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CEER report on barriers for gas storage product development

**Ref: C16-GST-25-03
28-APR-2017**

INFORMATION PAGE

Abstract

This document presents a review of gas storage product availability in Europe and potential barriers to product development and innovation. It was launched following recent studies which emphasised the importance of product development and innovation for gas storage markets in Europe.

CEER has not identified any pan-European barriers to storage product development. Our findings indicate that where barriers do exist, these primarily relate to specific market conditions and national implementation of European storage regulation. The findings of this report are intended to provide an evidence base to inform this debate and identify recommendations for further work in this area, where necessary.

Target Audience

European Commission, energy suppliers, traders, gas/electricity customers, gas/electricity industry, consumer representative groups, network operators, Member States, academics and other interested parties.

Keywords

Gas storage; Storage System Operators (SSOs); product development; innovation; wholesale markets, regulation; 3rd Package.

If you have any queries relating to this paper please contact:

CEER Secretariat

Tel. +32 (0)2 788 73 30

Email: brussels@ceer.eu

Related Documents

CEER documents

- [CEER Report Monitoring Implementation of the Gas Storage Guidelines of Good Practice and of the GSE Transparency Template](#), CEER, July 2015, Ref: C15-GWG-121-03
- [CEER Final Vision on Regulatory Arrangements for the Gas Storage Market](#), CEER, May 2015, Ref. C15-GWG-119-03
- [Amendment of the Guidelines of Good Practice of Storage System Operators \(GGPSSO\)](#), CEER, July 2011, Ref. C11-GST-15-03

External documents

- [Communication from the Commission on an EU strategy for liquefied natural gas and gas storage](#), February 2016
- [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 2003/54/EC](#)
- [Regulation \(EC\) 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](#)

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EXECUTIVE SUMMARY

Background

Recent CEER stakeholder engagement, the findings in CEER's 2015 *Vision for regulatory arrangements for the gas storage market* and report *monitoring the implementation of the Guidelines of Good Practice for Storage System Operators (GGPSSO) and of the GSE Transparency Template*, and the European Commission's recent storage and LNG strategy have emphasised the importance of European Storage System Operators (SSOs) being able to innovate and develop new products to meet the requirements of market participants and compete on a level playing field with other sources of flexibility. However, CEER does not have a strong evidence base showing where problems exist in relation to innovation and product development.

Objectives and Contents of the Document

This document is intended to provide an evidence base to inform the debate on gas storage in Europe. In particular, it is intended to input to the European Commission's ongoing work in this area and to help NRAs, SSOs and other market participants to review arrangements where market-specific problems are identified.

In this report, we review the types of products that are available from SSOs in different European storage markets. We then build on this information to analyse potential barriers to the development of different products, including regulatory barriers, issues related to market development, and the role of SSOs.

The content of the document is as follows:

- The regulatory framework for Third Party Access (TPA) to Gas Storage
- Product availability from SSOs in different European storage markets
- Market demand for other products or services
- Barriers to innovation and the development of new products
- CEER analysis, conclusions and recommendations for further work

Brief summary of the conclusions

Our review of product availability across Europe provides evidence of some SSOs already proactively responding to changing market demand with innovative products. New products developed include: short term products; storage products delivered at the hub; back-up services; swap products; park-and-loan services and virtual storage. However, there is also evidence of unmet demand for certain new products; availability of different products varies widely across Europe.

Stakeholder engagement has highlighted that the priority is not necessarily to replicate product offerings across Europe but to ensure SSOs are willing and able to discuss products with their customers and develop new products to respond to market demand. SSOs should be dynamic in responding to market demand and the regulatory framework should facilitate this dynamic approach. Market participants also highlighted a need for more information on storage in certain markets.

Based on the results of the survey of SSOs and wider engagement with relevant market participants, CEER has not identified any pan-European barriers to storage product development. Our findings indicate that where in a few cases barriers do exist, these primarily relate to specific market conditions and national implementation of European storage regulation.

Without prejudice to the fundamental principles of third party access, such as transparent and non-discriminatory capacity allocation, CEER considers that SSOs should not be unduly prevented from innovating and developing new products. The regulatory framework for storage should be flexible, transparent and conducive to product development, where appropriate.

Where barriers to product development are identified, they should be addressed on a case-by-case basis between the relevant NRA, SSOs and market participants. SSOs should develop clear proposals to NRAs where they consider product development to be unduly restricted by the regulatory framework.

1 Introduction

In 2015, the Council of European Energy Regulators (CEER) published a vision for regulatory arrangements for the gas storage market (Gas Storage Vision)¹. In the same year, CEER also published a report monitoring the implementation of the Guidelines of Good Practice for Storage System Operators (GGPSSO) and of the GSE Transparency Template². In both reports, CEER emphasised the importance of Storage System Operators (SSOs) being able to innovate and develop new products to meet the requirements of market participants. Additionally, in the vision document CEER also highlighted the importance of regulatory and policy frameworks that facilitate innovation, where appropriate, not stifle it.

