ofgem Making a positive difference for energy consumers

Cap and floor regime for application to project NEMO: Impact Assessment

Consultation

Publication date:	12 December 2013
Response deadline:	13 February 2014

Contact: Stuart Borland

Team: European Electricity Transmission

Tel: 020 7901 7134

Email: Cap.Floor@ofgem.gov.uk

Overview:

In March 2013, we consulted on our proposals for a new regulatory regime for electricity interconnector investment for application to project NEMO, the proposed electricity interconnector between Great Britain and Belgium. The cap and floor regime has been developed together with CREG, the Belgian energy regulator. Having considered responses to the consultation, and subject to responses to this Impact Assessment, we intend to publish our decision on the cap and floor regime for NEMO in spring 2014.

This Impact Assessment outlines the potential impacts of applying a regulated cap and floor to NEMO. We seek views on these potential impacts. We intend to publish an updated impact assessment alongside our policy decision document.

Context

Project NEMO is a proposed 1GW electricity interconnector between Zeebrugge in Belgium and Richborough, Kent in Great Britain ("GB"). The project developers are National Grid NEMO Link Ltd (a subsidiary of National Grid Plc) and Elia (the Belgian TSO), who would jointly own and operate the interconnector following construction.

Section 5A of the Utilities Act 2000 places a duty on the Gas and Electricity Markets Authority (the Authority) to carry out an Impact Assessment (IA) for any proposal that it believes to be important. We note that 'important' is defined by reference to a proposal which would involve a major change in our activities or significantly impact industry participants, the general public or the environment. We think that the application of the new cap and floor regulatory regime to project NEMO falls within these criteria.

We are also considering the regulatory options for future interconnection as part of our work on the Integrated Transmission Planning and Regulation project. We intend to consult on this area in spring 2014.

Associated documents

Electricity Interconnector Policy Consultation (12/10), January 2010:
http://www.ofgem.gov.uk/Europe/Documents1/Interconnector%20policy%20consultation.pdf

Open Letter on next steps from Ofgem's consultation on electricity interconnector policy, September 2010:
http://www.ofgem.gov.uk/Europe/Documents1/Ofgem%20next%20steps%20letter.pdf

Cap and floor regime for regulation of project NEMO and future subsea interconnectors (86/11), June 2011:
http://www.creg.info/pdf/Opinions/2011/NEMO/NEMO-EN.pdf
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=67&refer=Europe

Preliminary conclusions of the regulatory regime for project NEMO and future subsea electricity interconnector investment, December 2011:
www.ofgem.gov.uk/Europe/Documents1/Preliminary%20conclusions%20letter.pdf

Cap and Floor Regime for Regulated Electricity Interconnector Investment for application to project NEMO (28/13), March 2013:
http://www.ofgem.gov.uk/Europe/Documents1/Cap%20and%20Floor%20Regime%20for%20Regulated%20Electricity%20Interconnector%20Investment%20%20for%20application%20to%20project%20NEMO.pdf

Integrated Transmission Planning and Regulation Project: Emerging Thinking (83/13), June 2013:
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=134&refer=Networks/Trans/ElecTransPolicy/itpr

Summary of responses to Ofgem's consultation on a cap and floor regime for regulated electricity interconnector investment for application to project NEMO, June 2013:
http://www.ofgem.gov.uk/Europe/Documents1/Summary%20of%20responses%20to%20NEMO%20consultation.pdf

Contents

Executive Summary

Interconnectors are the physical links which allow for the transfer of electricity across borders and which underpin the European energy network. These connections provide benefits in addition to the traditional gains from trade through price arbitrage, such as improving security of supply and helping integrate variable renewable generation.

In mainland Europe, investment is typically through a regulated route; national Transmission System Operators as developers receive a return for their investment, with revenues underwritten by consumers.

The alternative exempt route is the only approach through which interconnection has been realised recently in GB. Under this route, developers typically seek an exemption from aspects of European legislation. However, the National Regulatory Authorities and the European Commission can impose additional conditions on exemption decisions. Feedback from interconnector developers suggests that this introduces uncertainty into the exemption process and reduces the commercial attractiveness of developing interconnector projects through this route.

We are developing a cap and floor regulatory regime for project NEMO, the proposed 1GW interconnector between GB and Belgium. This Impact Assessment (IA) sets out our views on the potential impacts of implementing a cap and floor regime for project NEMO.

Overview of the cap and floor regime

We consulted in March 2013 on the proposed cap and floor regime for application to project NEMO. This consultation built on the framework for the design of the proposed regime outlined in December 2011.

A developer-led cap and floor regime provides a balance between incentives to stimulate investment through a market-based approach and ensuring that the risks and rewards are bounded. Thus, a cap and floor can reduce financing costs by removing exceptional downside risks, while reducing consumer exposure by curtailing excessive revenue.

The proposed regime is designed to operate for 25 years, with the levels of the cap and floor set ex-ante and remaining fixed in real terms for the regime duration. The levels will be set through a cost-based approach, using a regulatory asset value model as used in onshore price controls in GB and mainland Europe. This includes a combination of ex-ante opex and ex-post capex reviews.

