European Regulators Group for Electricity & Gas

Status Review 2009
On Capacity Allocation Management and Congestion Management Procedures for Storage

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1 Introduction

1.1 Background and goal

In 2008 ERGEG established a Gas Storage Task Force (GST TF) with the aim to give an overview of the current situation in different EU Member States on capacity allocation management (CAM) and congestion management procedures (CMP) for storage. The analysis was based on questionnaires which were sent to SSOs, national regulatory authorities, actual and potential storage customers and summarised in "Status Review on Capacity Allocation Management and Congestion Management Procedures for Storage", published in December 2008.

The conclusions were that in many cases, the legal position of the national regulatory authorities (NRAs) does not provide for sufficient regulatory oversight to ensure a non-discriminatory and fair allocation of storage capacity. Furthermore the effectiveness of capacity allocation management (CAM) and congestion management procedures (CMP) needs to be further investigated. Further work has to be done on how secondary markets can be strengthened and how capacity trading can be facilitated by market participants and storage operators and be sufficiently transparent to all potential storage users and SSOs. The enhancement of a fair and non-discriminatory access to storage capacity should be supported by the development of guidelines on best practice approaches for CAM and CMP by ERGEG setting the framework.

Corresponding to the low response rate of the storage users, GST TF decided to launch a deeper analysis of the position of the storage users. GST TF developed in cooperation with GSE, Eurogas and EFET a further detailed questionnaire for collecting information about the situation on the storage markets in the EU and the assessments of the effectiveness of different CAM and CMP from storage users´ point of view.

Further to the survey the GST TF highlighted in different TF meetings the problems in the different storage markets in the EU from the NRAs´. The presentations held at these meetings are also summarised in this status review.

Meanwhile the regulatory framework for the internal gas market has changed with the 3rd Package in 2009. Some requirements from the GGPSSO are now legally binding. The effectiveness of different CAM and CMP should be further assessed and to be discussed with NRAs, SSOs and storage users in order to find the best practice for complying with the legal requirements. The result of discussion could be recommendations for an enhancement of the GGPSSO for CAM and CMP.

1.2 Method of approach and structure of report

The aim of the status report 2009 is to summarise the results of further analysis of the problems with different CAM and CMP in the Member States und therefore – together with the status review from 2008 and the input of the discussion with GSE, Eurogas and EFET in 2008/2009 - be the basis for recommending specific guidelines for CAM and CMP to improve the functioning of the storage markets.

(1) In the second chapter the problems of the storage markets in the EU and the main problems with access to storage capacity should be described.

(2) In the third chapter the findings in economic literature for access to storage will be described.

(3) In the fourth chapter the development of the discussion process of the regulatory framework of CAM and CMP is described.

(4) In the fifth chapter the results of the survey 2009 are summarised.

2 Experiences and problems in EU storage markets – country analysis

This chapter deals with problems in the various EU storage markets and discusses several questions related to capacity allocation and congestion management. In addition, experiences and approaches as a step towards a functioning storage market are described. The country analysis comprises the storage markets Austria, Belgium, Czech Republic, France, Germany, Hungary, Italy, Spain, the Netherlands and Great Britain (GB). For detailed background information on the various markets please see the extended description in the Annex.

2.1 Austria

In the Austrian storage system four SSOs market storage products with a total working gas capacity of 4.5 bcm: OMV Gas GmbH with the main part in the storage capacity, Wingas GmbH, Gazexport/ZMB and RAG AG. The access to storage is granted by law through negotiated third party access which means that prices, products and services are not determined by E-Control but by the SSOs. Access has to be provided by the SSOs in a non-discriminatory and transparent way.

The storage prices are not regulated but underlying a price cap: if the storage price for a specific storage product is higher than 20% over the average of the storage prices for comparable storage products in the EU, the regulator could issue a decree to determine the cost underlying the prices.

The regulator has not ex ante regulatory power for CAM and CMP, but can intervene if the CAM and CMP are discriminatory. The Austrian regulator is therefore aiming — at national level as well as through ERGEG — to develop and introduce effective anti-hoarding mechanisms.

Storage is the main flexibility tool in Austria:

→ Seasonal flexibility is mainly provided by storage as the flexibility in import contracts and from the domestic production seems to be poor respectively not reliable.

→ Short term flexibility (daily, hourly) can also be provided by the balancing market and short term trading. But balancing energy is produced by using storage and the liquidity at the trading hub CEGH is too poor to be a real competitor for storage.

→ As a consequence the flexibility market in Austria is mainly formed by the storage market.

The concentration in the storage market is over the critical HHI[1] limit of 1.800. This is the case for the supply side, but also for the demand side and will not change in the near future (over the next ten years).

The storage market in Austria faces several problems:

[1] The Herfindahl-Hirschman Index is a commonly used measure to evaluate market concentration. The index ranges from close to 0 (an infinite number of small market participants) to 10000 (monopoly). Commonly accepted benchmarks are that an index of below 1000 is *not concentrated*, 1000-1800 is *moderately concentrated* and above 1800 is *concentrated*.

→ Dominance of long term contracts, the bulk with incumbents. More than 90% of the storage capacity is locked in long term contracts. Storage capacity is booked out until 2017/2018.

→ Integration of storage operators and supply companies: All SSOs are also active in trading, wholesale and retail markets.

→ The dominance of FCFS as CAM gives wide range for discrimination, which cannot be verified. However, E-Control has no legal competence in developing CAM and CMP.

→ Weak incentives against hoarding.

2.2 Belgium

In Belgium, storage is a regulated monopoly with one SSO appointed by the Minister. The access to storage is legally dedicated to suppliers active on the distribution networks (priority rule). As there is a shortage of storage capacity the allocation is carried out on a pro rata basis.

Due to the priority rule, congestion is prevented to occur and thus congestion management procedures are not needed.

The SSO is legally obliged to organise the secondary market but due to the existing capacity shortage there are no transactions on it.

2.3 Czech Republic

In the Czech Republic there are eight underground gas storage facilities (seven seasonal and one cavern/peak-shaving) operated by three companies. One storage facility is only used for the Slovak Republic's needs, both under contracts and also for technical reasons of connection to the transmissions system. The third party access regime is a negotiated one.

As most of the storage capacity is under long-term contracts, competition is not developed sufficiently. The contracts are owned by RWE Transgas, a. s., which is a part of a vertically integrated group that also includes the largest Czech SSO RWE Gas Storage, s. r. o. New gas traders most frequently cite the limited accessibility to Czech underground gas storage facilities, which are needed for structuring supplies in the course of a year, as one of the reasons for their difficulties in penetrating the Czech market.

During 2007 and 2008 the Czech regulator dealt with complaints from storage users regarding the allocation process (see Annex). This situation is about to change in the near future when new storage capacities are announced to be built and these capacities will be accessible to all market participants. Also part of the already built capacity will be released as some of the long term contract will terminate.

The Czech Regulator decided to introduce new rules for storage capacity booking (auctions), in order to create adequate requests for storage capacity and give clear pricing and investment signals, and would comply with negotiated TPA.

Now, former incumbents receive a specific treatment in the allocation of storage capacity. Since the dominant Czech gas trader, RWE Transgas, a. s., is part of a vertically integrated group that also includes the largest SSO; the auction rules contain constraints on such dominant gas traders. Gas traders which are part of the same group as the SSO and which have booked with the SSO storage capacity amounting to at least 80 percent of the capacity of the virtual storage facility operated by the SSO, may only participate in the storage capacity auction if the price per unit of storage capacity is lower than or equal to the

UIOLI is not applied and there is no definition for “unused capacity”. SSOs have the obligation to organise secondary markets with capacities on their website, but there is a lack of liquidity as gas market participants can trade on secondary markets but are not obliged to do so.

2.4 France

In France there are 2 SSOs - Storengy and TIGF - which operate 16 storage sites. Storages are mainly used to cover seasonal variations of demand. The other flexibility tools are flexible gas purchase contracts, diversified sources and LNG terminals.

In France the TPA to storage is negotiated, which means that tariffs and services are set up by the SSO. However, access conditions are defined by decree. The capacity allocation mechanism applied in France is the “capacity goes with the customer” principle (CGWC). Each year, a Ministerial Order defines consumption profiles which are then used to calculate the storage rights associated with final gas consumers.

The application of the CGWC principle implies that all new entrants have an automatic access to the storage – defined by ministry - since they have an active portfolio on the French market. The exceeding capacity is proposed by SSOs to all suppliers according to the method they chose. This allocation is carried out twice a year: 1st April and 1st November.

Moreover, the decree compels the active suppliers to have in stock on 1st November at least 85% of the capacities rights dedicated to domestic customers and customers providing services of general interest.

In 2008 storage capacity dedicated to suppliers with a portfolio amounted to 90% of the global storage capacity. The 10% exceeding storage capacity were allocated by Storengy via allocation and by TIGF via pro rata.

If the capacity allocated through the CGWC principle is not completely booked on the 1st April, the SSO can sell it as releasable capacity. The CGWC principle applies to new developed capacities. CRE has not received any request for exemption so far.

The access conditions to storage are satisfying, even for new entrants; as they always get capacity because of CGWC. The remaining disadvantage is that new entrants are without any storage capacity for half a year maximum, as the capacity allotment is twice a year.

In France the evolution of tariffs set up by SSOs is criticized by storage customers. Suppliers complained about the successive increases implemented by two SSOs over the last three years. In 2009, CRE had carried out a European benchmark on tariffs to assess the level of visibility give by the French SSOs on the evolution of tariffs. CRE does not set up the tariffs, CRE monitors if tariffs are offered in a transparent and non-discriminatory way and settles potential conflicts.

There is no congestion due to the used CAM (CGWC). There is no obligation for the SSOs to organise a trading platform for secondary markets and for the storage users to trade on secondary markets.

In application of the measures in European Directive 2003/55/EC of 26 June 2003 and in Article 30 of law 2003-8 of 3 January 2003 modified by Law 2004-803 of 9 August 2004, the transport network operator is entitled to priority use of the storage site, via a special flexibility and security contract that gives the operator access to storage capacity required for its public service missions.

2.5 Germany

With 20 bcm Germany currently has the fourth largest working gas volume (wgv) in the world. It is unequally distributed in 49 storage facilities which are operated by 24 SSOs[2]. The three major storage system operators (Wingas, E.ON Gas Storage, VNG) already account for 24% of the total wgv, and the "Top Ten"-SSOs control 91% of the total wgv. 3,1% of the total wgv is reserved for production purposes or TSO duties; hence the TPA system applies to 96.9% of the total wgv.

German SSOs offer a variety of products in line with the requirements of the GGPSSO, but as they still differ significantly a comparison of products and tariffs is almost impossible.

In 2007, 116 companies have used storage capacities, predominantly wholesalers and suppliers. In the same period, 57 companies (21 without storage capacity) had requested storage capacity. These requests led to 58 refusals by eleven TSOs, mostly because of lacking availability of storage capacity. Bundesnetzagentur does not have any information neither on the actual storage users nor on storage contract details such as duration. But the yearly monitoring shows that half of the SSOs only serve one customer, presumably - in most of the cases - an affiliated company. But until now Bundesnetzagentur has not yet received any formal complaints regarding TPA (negotiated) to storage facilities.

In Germany there are no special requirements on CAM, TPA must be granted on an adequate and non-discriminatory basis. The SSO decides on the applied CAM and informs the users bilaterally or via internet publication. Bundesnetzagentur is not involved in designing or approving the CAM. Most of the German SSOs apply "first committed first served" or "first come first served" as CAM, but also bilateral negotiations are a common practise. The situation has not changed significantly during the last three years. Only two SSOs apply more market based capacity allocation mechanisms (auction/pro rata).

A basic necessity regarding the allocation of storage capacity is that the storage user also gets the related transport capacity to actually being able to use his storage capacity. Therefore, CAMs for storage and transport capacity have to be in line. An expedient way to achieve the necessity would be to bundle the capacity to one product by making the SSOs responsible for the transport capacity booking and nomination.

Regarding the CMP the same mechanisms as in case of CAM are in place. Most of the German SSOs apply "pro rata" or "first committed first served"/"first come first served" as the congestion management procedure of choice. In the last three years, the CMPs have developed towards the more market based mechanisms "pro rata". But only one SSOs applies an "Use-it-or-loose-it" (UIOLI) mechanism. In any case, further investigation has to be taken on how unused storage capacity can be determined. Besides secondary market trading has to be developed.

2.6 Hungary

In Hungary the third party access to storage is regulated, as there is no competition. E.ON Ruhrgas is the single owner of all storages. In 2010 and 2012 further SSOs will enter the storage market to operate a strategic and commercial storage. Thus the Hungarian regulator considers a change of the TPA regime to a negotiated one.

[2] At least one further SSO (& storage facility located) in Germany did not participate in the monitoring process, and therefore is not included in the following statistical results.

There have been no complaints from storage users or any structural or operational problems on the market, but as already mentioned there is no competition so far.

The current regulated TPA mechanism was elaborated to fit into an environment, where a single SSO has monopolistic position on the market, and storage capacities available are more or less equal with the storage capacity demand on the market. Cost-based storage tariffs cover the costs of the SSO, efficiency increase factor is as well included in the price. With the capacity booking priority of residential and communal customers, security of supply was properly managed.

Concerning capacity allocation, FCFS is applied under the regulator's control. During the allocation procedure no problems occurred regarding transparency and discrimination. The maximum duration of storage contracts is 5 years, but capacities are booked on an annual basis. With the change to nTPA there might also be a possible change in CAM - the preferential treatment of end consumers will be retained, but there won't be regulated prices any longer.

Regarding storage capacities, the term 'unused capacity' is not applied and no formal methodology for calculation is implemented. Due to the lack of liquidity there is no secondary market in the Hungarian storage market at the moment.

2.7 Italy

Italian storage system is formed by 10 depleted gas fields, managed by two SSOs, and the total working gas capacity is 13,9 bcm. The main SSO is Stogit, an Eni group company, that owns almost the total of the national storage capacity (13,5 bcm – 97% of the total) and 8 fields. The remaining two fields and capacity (0,4 bcm) is owned by Edison Stoccaggio.

The third party access to natural gas storage is completely regulated. AEEG has the power to fix the obligation of the SSOs, the criteria they have to follow in offering storage services, the tariff methodologies and to approve tariffs accordingly proposed by SSOs.

All the storage capacity is allocated for one thermal year contracts (i.e. from 1st April of each year to 30th March of the following year) during an open subscription period conducted every year, normally during the month of February.

In case of congestion, requests for storage capacity are accommodated with the following order: strategic, gas network operational balancing, domestic producers and modulation. Taking into account that the storage capacity to be dedicated to strategic storage or to domestic producers is fixed by the MSE, congestion occurs only in the allocation of the modulation storage. Available capacity for the modulation storage is allocated according to the following priorities, defined by AEEG:

a. amount of storage needed for the modulation of the domestic customers (more correctly the final customers with an yearly consumption lower than 200'000 Smc) in case of normally cold winter;

b. amount of storage needed for the modulation of the domestic customers in case of 1/20 cold winter;

c. modulation of other final customers.

Pro rata applies in case of congestion within each class of priority.

Since 2001, available capacity was not sufficient to satisfy the requests for priority b, therefore those that serve mainly industrial and thermoelectric customers needed to look for other flexibility resources. Consequently these supply markets are less contestable and are concentrated in the hands of those suppliers that benefit from other source of flexibility

(mainly associated with long term supply contracts). Possibility of use of storage for price arbitrage is also limited.

To overcome this situation it is necessary to develop storage capacity. Until now storage expansion has not been sufficient and there are many project for new storage sites at different grade of maturity.

However, in the meantime until an adequate incremental storage capacity will enter into operation, access to storage can improve with the introduction of new storage services permitting the optimisation of the use of existing capacities and facilitating the sharing of flexibility resources among users. to this aim, in November 2009, AEEG required SSOs to introduce a new storage service, mainly designed for balancing purpose and open also to users that don't benefit of the above mentioned access priority.

For this service SSOs offer for monthly and - in the near future - weekly periods, capacities obtained, during the contractual year, by means of the optimisation of storage utilization and development in progress, as well as the capacities that they expect will not to be used on the basis of their forecasts. Capacities are offered both on interruptible and firm basis and are allocated by means of auctions along with capacity offered by primary users.

No exemption from TPA access has been requested up to now. Investors do not have an unanimous view on this: some say the regulated regime sufficiently guarantees investment recovery while those that plans to develop storage for their own use are interested to the obtain a TPA exemption.

2.8 Spain

Currently Spain has a rTPA regime to the two current underground storage, but nTPA is foreseen in the regulation.

Part of the capacity is reserved to strategic reserves. As the demand has increased significantly since 2002 and as there was a lack of capacity, the law was changed in 2007 and the Royal Decree 1766/2007 was published to specify how the strategic reserve has been managed. Due to this new security of supply obligations, the capacity allocation mechanism was changed from FCFS to annual open subscription procedure with direct allocation (strategic reserves) and annual auctions (the rest of the capacity). The allocation mechanism established the following procedure: part of the available capacity is reserved yearly (from 1st April to 31st March) for shippers to comply with security of supply obligations (strategic and operative reserves); the rest of available capacity was allocated via auction, in a process with several rounds. This capacity was bought paying €/GWh, and this payment was additional to access tariff to underground storage.

Services offered in the underground storage system include injection, withdrawal and storage. Agents do not contract withdrawal or injection capacities, they contract only the storage capacity, and the injection and withdrawal rights are link to the contracted capacity. Their use depends on the rest of storage users' use. The maximum they can use is the technical installed capacity and the minimum (which occurs when all the users want to inject or withdraw at the same time) is proportional to their contracted storage capacity. There exit different tariffs for storage, injection and withdrawal.

The Ministerial Order ITC/3862 created a secondary capacity market for storage that allows agents to trade in storage, injection and withdrawal capacity rights.

2.9 The Netherlands

Because of the large Groningen field and its swing capability (flexibility in gas supply is mainly delivered by Groningen) the Netherlands has relatively few gas storages in operation. The physical characteristics of the Groningen field allows for both the supply of

seasonal and short term flexibility. Up till now the swing capability of the Groningen field has remained intact. This is for a large part due to the success of the small fields policy. In order to preserve the swing capability of Groningen for as long as possible, production from the small fields (high calorific gas) was given a favorable treatment. The policy stated that the incumbent gas trader Gasterra of the Netherlands had to accept any supply from the small fields at market based prices. Since these fields have a flat production profile (i.e. little or no flexibility) the gas is used as baseload year round and stored in summer to provide additional seasonal flexibility in winter. However the small fields production won't last forever. Because of the success of the small fields policy, these fields will most likely be depleted within the next ten years.

It is clear that the availability of seasonal storage capacity for the market (that is: other parties than the current contractor) is limited. Only 4% of the total storage capacity is made available to the market. For market participants, in particular for new entrants to the market, this limited availability can pose a problem. Shippers see the limited availability of gas storage as a barrier to competition on the gas market.

The limited TPA to storages in the Netherlands together with the limited use of storage capacity poses the question whether more storage capacity can be made available to the market. Clarity on this issue is important since any ambiguity about available capacity may impede (necessary) investments in new gas storage facilities.

2.10 GB

The total storage capacity in Great Britain is approximately 4.5bcm. Rough, operated by Centrica Storage, is the largest facility and accounts for around 70 percent of storage space. Hornsea, operated by Scottish and Southern Energy, is the second largest facility and accounts for 7 percent of storage space in Great Britain.

Following industry consultation, Great Britain adopted a nTPA regime for storage. The role of Ofgem in the nTPA regime is to determine disputes on access terms offered by storage operators where this does not prejudice: the efficient operation of the facility, or storage in the facility of capacity reasonably required by the Storage Owner, and the rights of other capacity holders. Ofgem also has an enforcement role in ensuring that storage operators meet their requirements. Up to now Ofgem has not received any formal complaints regarding TPA to storage facilities.

Current TPA arrangements

Rough

Centrica Storage Limited (CSL) purchased Rough in 2002[3]. The acquisition was referred to the Competition Commission who concluded that it may be expected to operate against the public interest. As a result CSL agreed to a set of undertakings which are in place for an unlimited time period. Centrica Plc (Centrica) is only allowed to hold to 15 percent of

[3] Centrica Storage Limited (CSL) is a wholly owned subsidiary of Centrica Plc (Centrica).

capacity[4] and to sell a minimum 85 percent of capacity available to third parties[5].Capacity is sold on an annual basis in three stages.

(1) First, a minimum amount of capacity is made available for sale on a bilateral (FCFS) basis.

(2) Second, any unsold minimum capacity is sold at a zero reserve price auction at least 30 days before the start of the storage year.

(3) Third, where the facility has been further developed such that additional capacity has become available, Centrica is permitted to bid for this capacity with other third parties.

The undertakings require CSL to sell all capacity at Rough on non-discriminatory terms. The undertakings also require CSL to offer at least 20 percent of minimum capacity on annual contracts and offer rest of capacity for a range of contract durations (a range of 1 to 5 years is suggested). In addition, CSL is required to give customers the option of either fixed or indexed contract prices. Indexed prices are indexed to the difference between forward prices and spot prices for gas.

The combination of the requirement to sell all minimum capacity, the zero reserve price auction and the cap on capacity which Centrica can procure effectively prevent Centrica from using its strong market position to the detriment of competition and ultimately customers. This serves to promote competition and reduces barriers to entry in the downstream gas market.