These messages were built upon in the European Commission's recent Communication on a strategy for LNG and storage in Europe³. In particular, the strategy states that,

“to allow storage to reach its full potential as a flexible instrument and to ensure efficient use of infrastructure, regulators should allow and encourage storage operators to develop and provide new services that are freely tradable on secondary markets and across borders. Such developments and arrangements should not discriminate between storage users. Competition between operators will ensure that storage providers and their customers can negotiate contractual terms reflecting their needs in the most cost-efficient manner. A strict enforcement of competition rules will ensure that this is indeed the case.”

Our 2015 Gas Storage Vision also advocated a regional approach to gas storage in Europe. We recommended that there should be no restriction on the use of storage across borders and that Member States should cooperate to deliver this. Again, the Commission's LNG and storage strategy built on these messages, arguing that,

“the effective use of storage sites will require Member States to cooperate closely on a regional basis and consult with neighbouring countries... With regard to storage and transmission capacity at interconnection points attribution processes should allow operators to book them simultaneously and an adequate time in advance of their needs; this could contribute for optimising the regional use of storage.”

This recent body of European work highlights the importance of flexibility and innovation in SSO product offerings, including the availability of cross-border products. However, we do not have a strong evidence base showing where problems exist in relation to innovation and product development. Given that storage competes in the wider flexibility market with other sources of flexibility, such as LNG and interconnectors, addressing potential barriers to product development is an important step towards ensuring that storage can compete on a level playing field in the flexibility market. This report aims to fill this evidence gap and provide recommendations for further work in this area, where necessary.

¹ http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Gas/2015/C15-GWG-119-03_CEER%20Vision%20gas%20storage%20market_25_May_2015.pdf

² http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Gas/2015/C15-GWG-121-03_monitoring%20GGPSSO%20and%20TT_21072015.pdf

³ https://ec.europa.eu/energy/sites/ener/files/documents/1_EN_ACT_part1_v10-1.pdf

1.1 Structure of report

This report initially provides a brief background of storage markets in Europe. This background includes a review of the current legislative and regulatory framework for gas storage in Europe and a look at the different access regimes and capacity allocation mechanisms in place across Europe. This provides important context to the more detailed discussion of product availability and barriers to product innovation that follows.

The report then reviews the availability of different types of storage product and product characteristics at storage facilities across Europe. This is followed by analysis of market demand for new products, the process for the development of new products, and the different barriers faced by SSOs seeking to innovate. Finally, in the conclusion we summarise our findings and suggest actions for next steps.

1.2 Process undertaken by CEER

The analysis in this report is based primarily on responses to a CEER questionnaire sent to Gas Storage Europe (GSE) members in December 2015. A small number of non-GSE member SSOs also responded to the questionnaire.

In order to develop this questionnaire, we engaged directly with storage users to ensure we captured the products and product characteristics that were most important to market participants. We also used this engagement to inform our analysis throughout the report.

We received responses from 22 SSOs across Europe. The table below provides a summary of the respondents.

Country	Abbreviation	Company
Austria	AT	Uniper Energy Storage
Belgium	BE	Fluxys Belgium
Bulgaria	BG	Bulgartransgaz
Croatia	HR	PSP OKOLI
Czech Republic	CZ	innogy Gas Storage ⁴
Denmark	DK	Energinet.dk
France	FR	Storengy
France	FR	TIGF
Germany	DE	Astora
Germany	DE	Uniper Energy Storage
Germany	DE	EWE (non-GSE member)
Germany	DE	RWE
Germany	DE	Storengy
Hungary	HU	HGS

⁴ On 1 October 2016, RWE Gas Storage changed its name to innogy Gas Storage.

Italy	IT	Stogit
Netherlands	NL	Energystock
Netherlands	NL	TAQA
Poland	PL	OSM
Portugal	PT	REN
Spain	ES	Enagas
UK	UK	Storengy UK
UK	UK	CSL

Table 1 – SSOs covered by CEER Questionnaire

According to data available on GSE's Aggregated Inventory⁵, the storage facilities covered by responses to this questionnaire represent over 58% of total storage capacity in Europe. The majority of these facilities, however, are located in Western Europe, which is a limitation to the findings of this report.

The CEER Storage Task Force also organised a Workshop⁶ in Brussels to present our preliminary findings and gather additional information from SSOs and other market participants, in particular storage users. The discussion at the Workshop informed the finalisation of our report.

The report aims to clearly distinguish between evidence provided by SSOs or other market participants, and CEER's position. In addition, where the evidence gathered is incomplete, limiting the conclusions that can be drawn, this is noted.

1.3 Customer perspective

CEER believes that functioning wholesale markets can deliver the best outcomes for customers. Gas storage is a key component of European wholesale markets. Promoting flexible and innovative gas storage markets that ensure an efficient use of storage capacity in Europe, including across borders, should ensure that European storage markets are working in the interests of consumers.

⁵ <https://transparency.gie.eu>

⁶ http://www.ceer.eu/portal/page/portal/EER_HOME/EER_WORKSHOP/CEER-ERGEG%20EVENTS/GAS/GST_Workshop_2017

2 The regulatory framework for access to gas storage in Europe

Third Party Access

Given the importance of storage to the EU gas market, the European Commission established mandatory third party access (TPA) to gas storage facilities under the Second Energy Package. These arrangements were reinforced under the Third Package.

