

Gas Storage in Europe

“Adding security through flexibility”

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This paper outlines the EFET position on the role of Commercial storage facilities in Europe. It presents the current situation regarding access to storage and how Commercial storage can contribute to the proper functioning of the European gas market. It also considers the security of supply implications of an optimal storage system, concluding that the ultimate goal should be for all storage in the EU to be Commercial and with access on a competitive basis.

EFET looks forward to a time when all storage is in a competitive market; until this is achieved it is important that the EU standard is raised for non-discriminatory third party access (TPA) conditions for existing storage facilities. We therefore welcome the changes in the new Gas Regulation and Gas Directive that improve TPA to necessary storage facilities and offer this paper as a guide to the further structure of the storage market.

- **Storage has a crucial role to play both in facilitating development of competition and in contributing to security of supply**
- **New investment is needed in storage across the EU, to be triggered by an appropriate regulatory framework**
- **Storage should be unregulated unless a consistently applied EU-wide test demonstrates that there is insufficient competition.**
- **Where storage needs to be regulated there must be clear rules to ensure non-discriminatory access**
- **Development of competition in all flexibility services, including storage, should improve with enhanced interconnection, better market design and harmonisation overseen in future by ACER.**
- **We have not seen any evidence that Strategic storage is cost effective, and we are concerned that it could discourage commercial projects.**
- **Provision of information by all storage operators will need to develop in line with the need to ensure the efficiency and integrity of a competitive market.**

1 Introduction and terminology

The EU gas market currently has many types of storage regime. EFET does not necessarily agree that these distinctions are the most useful ones, but for clarity we have grouped the different types of storage into three broad categories:

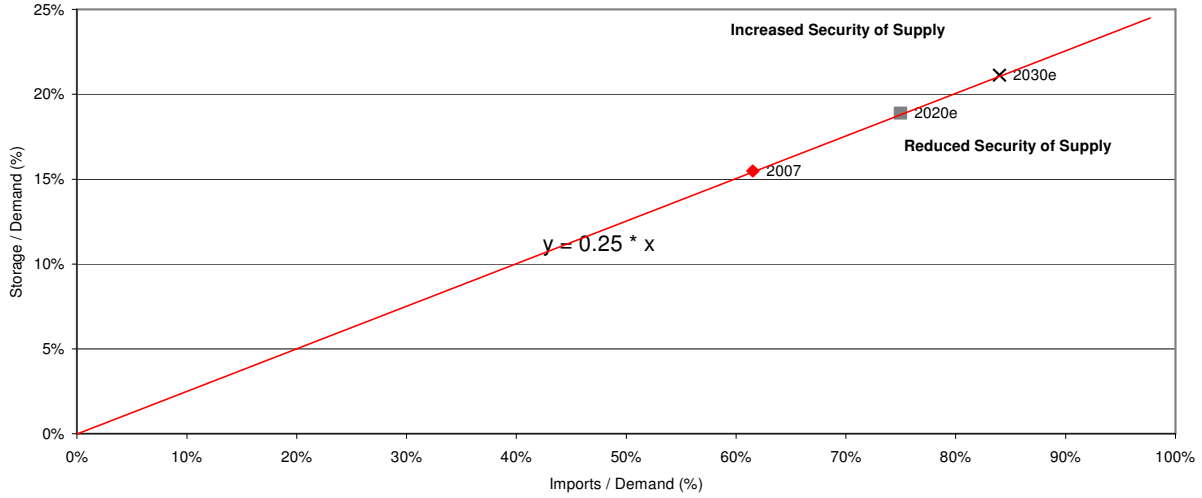
Category	Type of storage	Explanation	Access
Strategic	National Strategic Stocks	Reserved for supply of certain consumers in extreme supply security circumstances	Administered allocation and/or use of capacity
Commercial	Exempt storage facility	Major storage facility deemed to satisfy article 22 requirements	Fully or partially exempt from Regulated TPA
	Essential Storage (necessary for access to networks for the supply of customers)	Choice of access regime determined by Member States	Regulated TPA
			Negotiated TPA
			Hybrid TPA
De minimis storage	Relatively small 'non-essential' facilities	No (mandatory) TPA	
Excluded	TSO storage	Part of storage needed by TSO to carry out their duties	No TPA Reserved for TSO
	Production storage	Part of storage technically essential for gas production	No TPA Reserved for Producer

Gas storage has a number of important functions including:

- managing the risk of supply disruption both due to physical and political reasons;
- providing the flexibility that is necessary in order to smooth the seasonal and within-day supply-demand gap;
- contributing to the liquidity markets need in order to play their role in providing robust price signals.

