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SSEHL's application for a minor facilities exemption for Hornsea

Consultation

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Overview:

In GB, the default access arrangement for gas storage is to offer open access to third parties on a negotiated basis (nTPA). This defines the terms under which gas storage operators must sell capacity. Under the Gas Act 1986, storage operators can apply to us for an exemption from these requirements. We can grant a minor facility exemption (MFE) if we are satisfied that nTPA at the facility is not technically or economically necessary for the operation of an efficient gas market.

SSEHL currently owns the Hornsea gas storage facility in East Yorkshire. This facility was developed by British Gas and came into operation in 1979. It has been owned by SSEHL and operated without an MFE since September 2002 when it was purchased from Dynegy Hornsea Ltd. SSEHL has now applied for an MFE for the Hornsea gas storage facility. We have assessed whether an MFE should be granted using a range of tests.

This consultation sets out our initial view not to grant the MFE and summarises the analysis that has led us to this view. We are consulting this initial view and welcome feedback from any interested parties.

Context

SSE Hornsea Limited (SSEHL – a subsidiary of SSE) currently owns and operates the Hornsea gas storage facility in East Yorkshire. This facility was developed by British Gas and came into operation in 1979. It has been owned by SSEHL and operated without an MFE since September 2002 when it was purchased from Dynegy Hornsea Ltd. SSEHL has now applied for an MFE for the Hornsea gas storage facility.

Hornsea has storage capacity of 300 mcm, deliverability of 18 mcm/d and injectability of 2 mcm/d.

Our approach is that negotiated Third Party Access (nTPA) should apply unless we are confident that it is appropriate to grant an exemption. To date, we have granted MFEs to 7 of the 10 existing GB storage facilities and to 2 other sites that are not yet under construction. Rough and Hornsea are the only two facilities currently required to offer nTPA. SSEHL also owns 2/3 of the Aldbrough storage facility – which has an MFE.

Associated documents

SSE – Application for an Exemption (13 February 2015)
https://www.ofgem.gov.uk/ofgem-publications/93643/hornseaexemptionapplicationfinalpublic.pdf

Gas Storage Minor Facility Exemptions Open Letter (16 June 2009):
https://www.ofgem.gov.uk/publications-and-updates/gas-storage-minor-facility-exemptions-open-letter

Guidance on the regulatory regime for gas storage (December 2011):
https://www.ofgem.gov.uk/ofgem-publications/40419/guidance-regulatory-regime-gas-storage-facilities-gb.pdf

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Executive Summary

SSE Hornsea Ltd (SSEHL) (a subsidiary of SSE) has applied for a minor facility exemption (MFE) for its Hornsea gas storage facility. This exemption would remove the requirement that currently applies for Hornsea to offer open access to third parties on a negotiated basis (nTPA). We have assessed whether the application for Hornsea meets the requirements to be granted an MFE. On the basis of this assessment we are minded to reject this application, and are consulting on this initial view. This document sets out the analysis we have carried out in reaching this position, and invites views on our assessment.

Third party access and minor facility exemptions

We may only grant an MFE if we are satisfied that nTPA at the facility isn't technically or economically necessary for the operation of an efficient gas market. In June 2009, we set out the basis for our approach in an open letter.[1]

We assess economic necessity by considering whether the exemption has the potential to adversely affect competition in the gas market. We look at various indicators of market power to determine the potential impact an exemption would have on competition. We also look at the likely effect on market signals and the economic use of storage capacity. Our approach when analysing these tests is to consider access to be economically necessary if any of these tests raised significant concerns. We determine technical necessity by looking at the availability of gas supply capacity to meet peak demand.

Our assessment

Economically necessary

We consider that nTPA at Hornsea is economically necessary. We've reached this conclusion after considering a range of indicators. We consider whether any of these indicators suggest that granting the MFE could give SSE market power or distort the market. We focus this analysis on SSE as a group.

We use gas flexibility in GB as the relevant market. This is because the main service provided by gas storage is the ability for shippers to vary supply levels in response to changes in prices or demand. Other sources of supply can also provide flexibility, so we do not limit our focus to the storage market. This is consistent with our approach to previous MFEs and the Competition Commission's[2] work on the Rough undertakings.

To assess which supply sources are substitutes for gas storage, we have analysed responsiveness to changes in price and demand. We specify three possible market definitions to account for different future scenarios. These scenarios are consistent with

[1] https://www.ofgem.gov.uk/publications-and-updates/gas-storage-minor-facility-exemptions-open-letter

[2] The Competition Commission closed on 1 April 2014. Its functions have transferred to the Competition and Markets Authority.

those used for the Stublach phase II MFE decision of June 2014[3]. We consider whether granting an MFE could lead to increased potential for market power by looking at market shares, market concentration, pivotality and vertical effects. Of these tests, our analysis of market shares raises significant concerns.

We calculate market shares under the definitions of the gas flexibility market outlined above. These market shares are significantly above ten per cent in most cases. This indicates there is potential for SSE to hold a degree of market power in the gas flexibility market if we granted the MFE. Our analysis does not indicate a dominant position. However, it does suggest a significant increase in the share of the flexibility market that SSE would hold without any of the safeguards that nTPA provides. We have concerns that this potential for market power creates risks that SSE could distort the flexibility market.

On the basis of the concerns raised by our market share analysis, our conclusion is that access to Hornsea is economically necessary.

Technically necessary

We have assessed whether nTPA at Hornsea is technically necessary for a peak day and a cold winter. For both a peak day and cold winter in all years assessed, the headroom between supply and demand is significantly greater than the maximum deliverability of Hornsea. As a result, we conclude that nTPA at Hornsea is not technically necessary. This is in line with expectations, given the diverse nature of GB supplies. The availability of domestic sources, interconnector flows, storage and LNG means we are resilient to all but the most extreme circumstances.

Next steps

We think access to Hornsea is economically necessary for the operation of an efficient gas market. Therefore we are minded not to grant SSEHL an MFE for Hornsea, subject to responses to this consultation. We are consulting on our initial view to reject the MFE application. We welcome views on this minded-to position and our analysis. This consultation closes on 24 April 2015. After considering responses to our consultation, we expect to issue our final decision on the exemption application in spring 2015.

[3] https://www.ofgem.gov.uk/publications-and-updates/final-decision-%E2%80%93-storengy-uk-ltds-application-minor-facilities-exemption-stublach-gas-storage-phase-2

1. Introduction

1.1. In this section, we introduce the existing storage regulatory regime and outline our approach and position in relation to SSEHL's MFE application. In sections 2 and 3 we assess whether access to Hornsea can be considered economically or technically necessary using a range as tests. Section 4 presents our conclusions.

GB storage regulatory regime

1.2. Access arrangements for gas storage facilities are set out in the EU Third Internal Energy Market Package (Third Package), which for the purposes of this document means the Gas Directive[4] and the Gas Regulation[5]. This requires member states to choose either negotiated third party access (nTPA) or regulated third party access (rTPA) for access to storage facilities. In GB the default regime is nTPA, as set out in the Gas Act 1986 (Gas Act). This means that arrangements must enable storage users to negotiate access to storage when technically or economically necessary for efficient access to the system. In 2011, we published guidance describing our views on the measures that storage operators should consider in meeting the nTPA requirements of the Third Package.[6]

1.3. We must apply domestic legislation to achieve the results envisaged by the relevant European legislation. When assessing an exemption application under section 8S of the Gas Act, we consider, as set out in Article 33 of the Gas Directive, whether nTPA is technically or economically necessary to provide efficient access to the system for the supply of customers as well as for the organisation of access to ancillary services. A storage operator will not have to offer nTPA at a facility where access is not technically or economically necessary for the operation of an efficient gas market.

Open letter on MFEs

1.4. On 16 June 2009, we published an open letter on gas storage MFEs. Our open letter set out the criteria we would generally expect to use when considering applications for MFEs.

1.5. To date, we have granted exemptions to 7 of the 10 existing GB storage facilities and to 2 other sites that are not yet under construction. Rough and Hornsea are the

[4] 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 ("Gas Directive").
[5] 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 ("Gas Regulation").
[6] https://www.ofgem.gov.uk/publications-and-updates/guidance-regulatory-regime-gas-storage-facilities-great-britain

only two facilities currently required to offer nTPA. SSEHL also owns 2/3 of the Aldbrough storage facility – which has an MFE.

Hornsea gas storage

The facility

1.6. SSE Hornsea Limited, a wholly-owned subsidiary of SSE, is the owner and operator of the Hornsea gas storage facility in East Yorkshire. Hornsea provides 3300 GWh of capacity with 198 GWh/d deliverability and 20 GWh/d injectability.

Our approach to assessing the application

1.7. To determine whether an MFE should be granted, we assess whether nTPA at the facility is economically or technically necessary. The basis for our assessment approach is our 2009 open letter. We use a range of indicators to reach our conclusion.

