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Gas Security of Supply Significant Code Review - Draft Policy Decision

Consultation

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Publication date:	8 November 2011	**Team:**	Wholesale Markets
Response deadline:	31 January 2012	**Tel:**	020 7901 7000
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Overview:

The aim of the Gas Security of Supply Significant Code Review (Gas SCR) is to establish whether changes to the current gas market arrangements are required to enhance security of supply and, if so, what these reforms should be.

Following the release of our initial consultation document, stakeholder responses, workshops and further analysis carried out by Ofgem, this document sets out our draft policy decision.

We are currently minded to strengthen the incentives on market participants to deliver adequate gas supplies through cash-out reform. We also recommend investigation of the need for, impacts and effects of further interventions to enhance gas security of supply.

Responses to this draft policy decision will inform our final decision on the cash-out reform options, which is planned for late spring 2012. Investigation of further interventions will be progressed through a separate process.

Context

Over the two decades since privatisation and liberalisation, the gas and electricity markets in Great Britain have delivered secure supplies and substantial investment. However, for a number of years Ofgem has expressed concerns with the ability of the current market arrangements to deliver secure gas supplies over the longer term.

We launched the Gas Security of Supply Significant Code Review (Gas SCR) on 11 January 2011. At the same time we published an initial consultation document which outlined our initial proposals to enhance gas security of supply. Following this, we held several stakeholder events and meetings to elicit feedback on our proposals. Taking this feedback into consideration, we have developed and revised our reform options. This draft policy document outlines these revised options and the Gas and Electricity Markets Authority's draft policy decision.

Associated documents

Draft Impact Assessment - Gas Security of Supply Significant Code Review, November 2011 (Reference number 146/11):
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Draft%20Impact%20Assessment%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf

Redpoint Energy, Gas Security of Supply Significant Code Review: Modelling Report, November 2011:
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Redpoint%20Energy,Gas%20Security%20of%20Supply%20Significant%20Code%20Review%20-%20Economic%20Modelling.pdf

London Economics, Estimating the Value of Lost Load – Final Report to Ofgem, July 2011:
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/London%20Economics,%20Estimating%20Value%20of%20Lost%20Load%20-%20Final%20Report%20to%20Ofgem.pdf

London Economics, Estimating the Value of Lost Load – Annexes, July 2011:
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/London%20Economics,%20Estimating%20Value%20of%20Lost%20Load%20-%20Annexes.pdf

Ofgem Consumer First Panel Year 3, Report on Value of Lost Load (VoLL), Opinion Leader, May 2011:
http://www.ofgem.gov.uk/Sustainability/Cp/CF/Documents1/Ofgem%20Consumer%20First%20Panel%20Year%203%20-%20Report%20on%20Value%20of%20Lost%20Load.pdf

Launch Statement – Gas Security of Supply Significant Code Review, January 2011
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Launch%20Statement%20-%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf

Initial Consultation - Gas Security of Supply Significant Code Review, January 2011 (Reference number 02/11):
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Initial%20Consultation%20-%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf

Letter to update on Gas Security of Supply Significant Code Review, July 2011
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Gas%20SCR%20June%202011%20Letter_v5.pdf

Project Discovery - Energy Market Scenarios, October 2009 (Reference number: 122/09):
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=2&refer=markets/whlmkts/discovery

Project Discovery - Options for delivering secure and sustainable energy supplies, February 2010 (Reference number: 16/10):
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=73&refer=markets/whlmkts/discovery

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Executive Summary

The need for change

Since its liberalisation in the 1990s, the gas market in Great Britain (GB) has delivered secure gas supplies and substantial investment in new facilities. We have not had an emergency due to a lack of gas supply. However, for some time we have expressed concerns about whether the current arrangements will deliver secure gas supplies into the future. In our Project Discovery document of 2010, which considered security of GB energy supplies, we noted that price signals for ensuring gas security of supply are weakened in an emergency and do not reflect the value of secure gas supplies to consumers. While incremental changes have been made, concerns remain.

Outlook for security of supply

Historically, GB relied on domestic gas supplies to meet its entire demand. However, domestic sources are declining and GB increasingly relies on international supplies from Norway, continental Europe and global Liquefied Natural Gas (LNG) markets. At the same time Europe is becoming more reliant on Russian and LNG supply sources. There is general consensus that the GB gas market should be well supplied in the near term. However, we need to ensure our arrangements are resilient to a range of future scenarios given our increased dependence on international supplies and the risks associated with low probability, high impact events.

Concerns with the current emergency arrangements

In GB, shippers pay imbalance charges (called cash-out charges) if they take more gas off the system than they put on and vice versa: these reflect the costs to the system operator of balancing the system. The potential exposure to high cash-out charges incentivises shippers to take measures to ensure gas security of supply, for example through procurement of storage, long-term contracts or demand side response (DSR) measures. However, currently the cash-out price is frozen upon entering into a Gas Deficit Emergency (GDE). Hence, the price signals are weakened at the very time when they are needed to attract more gas. This means that shippers do not face sufficient incentives to take appropriate action to prevent a GDE occurring. Further, if an emergency were to occur it may be unduly prolonged if the cash-out price is frozen below the level required to attract additional gas into GB.

Currently, a GDE would be managed by the system operator instructing domestic gas supplies to flow and, where necessary, interrupting customers with firm gas supply contracts. In the latter case, this effectively requires 'firm' customers to provide involuntary DSR services. As GB gas supplies are decreasing, managing an emergency by instructing domestic supplies to flow may no longer be sufficient to get us out of an emergency. Further, the costs of firm customer interruptions are borne by the customer rather than the shippers that caused the emergency. Hence, the price signals do not reflect the risks faced by customers, and shippers do not face the true costs of an emergency. Risks are therefore not placed with those best able to manage them.

Policy rationale

We have considered ways to incorporate the costs of interrupting firm customers into the cash-out arrangements and to ensure that affected customers are paid for providing involuntary DSR services. In the case of wide scale interruptions, firm customers could be without gas for a prolonged period. It may be inappropriate for shippers to face the ongoing impact of this as they have little influence on how quickly supplies could be restored. Further, very high cash-out charges might lack credibility and potential exposure to very high payments may increase credit requirements which could reduce competition.

We are therefore minded to introduce payments to interrupted firm customers in the event of a GDE through a capped cash-out regime. Our analysis indicates this reform would deliver a net benefit to consumers and would have minimal impact on bills.

However, capping cash-out means that a gap in the arrangements still remains and consumers continue to bear some risks if a GDE occurs. Further, if we relied solely on capped cash-out reform to deliver security of supply we would be concerned that:

- market participants might not be able to accurately assess the likelihood of an emergency occurring and might not invest sufficiently against one occurring
- international gas might not flow into GB (even if there are high prices in GB) if arrangements in other countries take precedent
- there may be social costs of an emergency that are not reflected in our capped cash-out proposal.

Taken together, the gap left by capping cash-out and these broader concerns mean that we believe investigation of further interventions to enhance security of supply is required in addition to capped cash-out reform. While our draft impact assessment shows that there could be a net cost associated with pairing capped cash-out reform with certain further interventions, we believe that capped cash-out paired with an appropriate further intervention may be in the interests of consumers.

Draft policy decision

Our draft policy decision is that cash-out should be allowed to rise to an estimate of domestic customers' average daily value of lost load (domestic VoLL) for all days of firm load shedding (where individual large consumers are required to reduce their gas demand) and the first day of any network isolation (where parts of the network stop receiving gas). Initial work has yielded an estimate of £20 per therm for domestic VoLL. If firm load shedding occurs, firm daily metered customers would be paid domestic VoLL for each day they are without gas. If network isolation occurs and firm customers are interrupted, these customers would be paid domestic VoLL for the first day of an interruption only.

In addition, for the reasons stated above, we believe that further interventions to enhance security of supply should be investigated alongside our proposed cash-out reform. The Department of Energy and Climate Change supports this view and has asked us to undertake further analysis on the need for, impacts, costs and benefits of the various further interventions available. This work will be undertaken through a separate process alongside the Gas SCR. The final decision for the Gas SCR will focus on our proposed cash-out reform rather than further interventions.

1. Introduction

Chapter Summary

This chapter provides an introduction to this Gas Security of Supply Significant Code Review (Gas SCR). This includes our key objectives, general messages from responses to the initial consultation and our proposed process and timings.

1.1. As stated in our initial consultation document, our key objectives for this Gas SCR are to:

- minimise the likelihood of a Gas Deficit Emergency[1] (GDE) occurring by encouraging gas shippers and suppliers to take out sufficient investment to ensure gas security of supply[2]
- minimise the severity and duration of a GDE, if one ever occurred, by sharpening incentives to attract gas into Great Britain (GB)
- compensate firm consumers if they are ever interrupted due to a GDE.

1.2. The last of these objectives is not to provide 'compensation' as such, but to ensure that any involuntary demand side response (DSR) services that are provided in an emergency by firm customers are paid for by shippers that were short of gas (short shippers). In this way, the term 'compensate' was used as shorthand for the payment by short shippers for involuntary DSR services. We will in the future be referring to the policy option more accurately as payment for involuntary DSR services.

1.3. A GDE is an emergency that occurs as a result of there being insufficient quantities of gas on the network. This could ultimately result in firm customers — that is, customers that are supposed to have an uninterrupted supply of gas — having their gas supply interrupted to amend this imbalance. The reforms we are proposing would affect the emergency arrangements (namely section Q) of the Uniform Network Code (UNC) and potentially shippers', suppliers' and the system operator's licences. This review is not concerned with interruptions or emergencies that result from network infrastructure failures (except to the extent that these could cause a GDE).[3]

1.4. Ofgem published its initial consultation document for the Gas SCR on 11 January 2011. The initial consultation included three options for reform of the gas emergency arrangements. The intended purpose of these reform options was to improve the incentives on gas market participants to ensure gas security of supply in

[1] There are three types of National Gas Supply Emergencies: a Critical Transportation Constraint; a Gas Deficit Emergency (Insufficient Supplies) and; a Gas Deficit Emergency (Breach of GS(M)R Safety Monitor Emergency). This Significant Code Review seeks to minimise the likelihood of a Gas Deficit Emergency caused by insufficient supplies only.
[2] This could include investment in storage capacity and contracts for customer interruption, for example.
[3] See http://www.ofgem.gov.uk/Networks/GasDistr/QoS/Pages/QoS.aspx for more information on the quality of service arrangements for network outages.

GB. In addition, the role of enhanced obligations as well as, or instead of, improved price signals was discussed.

1.5. The purpose of this document is to consult and seek stakeholder views on the preferred option within this draft policy decision for reform of the gas emergency arrangements. This preferred option has been developed by taking into consideration stakeholder views and responses and the results of our draft impact assessment.[4]

General messages from stakeholders

1.6. Written responses to the initial consultation document were invited by 22 February 2011. Thirty-seven responses were received; these are available on our website.[5] In addition, we undertook widespread consultation including seminars, workshops and bilateral meetings with gas users, shippers, suppliers and gas storage operators (appendix 1 contains a list of the key consultation events that we have undertaken to date).

1.7. Stakeholders have generally supported the Gas SCR being undertaken. Some stakeholders noted that the timing of the review was appropriate given that gas security of supply is less of a concern in the short term than into the future. Hence, this allows time to carefully consider the full impacts of the reform options and to implement reforms before gas supplies tighten. While there was general support for the review, many respondents were of the view that the gas market has delivered to date and hence, minimal reform is required. A number of related but out of scope issues, such as gas quality and regulatory arrangements for storage investment, were also mentioned. These are discussed in further detail in appendix 2. Views on the options included in the initial consultation document are set out in chapters 4 and 5.

Findings from our Consumer First Panel

1.8. In 2008 Ofgem set up its 'Consumer First Panel' (the Panel) to better understand the concerns of gas and electricity consumers. The Panel consists of 100 domestic consumers across six locations in GB. Participants are called upon regularly to feed back their views and opinions on key energy topics and regulatory issues.

1.9. In January and February of 2011, we held six deliberative workshops in which we asked Panellists about their knowledge of the risks to GB gas security of supply and explored options for improving security of supply.[6] Key findings of these Panel discussions include:

[4] See *Draft Impact Assessment - Gas Security of Supply Significant Code Review*: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Draft%20Impact%20Assessment%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf

[5] Available at http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=1&refer=Markets/WhlMkts/CompandEff/GasSCR

[6] Ofgem Consumer First Panel Year 3, *Report on Value of Lost Load (VoLL)*, Opinion Leader, May 2011: http://www.ofgem.gov.uk/Sustainability/Cp/CF/Documents1/Ofgem%20Consumer%20First%20Panel%20Year%203%20-%20Report%20on%20Value%20of%20Lost%20Load.pdf

- Panellists tended to view gas as a cheap, instantaneous and reliable source of heating and cooking and were generally worried about the impacts that a gas supply shortage would have on them, especially in winter.
- Most Panellists were of the view that suppliers are responsible for maintaining reliable gas supplies. Panellists were generally surprised that there are no regulatory mechanisms in place on suppliers to ensure security of supply.
- When the option of compensation was raised, this was met with mixed views as many Panellists thought that this would ultimately be funded through bill increases. A common view was that any additional revenue through bill increases should be invested to ensure against outages occurring.
- In three of the Panel sessions, Panellists offered the unprompted solution of Ofgem obligating energy companies to make the required investments instead of relying on price signals. In these sessions, this was met with broad support from Panellists.

1.10. In this way, a number of Panellists favoured obligations to ensure that suppliers undertake sufficient investment to minimise the risk of an emergency occurring rather than relying solely on price signals. However, the costs and benefits of such obligations were not discussed in any detail.

Process and timings

1.11. Any licence changes will be implemented through the licence modification process which is to be introduced as part of Third Package implementation.[7]

1.12. Modifications to the Uniform Network Code (UNC) could be implemented under two possible routes:

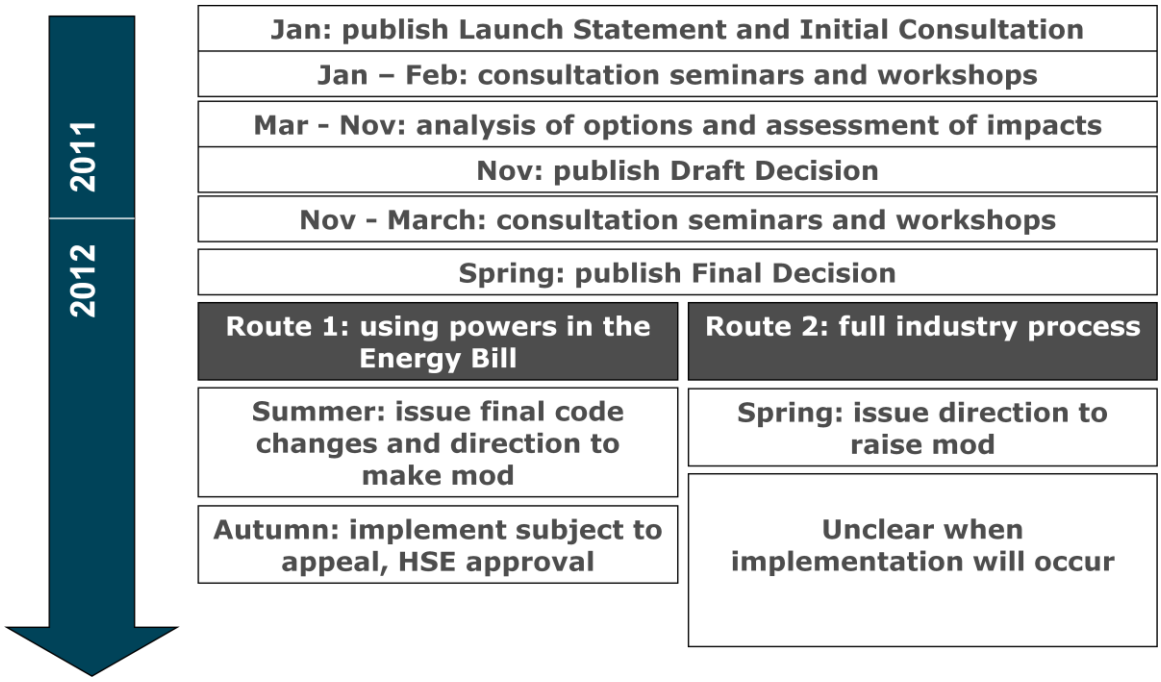
- The Significant Code Review (SCR) process whereby the proposal would be implemented by industry following our final decision under the normal code modification process.
- Section 81 of the Energy Act 2011[8] has inserted a new section (section 36C) into the Gas Act 1986 to allow the Authority to direct a modification to the UNC if the Authority considers that such a modification will reduce the likelihood of a gas supply emergency occurring or reduce the severity or the duration of an emergency.[9]

Indicative timeline

1.13. The indicative timeline for the two different routes is shown in Figure 1.

[7] The term "Third Package" in this document refers to 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; 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 and Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators.
[8] The Energy Act 2011 gained Royal assent on 18 October 2011.
[9] Ofgem is required to consult such persons as it considers appropriate before directing changes to be made using these new statutory powers. The SCR process would constitute consultation for the purposes of this statutory power.

Figure 1 Indicative timeline



1.14. A number of respondents commented that the timeframe for the Gas SCR was very tight and suggested that the new powers under the Gas Act 1986 should not be used to implement the relevant reforms. Instead they argued that the full SCR process should be followed. We have responded to these views in part by extending the timetable to allow for more consideration of the various reform options as part of this draft policy decision.

Responses to this consultation document

1.15. We welcome views from interested parties regarding all aspects of this Gas SCR draft policy decision document. In particular, we welcome responses to the questions set out within each chapter.

1.16. Responses should be sent to Ofgem no later than 31 January 2012. Details of how to respond can be found in appendix 4.

Stakeholder events following release of this draft policy decision

1.17. A number of stakeholder events will follow the release of this draft policy decision. To register your interest in attending these events, please email GB.Markets@ofgem.gov.uk. Indicative dates for these events are as follows:

Draft policy decision consultation:

- Opening seminar – 29 November 2011
- Workshop 1 – 13 December 2011
- Workshop 2 – 23 January 2012
- Consultation response deadline – 31 January 2012.

Licence and codes drafting:

- Workshop 1 – 15 February 2012
- Workshop 2 – 29 February 2012.

Feedback to industry on policy and licence and codes drafting:

- Closing seminar – 14 March 2012.

2. Background

Chapter Summary

This chapter provides a background to this Gas Security of Supply Significant Code Review (Gas SCR). First, the current arrangements are discussed. This is followed by a discussion of our concerns regarding gas security of supply in Great Britain (GB). Lastly, an overview of the wider context is provided.

Current arrangements

2.1. In GB, gas shippers are incentivised to balance their gas supplies and demands through imbalance or 'cash-out' charges:

- 'Short' shippers — those that have not put as much gas onto the system as their customers are taking off — are required to pay the System Marginal Buy Price[10] for the volume of gas for which they are short.
- 'Long' shippers — those that have put more gas onto the system than their customers are taking off — are paid the System Marginal Sell Price for any additional gas they flow onto the system.

2.2. Thus in most circumstances long shippers would be paid less than they would have received from selling their excess gas in the market. Similarly, short shippers would usually be charged more than they would have likely paid for buying the gas in the market. Hence, there is always an incentive for shippers to keep their supply and demand in balance.[11]

2.3. The level of cash-out will generally reflect system tightness, so that cash-out will rise when supplies are scarce relative to demand. It is these short term cash-out prices that incentivise shippers to balance their positions and invest in sources of flexibility to allow them to hedge against higher imbalance charges in the future.