Hence, storage contributes to the efficient functioning of the overall energy market as well as responding to security of supply needs. Its role has become increasingly important as the level of EU import dependency has increased.

Natural gas represents one quarter of total energy consumption in the EU; about half of it is imported. Gas import dependency affects the whole EU and is generally expected to increase significantly in the future.



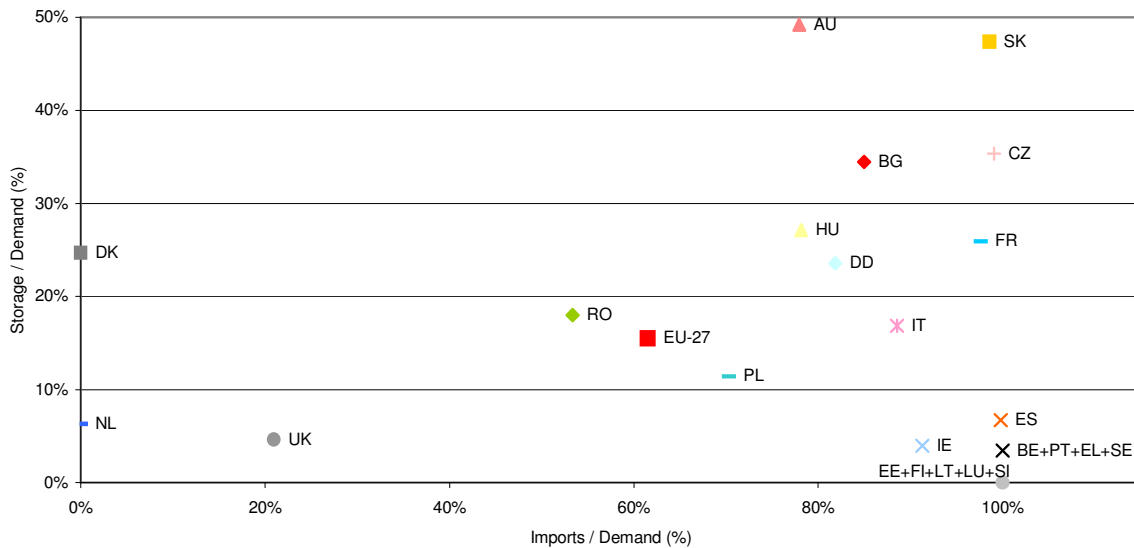
Source: SG Equity Research / GSE /

Even without growing import dependency and concerns about security of supply, the natural gas market faces demands for increased flexibility: The projected growth in wind, solar and other less predictable forms of renewable power generation will depend on natural gas as a flexible back-up fuel.

2 Current storage market

2.1 Facts and figures

With an annual growth rate of 1,8 % per annum, gas demand would exceed 5,400 TWh by 2030. Assuming no major structural change with respect to supply and demand of flexibility, this translates into a swing demand of nearly 1,500 TWh for seasonal flexibility alone¹, which is in turn equivalent to a storage gap of more than 7.2 Bcm of working gas volume, even if all currently planned new capacity were effectively realized by 2030.²



Source: SG Equity Research / GSE / Eurogas

, The development of new storage capacity can be hindered if market failures exist due to the lack of competition. Ensuring that there is fair and non-discriminatory access to the existing storage facilities is crucial for the proper functioning of the market and the promotion of competition; at least until there is sufficient new capacity in direct competition with existing facilities such that the storage market is fully competitive. In Member States where there is monopoly storage ownership, access terms can be deemed unreasonable if the level of charges bears no relationship to the cost, or if non-price terms make access to storage services difficult or unattractive to new entrants. For example,

¹ Felix Höffler, Madjid Kübler, Demand for storage of natural gas in north-western Europe. A simulation based forecast 2006-2030, Max Planck society, 2006.

² The global economic downturn will have reduced these projections in the short term, but increased use of intermittent energy sources and energy security concerns both suggest the storage requirement would be higher. Overall. It is clear that Europe needs additional storage capacity, although there is doubt as to the exact amount.

contract terms that favour large counterparties (like very high minimum lot sizes), or by offering withdrawal capacity but no working volume or injection.

In most Member States, better access to or improved use of storage is crucial to the development of more efficient, effective and integrated markets. Germany, France and Italy together hold more than 70% of the EU storage capacity: the main storage problems experienced in these markets are summarised in the annex to this paper.