Impacts of applying the cap and floor regime to project NEMO

This document sets out the anticipated impacts of applying the cap and floor regime to project NEMO. These impacts are considered against a baseline whereby, without the cap and floor regime, NEMO would not be developed and therefore electricity interconnection between GB and Belgium would not be realised.

We consider the potential impacts of applying the cap and floor to project NEMO across a number of areas, including impacts on consumers, security of supply, competition and sustainable development. On balance, we expect applying the cap and floor to project NEMO will provide benefits to both GB and Belgium.

Analysis undertaken by the Brattle Group, on behalf of the developers, shows that over the lifetime of the project, development of NEMO will provide social welfare benefits resulting from trade between the two markets. We also anticipate wider positive impacts (such as a small increase in competition and enhanced security of supply) that will provide benefits to consumers, in addition to those captured by trade benefits. The cap and floor is designed such that a project would only go ahead if revenues were expected to exceed the floor. This design feature, along with potential revenue projections presented by the Brattle Group, suggests that consumer top-ups to the floor would be unlikely.

We also consider that NEMO will provide sustainable development benefits. It will assist with the integration of renewables by providing access to additional sources of reserve. Further, the interconnector can facilitate connection to the most efficient sources of renewable generation, and help to ensure that low-carbon generation is not curtailed at times of low demand, therefore extracting maximum value from the investment and contributing to progress towards renewable generation targets.

The impact of the NEMO interconnector on GB wholesale prices over the lifetime of the project is likely to be small, according to the analysis by the Brattle Group. Their analysis suggests that in the period from 2020 to 2025 NEMO could marginally increase GB electricity prices. Their analysis shows that the impact on GB consumers reverses in 2030, with GB consumers benefiting from the import of cheaper power from Belgium. However, this kind of analysis is highly dependent on assumptions on investment, fuel mix and market conditions in the different countries.

Our views and next steps

The NEMO interconnector is expected to bring a number of benefits to GB and Belgian consumers. Through enhancing market integration with other European Union Member States, it will extend GB access to continental electricity generation, enhance competition, contribute to security of supply, and facilitate cost-effective integration of variable renewable generation.

We are currently developing our draft proposals into the final cap and floor regime for application to the NEMO interconnector. This will build on our March 2013 consultation and will set out the regulatory framework for the construction and operation of the interconnector. We aim to publish our decision in spring 2014.

We seek views on the impacts of applying the cap and floor regime to project NEMO as set out in Chapter 3 of this IA. Following consultation, we plan to update this IA as appropriate in light of responses and to publish a final version alongside our decision document.

1. Key objectives and background

Chapter Summary

This chapter outlines the objectives of this Impact Assessment and the background to the development of a cap and floor regime and its application to project NEMO. It notes the objectives and duties that we have regard to when considering impacts of applying the cap and floor regime to project NEMO. It then gives a brief overview of the work that has been undertaken to date.

Objectives of this Impact Assessment

1.1. This IA seeks to set out the impacts of implementing a cap and floor regulatory regime for project NEMO. We will analyse these across a number of areas, including those mentioned above in relation to our statutory duties.

1.2. For this IA, we have assumed as a baseline that under the exempt route Elia would not invest in a link. Further, there may not have been sufficient developer appetite to take project NEMO forward. Therefore, the impacts of the cap and floor regulatory regime for project NEMO are considered against a counterfactual of no new interconnector link being developed between GB and Belgium.

1.3. This IA is largely qualitative at this stage, supported by existing analysis where appropriate. The nature of our proposal at this stage (ie before setting the values of the cap and floor that the NEMO developers will be exposed to) means that it is difficult to accurately quantify some of the direct costs and benefits of the cap and floor regime.

1.4. As a supporting document alongside this IA we have published a study commissioned by the NEMO developers and undertaken by the Brattle Group. This study was undertaken in 2011 and estimates the impact of the NEMO interconnector on welfare, competition and congestion revenue. We have published this study with the consent of the developers. We have used some of the findings of this study to inform our analysis in Chapter 3.

1.5. The results of the Brattle analysis are indicative only and are based on prevailing assumptions at the time of the study. We have not undertaken a detailed assessment of the underlying assumptions for the purpose of this IA and welcome views on the analysis (published alongside this IA) for input into our final decision. Further, it is important to note that estimated developer revenue is unbounded in the study whereas in practice revenue will be subject to the cap and floor (ie if revenue is greater than the cap this will be returned to tariff payers and will not be retained as revenue by the developers). Therefore actual revenues for the project developers will be subject to the final setting of the cap and floor parameters.

1.6. This IA aims to estimate how market prices may impact consumers, mainly through changes to energy bills (using the indicative Brattle analysis), while also describing potential wider system impacts. However, future market prices and conditions cannot be accurately forecast and therefore forecasts of future congestion revenues for the project are uncertain. Interconnector congestion revenues for NEMO will depend on the existence of price differentials between the GB and Belgium markets.

1.7. Throughout the development of the cap and floor regime for project NEMO we have sought engagement from several key stakeholders, including interconnector developers, Transmission System Operators (TSOs), The Belgian National Regulatory Authority (NRA) CREG, government, and other NRAs. We value stakeholder input into our development of the regulatory regime for project NEMO and seek views on this IA from these stakeholders, as well as any other interested parties. We will consider these views and will provide an updated IA alongside the publication of our decision in early 2014.