1.8. We assess economic necessity by considering whether the exemption would adversely affect competition or distort the market, and provide a materially worse outcome than if the exemption is not granted. We look at various indicators of market power to determine the potential impact an exemption would have on competition. We also look at the likely impact on market signals and the economic use of storage capacity. Since we published our 2009 open letter, we have developed a pivotality model. We published this model alongside our 2011 guidance on nTPA at storage facilities.[7] We use this model as part of our assessment of market power, which is set out in Chapter 3.

1.9. The focus of our analysis is the market for gas flexibility. The gas system needs to balance. Because of this, shippers require flexibility. Storage is important to the gas market because of the flexibility it provides. Other sources of supply can also provide flexibility.

1.10. As explained in our open letter, we assess technical necessity by considering the availability of capacity to supply gas from various sources to meet peak demand – for a peak day and cold winter. We are likely to consider that access to the facility is economically necessary if any of our tests raise material concerns.

Our position for consultation

1.11. As a result of our analysis, our initial view is not to grant an MFE for the Hornsea facility. We're consulting on this position; please send any responses to

[7] https://www.ofgem.gov.uk/publications-and-updates/guidance-regulatory-regime-gas-storage-facilities-great-britain

wholesale.markets@ofgem.gov.uk by 24 April 2015. The remainder of this document sets out the analysis we have carried out in reaching our minded-to position on SSEHL's application.

2. Assessment of economically necessary

Chapter Summary

We have considered the potential impact of an exemption on market power and market operation. Based on this analysis, our initial conclusion is that nTPA at Hornsea is economically necessary.

Question box

Question 1: Do you think our definition of the relevant market for gas storage is appropriate? If not, please explain why.

Question 2: In particular, do you consider that our three potential market definition scenarios are appropriate? If not, please explain why.

Question 3: Do you agree with our approach to considering whether nTPA is economically necessary for the operation of an efficient gas market? If not, please explain why.

Question 4: Would you suggest any additional analysis to assess whether nTPA is economically necessary? If so, what?

Question 5: Do you agree with our overall assessment that nTPA at Hornsea is economically necessary? If not, please explain why.

2.1. In line with the approach set out in our 2009 open letter, we have considered whether access to Hornsea is economically necessary for the operation of an efficient gas market. The range of our economic tests, including market share, is our interpretation of "economically necessary for the operation of an efficient gas market". Our approach is to only grant an exemption if we are confident that there are no appreciable risks of market power or other market distortions. We think that proving access is not economically necessary must be demonstrated to a high standard.

2.2. Specifically, we have assessed whether a lack of nTPA at Hornsea could give SSE market power, or cause weak competition, in the GB flexibility market. We also considered the qualitative impact an exemption would have on the GB gas market, including transparency, market signals and efficient use of storage capacity.

2.3. In assessing the impact of the exemption, we consider the facility as if all of the capacity is assigned to SSE (given that the safeguards provided by nTPA would be removed). We also consider the information SSE has provided on the sale of capacity to third parties and the impact of this on our analysis. There is no single test, and we rely on a range of indicators of potential market power and impacts on market signals. We are likely to consider that access to the facility is economically necessary if any of our tests raise material concerns.

2.4. We begin by defining the relevant market for our analysis. We then use this definition to test for market power. We consider four potential indicators:

- Market shares;
- Market concentration;
- Pivotality; and
- Vertically related markets.

2.5. Secondly, we consider the impact of the exemption on market operation, including:

- Demand for access to storage and flexibility;
- Impact on transparency;
- Commercially sensitive information; and
- Efficient use of capacity.

Relevant market

2.6. To analyse whether nTPA is economically necessary, our first step is to define the relevant market in which Hornsea operates. This allows us to calculate indicators of market power, and so assess whether a lack of nTPA at Hornsea could lead to distortions in the market.

2.7. Our starting point for the relevant market builds on previous MFE decisions, and the statutory undertakings (the "Rough Undertakings") that were set down by the Competition Commission when Centrica acquired the Rough facility from Dynegy Ltd in 2002.[8]

2.8. This previous work has regarded the relevant market as the market for gas flexibility in GB. This is because the service provided by gas storage is flexibility, in allowing shippers to inject gas in periods of low demand or prices, and withdraw it when demand or prices are high. The value of gas storage is effectively the arbitrage between two time periods. These definitions are the same as those used for the recent MFE decision on Stublach phase 2.

Flexibility

2.9. The characteristics of Hornsea make it a medium range storage (MRS) facility. We define MRS as storage facilities with the capability to deliver gas from its maximum stock at full capacity for several days or weeks. We build our market definition starting with all MRS facilities in the GB market – as any one MRS facility is likely to

[8] The Rough Undertakings place a range of additional requirements on Centrica in addition to those required under the existing nTPA legislated requirements.

be a very close substitute for Hornsea. We also include long range storage (LRS) facilities – as these too provide very similar flexibility services – albeit typically with a longer duration.

2.10. We then consider other sources of flexibility in the GB gas market, which could act as substitutes for Hornsea. A description of each is set out below.

- *Short range storage (SRS):* SRS facilities have the capability to deliver gas from its maximum stock at full capacity for only a few days. They typically take much longer to refill than withdraw and have relatively small storage space (eg, LNG storage). SRS is typically used to withdraw in response to peak market conditions. Previously, we have not regarded SRS as part of the flexibility market due to its very short deliverability period and the long-time taken to refill. As such, we have considered that SRS is unlikely to provide a meaningful competitive constraint on other storage facilities.

- *UKCS ("Beach Flex"):* Much domestic gas production on the UKCS operates as baseload – particularly associated gas production in the Northern North Sea. Some "dry gas" production in the Southern North Sea and Irish Sea can operate more flexibly.

- *Norway:* The Langeled and Vesterled pipelines, and the Tampen & Gjøa links, import gas from Norway to GB. Historically, this gas has generally operated as baseload supplies to GB. The Norwegian offshore transmission system can provide for flexibility in delivery of gas. Variability in Norwegian flows to GB is driven by market conditions at both NBP and in continental Europe. The relationship is affected by the amount of gas that continental Europe receives in oil-indexed long-run contracts form Norway. As continental Europe reduces its demand for oil-indexed long run contracts the ability for GB to attract flows at peak times should also increase.

- *Interconnector UK (IUK):* This interconnector runs from Zeebrugge in Belgium to Bacton. It has the capability to both import and export gas, though at different rates. Flows are dependent on price differentials between GB and Belgium. Previously, we have only regarded a proportion of IUK as flexible, based on historical peak flows which were typically well below peak capacity. We have recently seen increased flows from IUK at times of high demand, indicating increasing flexibility at times.

- *Bacton-Balgzand Line (BBL):* This interconnector runs from Balgzand in the Netherlands to Bacton. At present, it can only physically flow gas into GB, though a virtual reverse flow product is also available. BBL flows have historically operated as baseload on the basis of long term contracts. Previously we have not regarded BBL as flexible, as it had not shown significant responsiveness to price signals. There is potential for BBL to operate more flexibly in the future.

- *Liquefied Natural Gas (LNG):* LNG is imported into GB through four terminals: South Hook, Dragon, Isle of Grain and Teesside GasPort. All LNG facilities are exempt from nTPA arrangements. Levels of LNG imports are largely dependent on price differentials between NBP and alternative

destinations. LNG terminals have some storage to facilitate the unloading of ships and subsequent injection of gas into the system. This storage could allow for some flexibility by varying send-out rates, but this may be dependent on the level of gas in tanks and the expected arrival of the next cargo.

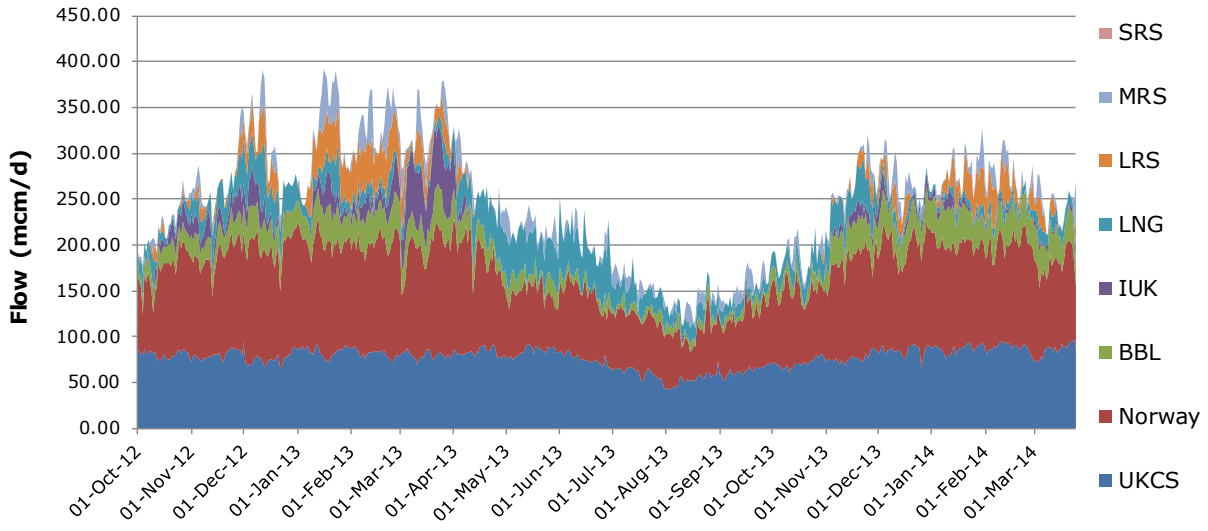
- *Demand-Side Response (DSR):* DSR occurs where consumers reduce their consumption, most likely in response to rising prices. Gas-fired generators and large industrial and commercial (I&C) consumers are most likely to provide DSR. Previously, we have not included flexibility from DSR as it is likely to operate in a different price range from storage, and it is difficult to anticipate the availability of DSR on a given day.