CSL also offers secondary trading of storage capacity and gas in store. Trading gas in store enables users to transfer ownership of gas they own at the storage facility. The facility also has use-it-or-lose-it (UIOLI) arrangement where users can buy additional deliverability, injectability and working gas volume on an interruptible basis. This UIOLI capacity is capacity owned by other storage users, but not nominated for use. The secondary trading and UIOLI services are facilitated through CSL's STORIT platform[6].

Hornsea

Scottish and Southern Energy (SSE) acquired the Hornsea facility from Dynegy in September 2002[7]. Hornsea is subject to the TPA provisions in the Gas Act which stipulate that capacity should be allocated on a non-discriminatory basis. Capacity is sold on an auction basis and contract length is between one and five years.

Ofgem monitors actual day to day usage and capacity holdings at storage facilities on an ongoing basis. For Rough and Hornsea, Ofgem collects information on capacity holdings

[4] When Centrica Plc purchased Rough it was allowed to hold 20 percent of capacity. Its allowed capacity holding was required to decline by 1 percent each year for the first five years of ownership. Its allowed capacity holding is now fixed at 15 percent.

[5] The "minimum capacity" that CSL is required to offer to third parties initially equated to 80 percent of the defined capacity level at Rough at the time of giving the undertakings – this increased to the current figure of 85 percent over a five year period. If CSL invest in new capacity the additional capacity can be held be CSL, thereby providing CSL an incentive to invest.

[6] STORIT is a secure online customer services system where customers can place orders for injecting or withdrawing gas, see flow profiles and available capacity, buy additional storage capacity, trade storage capacity and download invoices.

[7] http://www.scottish-southern.co.uk/SSEInternet/index.aspx?rightColHeader=26&id=412

and use. Ofgem also has powers to request information from facilities exempted from TPA under the terms of their exemption for the purpose of monitoring the operation of the provisions under which they are excluded.

Access conditions at TPA excluded facilities

Since Ofgem's storage review in 1999 five new gas storage facilities have become available to the GB market; Hole House Farm, Holford H165, Hatfield Moor, Humbly Grove, and Aldbrough, which are all exempted from TPA[8]. Apart from Aldbrough, which is part owned by SSE these facilities are owned by different SSOs. Hole House Farm and Hatfield Moor are used exclusively by their owners. Holford H165 is used by National Grid for operational balancing. Capacity rights at Humbly Grove were sold by its owner to a third party on a long-term basis. Capacity at Aldbrough is shared by several parties.

Approximately 80 percent of the storage capacity is available to the market at facilities that operate TPA (i.e.at Rough and Hornsea). The undertakings at Rough and Hornsea have, over time, contributed to the development of wholesale and retail market competition. Examining the capacity holding across the storage market reveals that capacity ownership is not concentrated with a HHI index of between 650 and 780 depending on measurement used.

2.11 *Summary and Conclusions*

The overview of the storage markets in several EU countries shows a fairly mixed picture. In a number of countries (like Germany, Austria, Netherlands), access to storage capacity is restricted because of existing long-term contracts between SSO and the former incumbent. In these countries shippers report that they experiences barriers to become more active on the market. In a number of other countries (like Hungary, the GB), however, the storage market seems to function rather well. In these countries, market parties have not submitted formal complaints about access to storages while the capacity seems to be efficiently used.

The EU countries also show a large variety of capacity allocation mechanisms. In several countries (like Austria, Germany, the Netherlands), FCFS is the dominant form, but several others (like Hungary, Czech Republic, Spain) auctioning of capacity is (becoming) important. The GB experience shows that it is key to design mechanisms in such a way that it cannot be abused by dominant firms. Components of such a scheme can include a cap on capacity to be obtained by the dominant firm and a zero reserve price.

As a congestion mechanism, UIOLI is applied in few countries (like the GB). Secondary markets are in place in many countries, but hardly applied and not liquid. In countries allocating capacity on basis of CGWC (France) or pro rata (Belgium), congestion mechanisms are not used as capacity is automatically allocated based on customer market share.

From these rather large differences between countries, both in the methods of allocating capacity and the problems experienced by market parties, one can conclude that there will likely be no one-size-fits-all solution.

[8] Section 19A of the Gas Act 1986 provides for exemption from TPA on the basis of Article 19 of the Second Gas Directive where TPA does not apply where storage is not economically and/or technically necessary for providing efficient access to the system for the supply of customers.

3 Economic theory and access to storage[9]

Economic theory is helpful to determine the optimal kind of regulation of access to storage facilities. Several issues have to addressed. The first one being the reason for government (regulatory) intervention in access to storage, the second one is directed at the benchmark for optimal intervention, while the third issue consists of the design of the optimal regulation.

Reason for regulation

The fundamental economic reason for government intervention in the storage market is the presence of market failure, e.g. when increasing supply of storage capacity is limited by geological reasons. Without intervention, the market would deliver inefficient outcomes in terms of prices and supply of storage capacity: prices would exceed marginal costs while capacity in the market would be below the economically optimal level. These inefficiencies result from the essential facility character of storages. In many countries, like Germany, France and Italy, storages are an important means for supplying flexibility where shippers hardly have alternatives.[10] In addition, in the short term the total storage capacity is given (inelastic), although storage facilities can be extended in the medium to long term. Hence, shippers need access to the existing storage facilities in order to deliver profiled products on the downstream market. Quoting Bertoletti et al. (2008):

> "The asymmetric distribution of storage substitutes between incumbents and new entrants, together with the long time span required to deliver new capacity to the market leads to recognize storage plants as essential facilities, even if storage is not a natural monopoly and duplication of storage facilities may be viable in principle."

Because of this essential role of storages (in many countries), the owner of the storages possesses monopoly power which, in case of absence of any regulation, would be used to charge monopoly tariffs and to limit the available storage capacity to it's profit maximizing level. Third party access regulation is therefore needed to repair this market failure[11]. One of the elements of this regulation is the allocation of capacity among potential users, which is the focus of this report.

Benchmark for optimal regulation

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[9] This section is based on references:

- Bertoletti, P., A. Cavaliere and A. Tordi (2008), The regulation of access to gas storage with capacity constraints.
- Creti, A. (2009), The economics of natural gas storage; an European perspective.
- Hawdon and Stevens (2001), Regulatory reform of the GB Gas Market: the case of the storage auction, Fiscal Studies, 22(2), pp. 217-232.
- McDaniel and Neuhoff (2002), Auctions to gas transmission access: the British experience, University of Cambridge.
- Newberry and McDaniel (2002), Auctions and trading in energy markets: an economic analysis, University of Cambridge.

[10] See Creti (2009)

[11] See Creti (2009)

Before determining the optimal design of the capacity allocation, one has to define the benchmark for optimal intervention. Theoretically, this benchmark can be defined as maximisation of the present value of future streams of producer and consumer surplus. This result will materialise when the utilisation of storage is set at that level where the marginal costs of an additional unit of storage use equals the marginal value of this use. At that level, maximum allocative efficiency emerges. At the same time suppliers are able to capture inframarginal profits which incentives decisions on investments in additional capacity. If the aggregated inframarginal profits exceed the fixed costs of storage extension, i.e. the investment costs, storage extension is beneficial. On the other hand, if aggregated demand for storage is such that the inframarginal profits are below the level of investment costs, no new capacity will be build. Hence, this theoretically defined system not only results in optimal short-term utilisation of existing capacity, it also gives producers optimal investment signals.

Optimal allocation mechanism

The key question now is which form of capacity allocation meets the theoretical benchmark in the best way. The general conclusion from the economic literature is that auctioning of capacity gives the best economic outcome. Quoting McDaniel et al. (2002):

> "When access to monopoly owned networks is constrained auctioning access rights can increase the efficiency of allocations relative to negotiation and grandfathering when there is sufficient competition among network users. Historically, access rights to entry capacity on the British gas network were granted by the monopoly network owner via negotiation; rights were later based on regulated tariffs with an increasing reliance on market based constraint resolution by the system operator. In 1999 an auction mechanism for allocating rights was introduced. Comparing the different allocation methods we conclude that where there is competition at entry terminals auctions have been successful with respect to anticipating spot prices, capturing producer rents and reducing the costs of alleviating network constraints. Moreover, auctions are more transparent and better facilitate entry."

Hence, allocation mechanisms which do not directly take into account both the marginal value as well as the marginal costs of using a storage, do not deliver optimal economic outcomes. Examples of such economically suboptimal mechanisms are first come, first serve and pro-rata. After all, in these mechanisms the allocation of the scarce capacity is based on historical positions and the volume of trade, respectively, which is of course not equal to allocating capacity to those users attaching the highest value to the (marginal) capacity.

Although auctioning is the optimal way of allocating scarce capacity, several aspects have to be taken into account carefully. From the above quotation follows that a necessary condition for auctioning to be an efficient allocation mechanism is the presence of a significant number of bidders. Generally, an auction does only produce efficient outcomes when there is competition between the bidders and absence of the possibility to behave strategically. Another condition for auctioning for being an efficient allocation mechanism is the absence of vertical integration between the storage owner and an user of the facility. Quoting Bertoletti et al. (2008) again:

> "Without ownership unbundling even the effect of the adoption of a market mechanism on the adverse incentives of the incumbent is diluted. In fact the market clearing price paid by the incumbent gas supplier to the storage firm just becomes a transfer price inside the same holding company."

Empirical evidence on the use of auctions in the storage markets shows also positive effect of auctioning capacity. Quoting Hawdon et al. (2001):

> "Using auctions represents an important new development in the regulation of the formerly publicly owned utilities. It offers the prospects of achieving optimal or near-optimal allocation of existing capacity and a price mechanism for establishing whether new investment is needed. Although there are varieties of auction design available, most of them have highly desirable properties with respect to the valuation of assets in rapidly changing market environments. Capacity can be allocated to users whose bids reveal that they place the greatest value on capacity, thus directly improving welfare. At the same time, auctions have useful revenue-raising features, as is witnessed by the popularity of auctions among many regulatory authorities.
>
> The use of auctions in connection with GB gas storage has shown that auctions can be successfully organised for this important component of the gas industry. Previously considered as essentially a joint input together with transportation services, the auctions held in March–April 1999 have clearly shown that storage can achieve higher than reserve values at auction. This suggests that there is a sufficient variety of competing uses for storage available in the independent gas sector to ensure that bidders have no difficulty in matching the incumbent's valuation. The fact that not all of the available capacity was sold, however, implies that the incumbent's valuation is too high for at least one of the facilities — the Rough field. This lends support to the argument that reserve prices should not be applied, since they can be used as ways of sustaining monopolistic pricing and may exclude potential buyers.
>
> Major improvements in the efficiency of auctions in the gas industry may be expected, provided certain developments occur. First is the integration of all aspects of storage into the auction process. Reservation of part of storage, such as LNG storage, for fixed price tender is likely to undermine the auction outcomes, so LNG should be included in future auctions. Wider adoption of auctions throughout the industry, as is envisaged in Ofgas (1999c), will attract greater bidder interest. Reserve prices should be rejected since there is no evidence of the development of rings, or of other forms of collusion, against which they might be a form of protection. The type of auction design used in any case minimises the potential for collusion."

From this quotation follows that the actual design of the auction mechanism is crucial to the effects. Using reserve prices reduce the potential efficiency of the auction as it creates the chance that demand is rationed while the value of its marginal use exceeds the marginal costs of supply.

Another aspect which has to be taken into account is the impact of auctioning on incentives to invest in new storage capacity. Newberry et al. (2002) refer to the commitment problem of the regulator:

> "The temptation is to believe that the price discovery role of auctions can be used to guide investment decisions in long-lived natural monopoly elements. Clearly the price signals emerging from spot auctions are informative, but there are risks involved in relying solely on auctions to determine future capacity, at least without clearly specifying how and when the regulator may step in to ensure adequate capacity if the auctions deliver apparently inadequate investment. There are then dangers that investors will fear future excess capacity (which has social and external benefits in increasing reliability and reducing market power) and will thus underbid for new investment, validating the need for additional investment and low prices."

Hence, an auctioning mechanism for capacity allocation does not necessarily deliver an efficient level of investments as the mechanism itself does not guarantee long-term commitment by the government. This hold-up problem, however, is not specific to auctioning, but also occurs in other allocation mechanisms.

4 Development of the discussion process of the regulatory framework for CAM and CMP

The basis for third party access to storage are at EU level the EU Directives and at national level their implementation in national law.

In addition to the legally binding framework, voluntary rules were defined. In 2005 Guidelines of Good Practice for Storage System Operators (GGPSSO) were adopted by the stakeholders (NRAs, SSO) setting minimum requirements for a fair and non-discriminatory access to storage facilities.

The next steps of the regulatory framework for CAM and CMP are defined by the 3rd Package.

4.1 *EU-Directives 1998 and 2003*

In the first Gas Directive from 1998 (98/30/EC), Chapter III and VI, the **principle of access to the gas system was established.** Member States could choose between negotiated and regulated access to the system. Storage was regarded as part of the "system", but there were no specific rules for the access to storage. The organisation of storage access should be objective, transparent and non-discriminatory.

The 2nd Gas Directive from 2003 (2003/55/EC), Article 19 regulated **the access to storage**. It is stated (20) that access to storage had been treated as part of the system but the experience gained in implementing the internal market showed that additional measures should be taken to clarify the provisions for access to storage and ancillary services. Member States could choose between regulated and negotiated access to storage facilities. The procedures for the organisation of storage access should be objective, transparent and non-discriminatory. The Regulatory Authority should monitor the access conditions to storage as provided in Article 19.

Directive 2003/55/EC did not cover specific requirements for CAM and CMP.

4.2 *GGPSSO (ERGEG)*

After a two years long discussion process the Guidelines of Good Practice for Storage system operators (GGPSSO) were adopted by the stakeholders (NRAs, SSO) in 2005 **setting minimum requirement for a fair and non-discriminatory access for storage facilities**.

According to the GGPSSO, the SSOs are responsible for the provision and management of technical storage capacity, storage services and information as well as the technical integrity and safety of storage facilities. For capacity allocation mechanisms and congestion management procedures the relevant roles and responsibilities for SSOs are specified in the following way:

"…1.2 SSOs shall inter alia:

c. aim at accommodating market demand on a non-discriminatory basis, without imposing barriers to customer supply and to trade, whilst granting efficient and competitive access taking into account § 3.4 and 4.2;

d. establish rules on the use of capacity aimed at facilitating competitive and efficient use of that storage facility, in particular to discourage storage capacity hoarding. Maximise the use of available capacity and offer unused capacity at least on an interruptible basis, and services according to § 3.3;

e. treat commercial information confidentially, especially with regard to any affiliated company, in order to avoid any discrimination between storage users;… "

According to the GGPSSO CAM should:

- *facilitate the development of competition and liquid trading of storage capacity and be compatible with market mechanisms;*
- *take into account system integrity and security of supply;*
- *not create undue barriers to market entry;*
- *ensure maximum availability and efficient use of storage under economic and nondiscriminatory conditions;*
- *be subject to consultation with storage users.*

In case of congestion:

a. *non discriminatory, market-based solutions shall be applied by the SSO or by the relevant national regulatory authority, where appropriate;*

b. *alternative solutions such as pro-rata mechanisms may be considered if they ensure equivalence in terms of non-discriminatory and competitive access;*

c. *the SSO or the relevant national regulatory authority shall appropriately balance the portion of storage capacity contracted under long-term contracts and short term contracts, with the aim of promoting effective competition.*

4.3. In no circumstances should the provisions of § 4.1 and 4.2 prevent customers from changing suppliers at any time of the year.

4.4. The SSO shall actively endeavour to discourage hoarding and facilitate re-utilisation and trade of storage capacity by all reasonable means, including at least the offer on an interruptible basis of all unused capacity (e.g. day-ahead release of non-nominated injectability and deliverability).

4.5. If, in spite of all measures aimed at preventing capacity hoarding, capacity remains unused and significant and prolonged contractual congestion occurs, the relevant national regulatory authority may according to national law introduce measures to ensure the efficient functioning of the market, including the efficient use of storage capacity…"

Monitoring of the GGPSSO

In 2005 and 2006 two monitoring reports were published to monitor the compliance with the GGPSSO. In the **Monitoring report 2005** ERGEG stated that the "monitoring compliance with congestion management & capacity allocation mechanisms requirements is particularly difficult as the GGPSSO provide only high level principles and objectives. This lack of specificity makes it difficult to assess whether the principles/objectives have been achieved." (p. 4)

An open question remained the effectiveness of anti hoarding procedures and to what extent capacity allocation and congestion management mechanisms facilitate the development of competition, taking into account the integrity and the maintenance of the storage system, do not create undue barriers to entry, and ensure the maximum availability and efficient use of storage – all as required by the GGPSSO. (p. 38)

In the **Monitoring report 2006** ERGEG came to the conclusion that the GGPSSO compliance still remains unsatisfactory in key areas which are essential for non-discriminatory access:

→ transparency,

→ equal treatment of storage users (including confidentiality requirements),

→ congestion management (including secondary markets).

The assessment of CAM and CMP was also not possible in the Monitoring report 2006. ERGEG stated that "a full assessment of capacity allocation and congestion management needs to take into account users views."

ERGEG suggested in the Monitoring Report 2006 that the voluntary guidelines developed by ERGEG should form the basis for binding rules.

4.3 *DG Comp Sector Inquiry*

The European Commission launched an inquiry on competition in gas and electricity markets in 2005, pursuant to Article 17 of Regulation 1/2003 EC. The final report was published in 2007.

Regarding access to storage and CAM and CMP the following was pointed out:

"*Newcomers complain about a number of weaknesses in negotiated access: lack of transparency on storage use, inadequacy of storage services to their needs, lack of secondary markets, and high prices. " ……*

"The Gas Sector Inquiry has found that, across the countries reviewed, available storage capacity (that part of storage which is not excluded from TPA and which is not booked is very scarce or non-existent. Out of about 25 storage operators analyzed whose storages are open to TPA only five of them indicated that they have available capacity. According to the sample, in four countries there is no available capacity at all. In another one, available capacity is very small compared to the total amount. "….

"When capacity is fully booked, and in particular in long-term arrangements, it is important that appropriate congestion management procedures are put in place to allow access to newcomers. … Where such congestion management procedures exist, it remains to be assessed whether they are efficient, provide for non-discriminatory access to storage and meet users' needs."

"Access to storage is seriously foreclosed by long-term reservations. In some cases booked storage is not being fully used. Moreover, separation of suppliers from affiliated storage operators is unclear, leading to concerns about non-discrimination. Investment into new storage capacity may be hampered by the interests of vertically integrated incumbents. A wider than national perspective on future storage demand is necessary."

4.4 *ERGEG Survey on CAM and CMP in 2008*

Developing the 3rd Energy Package, the European Commission took up many of the proposals on storage made by ERGEG. However, in its 3rd Energy Package, the EC only lays down basic principles - detailed obligations, including those having to do with capacity allocation mechanisms and congestion management could be developed via comitology. ERGEG believed it was important to start working on such obligations as soon as possible given the prevalence of storage facilities in the EU that are congested on a long-term basis (as noted in DG Competition's Sector Inquiry).

ERGEG has therefore established a Task Force to give an overview of the current situation in different EU Member States and to explore solutions for better TPA to storage by assessing various CAMs and CMPs. This status report provided an overview of the current situation in Member States and should be the basis for the assessment of CAMs and CMPs in the near future.

The status report was based on a GST TF survey on CAM and CMP using questionnaires to SSOs, NRAs and also actual and potential storage customers. The questionnaires focussed at the current way of development, design, actual use and effects of the systems regarding capacity allocation, congestion management and security of supply.

The aim of the status report was to analyse the implementation of CAM and CMP in the different Member States but also to get an impression on the effectiveness of the implemented CAM and CMP. One main problem seems to be the weak position of NRAs in some countries especially where “first come first served” is implemented.

Again, the effectiveness of CAM and CMP could not clearly be assessed. As CAM/CMP applied by integrated SSOs shall be designed in a non-discriminatory way and shall facilitate competition the results of the survey indicate that FCFS applied by integrated SSOs could prefer the affiliates: FCFS is not non-discriminatory and fair in itself, the framework for applying FCFS has to be set by regulation and accompanying measures have to be set to support non-discrimination.

For the CMP the main question is how effective they are regarding capacity release as some CMP still lacking the practical test. As far as there is still insufficient information on the contractual use of storage capacity there is no information on the effectiveness of different CMP.

As the secondary markets are preferred by SSOs and storage users, it has to be addressed how capacity traded on secondary market will in practice be made available to all existing and potential storage users in a non-discriminatory and transparent process.

Although there are e.g. UIOLI principles in place it has not been necessary to put them in practice yet and therefore their effectiveness has not been proved. The data does not provide a clear picture with regard to the effectiveness of different CMP at releasing unused capacity.

Position of GSE to CAM and CMP

GSE published in 2008 a survey and position paper on the topic of capacity allocation and congestion management in order to provide a view to providing ERGEG and other institutional players and associations.

In the position paper GSE stated that negotiated TPA is the preferred regulatory regime as a stable predictable regulatory framework that encourages new storage development as well as an optimal use of the existing storages.

GSE said in its memo of 18 December 2008:

“Capacity Allocation Mechanisms should

- Be non-discriminatory in the sense that no market participant should receive preferential treatment or additional information and no rules should be bent to accommodate one storage user over another or affiliated companies over new market entrants;
- Be transparent in the sense that information about CAM mechanisms in use and the storages and/or parts of storages of the given SSO they apply to should be published on the Internet in the local language as well as in English;
- Provide incentives to SSOs to invest in maintenance necessary for the proper functioning of existing storages as well as in development of new capacity if and when required by the market;
- Be drafted in consultation with storage users, NRAs or other stakeholders if necessary
- Discourage capacity hoarding;
- Maximise the use of available capacity and offer unused capacity at least on an interruptible basis; and

- Guarantee the confidentiality of commercial information when necessary, but without unnecessarily withholding information from the market."