2.4. At present there are five stages of an emergency as shown in Figure 2. At stage 2, cash-out is frozen at its current level and the emergency is managed predominately by the Network Emergency Coordinator (NEC) directing physical delivery of supply.[12]

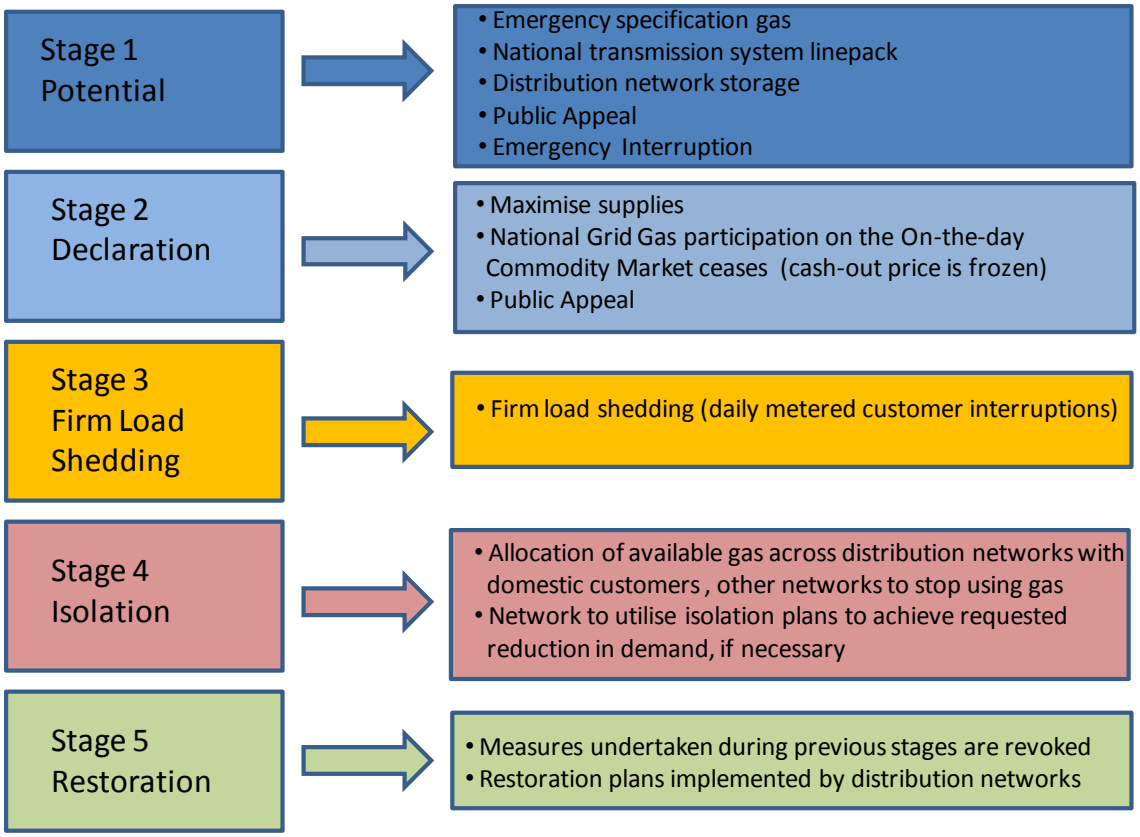
2.5. In addition, Post Emergency Claims (PEC) arrangements exist to compensate shippers that have supplied gas into GB in an emergency at a price below what they would have otherwise received for their gas if they could have used it elsewhere.

[10] Please see Glossary for full explanation of terms.
[11] For more on how cash-out prices are determined, see: Joint Office, *Modification Report Update of the default System Marginal Buy Price and System Marginal Sell Price Modification Reference Number 0333/0333A*, Version 3.0, 16 March 2011 [http://www.gasgovernance.co.uk/sites/default/files/Final%20Modification%20Report%200333%200333A%20including%20formal%20text%20v3.0.pdf]
[12] The Exit Reform currently being undertaken by National Grid would change these stages of an emergency. The proposed changes are consistent with the changes we are considering as part of this Gas SCR. See chapter 4 for more.

This should reflect the price that the GB market may have risen to if cash-out was not frozen.

2.6. For more on the current gas emergency arrangements, see chapter 2 and appendix 2 of the initial consultation document.[13]

Figure 2 Current stages of an emergency



Concerns with the current arrangements

2.7. We have a number of concerns about the incentives provided by the current arrangements to ensure continued gas security of supply into the future.

2.8. Firstly, as the cash-out price is frozen upon entering into a gas deficit emergency (GDE), the price signals are weakened at the very time when it is likely that prices need to rise to attract more gas. This means that shippers do not face sufficient incentives to take appropriate actions to ensure against a GDE occurring. Further, if an emergency were to occur it may be unduly prolonged if the cash-out price is frozen below the level required to attract gas into GB.

[13] See *Gas Security of Supply Significant Code Review - Initial Consultation*: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=1&refer=Markets/WhlMkts/CompandEff/GasSCR

2.9. In addition, the costs of any firm customer interruptions that are required to balance the system in a GDE are borne by the customer rather than the shippers that were short of gas. Hence, the price signals do not reflect the risks to customers, and shippers do not face the true costs of an emergency. Again, this means shippers do not face sufficient incentives to take measures to ensure gas security of supply.

2.10. Further, as the PEC process is completed after a GDE has occurred and claims are potentially subject to Ofgem review, there are a number of uncertainties around whether a shipper will receive what it has claimed under the PEC arrangements and when it will receive this payment. For this reason, where shippers are able to sell their gas outside of GB, they are likely to choose to do this rather than face the uncertainty of the PEC process.

2.11. Ofgem has communicated these concerns for several years, most recently in Project Discovery.[14]

Broader concerns about gas security of supply

2.12. Over the two and a half decades since privatisation and liberalisation, the GB gas market has been effective in delivering secure gas supplies. However, the gas market is changing and Ofgem is increasingly concerned that GB's current arrangements may not deliver gas security of supply over the longer term.

2.13. Historically, GB has relied almost entirely on supplies of gas from the UK continental shelf. Recently, however, domestic supplies have declined as shown in Chart 1. The decrease of domestic supplies has made GB increasingly reliant on gas from international sources. This trend is forecast to continue as shown below on chart 1.

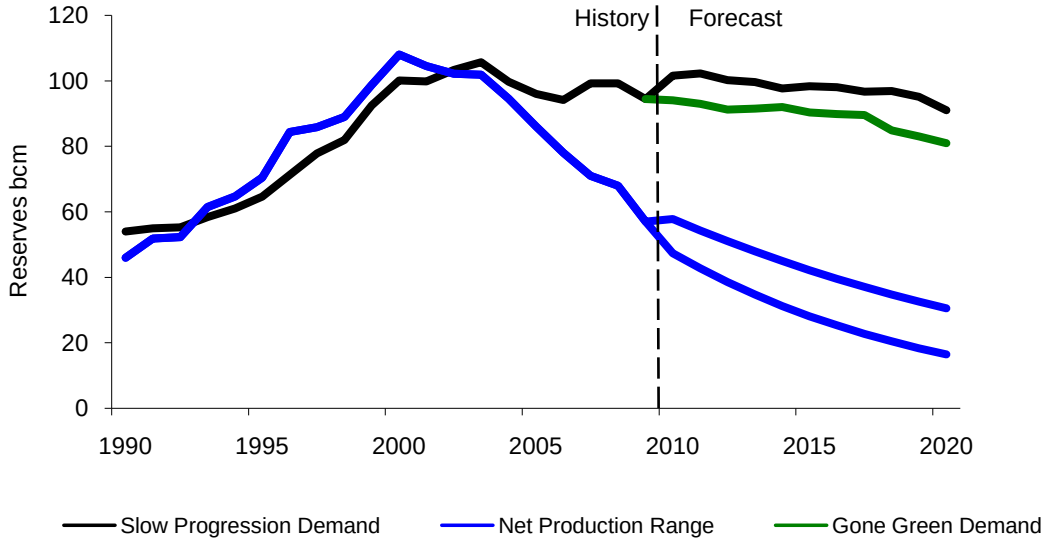
2.14. In the past, an emergency could be managed through the NEC instructing domestic gas supplies to flow and, where necessary, interrupting firm customers (ie effectively requiring firm customers to provide involuntary DSR services). However, as our domestic gas supplies are decreasing, managing an emergency by instructing domestic supplies to flow may no longer be sufficient to get us out of an emergency.

2.15. Further, interdependence with international markets can also expose GB to a range of additional risks to gas security of supply. In particular, differences in market arrangements can mean that gas might not flow according to where it will get the highest price.[15]

[14] Ofgem, *Project Discovery: Options for delivering secure and sustainable energy supplies,* Feb 2010: http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Documents1/Project_Discovery_FebConDoc_FINAL.pdf

[15] Ofgem, *Project Discovery: Options for delivering secure and sustainable energy supplies,* Feb 2010: http://www.ofgem.gov.uk/Markets/WhlMkts/Discovery/Documents1/Project_Discovery_FebConDoc_FINAL.pdf

Chart 1 UK continental shelf remaining supplies



Source: National Grid Ten Year Statement 2010

2.16. Being more reliant on international supplies also tends to mean longer supply chains. There are different risks associated with each part of any supply chain. These include risks of infrastructure outages, natural disasters and political instability, for example. Hence, the longer our supply chains, the greater the risks to gas security of supply. In addition, being part of a more global gas market means we are less sheltered from global events which can create shocks to demand or supply (for example, the events in Japan this year). Risks to gas security of supply will also be greater where gas supplies are concentrated in areas where delivery of gas depends more on political relations than prices.

2.17. Some steps have been, and continue to be, taken to increase harmonisation of gas and electricity markets across Europe, and Ofgem has led efforts to improve transparency of gas transmission and storage.[16] However, differences between the various gas markets remain. For example, while GB relies on price signals to provide security of supply, some European markets use Public Service Obligations and strategic provisions.

2.18. In addition, there are still problems around access to pipelines and storage facilities in some European markets. This is partly due to a lack of transparency and the greater prominence of long-term contracts, but also due to a lack of appropriate congestion management procedures and delays in implementing the Third Package across Europe. Ongoing European policy development and implementation work is

[16] For example, Regulation (EU) No 994/2010 on measures to safeguard security of supply was passed late last year (see chapter 3). This legislation aims to set a common gas security of supply standard for the European Union. Member states are required to have a competent authority responsible for monitoring gas security of supply, assessing risks to supplies and establishing preventive and emergency action plans. Member states are also obliged to cooperate in emergencies through the gas coordination group and by sharing information.

likely to improve this situation, but in the near future shippers may continue to face some of these obstacles when making forward arrangements to cover peak positions.

Wider context

2.19. We recognise that a number of other energy sector reforms are currently underway. To the extent that these reforms could affect, or be affected by, the Gas SCR, we are mindful of these interactions and of the need for consistency in our approach. Some key reforms of relevance are highlighted below.

Electricity Market Reform

2.20. The Government's Annual Energy Statement of 2010 announced the Electricity Market Reform (EMR), which resulted in a White Paper being released in July 2011. The EMR will undertake a fundamental overhaul of electricity market arrangements to help to promote investment in energy infrastructure, especially low-carbon generation.

2.21. One of the proposals in the EMR consultation is to implement a capacity mechanism to enhance electricity security of supply. Given the important interaction between the gas and electricity markets, especially the role of gas fired generation in providing secure electricity supplies, we will continue to monitor EMR developments closely.

European legislation

2.22. Any options for reform must comply with the European legislative framework. The Third Package creates a framework for new legally-binding rules to liberalise European markets and to promote cross-border trade. The Third Package seeks to create an integrated regulatory regime by requiring national regulators to cooperate on cross-border issues, establishing network codes for cross-border issues and creating an Agency for Cooperation of national Energy Regulators (ACER).[17]

2.23. ACER's Gas Balancing Framework Guideline was published on 13 October 2011. It sets out harmonised rules for the calculation of cash-out charges (based on the marginal and average price), but does not prevent Member States from implementing additional gas balancing arrangements that may apply during an emergency as defined under Article 10(3)(c) of the recent Gas Security of Supply Regulation.[18] There may also be interactions with the Framework Guideline on Interoperability and the Framework Guideline on operational procedures in an emergency.[19] All Framework Guidelines will eventually be implemented through legally binding European network codes.

[17] We note that we are planning to have a gas workshop on the implications of the European Union target model for GB in early 2012.
[18] Regulation (EC) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC.
[19] The Framework Guideline on Interoperability is currently in the scoping phase and work on the Framework Guideline on operational procedures in an emergency is yet to commence.

2.24. In addition, the recent Gas Security of Supply Regulation[20] came into force on 2 December 2010. This Regulation has important interactions with the Gas SCR and provides the European Commission with additional powers, including powers to declare and be able to take certain actions in a regional or European Union emergency. This Regulation also imposes a number of requirements on the Member State and the Competent Authority (see chapter 3). Where possible, Member States are expected to fulfil these obligations through market-based mechanisms. There is also an obligation on the Competent Authority to put in place an emergency plan which clearly defines the roles and responsibilities of the various players involved in such events.

Exit reform

2.25. The GDE procedures are set out in Section Q of the UNC. NGG is currently reviewing the procedures to ensure they are aligned with the changes to the national transmission system exit capacity arrangements which will take effect from 1 October 2012 as a consequence of Exit Reform.[21] As part of Exit Reform, NGG will offer an off-peak capacity product, but users will no longer be able to unilaterally nominate customers as 'interruptible'. Where capacity constraints arise, NGG will be able to scale back off-peak capacity, but the use of interruptible capacity for a GDE as currently set out in stage 1 of the procedures may no longer be an option. We are following this review and ensuring that our proposals for reform of the gas emergency arrangements are aligned with the review as it develops.

[20] Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC.
[21] See our website for further details on Exit Reform http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=34&refer=Networks/Trans/Archive/GasTrans/OfftakeReview.

3. Level of security of supply

Chapter Summary

This chapter discusses the various standards for security of supply which could be used as a benchmark for the Gas Security of Supply Significant Code Review (Gas SCR). It then discusses how these standards could be used alongside the various reform mechanisms being proposed.

Question box

Question 1: Are there any options for determining the level of gas supply security to be delivered by the market that we have not considered?

Question 2: Do you agree with our approach towards setting the level of security of supply?

Security of supply standards

3.1. The level of gas security of supply is important for defining what level of gas security of supply is expected to be delivered by industry with the remaining risks being managed by customers and/or government.

3.2. The EU Gas Security of Supply Regulation (Regulation (EU) No 994/2010[22]) (the Regulation) prescribes a minimum level of security of supply which Member States, including the United Kingdom, must achieve. Provided that Great Britain (GB) complies with this standard, there are a number of other security of supply standards which we may wish to consider in determining an appropriate security of supply standard. These include the security of supply requirements in licences and in the Uniform Network Code (UNC) which are discussed below.

EU Gas Security of Supply Regulation

3.3. The Regulation sets out the required gas security of supply standards for EU Member States. The Regulation requirements are described in box 1. GB will have to be compliant with these requirements by the relevant dates. Hence, the outcome of the Gas SCR should be designed to promote a level of security of supply which is compliant with the Regulation.

[22] Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC.

Box 1: Security of supply standards in the Regulation

Infrastructure standard

Paragraph 1 of Article 6 of the Regulation requires that if the single largest gas infrastructure is interrupted, the capacity of the remaining infrastructure must satisfy total gas demand during a day of exceptionally high gas demand (occurring with a statistical probability of once in 20 years).

Commodity standard

Paragraph 1 of Article 8 states that:

> The Competent Authority shall require the natural gas undertakings, that it identifies, to take measures to ensure gas supply to the protected customers of the Member State in the following cases:
>
> (a) extreme temperatures during a 7-day peak period occurring with a statistical probability of once in 20 years;
>
> (b) any period of at least 30 days of exceptionally high gas demand, occurring with a statistical probability of once in 20 years; and
>
> (c) for a period of at least 30 days in case of the disruption of the single largest gas infrastructure under average winter conditions.

Protected customers include all households and can include small and medium enterprises, essential social services and district heating services, as determined by the Member State by 3 December 2011.

Licence and UNC requirements

3.4. Gas transporters are required to ensure that their pipeline systems are planned and developed to deliver a one in 20 standard.[23] Gas transporters are also required to develop incentive mechanisms (ie through the UNC) to put reasonable incentives on suppliers to meet the demands of their domestic customers in a one in 20 year peak day.[24]

3.5. Under the UNC, shippers are also incentivised to meet the required security of supply standards. Shippers are incentivised to balance their offtakes and deliveries, operate within security standards for the pipeline system, and to nominate their offtakes and deliveries to the transporter prior to the delivery period. Shippers must also use their best endeavours to comply with all requests made by transporters if the transporters are of the opinion that emergency conditions apply.

3.6. Stakeholders have argued that the security of supply standard for gas should be no higher than that required for the gas network; otherwise there might be sufficient gas but it might not be able to be delivered to customers.

[23] "One-in-20 peak day demand" is the peak day demand that, in a long series of winters, with connected load being held at the levels appropriate to the winter in question, would be exceeded in one out of 20 winters, each winter being counted only once (defined in the UNC).
[24] Gas suppliers' licence conditions changed in August 2008, so that there is no longer an obligation in the suppliers' licence to meet a 1 in 20 peak day demand.

How to use the security of supply standard

3.7. The security of supply standard could be used as a way of 'bounding' the liabilities associated with the reform options being investigated.

Cash-out reform and a security of supply standard

3.8. In the case of cash-out reform (see chapter 4), a gas security of supply standard could be used to limit shippers' cash-out liabilities in line with the standard. In this way, the circumstances in which cash-out would be payable could be bounded in line with the level of security of supply sought. Outside of these circumstances customers or government would bear the risk of a gas deficit emergency.

3.9. Alternatively, value of lost load (VoLL) could be estimated for the circumstances corresponding to the relevant standard. For example, in the Regulation, part a) could correspond to the willingness to accept payment for a seven day outage occurring once every 20 years. Assuming this occurred in winter, this would equate to approximately £20 per therm for domestic customers (see chapter 4 for more on how domestic VoLL was estimated). In this case, shippers would not be relieved of paying cash-out in an emergency, but cash-out would be set at the VoLL that corresponded to the security of supply standard.

Further interventions and a security of supply standard

3.10. Chapter 5 introduces a range of possible further interventions. A gas security of supply standard (including VoLL) could potentially be used to set the level of any further interventions. For example, the volume for any storage obligation, the volume of any centralised demand side response auction or the conditions under which a licence condition would be applicable could be set using this method. However, this might not be possible for all types of further interventions.

Preferred security of supply standard

3.11. The Regulation sets out the minimum standard with which GB (and the UK as a whole) has to comply. The standard in GB may exceed that in the Regulation if certain conditions are met as stipulated in Article 8(2) of the Regulation. Among other things, any higher standard shall not:

- unduly distort competition or hamper the functioning of the internal market in gas; or
- impact negatively on the ability of any other Member State to supply its protected customers in accordance in the event of a national, Union or regional emergency.

3.12. The intent of the Regulation is to allow market mechanisms to deliver gas security of supply to the extent possible. Whilst the current market mechanisms in GB may be suitable to deliver these standards, we are concerned that the gap we have identified in the arrangements — the potential for firm consumers to be interrupted with no cost to shippers — could make our current arrangements insufficient in certain circumstances. However, this could only be tested if the specified circumstances ever occurred and even compliance at this time would not guarantee compliance with the Regulation in the more distant future. Compliance

with the Regulation therefore relies on some faith that the market arrangements are sufficient to provide appropriate incentives to deliver sufficiently secure supplies.

3.13. Our draft policy decision is to use the VoLL which corresponds with the gas security of supply standard to set the level of cash-out or a further intervention (or a combination of the two). That is, we will choose the VoLL which corresponds to the duration and frequency of outages referred to in the gas security of supply standard. In the Regulation, part a) refers to seven days of exceptional demand occurring once every 20 years.

3.14. If cash-out reform is introduced, we propose that the Regulation be met by setting the cash-out price (in the event of a firm customer interruption) at the average VoLL estimate for a one week outage occurring with a probability of once in twenty years. Assuming this would occur in winter, our analysis suggests that the VoLL for domestic customers would be approximately £20 per therm (see chapter 4 for more details). This would protect firm customers as they would theoretically be indifferent between receiving a completely firm supply of gas or a payment of VoLL if an interruption occurred.

3.15. However, to the extent that VoLL were capped, this might mean that a gap in the arrangements remained which might need to be addressed with further interventions (discussed in more detail in chapter 5). Such further interventions should theoretically be set to fill the gap between full and capped VoLL.

3.16. Cash-out liabilities are not currently subject to Force Majeure[25], and we do not propose to change this. However, were further interventions to be pursued then this may need to be re-considered.

[25] Clause 3 of Section 3 of the UNC General Terms defines Force Majeure as: "Any event or circumstance, or any combination of events and/or circumstances the occurrence of which is beyond the reasonable control of, and could not have been avoided by steps which might reasonably be expected to have been taken by, a Party (the Affected Party) and which causes or results in the failure of the Affected Party to perform or its delay in performing any of its obligations owed to any other Party or Parties under the code."

4. Cash-out reform

Chapter Summary

This chapter contains our draft decision on cash-out arrangements to enhance the incentives on shippers to reduce the likelihood and severity of gas deficit emergencies (GDEs). Under our preferred option an estimate of the Value of Lost Load (VoLL) of disconnected firm customers would feed into the cash-out price for short shippers, strengthening the incentive on shippers to balance their supplies and demands. Consumers would receive payment for providing involuntary demand side response (DSR) services. We also address the related emergency arrangements and discuss the other options we have considered.