2.11. To help inform our decision on the relevant market, we have analysed the historical behaviour of these different sources of gas flexibility. We did this by looking at the responsiveness of supply sources to changes in market fundamentals. We focused on supply sources only, as we have limited data on the historical availability of DSR. We examined:

- Flow profiles of different supply sources;
- Flexibility range, which measures the difference between the highest and lowest levels of flow for different supply sources;
- Flows on high demand days, and how different sources of supply respond to changes in prices; and
- Correlation of flows with prices and demand, and of changes in flows with changes in prices and demand.

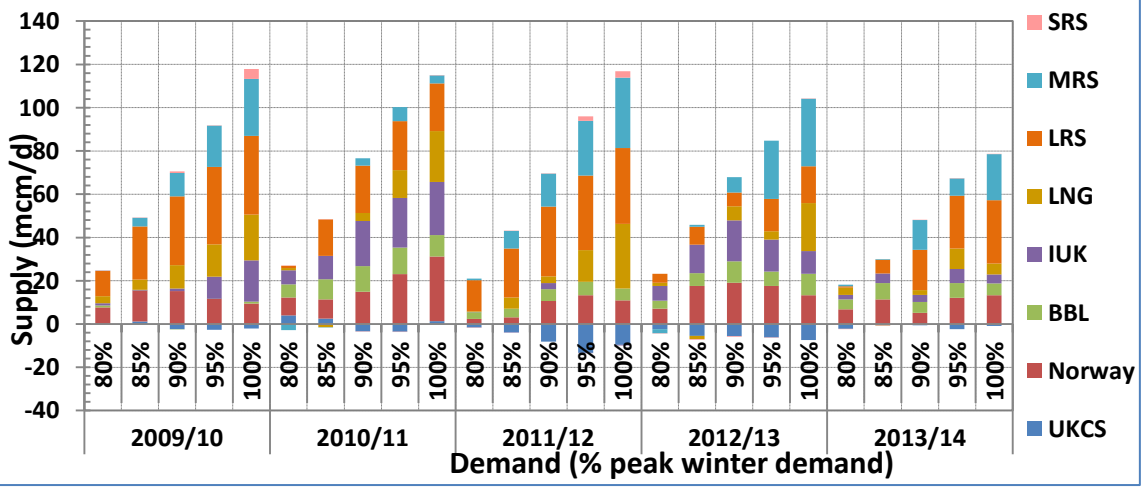
2.12. Figure 1 and Figure 2 below illustrate the different sources of supply to GB and how they vary over time. In particular, Figure 2 shows incremental supplies when demand rises above 75 per cent of peak. This effectively illustrates which sources of supply contribute most to meeting peak demand. This analysis shows that going from a typical winter day to a peak day, a significant proportion of flexibility is provided by storage. LNG and IUK flexibility is substantial, but varies year-to-year. Generally Norwegian supplies and BBL provide some flexibility.

Figure 1 – Sources of supply to GB



Source: Ofgem analysis of NGG data

Figure 2 Incremental changes (over 75% demand level) in peak day supply



Source: Ofgem analysis

2.13. Our market definitions need to be forward looking to assess the impact on the market of Hornsea, should it be granted an MFE. As a result, we do not rely exclusively on our quantitative analysis of flexibility. We also use expectation of future developments in the market and the impact this may have on different sources of flexibility.

2.14. In general, we would expect developments in European markets to result in greater flexibility. The implementation of European network codes should improve access to cross-border capacity and so make it easier for shippers to access the capacity they need to respond to price differentials. A potential move away from oil-indexation in

contracts may also make flows more responsive to hub prices. At present, oil indexed contracts mean that a proportion of supply does not respond to hub prices and as a result cannot respond to changes in prices quickly.

Market definitions

SSEHL view

2.15. SSEHL based its market definitions on the definitions presented in the Stublach consultation, with higher levels of Norwegian gas flows.

2.16. SSEHL believes that Norwegian flows have fundamentally changed as Statoil has taken a more active approach to optimising its portfolio. Furthermore, they do not believe there is anything to suggest that flows will revert to being less price-responsive given the economic benefits Norway (Statoil) and its customers gain from this flexibility.

2.17. SSEHL's three market definitions are:

Definition 1) *MRS + LRS + Beach Flex + 20% Norway + 50% IUK + 25% LNG*

Definition 2) *MRS + LRS + Beach Flex + 35% Norway + 70% IUK + 25% BBL + 50% LNG*

Definition 3) *MRS + LRS + Beach Flex + 50% Norway + 100% IUK + 50% BBL + 50% LNG*

Our view

2.18. As our analysis is forward looking, there is uncertainty in setting any single definition of the relevant market for flexibility. As a result, we use three definitions, designed to represent a range of possible scenarios for the future development of the GB flexibility market. The proportions of capacity included in each definition are based on our analysis of historical flows and our view on the likely future behaviour of supply flexibility. For example, on a day when IUK is near max capability it will be unable to provide 50 per cent flexibility to increase flows. In general, we would expect a wider definition to show reduced market share of any one player; though this would be dependent on the player in question. The market definitions we use in this analysis are consistent with those used for the June 2014 MFE decision on Stublach phase II.

2.19. We do not agree with the broader definitions suggested by SSEHL. SSEHL has based their analysis on one year of flow data. In our view, they have not provided sufficient evidence to change our position that Norwegian flows vary more in response to contractual conditions with Continental Europe than in response to GB prices. For example, in winter Norwegian flows are highly unlikely to be capable of varying by 20-50% day to day. We are open to new information and to changing

our definitions should the evidence suggest this. However, in this case we do not believe that there is currently sufficient evidence to merit changing the definitions.

2.20. Our three market definitions are:

Definition 1) *MRS + LRS + Beach Flex + 50% IUK + 25% LNG*

Definition 2) *MRS + LRS + Beach Flex + 15% Norway + 70% IUK + 25% BBL + 50% LNG*

Definition 3) *MRS + LRS + Beach Flex + 30% Norway + 100% IUK + 50% BBL + 50% LNG*

2.21. The first definition is all medium- and long-range storage deliverability, as these are close substitutes for the flexibility services provided by Hornsea. We have also included the flexible element of UKCS production ('beach flex'). In addition, in definition 1 we have included 50 per cent of IUK deliverability. This represents a reasonable assumption of the level of flexibility available over IUK – and is in line with long-term historical trends in peak IUK flows (representing around 35 mcm/d). There is significant variation in the flexibility of LNG – driven by the availability and timing of cargos. As a result, in definition 1, we make an assumption that only 25 per cent of LNG capacity is able to provide flexibility. This approximates to the average size of one LNG terminal in GB.

2.22. Definition 2 builds on definition 1. We include 15 per cent of Norwegian gas deliverability to GB on the basis that Norwegian flows have some technical flexibility between destination markets. Historically we have regarded variability in Norwegian flows as driven by flexibility in contracts with continental Europe – with GB typically receiving the remainder. With increasing market liberalisation, continental Europe may move away from long-term contracts, and this may lead to greater flexibility in Norwegian flows by increasing arbitrage opportunities between NBP and continental European hubs.

2.23. Definition 2 also includes a greater share of IUK capacity (70 per cent). This reflects evidence that IUK flows reached high levels on several days (in March 2013) where price differentials between NBP and Zeebrugge were substantial. Definition 2 contains 25 per cent of BBL deliverability. We have historically regarded BBL as generally providing 'baseload' supplies, though the flexibility of BBL could increase in the future.

2.24. In definition 2 we expand the proportion of LNG capacity included to 50 per cent, representing an expectation that LNG will play an increasing role in the GB gas supply mix in the future. It also reflects the flexibility of LNG we have observed in some years of our historical analysis.

2.25. Definition 3 builds on definition 2 by increasing the proportion of Norwegian gas and interconnector flows. The increase in Norwegian flows to 30 per cent represents potential upside in flexibility owing to increasing movement away from long-term

oil-indexed contracts in continental Europe. The increases in proportions of IUK (to 100 per cent) and BBL (to 50 per cent) represent upside in the flexibility that may become available.

2.26. In all market definitions we exclude SRS and DSR. We exclude SRS (which is effectively LNG storage) because its limited duration and long refill times mean it is unlikely to operate as a competitive constraint on other forms of flexibility. Also, LNG storage capacity is in decline as facilities have closed in recent years. We exclude DSR as we have limited information on its likely scale. We also expect it is more likely that DSR would occur in an exceptionally tight market, rather than as a day-to-day source of flexibility.