The Third Package, in particular Regulation 715/2009/EC on Conditions for Access to the Natural Gas Transmission Networks and Directive 2009/73/EC on Common Rules for the Internal Market in Natural Gas, places legal obligations on storage facility operators to provide, amongst other things, third party access. Third party requirements for SSOs include:

- Make available maximum capacity to market participants
- Non-discriminatory and transparent capacity allocation mechanisms
- Anti-hoarding mechanisms, facilitating secondary trading
- Market consultation for commercial conditions and mix of services
- Offer long and short term, firm and interruptible, bundled and unbundled services
- Transparency (access, available capacity, stocks, inflows and outflows)

Under this European legislation, all storage facilities that are technically and/or economically necessary for providing efficient access to the system must provide TPA. Two forms of third party access are allowed: regulated (rTPA) and negotiated (nTPA). Member states can choose which regulatory regime to apply based on their national circumstances. Member States (or the NRA) must define and publish the criteria according to which the access regime for storage facilities is chosen⁷. In addition, major new gas storage facilities can request exemptions from TPA under the Third Package on the grounds that (amongst other requirements) without it the facility is unlikely to be built. Table 2 below shows the access regime in place for the SSOs covered by our questionnaire.

Access Regime	Number of SSOs	SSOs
Negotiated TPA	13	Uniper Energy Storage (AT); innogy Gas Storage (CZ); Energinet.dk (DK); Storengy (FR); TIGF (FR); Astora (DE); Uniper Energy Storage (DE); EWE (DE); RWE (DE); Storengy (DE); Energystock (NL); TAQA (NL); CSL (UK).
Regulated TPA	8	Fluxys Belgium (BE); Bulgartransgaz (BL); PSP OKOLI (HR); HGS (HU); Stogit (IT); OSM (PL); REN (PT); Enagas (ES)
Exempt	1	Storengy (UK)

Table 2 – Access regimes

⁷ In 2012, CEER published a report on *Implementation of article 33 and article 41 of Directive 2009/72/EC*. This report explains the criteria used in different countries when choosing the access regimes and reasons for choosing a rTPA or nTPA regime:

http://www.ceer.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Gas/Tab1/C12-GWG-85-03_Monitoring_Report_Arts_%2033-41_09Jul2012_final.pdf

The majority of SSOs covered operate under nTPA. Under this regime, the owner of the facility usually sets access charges and products offered freely in consultation with users. NRAs or the competent authority maintain oversight and monitor the access terms offered by the SSO. SSOs must publish their main commercial conditions and consult system users on the development of these conditions.

Eight SSOs operate under rTPA. Under this regime, the NRA or competent authority sets the conditions for access to the storage facility. The NRA or competent authority defines and publishes criteria according to which the access regime applicable to storage facilities is determined. Storage users must be consulted in this process. It is important to note, however, that there is significant variation between Member States in the detailed implementation of these regimes.

Capacity allocation mechanisms

Capacity allocation mechanisms determine the way in which storage users purchase access to a particular storage facility. The third energy package does not prescribe the allocation mechanism to be used. Auctions and negotiations/first-come-first-served (FCFS) are the most common allocation mechanisms according to the results of our survey. Other mechanisms include merit-order and pro-rata allocation of capacity. As noted in our 2015 GGPSSO/TT monitoring report, CEER recommends the use of auctions as the preferred, market-based allocation mechanism unless particular circumstances necessitate the use of an alternative mechanism. In negotiated TPA regimes, transparent and non-discriminatory allocation mechanisms in line with the 3rd Package are particularly important.

Other restrictions

The 3rd Package also places restrictions on certain other activities. SSOs are not allowed to produce gas in an EEA state, or supply, transport or sell gas except to the extent that the activity is necessary for the efficient operation of the storage facility or of another facility used by the owner to store gas.

3 Storage products and product delivery

In this section, we analyse the availability of different storage products across Europe and the different forms of delivery of storage products.

3.1 Standard bundled products

The most common storage product in Europe is a Standard Bundled Unit (SBU). Under the Third Package, SSOs are legally obliged to provide bundled products.

An SBU comprises a ratio of injection, space and withdrawal capacity. This ratio varies according to the storage facility in question and is usually determined by the technical characteristics of the facility. All SSOs covered by the questionnaire offer SBUs.

3.2 Storage products delivered at the hub

Traditionally, gas injected/withdrawn from a storage facility is delivered at the entry/exit point from the storage facility to the transmission network. As such, storage customers are responsible for booking the necessary transmission capacity to use the injection/withdrawal rights associated with an SBU.

With the development of trading hubs or Virtual Trading Points (VTPs), some SSOs have developed storage products with delivery of gas at the trading hub. In these cases, the SSO is responsible for booking transmission capacity which is incorporated into the price of the storage product. The storage user's nominated gas is delivered at the VTP with no need to purchase separate transmission capacity to/from the facility. This may offer benefits to storage users, in particular smaller market participants, by reducing potential complexity.

