG into natural gas and to inject this gas into the pipeline network, eventually accommodating the send-out rate to the consumption through the use of a temporary LNG storage (buffer) at the terminal.

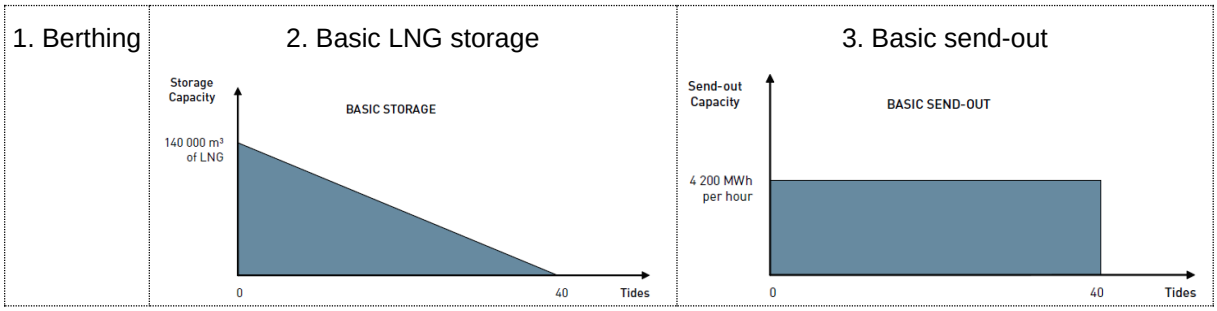
Bearing in mind the diversity of situations, LNG services have evolved and adapted to the different cases in order to fulfil its role in each market. In the majority of the cases the capacity of the terminals is assigned to the different users through the reservation by the user of a certain number of slots [6], although in some terminals (i.e. Spanish and Portuguese terminals) the main parameter used to allocate the capacity at the different terminals is the send-out / regasification capacity.

There are terminals where users are neither allowed to reserve a part of the send-out capacity (in the same way that it is usually done in an interconnection pipeline), nor to decide on the daily amount of gas to be injected to the transmission network and this is done at a fixed rate or it is decided by the terminal operator taking into consideration the status of the terminal (storage tanks level, next unloads forecast, etc.). In these cases, users have to rely on other tools in order be able to use additional flexibility by means of terminal unbundled services (i.e. additional LNG storage and/or send-out capacity).

For instance, at Zeebrugge terminal, a slot includes the next three basic services[7]:

[6] A slot (unloading slot) refers to the time window during which an LNG ship is scheduled and allowed to berth, unload the LNG and leave the dock. This concept is also applied in the case of loading operations.

[7] Information extracted from “LNG terminalling programme” document, by Fluxys.



Where:

- The berthing service is time-sensitive: as from the tide signalling the start of a given slot, the terminal user has to berth his ship within the window of the first 10 tides.
- The basic storage period is 40 consecutive tides and the basic storage volume is 140,000 m³ of LNG (decreasing on a linear basis over time).
- The basic send-out capacity is equal to 4,200 MWh/h.

In this case, the LNG tanks level and send-out capacity utilization can be graphed as follows:

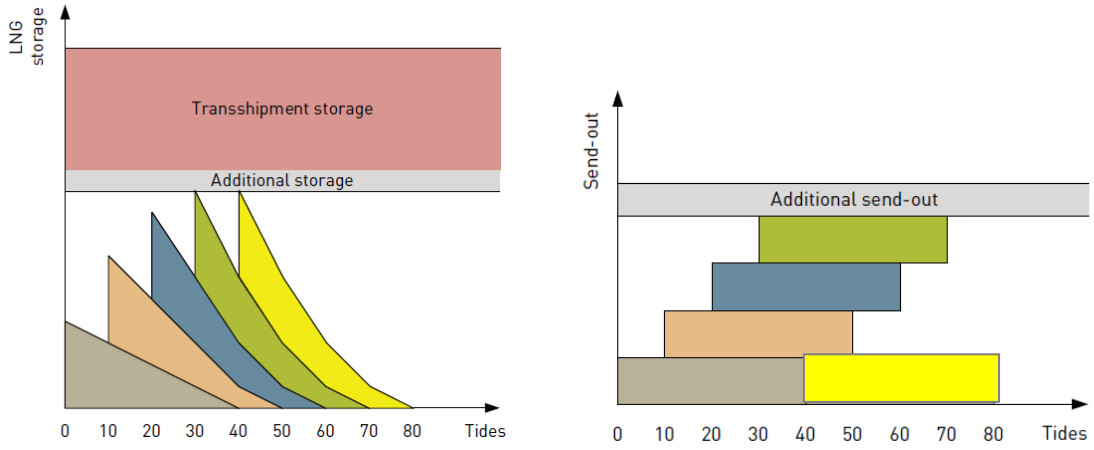


Figure 6 – Example of utilization of LNG storage and send-out capacities at Zeebrugge. Source: Fluxys

Another variant of this model is, for instance, the Greek model, where there is a basic LNG storage that also decrease on a linear basis until zero value in a period of 18 days, but here the send-out rate is not fixed. In this case, it is the user's responsibility to exhaust the LNG inside the tanks in the referred period, who can face penalties if he exceeds the daily basic storage granted with the slot.

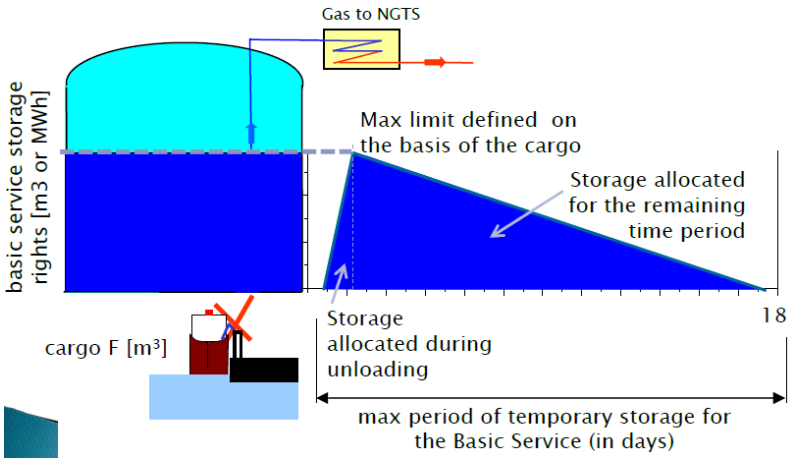


Figure 7 – Bundled unloading + LNG storage + regasification service at Revithoussa terminal. Source: RAE

Nevertheless, in those countries where LNG represents a significant amount of the supplies, users need much more flexibility at the terminals, as these are normally used in the daily demand modulation (because of the lower share of pipeline supplies or, in some cases, because some players have only access to LNG supplies). In consequence, some terminals offer their bundled services to users by contracting send-out capacity, who are responsible for nominating the daily regasification rate, as if the terminal was an additional interconnection. This entails a greater complexity, from the terminals management point of view, but it is a result of the supply infrastructures and market services demand.