In Germany storage access is possible, with terms offered by various SSO such as BEB, EON Gas Storage, RWE, Wingas, EWE and others. However, utilising storage commercially is difficult for many players, due to difficulties in gaining access to storage services. The rapid growth of gas trading, both on the GUD and NCG system, is likely to boost the use of storage as a trading tool and increase the demand for storage even further. In this context the auctioning of 5.75 TWh of working gas capacity by E.ON Gas Storage in 2009 is a promising start but further action is needed.

In France a majority of gas storage capacity is reserved for companies that supply certain consumers. There is effectively an obligation on storage operators to allocate capacity to certain suppliers so that the suppliers could hold sufficient gas stocks to satisfy their contractual obligations. This approach impedes free access to storage, preventing the development of meaningful market signals and unduly restricting or prematurely denying capacity allocation to wholesale market participants.

In Italy gas storage capacity is to a large extent booked by the incumbent gas suppliers and it is not clear if this is always fully utilised. However, there is no additional storage capacity offered on the secondary market. There is also an obligation on users who have been assigned storage capacity to keep a minimum stock in the storage facility at the end of each month during the winter. This is not an efficient solution for security of supply because it sterilises a large quantity of storage gas over the winter months, exacerbating the storage capacity position.

2.2 Not a natural monopoly

Gas storage is not a natural monopoly, for two main reasons:

- The owners of existing storage facilities generally incur the same costs as anyone else in expanding their own storage capacity. No significant economies of scale can be obtained when creating new storage capacity.
- Alternatives to storage facilities should exist in the market for flexibility³.

As a consequence of these features of the gas storage industry, even the exclusive use of own capacity by new entrants should not cause concern provided that other market conditions are sufficiently developed. On the contrary, investment in storage can represent an effective way for new entrants to gain access to a market and enhance competition.

³ EFET recognises that in some areas there is insufficient access to flexibility, but this will improve as the European gas market becomes more integrated and access to cross-border capacity and intraday balancing markets are implemented.

To help ensure that there are no barriers to the development of commercial storage it is also crucial that there are no undue restrictions when seeking access to the transmission network. This applies both to the conditions for pipeline connection to the network and the continuing operation as well as the ongoing terms and procedures for access.

Although geological conditions or historical developments have in some cases led to established dominant positions in flexibility markets, there are cases in Europe where liberalisation has been more successful and access to storage is both more transparent and non-discriminatory. Extensive alternatives to the flexibility provided by storage facilities, such as interruptible gas to power generation facilities, non-congested interconnection capacity, flexibility in import contracts and indigenous production swing usually facilitate such a development and a regulated TPA regime for commercial storage may thus prove unnecessary. This reduction in regulatory risk in turn encourages much needed investment in the development of commercial storage capacity.

2.3 Diverse functions of storage

Being aware of the unique features of the storage business is of key importance, due to the role that storage plays in the mechanics of the gas market and in enabling access to markets. EFET believes that there is a strong case for the enhancement of competitive, market-based commercial storage:

- Storage facilities, available for commercial use, provide European companies with the possibility of diversifying their market strategies, enhancing their stability. Liberalisation of gas markets and increased competition promotes the use of gas storage for trading and optimisation purposes because such flexibility has an inherent value.
- Increased supply flexibility through storage facilities, as well as flexible interconnection capacity between markets, would act as a competition-enhancing buffer, which would help markets find their natural equilibrium, hence reducing the risk of price shocks.
- Increased long-distance base load gas import and decreased indigenous production swing is likely to lead to increased demand for regional and local flexibility to meet seasonal consumption patterns.
- Production activities might entail regularity problems, limiting the ability of suppliers to deliver gas to customers in line with commitments. As distance from sources and import dependency increase, the risks linked to regularity become more and more evident. As above, storage facilities close to the market and connected to import pipelines will be able to tackle this problem.
- A gas network requires a certain degree of flexibility to maintain its integrity. Availability of storage at disposal of network users and TSOs is a guarantee for the well-functioning of the system and its ability to cope with imbalances.
- The need for low carbon power generation also calls for more flexibility in the gas market. Gas fired power plants, due to their responsiveness as well as their lower carbon contribution, will become a practical back up option for wind power, beyond being a valid part of the solution for climate change in its own right. This will only be possible if resources to supply sudden demand will be immediately available to the market.
- Increased role of LNG will fuel demand for gas storage, as LNG shipments are often too large to be absorbed immediately by the gas market.