Congestion Management Procedures should

- Be non-discriminatory, being applied by the SSO or by the relevant national regulatory authority, where appropriate, to all storage users equally;
- Be market-based in order to provide the right signals regarding pricing and demand to SSOs, but alternative solutions such as pro-rata mechanisms may be considered if they ensure equivalence in terms of non-discriminatory and competitive access;
- Be set up in such a way that the SSO or the relevant national regulatory authority can appropriately balance the portion of storage capacity contracted under long-term contracts and short term contracts, with the aim of promoting effective competition;
- Be transparent in the sense that they are described and published on the Internet in the local language as well as English together with specific figures on the existing and projected congestion;
- Maximize the use of available capacity and offer unused capacity at least on an interruptible basis or on the secondary market; and
- Motivate shippers to publish information about transactions with storage capacity completed on the secondary market.

4.5 *Regulation of CAM and CMP in the 3rd Package*

In the Directive[12] and the Regulation[13] the main points concerning the CAM and CMP are

(1) Unbundling of storage system operators (Article 15, Directive 2009/73/EC)

(2) The definition of criteria for choosing regulated or negotiated access (Article 33, Directive 2009/73/EC)

(3) Tasks of NRAs (Article 41, Directive 2009/73/EC)

(4) The requirements for access (Article 15, 17 and 19, Regulation 715/2009/EC).

Unbundling

Unbundling of SSOs from trading activity helps to improve non-discrimination.

Article 15: Unbundling of transmission system owners and storage system operators

1. A transmission system owner, where an independent system operator has been appointed, and a storage system operator which are part of vertically integrated undertakings shall be independent at least in terms of their legal form, organisation and decision making from other activities not relating to transmission, distribution and storage.

[12] 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

[13] Regulation 9EC) No 715/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005

This Article shall apply only to storage facilities that are technically and/or economically necessary for providing efficient access to the system for the supply of customers pursuant to Article 33.

2. In order to ensure the independence of the transmission system owner and storage system operator referred to in paragraph 1, the following minimum criteria shall apply:

(a) persons responsible for the management of the transmission system owner and storage system operator shall not participate in company structures of the integrated natural gas undertaking responsible, directly or indirectly, for the day-to-day operation of the production and supply of natural gas;

(b) appropriate measures shall be taken to ensure that the professional interests of persons responsible for the management of the transmission system owner and storage system operator are taken into account in a manner that ensures that they are capable of acting independently;

(c) the storage system operator shall have effective decision-making rights, independent from the integrated natural gas undertaking, with respect to assets necessary to operate, maintain or develop the storage facilities. This shall not preclude the existence of appropriate coordination mechanisms to ensure that the economic and management supervision rights of the parent company in respect of return on assets regulated indirectly in accordance with Article 41(6) in a subsidiary are protected. In particular, this shall enable the parent company to approve the annual financial plan, or any equivalent instrument, of the storage system operator and to set global limits on the levels of indebtedness of its subsidiary. It shall not permit the parent company to give instructions regarding day-to-day operations, nor with respect to individual decisions concerning the construction or upgrading of storage facilities, that do not exceed the terms of the approved financial plan, or any equivalent instrument; and

(d) the transmission system owner and the storage system operator shall establish a compliance programme, which sets out measures taken to ensure that discriminatory conduct is excluded, and ensure that observance of it is adequately monitored. The compliance programme shall set out the specific obligations of employees to meet those objectives. An annual report, setting out the measures taken, shall be submitted by the person or body responsible for monitoring the compliance programme to the regulatory authority and shall be published.

3. The Commission may adopt Guidelines to ensure full and effective compliance of the transmission system owner and of the storage system operator with paragraph 2 of this Article. Those measures, designed to amend non-essential elements of this Directive by supplementing it, shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 51(3).

The definition of criteria for choosing regulated or negotiated access (Article 33, Directive 2009/73/EC):

Under the Directive 2009/73/EC both a negotiated and a regulated access regime is permitted without discriminating against either of them. The results of both regimes should comply with the principle of non-discrimination and competition enshrined in the Directive 2009/73/EC. All Member States need to define criteria how to assess whether regulated or negotiated access should be applied. These criteria have to be made public. The regulator consequently has the task to control if these criteria are applied correctly to all storages.

The question of the regulated or negotiated access is also crucial for the regulatory power on developing CAM and CMP. The Status Review 2008 showed that the regulatory powers in storage markets with nTPA are limited.

Article 33: Access to storage

1. For the organisation of access to storage facilities and linepack when technically and/or economically necessary for providing efficient access to the system for the supply of customers, as well as for the organisation of access to ancillary services, Member States may choose either or both of the procedures referred to in paragraphs 3 and 4. Those procedures shall operate in accordance with objective, transparent and non-discriminatory criteria.

The regulatory authorities where Member States have so provided or Member States shall define and publish criteria according to which the access regime applicable to storage facilities and linepack may be determined. They shall make public, or oblige storage and transmission system operators to make public, which storage facilities, or which parts of those storage facilities, and which linepack is offered under the different procedures referred to in paragraphs 3 and 4.

The obligation referred to in the second sentence of the second subparagraph shall be without prejudice to the right of choice granted to Member States in the first subparagraph.

2. The provisions of paragraph 1 shall not apply to ancillary services and temporary storage that are related to LNG facilities and are necessary for the re-gasification process and subsequent delivery to the transmission system.

3. In the case of negotiated access, Member States or, where Member States have so provided, the regulatory authorities shall take the necessary measures for natural gas undertakings and eligible customers either inside or outside the territory covered by the interconnected system to be able to negotiate access to storage facilities and linepack, when technically and/or economically necessary for providing efficient access to the system, as well as for the organisation of access to other ancillary services. The parties shall be obliged to negotiate access to storage, linepack and other ancillary services in good faith.

Contracts for access to storage, linepack and other ancillary services shall be negotiated with the relevant storage system operator or natural gas undertakings. The regulatory authorities where Member States have so provided or Member States shall require storage system operators and natural gas undertakings to publish their main commercial conditions for the use of storage, linepack and other ancillary services by 1 January 2005 and on an annual basis every year thereafter.

When developing the conditions referred to in the second subparagraph, storage operators and natural gas undertakings shall consult system users.

4. In the case of regulated access, the regulatory authorities where Member States have so provided or Member States shall take the necessary measures to give natural gas undertakings and eligible customers either inside or outside the territory covered by the interconnected system a right to access to storage, linepack and other ancillary services, on the basis of published tariffs and/or other terms and obligations for use of that storage and linepack, when technically and/or economically necessary for providing efficient access to the system, as well as for the organisation of access to other ancillary services. The regulatory authorities where Member States have so provided or Member States shall consult system users when developing those tariffs or the methodologies for those tariffs. The right of access for eligible customers may be given by enabling them to enter into supply contracts with competing natural gas undertakings other than the owner and/or operator of the system or a related undertaking.

Article 41: Tasks of NRAs

According to the Article 41 of Directive 2009/73/EC, the NRAs have the task to review the access conditions and to monitor the correct application of the criteria for choosing the regulatory regime.

"*1. The regulatory authority shall have the following duties:…..*

(f) ensuring that there are no cross-subsidies between transmission, distribution, storage, LNG and supply activities;

…..

(n) monitoring and reviewing the access conditions to storage, linepack and other ancillary services as provided for in Article 33. In the event that the access regime to storage is defined according to Article 33(3), that task shall exclude the reviewing of tariffs;

…..

(s) monitoring the correct application of the criteria that determine whether a storage facility falls under Article 33(3) or (4); and……"

The requirements for storage access in Article 15, 17 and 19, Regulation 715/2009/EC

Non-discrimination and transparency are the main points of Article 15. The products SSOs have to offer are determined in Article 15.

"Article 15: Third-party access services concerning storage and LNG facilities

1. LNG and storage system operators shall:

(a) offer services on a non-discriminatory basis to all network users that accommodate market demand; in particular, where an LNG or storage system operator offers the same service to different customers, it shall do so under equivalent contractual terms and conditions;

(b) offer services that are compatible with the use of the interconnected gas transport systems and facilitate access through cooperation with the transmission system operator; and

(c) make relevant information public, in particular data on the use and availability of services, in a time-frame compatible with the LNG or storage facility users' reasonable commercial needs, subject to the monitoring of such publication by the national regulatory authority.

2. Each storage system operator shall:

(a) provide both firm and interruptible third-party access services; the price of interruptible capacity shall reflect the probability of interruption;

(b) offer to storage facility users both long and short-term services; and

(c) offer to storage facility users both bundled and unbundled services of storage space, injectability and deliverability.

3. LNG and storage facility contracts shall not result in arbitrarily higher tariffs in cases in which they are signed:

(a) outside a natural gas year with non-standard start dates; or

(b) with a shorter duration than a standard LNG and storage facility contract on an annual basis.

4. Where appropriate, third-party access services may be granted subject to appropriate guarantees from network users with respect to the creditworthiness of such users. Such guarantees shall not constitute undue market-entry barriers and shall be non-discriminatory, transparent and proportionate.

5. Contractual limits on the required minimum size of LNG facility capacity and storage capacity shall be justified on the basis of technical constrains and shall permit smaller storage users to gain access to storage services."

In Article 17, the principles of **capacity allocation** mechanisms and congestion management procedures concerning storage facilities and LNG facilities are contained. The SSOs shall offer the maximum storage capacity, taking into account system integrity and operation. SSOs shall implement and publish non-discriminatory and transparent capacity allocation mechanisms.

"Article 17: Principles of capacity-allocation mechanisms and congestion-management procedures concerning storage and LNG facilities

1. The maximum storage and LNG facility capacity shall be made available to market participants, taking into account system integrity and operation.

2. LNG and storage system operators shall implement and publish non-discriminatory and transparent capacity-allocation mechanisms which shall:

(a) provide appropriate economic signals for the efficient and maximum use of capacity and facilitate investment in new infrastructure;

(b) be compatible with the market mechanism including spot markets and trading hubs, while being flexible and capable of adapting to evolving market circumstances; and

(c) be compatible with the connected network access systems.

3. LNG and storage facility contracts shall include measures to prevent capacity-hoarding, by taking into account the following principles, which shall apply in cases of contractual congestion:

(a) the system operator must offer unused LNG facility and storage capacity on the primary market without delay; for storage facilities this must be at least on a day-ahead and interruptible basis;

(b) LNG and storage facility users who wish to re-sell their contracted capacity on the secondary market must be entitled to do so."

To **improve transparency,** Article 19 states that SSOs shall make public detailed information regarding the services they offer and the relevant conditions applied, together with the technical information necessary for storage facility users to gain effective access to storage facilities.

"Article 19: Transparency requirements concerning storage facilities and LNG facilities

1. LNG and storage system operators shall make public detailed information regarding the services it offers and the relevant conditions applied, together with the technical information necessary for LNG and storage facility users to gain effective access to the LNG and storage facilities.

2. For the services provided, LNG and storage system operators shall make public information on contracted and available storage and LNG facility capacities on a numerical basis on a regular and rolling basis and in a user-friendly standardised manner.

3. LNG and storage system operators shall always disclose the information required by this Regulation in a meaningful, quantifiably clear and easily accessible way and on a non-discriminatory basis.

4. LNG and storage system operators shall make public the amount of gas in each storage or LNG facility, or group of storage facilities if that corresponds to the way in which the access is offered to system users, inflows and outflows, and the available storage and LNG facility capacities, including for those facilities exempted from third-party access. That information shall also be communicated to the transmission system operator, which shall

make it public on an aggregated level per system or subsystem defined by the relevant points. The information shall be updated at least daily.

In cases in which a storage system user is the only user of a storage facility, the storage system user may submit to the national regulatory authority a reasoned request for confidential treatment of the data referred to in the first subparagraph. Where the national regulatory authority comes to the conclusion that such a request is justified, taking into account, in particular, the need to balance the interest of legitimate protection of business secrets, the disclosure of which would negatively affect the overall commercial strategy of the storage user, with the objective of creating a competitive internal gas market, it may allow the storage system operator not to make public the data referred to in the first subparagraph, for a duration of up to one year.

The second subparagraph shall apply without prejudice to the obligations of communication to and publication by the transmission system operator referred to in the first subparagraph, unless the aggregated data are identical to the individual storage system data for which the national regulatory authority has approved non-publication.

5. In order to ensure transparent, objective and non-discriminatory tariffs and facilitate efficient utilisation of the infrastructures, the LNG and storage facility operators or relevant regulatory authorities shall make public sufficiently detailed information on tariff derivation, the methodologies and the structure of tariffs for infrastructure under regulated third-party access."

Conclusion

In the development of the regulatory framework for storage access, allocation mechanism and congestion management main improvements have been achieved. The legally binding parts of the GGPSSO and the requirement for unbundling of the system storage operators. Also the required verification for the Member States for choosing regulated or negotiated access could strengthen the position of the regulatory authorities.

The main question is if the regulatory framework (EU law and existing GGPSSO as voluntary guidelines) is sufficient to deal with the problems of lack of availability of storage capacity, not only short term, but also mid term, the preferential treatment of different costumer groups and incentives for new investments.

5 Results of the survey in 2009

As the response rate of the storage users was very low in the survey of 2008, more work had to be done to get a much more specific view on CAM and CMP of this group of stakeholders.

For this purpose, a detailed questionnaire based on the results of the survey 2008 and focussing again on CAM, CMP and secondary markets was sent out to the storage users in 2009. The questionnaire was coordinated with GSE, Eurogas and EFET. The addresses were taken by published lists of traders on different hubs. EFET and Eurogas in addition requested their members to support the survey.

20 storage users returned the questionnaire, among them main player in the European gas markets: E.ON Ruhrgas, GDF Suez, Centrica, Gas Natural, Statoil and RWE. The storage users cover about 372 bcm of gas sales and about 32 bcm of storage rights, 40% of storage volumes in EU 27.

About 50% of the respondents are integrated with SSOs, about 63% have separation agreements.

Storage is the main flexibility tool in most countries. For fulfilling public service obligations, a seasonal storage access to storage capacity is necessary (Figure 1).

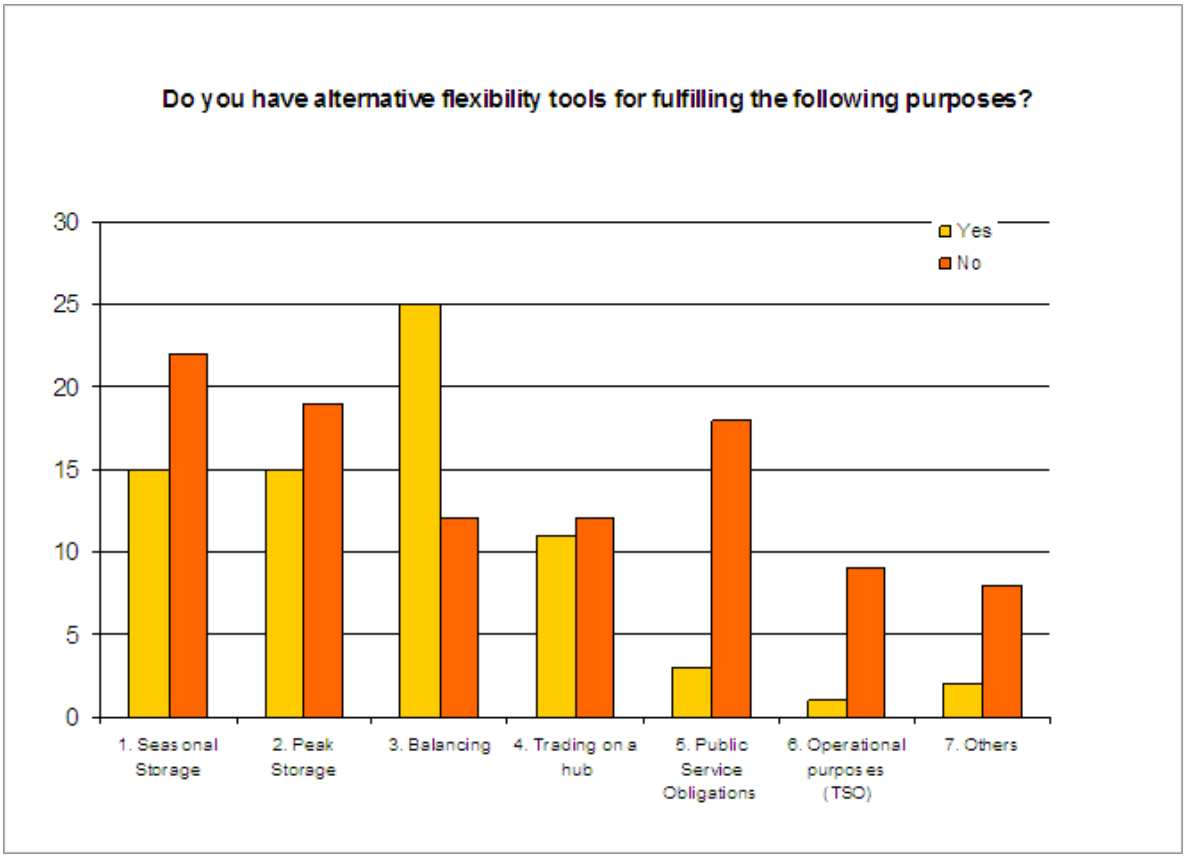

Figure 1: Alternative flexibility tools for using storage

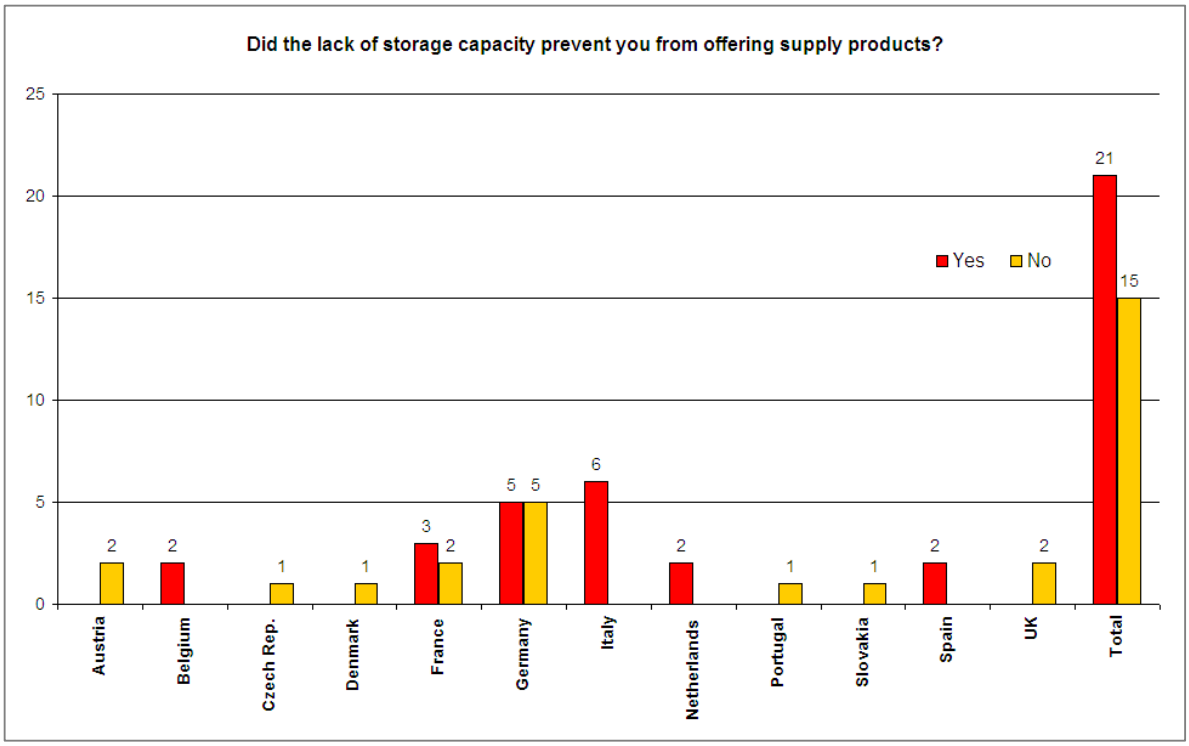

Figure 2: Did the lack of storage capacity prevent you from offering supply products?

(The 21 "yes' responses in the total bar include one positive reply from a storage user which could not be attributed to a specific country).

The lack of storage capacity is a barrier to entry as Figure 2 shows.

Being successful in a capacity allocation process depends on the price level when applying auction and on the availability of capacity applying FCFS. One storage user applying for capacity in France believes that the volumes offered under auction (i.e. after the "following the clients' customers' portfolio" mechanism) were limited compared to the demand from new entrants (typically traders and foreign players), which might have distorted prices. Another storage user, having experience in most European countries, stated that in Germany, the Netherlands, Austria and Czech Republic the most difficult is to obtain sufficient capacity because of geological or regulatory constraints.

The following table summarizes the answers of the storage users.

Country	Reason for failure to get capacity	CAM applied by SSO
Austria	capacity already booked out	FCFS
France	price too high	auction
France	applied CAM	administred, pro-rata of supplied end costumer
Germany	price too high	auction
Germany	capacity already booked out	FCFS
Italy	applied CAM/industrial customers	administred, pro-rata of supplied end costumer
Netherlands	sold out during negotiations	free market
Portugal	lack of capacity	CGWC, auction
Slovakia	price	auction

Spain	lack of capacity	CGWC, auction
GB	price	auction

Figure 3 shows that the participants of the survey prefer auctions for capacity allocation, as they are market based and reflect the value of the storage best. Auctions offer greater certainty and transparency, thus enabling a fairer, non-discriminatory participation and facilitating competition.