1.8. We welcome views on this IA by 13 February 2014. Information on how to respond to this IA can be found in Appendix 1.

Project background and work to date

Interconnection investment and drivers for change

1.9. Interconnectors are the physical links which allow for the transfer of electricity across borders.

1.10. Like other electricity network infrastructure, an interconnector helps to connect sources of generation with demand. By providing consumers with better access to a larger pool of generation over an extended geographical area, an interconnector can:

- improve the operating efficiency of the overall generation portfolio by providing access to the most efficient units over a larger area. This can also help to reduce the greenhouse gas emissions associated with meeting electricity demand;
- enhance competition by creating larger effective markets thereby facilitating efficient electricity market prices;
- improve security of supply by increasing access to generation in periods of tightness; and
- enhance the efficient integration of variable generation and demand (for example, wind and solar renewable energy generation) by harnessing the diversity between output in different locations and by providing improved access to the balancing services and other production flexibility that is needed to maintain security and quality of supply.

1.11. As with all electricity network infrastructure, interconnectors have significant capital costs which must be financed, require operating expenditure for repairs and maintenance, and give rise to transmission losses. It is therefore important to ensure that the value of the benefits that these links bring over the length of the regime outweigh their costs before asking consumers to underwrite the floor. It is also important that such costs and benefits are appropriately allocated.

1.12. Interconnection between European Union (EU) Member States forms part of the delivery of the European internal energy market. In the European Commission's November 2012 communication on the internal market[1], the realisation of more interconnection was considered a priority. The GB electricity market currently has 4 GWs of interconnection to France (IFA), the Netherlands (BritNed), the Republic of Ireland (East West) and Northern Ireland (Moyle).

1.13. Across Europe, there have historically been two routes available for investment in interconnection. Through a regulated route, developers can receive a regulated revenue or return for their investment and must comply with all EU legislation on cross-border electricity infrastructure. Through the exempt route, developers can apply for exemption from aspects of EU legislation (eg use of revenues, unbundling or third party access requirements) and are exposed to the risks of owning and operating interconnector assets.

1.14. Across Europe, interconnector investment typically follows the regulated route. Interconnection is commonly developed by the national TSO with revenues underwritten by consumers. Interconnection forms part of the onshore Regulated Asset Value (RAV), the asset portfolio on which the TSO can earn regulated returns.

1.15. In GB, interconnection is a separately licensable activity and cannot form part of the regulated monopoly Transmission Owner (TO) asset base. In the absence of a regulated revenue regime in GB, new investment has recently only be realised through the exempt route.[2]

Developing a regulated interconnector investment regime

1.16. The exempt investment route in GB has proven to be increasingly challenging. In the case of BritNed, the European Commission imposed additional conditions on the exemption decision at the end of the development process, placing a cap on returns. Feedback from interconnector developers suggested that this decision introduced uncertainty into the exemption process and reduces the commercial attractiveness of developing interconnector projects through this route.

1.17. Some EU countries do not allow TSOs to invest in exempt interconnection, and often do not allow third party investment without TSO involvement. Different national regimes on either side of an interconnector may result in asymmetries as the parties involved may face different construction and operational incentives in the interconnected countries.

1.18. Given the cross-border nature of interconnectors, there is a clear need for a coordinated approach to interconnector investment. Our approach must provide clear

[1] November 2012 Communication on "Making the internal energy market work": http://ec.europa.eu/energy/gas_electricity/doc/20121115_iem_0663_en.pdf

[2] An exception is the recent East-West interconnector with Ireland which is owned by the Irish TSO EirGrid and subject to a regulated model and is fully underwritten by Irish consumers.

and transparent rules, while considering compatibility with regimes in countries to which GB could connect. In addition, we recognise the importance of the European Commission's role in regulating interconnector investment. The proposed regulatory regime for NEMO aims to facilitate economic and efficient investment, in line with our duties under the EU Third Package.

1.19. We consulted on options for regime design in January 2010.[3] Following responses, we decided to commit to further exploring the cap and floor option with the Belgian regulator CREG, for the NEMO interconnector.[4] The developer-led cap and floor regime was seen as the preferred approach as it had clear benefits in terms of retaining market incentives, while ensuring compliance with EU legislation and therefore removing the need to apply for an exemption.

1.20. Ofgem and CREG published a consultation on the regime principles and cap and floor design in June 2011[5], followed by preliminary conclusions on the basic regime design in December 2011.[6] We published a consultation in March 2013 outlining the proposed cap and floor design and methodology for setting the cap and floor for project NEMO.[7] This consultation closed in May 2013 and we have since published a summary of responses.[8]

1.21. Further information about our development of the cap and floor regime to date is set out in Chapter 1 of our March 2013 consultation.