Question box

Question 1: Do you agree that it is appropriate to retain the Post Emergency Claims (PEC) arrangements? If not please explain why.

Question 2: Do you agree with how we have estimated VoLL and the level of VoLL that we have used? Is there a case for using a higher VoLL to incentivise more discovery of the demand side?

Question 3: Is one day domestic VoLL an appropriate administrative price for any firm load interruptions?

Question 4: Do you agree that it is appropriate to retain the Emergency Curtailment Quantity (ECQ) arrangements? If not please explain why.

Question 5: To what extent do our proposals alleviate shippers' concerns about credit implications of targeting the full cost of multiple days of interruption on shippers that were short on day one of a stage 3 (network isolation) interruption?

Question 6: Should extended payment terms be applied to emergency cash-out (possibly to align with payments through the PEC payment process)?

Question 7: Will enhanced incentives to avoid an interruption occurring increase the number of interruptible contracts entered into by industrial consumers? Please explain why.

Question 8: Do you agree with our broad proposal for collecting monies from shippers and passing this through to customers? If not do you have an alternative proposal?

Cash-out

4.1. Under the current arrangements for a GDE the cash-out price is frozen upon declaration of stage 2 or beyond of an emergency. We are concerned that the cash-out price and the associated PEC arrangements may not provide sufficient incentives for shippers to import gas up to the price that consumers would be willing to pay for that gas.

4.2. Our cash-out reform proposals are designed to create incentives for shippers to purchase gas priced up to consumers' estimated VoLL. Our proposals are also consistent with the safety requirements of operating the network in accordance with the Gas Safety (Management) Regulations (GS(M)R).[26] Where firm consumers are disconnected, they would receive a payment at this estimated VoLL. We believe the costs associated with firm customer interruption should be borne by short shippers. Our proposals are aimed at appropriately targeting these costs, particularly given that it is not necessarily the customers of those shippers/suppliers that are short of gas that will be affected. Therefore, reputational risk will be shared to some extent.

Initial consultation

4.3. The three options which were put forward in the initial consultation document are summarised below (for more detail see the initial consultation document)[27]:

- Option 1:
  - Cash-out would be dynamic up to a cap of VoLL and would be set by market balancing actions undertaken by National Grid Gas (NGG).
  - The Network Emergency Coordinator (NEC) would no longer have the ability to direct physical delivery of supply onto the system.
  - Shipper-to-shipper trades would continue.
  - Disconnected firm customers would be paid VoLL.
- Option 2:
  - NGG would be the sole purchaser of non-domestic gas in an emergency and would pass on the costs of these purchases to short shippers; shipper-to-shipper trades would be suspended.
  - Cash-out would be dynamic and capped at VoLL as in Option 1.
  - Disconnected firm customers would be paid VoLL.
  - The NEC would be able to direct physical delivery of supply onto the system.
- Option 3:
  - NGG would act as the sole purchaser of gas in an emergency and would socialise the costs of these purchases.
  - Cash-out would be frozen and shipper-to-shipper trades would be suspended.
  - The NEC would be able to direct physical delivery of supply onto the system.
  - Disconnected firm customers would be paid VoLL.

[26] The GS(M)R are available on the HSE website:
http://www.hse.gov.uk/gas/supply/legislation.htm#gsmr

[27] Ofgem, 2011, Initial Consultation - Gas Security of Supply Significant Code Review (SCR), January, pp. 19-32
http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Initial%20Consultation%20-%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf

Respondents' views

4.4. We have received significant feedback on the options outlined above. Issues identified included:

1. Consultation respondents and workshop participants were resistant to the proposal that NGG could take on a role of purchasing gas in an emergency. It was considered that NGG does not have the relevant expertise, the appropriate incentives or contacts to purchase gas in an emergency. It was noted that shippers are far better placed and incentivised to do so as this is a core business for them.
2. Respondents' views were mixed over whether the costs of an interruption should be borne by short shippers. Whilst the economic principle of placing risk with those most able to bear it was understood, there were concerns that shippers may not be able to respond to these incentives in some circumstances. In this regard, a number of respondents suggested that there should be differing arrangements for emergencies that emerge quickly and those that emerge slowly.
3. NGG raised concerns about its ability to demonstrate an improvement in its safety case if the ability to instruct maximised supplies onto the system from domestic sources of gas was removed.
4. Some respondents expressed concerns that capping the cash-out price at VoLL could act as a target price and that shippers might withhold gas in the lead up to an emergency to receive higher prices at VoLL. However, other respondents believed that shippers would not act in this way as prices would likely be at historically high levels and would not be guaranteed to reach VoLL.
5. Concerns were raised about the credit implications of introducing a cash-out regime where prices could potentially rise much higher than they could do under current arrangements. These higher cash-out prices would mean a potentially greater financial liability for short-shippers than under the current cash-out arrangements.

Ofgem response to feedback

4.5. We have considered the feedback received. Our current view on this feedback is below.

1. We agree with respondents' views that, to the extent possible, those that are experienced in buying and selling gas under normal market conditions (shippers) would be better placed to do so in an emergency.
2. We remain of the view that the costs of an emergency should be borne by those short shippers who ultimately triggered the emergency. We do not think it is appropriate for different cash-out arrangements to be put in place for different types of emergencies. Reducing liabilities in a quickly emerging

emergency for example, would reduce the incentives to invest in flexible response (eg demand side services) to avoid such emergencies occurring and to attract gas during such an emergency. Furthermore, defining what is a 'rapid' or a 'slow' emergency would be problematic and would likely be arbitrary.

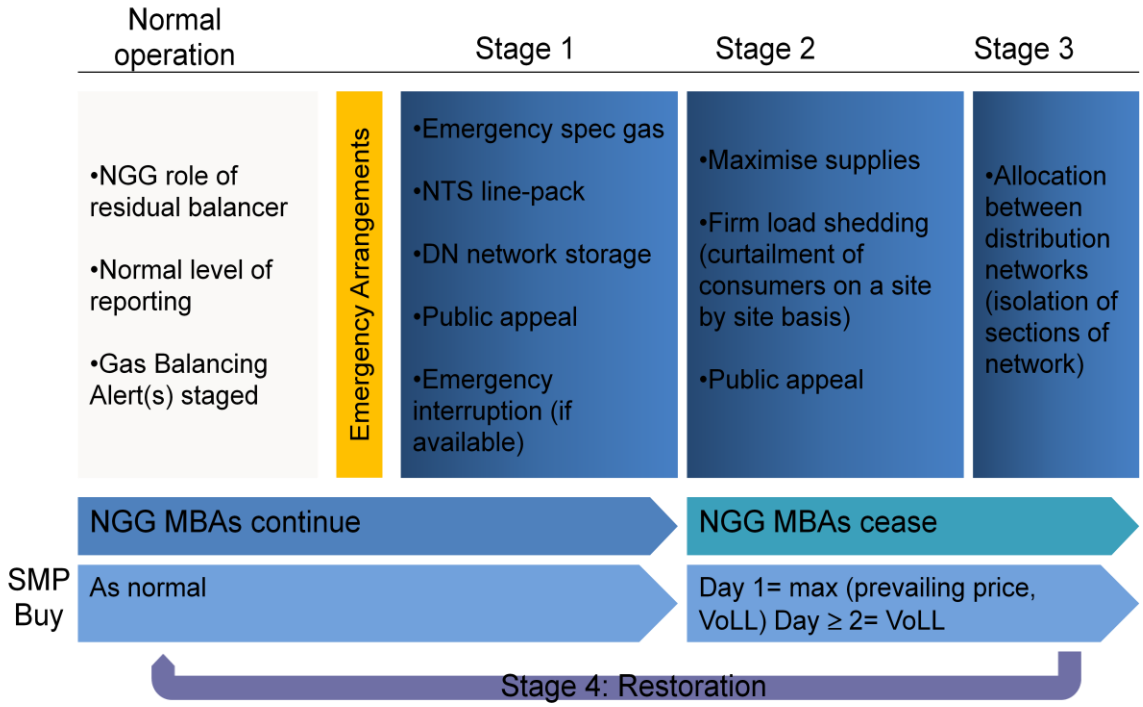
3. The main reason for proposing to remove the ability to direct domestic gas supplies onto the system is that we do not consider it appropriate for this direction to occur while NGG is still setting cash-out through its supply-side balancing actions. We consider the link between the willingness of shippers to supply gas and the price that they are willing to sell for to be broken for domestic sources in this scenario. An alternative way to prevent cash-out from freezing below the price consumers would be willing to pay for it is to raise cash-out price to at least an administrative level of VoLL whenever NGG takes an action to disconnect firm customers.
4. We have no evidence that shippers would withhold gas in order to force the price to reach VoLL. Shippers have a licence obligation not to knowingly or recklessly pursue any course of conduct which is likely to prejudice the safe and efficient operation of the system, the safe, economic and efficient balancing of the system or the due functioning of the arrangements provided for in its network code.
5. We acknowledge concerns about the ability of shippers to have sufficient credit and collateral for the sums necessary to pay consumers for the provision of emergency involuntary DSR services in the event of a GDE. We also acknowledge that once consumers on all or part of a Local Distribution Zone have been interrupted, the length of time it takes to reinstate their supplies will be out of shippers' control. We think that there are ways that shippers can mitigate this risk (eg through appropriate interruptible arrangements) and that the incentives to do so are important. However, we are minded to further mitigate these risks by capping the amount which shippers are required to pay to consumers for emergency involuntary DSR services.

4.6. Bearing in mind these issues, our proposed model for cash-out reform is set out below.

Changing the stages of emergency

4.7. NGG is in the process of changing the stages of an emergency to reflect Exit Reform implementation, expected in October 2012. For the remainder of this document we refer to the stages of emergency, post exit reform. We do not envisage that our proposals would cause additional changes from a safety perspective. The commercial arrangements sitting alongside would change as shown in Figure 3.

Figure 3: Proposed stages of a Gas Deficit Emergency



Acronyms: NGG – National Grid Gas; NTS – National Transmission System (Gas); DN – Distribution Network; MBAs – Market Balancing Actions; SMP (Buy) – System Marginal (Buy) Price; VoLL – Value of Lost Load

Proposed reforms to the emergency arrangements

National Grid Gas role

4.8. NGG would continue to take market balancing actions (MBAs) until the first firm load disconnections occurred (stage 2 under post-exit reform emergency stages[28]). These MBAs would set the market price. Upon disconnection of firm load, NGG would no longer take MBAs.

4.9. The NEC would retain its ability to direct physical delivery of supply from GB sources of gas.

Shipper-to-shipper trading

4.10. We propose that, as under the current arrangements, shipper-to-shipper trading would continue to be facilitated throughout an emergency.

[28] We refer to post exit reform stages throughout the remainder of this chapter as we anticipate that these will be in place by next winter.

Cash-out price

4.11. Our proposal for emergency cash-out is to treat interruption of firm consumers as an administratively priced demand side offer to reduce offtakes[29]. On day one of an emergency, the cash-out price for short shippers would rise to reflect the most expensive MBAs taken by NGG.[30] If firm consumers were interrupted (post exit reform stage 2 of an emergency), this would be reflected in the cash-out price by an administrative VoLL[31]. If other actions had been undertaken at a price above this administrative VoLL, the highest priced MBA would set the System Marginal Buy Price on day one of an emergency.[32]

4.12. On subsequent days of an emergency, the cash-out price would then revert to (or remain at) VoLL.[33] It is proposed that this remains the case until the point at which NGG can re-enter the market.

4.13. The cash-out price paid to long shippers (the System Marginal Sell Price) would continue to be based on the System Average Price. The default price may be relatively low, particularly on day one of an emergency, as the volume of high priced on-the-day commodity market (OCM) trades could be relatively low and default prices are derived using the System Average Price. Retaining use of these prices would require the PEC arrangements (discussed below) to maintain sufficient incentives for shippers to offer gas in excess of their anticipated offtakes onto the OCM.

4.14. We believe that the cash-out price calculation for each stage of an emergency could be incorporated directly into the Uniform Network Code (UNC).[34]

4.15. We believe that, in principle, firm customers should be paid for the duration of the period for which they are providing involuntary DSR services. However, for stage 3 interruptions involving network isolation, it is not possible to know the duration of an interruption at the point of entry into an emergency. Furthermore, shippers that are liable for paying for the provision of involuntary DSR services will be unable to control the speed of reconnection. To the extent that an outage lasts longer than one day, we believe that paying consumers for the provision of involuntary DSR services for the duration of their disconnection and pricing this into cash-out could create perverse outcomes.[35]

4.16. We consider that our proposals should provide strong incentives for shippers and consequently suppliers to enter into interruptible contracts with customers to allow them to interrupt consumers at a rate below the cost of the provision of

[29] That is to say, the regulator would determine how much NGG should pay firm consumers for this emergency interruption to their load. This would then be fed into the cash-out price.
[30] This could be achieved via a default in the UNC
[31] If NGG were to take action to maximise supplies but there were no firm load disconnection, the cash-out price for short shippers would be calculated in the same way as under the current emergency arrangements.
[32] The System Marginal Buy Price (SMP_{buy}) is the price paid by short shippers.
[33] If NGG had taken actions in excess off VoLL on day 1 SMP_{buy} would return to VoLL on subsequent days.
[34] An alternative may be to have National Grid effectively take both sides of a trade on the OCM that would set SMP_{buy}. The most appropriate way of applying the price would be considered as part of the implementation of the Gas SCR.
[35] This is discussed further in chapter 6.

involuntary DSR services. Where consumers have a VoLL below the administrative VoLL they would have an incentive to enter into contracts with suppliers that are willing to offer lower gas prices in all periods in return for their interruptible services.

Post Emergency Claims (PEC)

4.17. We believe that under our proposed model, the PEC arrangements should remain in place. The NEC would retain its ability to direct physical delivery of supply from GB sources of gas under these arrangements. This could mean shippers are forced to deliver gas that they consider to have greater value than the prevailing market/cash-out price. PEC arrangements are required to compensate those suppliers that deliver gas to the system in excess of their off-takes where the cost of supplying this gas exceeds the price they would be paid through cash-out.

4.18. In principle, we believe that it would be appropriate to make the charges to short shippers associated with the PEC arrangements reflect the marginal PEC if there were a way for shippers to be able to see the impact of this on cash-out at the time. This would sharpen the incentive for shippers to pay the maximum price accepted for gas used to help balance the system in an emergency. However, given the ex post nature of the assessment of claims, the price of the marginal claim that is approved will not be visible to market participants at the time of the emergency.[36] We therefore propose at this stage that short shipper exposure to the costs of claims (their PEC charge) continues to be based on the volume weighted average price of PEC and continues as an ex post process.

Role of VoLL

4.19. VoLL would be used as an administrative price for any disconnection of firm load. This should reflect a reasonable estimate of the cost to consumers of losing their gas supplies where they have not agreed an alternative interruptible contract. See box 2 for more on how VoLL was estimated.

NEC role

4.20. The NEC would retain its existing role, continuing to authorise the actions proposed by NGG to maintain system safety. This would include the ability to direct domestic supplies.

Payment for emergency involuntary DSR services

4.21. Disconnected firm customers would be paid for providing emergency involuntary DSR services. Interrupted firm customers will be paid domestic VoLL for each day that they are interrupted during stage 2 of an emergency.[37] However, firm customers that are interrupted in stage 3 will only be paid domestic VoLL for the first day of an interruption. This is based on the assumption that firm customers will be

[36] PEC trades are posted on the OCM so market participants would be able to see the prices at which they are being offered and an indicative volume weighted average price shown on the APX system.
[37] From a practical perspective however, payment for involuntary DSR service in stage 2 might have to be restricted to gas users that can verify that they have either reduced or stopped their gas use. This may mean that only DM customers would be able to receive payment for DSR services in stage 2.

able to reinstate their own supplies quickly in stage 2 but that restoration will take much longer once networks are isolated in stage 3.[38]

Box 2: Determining the Value of Lost Load

We commissioned London Economics in cooperation with OMB and YouGov to estimate VoLL for domestic, small and medium enterprise (SME) and Industrial and Commercial (I&C) consumers. This report is available on our website.[39]

London Economics used a non-market valuation technique called choice modelling to estimate VoLL for domestic and SME customers. This involved conducting a survey to elicit monetary values for both willingness to pay (to avoid outages) and willingness to accept payments (in the event of an outage) for a range of scenarios. For I&C gas users, a value at risk methodology was used.

We have chosen to use domestic VoLL to set cash-out. This is on the basis that domestic customers generally value reliable gas supplies above most other gas users. Hence, this will provide a stronger incentive for suppliers to negotiate interruptible contracts with daily metered (DM) customers that have a VoLL that is below the administratively set domestic VoLL. In addition, there is much more variation in non-domestic customers' VoLLs than for domestic customers, as demonstrated in London Economics' report. Hence, if multiple VoLLs were used this could overly complicate the arrangements.

In particular, VoLLs could theoretically be used to determine the order of firm customer disconnection. However, this would be unlikely to match the order of interruption determined from a safety perspective. As the order of firm customer interruption will continue to be determined with respect to safety considerations, we believe there is little benefit from having multiple cash-out prices for different customers (as this could distort the price signal during an emergency).

As London Economics estimated domestic customers' VoLL for a range of scenarios, we had to choose one value for VoLL within this range. We have chosen to use the average estimate of willingness to accept (compensation) for a one week outage in winter, occurring once in 20 years. This equates to approximately £20 per therm (see chapter 3 for why we chose this scenario).

If we wanted to further incentivise greater discovery of the demand side there could be a case for choosing a VoLL even further towards the upper end of the range of VoLLs. This would mean that more consumers would have an incentive to negotiate interruptible contracts and could lead to even more efficient sequencing of disconnection in the lead up to an emergency. This is one of the issues we are seeking stakeholder views on.

[38] In many cases, large daily gas users will be able to turn down their demand relatively quickly without the need to be physically disconnected from the gas network. However, if supplies are very tight network isolation may be required to maintain the safety of the system. While network isolation may be relatively fast, the reconnection of users on these networks will require engineers to visit each offtake to ensure gas supply can safely be restored in the network. Given the number of offtakes that would be involved, it is likely that this would take some time.

[39] See London Economics, Estimating the Value of Lost Load – Final Report to Ofgem, July 2011: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/London%20Economics,%20Estimating%20Value%20of%20Lost%20Load%20-%20Final%20Report%20to%20Ofgem.pdf

ECQ arrangements

4.22. It is unlikely that only the customers of those shippers that are short of gas would have their supplies interrupted by NGG in an emergency. As such, some shippers would not receive revenues from consumers interrupted by NGG even though they provided sufficient gas to the network to be able to supply those consumers. For this reason we believe that the ECQ arrangements will need to remain in place. In addition, something similar to ECQ may need to be developed to deal with any non-daily metered customers that are interrupted in an emergency. We welcome stakeholder views on this.

Impact of proposed reforms

Impact on shippers incentives to balance before and during an emergency

4.23. The proposed approach to cash-out would provide incentives for shippers to purchase gas up to the administered domestic level of VoLL in an emergency. Shippers' expectations of the possibility of firm load disconnections may also provide the incentive to purchase gas above the prevailing cash-out price where it appears that firm load curtailment is imminent.

4.24. We acknowledge that our estimate of domestic VoLL is higher than any cash-out price experienced to date. However, the size of this risk will be proportional to the risk that consumers and government currently bear were and emergency to occur and we consider that shippers are better placed to bear this risk. That said we would like to consider with industry whether it is appropriate to introduce a mechanism to allow shippers to make emergency cash-out payments over an extended period, potentially the same as the period for payment of PEC.[40]

Longer term incentives

4.25. We believe that our cash-out proposals will improve not only short term incentives to bring gas into GB in an emergency, but also long term incentives to avoid an emergency ever occurring. The risk of a high cash-out price should serve to incentivise shippers and suppliers to invest in measures to avoid that risk.

4.26. One such measure is DSR. Currently shippers' and suppliers' incentives to agree interruptible contracts are dampened since shippers do not face any additional costs when firm customers are interrupted in an emergency. The new cash-out proposals would impose these additional costs on short shippers. We would expect this to increase suppliers' readiness to take measures such as entering into interruptible contracts. This could be used by shippers to allow them to reduce the risk of negative imbalances. It should be noted that while our cash-out reforms go some way to encouraging DSR, there may be further issues that it is necessary to address. These are discussed further in appendix 3, and may be explored in more detail in any further interventions work stream.