Assumptions

2.27. We have derived flexible capability by using a proportion of the capability of each supply source. Assumed capabilities are taken from National Grid's Ten Year Statement (TYS) 2014 and Future Energy Scenarios (FES) 2014. There are two exceptions to this; Rough's capacity is taken from CSL published values and Beach Flex is based on our own assumptions. We use these to calculate SSE's share of each market definition.

2.28. To estimate beach flex, we use projections of average annual utilisation and the total capability of UKCS in the FES documents to project the expected available flexibly out to 2024/25. We assume the difference between the percentage of UKCS used to meet annual demand and the percentage of UKCS used to meet average winter demand remains constant over time. We use this to estimate average winter utilisation of UKCS beyond 2014/15, and hence to estimate available beach flex.

Market power

Market shares

2.29. We examine market shares to assess SSE's position in the relevant market for gas flexibility, as defined above. Greater market shares could indicate a greater potential for market power. We calculate these market shares using information on the capacity of Hornsea and SSE's capacity holdings in other sources of flexibility.

SSEHL view

2.30. SSEHL has calculated market shares on the basis of its alternative market definitions and assumptions outlined above. SSEHL calculates market shares of SSE from years 2014/15–2024/25. The results of this analysis are summarised in Table 1 below:

Table 1 SSE market shares (% of relevant market)

Market Definition	2014/15 - 15/16	16/17 – 2024/25
SSE 1	15-20	10-15
SSE 2	10-15	10-15
SSE 3	10-15	5-10

Source: SSEHL

Our view

2.31. We have calculated SSE's share of the gas flexibility market – based on the three market definition scenarios described in the previous section. We have also calculated its share of the storage capacity market.

2.32. We calculate these market shares for all gas years from 2014/15 to 2024/25. These are shown below in Table 2.

Table 2 SSE market shares (% of relevant market)

Market Definition	2014/15	2015/16 – 2017/18	2018/19 – 2024/25
Ofgem 1	15-20	15-20	15-20
Ofgem 2	10-15	10-15	10-15
Ofgem 3	10-15	10-15	10-15
Storage Space	10-15	10-15	5-10

Source: Ofgem analysis

2.33. SSE's potential market shares of the flexibility market are material. They are significantly greater than 10 per cent under all our market definitions. In our narrowest market definition they increase further to 15-20 per cent of the market. We also calculate SSE's market share based on space. In this case, SSE's market shares are estimated to be closer to 10 per cent in all years considered.

2.34. Our analysis suggests that there is increased potential for market power in the flexibility market. Our analysis does not indicate a dominant position. However, it does suggest a significant increase on the share of the flexibility market that SSE would hold without any of the safeguards that nTPA provides. If granted an MFE, SSE would become one of the largest players in the flexibility market, given their existing MFE at Aldbrough. They would have the ability to withhold from third parties a substantially greater share of flexible capacity than other operators of exempt facilities. We have concerns that this potential for market power is increased, and could distort the flexibility market. As a result, we consider that access to Hornsea is economically necessary for an efficient gas market.

Market concentration

SSEHL view

2.35. As SSEHL does not have information on the capacity holdings of other parties in the flexibility market, it has not been able to carry out a definitive analysis of market concentration.

Our view

2.36. There are difficulties in obtaining information on the positions of each player within the whole flexibility market. Capacity holdings at nTPA storage facilities change year-on-year, and information on ownership and control of flexible production is usually not readily available. As a result, we have focused our market concentration analysis on the impact of Hornsea on concentration in the storage market. We make assumptions about the future allocation of capacity at nTPA facilities. This is consistent with our approach in considering previous MFE applications.

2.37. We have looked at concentration in both space and deliverability. We measure concentration using the HHI[9]. We are interested in both the absolute value of the index and the change in the index caused by a potential MFE at Hornsea.

2.38. We calculate HHIs by assuming that current capacity holdings at existing storage facilities remain unchanged in the future. These are shown in Table 3 below. We calculate HHIs for four scenarios and assess the change between these scenarios. These are:

- Hornsea without an MFE in 2014;
- Hornsea with an MFE in 2014;
- Hornsea without an MFE in 2020; and
- Hornsea with an MFE in 2020.

[9] This index measures concentration by summing the squares of the market share of each player. A HHI exceeding 1000 is regarded as concentrated, and above 2000 is regarded as highly concentrated (source: CC/OFT merger assessment guidelines 2010: http://www.oft.gov.uk/shared_oft/mergers/642749/OFT1254.pdf)

Table 3 HHIs for the gas storage market

Space concentration	2014	2014 with MFE	2020	2020 with MFE
HHI	1,160	1,172	1,114	1,124
Difference		**12**		**10**
Deliverability concentration	**2014**	**2014 with MFE**	**2020**	**2020 with MFE**
HHI	1,504	1,572	1,346	1,395
Difference		**68**		**50**

Source: Ofgem analysis

2.39. The HHIs for both space and deliverability are relatively low, suggesting that the storage market is not highly concentrated. If Hornsea were to get an MFE this leads to modest increases in the concentration of both space and deliverability compared to the counterfactual where the MFE is not granted. This holds both for the present and in 2020 when Stublach and Hilltop Farm are expected to be at maximum capacity. Thus, granting an MFE leads to a small, negative impact in market concentration as measured by HHI however this does not indicate concerns with market concentration.

Pivotality

2.40. Our 2011 guidance on third party access to storage stated that pivotality analysis was expected to form an integral part of our assessment of Significant Market Power (SMP). Although our assessment for an MFE is broader than SMP, we use pivotality as one of our suite of indicators to assess whether access is economically necessary. However a finding of pivotality is not required for us to conclude that access to a facility is economically necessary.

2.41. Pivotality analysis identifies the market players that are 'pivotal' by using demand and supply data. When a market player is pivotal total demand cannot be met from all sources of supply controlled by other players. Therefore the market player will not face material competitive constraints for its pivotal volume of supply (ie, it is guaranteed a certain market share as a result of the lack of competing supplies).

2.42. A pivotal player and its related undertakings have the potential to significantly raise peak wholesale prices and/or reduce off-peak prices as gas demand is relatively price inelastic. The degree of a player's market power can be assessed by looking at the pivotal volume of supply as a percentage of total demand, over a range of timeframes.

SSEHL view

2.43. Using the approach and model assumed by Ofgem in its consideration of Storengy's application as a starting point, SSEHL has looked at its pivotality three scenarios. It finds some pivotality in its most extreme scenario, which includes an N-1 system

loss. While the scenarios are slightly different to ours, they are not significantly different and do not find any pivotality which would be considered excessive.

Our view

2.44. We have assessed pivotality using a version of the model that was published alongside the 2011 guidance. The pivotality model explicitly addresses the issue of the substitutability of different sources of gas supply over differing timeframes. This is done by taking a series of snapshots of progressively longer exposure (one day, one week, one month, one quarter, one season) and assessing, within each period, the likely supply and demand for gas. For each gas year from 2013/14 up to 2025/26, the model estimates whether a market player's expected available gas supplies are necessary for demand to be met within the period. A detailed description of the way the model works and the steps that have been taken to update it can be found in our March 2014 Stublach consultation[10].

2.45. Our finding is that, using our base assumptions, we do not observe any pivotality in all modelled years. Our base assumptions cover:

- Likely available supply over various time periods for a range of demand profiles;
- An annual demand growth based on a conservative outlook for future growth;
- Assumptions regarding new supply infrastructure; and
- That all capacity at Hornsea is retained within the SSE group.

2.46. To further assess the potential for market power we looked at scenarios to assess what type of circumstances would be needed before SSE began to exert any significant pivotality.

2.47. Testing the model using a hypothetical 1-in-50 winter profile did not generate much pivotality. Simulating an N-1 outage did result in SSE becoming pivotal to meet demand to varying degrees in all years. Combining the N-1 outages with the 1-in-50 winter profile resulted in SSE becoming pivotal to meet demand on a seasonal, quarterly, monthly, weekly and even daily basis. A summary of the results can be found in Table 4 below. The key below explains what these mean:

- **Range of periods in which pivotality was observed.** This simply refers to the different lengths of time period assessed in the model (eg, 'daily', 'weekly', 'none' etc.), and

[10] https://www.ofgem.gov.uk/publications-and-updates/storengy-uk-ltds-application-minor-facilities-exemption-stublach-gas-storage-phase-2

- **Largest percentage of GB demand that SSE supplies were pivotal to meeting.** A 5% next to 'monthly' means over all years modelled, the most severe monthly pivotality involved SSE being needed to meet 5 per cent of monthly demand.