10 out of the 22 SSOs surveyed offer storage products delivered at VTPs⁸. Some SSOs identified barriers to the provision of these products, which included the cost of transmission tariffs, the maturity of trading hubs and restrictions on SSOs booking transmission capacity. These barriers are discussed in more detail in section 5.

3.2.1 Back-up services

In addition to storage products delivered at the trading hub, some SSOs offer a "back-up service". A back-up service guarantees delivery of a user's injection or withdrawal capacity, irrespective of technical problems (e.g. equipment failure) that may otherwise force cancellation. In order to provide this service, SSOs can either pool storage facilities together (see 3.2.2. for more explanation) or trade in the market to deliver gas to the customer when the facility is unable to meet the commercial flow of gas.

Three of the SSOs that responded to the questionnaire indicated that they provide a back-up service: Uniper Energy Storage (DE), CSL (UK) and TAQA (NL). Restrictions on SSOs trading gas were identified by some SSOs as a barrier to the provision of these products.

⁸ Uniper Energy Storage (AT); Fluxys (Belgium); Storengy (FR); Storengy (DE); Energystock (NL); TAQA (NL); OSM (PL); Enagas (ES); Storengy (UK); CSL (UK)

3.2.2 Pooled storage

Pooled storage refers to a combination of different physical storage facilities that are treated commercially as a single facility. Pooled storage offers benefits to SSOs by amalgamating the physical capability of different facilities to offer products to market participants. This provides increased flexibility to manage variations between commercial obligations and the physical capability of storage facilities. For example, technical problems at one facility can be offset by utilising capacity at other facilities. Products based on pooled storage facilities are often delivered at the trading hub. Eight SSOs surveyed operate pooled storage facilities: innogy Gas Storage (CZ); Energinet.dk (DK); Storengy (FR); EWE (DE); Enagas (ES); HGS (HU); Stogit (IT); OSM (PL).

3.2.3 Virtual storage

Even where a back-up service is provided, which may require SSOs trading in the market to fulfil contractual obligations where there is a technical problem at the facility, storage products offered by SSOs are primarily physically-backed and reflect the physical capability of a facility or a group of facilities (pooled storage). However, other market participants can also offer “virtual storage products”. Virtual storage products are contracts which imitate the characteristics of a storage contract (i.e. injection, space and withdrawal) but are not necessarily physically backed by gas in storage. Virtual storage products can be supported by a combination of contracts including gas production, physical storage and supply contracts.

Although in most cases SSOs’ storage products are asset backed, some SSOs also offer virtual products (storage products that do not reflect the physical operation of a particular facility). Five respondents indicated that they offer a form of virtual storage product: Bulgartransgaz (BG); PSP OKOLI (HR); Storengy (DE); Storengy (UK); CSL (UK). Bulgartransgaz (BG) and PSP OKOLI (HR) offer virtual products whereby virtual injection is offered in a period of withdrawal, and vice versa. A couple of SSOs cited restrictions on SSOs buying or selling gas for the purpose of providing virtual storage products as a barrier to developing virtual products. This is sometimes cited as a barrier to competition with other market participants who offer products at virtual trading points. These issues are discussed in more detail in section 5.

3.2.4 Cross-border products

Cross-border storage products refer to storage products that are specifically targeted at providing storage services to market participants in a different market area. This may include, for example, the delivery at a trading hub by a storage facility that is not physically located in the relevant market area.

Six SSOs indicated that they offer cross-border storage products: Uniper Energy Storage (AT); Astora (DE); Uniper Energy Storage (DE); EWE (DE); RWE (DE); and Storengy (DE). A number of SSOs cited transmission tariffs as a barrier to the provision of cross-border products. One SSO stated that added complexity associated with different regulatory regimes on either side of an interconnection point (IP) is a barrier to cross-border products. Other SSOs noted that high transmission tariffs diminish the attractiveness of such products. These issues are discussed in more detail in the section on barriers to product development below.

4 Product Characteristics

4.1 Unbundled products

Unbundled products refer to the ability to purchase separate injection, space or withdrawal capacity. Under the Third Package, SSOs are legally obliged to provide unbundled injection, space and withdrawal.

Our questionnaire results indicate that most SSOs do offer unbundled products - only Bulgartransgaz (BL) and Enagas (ES) do not meet this legal obligation. However, the conditions under which unbundled products are available vary considerably. Unbundled products are often dependent on available capacities and are obtainable at a shorter booking time horizon and for shorter product durations than SBUs. This can add important flexibility to the ability of market participants to access storage products; a number of SSOs pointed to the availability of unbundled products as a means to creating a custom bundle.

4.2 Firm/Interruptible products

Typically, storage products in Europe are sold as “firm” products. This means that, except in exceptional circumstances, the storage user is guaranteed delivery. However, according to the third package, products must also be sold as “interruptible”. Interruptible capacity means capacity (which could be space, injection or withdrawal) that may be interrupted by the SSO in accordance with conditions stipulated in the storage contract. This is usually for a limited number of days in a specific period. The price of interruptible capacity should reflect the probability of interruption⁹. Interruptible storage products can provide added flexibility to a storage user’s portfolio and are available from 17 of the SSOs covered in the questionnaire. Five SSOs do not meet the requirement to offer interruptible services: Storengy (FR); TIGF (FR); Energystock (NL); REN (PT); and Enagas (ES).