Some procedures are even mentioned in combination, depending on the capacity situation. If there is a lack of capacity, pro rata could be a possible mechanism for storage users. They could also imagine a mix of CGWC and auctions, as already introduced in France.

Nevertheless an open season period to survey the demand and transparency are the basic conditions independent of the applied mechanism for capacity allocation.

60% of the storage users think that they would have a better opportunity to get more storage capacity through market based mechanism (auctions) than through administrative measures (e.g. FCFS, pro rata).

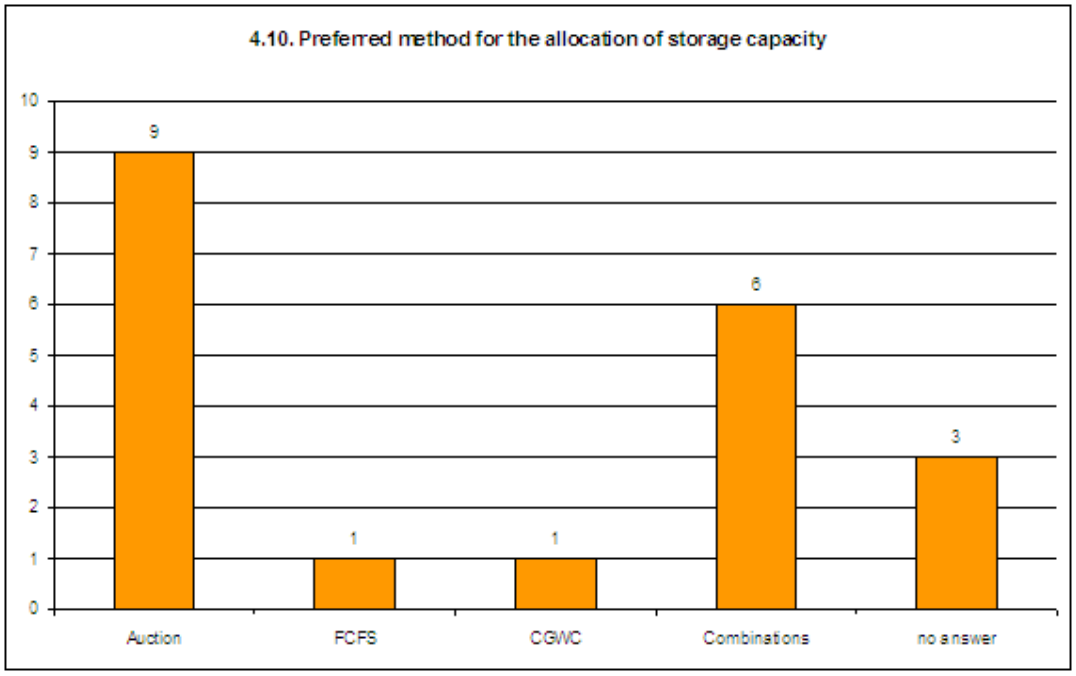

Figure 3: Preferred method for the allocation of storage capacity, answer of storage users

Comments of the storage users for the preference of auctions are:

→ "More flexible."

→ "The most non-discriminatory and transparent allocation mechanism, giving shippers the choice to determine the price and sending clear price signals for necessary investments to the market."

→ "Would allow for more short term allocation of capacities."

→ "Lead to an objective, transparency and non-discriminatory allocation of capacity."

→ "In competitive markets, auctions provide the most efficient market solution for the sale of storage capacity. Where the supply of capacity is greater than demand, prices are low and the consumer does not suffer unnecessary costs. Where storage capacity is limited, storage operators are incentivised to build new storage facilities. (Where a market is not competitive or the storage operator holds a dominant position in the market, mechanisms should be in place to prevent the storage operator from withholding capacity, charging excessive prices, or discriminating in favour of its own interests. This could be achieved through regulation that requires the storage operator to sell all capacity to third parties on reasonable terms.)"

→ "The precondition that auctions can function properly is that all market parties have access to the same information."

Comments of the storage users against the preference of auctions:

→ "Trading companies could get more values from storage capacities than supplier of end customers. "

→ "If there is a lack of capacity it would be better to use administrative measures."

→ "Where a market is not competitive or the storage operator holds a dominant position in the market, mechanisms should be in place to prevent the storage operator from withholding capacity, charging excessive prices, or discriminating in favour of its own interests. This could be achieved through regulation that requires the storage operator to sell all capacity to third parties on reasonable terms."

In Table 1 the views of the respondents on the advantages or disadvantages of each CAM are summarised. The answers refer to the concept of each CAM; only if referred to the CAM as it is applied in a country, this is mentioned. Table 1 reflects the different experiences of the storage users with the CAM in different countries.

Table 1: Advantages and disadvantages of CAM and CMP, answers of storage users

CAM	Advantages	Disadvantages
FCFS	only advantageous to the parties who learn about the storage release first	potential for misuse i.e. partially discriminatory
	possibility to structure the portfolio; certainty of not having the risk of spot market	in case of congestions no appropriate market signal is set
	pre-determined price, no price risk	difficult to obtain storage for new entrants, and is non transparent
Auctions	market based pricing setting, appropriated market signals	prices can be very high

	those prepared to pay get capacity	lack of security of supply
	transparency	limited capacity auctioned distorts players behaviour, SSO sets a reserve price to a minimum level equal to annual capacity that can be inconsistent with market value (France)
	competition	Auctions are organised for different storages at the same time, which leads to uncertainties on the total capacity bought if the auctions ends at the same tour
	auctions are organized storage by storage (high visibility on the capacities booked)	
CGWC	security of getting capacity	no additional capacity available for trading purposes
	easier to have public service obligations	no security of supply
		no capacity for balancing
		barrier to entry for market participants not supplying end costumers, e.g. traders, limited flexibility market (Italy)
		few capacities are left for other purposes, and discussions for sharing capacities amongst types of customers are long. Moreover, the frequency of the allocation process is not sufficient (2 times per year). (France)
		- does not highlight the market value of storage, and prevents suppliers to end users with a strong portfolio growth to anticipate future needs (allocation process has to be as frequent as possible to match suppliers portfolio) - complexity of the process - price is not regulated even though there is an obligation to store for households, and there is no visibility on price evolution (France)

5.1 *Congestion Management Procedures*

The survey showed that only 30% of the respondents have contracts with SSO, executing a Use-It-Or-Lose-It principle (UIOLI).

Some experiences from storage users how UIOLI is applied by the various SSOs:

Centrica Storage Ltd/GB: “If capacity holders fail to nominate then another customer can purchase withdrawal/injection rights; this happens most days.”

Enagas/Spain: “Part of the capacity is lost if a minimum of gas corresponding to 80% of the rights has not been injected within 6 months after the allocation of capacity. However we (storage users) doubt that it is a real UIOLI mechanism as there is no evidence that this lost capacity can be offered on time by the SSO on the market. It is more an initiative rule, the user trying to avoid this penalty.”

Storengy/France: “The "Day Ahead" offer can be compared to a UIOLI mechanism, with pro-rata. Any shipper can request Day Ahead capacity (interruptible only) for day D in day D-1 for specific storage sites. This capacity never becomes firm but pro-rata applies as time goes by.”

In order to avoid capacity hoarding above all in case of integrated companies, clear rules regarding UIOLI are necessary. Otherwise this could hamper the market entry for new entrants and in a row constrain competition.

But the question occurs, whether there should respectively be a common rule for UIOLI.

The storage users were asked how the applied UIOLI mechanisms can be improved. Their answers were:

- "UIOLI is essential to require capacity holders to make all unused capacity available to the market. If secondary markets were available and sufficiently liquid, this could reduce the need for storage operators to apply UIOLI as capacity holders would be actively encouraged to sell their own unused capacity."
- "When creating a UIOLI rule it has to be considered, that all commercial functions of a gas storage, i.e seasonal balancing, security of supply, fast-churn, portfolio optimisation, etc. are still possible and no user group is discriminated against."
- "The application of UIOLI in gas storages is undesirable as storage capacities are primarily reserved for potentially cold winter periods and pipeline supply interruptions for which a prediction is nearly impossible."
- "The application of the current existing UIOLI rules does not fit as storage is primarily needed for seasonal and security of supply reasons."
- "As underlined, in ERGEG 2008 Status Review (E08-GST - 03 -03) it is very difficult to address the question of how a practical and effective UIOLI or a similar mechanism can be designed for storage capacity. On this question, there is clearly a need for further reflection and in-depth analysis from all stakeholders. We would welcome if this consultation could help design an innovative solution, which could be applied on a wider-scale. In the meantime we would summarise our views as follows :

  a) In order to ensure the respect of PSO, some countries already have special provisions setting for the storage users a rule of minimum use of their storage capacity, depending on their portfolio or on climatic conditions. Notably a minimum rate of injection in the storage at the beginning of winter is often laid down by the legal framework. Such a framework, driven by security of supply concerns, provides also for an effective use of storage capacity and is clearly consistent with the CGWC principle wherever it is applied.

  b) There is also, probably, room for more proactive offer of interruptible capacity, as suggested with the example of Centrica in ERGEG Status Review. But the right of the user of the firm capacity to nominate until the very last moment is also very important and should be guaranteed as long as possible. One might imagine a more balanced system in which the nominating obligations of the firm user would depend on the characteristics of the storage or on the actual utilization rate of its rights. It could help optimize the injection and withdrawal interruptible capacities on a daily basis. But such a mechanism should be made very clear and described very precisely in the Tariff and terms conditions, including the way the SSOs should monitor the utilization of their capacity by the storage users and implement this mechanism in order to grant fair and equal treatment to every storage user. Besides, such a mechanism would still be far from being a real UIOLI mechanism as one might be used to it when it comes to transport capacity on the transmission grid. In particular, if it could help solve lack of capacity problems for users on a day-to-day basis, it hardly suits their seasonal or peak-needs.

  c) For such seasonal or peak-needs, it seems that the solution lays on a fair, proper and well-designed capacity allocation process on the primary market as well as on a

mature and liquid secondary market, rather than on CMP tools such as UIOLI/UIOSI mechanisms which are designed in the first place for transmission grids."

5.2 Conclusions

The results of the survey 2009 reaffirmed the results of 2008; whereas FCFS causes problems regarding non-discrimination. Having in mind that in some countries FCFS is the major applied CAM a clear definition of the situation when FCFS is applicable; and the non-discriminatory, fair, as well as economic efficient design of the process, is needed.

Auctions are mostly preferred by traders who are used to them in gas trading but they also see problems with the price level which is influenced by limitation of auctioned storage capacity. Most storage markets, but also most supply and retail gas markets are highly concentrated therefore market situations should be taken into account when designing an auction mechanism.

In case storage capacity is essential for the market entry, storage users are also in favour of pro rata allocation instead of auctions.

In some countries CGWC was chosen, as suppliers have the guarantee to get the necessary storage capacity for their final customers. Thus the household users are protected as access to storage is granted with priority to satisfy their needs. Only if these needs are satisfied, the remaining capacity is offered to other users. Because of this settlement security of supply is given to a certain extent. CGWC can promote the contestability of final customers (or part of them) because new entrants have the right to receive the amount of storage to serve the customers they acquire. This method can be considered a consequence of PSOs to which in many countries are subject the suppliers that serve final customers. If storage capacity is scarce, the application of this method could lead to partial or no access to other users (i.e. traders or those that serve final customers not considered as a basis for the allocation). In the 2009 survey this was also stated by respondents.

Therefore it should be made clear that CGWG should only be applied in the case and to the extent for which storage is necessary to fulfil PSOs; this decision appears to be out of the competences of SSOs. Bodies entitled to take the decision are the Member States or the NRAs, and therefore the application of this CAM should be possible only in countries that choose rTPA and under the strict guidance of the relevant authorities.

The 2009 survey showed that UIOLI is hardly used in storage markets. The responding storage users broadly supported the opinion, that the application of UIOLI in gas storage is complicated because it limits the use of storage as a flexibility tool. An improvement of the secondary markets towards more standardisation is supported by the respondents, more regulation (as UIOSI) only in cases, when liquidity on the secondary markets will stay limited.

6 Further development of CAM and CMP for storage

Although some of the requirements of the GGPSSO are now parts of the Regulation 715/2009/EC, it has to be discussed whether more specifications could be considered. As mentioned in the ERGEG Monitoring reports for the GGPSSO, the assessment of the effectiveness of different CAM and CMP is difficult, because of the general requirements in the GGPSSO. The ERGEG survey 2008 gave some hints on strengths and shortcomings of different CAMs, but the in-depth-analysis of CMPs could not be done sufficiently.

An assessment of CAM and CMP on the compliance with the requirements in the 3rd Package (Article 17 Regulation 715/2009/EC) is therefore even more important. This assessment should result in proposals for additional requirements in the GGPSSO for CAM and CMP. Any proposals would be subject to a public consultation with relevant stakeholders.

The assessment of CAM and CMP for storage and the proposals, if necessary, for the enhancement of the GGPSSO is subject of a public consultation paper which be will published later this year.

7 Annex 1

7.1 Country Analysis

7.1.1 Austria

Characteristics of the storage markets

The Austrian gas storage facilities are depleted gas fields and are all located in the Eastern control area, in the concession areas of the two oil and gas producers, OMV and RAG. Both of these companies are storage operators. Wingas GmbH and ZMB are also storage companies as defined by the Natural Gas Act. The Haidach storage facility was commissioned[14] in July 2007; it is not connected to the Austrian but to the south German transmission grid (the upstream system operator is Wingas GmbH).

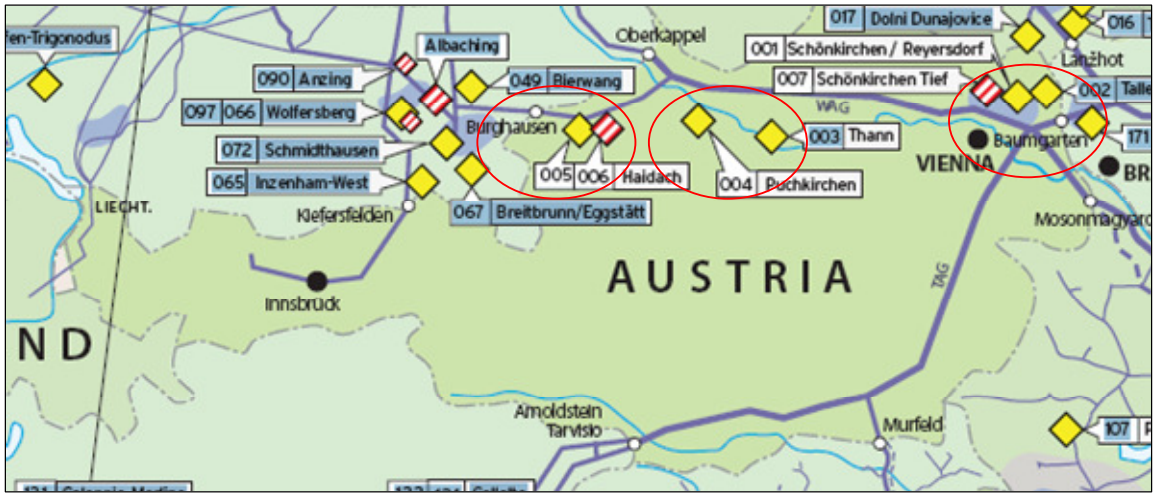

Figure 1: Storage facilities in Austria (ringed in red)

Source: GSE, http://www.gie.eu.com/download/gridmap/GSE_STOR_1031.pdf

OMV Gas owns about 45% of the country's storage capacity. Total working gas capacity at Austrian storage facilities is about 4.5 bcm — equal to more than one-half of domestic gas demand in 2008.

The first stage of the Haidach project has created a working gas capacity of 1.2 bcm and a withdrawal capacity of 500,000 cm/hour. The Haidach site is linked to the storage facility at

14 www.haidach.zmb.at.

the Burghausen/Überackern gas hub on the Austro-German border by the 39 km Austria-Bavaria-Gas-Pipeline (ABG). To date there is no link with the Eastern control area grid.[15]

Table 1: Storage capacity in Austria, 2009

Storage operator and storage site	Injection rate in cm/h	Share in total capacity	Withdrawal rate in cm/h	Share in total capacity	Working gas volume in mcm	Share in total capacity
OMV-Schönkirchen	650.000	34%	960.000	42%	1.680	37
OMV-Tallesbrunn	125.000	7%	160.000	7%	400	9
OMV-Thann	115.000	6%	130.000	6%	250	6
Total storage sites of OMV Gas GMBH	*890.000*	47%	*1.250.000*	55%	*2.330*	51
RAG-Puchkirchen	520.000	27%	520.000	23%	1.000	22
Wingas-Haidach	167.000	9%	167.000	7%	400	9
Gazprom-Haidach	333.000	17%	333.000	15%	800	18
Total	**1.910.000**	100%	**2.270.000**	100%	**4.530**	100

Sources: www.omv.com, www.rohoel.at and www.wingas.de

Storage as the main flexibility tool

Storage is the main flexibility tool in Austria and is used for all kind of flexibility (seasonal, daily, hourly). Flexibility in import contracts and gas production is restricted. Balancing energy is mostly provided by using storage facilities. Interruptible contracts with industrial customers have just little importance.

As Figure 4 shows, storage is mainly used in the winter to cover the demand. In the summer a main part of the gas imports is injected. In the crisis 2009 the storage facilities were the main pillar for securing the supply.

[15] Due to the lack of transportation capacity in Burghausen, German storage customers are also unable to use the free capacity at Haidach. This will not be possible until further network development has taken place (see Energate, 12 March 2008: *Speicher Haidach: Beschränkte Möglichkeiten für deutsche Marktteilnehmer* (Haidach storage facility: limited possibilities for German market participants)

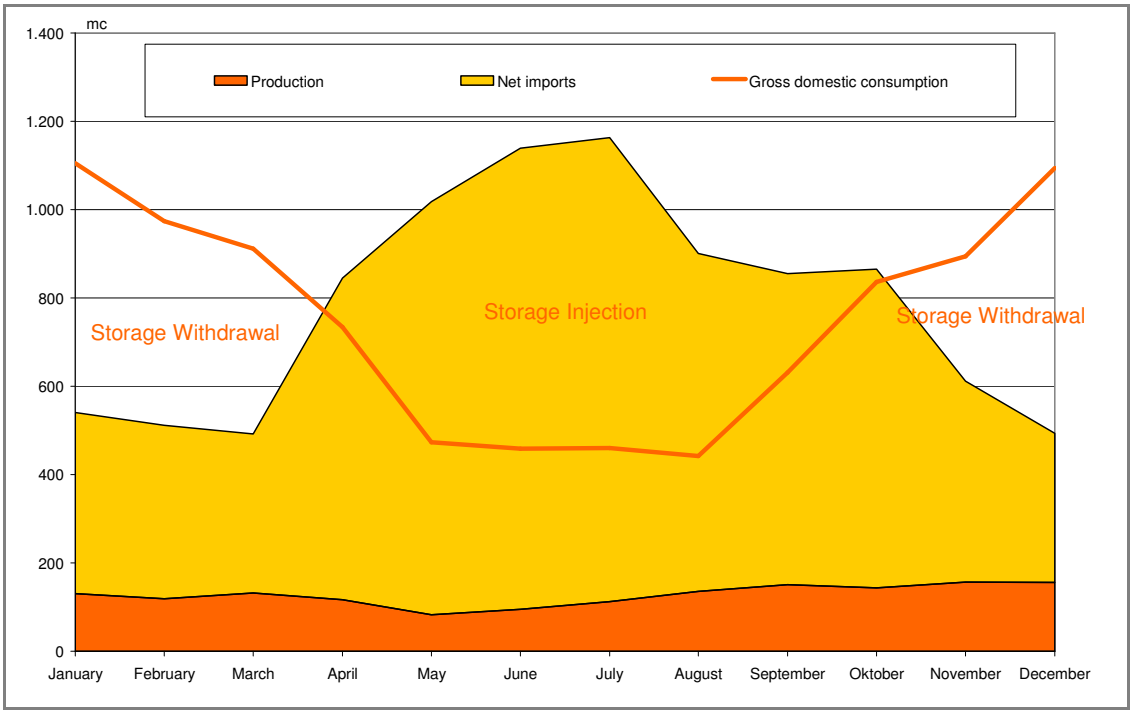

Figure 4: Seasonal use of storage in Austria, 2008

Source: E-Control

Regulatory framework

The regulatory framework is set out in the Natural Gas Act 2006**.** § 39 regulates the access to storage facilities in form of negotiated TPA at non-discriminatory and transparent conditions. For the storage utilisation charges a benchmarking is foreseen in § 39a:

In the event that the storage utilisation charges for a storage service demanded by customers and published by a storage undertaking are more than 20% higher than ***the average charges for comparable services in the EU Member States****, Energie-Control Kommission, for the purposes of ensuring comparability of storage utilisation charges, shall specify by ordinance how the cost components pursuant to para. 1 above are to be used to underlie the pricing of the storage undertakings. In doing so, the principles of cost causation and cost orientation shall be applied.*

Another main part of § 39 is the submission of contracts promptly upon their conclusion. This enables the regulator to monitor if there was any discriminatory behaviour. Furthermore in § 39c the minimum requirements for general terms and conditions for access to storage facilities and in § 39d obligations of storage undertakings to publish data on a regular basis are stated.