Project NEMO: Background and project timescales

1.22. Project NEMO was granted an electricity interconnector licence in March 2013. Planning and consent applications were submitted to British, French and Belgian planning authorities in March 2013. Each application was accompanied by an Environmental Statement. Converter station sites are currently being prepared in

[3] Electricity Interconnector Policy Consultation (12/10), January 2010: http://www.ofgem.gov.uk/Europe/Documents1/Interconnector%20policy%20consultation.pdf

[4] Open Letter on next steps from Ofgem's consultation on electricity interconnector policy, September 2010: http://www.ofgem.gov.uk/Europe/Documents1/Ofgem%20next%20steps%20letter.pdf

[5] Cap and floor regime for regulation of project NEMO and future subsea interconnectors (86/11), June 2011: http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=67&refer=Europe

[6] Preliminary conclusions of the regulatory regime for project NEMO and future subsea electricity interconnector investment, December 2011: www.ofgem.gov.uk/Europe/Documents1/Preliminary%20conclusions%20letter.pdf

[7] Cap and Floor Regime for Regulated Electricity Interconnector Investment for application to project NEMO (28/13), March 2013: http://www.ofgem.gov.uk/Europe/Documents1/Cap%20and%20Floor%20Regime%20for%20Regulated%20Electricity%20Interconnector%20Investment%20%20for%20application%20to%20project%20NEMO.pdf

[8] Summary of responses to Ofgem's consultation on a cap and floor regime for regulated electricity interconnector investment for application to project NEMO, June 2013: http://www.ofgem.gov.uk/Europe/Documents1/Summary%20of%20responses%20to%20NEMO%20consultation.pdf

both GB and Belgium. The final investment decision is expected to be taken in 2014. Construction of the link is expected to be completed by 2018 with the link due to be operational that year.

1.23. More information about the project and timescales can be found on the project's website.[9]

Ofgem duties relating to impact assessments

1.24. Impact assessments are a vital part of our policy-making process. These provide a valuable framework which enables us to consider the impacts of our policy proposals.[10]

1.25. The implementation of the cap and floor regime for project NEMO may have impacts on regulated businesses (TSOs/TOs), industry participants (developers, generators and suppliers), electricity consumers and wider society.

1.26. Our IA guidance sets out the key considerations that we will take into account when assessing impacts of our policy proposals. We recently consulted on revisions to our IA guidance, and published an update on 1 October 2013.[11] This IA has been undertaken with reference to our previous guidance.[12] Key themes from the updated guidance are reflected in this IA.

Ofgem objectives and duties relating to project NEMO

1.27. The Authority's powers and duties are largely provided for in statute (such as the Gas Act 1986, the Electricity Act 1989, the Utilities Act 2000, the Competition Act 1998, the Enterprise Act 2002 and the Energy Acts of 2004, 2008, 2010 and 2011) as well as arising from EU legislation.

1.28. We have a number of core objectives and duties relevant to the design and implementation of a cap and floor regime for project NEMO. These are outlined briefly below. More information on these duties can be found on our website.[13]

---

[9] http://www.nemo-link.com/

[10] Section 5A of the Utilities Act 2000 places a statutory duty on the Gas and Electricity Markets Authority (the Authority) to carry out an IA when, in carrying out its functions, it considers a proposal that it believes to be important. Section 6 of the Sustainable Energy Act 2003 introduced Section 5A into the Utilities Act 2000. Section 6 of the Sustainable Energy Act 2003 is available at: http://www.legislation.gov.uk/ukpga/2003/30/section/6

[11] Our updated guidance is available at: https://www.ofgem.gov.uk/publications-and-updates/impact-assessment-guidance

[12] Our December 2009 IA guidance is available at: https://www.ofgem.gov.uk/publications-and-updates/guidance-impact-assessments

[13] http://www.ofgem.gov.uk/About%20us/Authority/Pages/TheAuthority.aspx

Protecting existing and future consumers

1.29. The Authority's principal objective is to protect the interests of existing and future consumers in relation to electricity conveyed by distribution or transmission systems. The interests of consumers are their interests taken as a whole, including their interests in the reduction of greenhouse gases, in the security of the supply of electricity to them, and their interests in the fulfilment by the Authority, when carrying out its functions as designated regulatory authority for GB, of specified objectives set out in EU legislation.

Promoting competition

1.30. The Authority is generally required to carry out its functions in the manner it considers is best calculated to further the principal objective, wherever appropriate by promoting effective competition between persons engaged in, or commercial activities connected with:

- the generation, transmission, distribution or supply of electricity;
- the provision or use of electricity interconnectors.

1.31. We consider that the promotion of effective competition in the context of this IA applies to the provision and use of interconnectors and also to the generation, transmission and supply of electricity.

Promoting a single European electricity market and cross-border trade

1.32. The European Third Energy Package of legislation on European electricity and gas markets ('the Third Package') fully came into force in GB in 2011.[14] The provisions of the Third Package have added to Ofgem's principal objective of protecting consumer interests, such that the consumer interest now takes account of certain of our duties as NRA for GB, including regarding the promotion of the internal energy market and the removal of restrictions to trade between Member States.

Promoting sustainable development

1.33. Ofgem's duty to contribute to the achievement of sustainable development was introduced in 2004. In 2008, the Energy Act placed this duty on an equal footing with our duties to meet reasonable demand and finance authorised activities. The Act also highlighted that our principle objective, to protect the interests of consumers, refers to future as well as existing consumers.