4.3 Transfer rights (secondary trading of capacity and/or gas in tank)

Secondary trading markets are an important aspect of the European storage market. Under the Third Package, SSOs must prevent hoarding of capacity and facilitate the secondary trading of contracted capacity. Apart from Energystock (NL), all SSOs responded that they allow for the transfer of storage capacities through a secondary market. However, the degree of flexibility provided by SSOs for secondary trading varied considerably. Many SSOs allow secondary trading of bundled units, unbundled components and gas in store. In other cases, restrictions included: unbundled components not tradable on secondary markets; only products with duration of one month or more tradable on secondary markets. CEER recommends that maximum flexibility be provided for the secondary trading of storage products.

⁹ Article 15 (2) of Regulation No. 715/2009 on TPA for storage and LNG facilities states that all storage facilities should provide both firm and interruptible third-party access services; the price of interruptible capacity shall reflect the probability of interruption.

4.4 Product duration

In terms of product duration, the most common form of SBU is yearly or seasonal. Only a limited number of SSOs offer SBUs with shorter product duration. In some countries, short-term products are not currently allowed for in the regulation. It was also noted, however, that there is no market demand for SBUs with shorter product durations in certain markets.

4.5 Pricing methodologies

Pricing methodologies is an important area where there has been innovation from SSOs. An example of innovation is in new pricing models and the development of index-based prices. There has been a growth in storage operators offering pricing structures which are formula based and 100% market orientated.

10 SSOs offer both fixed and indexed prices: Uniper Energy Storage (AT); innogy Gas Storage (CZ); Energinet.dk (DK); Storengy (FR); Uniper Energy Storage (DE); EWE (DE); RWE (DE); Storengy (DE); TAQA (NL); Storengy (UK); CSL (UK).

A common form of indexed prices is for the price of storage capacity to be linked to the summer-winter spread. Given the seasonal nature of many storage facilities in Europe, the summer-winter spread is the main driver of value for SSOs. Prices indexed to the spread allow for risk to be shared between user and operator (low spread = lower price, high spread = higher price).

From the results of our survey, we observe that indexed prices are more prevalent in markets with negotiated TPA.

4.6 Alternative/customised bundled units

As stated in the introductory section, our previous stakeholder engagement has highlighted a trend of market participants increasingly demanding alternative or customised storage products. Our questionnaire asked SSOs if they offered alternative or customised configurations of bundled capacity (injection, space and withdrawal).

Thirteen SSOs responded that they offered alternative or customised bundled products¹⁰. There is significant variation, however, in the definition of alternative/customised products. In the Netherlands, for example, Energystock responded that all elements of their SBUs can be customised. In the Czech Republic, innogy Gas Storage offers many different types of bundles with different ratios for injection, space and withdrawal. CSL and Storengy in the UK both offer a variety of products. Other respondents noted that storage customers can create customised products by purchasing a combination of products or by purchasing additional unbundled capacity.

One SSO highlighted a tension between transparency requirements and customisation. A few SSOs noted that the process for developing new products or amending standard contracts is protracted and can act as a barrier to the development of products which reflect immediate market demand.

¹⁰ Uniper Energy Storage; innogy Gas Storage (CZ); Energinet.dk (DK); TIGF (FR); Storengy (FR); EWE (DE); RWE (DE); Storengy (DE); HGS (HU); Energystock (NL); OSM (PL); Storengy (UK); CSL (UK); TAQA (NL).

5 Market demand and barriers to product development

5.1 Demand for other products/services

SSOs were asked if they offered additional products or services to those covered in our questionnaire. The majority of respondents did not offer any additional products or services. A limited number of SSOs specified some products which included: swap products; park and loan services; gas-in-store products and specific trading services.

Our review of product availability across Europe provides evidence of some SSOs already proactively responding with innovative products. However, availability of different products varies widely across Europe. At the Workshop, it was noted that transparency is a problem in certain markets and more information is needed on storage products in Eastern European markets.

We also asked SSOs if there were additional products or services to those currently available that they would like to offer. In response, SSOs identified a number of additional products that they would like to offer or are developing. These included: products with a flat storage curve; storage products delivered at the hub; back-up services; use of gas in store as collateral for securitisation; short-term products; fast-cycle products; interruptible products; cross-border products; virtual storage; indexed pricing methodologies; firm unbundled products; park and loan services; individualised injection and withdrawal curves (e.g. injection and withdrawal curves based on customer inventory rather than total reservoir stocks). These products show evidence of demand for enhanced flexibility and a general tendency towards more customised products in certain markets.

At the Workshop, a key message from storage users was that storage markets vary across Europe, and subsequently the requirements of storage users in Europe are not homogenous. The role of storage changes as markets mature. Storage users noted that the priority was not necessarily to replicate product offerings across Europe but to ensure SSOs are willing and able to discuss products with their customers and develop new products to respond to market demand. Storage users argued that SSOs should be dynamic in responding to market demand and the regulatory framework should facilitate this dynamic approach.