Utilisation and availability of storage capacity

OMV Gas posts information on the utilisation of its storage capacity on a monthly basis on its online capacity booking system, storage capacity is also employed for balancing services, and these should be taken into account when considering the extent to which unused capacity is made available to third parties.

The storage terms and conditions of RAG AG and OMV Gas GmbH contain no arrangements to prevent the hoarding of capacity. OMV Gas GmbH offers interruptible

storage products through which unused capacity can be provided, while Wingas GmbH provides for the loss of unused capacity in its terms and conditions.

RAG, Wingas GmbH and ZMB do not disclose capacity utilisation data.

On the basis of the information available E-Control is unable to say what extent there is a secondary storage capacity market. There are no contractual limitations on the resale of storage rights, and the storage operators offer title tracking services for their capacity. OMV Gas has set up an online bulletin board to facilitate secondary trading of storage capacity. Wingas is a member of the store-X trading platform, and RAG has an inquiry form on its website.

Capacity expansion plans

According to AGGM's 2008–2012 long-term plan[16] both RAG and OMV Gas need to expand their storage capacity. The capacity model reflects this projected demand for "other shipments". However the plan does not contain precise data. As of June 2008 no storage company had announced an open season tender for additional capacity.

Expanding storage capacity will not lead to an increase in the number of storage operators, as a joint venture with RAG or OMV Gas would be necessary, since they hold the necessary storage licences for the depleted gas fields. RAG explicitly offers storage developments (long-term plans for the technical and commercial development of gas storage facilities).[17] In May 2007 OMV Gas announced its intention to cooperate with Gazprom on developing the Schönkirchen Tief storage facility.[18] According to information in the GSE Storage Investment Database, the planned Schönkirchen Tief project will create an additional 2bn cu m of working gas capacity.[19]

Storage users

The demand for storage capacity comes from Austrian gas wholesalers and distributors, large consumers, generating stations and local retailers. Foreign companies also use the facilities[20] for interim storage related to transit business, and to offer flexible delivery to the Baumgarten gas hub trading point. Since liberalisation in 2002, the number of storage customers and the interest of foreign companies in Austrian storage services have increased significantly. EconGas is the largest storage customer, with reservations amounting to about 1.7bn cu m of working gas volume.[21]

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[16] See AGGM, *Langfristige Planung 2006 für die Regelzone Ost für den Zeitraum Gasjahr 2008 – 2012 mit Ausblick auf das Gasjahr 2030* (2006 long-term plan for the Eastern control area for the 2008–2012 gas year period, and outlook until the 2030 gas year), 27 July, p.9.

[17] www.rohoel.at.

[18] See OMV AG press release dated 23 May 2007: *OMV und Gazprom verstärken Kooperation im Gasbereich* (OMV and Gazprom step up cooperation in gas business), www.omv.com.

[19] See www.gie.eu.com/maps_data/database/database.php.

[20] See AGGM, *Langfristige Planung 2007 für die Regelzone Ost für den Zeitraum Gasjahr 2008 – 2012 mit Ausblick auf das Gasjahr 2030* (2007 long-term plan for the Eastern control area for the 2008–2012 gas year period, and outlook until the 2030 gas year), 27 July, p.9.

[21] See Energate, 6.1.2009, Erhebliche Lieferkürzungen im russisch-ukrainischen Gasstreit, www.energate.de

→ The concentration in the storage market is over the critical HHI[22] limit of 1.800. This is the case for the supply side, but also for the demand side and will not change in the near future (over the next ten years).

The storage market in Austria faces several problems:

→ The main problem is the dominance of long term contracts, the bulk with incumbents. More than 90% of the storage capacity is locked in long term contracts. Storage capacity is booked out until 2017/2018.

→ Integration of storage operators and supply companies: All SSOs are also active in trading, wholesale and retail markets.

→ The dominance of FCFS as CAM gives wide range for discrimination, which cannot be verified. However, E-Control has no legal competence in developing CAM and CMP.

→ Weak incentives against hoarding.

Outlook for the regulatory regime

The availability of storage capacity is poor in the Austrian gas market as a whole and in the Eastern control area in particular, especially for mid- and long-term storage capacity. The concentration in the storage market is very high, on both market sides and does not seem to change in the near future.

On the other side, the regulatory power for E-Control is limited related to CAM and CMP. Bearing in mind the importance of storage access for the development of competition in the gas market, the regulatory framework should be improved.

7.1.2 Belgium

Storage capacity

As storage capacity is very limited due to geological circumstances, storage in Belgium is a regulated monopoly. Access to storage is legally dedicated to suppliers active on the distribution networks.

Storage sites and types

Storage facilities in Belgium are only available on the H-cal gas network. There is no storage for L-cal gas. The storage services are offered from the Loenhout underground storage facility and the Dudzele Peak shaving facility (PSP). Loenhout is an aquifer storage facility with the following characteristics: working volume 650 Mm³(n), peak injection capacity is 250 km³(n)/h, peak emission capacity is 500 km³(n)/h. The Dudzele PSP is a storage facility for LNG with the following characteristics: usable volume 59 Mm³(n), peak injection capacity is 460 km³ LNG/day, peak emission capacity is 500 km³(n)/h. The Dudzele PSP is to be considered as an exclusively peak installation.

[22] The Herfindahl-Hirschman Index is a commonly used measure to evaluate market concentration. The index ranges from close to 0 (an infinite number of small market participants) to 10000 (monopoly). Commonly accepted benchmarks are that an index of below 1000 is *not concentrated*, 1000-1800 is *moderately concentrated* and above 1800 is *concentrated.*

Storage operator

Storage is a regulated monopoly, there is a unique SSO, appointed by the Minister.

Storage services

Storage services are offered exclusively on a yearly basis.

Capacity allocation

According to the law capacity is allocated to suppliers on the distribution grids. Capacity is allocated on a pro rata basis. As there is a storage capacity shortage, no spare capacity is available.

Congestion management

Since, according to legal obligations, capacity is allocated by priority to suppliers on the distribution grid, congestion is prevented to occur and congestion management procedures are not needed.

Secondary market

The SSO is legally obliged to organize the secondary market. Due to the existing capacity shortage there are no transactions on the secondary market.

Investment in storage capacity

Despite the current project to extend Loenhout capacity further to 700 mio $m^3(n)$ working gas volume, the existing shortage on the storage capacity market will merely grow in the next decade. The geological structure of the Belgian subsoil is not favorable to the development of additional storage facilities. Therefore financial incentives may not be sufficient to foster the development of extra storage capacity.

7.1.3 Czech Republic

In the Czech Republic there are eight underground gas storage facilities (Dolní Dunajovice, Háje, Lobodice, Tvrdonice, Štramberk, Třanovice, Dolní Bojanovice and Uhřice). Seven of them are seasonal type. UGS facility Háje is cavern and peak-shaving type.

In the gas storage market in the Czech Republic exist three companies. In addition to RWE Gas Storage, s. r. o., which owns six of the eight underground gas storage facilities located in the Czech Republic, also MND Gas Storage, a. s. and SPP Bohemia, a. s. are active on the Czech natural gas storage market. MND Gas Storage, a. s. operates the Uhřice UGS facility; the owner and operator of the Dolní Bojanovice facility is SPP Bohemia, a. s. The last mentioned facility is only used for the Slovak Republic's needs, both under contracts and also for technical reasons of connection to the transmissions system.

SSOs offer firm and interruptible services based on yearly/monthly/daily contracts. For new-built capacity SSOs can sign a special long-term contract up to 15 years.

In the Czech Republic the storage capacity has been covered for the long term by contracts owned by RWE Transgas, a. s., which is a part of a vertically integrated group that also includes the largest Czech SSO RWE Gas Storage, s. r. o. New gas traders most frequently cite the limited accessibility to Czech underground gas storage facilities, which are needed for structuring supplies in the course of a year, as one of the reasons for their difficulties in penetrating the Czech market.

More than 90 percent of the gas stored in UGS facilities for supply to the Czech market in 2008 was owned by RWE Transgas, a. s., and the balance was owned by Pražská plynárenská, a. s., the Italian company ENOI S.p.A., Pragoplyn, a. s., and United Energy Trading, a. s.

Storage capacity availability, including some other information, is posted on the operators' websites, from which also model capacity booking request forms can be obtained. When new storage capacity is put on stream (for example, a gas storage facility is reinforced or a contract with a storage customer is terminated), it is offered to bidders in public auctions under terms and conditions published in advance.

The use of storage is for

- seasonal balancing;
- efficiency;
- coverage of consumption peaks;
- support of transmission flexibility;
- safety reserves.

Because most of the storage capacity is under long term contracts the competition is not developed sufficiently. This situation is about to change in the near future when new storage capacities are announced to be built and these capacities will be accessible to all market participants. Also part of the already built capacity will be released as some of the long term contract will terminate.

The access to storage is organised as negotiated TPA.

Another flexibility product is offered by the TSO. The TSO RWE Transgas Net, s. r. o. concludes contracts with shippers for providing flexible gas. Flexibility contract consists of a flexible gas supply and offtake to keep a high-pressure gas transmission system in balance.

The biggest problem is the limited accessibility to storage capacity at the storage market in the Czech Republic. During 2007 and 2008 the Czech regulator (ERO) dealt with administrative procedures regarding access to the storage capacity of RWE Gas Storage, s. r. o.

Capacity allocation

In the Czech Republic it is a duty of ERO to decide on CAM. CAM is defined in amendment public notice no. 524/2006 laying down the rules for the organisation of the gas market and for the development, allocation and use of typical gas supply profiles (gas market rules) issued by the ERO.

For storage capacity allocation, the method of multi-round online auction has been selected. The definition of storage capacity has been broken down to "storage capacity" meaning the existing, already used capacity, and "new storage capacity" defined as storage capacity put on stream after 1 January 2010. The ways of booking these two types of storage capacity differ in terms of both the time limits within which capacity can be requested and the duration and type of the gas storage agreement.

Special treatment for incumbents

Since the dominant Czech gas trader, RWE Transgas, a. s., is part of a vertically integrated group that also includes the largest SSO, with which the trader has booked for a long time ahead, almost all of the storage capacity operated by the SSO, the auction rules contain constraints on such dominant gas traders. The main purpose of this measure is to enhance

the development of the Czech gas market by opening access to storage capacity for additional gas market participants and also by the fact that it will not be possible for an affiliated company to speculatively increase the price. This is why gas traders who are part of the same group as the SSO and who have booked with the SSO storage capacity amounting to at least 80 percent of the capacity of the virtual storage facility operated by the SSO, may only participate in the storage capacity auction if the price per unit of storage capacity is lower than or equal to the current market price of storage capacity.

Problems with the CAM

Prior to the amendment in 2008, the public notice contained rules for storage capacity booking in the case of its shortage on the pro-rata principle (storage capacity booked in proportion to the amount of the requests). However, these rules did not fully match the principles of the negotiated, i.e. free market, access to storage capacity. On the one hand, this situation resulted in a speculative behaviour of the gas market participants, who requested storage capacity booking and reckoned in advance that storage capacity would not be booked for them to the full amount of their request, and therefore artificially increased their requests, which resulted in an uncertainty of the potential investors in storage capacity concerning the actual size of the demand for storage capacity because they received very distorted signals of the level of demand from the market. On the other hand, there were cases of discrimination against some storage customers on the part of the SSO, because the storage price was set by agreement between the SSO and the storage customer, which created room for possible discrimination against certain market participants.

ERO therefore wanted to introduce such rules for storage capacity booking, which would help to create adequate requests for storage capacity and give clear pricing and investment signals, and would comply with negotiated TPA.

Complaints from storage users

During 2007 and 2008, ERO dealt with administrative procedures regarding access to the storage capacity of RWE Gas Storage, s. r. o.

Pražská plynárenská, a.s. and RWE Gas Storage, s.r.o.: A dispute over storage capacity allocation. Pražská plynárenská, a.s. requested the SSO to allocate to it storage capacity for storing natural gas for five years from 1 April 2007. However, the SSO allocated much smaller storage capacity to the applicant. Since according to the applicant the allocated capacity fell short of its required storage capacity, the applicant requested adjudication of the dispute, declaring that all storage capacity was intended for serving the current customers of Pražská plynárenská, a.s. ERO examined the specification of free storage capacity, which was to be offered by the SSO on 1 April 2007 to the other gas market participants for reservation, and decided that in respect of a part of the storage capacity, Pražská plynárenská, a.s. had, in the storage period from 1 April 2007 to 31 March 2012, the right to be allocated firm storage capacity by the SSO and imposed on RWE Gas Storage, s.r.o. the obligation to execute an addendum to the gas storage agreement with Pražská plynárenská, a.s. In respect of the remaining part of the storage capacity requested by Pražská plynárenská, a.s., the Office rejected its petition, noting inter alia that as regards storage capacity allocation to an applicant who was not a gas trading licence holder on 1 April 2007, the SSO did not proceed in line with the Energy Act and the related implementing regulations. RWE Gas Storage, s.r.o. filed remonstrance against this decision. Subsequently, ERO received a letter retracting the remonstrance, and the proceeding was discontinued.

E.ON Energie, a.s. and RWE Gas Storage, s.r.o.: A dispute over storage capacity allocation. E.ON Energie, a.s. requested the SSO to allocate storage capacity to it. The

SSO denied the applicant access to the virtual UGS facility operated by the SSO and did not allocate storage capacity to the applicant, referring to the procedure under Section 1 8 of public notice no. 524/2006 laying down the rules for the organisation of the gas market, as amended. ERO decided analogously to the proceeding described in the previous case. However, ERO rejected the petition in full because the applicant requested storage capacity allocation for a shorter period of time than the applicant in the above proceeding. E.ON Energie, a.s. filed remonstrance against this decision, which was rejected by the ERO Chairman.

Improving the situation, new rules for storage (auctions) have been just implemented so the proper evaluation should be done after certain period of time.

Impact of CAM on storage investments

The rules for storage capacity allocation, the method of multi-round online auctions, are to support the development of storage capacity through the extension of the existing and the building of new underground gas storage facilities in the Czech Republic.

Congestion management

CMP is defined in amendment public notice no. 524/2006 laying down the rules for the organisation of the gas market and for the development, allocation and use of typical gas supply profiles (gas market rules) issued by the ERO.

In case of congestion, capacity is made available by applying interruptible services, and using the secondary market. Since there exist interruptible services and secondary market with storage capacity, the capacity reallocation is not specially defined (alternatively – standard CAM would be used)

Secondary markets

SSOs have the obligation to organise secondary market with capacities on their website. SSOs should provide ERO with information on request. The gas market participants can trade on secondary markets, but it is not their duty/obligation. Secondary market is not used by the market participant thus it does not have important role in the Czech Republic. There is no liquidity on secondary markets. Price is determined by auction.

Investments in storage capacity

The need for storage capacity depends on market demand, can not be specified more deeply. No exemption has been granted so far. ERO is not in favour of granting exemptions as market CAM is applied; unless serious obstacles and fulfilled conditions according to Art. 22 were proved.

In 2008, RWE Gas Storage, s. r. o. disclosed its plan to expand the capacity of its underground gas storage facilities in the coming years, specifically by 795 mcm. The other Czech SSO, MND Gas Storage, a. s., is also planning to expand its capacity, specifically by 450 mcm.

In the Czech Republic gas consumption is distributed unevenly throughout the year. Significant proportion of gas is used as fuel for the heating (particularly for households). There is the difference between summer and winter consumption. For this reason the Czech Republic uses the underground gas storage for storage of excess gas. Excess gas arises in summer, when the gas consumption for the heating is very low both for households and in the industry.

Reserves of natural gas in underground gas storage are also important in terms of dependence the Czech Republic on gas imports.

ERO introduced rules for storage capacity booking, which should help to create adequate requests for storage capacity and give clear pricing and investment signals, and would comply with negotiated TPA.

7.1.4 France

In France there are 2 SSOs - Storengy and TIGF - who operate 16 storage sites. Storages are mainly used to cover seasonal variations of demand. The other flexibility tools are flexible gas purchase contracts, diversified sources and LNG terminals.

In France the TPA to storage is negotiated, which means that tariffs and services are set up by the SSO. However, access conditions are defined by decree. The capacity allocation mechanism applied in France is the "capacity goes with the customer" principle (CGWC). Each year, a Ministerial Order defines consumption profiles which are then used to calculate the storage rights associated with final gas consumers.

The application of the CGWC principle implies that all new entrants have an automatic access to the storage – defined by ministry - since they have an active portfolio on the French market. The exceeding capacity is proposed by SSOs to all suppliers according to the method they chose. This allocation is carried out twice a year: 1st April and 1st November.

Moreover, the decree compels the active suppliers to have in stock on 1st November at least 85% of the capacities rights dedicated to domestic customers and customers providing services of general interest.

In 2008 storage capacity dedicated to suppliers with a portfolio amounted to 90% of the global storage capacity. The 10% exceeding storage capacity were allocated by Storengy via allocation and by TIGF via pro rata.

If the capacity allocated through the "CGWC" principle is not completely booked on the 1st April, the SSO can sell it as releasable capacity.

The access conditions to storage are satisfying, even for new entrants as they always get capacity because of CGWC. The remaining disadvantage is that new entrants are without any storage capacity for half a year maximum, as the capacity allotment is twice a year.

In France the evolution of tariffs set up by SSOs is criticized by storage customers. Suppliers complained about the successive increases implemented by the two SSOs over the last three years. In 2009, CRE had carried out a European benchmark on tariffs to assess the level of visibility given by the French SSOs on the evolution of tariffs.

CRE does not set up the tariffs, CRE monitors if tariffs are offered in a transparent and non-discriminatory way and settle potential conflicts.

There is no congestion due to the used CAM (CGWC). There is no obligation for the SSOs to organise a trading platform for secondary markets and for the storage users to trade on secondary markets.

In application of the measures in European Directive 2003/55/EC of 26 June 2003 and in Article 30 of law 2003-8 of 3 January 2003 modified by Law 2004-803 of 9 August 2004, the transport network operator is entitled to priority use of the storage site, via a special flexibility and security contract that gives the operator access to storage capacity required for its public service missions.

The "CGWC" principle applies to new developed capacities. CRE has not received any requests for exemption so far.

7.1.5 Germany

Current storage situation and utilisation

Germany currently has the fourth largest working gas volume (wgv) in the world (USA: 100.8 bcm, Russia: 93.5 bcm, Ukraine: 31.9 bcm). According to Bundesnetzagentur's yearly monitoring, the total wgv of almost 20 bcm is unequally distributed in 49 storage facilities operated by 24 storage system operators (SSOs)[23]. Two thirds of the total wgv is serviceable in porous rock and aquifer underground storage facilities and one third in cavern underground storage facilities. Aboveground storage facilities only account for a negligible portion of 0.2% of the total wgv. 91% of the wgv is currently utilised by storing high calorific gas, only 9% for low calorific gas. The three major storage system operators (Wingas, E.ON Gas Storage, VNG) already account for 24% of the total wgv, and the "Top Ten"-SSOs control 91% of the total wgv. 3,1% of the total wgv is reserved for production purposes or TSO duties; hence the TPA system applies to 96.9% of the total wgv.

German SSOs offer a variety of products in terms of duration, un/bundled, firmness etc. in line with the requirements of the GGPSSO. But products between different SSOs still differ significantly, which makes the comparison of tariffs almost impossible.

Bookable free storage capacity is rarely available in Germany. At the end of 2008, 3.9% of total wgv was available as of 9 months ahead and 5.2% as of 5¼ years ahead. In 2007, 116 companies have used storage capacities, predominantly wholesalers and suppliers. At the same period, 57 companies (21 without storage capacity) had requested storage capacity. These requests led to 58 refusals by eleven TSOs mostly because of lacking availability of storage capacity.

Bundesnetzagentur does not have any information neither on the actual storage users nor on storage contract details such as duration. But the yearly monitoring shows that half of the SSOs only serve one customer, presumably - in most of the cases - an affiliated company.

[23] At least one further SSO (& storage facility located) in Germany did not participate in the monitoring process, and therefore is not included in the following statistical results.

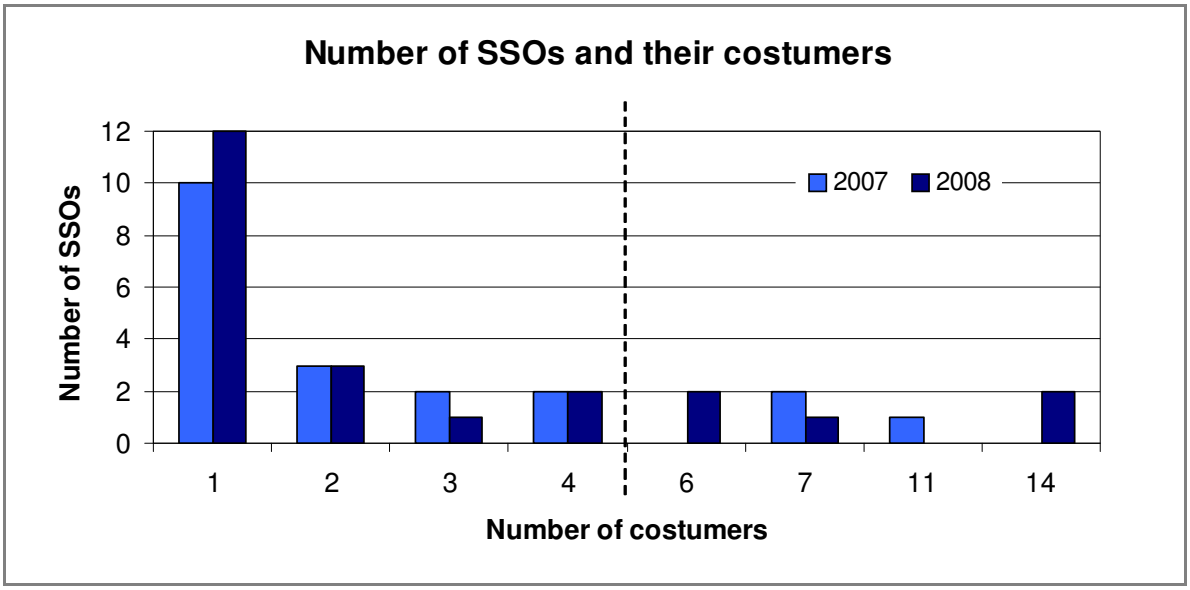

Figure 5: Number of SSOs and their costumers

Regulatory regime

Bundesnetzagentur is the central federal authority for monitoring the obligations under Article 28 of the German Energy Industry Act. According to this clause, SSOs are obliged to grant TPA to their storage facilities (if technically or economically required for efficient network access to supply customers) under fair and non-discriminatory terms and conditions. The German legislator has anchored a negotiated storage access in this law. An ex-ante determination of the storage access conditions or the storage charges by a regulatory authority is not envisaged. However, Bundesnetzagentur can take action ex-post in case of any abuse. But until now, Bundesnetzagentur has not yet received any formal complaints regarding TPA to storage facilities.