[40] PEC payments are expected to take approximately 3 months from the end of the relevant month.

Impact on safety case

4.27. Our proposed approach to cash-out would allow NGG to retain (via the powers of the NEC) its current role, including the ability to direct flows. For this reason we would expect the impact of the proposals on the NGG and NEC safety cases to be limited. This is because the safety case focuses on the physical activities of NGG. The changes proposed above relate more closely to the commercial arrangements for providing incentives to reduce the likelihood and duration/severity of an emergency. As such, it is currently believed that this would not require a change to the NEC's safety case beyond those already required as part of Exit Reform.

4.28. We are aware that the potential for increased risk of high imbalance prices could increase the financial distress for shippers in the event of an emergency and that this could impact their ability to cooperate with NGG's instructions in an emergency. We believe that by limiting the cash-out liability associated with firm disconnection to an administered level of daily domestic VoLL and potentially introducing increased payment timescales these risks can be minimised.

4.29. The Health and Safety Executive (HSE) supports Ofgem's approach and has indicated that it is broadly satisfied that the approach will have no adverse effect on the health and safety standards associated with preventing or managing a network gas supply emergency.

Other options considered

4.30. We have considered other options for allowing the cash-out price to rise to the VoLL of interrupted firm consumers. These options could allow the cash-out price (and accordingly the market price) to rise as demand curtailment progresses in a smoother way than they would under our lead option.

Fully dynamic cash-out reflecting NGG MBAs throughout an emergency

4.31. We believe that a fully dynamic cash-out price that can increase more gradually would provide more transparent incentives for shippers to provide gas, particularly as firm customer interruption progresses in stage 2. However, we do not believe that it is consistent or practical for NGG to purchase gas from non-domestic sources while instructing other sources to flow irrespective of the market price. This is because the price of gas from non-domestic sources would be distorted by the flow of gas without a transparent price and it may not be possible to distinguish between the sources of gas flowing onto the network.

4.32. We consider that NGG should only take balancing actions where it has not instructed an increase in supplies or a reduction in demand. In its response to the Gas SCR Initial Consultation, NGG expressed concerns about its ability to demonstrate an improvement in its safety case if its ability to instruct maximised supplies were removed. Given the views of NGG, we do not believe that removal of these powers is a viable option at this stage.

Cash-out set to reflect the duration of an outage

4.33. If the full cost to consumers of an emergency were reflected in the cash-out regime, the duration of an outage would need to be taken into account. We have

considered measures to set the cash-out price equal to daily domestic VoLL multiplied by a number of days. This multiplier would reflect the minimum amount of time that domestic disconnection would have to last in order to ensure that enough gas had been added to maintain system safety. It would also have to incorporate the time required to safely reconnect domestic customers to the system because consumers may be willing to pay multiple levels of daily VoLL to avoid being disconnected for this amount of time.

4.34. In the case of wide scale interruptions, firm customers could be without gas for a prolonged period. This is because engineers would be required to safely turn off and subsequently restore supplies. In the case of restoring supplies this would involve purging pipes to ensure safety which could take substantial time. As shippers cannot influence the speed of reconnection (it is essentially a distribution network issue), it may be inappropriate for shippers to face the ongoing costs associated with a long outage. Further, very high cash-out charges might lack credibility which could mean that shippers do not respond to the sharpened price signals. In addition, potential exposure to very high payments may increase credit requirements which could create barriers to entry and reduce competition.

4.35. For these reasons, we believe that cash-out exposure should be capped once distribution networks are disconnected causing firm customers to be interrupted for prolonged periods.

Shipper-to-shipper trades set cash-out price

4.36. We have also considered allowing shipper-to-shipper trades to set the cash-out price between stages 2 and 3 of an emergency. However, we do not believe that this would be appropriate since it breaks the link between the costs that the system operator incurs in physically balancing the system and economic exposure to short shippers.

Cash-flows

4.37. Given that the proposals set out above are likely to increase the levels of cash-out payments recovered from short shippers, it would be necessary to appropriately redistribute these cash-flows if an emergency should ever occur.

4.38. In theory, consumers with a firm contract for gas should be paid for providing DSR services if their supplies are interrupted. However, we acknowledge the concern that paying consumers for the full duration of an outage (once distribution networks have been disconnected) would place a potentially large financial burden on shippers. This could have implications for the credit-worthiness of shippers, particularly those with smaller balance sheets. In addition, we believe that such high cash-out charges could lack credibility which could undermine their effectiveness.

4.39. Our proposals take these concerns into account. We propose that the price that feeds into cash-out when firm interruption occurs only reflects the VoLL of domestic consumers on the day in question, not for the duration of the outage. This

would mean that the costs to consumers of an outage lasting several days are not fully reflected in the arrangements.[41]

4.40. These proposals would go some way towards placing risk on those most able to bear and mitigate it. However, this balance of risk will not provide wholly sufficient incentives for individual shippers to invest in an optimal level of security of supply as it leaves some risk with consumers, government, and the rest of the industry. Hence, it may be appropriate to fill this gap by introducing further interventions. The rationale and design considerations for further interventions are considered in chapter 5.

Our proposed arrangements for recovering and redistributing payments for the provision of emergency involuntary DSR services

4.41. We consider that the most appropriate mechanism for recovering money for the payment for the provision of emergency involuntary DSR services by suppliers to consumers would be through cash-out or a similar emergency fund. We consider any firm load curtailment to be equivalent to any other DSR offered but without the authorisation of the consumers concerned. Hence, the price of this needs to be set at an administrative level.

4.42. Shippers who are short of gas during a GDE could have an obligation under the UNC to pay cash out for their imbalance at VoLL. Arrangements would need to be made to pass the revenues collected onto the suppliers whose customers had been interrupted (this could be via shippers). This would be likely to require changes to the UNC and to licences. If a GDE were ever declared and customers were disconnected, suppliers would receive the money from a fund drawn from cash-out charges and be obliged to pay the customers who have been disconnected for the provision of an involuntary DSR service using the monies recovered through cash-out.

4.43. Another method of achieving this would be to have the UNC and licence mechanism described above with a third party acting as a central agent for collecting cash-out payments from short shippers under the UNC and passing those revenues to the suppliers whose customers have been interrupted. Short shippers would therefore pay the cash-out payments to the central agent, who would then pass these revenues to the suppliers of the customers who have been interrupted. Suppliers would then pay those consumers for the provision of emergency involuntary DSR services.

4.44. We also note that our proposed cash-out reform could change the net balance of funds after an emergency (compared with current arrangements). Arrangements for how these funds would be redistributed or paid would also need to be established. This could involve passing the funds through neutrality or through to short shippers (as is the case under PEC arrangements).

[41] Cash-out will be set at the greater of VoLL or NGG's marginal MBA for day 1 of an emergency, for all subsequent days, cash-out will be set at VoLL.

Level of security associated with the proposed emergency cash-out regime

4.45. We believe that the arrangements described above will go some way to providing more appropriate signals for shippers to purchase gas in an emergency and to avoid an emergency occurring in the first place. However, as we are recommending capping cash-out liabilities to one day of VoLL once network isolation occurs, a gap in the arrangements remains and consumers still bear some of the risks of an emergency occurring. In addition, there are some reasons why we might not want to rely solely on price signals to ensure gas security of supply. These reasons and options for addressing the gap left by capping cash-out are discussed in chapter 5.

5. Possible further interventions

Chapter Summary

This chapter discusses the potential role of further interventions to improve gas security of supply. We summarise the key points outlined in the initial consultation document and respond to stakeholders' feedback. We then describe possible further interventions and next steps.

Question box

Question 1: Do you agree with our assessment that a gap in the emergency arrangements would remain following the introduction of capped cash-out? If so, to what extent do you believe that this gap can be overcome through further interventions?

Question 2: Have we captured the full set of potential further interventions? If not what other further interventions should be considered?

Background

5.1. As outlined in the previous chapter, sharper price signals could enhance incentives to reduce the risk of a gas emergency occurring and to minimise the duration and severity of an emergency, if one occurred. In particular, sharper price signals could incentivise investment in new storage, interconnection with Europe, long-term supply contracts, import diversification or demand side response (DSR) — each of which could enhance security of supply.

5.2. However, in chapter 4 we proposed that the price associated with firm customer interruption should be capped at one day's value of lost load (VoLL) for firm customer interruptions in stage 3 (that is, network isolation). Given that such interruptions would likely last several days, our proposed capped cash-out reform will not provide sufficient incentives to invest as it places a value on security of supply that is below customers' full VoLL. Further, as we have stated previously, we have concerns about shippers' ability to respond to sharper price signals (discussed in more detail below). Hence, we are of the view that there remains a gap in the arrangements that may be addressed through further interventions.[42]

Summary of the initial consultation document

Rationale for enhanced obligations

5.3. In our initial consultation document, we outlined a number of reasons why market participants might not (or might not be able to) respond appropriately to stronger price signals. In particular, market participants:

[42] We are using the term 'further interventions' rather than 'enhanced obligations' in this draft decision to reflect the wider scope of the types of mechanisms that could be used to enhance gas security of supply.

- might not be able to accurately assess the risk of an emergency occurring
- might not individually be held accountable for supply failures – that is, if the reputational risk is shared (i.e. moral hazard)[43]
- might have a bias towards short term action over investing sufficiently in adequate insurance
- might not expect to be held accountable if an emergency ever occurred, even if they can be identified as the responsible party.

5.4. Even if the incentives were right and market participants were able to respond to these incentives appropriately, concerns may remain. Divergence in the arrangements for delivering security of supply in other connected markets can exacerbate the risks in Great Britain (GB). Where the security standards provided by European Public Service Obligations (PSOs) create stronger incentives than the price signals provided by the arrangements in GB, gas may flow to continental markets rather than GB, and could in fact flow out of GB. Further, exposing shippers to a potentially high financial liability may result in perverse outcomes such as higher credit requirements which could act as a barrier to entry and restrict competition.

5.5. While gas markets have generally worked well even in tight conditions, there have been concerns (for example in January 2009 during the Russia/Ukraine gas dispute) that gas may be withdrawn from GB storage ahead of continental storage in a way that does not reflect price differentials. Furthermore, damage to import infrastructure, in particular interconnector pipelines, could inhibit imports significantly.

Risks and unintended consequences of further interventions

5.6. In our initial consultation document we noted that introducing obligations on market participants should not be considered as an easy solution. The introduction of obligations raises a number of questions around how they are designed and the risks and unintended consequences associated with placing them on parties to ensure security of supply. In particular, the introduction of obligations may impact on competition and liquidity and may restrict suppliers' flexibility.

Stakeholders' feedback to the initial consultation

Rationale for the introduction of enhanced obligations on industry participants

5.7. Some respondents, including storage operators and business representatives, argued that obligations on market participants are required and/or should be further considered. A number of shippers and suppliers questioned whether industry would respond to sharper price signals. It was argued that without a licence or statutory obligation on market participants to act in a particular way, market participants might prefer to take the risk and choose not to insure (either physically or

[43] It is not generally only the customers of those suppliers that are short of gas that may be affected. Where it is possible (for the largest industry and commercial customers), this is not generally the method by which curtailment order is decided.

financially) against a GDE occurring. In particular, given the low probability of a GDE, it might be difficult for companies to gain approval from their boards for additional investment, despite the high potential impact of a GDE.

5.8. Even if shippers did respond to sharper price signals, some stakeholders noted that European PSOs can dampen the effect of GB price signals. It was argued that a storage obligation delivers physical gas security and will therefore make it easier to monitor, demonstrate and prove that security of supply standards have been met. It was also noted that storage capacity in GB is much lower than that in many other European Member States (eg France and Germany).

5.9. A number of stakeholders suggested extending the scope of this initiative by including other interventions besides relevant statutory or licence obligations on industry participants, such as improved DSR mechanisms to facilitate the greater use of interruptible contracts. Of these, the majority referred to an auction as a possible mechanism to achieve this. This auction could be run by a third party or by National Grid Gas (NGG). A number of large gas customers suggested that they are deterred from entering into interruptible contracts due to a perception that interruptible customers can be interrupted frequently (at the supplier's discretion) as compared to firm customers who (according to their perceptions) would never be interrupted. It was suggested that the decision to interrupt should instead be based on some form of objective trigger.

5.10. We held discussions with our Consumer First Panel[44] to elicit its views on the importance of, and ways to enhance, security of gas supply. In three of the panel sessions, Panellists offered the unprompted solution of Ofgem obligating suppliers to make the required investments instead of relying on financial incentives to ensure secure gas supplies. In these sessions, this was met with broad support from Panellists (see chapter 1 for other findings from the Panel).

Risks and unintended consequences of enhanced obligations

5.11. The majority of stakeholders, in particular shippers and suppliers, raised concerns about the potential introduction of enhanced statutory or licence obligations on industry participants; in particular an obligation to hold a specified amount of gas in storage (ie a storage obligation). It was argued that the GB gas market works well and that companies already respond to price signals. A number of respondents raised concerns that the introduction of additional obligations would increase investment costs and gas prices as well as inhibit liquidity. This could lead to creation of additional barriers to entry.

5.12. There are a range of potential interventions that could be implemented. The feedback we received centred mainly on the impact and design of a storage obligation. This includes:

[44] In 2008, Ofgem set up its 'Consumer First Panel' to better understand the concerns of domestic gas and electricity consumers. The panel consists of 100 domestic consumers across six locations in GB. Participants are called upon regularly to feed back their views and opinions on key energy topics and regulatory issues. In January and February of this year, we held six deliberative workshops in which we asked panellists about their knowledge of the risks to GB gas supply and explored options for improving security of supply.

- Some parties suggested that we should consider re-introducing top-up arrangements[45]. However, other stakeholders voiced concerns about this quoting the high costs that led to the discontinuation of these arrangements.
- A storage obligation could not guarantee secure supplies since storage facilities are liable to outages and gas in storage will eventually run out in an emergency. Also, suppliers/shippers who are subject to a storage obligation may have the incentive to withhold gas from the market prior to an emergency and could therefore make a gas supply deficit more likely and/or inflate prices in tight market conditions.
- Incentives rather than a legal obligation to act in a particular way should be used to attract more investment in storage.
- Investment in storage facilities is already occurring but regulatory uncertainty and planning issues are deterring a number of projects (see appendix 2).

Ofgem's response to stakeholder feedback

Rationale for further interventions

5.13. We agree that the GB gas market is a generally well functioning market. We continue to believe that our proposed reform of the cash-out arrangements will further improve the incentives for shippers and suppliers to manage the risk of a gas emergency occurring and to minimise the duration and severity of any gas emergency that might occur.

5.14. Following consultation, we continue to believe that market participants may not respond appropriately to price signals to avoid a high impact, low probability event. Our modelling, which is outlined in the draft impact assessment, shows that capping cash-out reduces the incentives to take appropriate action to insure against a GDE occurring compared with uncapped cash-out reform.[46] Therefore, there remains a gap in the arrangements that could be filled through further interventions. Our modelling illustrates that a storage obligation for example, combined with capped cash-out provides a high level of security – higher than capped cash-out alone. However, this option would come at a greater cost. For example, when more dynamic cash-out prices cannot attract more gas because it is not possible to attract physical gas supplies (eg when interconnectors are unavailable) a storage obligation can help by providing the required physical volumes of gas.

5.15. Following stakeholder feedback, we agree that it is beneficial to broaden the scope of this exercise by not restricting the discussion to enhanced licence or statutory obligations on industry participants. We have therefore decided to open the discussion up to other possible interventions. Hence, we are now using the broader term of "further interventions" to reflect this.

[45] Under top-up, the System Operator was responsible for ensuring sufficient supplies were held in storage to meet the demands of firm customers in a severe winter. This was achieved by buying and storing gas both in advance of winter if forecasted demand exceeded supplies as well as throughout winter in case stock levels fell below set levels.
[46] Chapter 6 outlines the options we have considered. Option 1 is with uncapped cash-out; option 2 is with capped cash-out.

Risks and unintended consequences of further interventions

5.16. We recognise the concerns expressed by the majority of respondents that the introduction of new statutory or licence obligations on industry participants could distort the market or result in unintended consequences. An assessment of these effects is outlined in the draft impact assessment. We further acknowledge that there are difficult design issues to be resolved when introducing further interventions to minimise risks and unintended consequences. Therefore, the choice and design of a further intervention would need to be carefully assessed.

5.17. We do not believe that reintroducing the top-up arrangements is appropriate. Top-up was removed following an Ofgem review in 2004[47] due to its high costs and concerns that the systems dulled the incentives on shippers to ensure security of supply. We have not received evidence to change our view on this issue.

5.18. We acknowledge stakeholder concerns around barriers to investment in infrastructure (eg planning consent, regulatory uncertainty). While being out of scope of this Gas SCR process, Ofgem is looking at these issues on an ongoing basis through separate work streams.

5.19. We acknowledge concerns that a storage obligation could potentially withhold gas from the market prior to an emergency and therefore make firm load shedding (that is, stage 2 of an emergency) in particular more likely. Our modelling supports these concerns, although the specific design of such an obligation will be critical to understanding its impact fully. However, cash-out reform can counter this effect by attracting additional gas in times of system tightness. Therefore, we believe that cash-out reform is an important element even if further interventions are implemented.

5.20. Consequently, we believe that the form and design of any further intervention would require further work. In developing further interventions to meet the objectives of this Gas SCR we would want to investigate the impacts and effects of the various possible interventions that are highlighted below. We also note that this is not intended to be an exhaustive list of possible further interventions.

Possible further interventions

5.21. We recommend consideration of a range of possible interventions. Appendix 3 outlines possible interventions in more detail while we provide a summary of the broader impact of these interventions in our draft impact assessment. In summary, the interventions we recommend for further consideration include:

5.22. Technology non-specific interventions including:

- an information obligation to require suppliers to provide demand and supply information to NGG and/or to Ofgem[48]

[47] Ofgem's decision to remove top-up is available at: http://www.ofgem.gov.uk/Networks/ad/Documents1/The%20Review%20of%20Top%20Up%20Arrangements%20in%20Gas%20-%20Conclusions%20Document.pdf

[48] We have informed the industry in a letter concerning the EU Security of Gas Supply Regulation (No

- a licence condition for suppliers to ensure that they meet the demand of domestic customers
- reliability contracts that seek to price in the risk of periods of high gas prices.

5.23. Demand side interventions including:

- standard contracts for interruption to facilitate greater negotiation of interruptible contracts between suppliers and larger Daily Metered (DM) customers
- a DSR auction to be held by NGG to facilitate coordinated DSR from DM customers.

5.24. Storage interventions including:

- new build of a regulated or semi-regulated storage facility
- a storage obligation, either on suppliers or the system operator for example
- strategic storage held by the government or system operator for example.

5.25. We note that the effectiveness and net benefit/cost of any such reform will vary depending on the specific form and design of the intervention. Consequently, additional work would be required to understand the risks and unintended consequences of further interventions fully.

994/2010) that we will refine the format of the existing winter supplies information request as part of the gas SCR process. The letter is available at: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/Documents1/Information_Request_EU_Security_of_Gas_Supply.pdf

6. Assessment of options

Chapter Summary

This chapter presents the options being considered as part of this draft policy decision. These options are described and their pros and cons are discussed. A preferred option is then presented.

Question box

Question 1: Do you believe that we have captured all the appropriate options?

Question 2: Do you agree with our assessment of the costs and benefits of the various options?

Question 3: Do you agree with our preferred option?

Options under consideration

6.1. Table 1 summarises the four options that have been considered as part of this Gas Security of Supply Significant Code Review (Gas SCR) draft policy decision. These options have been put together on the basis of the analysis undertaken in chapters 4 and 5. A description of each of the options follows the table. Conclusions from the draft impact assessment are then discussed.

Table 1: Options under consideration

Options*	Cash-out is frozen	Cash-out rises to full Value of Lost Load (VoLL)	Cash-out rises to capped VoLL	Further interventions
Current arrangements	X			
Option 1		X		
Option 2			X	
Option 3	X			X
Option 4			X	X

* Note that all options allow the Network Emergency Coordinator (NEC) to instruct physical delivery of supply once cash-out is no longer dynamic.

Current arrangements

6.2. In determining what option will best achieve the objectives of the Gas SCR, it is important to consider what level of security of supply we have under the current arrangements and how this is likely to change into the future.