CEER considers that SSOs should not be unduly prevented from innovating and developing new products. However, it is important to emphasise the importance of non-discrimination and transparent third party access arrangements. In some markets, depending on the level of competition and the ownership structure of the gas industry (e.g. SSO unbundling arrangements), there is a risk that innovation and complex product offerings could result in discrimination between storage users and a lessening of competition in the market.

5.2 Barriers to product development

A key focus of this report is the identification of barriers to storage product development. This section summarises the main barriers identified by SSOs through our questionnaire and wider stakeholder engagement.

5.2.1 Technical limitations

The **technical characteristics** of particular storage facilities were cited by a number of SSOs as a key driver behind the specific products and services that had been developed and, in some cases, a barrier to the development of new or innovative products. Other than for virtual products, storage products are asset-backed and therefore must reflect the physical capabilities of a particular storage facility or facilities. In some cases this poses a significant, though appropriate, limitation on the ability of storage operators to offer new products. For example, despite market demand for fast-cycle storage products, some SSOs may be unable to provide such products asset-backed because of the physical capability of their storage facilities.

Some specific technical issues were also raised by a few SSOs. For example, one SSO noted that gas quality issues between L-Gas markets in the Netherlands and Germany are a barrier to the cross-border use of storage in this region.

CEER acknowledges the role of technical limitations in determining the asset-backed products SSOs can offer. There is no evidence that this is an undue barrier to product storage product development in Europe.

5.2.2 Transmission tariffs and access to the network

Many SSOs stated that high transmission tariffs impacted negatively on the attractiveness of storage products. Some SSOs argued that transmission tariffs are too high, which reduces the competitiveness of storage products delivered at VTPs compared with other products offered at hubs. A few others noted that high transmission tariffs across borders were a barrier to developing attractive cross-border storage products.

In terms of access to transmission capacity, some SSOs cited restrictions on access as a barrier to product development. One SSO stated that the regulatory framework for transmission capacity was unpredictable. Another SSO argued that there was insufficient transmission capacity both within market areas and across borders. One of these SSOs noted a particular issue whereby unsold capacity at a specific interconnection point is not available for storage purposes (e.g. to provide a bundle with storage capacity on a day-ahead or intraday basis), which it said presented a barrier to market development. Other issues raised included the availability of intraday capacity for the provision of shorter-term products.

Transmission tariffs and access to cross-border capacity have been reviewed in the recent Tariffs (TAR) and Capacity Allocation Mechanisms (CAM) Network Codes. Member States voted to approve the Tariffs Network Code on 30 September 2016. It is expected to enter into force in April 2017. Member States also voted to approve CAM NC amendments on 13 October 2016. Implementation of the Tariffs Network Code will provide for more harmonised transmission tariffs across Member States. CAM NC should ensure efficient cross-border transmission tariffs.

Within the framework of these Network Codes, CEER considers that transmission tariffs for storage should consider to the greatest possible extent the benefits and costs that storage facilities provide to the overall system. SSOs should not be unduly restricted from accessing the transmission network.

5.2.3 Prohibition of certain activities

Restrictions on the ability of SSOs to book transmission capacity were highlighted by a few SSOs as a barrier to the development of bundled storage and transmission products/storage products delivered at the hub. In some cases, the legislative/regulatory framework does not allow SSOs to book transmission capacity. One noted that SSOs could only book capacity for the sale of gas that is not withdrawn at the end of a storage contract.

A number of SSOs also noted that not being allowed to trade gas for the purposes of providing storage products is a barrier to innovation, in particular for delivery at the hub, back-up services and virtual products.

In some Member States, the legal framework completely prohibits SSOs from trading gas and therefore providing these types of products. One SSO requested clearer guidance from NRAs to provide legal assurance for further product development, in particular with regards to services such as delivery at the hub and back-up services.

Some participants at the Workshop noted that restrictions on SSOs' trading activities may limit their ability to compete with other market participants offering virtual storage products.

Under the 3rd Package, SSOs are not allowed to produce gas in an European Economic Area (EEA) state, or supply, transport or sell gas except to the extent that the activity is necessary for the efficient operation of the storage facility or of another facility used by the owner to store gas. It is evident that this legislation has been interpreted and implemented in different ways by Member States and NRAs in Europe, which is influencing the ability of SSOs to develop certain types of storage products.

Where there is demand for such products (e.g. virtual products), CEER recommends that SSOs are not unduly restricted from trading gas or booking transmission capacity for the explicit purpose of providing storage products. In order to allow flexibility in product development, competent authorities and NRAs should carefully consider, on a case-by-case basis, the connection between SSOs trading activities/access to transmission capacity and the efficient operation of the storage facility, which may include the provision of different storage products. Additional guidance on interpretation from NRAs or competent authorities may be beneficial. SSOs should develop clear proposals for new products which evaluate the costs and benefits of SSOs trading gas/booking transmission capacity, set out risk mitigating actions and provide an explanation why they consider these activities to be necessary for the efficient operation of the facility.