During the yearly monitoring process, Bundesnetzagentur also gathers information on whether or not SSOs grant non-discriminatory TPA. Should there be any indication of a violation of paragraph 28 of the German Energy Industry Act, ex-post proceedings for abusive practices might be initiated against the storage system operator. Bundesnetzagentur is authorized to impose specific measures upon companies found to be contravening this legal rule.

Bundesnetzagentur also monitors the transparency requirements of the storage system operators under paragraph 28 (3) German Energy Industry Act. Pursuant to this clause, storage system operators must publish the available capacity and their main terms and conditions (e.g. treatment of requests for storage access, modalities of gas injection and withdrawal) on the internet. Approval under mining law and the technical monitoring of storage systems is not the responsibility of Bundesnetzagentur, but of other (local) authorities.

An ordinance regulating access to storage, which may be passed by the Federal Ministry of Economics and Technology under the regulations of the current German Energy Industry Act and which may include detailed provisions, has not yet been drawn up.

Based on Article 22 of Directive 2003/55/EC, paragraph 28a German Energy Act provides the possibility of granting a temporary exemption from TPA for new storage infrastructures (or extensions). This exemption can be granted by Bundesnetzagentur, but must generally be decided upon in agreement with the Federal Cartel Office. An application for an

exemption from TPA must be submitted to Bundesnetzagentur and be examined by both authorities in parallel. An exemption can be granted subject to conditions applying to the entire storage system or parts thereof. As stipulated by Article 22 (4) of the Directive 2003/55/EC, the exemption will be notified, without delay, to the European Commission; the Commission may request an amendment or withdrawal of the decision. The decision will be published on the website of Bundesnetzagentur. Even though there have been several preliminary talks, there has so far been no formal exemption request for storage projects in Germany yet.

Capacity allocation

In Germany there are no special requirements on capacity allocation mechanism, but according to paragraph 28 of the German Energy Industry Act, TPA must be granted on an adequate and non-discriminatory basis. This also covers an appropriate and non-discriminatory capacity allocation mechanism (CAM). The SSO decides on the applied CAM and informs the users bilaterally or via internet publication. Bundesnetzagentur is not involved in designing or approving the CAM. Most of the German SSOs apply “first committed first served” or “first come first served” as CAM. But also bilateral negotiations are a common practise. The situation has not changed significantly during the last three years. Only two SSOs apply more market based capacity allocation mechanisms (“auction” / “pro rata”).

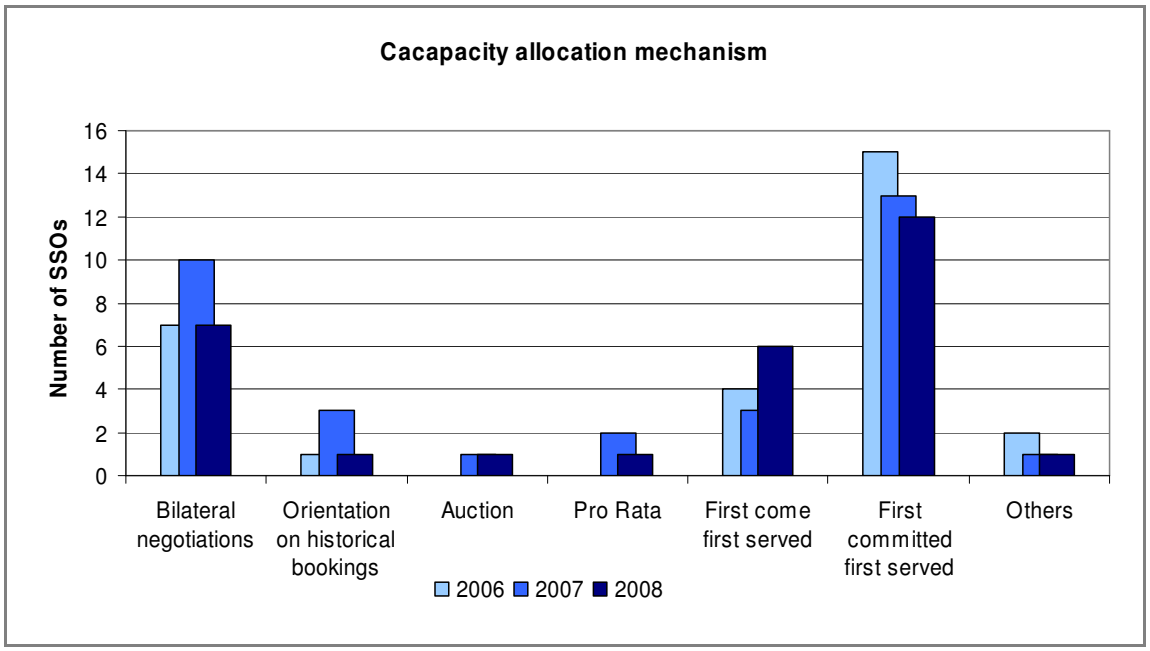

Figure 6: Capacity allocation mechanism

A basic necessity regarding the allocation of storage capacity is that the storage user also gets the related transport capacity to actually being able to use his storage capacity. Therefore, CAMs for storage and transport capacity have to be in line. An expedient way to achieve the necessity would be to bundle the capacity to one product by making the SSOs responsible for the transport capacity booking and nomination.

Congestion management

As for capacity allocation mechanism, in Germany there are also no special requirements for congestion management procedures (CMPs). The SSO decides on the applied CMP and informs the users bilaterally or via internet publication. Bundesnetzagentur is not

involved in designing or approving the CMP. Most of the German SSOs apply “pro rata” or “first committed first served”/”first come first served” as the congestion management procedure of choice. In the last three years, the CMPs have developed towards the more market based mechanisms “pro rata”. But only one SSOs applies an “Use-it-or-loose-it” (UIOLI) mechanism.

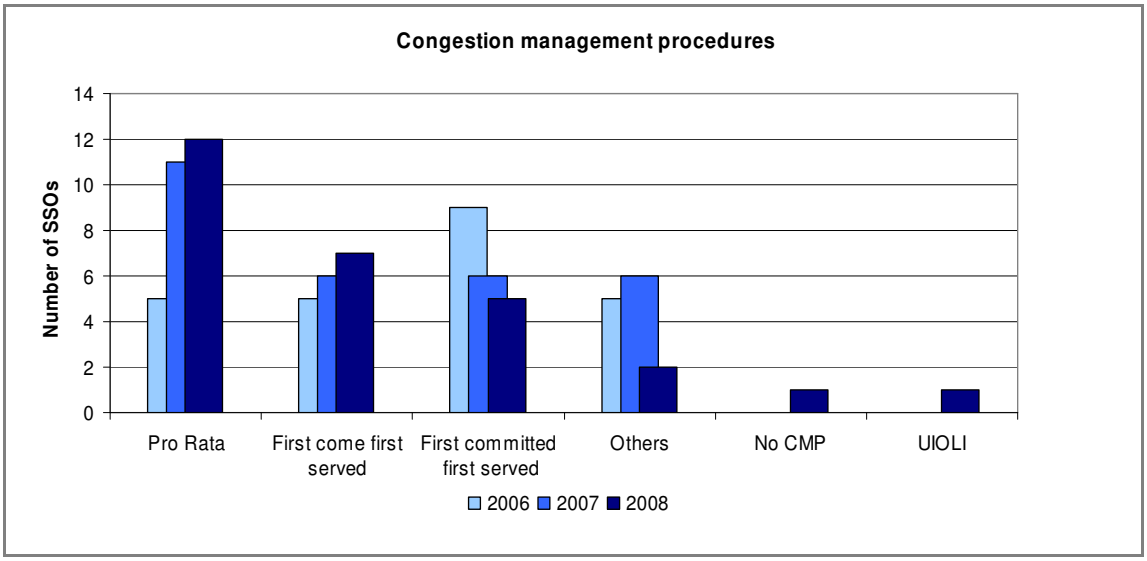

Figure 7: Congestion management procedures

In any case, further investigation has to be taken on how unused storage capacity can be determined. Additionally, the need of transport capacity has also to be taken into account, as already stated in the previous section.

Secondary capacity markets

As regards secondary capacity markets, in Germany no legal obligation exists; neither for SSOs to organise secondary markets, nor for storage users to trade on secondary markets. Nevertheless, some German SSOs have voluntarily developed and joined the common secondary trading platform “store-x”, that provides several marketing services (incl. auctions, multi-auctions, keyed procedure, buy-it-now, search procedure) and serves as information platform on storages in Europe. 15 SSOs participate in this platform, which already has over 600 registered users. The 2008 monitoring report of Bundesnetzagentur showed that users value the secondary market possibilities a little bit more positive than the year before, but about 1/3 of responding traders and the majority of DSOs stated that their opportunities for secondary trades are still very limited.

Investments in storage capacity

According to recent publications, further storage projects are planned in Germany in the next few years. Gas Storage Europe (GSE), the European association that represents storage system operators, has announced, based on indicative data from its members and other public sources, that 26 new and expansion projects are planned or already being under construction. These projects would provide an additional working gas volume of 8.7 bcm by 2016 (thereof, ~1.4 bcm already under construction). This represents approximately 13% of the additional working gas volume planned in Europe. If taking account further published information on storage projects in Germany, there are another 14.6 bcm at planning stage. Implementation of all the plans for more working gas volume would almost double Germany's current wgv over the next ten years. It should be kept in mind however, that this data relates to plans that do not yet provide any reliable information about actual

investment. Also, the networks must be configured for an expansion of storage facilities at this magnitude.

7.1.6 Hungary

Five commercial underground gas storage units exist in Hungary; all of them are operated by E.ON Gas Storage Company. The working gas volume of natural gas in the commercial underground storages is 3.72 billion m^3, the total injection capacity is 25.9 mio m^3/day, and the withdrawal capacity is 51 mio m3 per day.

With regard to the security of supply, it is another important condition that the system is able to meet more than half of the country's daily peak demand from the storages. There is a development investment in process at Zsana UGS Unit for increasing the working gas capacity with 600 million m^3 and the withdrawal capacity with 4 mio m^3/day.

Furthermore there is a security storage unit under construction. The Act 26 of 2006 on the security storage of natural gas prescribes the storage of 1.2 billion m^3 working gas, and the construction of an underground storage required for this by 2010. The natural gas security storage must be placed in a UGS facility that has a daily withdrawal capacity of 20 million m^3 for at least 45 days. The security storage of natural gas prescribed by the Act primarily serves the secure supply of natural gas to household and communal customers. Construction started in 2007 in the Algyő gas-field, at the Szőreg-I layer in Southern Hungary.

Short overview of the storage market

→ Use of storage:
- Public utility Wholesaler 68 %
- Free market traders 32 %

→ Level of competiton
- No competition until 2010 – there's only one SSO
- From 2010 – 2 SSOs
- From 2012 – 3 SSOs

→ Regulation of capacity
- Regulated TPA

→ Other flexibility tools in addition to storage:
  a. contractual flexibility of import;
  b. production flexibility;
  c. interruptible consumption;
  d. line-pack.

→ Problems occured in the storage market
- No known structural or operational problem is present on the market.
- No complaints from storage users

→ Who decided on the CAM?
- CAM is regulated in the Grid and Commercial Code which is approved by HEO

→ How do they work in details?
- SSO is obliged to publish its capacities available for the following storage year (from 1st of April to 1st of April) on the website
- Users submit their capacity requests for the respective storage year. If the demand is lower than the available capacity, customer demand will be satisfied, storage

contracts will be concluded. If there is over-demand, based on the regulation the SSO has to grant priority for those customers, who would like to book capacity for the supply of residential and communal customers. The remaining capacity will be auctioned in line with the Auction Rules of the SSO.

- Storage tariffs are regulated, set on cost basis, allowing the SSO to earn a reasonable return (8 %)

→ Impact of NRA in CAM

- In case of new investment, on HEO approval, it is possible to launch an open season, where capacities can be booked before the finalization of the investment, for long-term. On HEO approval, these capacities can be sold on market price as well.
- Regarding remaining capacities (or capacities developed during the storage year), the first-come-first-served principle is applied with HEO control.

→ Is there any special treatment of the former incumbents?

- No special treatment applied.

→ Which problems did occur during the allocation procedure regarding transparency and discrimination?

- No such problems occured.

→ Have there been any complaints from storage users?

- No complaints

→ Which CAM would be from your point of view the best one regarding the present market situation in Hungary?

- The current regulated TPA mechanism was elaborated to fit into an environment, where a single Storage Operator has monopolistic position on the market, and storage capacities available are more or less equal with the storage capacity demand on the market. Cost-based storage tariffs cover the costs of the SSO, efficiency increase factor is as well included in the price. With the capacity booking priority of residential and communal customers, security of supply was properly managed.
- However, current market dynamics projects a completely different market setup, which is more competitive and regional in focus. Clear over-supply of storage capacities is foreseen, which capacity is not concentrated in the hands of a single player. Circumstances will be given to let competition to do its job and introduce a negotiated TPA regime from 2010.

→ Who decided on the CMP?

- SSO decided, but HEO can control the procedures

→ How can unused capacity be determined?

- Regarding storage capacities, the term 'unused capacity' is not applied, no formal methodology for calculation is implemented.

→ How do CMP work in detail?

- SSO is not entitled or obliged to monitor the utilisation of booked capacities and offer unused capacities on the secondary market (or oblige the holder of the capacity to do so). However, this does not mean, that contractual congestion is not effectively managed, since in Hungary the Grid Code defines annual capacity booking procedure, which practically means, that capacities are re-allocated every year, and if in a given year capacity demand is higher than the supply, capacity is allocated via transparent auction. During the annual capacity booking period storage

users theoretically are entitled to book capacities for up to 5 years, but the business practice in Hungary is to book for a single storage year only.

- Regarding physical congestion, storage operator is obliged to monitor demand and identify potential future or current over-demand situation. In case SSO is unwilling to perform the required capacity development investment, HEO is entitled to launch a tender for the investment.

→ Secondary markets

- Currently there's no secondary market existing in Hungarian storage market because of the lack of liquidity.

→ Investments in storage capacity

- Over the current developments there is no need for more investments in Hungarian storage market
- According to the paragraph 17 of Gas Act:
- „In the interest of the continuous, secure and satisfactory operation of the integrated natural gas system HEO prepares the development directives of the transmission and distribution pipeline and the underground gas storage facilities. The natural gas transmission-, storage- and distribution licensees shall prepare investment plans on the basis of HEO's development directives. HEO may invite bids for the establishment of the transmission pipeline and the gas storage facility, and it may evaluate the bids, if the conditions of the development directive are not fulfilled by the licensees."
- There were no exemptions granted so far
- Storage is a very essential facility in Hungarian natural gas system
- Incentives for storage expansion:
    - Exemption
    - To increase the 8 % returns

7.1.7 Italy

Characteristics of the Italian storage market

Italian storage system is formed by 10 depleted gas fields, managed by two SSOs, and the total working gas capacity is 13,9 Bcm. The main SSO is Stogit, an Eni group company, that owns almost the total of the national storage capacity (13,5 Bcm – 97% of the total) and 8 fields. The remaining two fields and capacity (0,4 Bcm) is owned by Edison Stoccaggio.

Regulatory framework

In Italy, TPA to natural gas storage is completely regulated. The NRA, Autorità per l'energia elettrica e il gas (AEEG), according to the law (dlgs 164/00) that implemented in the Italian legislative framework the EU directive 98/30/CE, has the power to fix the obligation of the SSOs and the criteria they have to follow in offering storage services. AEEG fix as well the tariffs methodologies and approved tariffs accordingly proposed by SSOs.

The above mentioned obligation and criteria, contained in the AEEG's deliberation n. 119/05, include transparency requirements, content of services, allocation procedures, users' responsibilities and balancing charges. Tariff's criteria are defined in the deliberation n. 50/06.

On the basis of the above mentioned provisions, and after a mandatory consultation among users and other interested parties, each SSO drafted its storage code. The draft code was then sent to AEEG that verified their compliance to the relevant regulatory framework and

approved them. Any modification or integration of the codes is subject to users consultation and AEEG approval.

Regulation defines the storage services that the SSOs have the obligation to offer. Additional services can be offered if some general criteria are respected: non discrimination among users, service prices set under competitive condition with other, potentially substitutive, flexibility services, capacity for the mandatory services is not reduced. The services that the SSOs have to offer are:

- → strategic storage (both storage capacity and gas): the total capacity of the storage to be maintained as strategic storage is fixed yearly from the Ministero dello sviluppo economico (MSE). Since 2001 the amount of strategic storage is fixed in 5.1 Bcm. Strategic storage costs is hold by those users that import gas produced in non-EU countries, proportionally to the gas imported. Withdrawal of the strategic gas must be authorized by MSE, while the users that withdrawal the gas must re-inject the gas he had taken. AEEG fix the price charged for the strategic gas withdrawn and price refunded for the re-injected, as well as other balancing charge. The price difference between withdrawn and re-injected gas is such that the use of strategic gas for price arbitrage is discouraged, especially. in the case of not authorized use.
- → storage for the balancing of the national network. The capacities are limited to those necessary for the operational balancing of the network (i.e. line pack variation and infra day modulation).
- → storage for domestic producers: the aim of this service is to provide the domestic production, whose profile is flat, with a flexibility comparable to that of an import contract (10% percent of the average production rate). On this basis MSE yearly determines the maximum volume of storage that can be allocated for this service (currently around 0,4 Bcm, it's going to decrease because of domestic production decline).
- → modulation storage: it's aimed to the modulation of the consumption of the final customers. It's the major part of the total storage capacity, currently around 8 Bcm.

All the storage capacity is allocated for one thermal year contracts (i.e. from 1st April of each year to 30 March of the following year) during an open subscription period conducted every year, normally during the month of February. For this purpose, according to the criteria defined by AEEG and the general terms defined in the storage code, SSOs publish storage capacities, the procedure that the users have to follow to request, the relevant schedule as well as the allocation procedure that will be followed.

In case of congestion, requests for storage capacity are accommodated with the following order: strategic, gas network operational balancing, domestic producers and modulation. Taking into account that the storage capacity to be dedicated to strategic storage or to domestic producers is fixed by the MSE, congestion occurs only in the allocation of the modulation storage. Available capacity for the modulation storage is allocated according to the following priorities, defined by AEEG:

a. amount of storage needed for the modulation of the domestic customers (more correctly the final customers with an yearly consumption lower than 200'000 Smc) in case of normally cold winter;

b. amount of storage needed for the modulation of the domestic customers in case of 1/20 cold winter;

c. modulation of other final customers.

Pro rata applies in case of congestion within each class of priority.

The maximum amount that each shipper can ask for in relation to priorities a and b is determined as a proportion of the total consumption of domestic customers in an year taken as reference (2001). Each shipper that ask capacity for the purpose of priority a and b must declare each year the consumption of the customers he supplies (directly or indirectly).

AEEG is currently reviewing the criteria used in the determination of the maximum volume that can be requested with the aim of a more detailed assessment of storage needs attached to customers consumption profile taking into account the climate parameters of the area of consumption.

In the last four thermal years, available capacity was not sufficient to satisfy the request for the normally cold winter. In this case a pro rata cut is made on the basis of the amount of storage requested by each shipper for the normally cold winter. No capacity was allocated with respect to priorities a and b above.

In the last year storage users were more than 40; 5 of them hold around 70% of the total capacity.

SSOs have the obligation to facilitate trading of storage capacity and gas in storage. Capacity and gas volumes exchanges are concluded under bilateral basis: outcome in terms of capacity and gas volumes are registered by SSOs and communicated to the AEEG. Stogit has put in place an electronic bulletin – board where offer to buy or sell capacity and gas can be posted. The use of the bulletin board is not mandatory.

In the case that a shipper replaces another shipper in supplying a final customer he has the right to be allocated the relevant storage capacity the former supplier had for that customer. The methodology for the determination of the capacity to be transferred is defined in the storage code.

Storage withdrawal capacity is also scarce: indeed the Italian gas system can have problems in covering the peak of consumption that can occur at the end of the winter (February), i.e. towards the end of the withdrawal period when withdrawal rate has declined.