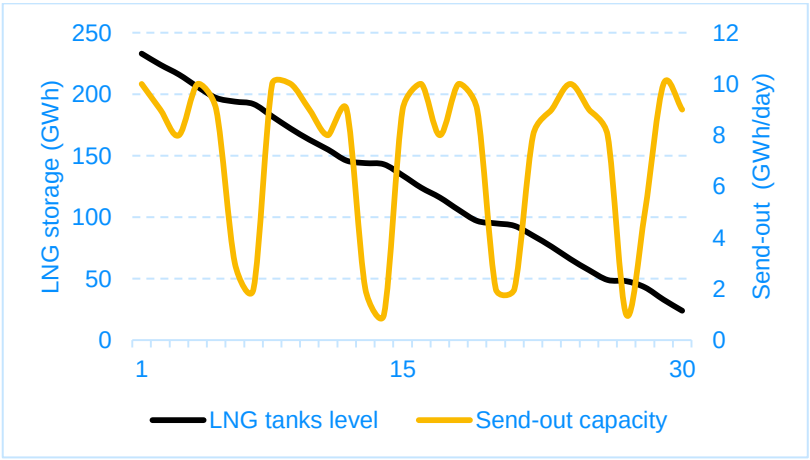


Figure 8 – Example of utilization of LNG storage and send-out capacities at Barcelona.

In these cases, because there is not a specific obligation to take the LNG out from the tanks, normally there are some provisions in place. These are designed to prevent the storage capacity hoarding, like applying increasing tariffs when users exceed, above a determined threshold, the ratio: storage / contracted send-out capacity.

Another bundled service offered by some terminals (Isle of Grain terminal, the Dutch, Polish and Spanish terminals) is: ship unloading + LNG storage + trucks loading. These services can only be offered in those terminals where truck loading is available. LNG trucks supply has arisen to fulfil different market needs: to supply LNG satellite plants, built with the aim of giving access to this energy source to some customers far (or hardly accessible) from the transmission grid, to supply isolated industrial demands, to supply LNG powered vehicles recharging points, etc. As it can be seen on table 2, not all the countries offering this product do it in a bundled way.

The third bundled service, offered by only one European LNG terminal (the Zeebrugge terminal), is: ship unloading + LNG storage + ship reloading. It includes all the actions and technical interventions needed to berth, unload a ship, store the LNG in a tank and reload (partial or totally) the LNG into a ship in a given moment. This service is a form of trans-shipment services (the other on being a direct ship-to-ship transhipment between two LNG carriers berthed at the same time at two separate jetties of a given LNG terminal).

Country	Terminals	Bundled services	Unbundled services									
			Unload	Regas.	LNG Storage	Reload	Truck loading	Cooling down	NG to LNG	Bunkering	Transhipment	Other
Belgium	Zeebrugge	Unload+ Storage + Regas.	☑	☑	☑	☑	☑	☑			☑	
Finland	Pori											
France	Dunkerque *(Exempted)*	Unload+ Storage + Regas.	☑		☑	☑	☑	☑		☑	☑	Inerting of tanks Unload of excess LNG
	Fos Cavau				☑	☑		☑			☑	Terminals pooling Uniform sendout LNG exchange Cargo sharing
	Fos Tonkin				☑	☑	☑	☑			☑	
	Montoir-de-Bretagne				☑	☑	☑	☑			☑	
Greece	Revithoussa	Unload+ Storage + Regas.						☑				Inerting of tanks. Providing liquid nitrogen Supply of water.
Italy	Toscana *(reguated. part)*	Unload+ Storage + Regas.										Flexibility of nominations Peak shaving LNG to underground Quality Adjust.
	Porto Levante											
	Panigaglia											
Lithuania	SC Klaipėdos Nafta	Unload+ Storage + Regas. Unload + Storage + Reload										
Netherlands	Gate *(Exempted)*	Unload+ Storage + Regas. Unload + Storage + Trucks				☑	☑	☑			☑	
Poland	Świnoujście	Unload+ Storage + Regas. Unload + Storage + Trucks										
Portugal	Sines	Unload+ Storage + Regas.	☑	☑	☑		☑		☑			
Spain	Barcelona	Unload+ Storage + Regas. Unload + Storage + Trucks	☑			☑		☑			☑	
	Cartagena		☑			☑		☑			☑	
	Huelva		☑			☑		☑			☑	
	Bilbao		☑			☑		☑			☑	
	Sagunto		☑			☑		☑			☑	
	Mugardos		☑			☑		☑			☑	
Sweden	Lysekil											
	Nysahamn LNG											

Country	Terminals	Bundled services	Unbundled services									
			Unload	Regas.	LNG Storage	Reload	Truck loading	Cooling down	NG to LNG	Bunkering	Transhipment	Other
United Kingdom	Dragon *(Exempted)*	Unload+ Storage + Regas.										
	Isle of Grain *(Exempted)*	Unload+ Storage + Regas. Unload + Storage + Trucks				☑	☑	☑			☑	
	South Hook *(Exempted)*	Unload+ Storage + Regas.										

(1) Cooling-down service includes also gassing up services (if necessary).

Table 2 – Bundled and unbundled services offered by European LNG Terminals.