Table 4 Summary of pivotality analysis

Supply	Demand profile basis				
	2010	2011	2012	2013	1 in 50 demand
Base Case	Seasonal [7%]	None	None	None	Quarterly [3%] Seasonal [7%]
Milford Haven outage	Daily [2%] Weekly [6%] Monthly [17%] Quarterly [19%] Seasonal [28%]	Quarterly [9%] Seasonal [22%]	Monthly [5%] Quarterly [9%] Seasonal [22%]	Seasonal [10%]	Daily [6%] Weekly [11%] Monthly [16%] Quarterly [23%] Seasonal [34%]

2.48. Overall, the levels of pivotality are found to be low regardless of the demand profile. The main driver of increased pivotality in the market relates to reduced supply, as evidenced in the N-1 supply scenario. In a high demand, reduced supply scenario some demand is required from SSE but this rarely exceeds 20 per cent of total demand. In conclusion, we do not see risks due to significant pivotality from SSE.

Vertically related markets

2.49. When examining market power in the flexibility market, it is also important to consider the impacts of market power in both the upstream and downstream related markets. If a facility owner/capacity holder has market power in one of the vertically related markets then it may be possible to use this market power to influence the market outcome in the flexibility market. One motivation for this could be to protect its position in the vertically related market by foreclosing the flexibility market, that is, by raising barriers to entry or expansion.

2.50. SSE holds positions in the retail market, as well as the wholesale market and in electricity generation. A summary of their retail and generation position is shown in Table 5 below.

Table 5 – SSE's current gas retail and generation market positions (% of relevant market)

Consumer type/Market segment	Share in 2014
Non-domestic	4%
Domestic	14%
Electricity generated volumes[11]	11%
Electricity installed capacity	13%

2.51. These figures suggest that SSE has a significant position in the domestic gas retail market. Shippers may need to access flexibility in order to manage the variation in demand from their domestic customer portfolio, or to support flexible gas fired generation. Therefore, there is a small risk that SSE could have incentives to raise barriers in the flexibility market to protect its retail or generation market positions. Third party access to Hornsea may be economically necessary to avoid this.

Market operation

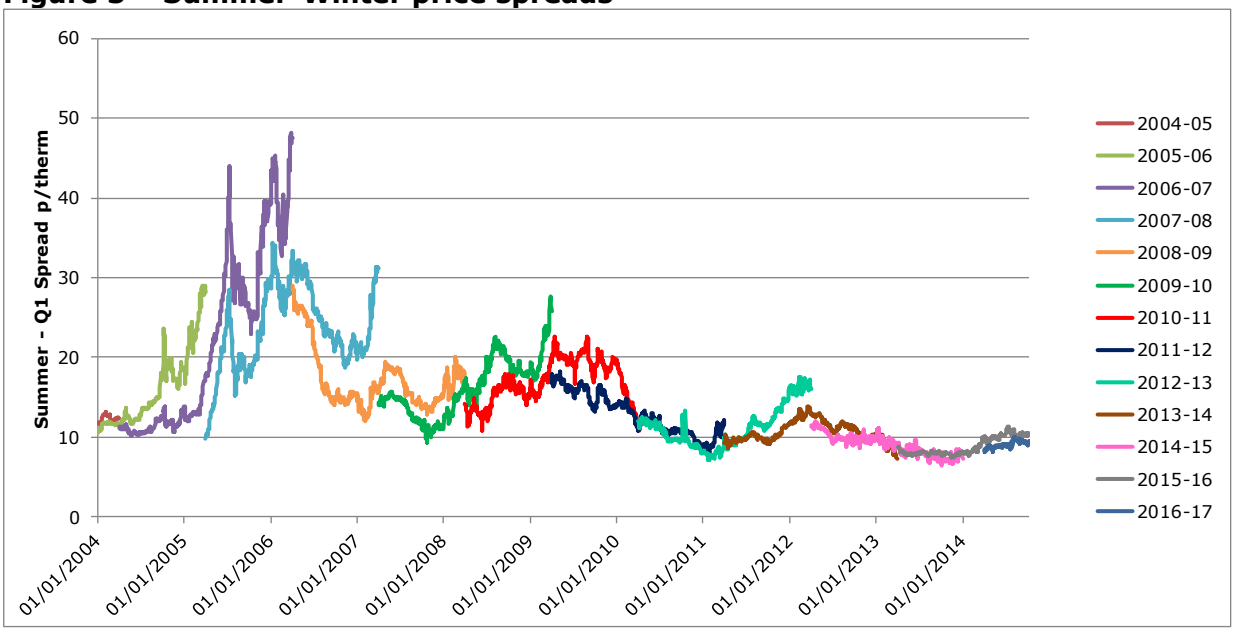
Demand for access to storage and flexibility

2.52. In considering whether access to storage is economically necessary for the operation of an efficient gas market, we have looked at the market for flexibility. Where there is a potential shortage of flexible capacity in the market, ensuring open access to storage may be more important for the operation of an efficient overall market. Conversely, where there is ample flexible capacity in the market, nTPA at an individual storage facility may be less important for the operation of an efficient overall market.

2.53. We have considered the summer-winter price spreads as an indicator of the market demand for flexibility. The summer-winter price spread is the difference in gas wholesale prices between the summer and the following winter. It is generally considered to be a good measure of the value of seasonal gas storage. It is equivalent to the simple arbitrage of buying gas in summer and selling the following winter. We measure this by calculating the difference between the average price of the Q2 and Q3 contracts and the price of the Q1 contract for the following year. Figure 3 below shows trends in summer-winter spreads over the past decade.

[11] Based on metered volume

Figure 3 – Summer-Winter price spreads



Source: Ofgem analysis of Heren data

2.54. We have also considered market demand for short-term flexibility. Price volatility can provide short-term arbitrage opportunities. These are where shippers can use flexibility to vary their flows in response to short-term price signals. Generally, NBP price volatility has declined in recent years.

2.55. Our assessment is that the GB market currently appears well supplied in flexibility. Changes in market conditions may change the level of demand for flexibility. For example, greater penetration of intermittent electricity generation may increase the volatility of demand from gas-fired power generation.

Impact on transparency

2.56. We have considered whether granting an MFE could have an impact on transparency. The transparency requirements of the third package with regard to gas storage[12] apply to a facility regardless of whether it is subject to nTPA. This means that SSEHL will be required to publish daily information on the amount of gas in the facility, inflows and outflows and the available storage capacity. In addition, the peak deliverability of the facility will be large enough that real time flow information will be published on NGG's website. SSEHL noted these requirements in its application. As a result, we do not consider that an exemption would be likely to have a detrimental impact on transparency.

[12] Article 19(4) of Regulation (EC) 715/2009

Commercially sensitive information

2.57. In summary, provisions in section 11C (*Restrictions on disclosure of information by facility owners*) of the Gas Act, which apply to all storage owners, state that:

- The owner of a storage facility must take all reasonable steps to ensure that commercially sensitive information relating to the operation of the facility is not disclosed in a discriminatory way or to an associated undertaking unless disclosure is necessary in order to enable a transaction with that associated undertaking to take place.
- Information which is obtained by the owner when transacting with an associated undertaking must not be used by the owner for any other purpose.

2.58. Exempt facilities are not required to put in place the same measures to ensure independence (eg, unbundling) as those subject to nTPA. However, we still expect them to:

- Have appropriate information management systems in place to ensure that no commercially sensitive information is inadvertently shared with other customers or affiliates;
- Share legitimate information via a non-discriminatory, transparent manner, such as through a public bulletin board; and
- Set out their confidentiality provisions as part of their main commercial conditions.

Efficient use of capacity

2.59. In considering the MFE application, we look at how the facility is expected to be used in practice. In general, where a facility is granted an MFE, we still anticipate that the capacity is used efficiently – ie, in response to price signals in the wholesale market. However, the nTPA regime provides additional safeguards. These include:

- The publication by the storage operator of the main commercial conditions;
- The provision of non-discriminatory access;
- Requirements to negotiate in good faith; and
- The ability of the Authority to issue ex-post determinations when disputes arise over access.

2.60. Therefore, the measures that storage operators put in place to ensure capacity is effectively used in the absence of nTPA may be relevant to our consideration of the impact of the exemption. For example, any potential market distortion may be limited or eliminated by the availability of a secondary market and/or UIOLI.

2.61. SSEHL has stated that it intends to continue to offer access to third parties. We welcome these commitments from SSEHL. However, it is worth noting that any exemption, even one with conditions attached, will remove some of the safeguards put in place by the nTPA regime. This means that any exemption lessens the protections against the risks outlined in this chapter.

Conclusions

2.62. Our assessment of flexibility market shares – and to a lesser extent vertical relationships – gives us concern that an exemption has the potential to give SSE some market power or create distortions. Our other tests for economic necessity did not raise significant concerns. However, our conclusion is that the potential for market power across all indicators is sufficient to judge that access to Hornsea is economically necessary.

3. Assessment of technically necessary

Chapter summary

Based on our analysis of peak demand and supply capability, our initial conclusion is that nTPA at Hornsea is not technically necessary.

Question box

Question 1: Do you agree with our approach to considering whether nTPA is technically necessary for the operation of an efficient gas market? If not, please explain why.

Question 2: Would you suggest any additional analysis to assess whether nTPA is technically necessary? If so, what?