Given all this, ensuring that there is an appropriate regulatory framework to encourage the development of new commercial storage should be a priority both at EU and national level.

2.4 Storage and security of supply

Some special consideration should be given to the role of storage in enhancing security of supply especially in view of the Second Strategic Energy Review and of the process leading to the revision of Gas Security of Supply Directive.

Strategic storage can be defined as stocks of natural gas immobilized⁴ in a facility to be used only by an administrative instruction in response to an emergency. Discussion around the need for strategic storage should include at least the following two elements:

- Cost - construction of strategic storage could lead to the crowding out of the resources available for commercial storage. In addition the amount of gas available for commercial purposes would be reduced and this will have a negative impact on the development of more efficient, effective and integrated markets;
- Alternative measures - these could help achieve the same objective of increasing the ability of the system to respond to a supply crisis. Such as the degree of interconnection, resilience of the transportation network, ability to reconfigure pipelines, market integration, the progressive harmonization of the internal market, and the contribution to security of supply represented by the mere availability of more commercial storage.

EFET believes that a thorough analysis of these elements would confirm that alternative solutions should be pursued to enable a market-based approach to be taken. In this context we note that during the January 2009 supply crisis, it was commercial storage, not strategic stocks, that provided gas from storage facilities to help mitigate the problems. Overall, improved market integration, deeper traded markets and more reliable price transparency would enable an even better response from new and existing commercial storage facilities. This not only mitigates the effects of a severe supply crisis but more fundamentally could enable the declaration of an emergency to be avoided altogether provided that national borders are kept open and gas in store is allowed to flow to where it is needed.

Once fully traded markets and intraday balancing have been established, suppliers are commercially incentivised to have sufficient gas even in extreme conditions (when imbalance charges will be very high). EFET recognises that, until such deep traded markets have been established, Government concerns on security of supply might lead to an obligation on shippers or suppliers to ensure supply to their customers in peak demand situations. If such obligations are imposed then it is essential, for the proper functioning of the market, that suppliers or shippers are allowed the freedom to source the necessary flexibility from other sources as well as storage. Investment in new storage capacity could be one solution used by some companies to cope with any such obligation.

⁴ i.e. not being freely accessible for commercial use by market participants either on a permanent basis or triggered by specified events (e.g. supply emergency).

For circumstances where an emergency does occur, some form of national or regional response plan, involving the affected countries, should be enacted to coordinate action and to give TSOs the necessary resources to safely manage the network.

3 Potential developments

3.1 Competitive markets

Markets must be properly developed and then be allowed to function. Investment in storage is one potential route for new entrants to compete and establish trading positions. It would be a disincentive to such investment if regulation ended up being structured in a way that the provision of third party access undermined the position of those new entrants.

In general where competition or a potential for competition to be generated by new investment exists, legislators and regulators should focus on deploying a framework conducive to building new infrastructure. TPA rules for access to new facilities that will be in direct competition with the incumbent storage provider(s) could inhibit the incentives to invest in new storage capacity.

The ultimate objective should be no regulation of storage access beyond general competition rules and necessary transparency requirements. This will require

- Industry restructuring and network interconnections effectively to broadened the market for storage and/or flexibility in general;
- Network users to have non-discriminatory access to sufficient alternative sources of flexibility in the same balancing zone;
- Independent storage companies having complete choice in providing access to network users based on price and market signals.

In Member States where a competitive storage market exists but more storage investment is needed, forward price transparency is necessary to inform investment decisions. The owner, and indeed the user, of new commercial storage can be confident that seasonal markets will be accessible, but their investment or booking still carried a large risk because liquidity and the forward price transparency are very limited beyond three years.

Policies that National Regulating Authorities could potentially employ to improve the investment climate include:

- Allow new entrants to develop storage facilities without any obligations for TPA, provided that they will operate in competition with existing storage providers and improve competition in the wider gas market;
- Develop and apply a consistent EU-wide competition test leading to automatic exemption from mandatory TPA.

3.2 Monopoly markets

Given the potential competitive nature of the storage business a non-regulated environment should be the default. Within Europe at present, however, there are de facto monopolies or duopolies for which rules must be in place both to regulate access to existing facilities and to encourage new investments that provide competitive flexibility services.