4.2.2 Unbundled services: Reloading, LNG Storage, Conversion NG to LNG, Bunkering, Small scale, etc.

Besides the typical bundled service (unloading + storage + regasification) the majority of the terminals offer also unbundled services, either to add more flexibility to the main bundled service or as additional and independent services. Following this, there is a brief description about the unbundled services offered at EU LNG terminals.

Unloading service

This service is mainly part of the bundled services, and comprises the ship berthing operation, the connection with the terminal and the unloading of the LNG into the terminal tanks. It is offered by most of the terminals and it allows users to trade with LNG at the flange of the terminal, or for instance, in combination with other unbundled services, to temporarily store it and, later on, to reload again or to inject it into the transmission system.

LNG storage service

This service is the storage of LNG, independent or additional to the one included in bundled unloading + storage + regasification service. When it concerns additional storage rights, it is not possible to access this service unless users previously contract the referred bundled service. The allocation of this scarce capacity is done in different ways: open subscription/season process, proportional to the bundled contracted capacity or on a first come first served basis. At present this service is offered at Belgian, French and Portuguese terminals.

Regasification service

This service is the transformation of LNG into natural gas, prior to the injection of this gas into the transmission network. It can be allocated in an independent way or linked (as additional capacity) to the bundled unloading + storage + regasification service. At present this service is only offered separately (i.e. not as part of bundled services) at two terminals, Zeebrugge and Sines.

Reloading or loading service

This service is the pumping of LNG from the terminal tanks to an LNG ship, and it is normally utilized by users to move LNG between terminals, according to their needs and or for market condition reasons (price spreads, opportunity costs, etc.). It is referred in different ways, such as reloading, LNG redelivery or ship loading service, and it is provided by the majority of the terminals. As it is explained later, this service is closely linked with the cooling down service and, in some cases, they are provided and invoiced in a bundled way.

Transhipment service

This is a variant from the ships loading service previously described and, in fact, it is offered at the same terminals. This service is the transfer of LNG between two ships, with or without the intermediate transfer of LNG into terminal tanks. Some terminals reserve part of the LNG tanks capacity for this kind of operations.

Trucks loading service

This service is the loading of LNG from terminal tanks into mobile/truck tanks, to be furtherly transported to satellite plants (to supply isolated networks or to final customers). There are some terminals which offer the trucks loading service only in an unbundled way, while others do it in both a bundled and unbundled way. It is a very common service offered by the majority of the terminals.

The offer of this service in an unbundled way widen the possibility to use these facilities, as there is no need to unload an LNG ship into the terminal to access the service. Users can directly buy gas at the LNG terminal, swap or virtually liquefy natural gas from the transmission grid, and then loading it in trucks by contracting this unbundled service.

Cooling down and gassing up services.

Gassing up is the replacement of inert gas in the cargo tanks with warm LNG vapour, which is done to remove carbon dioxide and to complete drying of the tanks, before cooling them down and loading LNG.

Cooling down is also a very common service, provided by the majority of the terminals, which is used by LNG ships to cool down their storage tanks prior to the loading of LNG, in order to avoid thermal shock caused by over-rapid cool down of the system, brittle fracture and to minimize the vapour generation.

Cooling down service is linked to the provision of the ships reloading service for technical reasons (it is not possible to start loading LNG into a ship without previously cooling down the tanks).

Virtual liquefaction (Natural Gas to LNG virtual conversion) service

This service is the conversion from gas (NG) to liquid (LNG), that allow users to move natural gas from, i.e., the virtual balancing point in the transmission system to the LNG tanks of a given terminal. At present only one European terminal, Sines, offers this service, which is not a physical operation but a virtual conversion. This service can only be offered on an interruptible way, as it is necessary a minimum level of send-out nominations at the terminal to match part of this capacity with a user backhaul nomination (from NG to LNG) and, at the same time, assuring that the operation does not jeopardizes network balance.

Bunkering service

This service is the supply of LNG as ships fuel directly from the terminal. It is currently offered only by the Dunkerque plant, although in the next future it is foreseen to be offered by many other terminals, as the use of LNG as fuel for ships is starting to spread out all around the world. Some terminals are also offering this service in an indirect way, through the use of barges (ships devoted to LNG ship to ship supply), or even trucks.

Other services

There are also additional services being particularly offered by some terminals, as they are named below.

French terminals (only those with rTPA), offer the following additional unbundled services: pooling for intra-monthly capacities, uniform option, LNG exchange points and cargo sharing services for unloading operations.

1. The pooling for intra-monthly capacities service allows any shipper who has subscriptions in at least one of the terminals and who is not planning to fully use them during a given month M, to use part of these capacities at other regulated terminal, by accessing the capacities still available after the 20th day of month M-1 at the second terminal.

2. The uniform option service, not accessible for spot cargoes, enables a smoothing of the send-out capacity. This option is accessible to any shipper who has a basic service subscription on a first come first served principle. For each terminal, any shipper is limited to one uniform option cargo per month and an annual quantity of 12 TWh. Total quantities proposed with the uniform option must be at least 20 % of the monthly regasification capacity of each terminal.

3. The LNG exchange points service provides users with the possibility to exchange quantities of LNG between themselves.

4. The cargo sharing for unloading operations service allows several shippers to share an unloading operation.

Italian terminals (with regulated TPA) offer the following additional unbundled services: flexibility, peak shaving, LNG + underground storage and quality adjustment.

1. The flexibility service provides users the possibility to increase / decrease the gas quantities to be redelivered intra-daily or for the next day, or to keep temporarily into the terminal's tanks an LNG quantity to be subsequently redelivered (Temporary Storage Service available on interruptible basis).

2. The peak shaving service covers the emergency needs of the gas system at peak time during winter. The TSO decides when to use this service and the price is determined by an auction process. The LNG is unloaded and stored in the terminal to be available in short time if necessary. The costs of the services are covered by the gas system.

3. The LNG + underground gas storage service is offered together with the underground storage operator, which offers a storage and injection capacity equivalent to the regasification capacity allocated at the Terminal. The energy delivered at the terminal is redelivered to the user in the storage.

4. The quality adjustment service: the ballasting installation at the terminal is used to inject nitrogen in the LNG flow in order to lower the Wobbe index and gross heating value of natural gas after regasification, for meeting gas quality specifications.