Question 3: Do you agree with our overall assessment that nTPA at Hornsea is not technically necessary? If not, please explain why.

3.1. In our 2009 open letter, we set out how we assess applications for an MFE. We consider, among other things, whether nTPA is technically necessary for the operation of an efficient gas market.

3.2. The market may have a technical requirement for flexible gas sources to meet fluctuations in demand. However, this does not imply that nTPA is "technically necessary" at a particular storage facility, or for gas storage in general. Shippers have a variety of ways to meet requirements for flexibility. As set out in our 2009 open letter, we do not think nTPA is likely to be technically necessary in the GB market – except at very large or strategically important facilities. At present, the GB market has a diverse range of supply sources and capacity well in excess of peak demand. This analysis is concerned with meeting whole-system demand from across the market.

3.3. In considering SSEHL's application for an MFE, we have considered the availability of supply capacity to meet forecast demand. We look across the market at different sources of supply, including other exempt storage facilities. We then consider the role of Hornsea and the impact of any exemption in meeting demand from a technical capacity perspective.

3.4. We assess technical necessity in two ways – looking at both a peak day, and over a winter period.

Analysis

Peak day

SSEHL view

3.5. In its application, SSEHL assessed technical necessity by comparing forecast peak supply capability with peak day demand using data from National Grid's Ten Year Statement. It calculated capacity 'headroom' for a peak day in each year from 2013/14 to 2023/24 – and excluded its total capacity. This calculates the estimated additional supply capability in excess of peak demand. SSEHL's analysis for all years shows significant capacity headroom and they conclude that this does not suggest that the use of the Hornsea facility is technically necessary for the operation of an efficient gas market.

Our view

3.6. In assessing whether access to Hornsea is technically necessary on a peak day, we take a similar approach to that taken by SSEHL. We too compare forecast peak supply capability and peak day demand. We base forecast peak capability on National Grid's Future Energy Scenarios – but make adjustments to assume no further new supply capacity is constructed beyond that currently under construction. This is a prudent assumption, though if access to Hornsea is not technically necessary under this test then it would also not be so if additional new capacity is built. We use slow progression diversified peak demand and capabilities from NGG's 2014 Future Energy Scenarios (FES).

3.7. From these projections, we assess the excess capacity ("headroom") between peak supply capability and peak demand. We use peak capacity values for interconnectors, LNG and storage, and use forecasts of peak production capability for Norway and UKCS. If this is greater than the deliverability of Hornsea (or SSEHL's capacity as a whole), it means Hornsea wouldn't be needed in order to meet peak demand unless there was a significant loss of supply. We consider projections of peak daily demand over the years 2013-14 to 2023-24, and compare this with non-storage supply capability and storage capacity. Hornsea would be technically necessary if the excess supply capacity across the market was greater than Hornsea's peak deliverability. Table 6 below summarises the results.

Table 6 - Peak-day technical necessity for Hornsea

GWh/day	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24
Peak Demand	5262	5246	5208	5147	5145	5135	5406	5335	5227	5139
Supply capability	6928	7046	7188	7235	7259	7309	7350	7312	7268	7213
Headroom	1666	1800	1980	2088	2114	2174	1944	1977	2041	2074
Hornsea capacity	198	198	198	198	198	198	198	198	198	198

Source: Ofgem analysis of NGG data (Future Energy Scenarios 2013 & 2014)

3.8. In all years and demand scenarios assessed, headroom is significantly in excess of Hornsea's peak deliverability (198 GWh/d). This implies it would take a highly significant loss of supply before the Hornsea facility is needed to meet peak day demand.

Winter period

SSEHL view

3.9. SSEHL replicated our analysis for the Winter period based on the information provided in the Stublach consultation. It concludes that use of the Facility by other persons is not technically necessary for the operation of an efficient and secure gas market.

Our view

3.10. In addition to considering a peak day, we consider whether demand could be met during a winter period using the capacity of other sources of supply, if access to Hornsea was not available.

3.11. We assess technical necessity over the winter period (October-March) using a two-stage approach. We begin by taking NGG's projected "cold" demand forecast for 2014-15. We then project this forward for each year to 2023/24, using NGG's forecasts for annual demand growth under a Slow Progression scenario. Using "cold" demand for the entire period represents a prudent assumption, as an entire winter of "cold" demand would be more severe than 1-in-20.

3.12. We aggregate this demand profile over the winter period, and compare this against aggregated non-storage supply capability and storage capacity (ie, space). We assume that storage begins the period full, and ends it empty – with no injections taking place over winter (though we recognise medium-range storage in reality does inject over winter). We use this to calculate the per-day excess supply on the basis of aggregated supply and demand over the winter period.

3.13. We then take this figure, and adjust it to take account of daily storage deliverability and dispatch. The model derives a per-day figure for excess supply capacity, and also the maximum MRS utilisation required to meet demand over the period if we assume this excess supply capacity is unavailable. Hornsea would be technically necessary if its peak deliverability was greater than the excess supply, or if maximum observed utilisation could not be met without Hornsea peak deliverability. Table 7 below sets out the results of the winter period analysis.

3.14. In all years and demand scenarios assessed, daily headroom is significantly in excess of Hornsea's peak deliverability (198 GWh/d). On average there is significant headroom. This implies it would take a significant loss of supply (far in excess of the single largest possible loss) before the Hornsea facility is needed to meet demand over winter.

Table 7 - Winter period technical necessity for Hornsea

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24
Excess NSS per day	1470	1527	1669	1728	1749	1791	1522	1442	1544	1621
Hornsea capacity	198	198	198	198	198	198	198	198	198	198

Source: Ofgem analysis

Conclusions

3.15. Our analysis shows that under normal market conditions, Hornsea is not required to meet demand. A substantial supply loss (far in excess of N-1) would be required for Hornsea to be needed. This is true for both a peak day and the winter period.

3.16. This result is aligned with our view of the GB market. Price signals in the GB market are designed to encourage gas to be made available in the short term and investment to meet peak and winter demand and demand for flexibility. The GB market is supplied by a diverse range of sources, and has supply capability well in excess of peak demand.

3.17. As a result, we conclude that nTPA at Hornsea is not technically necessary for the operation of an efficient gas market.

4. Conclusions

4.1. Based on the analysis set out in Chapters 2 and 3, our initial view is that nTPA at the Hornsea facility is not technically necessary for the operation of an efficient gas market. However, our analysis indicates that the facility is economically necessary for the operation of an efficient gas market, based on SSE's market shares of flexibility. Our analysis suggests that there is increased potential that SSE could have market power in the flexibility market. Our analysis does not indicate a dominant position. However, it does suggest a significant increase on the share of the flexibility market that SSE would hold without any of the safeguards that nTPA provides. If granted an MFE, SSE would become one of the largest players in the flexibility market, given their existing MFE at Aldbrough. They would have the ability to withhold from third parties a substantially greater share of flexible capacity than other operators of exempt facilities. We have concerns that this potential for market power is increased, and could distort the flexibility market. Further, vertical integration creates small risks that SSE could have incentives to use position in flexibility market to protect their position in vertically linked markets.

4.2. Our other tests for economic necessity did not raise significant concerns. However, our conclusion is that the potential for market power indicated by our market share analysis is sufficient to judge that access to Hornsea is economically necessary. We are therefore minded not to grant an exemption to Hornsea subject to our consideration of responses to this consultation.

4.3. Our analysis has been carried out against the criteria in our 2009 open letter and is specific to this application. Our decision does not preclude or affect in any way the operation of the Competition Act 1998 or the Enterprise Act 2002. Further, as the analysis in this document has been carried out for a specific situation, it may or may not be relevant to a consideration of any related issue, for example, under the Gas Act 1986, the Competition Act 1998 or the Enterprise Act 2002.

Next steps

4.4. We invite responses to the questions in this document or any other issues it raises. Responses should be sent to wholesale.markets@ofgem.gov.uk by 24 April 2015.

4.5. Following this consultation, we will consider responses and make a final decision on the MFE application for Hornsea. We will publish this, together with an exemption order if we decide to grant the MFE. We aim to reach this decision by Spring 2015.

Appendices

Index

Appendix 1 – Consultation response and questions

1.1. We'd like to hear your views about any of the issues in this document. We especially welcome responses to the specific questions at the beginning of each chapter. These are replicated below.

1.2. It would be helpful if you could submit your response both electronically and in writing. Responses should be received by 24 April 2015 and should be sent to:

Amy O'Mahoney / Thomas Farmer
Wholesale Markets
Ofgem
9 Millbank
London
SW1P 3GE
020 7901 7000
wholesale.markets@ofgem.gov.uk

1.3. Unless marked confidential, all responses will be published in our library and on our website, www.ofgem.gov.uk. You may ask us to keep your response confidential. We'll respect this request subject to any obligations to disclose information, for example under the Freedom of Information Act 2000 or the Environmental Information Regulations 2004.

1.4. If you'd like your response to remain confidential, mark it clearly to that effect and include your reasons. Please restrict any confidential material to the appendices to your response.