---

[14] The Third Package comprises the Electricity Directive (2009/72/EC), the Gas Directive (2009/73/EC), the Electricity Regulation (2009/714/EC), the Gas Regulation (2009/715/EC) and the Agency Regulation (2009/713/EC), as well as the implementing legislation in GB, the Electricity and Gas (Internal Markets) Regulations 2011 (SI 2011/2704).

2. Cap and floor regime design

Chapter Summary
This chapter outlines our proposed regime design, as set out in our December 2011 letter and March 2013 consultation. It highlights the core principles of the regime and design parameters related to costs, revenue and operational incentives.

High level principles

2.1. Our December 2011 decision letter set out a number of high level principles for the regime. This followed consultation on these principles in June 2011. These formed the basis for developing our detailed regime design as in our March 2013 consultation document.

2.2. The principles applied to project NEMO were:

- The regulatory framework will take into account the commercial viability of a project as well as considering the wider benefits efficient levels of interconnection can offer to consumers, for example: security of supply, integration of renewable energy sources, competition and market integration across Europe;
- Consumers should be protected from the cost implications of excessive returns or market power that might accrue to interconnector owners;
- Developers should be able to earn returns that are commensurate with the levels of risk they are exposed to under the regulatory framework;
- Regulatory treatment of developers should be coordinated between NRAs at either end of the shared asset; and
- (For GB and new interconnector developments) Regulatory treatment should allow third party developers and should be impartial and unbiased between TSOs and non-TSO developers, existing and future developers.

2.3. The cap and floor regime provides a balance between incentives to stimulate competition and investment and ensuring that the risks and rewards are bounded. We consider that a cap and floor regime for application to the NEMO project provides the efficient combination of facilitating investment, compatibility with EU requirements, and rewards for consumers. The provision of the floor overcomes some of the uncertainty associated with wholesale price fluctuations between markets. In doing so, this seeks to ensure that the benefits of interconnection can be realised. Further, the presence of a cap ensures that consumers are protected from unbounded developer revenues.

2.4. The principles were designed for new interconnector investment, should we consider it appropriate to apply a cap and floor regime to other future proposed interconnection projects.[15] The principles are intended to encourage consistent evaluation of proposals for new interconnection. These principles underpinned the development of our detailed cap and floor regime for project NEMO. These have therefore been considered when assessing the impacts of project NEMO in Chapter 3.

Regime design

High level design

2.5. The majority of respondents to the June 2011 consultation confirmed their support for the cap and floor regime. They highlighted that one of the interesting features is that it is possible to replicate other regulatory approaches to interconnection through the selection of appropriate parameters – in other words, the wider the cap and floor is set, the closer it gets to a market driven approach, and the narrower it is, the closer it gets to a fully regulated return.

2.6. Our December 2011 decision letter presented the high level regime design for NEMO. This is shown in Table 2.1 below. Our March 2013 consultation outlined our proposed regime design in more detail. This consultation closed in May 2013. Further information on all aspects of the regime design can be found in the March 2013 consultation document. We are currently working to finalise the regime design for NEMO which we intend to set out in our spring 2014 document.

Table 2.1: High level regime design

Aspect	Design
Regime length	25 years (rather than 20 years; developer choice)
Cap and floor levels	Levels set ex-ante and remain fixed in real terms for regime length
Setting costs	Capex: Ex-post capex review Opex: Ex-ante (ie before operation)
Assessment period (assessing whether revenues are above/below cap/floor)	5 years; discrete periodic basis
Mechanism	Cap and floor returns earned within boundaries; revenues above cap returned to consumers; revenues below floor require payment from consumers (via network charges)

[15] We are currently considering options for regulation of future interconnector projects through our Integrated Transmission Planning and Regulation (ITPR) project. Our latest ITPR open letter is available at: https://www.ofgem.gov.uk/publications-and-updates/open-letter-update-integrated-transmission-planning-and-regulation-project

3. Impacts of applying the cap and floor regime to project NEMO

Chapter Summary
This chapter provides an overview of the impacts of applying the cap and floor regime to project NEMO.

Question box

Question 1: Have we correctly identified the impacts that applying the cap and floor regime to project NEMO would have on:
- Consumers;
- Competition;
- Security of supply;
- Sustainable development and the environment; and
- Health and safety?

Question 2: Are there any specific areas in which we should further analyse and/or quantify the impacts of applying the cap and floor regime to project NEMO?

Question 3: Are there any additional impacts of applying the cap and floor regime to project NEMO that we should consider?

3.1. This chapter sets out the potential impacts of implementing the cap and floor regulatory regime for project NEMO. These are considered against a counterfactual of no new interconnector link being developed between GB and Belgium.

3.2. We will analyse the potential impacts across a number of areas. We will consider the impact on the following areas; however we recognise that all of these can have a consumer impact:

- consumers;
- competition;
- security of supply;
- sustainable development and the environment; and
- health and safety.

3.3. As noted in Section 1.20 above, this IA was commenced before our new IA guidelines formally came into effect. We consider the coverage of key issues to be consistent with our updated guidance. The new guidance groups impacts in terms of an overall estimate of the aggregate monetised impacts, distributional analysis, and strategic and sustainability aspects. NEMO would be expected to deliver benefits in helping to protect GB consumers from volatile electricity prices, since it will enable the UK to access cheaper continental electricity when our own price is high (and vice-versa). Interconnection also has a number of strategic and sustainability benefits, associated in particular with the greater diversity and additional options for managing peak electricity conditions, and the more effective and efficient integration of variable renewables sources. The monetised benefits should also be understood against this wider context.