Greek terminal offers the following additional services: inertization of LNG ship tanks using nitrogen, provision of liquid nitrogen from tanks to the ships and supply of fresh water (non-potable).

In general terms, it can be said that there are two kinds of unbundled services: those more standardized, which are offered in many plants, like regasification, storage, unloading, and those more atypical services, exclusively offered in particular terminals. In the first case, even if there is not any doubt about the nature of the services (from the physical point of view – i.e. additional storage capacity refers to the possibility to store a higher quantity of LNG inside terminal' tanks) the conditions can significantly differ from one terminal or country to another. As an example, additional send-out or storage capacity in some terminals can be reserved on a daily basis, while in others they can only be reserved on annual basis.

As can also be seen from the previous compilation, some of the unbundled services are additional or independent services (i.e. transhipment, bunkering, virtual liquefaction) while others are conceived as complementary/auxiliary to the main bundled services, to provide some additional flexibility. Concerning the latter, these unbundled services allow users to increase their assigned capacities (i.e. typically additional send-out capacity and or additional LNG storage capacity), but it is less common that these flexibilities allow them to decrease their assigned capacities.

Depending on the terminals, there are some services that are offered (and billed) as such, while in other cases they are instead offered free of charge, like the uniform option or cargo sharing services.

In consequence, even though some services are similar, users willing to operate at European LNG terminals have to enter into the particular regulation, conditions and details of each case, as they differ significantly.

4.2.3 Barriers concerning LNG services

From transparency point of view, concerning the availability of information on services provided by European LNG terminals, the situation has improved over recent years. The LNG terminals transparency template, published by GLE in 2012, has contributed to this improvement. This template was conceived to allow users to be easily directed to the necessary information, respecting at the same time the diversity of business models and regulatory conditions and making the already existing information in LSOs website more accessible to the market.

Nevertheless, it has to be noticed that even though the information is available, in many cases it is not easily accessible. In some LSOs websites, services are only referred in local language but not in English or, for instance, by linking the national legislation documents (without any further explanatory additional summary or document). In other cases, the information is very difficult to find among hundreds of pages and/or documents or, simply, it is not updated.

In general (there are some exceptions), it is not a common practice to publish simple and clear documents / webpages explaining the services provided at the terminals and the conditions to access them. It is necessary to dedicate a lot of time and to be an expert in the gas sector to reach and understand the information concerning the services provided in some of the terminals.

With regard to exempted LNG terminals, technical information regarding mostly the company organisation or the infrastructure in place is available. However, exempted terminals do not publish commercial information (like tariffs for instance). As a result thereof the existence of a true level-playing field between LNG terminals cannot be guaranteed. This is particularly the case when in a given area regulated LNG terminals offer the same types of services as the nearby exempted LNG terminals.

CEER considers transparency a key issue to improve access to LNG terminals and to foster the use of these infrastructures and liquidity. Transparency on the services offered is a prerequisite to facilitate and enable users, especially potential new entrants, to understand and value the different possible services accessible at each LNG terminal, either on a bundled or unbundled way.

CEER encourages NRAs to address transparency of the services offered by LSOs operating in their respective countries. They should assure the publication of, at least, the information included in the transparency template in both, national and English languages, in a comprehensive and accessible way. Accompanying explanatory documents, including graphs and examples of each service are considered very appropriate. Furthermore, the information should be regularly and conveniently updated according to the changes of the services that could arise.

Also with regard to services, we observe a high disparity on the type and number of services offered at European LNG terminals. In fact, it has been found that there is only one service offered by all the terminals (unloading + storage + regasification bundled service) and the way in which it is provided differ considerably. Furthermore, at some terminals this is the only service available, while others offer a variety of services, both, as a complement of the main bundled service or as independent additional services.

In relation to this issue, some stakeholders expressed in last year's questionnaire that they are concerned about the lack of harmonization of services offered by LSOs, suggesting even the proposition by LSOs of a minimum set of standardized products, and they express that more unbundling should be permitted to increase the flexibility of LNG.

CEER considers the lack of standardization of services not to be bad per se, as the services heavily depend on the particular circumstances and technical characteristics of each terminal. Nevertheless, the provision of additional services, both bundled and unbundled services, to the extent possible, would result in a higher degree of flexibility for users, which could be especially useful for smaller users and / or new entrants, enhancing market competition.

Additionally, LNG services shouldn't be static, but they should adapt to the changing conditions and, as LNG market evolves, new services could arise (i.e. bunkering, virtual liquefaction, etc.). All this would contribute to facilitate the emergence of possible LNG hubs/markets at European level.

In consequence, CEER encourages NRAs, in coordination with LSOs, to evaluate the existing services offered at their terminals and to value the necessity and possibility to broaden the catalogue of services, either to increase the flexibility of existing services and/or as additional services. When undertaking this process, to conduct an analysis of the services offered by the rest of EU terminals could serve as a point of departure, and public consultations would be valuable tools to get market views on this issue.

4.3 Tariffs

4.3.1 Tariffs description

In this section we describe the tariffs applied to the main bundled service offered by EU LNG plants. The information refers exclusively to the 16 terminals with rTPA Regime (one of these being partially exempted).

The next charts summarize the information related to the bundled unloading + LNG storage + regasification service which, as previously said, is the only service offered by all the terminals. As it can be observed, tariffs vary a lot, not only between countries, but also between terminals in some countries, in terms of the tariff structure as well as in term of the amount of the charges applied.

As for the tariff structure regarding the above bundled service, some of them are very simple, having just one term, like Zeebrugge or Klaipèda terminals. In the case of the Belgian terminal there is a fix term applied per cargo, and in the case of the Lithuanian one there is a variable term applied to the amount of LNG delivered.

Other terminals have more classical tariff structures, with both fix and variable terms, like the Polish or Greek plants, where the fix term applies to the send out capacity and the variable term to the amount of gas regasified. In the case of France, tariffs have also two terms, even though in this case the fix term is applied to the number of cargoes instead of the regasification capacity.