Inadequacy of storage capacity emerged strongly in winters 2004/2005 and 2005/2006, when in order to prevent possible shortage of gas at the end of the season (due to the cold temperature and to the increase of the consumption especially from the thermoelectric sector), the government had to adopt emergency measures to increase the availability of gas (maximisation of the use of booked import capacity) and to reduce gas consumption (activation of interruptible customers and maximization of use of alternative fuels to produce electricity, reduction of heating period and temperature). In the winters 2006/2007 and 2007/2008 the obligation to maximize the use of booked import capacity was adopted by MSE as a precautionary measure for the security of the gas system with the effect to preserve the availability of gas in storage.

For the same purpose PSOs attached to the use of storage for the modulation of the consumption of the domestic customers were also better defined. AEEG with the deliberation n. 303/07, on the basis of the effective and statistically expected temperature, established maximum volumes that each user can withdrawal form storage that he had for the modulation of the domestic customers and the minimum volume of gas to be held in storage by each user during the winter.

Minimum and maximum level of stock that each user has to hold in storage during the injection period (1st April – 30th October) is defined by the SSO with the objective to completely fill in the storage within the end of the same period. Users that don't comply are charged according to the criteria defined in the deliberation n. 119/05.

New storage capacity, in Italy, is not only needed to increase the security of the system, but to foster the competition in the market as well. Indeed, as long as there's no storage

capacity for the modulation of the consumption of industrial and thermoelectric customers, the market for this sector is concentrated in the hands of those operators that benefit from other source of flexibility (mainly associated with long term supply contracts). Because of the missing competition there is no possibility to profit from price differences in storage services.

Indeed storage is the main source of flexibility. Other flexibility tools are not adequately developed and equally distributed among market players. The possibility of modulating the deliveries embedded in some long term import contract is in the hand of few of them and above all of the incumbent. Another tool of flexibility is the possibility to buy spot or short term gas, or to exchange stored gas.

Trading of gas for daily balancing is not sufficiently developed in Italy, therefore storage currently play a crucial role for balancing the daily position of the users in the network. The Italian balancing regime is based on an implicit mandate to the main TSO to use the shipper's storage to balance its position, therefore gas flows from/to storage and their allocation to the users aren't based on nominated volumes but on the daily balance in the network (difference between gas delivered and redelivered in the account of each shipper). As a consequence of this, storage users know exactly their position after the TSOs have issued the daily balance of the network, around the middle of each month for the month before. The final balance of the network is issued each month for the third month before.

Those users that don't have gas in storage or enough storage capacity are charged with balancing charges.

To mitigate these criticalities, in November 2009, AEEG required SSOs to introduce a new storage service, mainly designed for balancing purpose and open also to users that don't benefit of the above mentioned access priority.

For this service, SSOs offer, for monthly and, in the next future, weekly periods, capacities obtained, during the contractual year, by means of the optimisation of storage utilisation and development in progress, as well as the capacities that they expect will not to be used on the basis of their forecasts. Capacities are offered both on interruptible and firm basis and are allocated by means of auctions along with capacity offered by primary users.

In order to promote the evolution of the balancing regime, AEEG has recently proposed to establish a centralised balancing market where TSOs and users can buy or sell gas in order to balance their position and the price for the balancing energy is formed. This proposal, still under discussion, will require relevant changes in the overall arrangement of the gas system (such as the responsibilities in the measurement and the allocation of gas flows at city gates), also with regard to the storage regulation (for instance introduction of binding nomination and re-nomination).

Available storage capacity has increased about 2,2 Bcm (approx. +20%) in terms of working gas since thermal year 2001/2002, the increase in withdrawal capacity is minimal. This increase was obtained with the optimisation and expansion of existing storage fields. In the meantime no new field entered in production.

Both MSE and AEEG made effort in order to put in place the better condition to push the development of new fields:

→ MSE required the national gas producer to communicate information about semi-depleted gas fields that could be potentially converted into new storage sites. Two procedures were carried out by MSE (2001 – 2006) to collect the interest from the market operators in developing new storage sites so identified and to select the more suitable project;

→ AEEG defined incentives to the development of new storage capacity with the granting of additional revenues for this kind of investment; a single national tariff for storage services, and a revenues compensation mechanism among SSOs, established in order not to penalise new storage sites that for technical and economical reasons, are clearly less efficient in comparison with existing ones.

Despite the measures taken and the interested shown by operators, as the number of projects under development testifies, only a new field is currently under construction, moreover by the main SSO.

The main cause for the delay in the construction of new storage capacity seems the length of the administrative procedure to gain the license to build a new storage site. This procedures involve many local and regional authorities and require a detailed EIA. Indeed since 2001 the first storage license for a new storage site was awarded this year: the overall procedure since the initial identification, by MSE, of the gas field potentially suitable for the storage operation took about 8 years.

No exemption from TPA access has been requested up to now. Investors have not an unanimous view on this: some says the regulated regime sufficiently guarantees investment recovery while those that plans to develop storage for their own use are interested to the obtain a TPA exemption.

In the Italian legal framework the exemption is issued by MSE after having acquired the opinion of AEEG.

Problems related to the development of new storage capacity in Italy are currently under examination of the AEEG and the Italian antitrust authority (Autorità garante della concorrenza e del mercato) that are finalising a fact-finding investigation.

7.1.8 Spain

Regulatory Framework

Spain has rTPA to the two current underground storage and the six LNG terminals. The nTPA is foreseen in the regulation for UGS. One of the storage is owned by Enagas, who also is the main TSO and has half of the regasification terminals, being ownership unbundled from the marketers. The other is owned by Repsol, its single facility in the gas market, not being active as a shipper.

Part of the capacity is reserved to strategic reserves, allocated in an annual OSP with direct allocation taking into consideration security of supply obligations, which depends on gas demand. The rest is also allocated each year, through an auction.

Originally the strategic reserves (Hydrocarbons Law 1998) were 35 days of the firm demand, to be storage by the shippers supplying final consumers. Nevertheless, the Spanish gas market had experienced such a large increase of demand from year 2002, that requirements set to companies had to be reviewed since there was a lack of capacity in the underground storage system to accomplish the established storage requirements. Therefore, the law was changed in 2007 and the Royal Decree 1766/2007 was published to specify how the strategic reserve was going to be managed.

Royal Decree 1766/2007 fixed the following modifications in the regulatory framework:

→ The Technical System Manager (GTS-functional unbundling from Enagas TSO/LSO/SSO) would perform an integrated management of the two existing underground storage sites, Serrablo and Gaviota, as an only one virtual storage.

- → The Royal Decree established that gas suppliers should keep 20 days of their previous year gas firm sales.
- → From this quantity, they had the obligation to maintain, as strategic reserves, 10 days stored in the underground storage sites on a permanent basis, and the remained 10 days need to be storage at the beginning of each winter in UGS (from 1st April to March 31st). It they did not have this gas quantity, they would be fined.
- → From the other 10 days, consisting in operative reserves, they had to maintain:
  - → 2 days of average daily sales from April of year n-1 to March of year n, in regasification terminal tanks or underground storage sites, as working gas.
  - → 8 days at the beginning of the winter (October of year n-1), in underground storage sites or other storage infrastructures (possibility to keep it in other Member State provided that there is sufficient interconnection capacity).

Due to this security of supply obligations, the capacity allocation mechanism was changed from FCFS to annual OSP with direct allocation (strategic reserves) and annual auctions (the rest of the capacity). The allocation mechanism established the following procedure:

Part of the available capacity is reserved yearly for shippers to comply with security of supply obligations (strategic and operative reserves).

The rest of available capacity was allocated via auction, in a process with several rounds. This capacity was bought paying €/GWh, and this payment was additional to access tariff to underground storage.

Existing and projected infrastructures

The following table shows the current capacities of the Spanish market

Table 2: Storage capacity in Spain

Storage Name	Operative Volume $Mm^3(n)$			Capacity $Mm^3(n)$/day	
	Cushion gas	Working gas	Total	Injection	Withdrawal
SERRABLO (Aurín y Jaca)	420	680	1.100	3,9	6,8
GAVIOTA	1.700	979	2.679	4,5	5,7
TOTAL	**2.120**	**1.659**	**3.779**	**8,4**	**12,5**

The following table summarises the storage underground infrastructures included in the Spanish Industry Ministry Gas Infrastructures Planification 2008-2016.

Table 3: Expansion of storage capacíty in Spain

Storage Name	Type of development	Operative Volume (Mm^3 (n))	Start up date reflected in last planification
Castor	New facility	1.300	by 2010
Gaviota	Expansion	1.558	Not defined
Marismas (Phase I)	New facility	300	Not defined
Marismas (Phase I)	New Facility	600	By 2010
Poseidon	New facility	250	Not defined
Yela	New facility	1.050	by 2012
Las Barreras	New facility	72	by 2011
El Ruedo	New facility	90	by 2011

Once one of the infrastructures included in the Central Planning is build, provided that uses rTPA, the retribution will be fixed for all the working life of the underground facility. The depretiation cost will be paid in the first 10 years, and the financial and operational cost during all the life of the asset, without regarding the utilisation rate of the infrastructure.

The following table illustrates the existing storage volume in the Spanish regasification terminals:

Table 4: Existing storage volume in the Spanish regasification terminals

Terminal Name	Operative Volume ($x10^3$ m^3 of LNG)
Barcelona	540
Cartagena	437
Huelva	460
Bilbao	300
Sagunto	300
Mugardos	300
TOTAL	2.337

Another terminal is foreseen in the Peninsula with an additional operative volume of 300.000 m3 of LNG, for 2010. Two other terminals could be built in the Canary Islands in the future.

Price levels and services offered

Royal Decree 1766/2007 established the following formula for tariff, distinguishing between injecting and withdrawal in the underground storage sites:

Ca = Tf* Qa + Tvi*Qi + Tve * Qe,

where, Qa is the amount of capacity reserved, Tvi is the variable term for injection, Qi is the gas quantity effectively injected, Tve is the the variable term for withdrawal and Qe is the gas quantity effectively withdrawn.

Services offered in the underground storage system include injection, withdrawal and storage. Agents do not contract withdrawal or injection capacities, they contract only the storage capacity; the injection and withdrawal rights are linked to the contracted capacity. Their use depends on the rest of storage users' use. The maximum they can use is the technical installed capacity and the minimum (which occurs when all the users want to inject or withdraw at the same time) is proportional to their contracted storage capacity. The Ministry of Industry's Resolution of 14th March 2008 established a contract model to access UGS.

The capacity in the LNG terminals is reserved through a regulated contract that gives the right to use the unloading, storage and regasification services. The LNG storage is paid applying a fee to the amount of gas in storage each day of the month. The fee discourages having a large amount of gas in storage for long.

Gas storage markets

22 shippers have capacity reserved in the underground storage. Almost all of them have also capacity reserved in some of the 6 LNG terminals.

The Ministerial Order ITC/3862/2007 established the basis of secondary capacity market for UGS, allowing agents to trade storage, injection and withdrawal rights via bilateral agreements. It also promotes the creation of an IT organised secondary capacity market, which will be managed by the Technical System Manager.

7.1.9 The Netherlands

Flexibility in gas supply is mainly delivered by the Groningen production field (low calorific gas). The physical characteristics of the Groningen field allows for both the supply of seasonal and short term flexibility. The following graphs show the Groningen production over the course of the year (first graph) and production against temperature (second graph).

Up till now the swing capability, of the Groningen field has remained intact. This is for a large part due to the success of the small fields policy. In order to preserve the swing capability of Groningen for as long as possible, production from the small fields (high calorific gas) was given a favourable treatment. The policy stated that the incumbent gas trader Gasterra of the Netherlands had to accept any supply from the small fields at market based prices. Since these fields have a flat production profile (i.e. little or no flexibility) the gas is used as baseload year round and stored in summer to provide additional seasonal flexibility in winter. However the small fields production won't last forever. Because of the

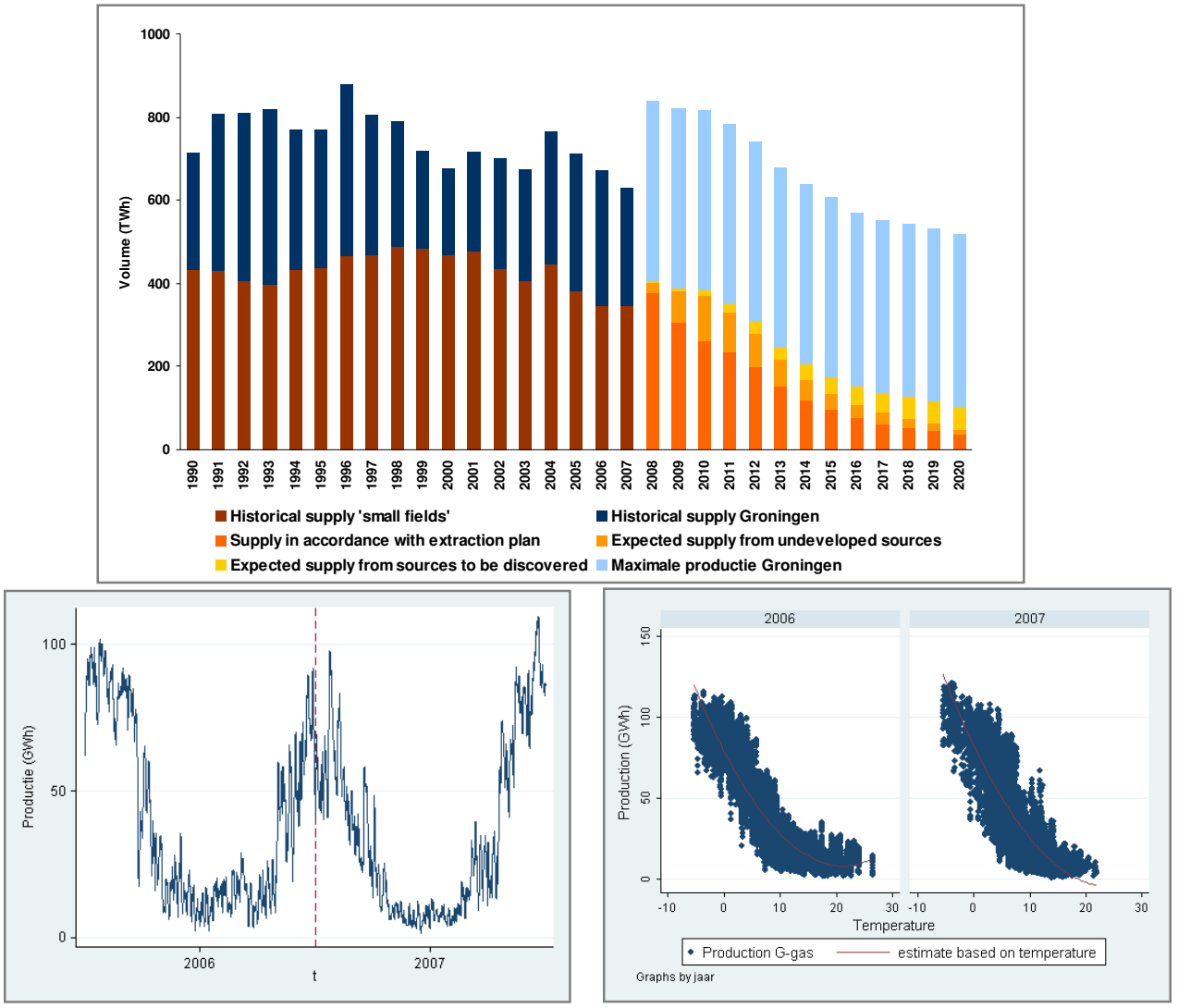

Figure 8 : The physical characteristics of the Groningen field

success of the small fields policy, these fields will most likely be depleted within the next ten years. The next graph shows the historical and expected supply from Groningen and from small fields.

Characteristics of Dutch gas storages

Because of the large Groningen field and its swing capability, the Netherlands has relatively few gas storages in operation. The limited role of gas storage in the Netherlands is also apparent from the gas balance.

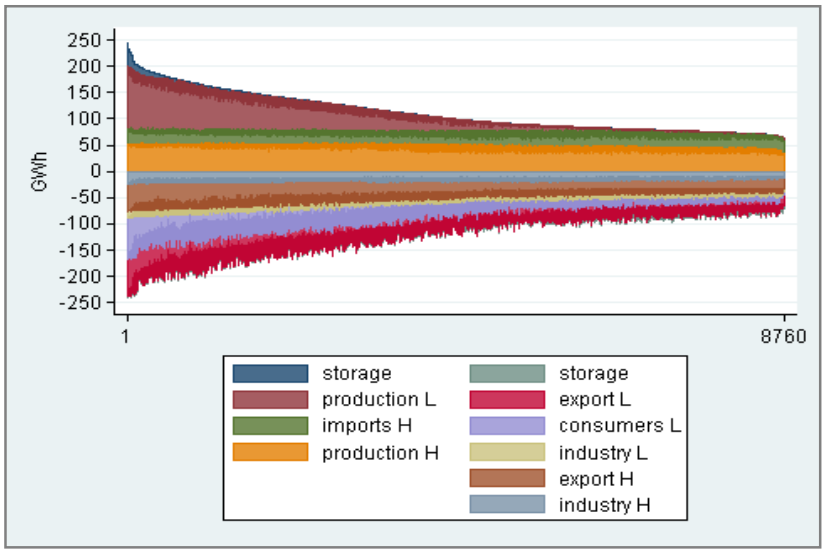

Figure 9: Gas balance in the Netherlands

The Netherlands has storages for both high and low calorific gas. For high calorific gas the most important is the storage installation in Grijpskerk. This storage facility has a work volume of 14.65 TWh and a send-out capacity of 22.4 GW. 11% of this capacity is made available to the market. The remaining storage capacity is used by operator NAM itself and used as injection storage for the small fields policy and retention of the flexibility of the Groningen field. The other storage installation is in Kalle (Germany). This storage facility, with a work volume of 2.5 TWh and a send-out capacity of 4.6 GW, is used entirely by operator RWE itself for flexibility on the Dutch market. Low calorific gas storages are located in Norg, Alkmaar and Epe. Just like the storage in Grijpskerk the NAM regards the storage facilities in the former gas fields of Norg and Alkmaar (operated by TAQA) as part of the Dutch gas production. None of the storage capacity of Norg is made available to the market, 7% of Alkmaar's is made available to the market. Essent and Nuon use their storage capacity in Epe (Germany) entirely for their own purposes, and do not make it available to the market. Apart from these storages Gasunie operates an LNG installation for peak delivery, and is in principle reserved for security of supply on extremely cold days.

Table 5: Storage facilities used in the Netherlands

Operator	Facility name	Type	Gas quality	Work volume (MWh)	Send-out capacity (MW)
NAM	Grijpskerk	Gas field	H gas	14,654,000	22,400
NAM	Norg	Gas field	L gas	29,308,000	22,400
TAQA	Alkmaar	Gas field	L gas	4,884,500	14,700
Essent	Essent Epe	Salt cavern	L gas	2,423,000	4,000
Nuon	Nuon Epe	Salt cavern	L gas	1,551,500	4,900
RWE	Kalle	aquifer	H gas	2,480,000	4,600
Gasunie	Maasvlakte	LNG installation	L gas	977,000	12,600

It is clear that the availability of seasonal storage capacity for the market (that is: other parties than the current contractor) is limited. Only 4% of the total storage capacity is made available to the market. For market parties, in particular for new entrants to the market, this limited availability can pose a problem. Shippers see the limited availability of gas storage as a barrier to competition on the gas market. In a questionnaire send out to shippers the limited availability of gas storage is seen as a considerable barrier to entry.

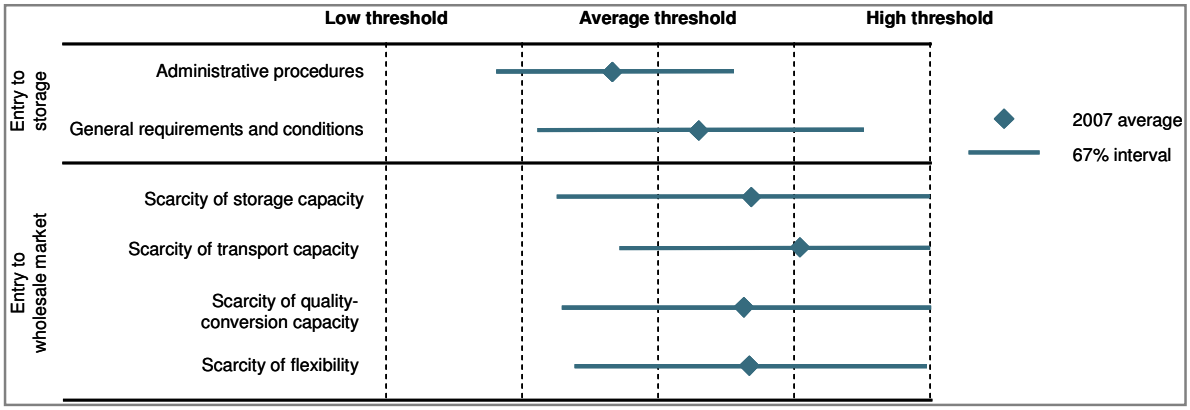

Figure 10: Results of the questionnaire to shippers

Limited use of storage capacity

The actual use of the gas storages in the Netherlands is limited. On average 25% of the total injection capacity for high calorific storage facilities for gas was utilised in 2007. On average 17% of the injection capacity of low calorific storage facilities for gas was utilised in 2007. The next figure shows that maximum utilisation of the withdrawal capacity of the storages of both high and low calorific gas is approximately half of the total capacity. In by far the most hours of the year the utilisation is markedly lower.