6.3. Under the current arrangements, cash-out is frozen at stage 2 of an emergency and remains frozen for the duration of the emergency. National Grid Gas (NGG) suspends its activities on the On-the-day Commodity Market (OCM) though shippers can continue to trade out their imbalances. At the same time the NEC can

direct shippers to maximise flows. The Secretary of State also has the ability to direct physical delivery of supply. This role can be delegated to the NEC and shippers are obliged to comply with the instructions of the NEC under their licences.

6.4. Redpoint Energy (Redpoint) has been commissioned to undertake modelling work to support this Gas SCR. More detail on the modelling is provided in the draft impact assessment and in Redpoint's report which are both published alongside this draft policy decision.[49]

6.5. For the purposes of assessing the impact of the reform options, Redpoint estimated the likelihood and impact of emergencies occurring under the current arrangements. This incorporated modelling of frozen cash-out and the NEC's role in directing physical delivery of supply:

- Cash-out was 'frozen' at the price prevailing on the day before any firm customer interruption occurred.[50] This was also subject to a sensitivity analysis.[51]
- It is difficult to predict how the market would respond to the NEC directing physical delivery of supply.[52] However, domestic supplies flowed in each of the emergency scenarios generated by the model (where physically available). This is what we would expect if the NEC directed physical supplies.

Option 1 — Cash-out at the full Value of Lost Load (VoLL)

6.6. In chapter 4 we discussed how cash-out could better reflect the value of secure gas supplies in an emergency. In particular, we suggested that cash-out should remain dynamic until firm customers are interrupted. When firm customer interruptions occur, the NEC would then suspend its actions on the OCM and the cost of the firm customer interruption would be priced into cash-out. Specifically, cash-out would be set at the price that firm consumers would be willing to accept to have their supplies interrupted; that is, their VoLL.[53] In this way, suppliers should have the incentive to purchase gas up to the price of VoLL — thus attracting sources of gas that are below this price into Great Britain (GB). At this point consumers would theoretically be indifferent between paying VoLL to maintain their gas supply and receiving VoLL for the provision of involuntary demand side response (DSR) services.

[49] See *Draft Impact Assessment - Gas Security of Supply Significant Code Review*: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Draft%20Impact%20Assessment%20Gas%20Security%20of%20Supply%20Significant%20Code%20Review.pdf and Redpoint Energy, *Gas Security of Supply Significant Code Review: Modelling Report*, November 2011: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/GasSCR/Documents1/Redpoint%20Energy,Gas%20Security%20of%20Supply%20Significant%20Code%20Review%20-%20Economic%20Modelling.pdf

[50] This is necessarily an approximation. In reality, an emergency may be declared before any firm customer interruption occurs. In this case, our approach will overestimate the frozen cash-out price. Conversely, our approach could underestimate the frozen cash-out price if an emergency were declared on the same day as firm customer interruption as any price changes on the day or Post Emergency Claims impacts would not be accounted for.

[51] In the sensitivity analysis, cash-out is frozen at 80 per cent of the previous day's price and 20 per cent of domestic VoLL. This has minor implications for the results (see the draft impact assessment).

[52] This is because it is unclear when and where the NEC would direct physical delivery of supplies.

[53] Unless cash-out had risen above this level in which case it would stay at this level for the first day of an interruption.

6.7. We have proposed that domestic customer VoLL be used to set cash-out, irrespective of the type of firm customer being interrupted. As discussed in chapter 4, we chose to use domestic VoLL to provide a stronger incentive for DSR since domestic customers generally have a higher VoLL than most other gas users. In addition, as the order of disconnection is determined by reference to safety considerations, having individual VoLLs set cash-out could result in the cash-out price 'jumping around'. This could result in unintended consequences. We commissioned London Economics to estimate domestic VoLL. A range of values was provided; for our modelling we used the estimate corresponding with a one week outage in winter occurring once in 20 years – approximately £20 per therm.[54]

6.8. Given safety considerations, firm load shedding (stage 2 post exit reform) would generally occur before any network isolation (stage 3). Stage 2 will usually involve firm daily metered and some larger non-daily metered customers turning down their gas use. As these customers would be able to turn up their gas use relatively quickly once gas supplies were available, such interruptions could be relatively short. Hence, stage 2 interruptions are likely to last only as long as there is a supply shortfall across the system. Setting cash-out in stage 2 is then relatively straightforward — it could simply be priced at one times the domestic VoLL for each day of a stage 2 emergency (ie £20 per therm). However, in practical terms, only customers that can verify that they have not taken gas may be able to receive a payment during stage 2.

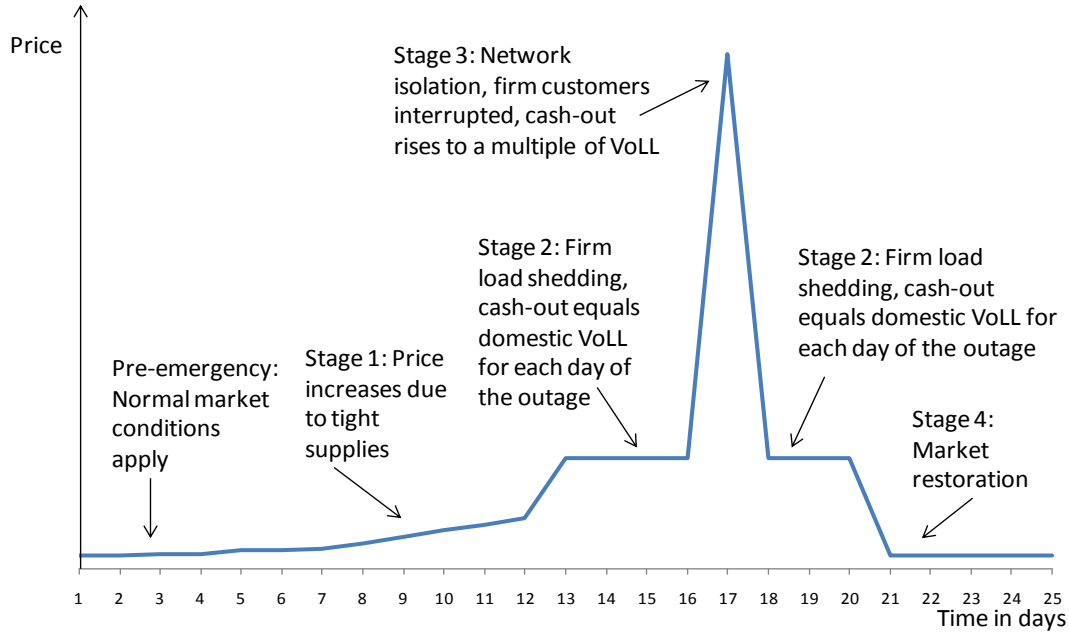
6.9. At stage 3 of an emergency, parts of the network would be physically isolated. Setting cash-out prices is less straightforward at this stage as outages are likely to last for several weeks or months.[55] For this reason, if cash-out is to reflect the full (minimum) costs of the interruption to the individual, it should rise to some multiple of domestic VoLL. For the purposes of modelling the impact of option 1, 14 days was chosen to represent the minimum time that it would take to reconnect the number of firm customers required to be interrupted to have a meaningful impact on overall system safety (this equates to £280 per therm).[56] Chart 2 shows how cash-out prices might change under option 1 in an emergency.

6.10. In this way, cash-out reform could contribute to achieving two of our key objectives for the Gas SCR. Further, this option could be used to pay otherwise firm customers that have offered involuntary DSR services to manage an emergency. This could be achieved by passing the cash-out charges recovered throughout an emergency through to interrupted firm customers rather than allowing it to flow back to shippers through neutrality.[57] This is important because if cash-out charges were redistributed to industry through neutrality, this could potentially undermine the incentives to take measures to enhance security of supply. Option 1 could potentially achieve all three of our key objectives.

[54] See chapter 3 for why we chose to use VoLL corresponding with this scenario. See chapter 4 for more detail on how VoLL was estimated.
[55] Due to safety considerations, engineers would be required to turn off, and subsequently purge and turn on, gas supplies at each supply point. This would take some time to complete given the number of supply points involved. Hence, stage 3 interruptions could last for a prolonged period.
[56] If we pursued option 1 we would undertake further consultation to determine a minimum outage duration for firm NDM customers. This would then be used to set the multiple which would be applied to VoLL for firm NDM customer interruptions.
[57] See chapter 4 for how payment of firm customers for involuntary DSR services could work in practice.

6.11. However, some unintended consequences could potentially arise from allowing cash-out to rise to such high levels. For example, if increased liabilities impact on credit requirements for shippers, this could increase barriers to entry (potentially reducing competition), and reduce the ability of shippers to respond to the instructions of the NEC in an emergency. Further, very high cash-out charges might lack credibility. We believe these reasons may justify capping the level of cash-out. These potential unintended consequences are discussed in more detail under option 2.

Chart 2: How cash-out will rise in an emergency under option 1*



**Note: This diagram is illustrative only and not drawn to scale*

6.12. In terms of modelling the impacts of option 1, the cash-out price was set to £20 per therm for each day of firm DM customer interruptions (as a proxy for a stage 2 emergency) and to £280 per therm on the first day only of any firm NDM customer interruptions (as a proxy for a stage 3 emergency). If an imbalance remained, the cash-out price stayed at £20 per therm until all firm customers' demands were again met.

6.13. We have modelled more DSR as a result of sharpening incentives on shippers to negotiate interruptible contracts, given that customers with a VoLL lower than the domestic VoLL should benefit from negotiating such contracts (in particular, if they can get an ongoing discount on their usual gas bill). This additional DSR provides a buffer for the remaining firm customers, which has the effect of reducing the likelihood of an emergency occurring.

Option 2 — Cash-out at a capped VoLL

6.14. When firm customers are disconnected, cash-out should theoretically be designed to reflect the full costs to those customers of being interrupted. However, there could be a number of reasons why customers and industry might be better off

if cash-out does not rise to this full level. In particular, the benefits of fully reflecting VoLL in cash-out might be offset if this results in:

- increased credit requirements for shippers, to the extent that this could act as a barrier to entry which could restrict competition to the detriment of customers
- increased risk of financial distress for shippers if an emergency did ever occur, potentially limiting their ability to respond to the NEC in an emergency.

6.15. In addition, if the potential cash-out liability is too high it might lack credibility. Shippers might not have the reserves or financial backing to actually be able to pay out on this liability if they were ever short during an emergency. Further, some shippers might not believe that they would actually have to pay such high levels of cash-out if an emergency occurred.

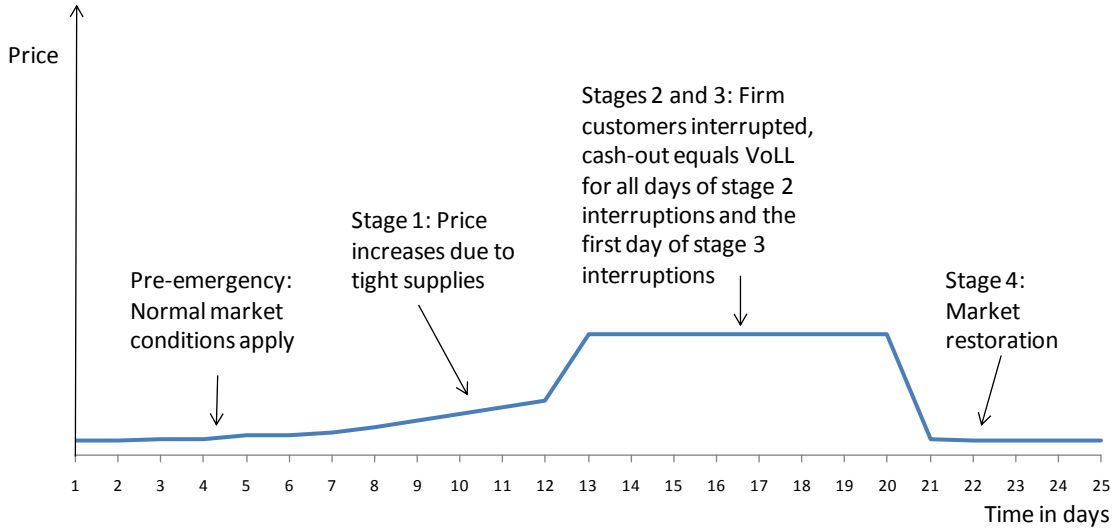
6.16. In this scenario, cash-out reflecting VoLL might be effective in attracting gas in an emergency but might be less effective at incentivising shippers to insure against an emergency occurring. If this were the case, capped cash-out may still attract gas in an emergency while minimising the risk of unintended consequences. For this reason, option 2 has been put forward as a variant to option 1 in which cash-out is capped at a lower level. Instead of cash-out rising to a multiple of VoLL for stage 3 interruptions, cash-out would instead rise to one times domestic VoLL for the first day of any new network isolation.

6.17. Hence, the cash-out price would be £20 per therm for any day in which any firm customers are interrupted as part of firm load shedding in stage 2[58] and for the first day on which firm customers are interrupted due to new network isolations in stage 3 (see chart 3).

6.18. The concern with capping cash-out is that the arrangements will not reflect the full costs of disconnection to firm consumers disconnected under stage 3.[59] Hence, a gap in the arrangements would remain. That is, there could be a risk that suppliers would not sufficiently insure against an emergency as they would not face the full costs associated with an emergency.[60]

[58] On the first day of firm customer interruption, cash-out could actually be above VoLL if the market price had risen above this level. However, on day 2 and beyond of any firm customer interruptions, cash-out would fall back to VoLL. Once all firm customer demand had been restored, the cash-out price would no longer need to remain at VoLL. At this point it would be for NGG to decide whether it was appropriate to begin taking market balancing actions again.
[59] This is likely to include domestic and smaller gas users in particular.
[60] To the extent that smart meters have the functionality to allow for supplies to be restored faster, this gap may lessen once smart meters are introduced. However, this is still subject to consultation. If smart meters allowed all customers to effectively become DM customers, we may wish to review the recommendations of the Gas SCR, depending on what reforms are implemented.

Chart 3: How cash-out will rise in an emergency under option 2*



** Note: This diagram is illustrative only and not drawn to scale*

Option 3 — Further interventions

6.19. As discussed in chapter 5, there could be reasons why market participants might not respond appropriately to stronger price signals. Hence, chapter 5 considered the case for further interventions. Further interventions could include technology non-specific interventions, demand side interventions or storage interventions, for example. Potential further interventions are discussed in more detail in appendix 3.

6.20. To illustrate the potential impacts of further interventions, a storage obligation was modelled by Redpoint. However, it is noted that if any type of further intervention were considered appropriate, the design of the intervention would require further consultation and refinement as the impacts are likely to vary significantly depending on its specific design.

6.21. The level of the storage obligation was set to increase from 1 billion cubic meters (bcm) in 2011 to 3 bcm in 2030, reflecting the declining proportion of GB demand that can be met from domestic supplies over time.[61] The storage obligation was designed to require suppliers to hold the specified amount in storage from 1 October until 1 January each year, decreasing to zero by 1 March.[62] The storage obligation could be breached to stop an emergency progressing to network isolation (stage 3).[63]

[61] This was split between short run storage (40 percent) and long run storage (60 percent) and applied only to GB storage (Rough was the only facility that was classified as long run storage).
[62] These dates were chosen as supply and demand is generally tightest over winter.
[63] In particular, it offers more protection to smaller customers (ie domestic). However, the gas withdrawn from storage could be used for any purpose once on the system. If breached during the winter, the obligation would reset to the lower of the original requirement for that date or the level that had been drawn down to.

6.22. The concern with further interventions is that they can be less efficient than allowing the market to determine the optimal solution in response to the price signals. In particular, a number of the further interventions discussed previously would tend to favour one type of flexibility (eg storage or DSR) over others. This could increase the use of that type of flexibility instrument above an economically optimal level. This may be more costly than allowing a range of flexibility instruments to emerge to provide flexibility and could ultimately increase consumer bills.

6.23. In addition, interventions often require government or another independent body to determine what is an 'optimal' amount of a certain product or service. This has the associated risk that whatever is determined as the optimal amount may under or overestimate the amount actually required. If the market signals have not also been corrected, there is a risk that the intervention might not be effective if too little has been provided for. Conversely, if too much has been provided, this will incur unnecessary costs to consumers. Further, interventions could result in some manner of market distortion. This is discussed in more detail in the draft impact assessment for a range of possible interventions.

6.24. For this reason, the careful design of any further intervention is important in ensuring that adverse consequences are minimised. In addition, without cash-out reform the cash-out price would still be frozen at stage 2 of an emergency. Hence, firm customer interruptions could occur even when gas is available at a lower price than customers would be willing to pay to retain their gas supply. For this reason, there could be a case for cash-out reform alongside further interventions.

Option 4 — Capped cash-out and further interventions

6.25. In the initial consultation document and in chapter 5 we outlined how further interventions could work alongside or instead of sharper price signals. In Option 4 sharper price signals and further interventions are paired together.

6.26. In option 2 we considered capping cash-out for interruptions caused by network isolation (under stage 3) on the basis that placing the full liability on short shippers might have a number of unintended consequences. However, as cash-out will not reflect the full costs of interruptions to firm customers that would be interrupted in stage 3 (as they are likely to be interrupted for several days but cash-out will only reflect the costs of one day), a gap in the arrangements remains. In addition, we discussed in chapter 5 our concerns about relying solely on price signals to deliver security of supply. Given these considerations, there is a case for considering further interventions alongside sharper price signals to enhance security of supply.

6.27. In this option cash-out is set at £20 per therm for all types of firm customer interruptions as in option 2.[64] In addition, a further intervention applies as described in option 3. For the purposes of modelling, the same illustrative storage obligation as was specified under option 3 was included alongside capped cash-out.

[64] This is for all days of interruption in stage 2 and for the first day of interruption in stage 3. The same assumption about greater DSR as was made for options 1 and 2 was also included for option 4 and was also subject to a sensitivity analysis.

6.28. As discussed in relation to option 3, there are a number of issues to consider in determining the choice of any further intervention. These issues are just as relevant to option 4. In addition, as option 4 includes multiple measures, it is important to consider how these measures interact.

6.29. The main benefits of option 4 are that:

- as cash-out will reflect the cost of firm customer interruptions, these higher prices should be effective in attracting gas into GB which should reduce the duration and severity of an emergency, should one ever occur
- a further intervention could be designed to ensure there is greater investment in measures to enhance security of supply so that the probability of ever entering into an emergency is reduced.

6.30. In this way, it appears that the two mechanisms in option 4 could be complementary in reducing the likelihood, duration and severity of an emergency.

Quantitative assessment

6.31. This section draws on findings from the quantitative modelling and cost-benefit analysis undertaken by Redpoint. While these aimed to quantify the likely costs and benefits of each of the options, there are a number of impacts which could not be assessed quantitatively. In particular, the quantitative results do not account for:

- Any costs that the government might incur in managing an emergency (eg if domestic consumers were ever interrupted the government might incur costs in providing heating, shelter or food).
- Wider knock-on effects to the economy (eg workplaces closing due to a lack of heating, downstream industries losing production and in the longer term, industries moving out of GB to countries with more secure gas supplies).
- Greater barriers to entry (eg from greater credit requirements or having to comply with further interventions) which could ultimately lessen competition to the detriment of consumers.

6.32. In this way, the cost-benefit analysis might not capture the full range of benefits that can accrue from reducing the likelihood and severity of emergencies; or the full range of costs that could accrue from each of the policy options.

6.33. Further, gas emergencies by their very nature are high impact, low probability events. The inherent difficulties involved in modelling such events are widely recognised. In addition, where emergencies occur infrequently, we have a small sample size to use for quantifying the impacts of the various options. Hence, care needs to be taken in interpreting the quantitative results and these should be considered alongside the qualitative findings which are drawn out in our draft impact assessment and in the following section which outlines our overall assessment.

6.34. The key outputs from Redpoint's quantitative modelling are:

- the likelihood of an emergency occurring under the current arrangements and each of the four policy options

- the expected duration and severity of an emergency, if one were to occur – estimated for the current arrangements and each of the four policy options
- the net costs/benefits of each option compared to the current arrangements
- the impact on consumer bills of each option compared to the current arrangements.

6.35. In respect of the first two outputs:

- a stage 2 emergency was said to have occurred once firm daily metered (DM) customers needed to be interrupted to address a supply shortfall[65]
- a stage 3 emergency was said to have occurred once the supply shortfall was so large as to require all firm DM customers and at least some firm non-daily metered (NDM) customers to be interrupted to get the system in balance.