Some other terminals, like those in the Iberian Peninsula, have a higher level of disaggregation of the tariffs, having different fix and variable terms, which apply separately to the unloading, regasification and LNG storage capacity. Although they refer to a bundled service, this kind of tariffs allow a high degree of choice to the users, who can freely determine the regasification capacity reserved and its daily use (through daily nominations) and the LNG daily storage capacity.

In the case of Italy, tariffs are composed of three coefficients, distinguishing between capacity, dismantling and metering services. All of them apply to the contractual or unloaded volume of LNG along the year.

Many of the terminals hold part of the gas delivered to the terminal in order to compensate the losses and consumptions (gas in kind). This percentages are diverse, ranking from 0.2% to 1.7%.

The tarification of other (disaggregated) services also vary significantly between terminals. As a result thereof, comparing the various tariffs that are applicable at various LNG terminals may be cumbersome.

Country	Description	Terminal	Tariff	Notes
			€/cargo	
BELGIUM	Tariffs have an unique fix term per cargo.	Zeebrugge	810.000	Tariffs include berthing, unloading, basic storage (140.000 m^3 LNG decreasing on a linear basis during 40 consecutive tides) and basic send out at a rate of 4,2 GWh/h during the same period.

Country	Description	Terminal	Tariff				Notes
			Service	Fix term TNA	Commodity TQD	Gas in kind TN	
				€/berthing	€/MWh	%	
FRANCE	Tariffs have two terms: - Fix term applied per cargo - Commodity term applied to the amount of LNG unloaded Also part of the LNG is retained to compensate consumptions and losses.	Fos Cavaou	S-Smart	100,000	1.343	0.2%	S-smart service: continuous send-out service for users that schedule more than one vessel per month on average across the year. S-spot service: reserved for unloading operations booked, for a given month M, after the 20th day of month M-1 (done on the basis of available capacities)
			S-Spot		1.007		
		Fos Tonkin	S-Smart	75,000	1.132	0.2%	
			S-Spot	100,000	0.849		
		Montoir	S-Smart	90,000	0.735	0.3%	
			S-Spot	100,000	0.551		

Country	Description	Terminal	Tariff		Notes
			Capacity c€/(kWh/d)/y	Commodity c€/kWh	
GREECE	Tariffs include two terms: capacity and commodity charges.	Revithoussa	14.936733	0.04634	These are the values for annual tariffs. In case of shorter term capacity multipliers are applied, only to the capacity regasification charge.

Country	Description	Terminal	Tariff	Notes

Country	Description	Terminal	Tariff				Notes
			€/cargo				
			LNG contractual capacity – Cqs	Dismantling Crs	Metering	Gas in kind	
			€/m3 LNG/year	€/m3 LNG/year	€/m3 LNG/year	%	
ITALY	Tariffs are composed of three variable terms: - Contractual yearly LNG volume - Dismantling term - Metering Also part of the LNG is retained for consumptions and losses.	Panigaglia	4.782	0.125	0.055	1.7%	Apart from the unloading operational storage and regasification, the tariff includes the allocation of transportation capacity at the National Grid Entry Point to inject in the network the LNG regasified at the terminal.
		Rovigo	22.376	-	0.264	0.7%	
		Toscana	23.009	0.079	0.017	-	

Country	Description	Terminal	Tariff	Notes
			€/MWh	
LITHUANIA	Tariffs have an unique variable term, and the charges are proportional to the unloaded LNG.	SC Klaipėdos Nafta	0.1	Maximum physical LNG storage in the terminal no longer than 60 days Virtual Cargo Storage Period for a single Cargo may not last longer than a period of 12 (twelve) months.

Country	Description	Terminal	Tariff (*)		Notes
			Capacity c€/(kWh/h)/h	Commodity c€/kWh	
POLAND	Tariffs include two terms: capacity and commodity charges.	Świnoujście	0.2142857	0.00922	These are the values for annual tariffs. In case of shorter term capacity multipliers are applied, only to the capacity regasification charge.

(*) The exchange rate applied for the Zloty is 4.34 PLN / 1 EUR, considering last year' average exchange rate.

Country	Description	Terminal	Tariff					Notes
			Send out		Unloading		LNG Storage	
			Capacity c€/(kWh/d)/month	Commodity c€/kWh	Fix €/ship	Variable c€/kWh	Variable c€/kWh/d/month	
PORTUGAL	Tariffs are applied to the next three concepts: - Send out capacity reserved (capacity & commodity charges) - unloading (variable charges) - LNG storage (capacity reserved charges)	Sines	1.105	0.020	0	0.028	0.105	These are the values for annual tariffs. In case of shorter term capacity multipliers are applied, only to the capacity regasification and LNG storage charges.

Country	Description	Terminal	Tariff						Notes
			Send out		Unloading		LNG Storage	Gas in kind	
			Capacity c€/(kWh/d)/m	Commodity c€/kWh	Fix €/ship	Variable c€/kWh	Variable c€/kWh/day	%	
SPAIN	Tariffs are applied to the next three concepts: - Send out capacity reserved (capacity & commodity charges) - unloading (fix & variable terms) - LNG storage (only variable term)	Huelva, Cartagena and Sagunto	1.961	0.012	33,978	0.007	3.24	0.005	These are the values for annual tariffs. In case of shorter term capacity multipliers are applied, only to the capacity regasification charge.
		Barcelona, Bilbao and Mugardos			16,988	0.004			

Table 3 –Tariffs for the bundled (unloading + storage + regasification) service, applied in regulated LNG terminals.

Concerning the charges value, the different terms and coefficients are not comparable among terminals because of the disparity of tariff structures. Therefore, it has been presented in a study case, summarized in the chart below.

The case considers the costs derived from the application of the tariff for the bundled (unloading + storage + regasification) service, to a 1,000 GWh LNG cargo, which regasifies the whole LNG amount in a period of 15 days. As a general assumption, for this case study we have considered tariffs applicable to annual contracts (multipliers for smaller contract periods - which normally increase the tariffs – have not been taken into account).