3.4. This chapter will first consider analysis undertaken by the Brattle Group in 2011, on behalf of the NEMO developers, National Grid and Elia.[16] This estimates the overall social welfare benefit of project NEMO. This analysis has informed the assessment of impacts on consumers and competition. It is important to note that any modelled scenarios will be subject to assumptions and therefore these contain a level of uncertainty.

3.5. The Brattle study analysed a range of scenarios and sensitivities and is published alongside this IA as a supporting document to ensure transparency around the assumptions made. Information on these assumptions, scenarios and sensitivities can be found in Chapters 2 and 4 of the study. Overall, and under a range of different assumptions, the analysis estimates that the interconnector will provide benefits to GB and Belgian consumers.

3.6. Revenue forecasts from modelling will not accurately represent the revenues that the developers will actually receive as the modelling does not take into account the presence of the cap and floor and the effect of other cost liabilities (as set out in paragraph 1.5). Further, the analysis does not specifically itemise the cost of developing and constructing the interconnector link and therefore project costs have not been directly assessed in this IA.

3.7. The levels of the cap and floor for project NEMO have not yet been set. Therefore we cannot accurately quantify some of the direct impacts of the cap and floor. We will take into account any additional impacts as we develop the final policy position and cap and floor parameters.

Social welfare benefit of project NEMO

3.8. Calculation of 'social welfare' is a common approach taken to evaluate the possible benefits of a new interconnector investment.

3.9. For interconnection, the term is used to describe the total monetised benefit that comprises: i) the savings to consumers through accessing cheaper generation ('consumer surplus'), ii) the additional profit for generators able to access a larger market ('producer surplus'), and iii) the revenue generated for the interconnector owner through sale of capacity on the link ('congestion revenue').

3.10. The key anticipated benefit of NEMO is an increase in social welfare. The distribution of benefits is asymmetric between interconnected countries and between different parties. When an interconnector to GB is importing, GB consumers will

[16] Our use of the Brattle analysis is with permission and consent of the NEMO developers, National Grid and Elia.

benefit from domestic prices being depressed; when an interconnector to GB is exporting, GB producers will benefit by selling power into a market with a higher price. Consumers in an exporting market may see a price increase, and generators in an importing area may see a fall in revenue. However, the distribution of these benefits will vary, often within short time periods, and will change over time, depending on the generation mix and demand at either end of the link. Modelling different generation scenarios is used to help inform decisions on the likely benefits for a given interconnector project. It is important to note that any modelled scenarios will be subject to assumptions and therefore contain a level of uncertainty.

3.11. The 2011 study by the Brattle Group for the NEMO developers attempts to quantify this social welfare benefit under a range of scenarios. The study used modelling techniques to simulate the operation of the electricity markets of GB, Belgium and a number of neighbouring interconnected markets – France, Germany and the Netherlands. The study models future electricity prices and interconnector revenues in three individual years: 2020, 2025 and 2030.

3.12. The Brattle study calculates the change in welfare from the change in market prices multiplied by domestic demand (consumer welfare), and the change in prices multiplied by the change in generation output (producer welfare).

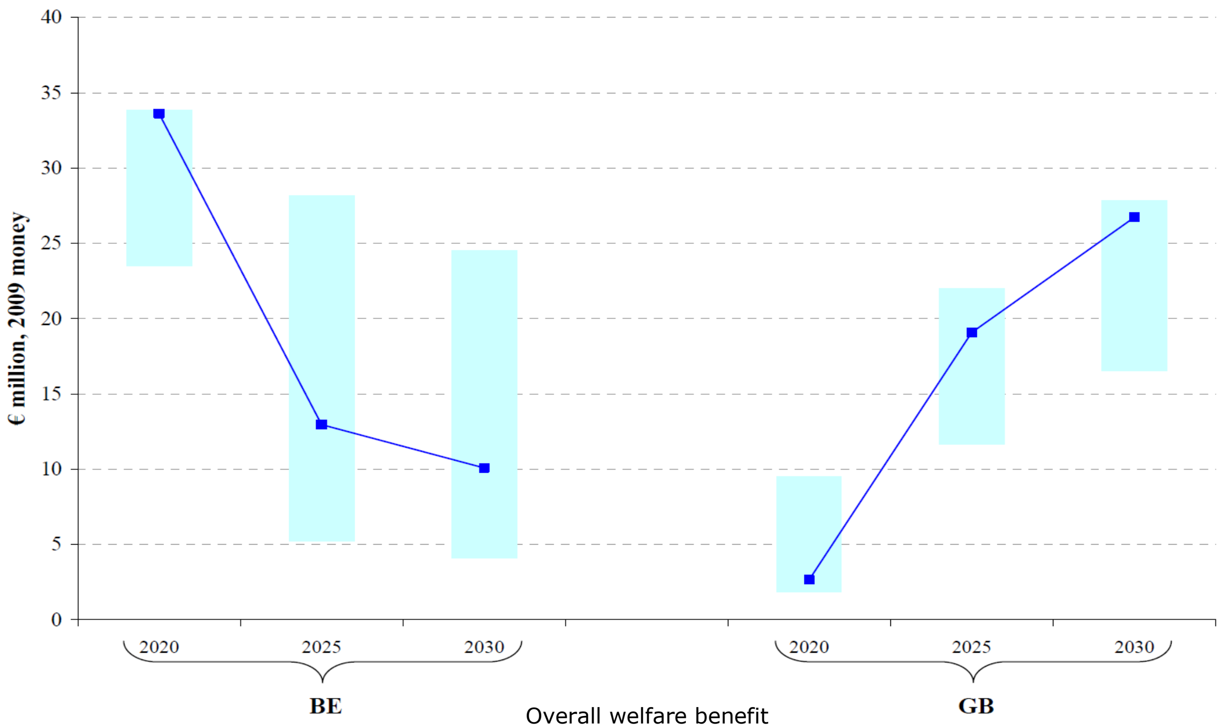
3.13. The study notes that both GB and Belgium make social welfare gains as a result of NEMO. Initially (in 2020) Belgium makes the larger net gain and both consumers and producers experience an increase in welfare. This is a result of a fall in baseload prices and the opportunity for producers to export to GB. The Brattle analysis shows GB making larger welfare gains by 2030, largely driven by consumer welfare gains resulting from imports at peak demand periods, as discussed below in paragraph 3.24. The report suggests that the overall net gain in welfare experienced in 2030 is likely to represent an equilibrium.[17] This net change in overall welfare for GB and Belgium provided by the NEMO interconnector is shown below in Figure 3.1. The impact on GB consumers (which forms part of the overall welfare impact) is discussed in more detail below.