Likelihood of an emergency

6.36. In respect of the likelihood of an emergency occurring, the key messages from the analysis are that:

- Options 1, 2 and 4 can reduce the likelihood of firm DM customers being interrupted (ie a stage 2 emergency) compared with the current arrangements.
- All options can reduce the likelihood of firm NDM customers being interrupted (ie a stage 3 emergency) compared with the current arrangements.
- Options including cash-out reform (options 1, 2 and 4) appear to offer more protection for firm DM customers while options 3 and 4 (as modelled with a storage obligation) appear to offer more protection for firm NDM customers. Hence, option 4 is most effective in reducing the likelihood of both, DM and NDM customers.

Duration and severity

6.37. The analysis suggests that all options can substantially reduce the duration and severity of an emergency compared with the current arrangements. Option 4 offers the most protection followed by options 3, 1 and 2. Options with cash-out reform (options 1, 2 and 4) are more effective in reducing the duration and severity of a stage 2 emergency and options 3 and 4 (as modelled with a storage obligation) offer more protection against a stage 3 emergency.

6.38. Redpoint's results also estimate that the expected costs of interruptions will be lower under all of the options compared with the current arrangements. The greatest improvement is for option 4, followed by options 3, 1 and 2.

Net cost/benefit

6.39. Redpoint estimated a range for the potential net cost/benefit of each of the options compared with the current arrangements. For each option, the estimate that gives the lowest benefit (or highest cost) was calculated by costing all storage at its

[65] However, in practice, some large non-daily metered customers might also be asked to reduce or cease their gas use in stage 2 of an emergency.

long run marginal cost. This would imply that all storage required under each option is additional to any storage that would normally be held for arbitrage purposes. The figure that gives the greatest net benefit for all options was calculated by costing storage at the cost of lost arbitrage profits. This accounts for the cost of not being able to sell gas in times of high prices.[66]

6.40. The results of the cost benefit analysis are presented in table 2. It should be noted that these do not account for:

- any social or knock on costs that could arise from an emergency
- any impacts on competition (eg risk of financial distress).

Table 2: Net benefit compared with current arrangements (£million, real 2011) average from 2012 to 2030

Options	Net benefit to consumers
Option 1: Cash-out rises to full VoLL	269 to 610
Option 2: Cash-out rises to capped VoLL	170 to 248
Option 3: Further interventions (using storage example)	-2,706 to 185
Option 4: Further interventions (using storage example) with cash-out rising to capped VoLL	-2,596 to 393

6.40 Options 1 and 2 show a positive net benefit whether taken at the upper or lower end of the estimate. Options 3 and 4 show a net cost or net benefit depending on how the cost of storage has been calculated. In reality, the net cost/benefit of each of the options will likely be somewhere within this range.

6.41 It is important to note that the results of options 3 and 4 are highly dependent on the type and design of the intervention that was modelled. This does not imply that other forms of interventions would result in the same costs and benefits. Further, the impacts of a storage obligation could differ from that shown above if it were designed differently from the one we have modelled.

Consumer bills

6.42 As could be expected from the cost-benefit analysis, the highest impact on consumer bills is for option 4 (up to £6.66 per annum). This is followed by option 3 (£6.59 per annum), option 1 (£0.64 per annum) and option 2 (£0.16 per annum).

[66] Both approaches have their limitations. In the former, this is likely to overestimate the net cost of storage as it doesn't account for increased scarcity value of storage available for arbitrage when a large part of existing storage capacity is taken up by the obligation. In the latter, storage arbitrage profits are calculated using a mathematic function to approximate lost arbitrage profits (which in reality would depend on individual companies deciding to withdraw stored gas at any point in time). Since this mathematical calculation of arbitrage profits impacts greatly on the costs, the results should be treated with caution.

These bill increases are towards the lower end of the range of willingness to pay estimates for domestic consumers as calculated by London Economics.

Preferred option

6.43 Under option 1, interrupted firm customers are paid for providing involuntary DSR services for the minimum expected duration of an emergency. Without considering the full impacts of this, option 1 would appear to be an attractive option in terms of sharpening the price signals during an emergency and moving the risks of an emergency from consumers to suppliers.

6.44 However, there are a number of unintended consequences that could emerge from fully sharpening the cash-out price signals. In particular, this could increase shippers' credit requirements and the risk of financial distress for shippers. This could raise barriers to entry and ultimately reduce competition to the detriment of consumers. In addition, if full VoLL were considered to lack credibility, there is a risk that shippers might decide to under insure. Further, it may be inappropriate for shippers to face the ongoing impact of wide scale interruptions as individual shippers have little influence on how quickly supplies could be restored.

6.45 Given these potential impacts and considerations, we believe that option 2 could have greater benefits than option 1. Option 2 only rises to VoLL for the first day of a stage 3 emergency rather than a multiple of VoLL as would occur under option 1. We believe that this would still be effective in attracting gas during an emergency but would not have the same scope for unintended consequences as under option 1.

6.46 That said, as option 2 does not reflect the full individual costs of stage 4 interruptions, nor any social costs of interruptions, we believe that a gap in the arrangements would remain. In addition, we have outlined above our concerns about relying solely on price signals to ensure security of supply. For this reason, we believe that option 4 is the best able to achieve our objectives while minimising the potential for unintended consequences.

6.47 The modelling shows that option 4 can be the most effective option in terms of minimising both the likelihood of an emergency occurring and the duration and severity of an emergency should one occur. It also allows for firm customers to be at least partly paid for the involuntary DSR services they provide in managing an emergency. In addition, a further intervention could potentially reduce the likelihood of an emergency occurring, reducing the need for the cash-out price to fully reflect the costs of an emergency to interrupted customers.

6.48 However, we acknowledge that as option 4 includes two measures there could be an issue of overlap. This could potentially lead respondents to prefer option 3. However, our modelling suggests that option 3 is less effective in attracting gas into GB during an emergency since cash-out prices tend to be frozen at a lower level. Hence, we believe that option 4 is superior to option 3 and that the two measures in option 4 are complementary rather than conflicting. Findings from Ofgem's Consumer First Panel also support the use of further interventions rather than relying solely on price signals (see chapter 1).

6.49 The cost-benefit analysis suggests that option 4 could have a positive or negative net effect. This does not take into account any social costs that would result from an emergency or the other qualitative assessments that we have considered in our draft impact assessment. Our overall quantitative and qualitative assessment is that option 4 could be developed in a way that it leads to the most positive outcomes for consumers. In addition, compared with the current arrangements, option 4 will move the risks of an emergency to those that are best able to manage those risks. We therefore recommend that more work be undertaken to identify appropriate further interventions that could work alongside capped cash-out to enhance gas security of supply in GB.

Next steps

6.50 We propose that the cash-out reform element of option 4 be pursued under this Gas SCR. We expect that this could potentially be implemented in late 2012 either under the SCR process or by using the powers given to us by the Energy Act 2011.

6.51 In relation to further interventions, we remain of the view that developing this further would require substantial work. In particular, we have only modelled the effects of one form of intervention — that is, a storage obligation. In developing further interventions to meet the objectives of this Gas SCR we would want to investigate the impacts and effects of the various interventions that have been discussed in chapter 5 and appendix 3.

6.52 In particular, further work is required to ensure that the form and design of any further intervention would meet our objectives at least cost. Further, work is required to ensure that we understand the full range of impacts of the various interventions so as to minimise the scope for unintended consequences which could potentially outweigh the benefits. Hence, we propose that a further consultation process on the form and design of any further interventions be undertaken.

6.53 The Department of Energy and Climate Change (DECC) agrees with Ofgem that there could be a role for further interventions to enhance security of supply. For this reason, DECC has asked Ofgem to prepare a report on risks to gas security of supply in GB and possible further interventions to enhance gas security of supply in GB. Hence, work on further interventions will be taken forward through this process. Ofgem will provide a report to DECC on this subject in May 2012.

Appendix 1 – Summary of Responses

Respondents to the initial consultation

1.0. In January 2011, we published our initial consultation paper for the Gas Security of Supply Significant Code Review (Gas SCR). Thirty-seven stakeholders responded in writing to the initial consultation, including gas suppliers, shippers, storage operators, customer representatives, distribution network operators and the system operator (see Table 3).

Table 3: List of respondents

Organisation	Sector
Association of Electricity Producers	Electricity generator
BG Group	Shipper/supplier
Blizzard Utilities	Energy consultancy
British Petroleum	Shipper/supplier
Centrica	Shipper/supplier
Chemical Industry Association	Gas customer representative
Cornwall	Energy consultants
Corona Energy	Shipper/supplier
E.ON	Shipper/supplier
EDF Energy	Shipper/supplier
EEF	Gas customer representative
ESB Energy International	Shipper/generator
ExxonMobil	Shipper
First Utility	Shipper/Supplier
Food and Drink Federation	Gas customer representative
Gas Forum	Industry group
Gas Action Task Group, Electricity Task Group	Industry group
GrowHow	Gas customer
Gas Storage Operators Group	Storage operators group
Health and Safety Executive	Health and safety regulator
Innovia Films	Gas customer
Interconnector UK	Interconnector
Major Energy Users' Council	Customer representative
Network Emergency Coordinator	Coordinator for gas emergencies
National Grid Gas Distribution	Distribution network operator
National Grid Gas Transmission	Transmission system operator
Oil and Gas UK	Trade association
RWE npower	Shipper/Supplier
Scottish and Southern Energy	Shipper/Supplier
Scottish Power Energy Management	Shipper
Shell	Shipper/Supplier
Smartest Energy	Shipper/Supplier
Stag Energy	Storage operator
Storengy	Storage operator

Organisation	Sector
Statoil	Shipper/supplier
TATA Steel	Gas customer
Wales and West Utilities	Distribution network operator

Stakeholder events

1.1. After releasing the initial consultation document we held several seminars and workshops. We also attended a number of bilateral meetings to discuss the development of the Gas SCR. Table 4 shows all seminars organised by Ofgem.

Table 4: Seminars hosted by Ofgem

18.01.2011	Opening seminar
21.01.2011	Workshop 1: Emergency cash-out options
28.01.2011	Workshop 2: VoLL and compensation
04.02.2011	Workshop 3: Obligations and impact assessment criteria
09.02.2011	Closing seminar
01.04.2011	Workshop on revised options

1.2. We have also had a number of bilateral meetings with a wide range of stakeholders, including the following organisations:

- Demand Side Working Group
- Department of Energy and Climate Change
- Energy Suppliers Forum
- Gas Forum
- Gas Storage Operators' Group
- Health and Safety Executive
- Large Users Group
- Major Energy Users' Council
- Network Emergency Coordinator
- National Grid Gas
- Small and Medium Users Group

1.3. The responses and feedback provided during stakeholder events are summarised below.[67]

[67] The written responses are available at: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=1&refer=Markets/WhlMkts/CompandEff/GasSCR

Stakeholder views

Need for review and rationale for change

1.4. The need to conduct a review of the gas security of supply arrangements was emphasised by most stakeholders and the significant code review was generally welcomed. However, many respondents, in particular suppliers and shippers, argued that the market has worked well with no gas deficit emergency occurring to date. A number of industry respondents therefore questioned the need for significant regulatory changes. It was also highlighted that the level of security that Ofgem was seeking to achieve remained unclear.

1.5. Further, stakeholders emphasised that regulatory interventions should focus on avoiding an emergency rather than mitigating the consequences if an emergency occurred. The majority of respondents supported a market-based and proportionate solution rather than more interventionist measures.

Process and timetable

1.6. Stakeholders appreciated Ofgem's efforts towards consultation with several stakeholder events held and the release of an initial consultation document, offering all parties the opportunity to provide feedback. However, there were concerns about the 'exclusive' nature of workshops with a specific list of invitees.[68] Transparency of workshop minutes was also questioned by some stakeholders, mostly non-attendees.

1.7. It was emphasised by some respondents that going forward, it is necessary to assess all options further and to consult with the industry before conducting a comprehensive impact assessment. In particular, it was highlighted that Ofgem should not limit its assessment to those options presented in the initial consultation document but also focus on those options proposed by stakeholders during the consultation process.

1.8. Several respondents were concerned about the pace of the process. It was pointed out that the reforms should not be rushed simply to ensure they are implemented before the coming winter. In particular, some respondents argued that reforms should go through the full industry process rather than being fast tracked by Ofgem using the powers in the Gas Act 1986 (see chapter 1).

Options in the initial consultation

1.9. Few stakeholders expressed a preference for any particular reform option outlined in the initial consultation document. Of those that did, preferences were mixed. Other options or a 'pick and mix' approach were generally preferred. Options were seen as focussing too much on cure, and not enough on prevention of an emergency. There was however some support for introducing dynamic cash-out to attract non-domestic gas in the early stages of an emergency. However, several respondents were concerned that capping the cash-out at the value of lost load (VoLL) could act as a 'target', pushing prices up.

[68] We took this comment on board and our last workshop on revised options was open to anyone who wished to attend.

1.10. With regard to option 1, there were concerns that the changes to the safety case with respect to the role of the National Emergency Coordinator would not be approved. Stakeholders also voiced concerns about adverse implications for shippers' credit requirements as a consequence of this option as well as option 2. With regards to options 2 and 3, the majority of respondents questioned whether it is appropriate or sensible for National Grid Gas (NGG) to take over the role as sole purchaser of gas. The industry and NGG itself argued that NGG lacks the necessary resources, connections and expertise.

Other proposed options for reform

1.11. Besides commenting on the options presented in the consultation document, stakeholders proposed a number of other possible measures. In particular, it was proposed that further analysis of enhanced demand side response (DSR) capabilities was required. For example, focusing on daily metered (DM) customers, NGG could administer DSR auctions at the start of winter. This option was further explored by Ofgem and is described in appendix 3 of this document.

1.12. Several stakeholders argued that different arrangements should be implemented to reflect differences between rapidly occurring emergencies and slowly developing emergencies. For example, it was argued that dynamic cash-out prices might be effective in slow emergencies but might not have any effect in rapidly developing emergencies. Other proposals included improving information flows from shippers to NGG, for example regarding storage and contracted liquefied natural gas supplies.

Value of Lost Load (VoLL)

1.13. The consultation document outlined the concept and use of VoLL. A large number of respondents argued that while VoLL is an interesting academic concept it is fraught with practical difficulties. It was stressed that it is difficult to calculate VoLL since it varies by customer type and season. However, some respondents favoured a simpler calculation over too much complexity when calculating VoLL. In our consultation document, VoLL was proposed to cap cash-out at stage 3 of an emergency. However, some respondents argued that it would be preferable to have an administrative body (eg the UNC panel or NGG) decide the cash-out levels instead of capping it at VoLL.

Emergency Demand Side Response (DSR) arrangements

1.14. Besides using VoLL to cap cash-out prices, Ofgem proposed to use VoLL to determine the payments for the provision of DSR services (referred to as "compensation" in the initial consultation) in the case of gas interruptions. The approach received support from gas consuming businesses. However, industry representatives voiced strong concerns about this approach due to its financial and credit implications which might lead to the collapse of several small shippers. Specifically, given the fact that shippers cannot influence the speed of recovery, it was argued that they should not need to pay for the entire duration of the interruption. It was also argued that emergencies can be caused by a multiplicity of events and it might be difficult to decide who ultimately caused the emergency, and who should therefore be liable.

1.15. Industry respondents argued that "compensation" should not be paid by the industry in cases of force majeure given that the industry's ability to plan for such events is minimal. It was also pointed out that the role of gas distribution networks during an emergency was unclear in the consultation document; in particular, whether they would need to bear compensation costs if they were found to be responsible for an emergency. Some industry representatives suggested that enhanced DSR might be more appropriate than using VoLL to pay DM customers for involuntary DSR services.

Enhanced obligations

1.16. The initial consultation document outlined the possibility of introducing enhanced obligations, such as requiring suppliers to hold a minimum level of gas in storage facilities. While such obligations were not part of the three options presented in the paper, several stakeholders argued that such obligations might be necessary to ensure that the industry increases the physical security of gas and not simply the financial security by buying insurance contracts.

1.17. Most suppliers and shippers opposed this approach and argued that the market works well and responds to price signals; hence, more interventionist measures are not required. In addition, it was argued that such obligations might not be consistent with regulations and developments within the European Union.

Interactions with other markets

1.18. Several stakeholders pointed out that any new regulatory arrangements would need to be consistent with other policies and developments in the wider energy market. For example, it was argued that a higher level of supply security will have positive repercussions for the electricity market since gas is also used to generate electricity.

1.19. With regard to Europe, several interactions were found to be important. Firstly, it was pointed out that gas quality specifications are different in Great Britain (GB) than in continental Europe. This may cause a situation whereby GB may not be able to source more gas from continental Europe despite higher prices. Some argued that Ofgem should become more involved in this area, while others argued that the industry needs to invest in gas quality treatment facilities to solve this issue. It was also noted that the options need to be assessed as to whether they are in line with EU Security of Supply Regulation[69].

1.20. Industry respondents further argued that market interventions such as public service obligations in many European countries will minimise the effect of dynamic cash-out prices in an emergency as it might be impossible to source more gas from continental Europe despite higher prices. Finally, storage operators pointed out that measures should be in line with EU reforms in the areas of third party access to storage facilities as well as unbundling energy supply and production from network operations.

[69] Regulation (EU) No 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of supply and repealing Council Directive 2004/67/EC

Appendix 2 – Out of scope issues

1.1. A number of stakeholders raised issues in the consultation which were related to, but out of scope of, the Gas Security of Supply Significant Code Review (Gas SCR). These included:

- issues about gas quality
- concerns regarding the storage investment environment — including unbundling and third party access issues
- electricity sector interactions.

Gas quality

1.2. Natural gas is made up of a mixture of hydrocarbon gases and this mixture can vary widely between sources. The quality of a given amount of natural gas is determined by the relative quantities of these hydrocarbon gases.

1.3. Gas-fired appliances are designed to operate within a certain gas quality specification range. In Great Britain (GB) this has been aligned to the quality of gas sourced from the United Kingdom continental shelf.

1.4. Gas quality specifications in continental Europe are broader than those applying in GB. This could mean that in future years, any gas flowing from continental Europe to GB might not comply with GB's quality standards, and therefore, will not be able to be accepted directly onto the GB gas network. To ensure that gas coming from international markets can be accepted into the GB network, gas processing facilities are required.

1.5. There have been a number of concerns from stakeholders that there are insufficient gas processing facilities in GB to deal with increasing imports of different quality gases from Europe. Some stakeholders suggested that Ofgem should directly address this as part of the Gas SCR.

1.6. To the extent that the Gas SCR should result in the market arrangements better reflecting the value of gas security of supply, we think that this should incentivise industry to invest in measures that will improve gas security of supply. One of the ways in which this could be done would be to invest in gas processing facilities in GB.

Storage investment environment

1.7. Some respondents noted that regulatory uncertainty could be delaying or blocking investment in gas storage facilities. In particular, a number of respondents argued that the third party access and unbundling requirements under the Third Package[70] could potentially have a negative impact on storage investment. Ofgem

[70] The unbundling and third party access obligations on storage system operators are set out in 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.

has consulted on guidance material to assist in the interpretation of the third party access regime for gas storage facilities in GB.[71] A key benefit of this guidance material is that there should be greater regulatory certainty regarding the interpretation of these legislative requirements.

1.8. In addition, we understand that any reform we pursue as part of the Gas SCR may have implications for storage investment and the regulation of storage facilities. Hence, we are liaising with the relevant teams within Ofgem on these issues.

Electricity sector interactions

1.9. Quite a number of stakeholders highlighted the potential impacts of any reforms to improve gas security of supply on the electricity sector. In particular, combined cycle gas turbines (CCGTs) form a significant proportion of the GB electricity generation mix and are a valuable price responsive source of gas demand. Moreover, in the event of a gas emergency, balancing the need to maintain consumers' gas supplies and the electricity supplies generated using CCGTs is crucial.

1.10. The model used for the draft impact assessment incorporates the electricity sector. Hence, we are able to consider how various scenarios will impact on the electricity sector. That said, during an emergency, it will be the National Emergency Coordinator that is responsible for assessing how electricity security of supply is affected when CCGTs are turned down or switched off.

1.11. Importantly, while the Gas SCR may have an impact on security of supply in the electricity sector, we will not be proposing any reforms to the electricity market arrangements as part of the Gas SCR. However, we note that as the Gas SCR should improve gas security of supply, this could be expected to reduce the likelihood and impacts of gas emergencies which could lead to CCGTs being interrupted less often as a result of gas supply shortfalls.

1.12. Further, in the same way that Project Discovery identified gaps in the emergency arrangements for gas, concerns about the ability of the current electricity arrangements to ensure security of supply were also highlighted. Hence, these concerns may form part of a separate but related SCR in the future.