5.2.4 Regulatory framework for product development

Under the 3rd Package, gas storage facilities must provide third party access. Member States can choose whether the default access regime is regulated or negotiated. These access regimes are in place to ensure fair access to European storage facilities on transparent and non-discriminatory terms.

Access regime

We did not receive robust evidence from the questionnaire on the impact of regime choice (negotiated or regulated) on storage product development and innovation. At the Workshop, one storage user argued that nTPA regimes are generally performing better than rTPA as markets become more dynamic and SSOs need to respond to changing demand. It was noted that a prescriptive regulatory framework could constrain the timely development of new products and competent authorities should review relevant competition tests to ensure the regulatory regime is fit for purpose in the context of market development. Another participant felt that CEER should not comment on the choice of TPA regime as these are decisions taken by policy makers in the interest of social welfare.

Some participants highlighted a risk that “over-regulation” can stifle necessary innovation, especially in the case of mature markets which are highly competitive. They noted that storage regulation in itself is not a problem, but SSOs must be given room to innovate and develop new products.

Product development process

A number of SSOs noted that the process for developing new products or amending current access arrangements (e.g. tariffs/tariff methodologies, contracts, auction parameters) limits their ability to respond quickly to changing market demand. However, there was limited concrete evidence provided on specific examples of NRA approval preventing the development of a product.

Time to introduce changes was highlighted as an important factor for product development. This applies to both NRA approval and requirements to consult. In regulated TPA regimes, NRAs must approve changes to storage products and tariffs are usually set at constant intervals (often annual). One SSO argued that the NRA approval process was unnecessarily detailed.

In both regulated and negotiated regimes, SSOs (or the NRA) must consult the market on changes to the commercial conditions and mix of services (including the development of new products). The duration of a formal consultation process varies according to the market in question and the specific products being developed. SSOs reported the use of a wide range of consultation tools to engage stakeholders on the development of new products. These included formal consultation, regular industry events, workshops and frequent one-to-one discussion with customers.

A few SSOs noted that the required consultation process can be a barrier to developing products quickly in response to changing market demand. Often the consultation must be for a minimum period (e.g. one month) and then contractual changes cannot take effect until a minimum amount of time after they have been published.

CEER considers that market consultation is needed to ensure that stakeholders’ views are considered in the development of storage products. Where possible, though, a balance should be struck between stakeholders being able to input to a formal process and SSOs having the ability to respond quickly to market demand and customer requests.

Transparency and non-discrimination

One SSO also noted a conflict between transparency and product customisation. They noted that individual customer requests for products must be published and offered to third parties, which may conflict with a customer's desire for confidentiality with regards to their individual flexibility needs. This raises an important issue with regard to individualised storage products; it is important that customisation of storage products does not undermine the fundamental principles of transparency and non-discrimination. A possible solution to this could be the anonymised publication of customised access terms.

CEER considers that TPA requirements for storage facilities are in place for good reason and to deliver positive outcomes. CEER understands the importance of SSOs being able to respond quickly to market demand. However, enhanced flexibility must not undermine the fundamental principles of non-discrimination and transparency. Market consultation is needed to ensure that stakeholders' views are considered in the development of storage products. It is important that implementation is proportionate and strikes an appropriate balance between SSO flexibility and required regulatory oversight. This may include, for example, considering shorter consultation periods or alternative forms of market engagement.

5.2.5 Storage obligations

Storage obligations are in place in some markets, usually for security of supply reasons. Storage obligations place an obligation on market participants to procure storage based on their customers or portfolios and ensure that a certain level of gas is in store at a specified time. Such obligations place additional restrictions on the sales process for storage capacity, which may reduce the scope for product development. Some stakeholders (user groups) have indicated that the presence of such obligations acts as a barrier to storage product development and restricts users' ability to manage their portfolios and optimise the use of storage. Storage users at the Workshop argued that all storage capacity should be offered on a commercial basis by SSOs. Other participants argued that storage obligations are important for ensuring security of supply and that the market will only deliver security of supply up to a certain point. One SSO noted in response to our questionnaire that storage obligations in other countries distort the storage market.

As noted in the CEER Storage Vision, the use of storage obligations should be restricted to situations where there is clear market failure and the impact on the market should be understood and minimised.

6 Conclusions

Recent European studies on storage have noted that as market conditions have evolved, there is a trend towards market participants demanding more flexible, customised and short-term products. These studies have also emphasised the importance of European SSOs being able to innovate and develop new products to meet the requirements of market participants and compete on a level playing field with other sources of flexibility.

Our review of product availability across Europe provides evidence of some SSOs already proactively responding with innovative products. New products developed include: short term products; storage products delivered at the hub; back-up services; swap products; park-and-loan services and virtual storage. However, availability of different products varies widely across Europe depending on market maturity, the detailed regulatory framework and the role of storage in the market.

Stakeholder engagement has highlighted that the priority is not necessarily to replicate product offerings across Europe but to ensure SSOs are willing and able to discuss products with their customers and develop new products to respond to market demand. SSOs should be dynamic in responding to market demand and the regulatory framework should facilitate this dynamic approach. Market participants also highlighted a need for more information on storage in Eastern European markets.