Country	Terminal	Cost	€/MWh	Notes
BELGIUM	Zeebrugge	810,000 €	0.81	The slot reservation includes berthing service, basic storage (140.000 LNG m^3 decreasing on a linear basis during 40 consecutive tides) and basic send-out constant capacity of 4,2 GWh/h during the same period.
FRANCE	Fos Cavaou	1,443,000 €	1.44	The calculations refers to the S-Smart continuous send-out service (users that schedule more than one vessel per month on average across the year). For this service, the daily send-out is set by the terminal operator in order to be as regular as possible, on the basis of the terminal's overall send-out schedule. The distribution of the physical send-out capacity between the shippers is done according to the LNG volumes unloaded and reloaded during the month, as well as the level of stock at the start of the month and the projected stock at the end of the month.
	Fos Tonkin	1,207,000 €	1.21	
	Montoir	825,000 €	0.83	
GREECE	Revithoussa	872,626 €	0.87	The Temporary LNG Storage Period for each LNG cargo is equal to 18 Days. (However, LNG Users may be able to acquire additional storage according to the provisions of the NNGS Network Code)
ITALY	Panigaglia	694,660 €	0.69	Apart from the berthing, storage and send-out services, the tariff includes the allocation of transportation capacity at the National Grid Entry Point to inject in the network the LNG regasified at the terminal.
	Rovigo	3,869,501	3.87	
	Toscana	3,234,728	3.23	
LITHUANIA	SC Klaipėdos Nafta	100,000 €	0.10	Daily regasification rate is variable and it is based on users' nominations. Maximum physical LNG storage in the terminal of a duration not longer than 60 days until complete withdrawal of the LNG from the Terminal through its regasification and/or reloading. Virtual Cargo Storage Period for a single Cargo may not last longer than a period of 12 months.
POLAND	Świnoujście	2,235,023 €	2.24	Users nominate a variable hourly send-out capacity within the range of allocated values.
PORTUGAL	Sines	1,120,380 €	1.12	The main driver of the tariffs is the contracted send-out capacity, which users can freely use and nominate on a daily basis. There isn't an obligation or restriction related to the maximum period of LNG storage, but the LNG storage term is proportional to the quantity and period of time stored (users decide). There are also anti-hoarding measures in place, discouraging people to overstock LNG storage capacity.
SPAIN	Huelva, Cartagena and Sagunto	1,131,911 €	1.13	
	Barcelona, Bilbao and Mugardos	1,080,921 €	1.08	

Table 4 – Costs derived from the application of the tariff for the bundled (unloading + storage + regasification) service, to a 1000 GWh LNG cargo, which regasifies the whole LNG amount in a period of 15 days.

The previous chart shows the extent to which tariffs vary from one terminal to another. For this case of study, tariffs are between 100,000 € and almost 4,000,000 €, which is a very spread range (1:40).

The observed remarkable differences can be due to many reasons. First of all, due to the tariffs structure itself and the cost allocation policy in each country. For instance, some terminal tariffs include not only berthing, regasification and storage tariffs, but also the entry transmission fees. It can also be due to technical aspects. Some terminals are newer than others, or have different technological approaches/solutions (for instance the vaporizers, with or without energy recovery, etc.), which entail different operating costs. Additionally, differences can be due to the size and/or because economies of scale. Another crucial parameter is the use of the infrastructure: the more is used the sooner is amortized. And, last but not least, they heavily depends on regulatory issues/decisions. Regulators design the tariffs following different criteria and in many countries, in the case of LNG plants, they have decided (for reasons like uncertainty of the use of the terminal, security of supply, etc.) to recover part of the regasification plant revenues from other tariffs (i.e. gas transportation tariffs).

The previous case of study has been repeated considering not only the terminal bundled service tariffs (unloading + storage + regasification), but also the entry tariffs from LNG terminals to the transmission network (that is, the tariffs that users have to pay to introduce gas form LNG terminals to the relevant balancing zone).

Nevertheless, as can be seen in the table below, price differentiation still remains and we still observe a significant spread of tariffs among terminals. These vary from 0.15 to 4.64 €/MWh, which means that an user can pay 31 times more than another for unloading, storing, regasifying and introducing 1,000 GWh of natural gas in two different balancing zones.

Country	Terminal	€/MWh	Notes
BELGIUM	Zeebrugge	0.90	
FRANCE	Fos Cavaou	1.71	
	Fos Tonkin	1.47	
	Montoir	1.09	
GREECE	Revithoussa	n.a.	
ITALY	Panigaglia	1.22	
	Rovigo	4.64	
	Toscana	3.78	
LITHUANIA	SC Klaipėdos Nafta	0.15	
POLAND	Świnoujście	2.24	There are no additional fees charged for provision of transmission services at the physical connection point between the transmission network and the LNG terminal.
PORTUGAL	Sines	1.53	
SPAIN	Huelva, Cartagena and Sagunto	1.49	
	Barcelona, Bilbao and Mugardos	1.44	

Table 5 – Addition of unloading + storage + regasification bundled service tariffs and entry to the transmission network (from LNG terminal to the relevant balancing zone) tariffs.

All previously mentioned factors and regulatory decisions are interrelated and have consequences for the use of the terminals. A regasification tariff as low as 0.1 €/MWh can give an economic signal to the market and have an impact completely different from a 4 €/MWh tariff (which amounts for 27% of usual price for the natural gas – considering a price of 15 €/MWh, as it was the case at TTF by the end of May 2017).

Some countries also apply multipliers, according to the contractual period. In many cases, the multipliers have discrete values, being different in case of contracting annual, monthly, daily or intra-daily capacity, while in other cases they are determined through a formula, whose input is the number of contracting days, from 1 to 365.

Because of the previous reasons and the highly complex situation that users can face when trying to access one terminal for the first time, CEER considers appropriated the provision of tariff simulation tools by all the terminals. These tools are considered to be not only very useful but a crucial instrument to understand the application of the tariffs under any circumstance.

Also having a common way to express the various tariffs in place (in Eur/MWh for instance) setting define parameters (one example per type of cargo -QFlex, QMax…) would allow an easier comparison of the LNG terminalling element of the gas value chain.

It should be noted, however, that there is a fundamental difference in access to information between regulated terminals, on the one hand, and exempted ones, on the other hand. Exempted terminals do not publish their tariffs while regulated terminals are obliged to do so. As a result, one cannot speak of a true level-playing field between the two types of LNG terminals. On the contrary, when it comes to existing/potential barriers with regard to bringing LNG volumes into the EU, this might be one. Therefore it has to be investigated if and to what extend it can be remedied to such a discrepancy.