In these cases an assessment of flexibility is required to ascertain the extent and weight of regulation needed. The new Gas Directive in the 3rd Internal Energy Package leaves the choice of storage regime to the Member States. The European Commission are also expected to provide some advice on the

choice criteria that Member states are obliged to publish. For national markets with limited competition in the storage business, and in the wider flexibility market, it is evident that TPA to storage should be regulated and congestion management procedures should be put in place. The definition of the boundary between 'limited' or 'sufficient' competition still needs to be established, and congestion management procedures need to address capacity in long-term bookings that were made, in some cases, before liberalisation.

In particular, in such regulated environments:

- Monitoring of compliance with transparency obligations must become a primary tool for limiting market power and helping new entrants to take appropriately informed business decisions;
- Market based mechanisms shall be the rule for allocating capacity to guarantee that no discrimination among class of users is made;
- Auctions should remain the preferred option where contractual congestion emerges and UIOLI rules are triggered;
- Standardised bundled products shall be made available to facilitate trade on capacity secondary markets;
- Public service obligations should not prevent companies from entering the markets
- Full implementation of the GGPSSO is needed in all Member States
- The level of information transparency from Storage Operators will need to continuously improve in line with customers' needs and market integrity requirements.

Regulated TPA to monopoly storage facilities remains essential until sufficient competition in the flexibility market has been established. Negotiated access – in compliance with the competition rules and transparency requirements – could be the appropriate solution for those markets that are on the way to become truly competitive, while exemption from third party access could be the answer where a new entrant is willing to enter a market dominated by incumbents.

The provision of information from all storage operators remains a key issue. Further work needs to be done to establish the right level of information transparency for different Storage Operators to fulfil the varying needs for security of supply, non-discriminatory access, efficient market investment and gas market integrity.

4 Conclusions

Europe faces an increased need for flexibility in the gas market. Ensuring that there is efficient market-based allocation of existing gas storage capacity and removing barriers to the construction of additional storage should be priority actions.

Whilst recognising that some market areas currently rely on a dominant Storage Operator, EFET believes that the goal should be to establish a competitive market in storage and equivalent flexibility throughout Europe. Once this is achieved, only minimal regulatory oversight will be required to ensure the proper functioning of the storage market. To ensure that this transition is successful only monopoly storage needs to have fully regulated third party access (TPA).

EFET recommends that Member States fulfil their responsibility to choose between Regulated and Negotiated TPA by implementing a competition test that is carried out on a consistent EU-wide basis.

Competitive storage facilities should be allowed as much freedom as is warranted by the market conditions and regulation on TPA should not represent a disincentive to investment.

Governments and Regulators should keep in mind that, for companies to invest, a viable business case should exist. Negotiated access and exemption from TPA can provide elements to build the necessary business case. Their ultimate objective should nonetheless be no regulation beyond general competition rules and necessary transparency requirements.

EFET Gas Committee

3 July 2009

Italian storage issues

Functioning and structure of the market

- ▶ **There are 5 SSO operating in the Italian storage market.**
- ▶ **Working gas capacity is due to expand by 11 bcm till 2015.**

Allocation

- ▶ Storage capacities are mainly allocated according to different purposes: balancing (for TSO), extraction (to producers), modulation (for some shippers)⁵;
- ▶ The modulation storage capacities are allocated pro-quota in relation with the market supplied, with priority rights for final customers with low consumption (which, as a matter of fact, exhaust the availability of modulation storage capacities)

Balancing

- ▶ The main issue in the storage part of the current balancing system is that the storage stock is the “closure” element of the shipper’s balancing position. This closure is determined by the real consumption directly or indirectly made by the final customer in a time frame of 3 months delivery period. The very element that should guarantee better flexibility is instead given to the shipper in a passive, regulated way.
- ▶ The TSO has a withdrawal capacity (42% of the available) and injection (10%), which is therefore not allocated to the market (see note).
- ▶ There is no possibility to efficiently trade ex-post in a “pre-settlement” phase.

Usage

- ▶ Storage use is unduly restricted:
 - Subjective: it must be physically assigned for modulation purpose to fulfil which has been originally allocated
 - Quantitative: the minimum threshold of storage at the end of each month must be respected, otherwise a proceeding for “improper use” of the allocated capacity can be opened
 - Profile: the storage code provides for the respect of the minimum and maximum injection profile as well as the maximum withdrawal, otherwise fines will apply (often suspended for “impossibility”)
- ▶ Lack of “special” services for the optimization of the existing capacities for commercial purposes. The option is between special services not regulated (with high costs) and total absence of services (for the unavailability of the storage operator to provide them under regulated conditions).