3.14. The blue line in Figure 3.1 represents the results for the 'base case' modelled in the Brattle report.[18] The light blue bars illustrate the range of welfare changes resulting from different scenarios and sensitivities modelled. These are explored further in the study.

[17] The Brattle study states that this is likely to represent an equilibrium as by 2030 the majority of changes to the electricity system as a result of decarbonisation are likely to be completed. Beyond 2030, the generation background is likely to be more stable.
[18] The base case is the Brattle Group's central modelled scenario and best estimate of the overall impact of the NEMO interconnector. The base case assumes that countries meet renewable energy targets and that new baseload plants are able to recover all of their costs but, on average, new peaking plants only recover 75% of their fixed costs. The base case is independent of scenarios and sensitivities taken into account under different modelling runs (which are set out in Chapter 4).

3.15. Figure 3.1 displays a net benefit for GB of approximately €2.7m (£2.16m) in 2020, €19.1m (£15.28m) in 2025 and €26.7m (£21.36m) in 2030 as a result of the NEMO interconnector.[19] The study also analyses net benefit in other countries.

Figure 3.1: Brattle Group's estimate of change in social welfare as a result of NEMO



Impact on consumers

3.16. The application of a cap and floor regime to project NEMO, and the subsequent development of the interconnector link with Belgium, will have both direct (financial impacts on energy bills) and indirect (longer-term or non-financial) impacts on consumers.

3.17. The direct impact on consumers from the NEMO project is expected to come from the following areas:

- Impact on wholesale market prices (this drives the consumer surplus benefits, which form part of the overall social benefit discussed above);

[19] The Brattle analysis presents figures in Euros (€). Indicative figures for Pound Sterling (£) are based on an exchange rate of 1.25 as forecast by the Office for Budget Responsibility (OBR). The OBR's Economic and Fiscal Outlook report (December 2012) is available at: http://cdn.budgetresponsibility.independent.gov.uk/December-2012-Economic-and-fiscal-outlook23423423.pdf

- Risk and benefits to consumers from revenues exceeding the cap or falling short of the floor; and
- Costs to consumers from the onshore reinforcements.

3.18. The indirect impacts are addressed in more detail in the subsequent sections in this chapter. These sections will cover the impact on competition, security of supply, sustainable development and the environment, and health and safety.

Impact on wholesale market prices

3.19. As noted above, interconnection will have an impact on wholesale market prices where connections are made between markets with different underlying market fundamentals and therefore different prices. Where power flows efficiently across an interconnector in response to market signals, trade will reduce the wholesale market price in the country that is importing across the link, as demand will be met more efficiently. However, this can also impact on wholesale prices in the exporting nation, with the wholesale price likely to rise if this exported generation effectively increases demand (ie more expensive generating units are used in order to meet national demand).

3.20. As discussed in the previous section, the Brattle study estimates overall social welfare generated by the NEMO interconnector (as the sum of the change in consumer and producer welfare resulting from the existence of the interconnector). The study therefore includes a measure of the impact on consumer welfare directly, calculated as the change in wholesale market prices multiplied by domestic demand.[20]

3.21. In a market with relatively limited interconnection, such as GB, the consumer surplus from changes in energy prices is likely to be the opposite of the producer surplus. This is because generators will gain when GB is exporting across the interconnector (as more GB generation is needed to meet GB demand) whereas consumers will gain when GB is importing across the interconnector (as GB demand is met by cheaper sources of generation in Belgium).