Modification proposal UNC 358

1.13. On 18 January 2011, Corona Energy Limited raised UNC 358 to introduce compensation for firm customers that have their supply interrupted in the case of an unplanned outage. The purpose of the modification was to provide gas transporters with a commercial incentive to minimise the number and impact of interruptions on customers. UNC 358 seeks to increase the level of compensation to:

- 100 per cent of the annual Local Distribution Zone capacity charges per day of interruption if the customer is connected to a distribution network

[71] Ofgem, 2010, *Guidance on the Third Party Access regulatory regime for gas storage facilities in Great Britain*, Consultation document, 3 November http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/Documents1/Third%20Party%20Access%20regime%20for%20gas%20storage%20facilities%20Consultation%20Document.pdf

- 100 per cent of the annual National Transmission System Exit capacity charge per day of interruption if the customer is connected to the transmission network.

1.14. On 22 February 2011, Ofgem published a letter indicating that UNC 358 would not be considered as part of the Gas SCR. This was on the basis that the Gas SCR is concerned with GDEs whereas UNC358 is concerned with unplanned network interruptions.[72]

[72] See http://gasgovernance.co.uk/sites/default/files/Letter%20to%20Panel%20on%20UNC358(1).pdf

Appendix 3 – Further interventions

Chapter Summary

This annex outlines possible further interventions that could be implemented as a complement to cash-out reform.

Question box

Question 1: Do you have a preference for a specific intervention/s that you think might be most effective for ensuring security of supply while minimising the risks and unintended consequences?

Question 2: Do you think that standard contracts combined with cash-out reform provide the necessary incentives for suppliers to increase penetration of contracts for interruption?

Question 3: A number of stakeholders have suggested an auction for interruption. We outline several challenges with such an approach and are keen to hear proposals on how to overcome these challenges.

Question 4: If some kind of storage intervention was to be implemented, do you favour a direct intervention aimed at developing storage capacity or an indirect intervention through an obligation on suppliers or shippers?

1.0. Chapter 5 discussed the potential role of further interventions in improving gas security of supply. Further interventions could include technology non-specific interventions; demand side interventions; and storage interventions. These interventions are discussed in more detail below.

Technology non-specific interventions

1.1. We have considered a range of technology non-specific interventions, and in particular:

- information obligations
- licence conditions
- reliability options.

Information obligations

1.2. An information obligation would require suppliers and/or shippers to provide information about contracted demand and supply to Ofgem and/or National Grid Gas (NGG)[73]. This could further develop the currently voluntary winter information requests by making these mandatory and improving the information requirements.

[73] We issued an open letter on 11 August 2011 concerning the EU Security of Gas Supply Regulation (No 994/2010) that we will refine the format of the existing winter supplies information request as part of the

1.3. In the past two years, we have requested information from the 15 biggest gas suppliers in the country on their demand and supply portfolio for winter. In the most recent request, the information was requested twice, once before winter and once during winter. The information was intended to assist us in assessing the security of supply situation for the approaching winter and potentially help the system operator to balance the system. Suppliers were asked to provide demand and supply information under various scenarios, such as a 1 in 50 winter and 1 in 20 peak day.

1.4. An explicit information obligation could require suppliers and/or shippers to supply information to Ofgem and/or NGG either once before winter or on an ongoing basis throughout winter or periodically throughout the year. Requested information could include:

- the supplier's/ shipper's anticipated supply portfolio, including the source of contracted supply (eg. National Balancing Point, Liquefied Natural Gas (LNG) imports and storage)
- demand information, including the volume of interruptible contracts and volume of demand that is not yet met by existing supply contracts.

1.5. The supply-demand portfolio information could be requested for various scenarios, such as seasonal normal demand winter, seasonal normal demand peak day, 1 in 20 peak day, and 1 in 50 winter. Further, this could be requested for the entire winter as a whole or for different periods in winter (eg September to November and December to February).

1.6. However, our previous experience has shown that it is difficult to obtain data that can be aggregated consistently. Suppliers hold information in different formats and it has been difficult for some suppliers to provide the requested information in the required format. Given that contractual positions can change rapidly, there is also a question about the usefulness of such information.

Licence condition

1.7. A licence condition could require suppliers to prove before or throughout winter that they can meet demand under specified security of supply standards (see chapter 3). If companies fail to prove compliance with these standards, then this would constitute a licence breach. This would be assessed ex-ante before an emergency occurs and would not affect company's behaviour in or immediately prior to an emergency.

1.8. Alternatively, a licence condition could be of an ex-post nature by requiring suppliers to meet demand under a specified security of supply standard or by requiring suppliers to use best endeavours to ensure they meet their customers' gas demands under all but exceptional circumstances. If a supplier fails meet these standards during a gas deficit emergency (GDE) then this would constitute a licence breach. Ofgem could fine suppliers in breach of their licence any amount up to ten

Gas SCR process. This letter is available at: http://www.ofgem.gov.uk/Markets/WhlMkts/CompandEff/Documents1/Information_Request_EU_Security_of_Gas_Supply.pdf

percent of the turnover of the licence holder. Further if the licensee failed to comply with a final order or with a provisional order of the Authority or to pay any financial penalty by the due date, Ofgem could potentially revoke the company's licence.

1.9. In general, a licence condition benefits from not favouring a particular source of demand or supply flexibility above others. However, supply solutions do implicitly deliver different types of flexibility in terms of response time and certainty of delivery. This might need to be taken into account when designing an ex-ante licence condition. In this case, such an obligation may increase the number of long-term supply contracts, as a means of demonstrating compliance with the obligation, which could potentially dampen market innovation. There is a risk that relying on an ex-ante assessment could be somewhat ineffective since suppliers could rapidly change their contractual positions following compliance with the licence condition.

1.10. An ex-post licence condition could significantly reduce monitoring costs. In addition, given the potentially significant consequences associated with a licence breach, we think that this requirement could be effective in ensuring suppliers take adequate measures to protect their firm customers. However, there are legal risks associated with this option as parties might disagree for example, on whether a supplier has used best endeavours to avoid a GDE.

Reliability options

1.11. Reliability options were highlighted by the Department of Energy and Climate Change as a potential capacity mechanism for the electricity market in the recent energy white paper entitled "Planning our Electric Future".[74]

1.12. An adapted version of this system could be used to enhance gas security of supply in the market in Great Britain (GB). Under this mechanism, a reliability contract could be signed, for example, between a supplier and a shipper. This would not necessarily need to be restricted to shippers and could be extended to other natural gas undertakings, such as storage operators. The terms of the contract could see the supplier obligated to make regular option payments to the shipper. In return the shipper would be obligated, if called, to make a payment to the supplier for a given volume of gas. This payment would represent the difference between the market price of gas and a pre-agreed strike price.

1.13. This will expose shippers to price spikes, which should create incentives to take appropriate action to insure against these price spikes, and thus potentially enhance security of supply. As well as providing compensation for the loss of scarcity rents, the regular option payments also work to provide the necessary certainty needed to support the long term investment in infrastructure.

1.14. In essence, the system could potentially work as follows:

- A central body would establish the level of gas to be procured based on a particular security of supply threshold. Suppliers would then be required to procure an appropriate level of reliability options in proportion to their customers' gas demand. The central body would act as an auction house for

[74] Available from DECC at: http://www.decc.gov.uk/media/viewfile.ashx?filetype=4&filepath=11/policy-legislation/EMR/2176-emr-white-paper.pdf&minwidth=true

shippers (and potentially other gas undertakings) to sell their options to suppliers.

- The gas market functions as normal, whilst shippers receive a regular option payment in exchange for their availability at high price periods. A supplier would typically exercise the option when the marginal cost of gas exceeds the strike price. Once a supplier exercises their option, the shipper would have to refund the price of gas above the predefined strike price to shippers. By selling gas into the market at this point a shipper would hedge themselves against the risk of a significant pay-out. Therefore, failure to deliver gas to the market at this moment would result in losses for shippers.

1.15. The primary advantage of this form of intervention is its flexibility. By setting a target for gas volumes without favouring a particular approach it enables shippers to use innovative methods to enhance security of supply. As a result, unlike other interventions, reliability options do not favour one method of enhancing gas security of supply over another. In this way, all forms of technology and all parts of the supply chain can play their part in ensuring that GB gas demand is met. A reliability option would also create a price cap for those volumes covered under the obligation. This would help to shield consumers from price spikes and may be particularly important for big businesses that have their prices pegged to wholesale gas prices.

1.16. The design of such an intervention would require careful consideration in order to avoid potential unintended consequences. For example, if not carefully designed, suppliers and shippers, in particular vertically integrated companies, could collude to create a 'reverse option'. The result would be an option payment going to the supplier, with the guarantee to refund the shipper any payment made when gas prices peak. It is also important to note that unlike other options, this financial approach lacks the certainty that gas will actually be available during periods of scarcity.

Demand side response (DSR) options

Standard contracts

1.17. Standard terms could be introduced for contracts for interruptibility between suppliers and customers. In its most basic form, a standard contract could simply formalise existing market processes, creating a more structured framework for the bilateral agreement of contracts. The standard contract could act as a template format for interruptible contracts, with customers and suppliers being free to decide all of the terms. It could provide space to define the volume of supply offered, the option/exercise price, the trigger for interruption, and any other relevant conditions.

1.18. The advantages of this basic form of standard contract would be to make the terms of these contracts as transparent as possible, and to highlight the options available to signatories (eg linking interruption to a Gas Balancing Alert (GBA)). In doing so, standard contracts may help to address customer concerns regarding shipper nominated disruption, and may also support customers and suppliers in valuing these contracts. By clearly defining the parameters of interruption, it could allow customers and shippers to compare terms across standard contracts more easily. This improved transparency could help to facilitate competition and reduce transaction costs for signatories.

1.19. Some stakeholders have suggested that there may be particular demand for interruptible contracts that can only be exercised in the event of an emergency. Whilst such contracts could be agreed through current market arrangements, or through the standard contract described above, we anticipate that a distinct 'emergency contract' format may provide additional reassurance. This could predefine the trigger for interruption as a GBA being declared, but leave all other terms open to negotiation between signatories. A supplier would typically interrupt customers when the marginal cost of gas exceeds the contractually agreed exercise price. Such standard term contracts can exist alongside other interruptible contracts that suppliers and customers can agree on. Hence, this could represent an additional option – rather than an obligation – for suppliers and customers.

1.20. Commercial interruptible contracts could be utilised and traded under normal market conditions, with the rate of use being partially determined by the cash-out price. Emergency interruptible contracts could be utilised and traded in the same manner in (or just before) an emergency.

1.21. A key concern we have identified with standard contracts is that they might curb product diversity and innovation. This is true to the extent that standard contracts narrow the parameters around which these contracts may be agreed. This concern is greater if suppliers and customers are obligated to agree any interruption through the standard contract format, and if they are not designed to accommodate sufficient diversity.

1.22. Further, we believe introducing voluntary standard contracts without cash-out reform would not be effective. Without cash-out reform the costs of being short when interruptions occur are relatively small; hence, the incentive for suppliers to agree interruptible contracts with customers is limited. In this way, standard contracts could be a useful complement to cash-out reform.[75]

Demand side response auction

1.23. A number of stakeholders have suggested that an auction for interruptible capacity would effectively alleviate current barriers to agreeing these contracts for use in an emergency. Stakeholders have suggested that an auction, run by NGG, government, or an independent body, would be a solution to the lack of demand for interruptible contracts from suppliers. This may also address the concerns among some customers with shipper nominated interruption and the lack of transparency within contracts.

1.24. We have considered a range of ways in which an auction for daily metered (DM) customers could work, and believe that the following arrangements would be the most effective starting point for any auction:

- Governance – In response to concerns about customer mistrust of supplier nominated interruption there could be a benefit in NGG running the auction.

[75] Alternatively, the use of interruptible contracts could be made mandatory by obliging suppliers to agree a certain number of interruptible contracts. The mandatory volume covered could be proportional to a suppliers' DM customer portfolio. This approach could be effective even without cash-out reform; however, it is unlikely to be sufficient to enhance security of supply.

However, due to a prohibition in the Gas Act 1986 against NGG contracting directly with customers, suppliers would need to submit bids on behalf of their customers. NGG would then need to hold a contract with suppliers whose bids had been accepted. These suppliers would then hold a contract directly with their customers.

- Timing and frequency – We believe that the timing of any auction would have to fulfil two criteria; to allow demand to be brought off in an organised and timely manner, and to capture as closely as possible the Value of Lost Load (VoLL) for customers at the time of interruption. Hence, we believe that an auction could be held annually pre-winter and contracts agreed in the auction could be exercised in an early stage of an emergency in the order of the bids.
- Participants – Any participants bidding into the auction would need to be isolatable DM customers who can demonstrate that they meet the appropriate safety requirements. We suggest that the auction only be open to customers that can safely turn down specified volumes in a short time frame.

1.25. One of the main benefits of an auction run by NGG is that the price of interruption could be fed into the cash-out price, allowing costs to be targeted appropriately at those who are responsible for causing the supply shortage. Where bids are accepted in the auction, the price of the bid is equivalent to the interruptibility payment offered to that customer.

1.26. To allow bids to be passed through cash-out, an auction with only an exercise price is the preferred option. Where bids are offered in on an option and exercise basis, there is no clear way of ordering the bids, and of feeding an appropriate proportion of the option price into cash-out.[76] An exercise only auction has the advantage of increasing the simplicity of bids for customers and NGG, and of still maintaining the opportunity for suppliers and customers to agree any option and exercise contracts outside of the auction where an option payment is of more importance to customers.

1.27. We believe that some form of cap on accepted bids would be necessary to drive down the price of bids to VoLL and ensure efficiency. We suggest that if an auction were instituted, a volume cap would be the most appropriate means of choosing successful bids. Whilst we have considered price caps and a value for money assessment as alternatives, we believe that these mechanisms would leave the auction open to significant gaming opportunities and thus would not induce efficient VoLL discovery.

1.28. A critical issue, given this volume cap, is the question of what eligible customers would receive if they are unsuccessful in the auction, or if they choose not to bid. If the auction is fully combined with the proposed cash-out arrangements described in chapter 6 (ie one possibility of option 4), all DM customers would have the opportunity to receive a payment for involuntary demand side response (DSR)

[76] One possibility may be to feed in only the exercise price. However, the exercise price could be very low relative to the actual VoLL of the isolated user. This could significantly dampen price signals on suppliers, reducing the incentives to avoid an emergency. Another option might be to feed a net present value of the option and exercise price into cash-out and to order bids in such a way. However, this would be difficult to determine given uncertainties around the frequency of emergencies. There may also be cash flow issues to the extent that option fees are paid on an ongoing basis and cash out is only paid in an emergency.

services at the level of domestic VoLL, or to bid into the auction at an exercise price. The incentives to bid into the auction could therefore be significantly weakened for any customers who have a VoLL below domestic VoLL. It is possible that the majority of those who choose to bid in would be those with VoLLs higher than the payments for involuntary DSR services, and therefore could be the very customers that would be efficiently interrupted last, rather than first. This could significantly detract from the benefits of any auction.

1.29. For these reasons we could consider that eligible DM customers that do not bid into the auction or are unsuccessful would not receive a payment for the involuntary DSR services they provided to suppliers. Those that are successful would receive the exercise price (ie payment for voluntary DSR services) according to their bid. However we believe that there are a number of significant problems with an auction in the absence of payments for involuntary DSR services, and further problems associated with an auction format in general:

- We believe that withholding payments for involuntary DSR services from those eligible customers who are unsuccessful in an auction is a significant problem. Where the auction is working efficiently, this would mean that those customers with the highest VoLLs would receive nothing if interrupted.
- We do not believe that an auction with a volume cap will be as efficient as the open market in revealing the VoLLs of a range of customers.
- There are likely to be a range of administrative costs and difficulties with committing any party, such as NGG to hold an auction. NGG might need to perform credit checks on suppliers before agreeing any contracts. Further, the process of isolating customers could take longer due to the nature of the contractual arrangements.
- For safety and other reasons, NGG might prefer to interrupt customers based on other factors than their bid. For example, NGG might prefer to interrupt customers with the highest gas consumption first rather than those with the lowest auction bids.

1.30. Our initial view is that these challenges will make it problematic to implement such an option. We acknowledge however that a large number of stakeholders have suggested such an approach and we are therefore keen to hear from stakeholders how these challenges could potentially be addressed.

Storage interventions

1.31. There are two main forms of storage intervention that could be considered. One is a direct intervention in the development of storage capacity, through central procurement or regulated development (or underwriting) of storage capacity. This capacity could be held outside the market (as "strategic storage") but it is likely to be more economic to make it available to market participants through third party access arrangements. This would be equivalent to the basis on which storage is developed in most European markets. The impact on the economics of existing storage projects would need to be considered in any such intervention, which in the GB context may favour approaches of underwriting of storage products (eg top-up of annual storage prices if they fall below a certain level).

1.32. The second form of intervention is an obligation on suppliers or shippers (or the transmission system operator) to hold an amount of gas in storage. This could be combined with a regulated/supported capacity intervention (as in some European countries, see box 4) or could be implemented on its own, on the basis that such a supplier obligation would generate sufficient demand for storage capacity to lead to new capacity being developed where it is needed. Equally, if there is an intervention to promote development of storage capacity directly (the first option above); it is not clear that an additional obligation would be needed in GB to ensure shippers use the capacity.

1.33. An obligation on shippers or suppliers could be to hold sufficient gas in store to meet a defined level of peak demand (eg a 1 in 20 winter). When designing, implementing and enforcing storage obligations, several complex design issues would need to be taken into account, including:

- Timing: An obligation could apply throughout the year, at the start of winter or at a number of points throughout winter. If applied throughout the year or throughout winter, then a declining profile requirement could be utilised.
- Type of Storage: There are different types of storage and different benefits associated with each. For example, long range storage facilities deliver gas from their maximum stock at full capacity for at least two months. Short range storage facilities are able to deliver gas quickly relative to their stock levels, usually for a few days at maximum capacity. An obligation would need to define both capacity and deliverability of storage.
- Location: Stocks could be held in storage, LNG tanks or potentially in continental Europe or beyond. However, holding gas in store outside of GB raises issues around the time it would take for the physical gas to be delivered in an emergency and concerns around its availability if interconnector outages had occurred.
- Storage volume: When calculating an appropriate volume of storage, consideration needs to be given to a range of factors. These include the availability of non-storage supplies and demand in extreme circumstances.
- Target group: A storage obligation could apply to suppliers, shippers or the system operator (or even government or a separate publically funded agency). Suppliers might be best placed to manage an obligation as they are ultimately responsible for purchasing sufficient capacity for their customers. On the other hand, if the main purpose is to drive investment decisions in storage facilities, this is a rather indirect mechanism.
- Enforceability: A storage obligation could be placed into supplier, shipper or system operator licences. Failure to comply could constitute a licence breach.
- Tradability: If the obligation is on suppliers or shippers, one could consider the introduction of storage obligation permits. These permits could be traded between companies throughout the year. This would increase flexibility and make it easier for small companies to comply.

1.34. Several European countries intervene in the storage market through regulated storage facilities and/or obligations on suppliers to hold an amount of gas in storage. Box 4 provides a summary of storage interventions in France and Spain.

Box 4: Storage interventions in France and Spain

France - France is highly dependent on gas imports, which represent 98 per cent of the country's gas supplies. For this reason, France has made significant investments in gas storage facilities. 140 Terawatt hours (TWh) of gas can be stored in the existing facilities, which represents 25 per cent of the country's annual gas demand. Transmission System Operators and Storage System Operators have priority access to gas storage capacity for balancing purposes and to ensure the integrity of the transmission grid. Once these requirements are met, a large part of the capacity is offered to suppliers with a portfolio of end consumers in the form of storage rights (currently around 116TWh of storage). Subsequently, the remaining capacity (capacity not associated to storage rights and capacity that remained unsold after the storage rights mechanism) is sold to all suppliers through an auction. There is currently a surplus of storage capacity due to low spreads between winter and summer gas prices. However, investments are being made to ensure that sufficient storage is available in the coming years. On 1 November each year, suppliers are required to have in stock at least 85 per cent of the capacity rights associated to domestic customers and customers providing services of general interest. In addition, suppliers must be able to meet the needs of firm end-customers under all of the following scenarios:

- in case of disruption of the major supply source during six months under normal weather conditions
- during a cold weather statistically occurring once every 50 years
- when facing extreme temperatures during a three day peak spell period statistically occurring once every 50 years.