⁵www.stogit.it/wps/wcm/connect/stogit/Stogit/Home/Area+business/Capacita+di+stoccaggio/Capacita+conferite/?WCM_Page.ResetAll=TRUE



Strategic Storage

This is currently being discussed by the Italian EFET task force, the concept, how it will be financed and the structure could lead to further issues for storage in Italy

Annex 2

French storage issues

Functioning and structure of the market

- ▶ **There are 2 SSO operating in the French storage market.**
- ▶ **Working gas capacity is due to expand by 1.8 bcm till 2017**

Allocation

- ▶ By decree, the majority of storage capacity is reserved for shippers supplying end-customers
- ▶ This reserved capacity is allocated pro-rata based on the portfolio size of the shipper at a negotiated price.
- ▶ Shippers without end-customer portfolio have two options to purchase capacity with Storengy:
 - Auction of reserved capacities with a reserve price
 - Participate in 2nd round allocation process of capacities that were not allocated to shippers with end-customer portfolio in the 1st round. This capacity is available at the same negotiated price, but allocated only for half a year on a firm basis (1 April to 1 November of each year). From 1 November to 1 April, shippers with end-customer whose portfolio has changed (increase or decrease in customers) have priority access to this capacity and the corresponding gas in store.
- ▶ Problem:
 - The lack of available (i.e. not constrained due to public service obligations) storage capacity is the biggest barrier to entry the French market.
 - The reserve price is generally not published and shippers have no indication how it is determined
 - In 2009, the auction will take place before the allocation of the capacities. Shippers with end-customers have an incentive to bid below the allocation price because they know they will receive capacity matched to their customer portfolio at the allocation tariff. We assume that this effectively sets the reserve price at the tariff level, rather than the marginal cost.

Annex 3

German storage issues

Functioning and structure of the storage market

- ▶ Access to storage capacity is not regulated - only bilateral agreements are needed, with 'reasonable' terms (§28, EnWG). This gives the SSO a wide scope for managing their assets.
- ▶ **There are 13 major and numerous smaller SSO operating in the German storage market.**
- ▶ The total capacity of storage in Germany is around 20 bcm spread over 46 storage facilities, about a dozen projects are being built currently (January 2009). Working gas capacity is due to expand by 8.7 bcm till 2016.
- ▶ The existing storage is deemed to keep up the German supply between 30 and 70 days in case of curtailment of gas imports.
- ▶ With the new reserve energy and balancing regime (Gabi Gas), which came into effect in October 2008, storage capacity is no longer needed for the supply of standard customers (standard load profiles are used: allocated as nominated).
- ▶ The Bundesnetzagentur's Monitoring Report (2008) confirmed that under 5% of all capacity storage volumes are used by TSO's to carry out their functions. This means that according to the definition of a storage facility (which excludes the TSO's requirements - §3, No. 31, EnWG), around 95% of all storage capacities should be available to access by network users. But due to the use of long-term import contracts linked with long-term storage capacity bookings, huge volumes of capacity are not available to the market.

Allocation (primary and secondary capacities)

- Storage capacity allocations occur either on a **first-come, first served basis** or an **auction basis**.
- The **predominant time-frame for storage allocation contracts** is 1 to 3 years – it is rather difficult to attain long(er)-term contracts.
- Access to existing storage sites is available but not always easy – the possible lack of access may lead to the fact that **new entrants have very little flexibility available** to them. This is a clear barrier to entry, and without such access the development of liquidity is likely to be damaged.
- Some new entrants have **built their own storage sites** to be able to supply customers or trade effectively in the German market. Such investment activity should be supported and facilitated.
- **New SSOs are not guaranteed connection to a German network** - bilateral discussions are required, in which the TSO is clearly in a much stronger position. See Epe storage connection difficulties to EGT L-Gas network. Transparent OS procedures participated by future/potential SSOs should be organised.
- There is a **lack of an effective secondary capacity management**. The current 'store-x' platform often does not provide regular, economic and/or firm storage capacities - this platform is clearly still in development. However, it also holds a monopoly position (similar to trac-x) and so you are only able to trade capacities using store-x's terms. To be able to solve the congestion of storage capacity due to historical long-term capacity bookings, a use-it-or-lose-it or a well designed use-it-or-sell-it mechanism should be in place. An effective secondary capacity market should certainly be a priority.
- **Storage tariffs vary hugely** across Germany. **A lack of standardisation of products** leads to an inability to benchmark prices.
- Although some SSOs comply with the **GGPSSO, these are still undersubscribed**.