CASE OF STUDY – Klaipèda LNG terminal

The Lithuanian LNG terminal has the lowest TPA tariffs among EU terminals. These are seven times cheaper than the second cheapest terminal and forty times cheaper than the most expensive one. It is probably one of the most notable cases where tariffs have not been designed to recover the capital, operational and financial costs of the terminal but with other additional criteria and targets.

Before the existence of this terminal, Russia was the only gas supplier of Lithuania and the country had not any other supply alternative. This resulted in one of the highest wholesale gas prices in the EU during several years (around 35 €/MWh by end 2014, while in many other European countries wholesale prices were around 23 €/MWh).

The Klaipèda LNG Terminal started operating in December 2014 and, for the first time, the country had the possibility to diversify the supply sources, not being tight to the same origin any more.

But the effects of the decision to commission this new infrastructure started to be noted earlier. In May 2014, Litgas (the company responsible for guaranteeing the baseload supply at the terminal) signed the term-sheet with a new supplier. This announcement automatically resulted in a 23% discount of the incumbent gas prices.

In 2015, LNG was already an active alternative supply source, accounting for 18% of the gas supplied to Lithuania gas market. It firmly contributed this year to a significant reduction of gas prices in the country, acting like a sort of price cap for traditional supplies.

In 2016, LNG supplies increased, accounting for 60% of national consumption. This resulted in an additional 16% reduction in gas tariffs for industrial customers.

In conclusion, LNG terminal costs could not be recovered through current LNG TPA tariffs in place, but it has supposed a clear benefit for Lithuanian natural gas market (and maybe neighbor countries), increasing security of supply, diversifying supply sources and benefiting customers with much more competitive gas tariffs.

4.3.2 Barriers concerning LNG tariffs

Concerning the availability of the information on terminal tariffs, as it was the case for the services description, even though the information is available, in many cases it is not easily accessible and understandable. Again, in some LSO websites, tariffs are just mentioned in local language but not in English, and by linking the national legislation documents (without any further explanatory additional summary or document). In other cases, the information is very difficult to find among hundreds of pages and/or documents or, simply, it is not updated.

A few terminals provide also tariff simulation tools. These are normally based on spreadsheets, with a form and hidden formulas, which allow users to simulate different tariff scenarios by introducing and modifying the contractual parameters (capacities, time periods, etc.). This proves to be useful, especially for new entrants that wish to investigate the impact of the LNG terminaling on the commercialisation of the LNG they (intend to) purchase.

CEER considers that transparency on the services provided should be conveniently accompanied with transparency on the tariffs applied to each service. Transparency is a prerequisite to facilitate and enable users, especially potential new entrants, to understand and value the costs of the services offered at each LNG terminal.

CEER encourages NRAs to address transparency on the tariffs applicable to any of the services offered by LSOs in their respective countries. They should assure the publication of the relevant information in both, national and English languages, in a comprehensive and accessible way. Furthermore, the information on tariffs should be complemented with simulation tools, in order to allow any interested party to simulate and quantify the applicable costs in different scenarios. These tools are considered to be not only very useful but a crucial instrument to understand the application of the tariffs under any circumstance.

Accompanying explanatory documents, including examples about the application of tariffs in different scenarios are considered appropriate. Furthermore, the information as well as the simulation tools should be regularly and conveniently updated according to the changes of the tariffs at any moment.

In addition, having a common way to express the various tariffs in place (in Eur/MWh for instance) setting define parameters (one example per type of cargo -QFlex, QMax…) would allow an easier comparison of the LNG terminaling element of the gas value chain.

Concerning the level of the tariffs applied to LNG services, as it has been shown in this document there are notable differences between terminals. In fact, for the case of study analysed in this document, tariffs can vary from 0.1 €/MWh to almost 4 €/MWh. Some countries also apply multipliers, which even widen these differences.

In relation to this, some stakeholders expressed in last year's questionnaire that LNG contribution to SoS is not considered enough (mechanisms are solely based on storages) and there should be a level playing field among the different flexibility sources. Moreover, some of them even proposed a discount on entry tariffs of LNG into the network so that LNG can be more competitive, although others considered this option as *"discriminatory and that could create cross subsidies between network users as not all players are users of LNG or not at the same proportion".*

Article 9.2 of TAR NC specifies that *"At entry points from LNG facilities, and at entry points from and exit points to infrastructure developed with the purpose of ending the isolation of Member States in respect of their gas transmission systems, a discount may be applied to the respective capacity-based transmission tariffs for the purposes of increasing security of supply".*

CEER acknowledges that the remarkable differences on LNG tariffs can be due to many reasons, like the costs allocation policy in each country, technical aspects, the use and/or amortization degrees, security of supply criteria, cost of opportunity considerations, etc.

As long as tariffs respect all the regulatory relevant tariff principles and relevant European regulation in place like, in particular, avoiding undue distortions between entry points in the network or unjustified cross-subsidies between users and/or countries, CEER would not identify any fundamental barrier on this matter.

5 CONCLUSIONS

The role played by LNG in Europe differs from one country to another, depending on many factors. Nevertheless, at European level, as import dependence increases, the EU market becomes more heavily exposed to global gas market dynamics. In this context, LNG terminals can play an important role, as LNG import capacity contributes to security of supply and diversification, provides flexibility to the system and allows for greater competition both in the upstream and downstream gas market.

With the aim to promote the access to liquid LNG markets which contribute to improve flexibility on European gas market in the interest of consumers, based on the findings of this report, evidence of barriers on gas markets regarding the services offered by LNG terminals and the tariffs currently applied have been identified.

Concerning the services provided by LNG terminals, we have noticed that even though some information is available for users, in many cases it is not easily accessible. In some LSOs websites, services are only referred in local language but not in English or, for instance, by linking the national legislation documents (without any further explanatory additional summary or document). In other cases, the information is very difficult to find or, simply, it is not updated.