1.5. Having considered the responses to this consultation, we intend to make a final decision on the exemption application in spring 2015. Please direct any questions about this document to:

Amy O'Mahoney / Thomas Farmer
Wholesale Markets
Ofgem
9 Millbank
London
SW1P 3GE
020 7901 7000
wholesale.markets@ofgem.gov.uk

CHAPTER: Two

Question 1: Do you consider that our definition of the relevant market for gas storage is appropriate? If not, please explain why.

Question 2: In particular, do you consider that our three potential market definition scenarios are appropriate? If not, please explain why.

Question 3: Do you agree with our approach to considering whether nTPA is economically necessary for the operation of an efficient gas market? If not, please explain why.

Question 4: Would you suggest any additional analysis to assess whether nTPA is economically necessary? If so, what?

Question 5: Do you agree with our overall assessment that nTPA at Hornsea is economically necessary? If not, please explain why.

CHAPTER: Three

Question 1: Do you agree with our approach to considering whether nTPA is technically necessary for the operation of an efficient gas market? If not, please explain why.

Question 2: Would you suggest any additional analysis to assess whether nTPA is technically necessary? If so, what?

Question 3: Do you agree with our overall assessment that nTPA at Hornsea is not technically necessary? If not, please explain why.

Appendix 2 – UKCS flexibility

1.1. Estimates for UKCS flexibility can be created using information in NGG's 2014/15 Winter Outlook Report (WOR) and their 2014 Future Energy Scenarios (FES).

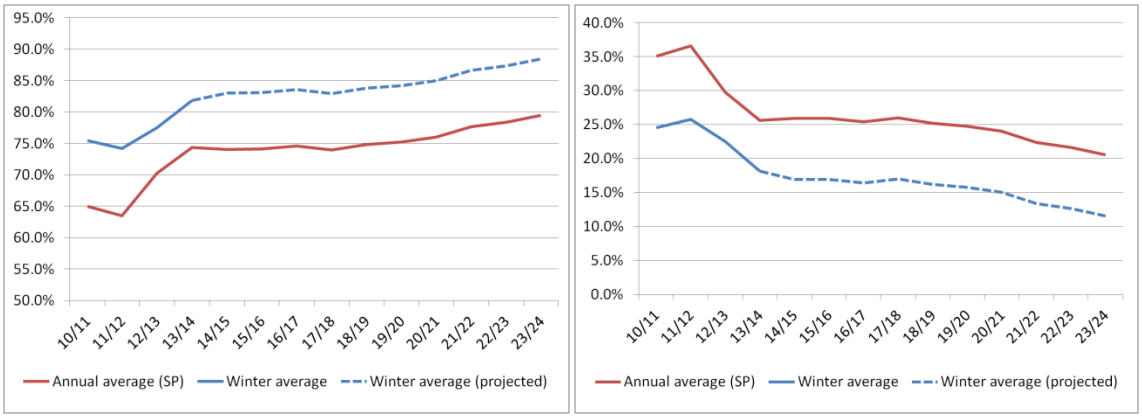
1.2. The WOR sets out average winter usage of UKCS and maximum UKCS capacity between 2010/11 and 2012/13. It also gives a projection for 2014/15. The difference between the average winter utilisation and the maximum capacity can be seen to give an estimate of the additional 'flexible' capacity that could be expected to be available to increase supplies during winter.

1.3. We use projections of average annual utilisation and total capability of UKCS in the FES documents to project the expected available flexibly out to 2023/24. We assume the difference between the percentage of UKCS used to meet annual demand and the percentage of UKCS used to meet average winter demand remains constant over time. We use this to estimate average winter utilisation of UKCS beyond 2014/15.

1.4. Between 2010/11 and 2013/14 UKCS capacity was used roughly 9 percentage points more to meet average winter demand compared to average annual demand. This is reflected by the gap between the solid red and blue lines in Figure 4 (left) between 2010/11 and 2013/14. Projecting this forward gives an estimated percentage of UKCS capacity utilised to meet average winter demand up to 2023/24. This is shown with the dashed blue line.

1.5. Subtracting these percentages from 100 per cent gives the additional 'flexible' UKCS capacity that could still ramp up to meet any demand over and above average winter levels (see Figure 4 (right)).

Figure 4 – % of capacity used to meet demand (left) and % of capacity available to meet additional demand (right)



1.6. Clearly the two approaches offer differing views on the levels of flexibility we can expect from UKCS in the future. The updated approach offers a more optimistic view of potential future flexibility of UKCS. This appears consistent with the fact that other fields are coming online and simply using the Morecambe and Sean fields as a proxy

would not capture this.[13] Importantly though, the updated approach still means flexibility is assumed to fall over time, both in absolute terms and as a percentage of total remaining UKCS capacity. This seems to be consistent with our understanding of how UKCS will be used in the future as its role in meeting GB demand continues to decline.

1.7. Finally, it should be noted that uncertainty regarding UKCS flexibility is unlikely to have a significant impact on the analysis. This is because the levels of supply set out below in Table 8 remain very small compared with the capacity of other flexible sources (eg, storage, interconnectors, LNG etc.).

Table 8 – UKCS beach flex figures

GWh/d	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	23/24
Beach flex	440	294	231	241	246	244	255	244	229	209	180	164	142

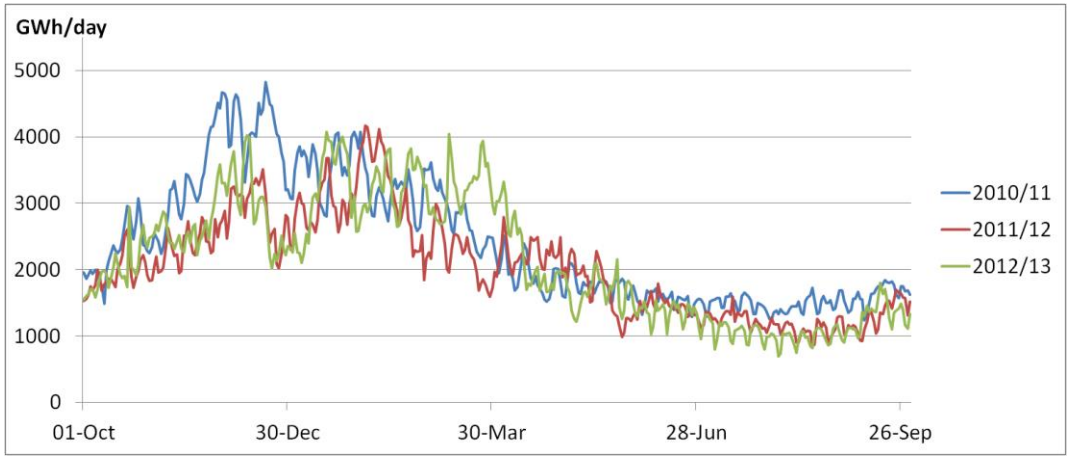
[13] Using Morecambe as a proxy effectively means assuming that it is fully flexible and that all other UKCS fields have zero flexibility.

Appendix 3 – Pivotality model

1.1. The pivotality model effectively takes a series of snapshots of progressively longer exposure (one day, one week, one month, one quarter, one season) and then assesses, within each period, the likely supply and demand for gas. For each gas year from 2013/14 to 2023/24, the model estimates whether a market player's (eg, GDF Suez's) total gas supplies are necessary if demand is to be met in the period. It will therefore analyse, for each gas year, 365 days, 52 weeks, 12 months, 4 quarters and 2 seasons. This approach to modelling pivotality has the advantage of abstracting from the complexities of dynamic storage management, in that injections are not modelled. In that sense, the model is essentially static (ie, it examines each period in isolation, irrespective of previous periods' inflows and outflows).

1.2. Because the model is static it uses a fixed demand profile and projects this forwards using assumptions about demand growth. The first demand profile used for this analysis was the profile from gas year 2011/12 as this was also the first in the series of years we chose to model. However, 2011/12 was a relatively mild year. To get an idea of pivotality under more challenging demand conditions we also tested the demand profiles for 2010/11 and 2012/13 (see Figure 5).[14]

Figure 5 – Daily demand in 10/11, 11/12 and 12/13[15]



1.3. To look at pivotality in the future the fixed demand profiles are then assumed to increase or decrease according to projections of how average and peak demand will

[14] In so doing we assumed that the fundamentals determining demand (economic activity, number and type of consumer, efficiency of boilers and other equipment, and so on) were virtually unchanged during these three years and that the principle factor affecting the differences in demand was the weather. This means that when varying the fixed demand profile year, the gas years modelled by the analysis would still be 2013/14 to 2023/24.