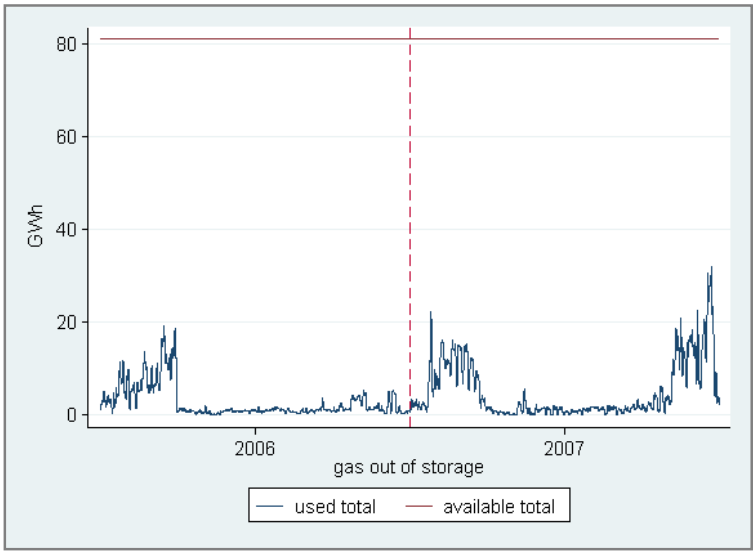

Figure 11: Storage use in Netherlands

Looking ahead

The limited TPA to storages in the Netherlands together with the limited use of storage capacity poses the question whether more storage capacity can be made available to the market. Clarity on this issue is important since any ambiguity about available capacity may impede (necessary) investments in new gas storage facilities. [24]

7.1.10 Great Britain

Introduction

The decline of flexible domestic gas production has increased the importance of other sources of gas flexibility, including gas storage. Gas import dependency is expected to increase from approximately 40 percent today to 72 percent in 2018[25]. The expected decline in domestic production, and associated decline in production flexibility, will have to be met through investment in alternative sources of supply. Over the past two years there has been a significant expansion of import capacity, with an additional 34bcm/year of LNG, 40bcm/year of interconnection and 28bcm/year of offshore pipeline capacity. Annual gas demand in Great Britain is approximately 100 billion cubic meters (bcm) per year.

[24] For recent developments on storage please also consult "monitoring report 2009" (page 22) at http://www.energiekamer.nl/images/Monitor%20wholesale%20markets%20on%20gas%20and%20electricity_tcm7-134754.pdf. For more information on storage investment outlook and some forthcoming projects like "Bergermeer" and "Zuidwending" please consult "report on security of supply 2009" by GTS at http://www.gastransportservices.nl/nl/downloads/publicaties/rapporten.

[25] http://www.nationalgrid.com/uk/Gas/TYS/

The total storage capacity in Great Britain is approximately 4.5bcm. Rough, operated by Centrica Storage Limited, is the largest facility and accounts for around 70 percent of storage space. Hornsea, operated by Scottish and Southern Energy, is the second largest facility and accounts for 7 percent of storage space in Great Britain. A table of existing facilities, facilities under construction and proposed facilities is provided the annex.

Negotiated third party access (nTPA) requirements

Following industry consultation Great Britain adopted a nTPA regime for storage. The nTPA requirements are set out in section 19B of the Gas Act 1986. In summary, storage operators must:

- → publish main commercial conditions relating to TPA to the gas storage facility at least once in every year;
- → publish any changes to the published conditions as soon as they become effective;
- → ensure that the conditions relating to TPA are non-discriminatory;
- → endeavour to negotiate in good faith and reach an agreement on an application for TPA to the storage facility.

The role of Ofgem in the nTPA regime is to determine disputes on access terms offered by storage operators where this does not prejudice: the efficient operation of the facility, or storage in the facility of capacity reasonably required by the storage owner, and the rights of other capacity holders. Ofgem also has an enforcement role in ensuring that storage operators meet their requirements.

Rough and Hornsea, which account for over 80 percent of storage capacity, are subject to nTPA requirements. National Grid LNG Storage also holds annual auctions for capacity at its three LNG storage facilities[26].

Ofgem has not received any formal complaints regarding TPA to storage facilities.

Evolution of TPA at storage facilities

In 1998 Ofgas[27] undertook a review of the gas storage market. The review concluded that British Gas Storage Company (BGS), which owned all storage facilities, possessed "significant short term market power". Furthermore, BGS exercised its market power in a way that hindered the development of competition. As a result British Gas plc (BG plc), the owner of BGS, gave a set of public, but non-statutory, undertakings to the Director General of Gas Supply (DGGS).

The undertakings required BGS to auction 100 percent of the capacity at its Rough and Hornsea facilities. It was agreed that 50 percent of the capacity would be sold for a five year period and 50 percent would be sold annually for a one year period over the next five years[28]. In addition, no individual company would be allowed to purchase more than 20 percent of the available capacity.

[26] http://www.nationalgrid.com/uk/Gas/lngstorage/

[27] The Office of Gas and Electricity Markets (Ofgem) was formed by the merger of the Office of Electricity Regulation (OFFER) and Office of Gas Supply (Ofgas)

[28] http://www.bg-group.com/MediaCentre/PressArchive/1998/Pages/pr-059.aspx

In November 2001 Dynegy, an American energy company, bought BGS with Rough and Hornsea from BG plc. The BG plc undertakings ceased to have effect. However, in lieu of a merger reference to the Competition Commission, Dynegy provided the government with a set of statutory undertakings.

Dynergy's undertakings allowed for capacity to be sold on a first come first served basis. This was subject to a requirement that any unsold capacity was offered for sale by auction at least 30 days before the start of the storage year.

Current TPA arrangements

Centrica Storage Limited (CSL) purchased Rough in 2002[29]. The acquisition was referred to the Competition Commission who concluded that it may be expected to operate against the public interest. As a result CSL agreed to a set of undertakings. These are in place for an unlimited time period.

The undertakings cap the volume of capacity that Centrica Plc (Centrica) is allowed to hold to 15 percent of capacity.[30] Moreover, CSL is required to sell a minimum 85 percent of capacity available to third parties[31]. Capacity is sold on an annual basis in three stages. First, minimum capacity is sold on a bilateral (FCFS) basis. Second, any unsold minimum capacity is sold at a zero reserve price auction at least 30 days before the start of the storage year. Third, any capacity at the facility that has been developed in excess of the minimum capacity is made available to third parties and Centrica. The undertakings require CSL to sell all capacity at Rough on non-discriminatory terms.

The undertakings also require CSL to offer at least 20 percent of minimum capacity on annual contracts and offer rest of capacity for a range of contract durations (a range of 1 to 5 years is suggested). In addition, CSL is required to give customers the option of either fixed or indexed contract prices. Indexed prices are indexed to the difference between forward prices and spot prices for gas.

The combination of the requirement to sell all minimum capacity, the zero reserve price auction and the cap on capacity which Centrica can procure effectively prevent Centrica from using its strong market position to the detriment of competition and ultimately customers. This serves to promote competition and reduces barriers to entry in the downstream gas market.

CSL also offers secondary trading of storage capacity and gas in store. Trading gas in store enables users to transfer ownership of gas they own at the storage facility. The facility also has use-it-or-lose-it arrangement where users can buy additional deliverability, injectability and working gas volume on an interruptible basis. This UIOLI capacity is capacity owned by

[29] Centrica Storage Limited (CSL) is a wholly owned subsidiary of Centrica Plc (Centrica).

[30] When Centrica Plc purchased Rough it was allowed to hold 20 percent of capacity. Its allowed capacity holding was required to decline by 1 percent each year for the first five years of ownership. Its allowed capacity holding is now fixed at 15 percent

[31] The "minimum capacity" that CSL is required to offer to third parties initially equated to 80 percent of the defined capacity level at Rough at the time of giving the undertakings – this increased to the current figure of 85 percent over a five year period. If CSL invest in new capacity the additional capacity can be held be CSL, thereby providing CSL an incentive to invest.

other storage users, but not nominated for use. The secondary trading and UIOLI services are facilitated through CSL's STORIT platform[32].

Scottish and Southern Energy (SSE) acquired the Hornsea facility from Dynegy in September 2002[33]. Hornsea is subject to the TPA provisions in the Gas Act which stipulate that capacity should be allocated on a non-discriminatory basis. Capacity is sold on an auction basis and contract length is between one and five years.

Capacity at the LNG storage facilities owned by National Grid LNG Storage is sold by way of a two stage, pay-as-bid auction process. 75 percent of the available storage capacity is offered in stage one with the remaining twenty 5 percent is offered in stage two[34].

Ofgem monitors actual day to day usage and capacity holdings at storage facilities on an ongoing basis. For Rough and Hornsea, Ofgem collects information on capacity holdings and use. Ofgem also has powers to request information from facilities exempted from TPA under the terms of their exemption for the purpose of monitoring the operation of the provisions under which they are excluded.

Access conditions at TPA excluded facilities

Since Ofgem's storage review in 1999 five new gas storage facilities have become available to the GB market; Hole House Farm, Holford H165, Hatfield Moor, Humbly Grove and Aldbrough, which are all exempted from TPA[35]. Apart from Aldbrough, which is part owned by SSE these facilities are owned by different SSOs. Hole House Farm and Hatfield Moor are used exclusively by their owners. Holford H165 is used by National Grid for operational balancing. Capacity rights at Humbly Grove were sold by its owner to a third party on a long-term basis. Capacity at Aldbrough is shared by several parties.

Approximately 80 percent of the storage capacity is available to the market at facilities that operate TPA (i.e.at Rough and Hornsea). The undertakings at Rough and Hornsea have, over time, contributed to the development of wholesale and retail market competition.

Examining the capacity holding across the storage market reveals that capacity ownership is not concentrated with a HHI index[36] of between 650 and 780 depending on measurement used. Chart 1 provides a snapshot of capacity holdings at storage facilities in Great Britain.

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[32] STORIT is a secure online customer services system where customers can place orders for injecting or withdrawing gas, see flow profiles and available capacity, buy additional storage capacity, trade storage capacity and download invoices.

[33] http://www.scottish-southern.co.uk/SSEInternet/index.aspx?rightColHeader=26&id=412

[34] http://www.nationalgrid.com/uk/Gas/lngstorage/Auctions/

[35] Section 19A of the Gas Act 1986 provides for exemption from TPA on the basis of Article 19 of the Second Gas Directive where TPA does not apply where storage is not economically and/or technically necessary for providing efficient access to the system for the supply of customers.
where a facility is not necessary for the economic

[36] The Herfindahl-Hirschman Index is a commonly used measure to evaluate market concentration. The index ranges from close to 0 (an infinite number of small market participants) to 10000 (monopoly). Commonly accepted benchmarks are that an index of below 1000 is *not concentrated*, 1000-1800 is *moderately concentrated* and above 1800 is *Concentrated.*

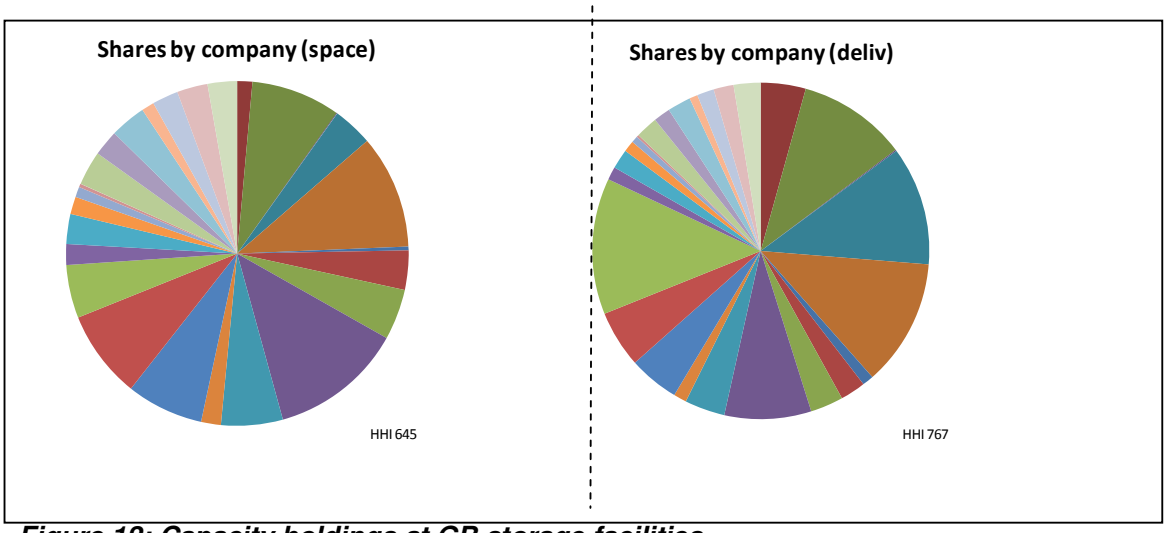


Figure 12: Capacity holdings at GB storage facilities

Use of storage capacity and alternative sources of flexibility

Gas storage in GB is used for a number of purposes. It is used by gas suppliers to meet seasonal variations in gas demand, by gas producers to mange their commercial positions and take advantage of price differences between the summer and the winter periods, by gas traders to arbitrage and by the transmission system operator to provide operating margins volumes for support of the transmission system.

However, storage is only one source of supply flexibility used by market participants. Chart 2 shows the use of the storage facilities in GB between October 2007 and March 2009. Charts 3 and 4 describe the use of competing sources of flexibility such as LNG, gas interconnectors and flexible production. Also, the demand side response of large gas users, such as gas fired power stations, provides additional flexibility.

This flexibility is to a degree facilitated by the traded, liquid NBP market which provides price signals to infrastructure owners to ensure supply meets demand.

Chart 2 withdrawal and injection to GB storage facilities 2007-9

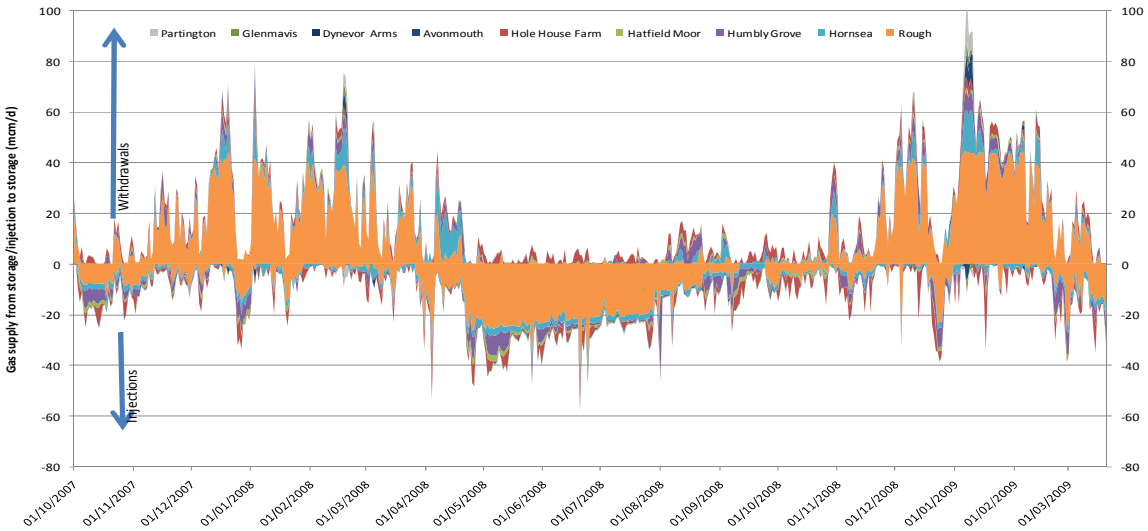


Chart 3 Flows from LNG importation facilities and IUK and BBL interconnectors 2007-9

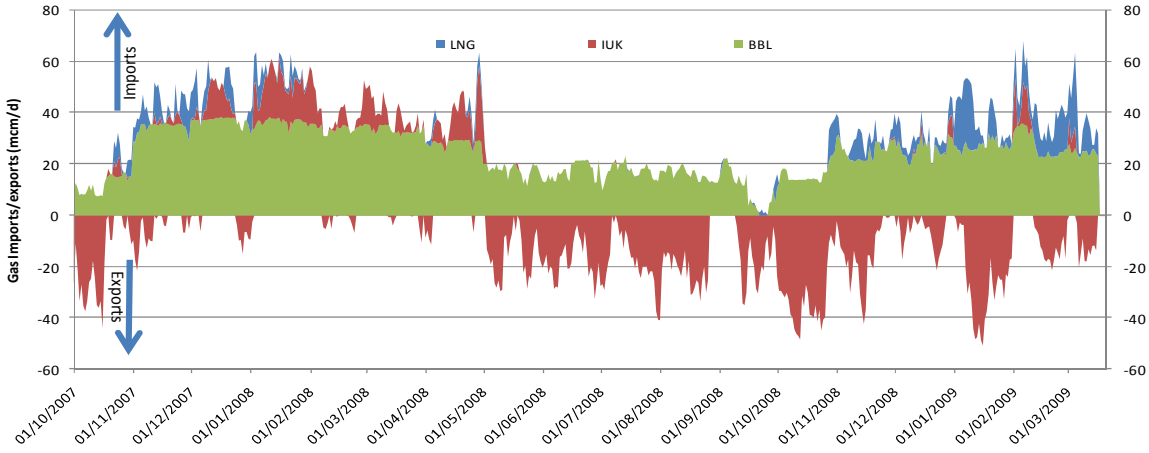
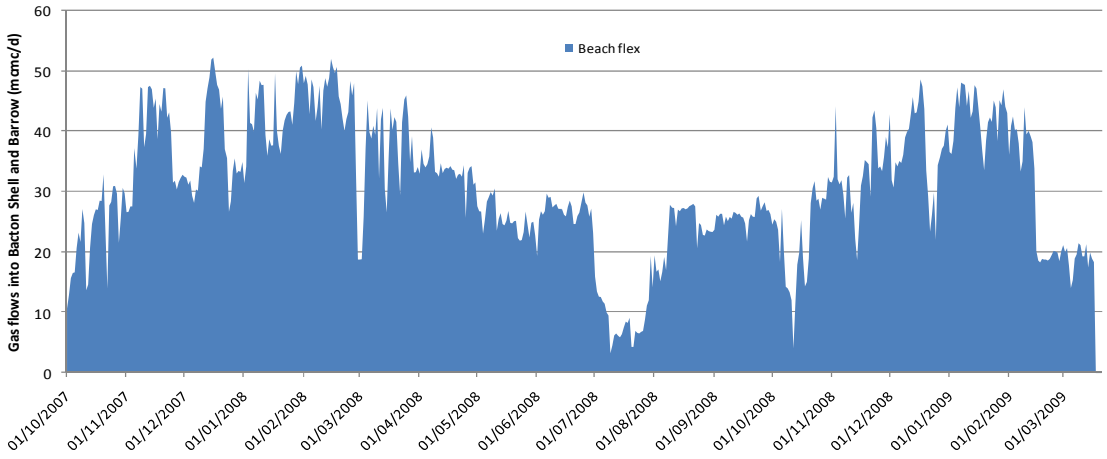


Chart 4 Flexible gas production in GB 2007-9



Gas storage facilities, owners, capacities and capacity allocation mechanisms

Existing facilities

Facility	Type	Space (GWh)	Deliv. (GWh)	Duration (Days)	Start date	Owner	Capacity allocation
Rough	Offshore depleted field	36,800	455	80.9	1985	CSL	nTPA + undertakings
Hornsea	Salt cavern	3,496	195	17.9	1979	SSEHL	nTPA
Avonmouth	LNG	877	156	5.6	1978	NG	TPA arrangement under network code
Dynevor Arms (due to close 2009)	LNG	303	49	6.2	1983	NG	TPA arrangement under network code
Glenmavis	LNG	509	101	5.0	1975	NG	TPA arrangement under network code
Partington (capacity to be reduced 2009)	LNG	1126	219	5.1	1972	NG	TPA arrangement under network code
Hole House Farm	Salt cavern	600	90	6.6	2007	EDF	Own use
Holford H165 (used for local balancing)	Salt cavern	50	75	0.67	2007	NG	Own use
Hatfield Moor	Depleted field	1,260	22	57.3	2002	Scottish Power	Own use
Humbly Grove	Depleted field	3,100	82	37.8	2005	Petronas	Own use

Facilities under construction

Facility	Type	Space (GWh)	Deliv. (GWh)	Duration (Days)	Start date	Owner	Access arrangemnts
Aldbrough	Salt cavern	4,550	420	11	2009	SSE/Statoil	Own use
Holford	Salt cavern	1,758	175	10	2010 /11	e.on	Own use
Caythorpe	Depleted field	3,000	120	25	2011 /12	CSL	Own use
Stublach	Salt cavern	1,500	175	8.5	2013	Gdf/Ineos	Unknown

Planned and proposed facilities

Facility	Type	Space (GWh)	Deliv. (GWh)	Owner
Saltfleetby	Depleted field	7,650	85	Wingas/Gazprom
Aldbrough 2	Salt cavern	4,550	?	SSE/Statoil
Gateway	Offshore salt cavern	12,775	305	Stag Energy
Whitehill Farm	Salt cavern	4,548	433	e.on
Portland	Salt cavern	10,830	216	Portland Gas
Albury	Depleted field	1,850	46	Petronas
Welton	Depleted field	2,520	63	Petronas

Facility	Type	Space (GWh)	Deliv. (GWh)	Owner
Bains	Offshore depleted field	6,000	?	CSL/Gdf
Fleetwood	Salt cavern	18,400	650?	Canatxx
Baird	Offshore depleted field	17,000	?	CSL
Hewett	Offshore depleted field	50,000	?	ENI

8 Annex 2: Results of Questionnaire