Spain – In Spain, obligations are in place that set minimum storage levels and maximum levels of import dependence. Storage obligations require year round minimum security stocks equivalent to 12 days of firm sales to final consumers, rising to 20 days in October for the start of winter. The diversification obligation places a 50 per cent cap on the proportion of imports from Spain's largest gas source (currently Algeria) and applies to all parties importing over 7 per cent of national gas supplies. Despite introducing storage obligations, new suppliers have entered the market and hold significant market shares.

1.35. Stakeholders mentioned during the consultation that a storage obligation could be similar to the top-up system that was put in place in GB in 1996. Top-up placed an obligation on the system operator to ensure sufficient levels of storage. It was discontinued in 2004 due to its costs. Box 5 provides an overview of the system.

1.36. As outlined in chapter 5, Ofgem undertook a review in 2004 of the effectiveness of top-up in ensuring long-term gas security of supply in GB at a reasonable cost to consumers. The review found that top-up could cost consumers in excess of £200 million for the 2004/05 winter. In addition, it was concluded that top-up could dull the incentives on shippers to ensure security of supply. Ofgem also believed that the system distorted competition in the storage market. For these reasons, top-up was removed.

Box 5: Overview of the top-up system

Top-up was introduced in 1996 as part of the network code of the system operator (at the time Transco, now NGG). Under top-up, Transco was responsible for minimising the risk of a gas supply emergency by ensuring sufficient supplies were held in storage to meet the demands of firm customers in a severe winter. In particular, Transco would forecast gas supplies for the coming winter and contrast this with estimated firm customer demand in a severe winter. If supplies were forecast to fall short of demand, Transco was required to buy and store gas to fill this gap.

As well as having to procure in advance, Transco was required to monitor gas storage levels throughout winter and intervene if stocks threatened to fall below set levels. This was achieved by preventing shippers from withdrawing gas from storage through counter-nominations. Since this required Transco to buy gas in times of high prices, the costs of the scheme substantial. Transco recovered these costs through its transportation charges levied on shippers.

Appendix 4 - Consultation response and questions

1.37. Ofgem would like to hear the views of interested parties in relation to any of the issues set out in this document.

1.38. We would especially welcome responses to the specific questions which we have set out at the beginning of each chapter heading and which are replicated below.

1.39. Responses should be received by 31 January 2011 and should be sent to: gb.markets@ofgem.gov.uk

1.40. Unless marked confidential, all responses will be published by placing them in Ofgem's library and on its website, www.ofgem.gov.uk. Respondents may request that their response is kept confidential. Ofgem shall 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.

1.41. Respondents who wish to have their responses remain confidential should clearly mark the document/s to that effect and include the reasons for confidentiality. It would be helpful if responses could be submitted both electronically and in writing. Respondents are asked to put any confidential material in the appendices to their responses.

1.42. Having considered the responses to this consultation, Ofgem intends to publish a final decision in spring 2012. We will also be looking to run a number of stakeholder workshops and seminars during and after the consultation process. Although these are intended to inform our thinking on the Gas SCR process these workshops should not be seen as a substitute for providing a full written response. Any questions on this document should, in the first instance, be directed to:

Anna Barker, Senior Economist
Ofgem, 9 Millbank, London, SW1P 3GE
Tel: 020 7901 7000
E-mail: gb.markets@ofgem.gov.uk

Consultation Questions

CHAPTER 3: Level of security of supply

Question 1: Are there any options for determining the level of gas supply security to be delivered by the market that we have not considered?

Question 2: Do you agree with our approach to setting the level of security of supply?

CHAPTER 4: Cash-out reform

Question 1: Do you agree that it is appropriate to retain the Post Emergency Claims (PEC) arrangements? If not please explain why.

Question 2: Do you agree with how we have estimated Value of Lost Load (VoLL) and the level of VoLL that we have used? Is there a case for using a higher VoLL to incentivise more discovery of the demand side?

Question 3: Is one day domestic VoLL an appropriate administrative price for any firm load interruptions?

Question 4: Do you agree that it is appropriate to retain the Emergency Curtailment Quantity (ECQ) arrangements? If not please explain why.

Question 5: To what extent do our proposals alleviate shippers' concerns about credit implications of targeting the full cost of multiple days of interruption on shippers that were short on day one of a stage 3 (network isolation) interruption?

Question 6: Should extended payment terms be applied to emergency cash-out (possibly to align with payments through the PEC payment process)?

Question 7: Will enhanced incentives to avoid an interruption occurring increase the number of interruptible contracts entered into by industrial consumers? Please explain why.

Question 8: Do you agree with our broad proposal for collecting monies from shippers and passing this through to customers? If not so you have an alternative proposal?

CHAPTER 5: Possible further interventions

Question 1: Do you agree with our assessment that a gap in the emergency arrangements would remain following the introduction of capped cash-out? If so, to what extent do you believe that this gap can be overcome through further interventions?

Question 2: Have we captured the full set of potential further interventions? If not what other further interventions should be considered?

CHAPTER 6: Assessment of options

Question 1: Do you believe we have captured all the appropriate options?

Question 2: Do you agree with our assessment of the costs and benefits of the various options?

Question 3: Do you agree with our assessment on a preferred option?

APPENDIX 3: Further interventions

Question 1: Do you have a preference for a specific intervention/s that you think might be most effective for ensuring security of supply while minimising the risks and unintended consequences?

Question 2: Do you think that standard contracts combined with cash-out reform provide the necessary incentives for suppliers to increase penetration of contracts for interruption?

Question 3: A number of stakeholders have suggested an auction for interruption. We outline several challenges with such an approach and are keen to hear proposals on how to overcome these challenges.

Question 4: If some kind of storage obligation was to be implemented, do you favour an obligation on suppliers or shippers? Alternatively, do you think the system operator or government should invest in strategic storage or build storage facilities for the industry to use?

Appendix 5 - Glossary

A

Agency for the Cooperation of Energy Regulators (ACER)

The Agency for the Cooperation of Energy Regulators is a body of the European Union designed to help co-ordinate and support the actions of national regulatory authorities. Its over-arching objective is to help achieve a single energy market in Europe.

Authority (The)

The Authority is the Gas and Electricity Markets Authority (GEMA). GEMA is the governing body of Ofgem and consists of non-executive and executive members and a non-executive chair.

C

Cash-out

National Grid Gas is responsible for taking out balancing actions on behalf of the market. The prices paid for these balancing actions are then passed onto long and short shippers. That is, long shippers are paid at one rate for their positive imbalance and short shippers have to pay at a different rate for their negative imbalance. These charges are known as cash-out prices.

Cash-out (dynamic)

Dynamic cash-out means that the level of the cash-out continues to change in response to circumstances upon declaration of stage 2 of an emergency (pre exit reform). This approach was proposed in the initial consultation.

Cash-out (frozen)

Under current gas emergency arrangements the cash-out price is frozen when stage 2 of an emergency is declared. That is, the cash-out price remains at the level it was at this time for the duration of the emergency.

Curtailment Order

The order in which load will be curtailed at stage 3 (pre exit reform) and above of an emergency.

D

Daily-metered (DM) customer

This is a gas customer with a meter which allows their consumption to be measured on a daily basis.

Demand Side Response (DSR)

A demand side response is a short-term change in the use of, in this case, gas by consumers following a change in the balance between supply and demand.

Distribution Network Operator

Distribution Network Operators are companies licensed by Ofgem to distribute gas or electricity in Great Britain.

E

Emergency curtailment arrangements

The emergency curtailment arrangements provide for compensation to be provided to shippers in the event that transporters instruct, under the direction of the Network Emergency Coordinator, the curtailment of gas off-takes at any relevant supply point. Shippers are still required to pay cash-out on their imbalances but curtailed quantities are subject to a trade between the shipper and the residual balancer at the Emergency Curtailment Trade Price. As such, shippers will not be 'cashed out' on these curtailed quantities.

Emergency curtailment trade price

This is the price at which a shipper's emergency curtailment quantity is compensated. This is determined as the 30 day average System Average Price prevailing at the commencement of a gas deficit emergency.

Emergency specification gas

For gas to be allowed to enter the GB network it must meet certain specifications with respect to, for example, its calorific content. In the event of an emergency these specifications may be relaxed to allow for gas that would not normally meet the tighter specifications to enter the system. This is known as emergency specification gas.

Ex Ante / Ex Post

These are Latin terms meaning "before the event" and "after the fact" respectively.

Exit Reform

The Reform of the NTS Exit Capacity arrangements also known as Exit Reform began in 2005 following the Authority's decision to approve National Grid Gas's sale of four of its distribution network businesses. The process concluded in January 2009 with the implementation of code modification UNC195AV known as the Introduction of Enduring NTS Exit Capacity Arrangements.

The reform was necessary to ensure NGG received efficient investment signals in respect of NTS users' capacity needs under the new arrangements. This reforms process has also resulted in changes being made to the stages of a national gas deficit emergency.

F

Firm customer

This is a customer with a non-interruptible gas supply contract. These customers cannot be instructed to reduce their demand or have their demand curtailed except for following the announcement of stage 3 or greater of an emergency.

Firm load shedding

Upon declaration of stage 3 of an emergency, the Network Emergency Coordinator may instruct transporters of gas to instruct that consumers stop using gas. This is known as firm load shedding.

Force Majeure

Force Majeure is a way in which parties to a contract can agree on specific circumstances when a failure to perform an obligation will be excused (ie when the breaching party will not face liability for its breach).

Clause 3 of Section 3 of the Uniform Network Code General Terms defines Force Majeure as: "Any event or circumstance, or any combination of events and/or circumstances the occurrence of which is beyond the reasonable control of, and could not have been avoided by steps which might reasonably be expected to have been taken by, a Party (the Affected Party) and which causes or results in the failure of the Affected Party to perform or its delay in performing any of its obligations owed to any other Party or Parties under the code."

G

The Gas Act (1986)

The Gas Act is a piece of primary legislation that prohibits persons from engaging in specified activities unless authorised to do so by a licence granted by the Authority. The Gas Act also sets out the powers of the Authority in carrying out its functions under Part I of the Gas Act.

Gas Balancing Alert (GBA)

A Gas Balancing Alert is used by National Grid Gas where the amount of demand on the system reaches a certain trigger level relative to the supply available. It provides a signal to the market to increase gas flows to the system in order to reduce the risk of entering into a gas supply emergency.

Gas Deficit Emergency (GDE)

A Gas Deficit Emergency is a type of Gas Supply Emergency arising as a result of insufficient deliveries of gas being available to meet required demand on the gas system or as a result of a potential or actual breach of a safety monitor.

The Gas Safety (Management) Regulations 1996 (GS(M)R)

The GS(M)R set out the requirement for a Network Emergency Coordinator (NEC) for any network which includes more than one gas transporter. They also require each gas transporter, as well as the NEC, to prepare a safety case which must be approved by the Health and Safety Executive.

Gas Supply Emergency

A Gas Supply Emergency is defined in the Uniform Network Code as the occurrence of an event or series of events that results in, or gives rise to a significant risk of, a loss of pressure in the gas system which may lead to a supply emergency.

H

Health and Safety Executive (HSE)

The Health and Safety Executive (HSE) is the national independent watchdog for work-related health, safety and illness. The safety case produced by the Network Emergency Coordinator must be submitted to the HSE for their approval.

I

Interconnector (Gas)

The gas pipelines and associated terminals which connect the European and UK gas transmission networks.

Interruptible contract

An interruptible contract may be signed by gas consumers where the relevant transporter and/or supplier have the ability to ask a consumer to reduce its off-takes (generally daily metered customers). These contracts allow the transporter and/or supplier to disconnect the consumer (in or out of an emergency) in order to manage demand on the system. Consumers may sign these contracts in return for reduced rates on their gas supply.

L

Licensee (Gas)

The Gas Act requires parties involved in the gas industry to be licensed by the Authority. As license holders, these parties are required to comply with a number of licence conditions. In addition, licensees are required to adhere to the legal and contractual framework that is set out in the Uniform Network Code.

Licence condition

All parties licensed by the Authority to partake in gas industry activities are required to meet certain licence conditions. The licence conditions for the gas industry are categorised into transporter, shipper, supplier and interconnector licence conditions. The licence conditions are separated into standard licence conditions which apply to

all licensees of one type (eg transporters) and special licence conditions which apply only to a specific party (eg National Grid Gas).

Line-pack

Gas line-pack is the quantity of gas that is available in the network itself held in the pipes that are used to transport the gas. As there is some flexibility in the pressures that are allowed in the gas system line-pack may be used by NGG to manage load to a certain degree.

Liquefied Natural Gas (LNG)

Liquefied Natural Gas is natural gas (predominantly methane, CH4) that has been converted temporarily to liquid form for ease of storage or transport.

Liquidity

Liquidity is a measure of the potential for new entrants to join a market. A low liquidity means that it is difficult for new entrants to enter into and grow in a market.

Local Distribution Zone (LDZ)

Local Distribution Zones (LDZs) are low pressure pipeline systems which deliver gas to final users and Independent Gas Transporters. There are twelve LDZs which take gas from the high pressure transmission system for onward distribution at lower pressures.

M

Market Balancing Action (MBA)

An action taken by National Grid Gas to balance the system in which it enters into a transaction with a party so that that party will agree to make an acquiring or disposing trade nomination. The cash-out prices set the price at which these trades will be made.

Modification (Code)

The Uniform Network Code (UNC) is the framework which sets out the gas transportation arrangements for those parties licensed under the Gas Act 1986. This code has developed through modifications raised by signatories to the UNC. It is still possible for modifications to be made through this industry led process. However, the introduction of the Significant Code Review process now allows for Ofgem to lead on the development of modifications before directing them to be raised.

Moral hazard

An economics term used to describe the tendency of parties to take greater risks in relation to an event occurring when they have insurance against the occurrence of this event.

N

National Grid Gas (NGG)

National Grid Gas (NGG) is the Gas Transportation licence holder for the North West, West Midlands, East England and London Gas Distribution Networks. NGG also hold the Gas Transportation licence for the gas National Transmission System (NTS). Prior to 10 October 2005, NGG was known as Transco.

National Transmission System

This is National Grid Gas's high pressure gas transmission system. It consists of more than 6,400 km of pipe carrying gas at pressures of up to 85 bar (85 times normal atmospheric pressure).

Network Emergency Coordinator (NEC)

The Network Emergency Coordinator is responsible under safety legislation for the coordination of a gas supply emergency.

Non-daily metered gas customer (NDM)

This is a gas customer who does not have a meter which can be read on a daily basis.

Neutrality

This refers to the system of Balancing Neutrality Charges which are used under the Uniform Network Code (UNC) to ensure that National Grid neither benefits nor loses financially from the balancing actions it is required to undertake. The charges reflect the difference between all amounts received and paid by National Grid for gas used to balance the system and are spread across all signatories of the UNC on the basis of their usage of the transportation system.

O

On-the-day Commodity Market (OCM)

This is the market on which trading takes place to allow NGG to balance the system. Shippers may also trade with each other on the OCM.

P

Post Emergency Claim (PEC)

The post emergency claims arrangements are used to compensate parties for flowing additional gas onto the system in an emergency if opportunity costs for shippers to do so exceed the cash-out price they received for being long.

Project Discovery

Project Discovery is Ofgem’s investigation published in 2010 into whether or not future security of supply could be delivered by the existing market arrangements

over the coming decade. A copy of the report and associated documents can be accessed on our website.

Public Appeal

An appeal made by National Grid Gas to consumers in the event of a Gas Supply Emergency to reduce gas use.

Public Service Obligations

A public service obligation is an obligation on suppliers to meet the needs of certain categories of customers. The details of the obligation placed on each supplier will differ.

R

Royal Assent

Royal Assent is the Monarch's agreement to make a Bill into an Act. A Bill must have Royal Assent before it can become an Act of Parliament (law).

S

Safety case

The Gas Safety (Management) Regulations 1996 set out the requirement for each transporter of gas to publish a safety case which must be approved by the Health and Safety Executive. These safety cases must demonstrate the method by which the holder will ensure the safe operation of its network. In the case of the Network Emergency Coordinator (NEC), the safety case includes details of the procedures that the NEC has established to monitor the situation throughout a supply emergency and for co-ordinating actions across affected parts of the gas network.

Safety and Firm Gas Monitor Methodology (Safety Monitor)

The Safety Monitor provides a requirement for sufficient gas to be held in storage to meet a number of criteria. This requirement remains valid in the event of a GDE.

Significant Code Review (SCR)

The SCR is a new modifications process introduced through the Code Governance Review. This process allows Ofgem to develop modifications proposals before directing them to be raised.

Shippers

Gas shippers buy gas from producers and sell the gas onto suppliers, and are defined as any body which introduces, conveys and takes out gas from the gas pipeline.

Smeared/shared cost

This is a cost that is spread across all relevant parties. For example, the costs to National Grid of a certain activity may be spread across all shippers involved in the Great Britain gas market.

Stage 2 Emergency

Upon entrance into a Gas Supply Emergency, a number of stages may be declared. Under the current arrangements the cash-out price is frozen upon declaration of stage 2 of an emergency.

System Average Price

This is the average of the prices paid by National Grid in taking market balancing actions for all balancing transactions.

System Marginal Buy Price

The System Marginal Buy Price is the greater of the system average price plus the default system marginal price, and; the price of the highest balancing action offer price in relation to a Market Balancing Action taken by National Grid Gas for that day.

System Marginal Sell Price

The System Marginal Sell Price is the lesser of the system average price minus the default system marginal price, and the price of the lowest balancing action offer price in relation to a Market Balancing Action taken by National Grid Gas for that day.

System Operator

This is the entity responsible for operating the Great Britain transmission system and for entering into contracts with those who want to connect to and/or use the transmission system. National grid is the GB system operator.

T

Therm

A unit of heating value equivalent to 100,000 British thermal units (Btu).

The Third Package

The Third Package is a key step in implementation of the internal European energy market. It recognises the need for better co-ordination between European network operators and continuing co-ordination between regulators at that level.

When discussing the 'Third Package' in this document we are referring to 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 to Regulation (EC) No 713/2009 of the European Parliament and of the Council of 13 July 2009 establishing an Agency for the Cooperation of Energy Regulators.

Transporter (Gas)

The holder of a Gas Transporter's licence in accordance with the provisions of the Gas Act 1986.

U

Uniform Network Code (UNC)

The UNC defines the rights and responsibilities for all users of gas transportation systems in Great Britain. The UNC is, in effect, a contract between the gas transporter and the users of its pipeline system.

Uniform Network Code (UNC) – Section Q

Section Q of the UNC is the main framework which sets out the arrangements that will be in place in the event of declaration of a gas emergency.

V

Value at Risk

This was a methodology used by London Economics to calculate the Value of Lost Load for Industrial and Commercial consumers (with the exception of generators). It estimates the value of risks (eg lost profits) of gas consuming businesses if they had their gas supplies interrupted.

Value of Lost Load (VoLL)

This is the theoretical price at which a consumer would rather have their gas supply disconnected than continue to pay for a firm supply.

List of Acronyms

ACER	Agency for Cooperation of National Energy Regulators
ASSAP	Average Summer System Average Price
CM	Choice Modelling
BCM	Billion Cubic Meters
CV	Contingent Valuation
DECC	Department of Energy and Climate Change
DM	Daily Metered (gas customer)
DN	Distribution Networks
DSR	Demand Side Response
ECQ	Emergency Curtailment Quantity
EMR	Electricity Market Review
GBA	Gas Balancing Alert
GDE	Gas Deficit Emergency
GS(M)R	Gas Safety (Management) Regulations 1996
HSE	Health and Safety Executive
I&C	Industrial and Commercial
LDZ	Local Distribution Zone
LNG	Liquefied Natural Gas
MBA	Market Balancing Action
NDM	Non-Daily Metered (gas customer)
NEC	Network Emergency Coordinator
NGG	National Grid Gas
NGSE	Network Gas Supply Emergency
NTS	National Transmission System
OCM	On-the-day Commodity Market
OTC	Over The Counter
PEC	Post Emergency Claims
PSOs	Public Service Obligations
SAP	System Average Price
SCR	Significant Code Review
SO	System Operator
SWCQ	Storage Withdrawal Curtailment Quantity Arrangements
UKCS	UK Continental Shelf
UNC	Uniform Network Code
VoLL	Value of Lost Load

Appendix 6 - Feedback questionnaire

Ofgem considers that consultation is at the heart of good policy development. We are keen to consider any comments or complaints about the manner in which this consultation has been conducted.

In any case we would be keen to get your answers to the following 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?

6. Please add any further comments?

Please send your comments to:

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