[15] Importantly, the demand the model aims to meet is always taken as demand net of exports and storage injections. This removes the need to account for the dynamic optimisation of storage injections or interconnector exports. Using 3 different demand profiles also ensures that a range of different storage injection and export levels are controlled for.

change between now and 2023/24. The assumptions for demand growth were taken from National Grid's 2012 Ten Year Statement and are shown below:

NGG scenario	Annual rate of demand growth	
	Average	Peak
Gone Green	-1.5%	-0.9%
Slow Progression	-0.1%	-0.3%

Source: NGG

1.4. It is unrealistic for the model to assume that all infrastructure can supply gas all year round at its full technical capacity. To account for this the model effectively de-rates the peak physical capacities of the various non-storage supply sources using so-called "capacity coefficients". [16] We have updated the capacity coefficients in the model to account for changes to the market and additional data on historical utilisation rates. The updated coefficients are shown below and a fuller description of how they were formulated is given later:

Supply Source	Daily	Weekly	Monthly	Quarterly	Seasonal
UKCS	96%	93%	90%	87%	84%
Norway	98%	90%	83%	81%	77%
LNG	84%	78%	72%	65%	59%
Continent	90%	75%	60%	50%	40%

The capacity coefficients

1.5. The capacity coefficients are a key assumption in the pivotality model. The model uses a range of non-storage supply sources to meet demand on any given day over a number of years (in our case this is from 2013/14 to 2023/24). These supply sources are UKCS, Norway, LNG and Continent. As a starting point, the model uses the peak physical capacities of these four sources. However, it is unreasonable to assume that these supply sources could all operate at their peak physical capacities, particularly for extended periods of time. There are a number of reasons for this:

1) Infrastructure may undergo planned maintenance.

2) Infrastructure may experience an unplanned outage.

[16] The "capacity coefficients" look to account for differing degrees of substitutability of supply sources at different time scales by adjusting (effectively de-rating) the maximum technical capacities. For example, given the stocks of gas held in store at LNG import facilities, LNG may be able to provide flow at rates closer to their technical capacities over short timeframes (daily or weekly). However, as LNG can flow to a number of markets, the level of supplies over the winter period is likely to be less than the total physical capacity. Therefore a capacity coefficient of 90 per cent would mean that flows would be expected to be 90 per cent of the physical capacity for the period that the coefficient applies to.

3) Infrastructure may not be technically capable of supplying gas even if it is online and operational (eg, LNG stocks may be fully depleted due to high global prices restricting cargo arrivals).

4) Supplies from a piece of infrastructure may not be able to fully respond to increased GB demand/prices for a range of reasons, even if it is technically able to do so:

    a. Supplies through IUK and BBL are influenced by prices on the Continent, as well as in GB.[17]

    b. Supplies from LNG terminals may be less responsive if stocks are low.[18]

    c. Supplies may be inflexible due to the presence of long-term contracts (eg, LNG and Norway).

1.6. The capacity coefficients must therefore account for a wide range of factors in trying to determine the levels of supply that we can reasonably expect to be available compared to the levels that are technically available.

1.7. These coefficients can never fully capture all the factors that may prevent supply capacity from reaching its technical maximum. As such they provide an informed best estimate. Where significant uncertainty exists we have erred on the side of caution. If SSEHL passes the pivotality test with prudent assumptions, it will also pass with more optimistic assumptions.

[17] This should cause larger de-rates for seasonal vs daily coefficients because a high daily GB demand is less likely to be correlated with one on the continent, where as a high seasonal GB demand is likely to be correlated with one on the continent. This means increased imports are likely on a high price day, but over the course of weeks or months increased imports may be less likely.
[18] This is because a certain amount of gas must be kept in the terminal until there is certainty over the arrival of another LNG cargo (analogous to cushion gas in storage).

Appendix 4 – Glossary

A

Anti-hoarding arrangements

Transparent mechanism(s) that allows unused capacity to be made available to the market so as to maximise the use of a facility.

B

Balgzand Bacton Line (BBL)

BBL is an interconnector that flows gas from Balgzand in the Netherlands to Bacton in the UK. It currently physically transports gas only one way: from the Netherlands to the UK.

Baseload

Part of the gas supply that is flowing on most days, and prone to only small variations.

C

Competitive constraints

Competitive constraints are factors that prevent a firm from profitably sustaining prices above competitive levels. Where there are no effective competitive constraints, market power can arise.

Cycling (storage)

Cycling is successive injection and withdrawal of gas within a season at a storage facility. Cycling usually refers to multiple successive refill and withdrawal cycles within the winter, as opposed to a single summer refill followed by winter withdrawal.

D

Daily Metered (DM) sites

Meters with data-loggers installed at NTS offtake points provide Gas Transporters with the volume of gas consumed each day. Supply points with such meters are called DM sites.

Deliverability

Deliverability refers to storage exit capacity, ie, the rate at which gas can be delivered from the storage facility to the transmission system.

Demand-side response (DSR)

DSR is achieved when electricity and gas users reduce a proportion of their demand – for example, in response to a high price or contract for demand reduction.

Duration

The time it takes to empty a storage facility from when it is full assuming maximum deliverability.

F

Flexible beach

That proportion of domestic gas production that offers more flexible supply.

G

Gas storage facility

Any facility designed to take gas (inject) from the NBP and release it (deliver) at a latter point in time. We may distinguish between Short, Medium and Long range storage facilities.

H

Herfindahl-Hirschman Index (HHI)

HHIs are a measure of market concentration. They assess the size of firms in relation to the industry.

I

Injectability

Injectability refers to storage entry capacity ie, the rate at which storage can be injected from the transmission system to the storage facility.

Interconnector

An interconnector is a pipeline linking two consumption markets, as opposed to pipelines linking a gas field and a consumption market.

Interconnector UK (IUK)

IUK is the commercial name of the interconnector linking Belgium and Great Britain.

L

Liquefied Natural Gas (LNG)

The fluid state of natural gas, it can be obtained industrially by cooling down natural gas. Used essentially in dedicated tanker ships to transport gas overseas in a much reduced volume.

LNG importation terminal

LNG importation terminals are the terminals where LNG vessels can be offloaded.

Long Range Storage (LRS)

LRS facilities tend to be able to deliver gas at full capacity for more than 70 days.

Langeled

Langeled is an undersea pipeline bringing gas from Norway (Sleipner) to the UK (Easington).

M

Medium Range Storage (MRS)

MRS facilities tend to be able to deliver gas at full capacity for between 5 and 70 days. Such facilities are typically able to cycle gas.

Minor facilities exemption

Exemptions granted on the basis that Article 19 of the Second Gas Directive does not apply as nTPA is not economically and/or technically necessary for providing efficient access to the system for the supply of customers.

N

National Balancing Point (NBP)

The NBP is the virtual unified trading point of the GB gas transmission network.

National Grid Gas (NGG)

NGG owns and operates the National Transmission System throughout Great Britain and owns and operates a significant Gas Distribution Network throughout part of England.

Negotiated Third Party Access (nTPA)

Negotiated Third Party Access (nTPA) refers to arranging supply contracts on the basis of voluntary commercial agreements negotiated in good faith.

Non-daily Metered (NDM) sites

Supply points with meters installed that are read at monthly, six monthly or at longer intervals are called NDM sites.

R

Regulated Third Party Access (rTPA)

Regulated Third Party Access (rTPA) refers to a system of access based on published tariffs and/or other terms and obligations, as determined by the relevant regulatory authority.

S

Secondary capacity allocation

Involves mechanism(s) by which unused capacity is offered to shippers on the secondary market.

Short Range Storage (SRS)

SRS facilities tend to be able to deliver gas at full capacity for up to 5 days. In GB these are normally LNG facilities that are able to flow gas at very short notice, but take a very long time to refill.

Small but Significant Non-transitory Increase in Price (SSNIP) test

A SSNIP test considers if a hypothetical monopolist on the considered market, defined as a couple of products and regions, could profitably increase prices by 5-10 percent.

T

Tampen

Underwater pipeline bringing gas from Norway (Stratfjord) to the North Sea UK pipeline system (FLAGS).

Ten Year Statement (TYS)

The TYS is published in line with Special Condition C2 of NGG's Gas Transporters' Licence and Section O of the Uniform Network Code. It is published annually and provides a ten-year forecast of transportation system usage and likely system developments.

Third Party Access (TPA)

TPA means access by third parties to transmission and distribution networks, and gas and LNG storage facilities.

U

United Kingdom Continental Shelf (UKCS)

The UKCS is the region of waters surrounding the UK, in which the UK claims the rights to minerals.

Use it or lose it (UIOLI) arrangements

Arrangements that ensure there are incentives to use capacity at a facility or otherwise lose capacity at a facility whereby any unused capacity is made available to the market.

V

Vesterled

Pipeline which runs from the Heimdal Riser platform in the North Sea to St. Fergus near Peterhead in Scotland.

Appendix 5 – Feedback questionnaire

1.1. Consultation is at the heart of good policy development. We're keen to consider any comments or complaints about the way we've conducted this consultation. In any case we would be keen to get your answers to these questions:

1. Do you have any comments about the overall process which was adopted for this consultation?
2. Do you have any comments about the overall tone and content of the report?
3. Was the report easy to read and understand? Could it have been better written?
4. To what extent did the report's conclusions provide a balanced view?
5. To what extent did the report make reasoned recommendations for improvement?

1.2. Please add any further comments and send your response to:

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