CEER considers that transparency is a key issue to improve access to LNG terminals that contributes to foster the use of these infrastructures and liquidity. Transparency on the services offered is a prerequisite to facilitate and enable users, especially potential new entrants, to understand and value the different possible services accessible at each LNG terminal, either on a bundled or unbundled way.

This aligns with the idea expressed by stakeholders in last year's questionnaire, encouraging an increase of transparency in terminals offer of services as well as key documents accessible at least in English and in the national language.

CEER encourages NRAs to address transparency of the services offered by LSOs operating in their respective countries. They should assure the publication of, at least, the information included in the transparency template in both, national and English languages, in a comprehensive and accessible way. Accompanying explanatory documents, including graphs and examples of each service are considered very appropriate. Furthermore, the information should be regularly and conveniently updated according to the changes of the services that could arise.

Also with regard to services, we observe a high disparity on the type and number of services offered at European LNG terminals. In fact, it has been found that there is only one service offered by all the terminals (unloading + storage + regasification bundled service) and the way in which it is provided differ considerably. Moreover, at some terminals this is the only service available, while others offer a variety of services, both, as a complement of the main bundled service or as independent additional services.

CEER considers the lack of standardisation of services not to be bad *per se*, as the services heavily depend on the particular circumstances and technical characteristics of each terminal. Nevertheless, the provision of additional services, both bundled and unbundled, would result in a higher degree of flexibility for users, which could be especially useful for smaller users and / or new entrants, enhancing market competition. This aligns with stakeholders' opinion, which have identified the lack of flexible products adapted to market needs, or at least the slow adaptation to market demand, as an operational barrier.

Additionally, LNG services shouldn't be static, but they should adapt to the changing conditions and, as LNG market evolves, new services could arise (i.e. bunkering, virtual liquefaction, etc.). All this would contribute to facilitate the emergence of possible LNG hubs/markets at European level.

Because of this, CEER encourages NRAs, in coordination with LSOs, to evaluate the existing services offered at their terminals and to value the necessity and possibility to broaden the catalogue of services, either to increase the flexibility of existing services and/or as additional services. When undertaking this process, to conduct an analysis of the services offered by the rest of EU terminals could serve as a point of departure, and public consultations would be valuable tools to get market views on this issue.

Concerning the availability of the information on terminal tariffs, similar to the services description, even though the information is available, in many cases it is not easily accessible and understandable. Again, in some cases tariffs are just mentioned in local language but not in English, and by linking the national legislation documents (without any further explanatory additional summary or document). In other cases, the information is very difficult to find or, simply, it is not updated.

A few terminals provide tariff simulation tools, which allow users to simulate different tariff scenarios by introducing and modifying the contractual parameters (capacities, time periods, etc.). This proves to be useful, especially for new entrants that wish to investigate the impact of the LNG terminaling on the commercialisation of the LNG they (intend to) purchase.

CEER considers that transparency on the services provided should be conveniently accompanied with transparency on the tariffs applied to each service. Transparency is a prerequisite to facilitate and enable users, especially potential new entrants, to understand and value the costs of the services offered at each LNG terminal.

CEER encourages NRAs to address transparency on the tariffs applicable to any of the services offered by LSOs in their respective countries. They should assure the publication of the relevant information in both, national and English languages, in a comprehensive and accessible way.

Furthermore, the information on tariffs should be complemented with simulation tools, in order to allow any interested party to simulate and quantify the applicable costs in different scenarios. These tools are considered to be not only very useful but a crucial instrument to understand the application of the tariffs under any circumstance.

Accompanying explanatory documents, including examples about the application of tariffs in different scenarios are considered very appropriate. Moreover, the information as well as the simulation tools should be regularly and conveniently updated according to the changes of the tariffs at any moment.

Also having a common way to express the various tariffs in place (in Eur/MWh for instance) setting define parameters (one example per type of cargo -QFlex, QMax…) would allow an easier comparison of the LNG terminaling element of the gas value chain.

Concerning the level of the tariffs applied to LNG services, as it has been shown in this document there are notable differences between terminals. In fact, for the case of study analysed in this document, tariffs can vary from 0.1 €/MWh to almost 4 €/MWh. Some countries also apply multipliers, which even widen these differences.

CEER acknowledges that the remarkable differences on LNG tariffs can be due to many reasons, like the costs allocation policy in each country, technical aspects, the use and/or amortization degrees, security of supply criteria, cost of opportunity considerations, etc.

As long as tariffs respect all the regulatory relevant tariff principles and relevant European regulation in place, CEER wouldn't identify any fundamental barrier on this matter.

Annex 1 – List of abbreviations

Term	Definition
ACER	The Agency for the Cooperation of Energy
CEER	Council of European Energy Regulators
EC	European Commission
FSRU	Floating Storage and Regasification Units
GLE	Gas LNG Europe
LNG	Liquefied natural gas
LSO	LNG System Operator
NRA	National Regulatory Authority
PCI	Projects of Common Interest
rTPA	Regulated Third Party Access
SoS	Security of Supply
SSO	Storage System Operator
TSO	Transmission System Operator
TYNDP	Ten-Year Network Development Plan

About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. CEER's members and observers (from 35 European countries) are the statutory bodies responsible for energy regulation at national level.

One of CEER's key objectives is to facilitate the creation of a single, competitive, efficient and sustainable EU internal energy market that works in the public interest. CEER actively promotes an investment-friendly and harmonised regulatory environment, and consistent application of existing EU legislation. Moreover, CEER champions consumer issues in our belief that a competitive and secure EU single energy market is not a goal in itself, but should deliver benefits for energy consumers.

CEER, based in Brussels, deals with a broad range of energy issues including retail markets and consumers; distribution networks; smart grids; flexibility; sustainability; and international cooperation. European energy regulators are committed to a holistic approach to energy regulation in Europe. Through CEER, NRAs cooperate and develop common position papers, advice and forward-thinking recommendations to improve the electricity and gas markets for the benefit of consumers and businesses.

The work of CEER is structured according to a number of working groups and task forces, composed of staff members of the national energy regulatory authorities, and supported by the CEER Secretariat. This report was prepared by the LNG Task Force of CEER's Gas Working Group.

CEER wishes to thank in particular the LNG Task Force for their work in preparing this report.

More information at www.ceer.eu.