Based on the results of the survey of SSOs and wider engagement with relevant market participants, CEER has not identified any pan-European barriers to storage product development. Where in a few cases barriers were identified, these primarily relate to specific market conditions and national implementation of European storage regulation.

This report has identified the following categories of potential barriers to storage product development and associated recommendations:

- **Technical limitations**
 - Storage is primarily an asset-backed flexibility source. Other than for virtual products, storage products tend to be asset-backed and therefore must reflect the physical capabilities of a particular storage facility or facilities.
 - CEER acknowledges the role of technical limitations in determining the asset-backed products SSOs can offer. There is no evidence that this is an undue barrier to product storage product development in Europe.

- **Transmission tariffs and access to the network**
 - A number of SSOs cited high transmission tariffs and access to the transmission network as barriers to product development, including cross-border products.
 - Within the framework of these Network Codes, CEER considers that transmission tariffs for storage should consider to the greatest possible extent reflect the benefits and costs that storage facilities provide to the overall system. SSOs should not be unduly restricted from accessing the transmission network.

- **Prohibition of certain activities**
 - In some markets, restrictions on the ability of SSOs to book transmission capacity and trade gas for the purpose of providing storage products hinders new product development and innovation.
 - Where there is demand for such products (e.g. virtual products), CEER recommends that SSOs are not unduly restricted from trading gas or

booking transmission capacity for the explicit purpose of providing storage products.

- In line with the requirements of the Third Package, SSOs can only supply, transport or sell gas if the activity is necessary for the efficient operation of the storage facility. In order to allow flexibility in product development, competent authorities and NRAs should carefully consider, on a case-by-case basis, the connection between SSOs trading activities/access to transmission capacity and the efficient operation of the storage facility, which may include the provision of different storage products. This should not result in SSOs trading or transporting gas for any other purpose.
 - The provision of additional guidance on interpretation from NRAs or competent authorities may be beneficial in this area. SSOs should develop clear proposals for new products which evaluate the costs and benefits of SSOs trading gas/booking transmission capacity, set out risk mitigating actions and provide an explanation why they consider these activities to be necessary for the efficient operation of the facility.
- **Regulatory framework**
 - The regulatory framework and in particular time to introduce changes to products to meet demand was highlighted as an important factor for product development. Particular examples focused on the consultation and regulatory approval process for new products in specific markets. CEER notes however that there was limited concrete evidence provided on specific examples of NRA approval preventing the development of a product.
 - CEER considers that TPA requirements for storage facilities are in place for good reason and to deliver positive outcomes. CEER understands the importance of SSOs being able to respond quickly to market demand. However, enhanced flexibility must not undermine the fundamental principles of non-discrimination and transparency. Market consultation is needed to ensure that stakeholders' views are considered in the development of storage products. It is important that implementation of TPA is proportionate and strikes an appropriate balance between SSO flexibility and required regulatory oversight.
 - **Storage obligations**
 - Some stakeholders have indicated that the presence of storage obligations acts as a barrier to storage product development and restricts users' ability to manage their portfolios and optimise the use of storage.
 - As noted in the CEER Storage Vision, the use of storage obligations should be restricted to situations where there is clear market failure and the impact on the market should be understood and minimised.

Overall, the detailed implementation of the TPA regulatory framework for gas storage varies across Europe, which affects the ability of SSOs to develop storage products. Markets across Europe are also at different stages of development and this influences the need and demand for more advanced products. Products should be compatible with the wider market including spot markets, trading hubs, and transmission networks. Product offerings should also be flexible and capable of adapting to evolving market circumstances. Without prejudice to the fundamental principles of third party access, such as transparent and non-discriminatory capacity allocation mechanisms, SSOs should not be unduly prevented from innovating and developing new products. The regulatory framework for storage should be flexible, transparent and conducive to product development, where appropriate.

Based on the findings of this report, evidence of barriers to storage product development are primarily in relation to market specific issues and national implementation of European legislation. Therefore, barriers to product development should be addressed on a case-by-case basis between the relevant NRA, SSOs and market participants. SSOs should develop clear proposals to NRAs where they consider product development to be unduly restricted by the regulatory framework.

Annex 1 – List of abbreviations

Term	Definition
CAM NC	Capacity Allocation Mechanisms Network Code
CEER	Council of European Energy Regulators
EEA	European Economic Area
GGP	Guidelines of Good Practice
GSE	Gas Storage Europe
LNG	Liquefied Natural Gas
NRA	National Regulatory Authority
nTPA	Negotiated Third Party Access
rTPA	Regulated Third Party Access
SBU	Standard Bundled Unit
SSO	Storage System Operator
TAR NC	Tariffs Network Code
TPA	Third Party Access
VTP	Virtual Trading Point

Annex 2 – About CEER

The Council of European Energy Regulators (CEER) is the voice of Europe's national regulators of electricity and gas at EU and international level. CEER's members and observers (from 33 European countries) are the statutory bodies responsible for energy regulation at national level.

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

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

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

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

More information at www.ceer.eu.