3.22. The Brattle analysis models electricity prices and interconnector revenues in three individual future years; 2020, 2025 and 2030. The analysis shows GB experiencing a decrease in consumer welfare in 2020 and 2025 due to the impact of the interconnector on GB wholesale prices. This is as a result of modelling assumptions that suggest that over this period GB will be predominately exporting to Belgium in response to high Belgian wholesale prices. The decrease is larger in 2025, reflecting a potentially tight capacity margin in Belgium in that year (though predicting capacity margins this far into the future is inherently uncertain). This means that GB producer surplus increases as increased GB exports drive up GB wholesale baseload and peak prices.

[20] The peak demand (GW) and volume of demand (TWh) inputs to the Brattle modelling were provided by the NEMO developers. The Brattle study then derives detailed load based on historical data. More detail on modelling inputs can be found in Appendix I of the study.

3.23. However, the modelling shows that the increase in GB wholesale electricity prices in this period is likely to be fairly small. This impact is driven by an assumption around Belgian capacity margins in 2025 being very tight, driving up Belgian prices to attract exports from the UK. Since the study was completed in 2011, the Belgian government has planned to launch a tendering process for new capacity to ease margins after 2017. We therefore consider the price impact in 2025 is likely to overstate the impact on GB consumers. A £1 annual impact on bills[21] is a reasonable estimate of the upper limit of GB consumer costs as a result of wholesale price changes. Should the UK situation be tighter, consumers would gain from the cheaper imports, in addition to the wider benefits noted.

3.24. By 2030, the study shows a sharp increase in GB consumer welfare. Brattle's modelling assumes that an increase in wind penetration in GB by 2030 will drive down baseload prices. They suggest this will be coupled with an increase in GB peak prices to allow for generator cost recovery. These inflated peak prices result in interconnector flows from Belgium to GB at peak times causing GB wholesale market peak prices to fall. The study considers that the 2030 welfare results are likely to be broadly representative of market conditions going forward, ie with significant wind resource in GB allowing export when GB prices are low and 'inelastic' and Belgian imports dampening GB prices when renewables are not running. It is important to reiterate that this result is also subject to modelling assumptions as noted above.

3.25. The following sections discuss the upside to consumers of revenues being above the cap and downside risk to consumers of interconnector revenues falling below the floor. We also discuss the impact of onshore reinforcements required in order to connect NEMO, and longer-term impacts relating to cross-border price convergence and investment. These impacts are in addition to the consumer impacts resulting from wholesale price changes discussed above.

Risk and benefits to consumers from revenues exceeding the cap or falling below the floor

Downside risks to consumers from revenues falling below the floor

3.26. The cap and floor mechanism provides a return to consumers where revenue exceeds the cap and requires payment from consumers if revenue falls below the floor. If floor payments are required, the total cost of the floor will be funded equally by GB and Belgian consumers (ie GB consumers will pay half the required value of the floor). In GB this will be settled through Transmission Network Use of System (TNUoS) charging and therefore the impact on consumers will depend on the specific transmission charging methodology that is in force at the time. Under the present methodology 73% of any shortfall below the floor will be charged to GB suppliers and the remainder to GB generators. Under competitive conditions in GB it is reasonable

[21] £1 is derived from the Brattle analysis and represents the upper limit of the impact of NEMO on GB wholesale prices, multiplied by GB domestic demand to arrive at an indicative GB consumer bill impact. For further information on average GB demand assumptions see footnote 42.

to expect that these additional charges will be passed on through bills of domestic, commercial and industrial consumers.

3.27. In the extreme scenario in which the NEMO link generates no congestion revenues the full top-up to the floor payment will be made. This represents the worst-case scenario for consumers with regard to transmission charges.

3.28. Based on indicative values provided by the developers and the methodology consulted on in March 2013, an indicative floor level would be around £34m per annum. If the interconnector made no revenue then £17m of this would be funded by GB network charges.[22]

3.29. This would represent an increase of approximately £0.17 on the annual bill of a typical GB domestic consumer. This worst-case scenario would therefore increase bills by around 0.01%.

3.30. This extreme scenario, where the interconnector makes no revenue, is highly unlikely to be realised. The top-up to the floor payment is only made if licence conditions on availability have not been breached. In addition, it is intended that persistent floor payments would be a commercially unviable place for the developer to operate and so the developers would not be likely to take the project forward if revenues were consistently at the floor.

Interconnector use and revenues

3.31. While it is very difficult to forecast with much accuracy, it is possible to get some sense of the use of the interconnector from looking at the market prices in both GB and Belgium. The Brattle study indicates probabilistic interconnector revenues (in real terms) of around €60million in 2020, rising to over €100million in 2030. As the cap may limit revenues for the developers, the actual revenue for developers will be subject to the final setting of the cap and floor and other cost liabilities.

3.32. Increases in interconnector revenues in 2030 compared to earlier years, as estimated in the Brattle analysis, are largely due to assumptions about an increase in wind generation. This variable generation may create price differences between the GB and Belgian markets, which would result in an increase in trades across the interconnector and higher congestion revenues.

3.33. In practice, 'top-up' revenues to meet the floor would only be expected to be triggered in the event of a systematic reduction in the market value of interconnector capacity, which could be the result of a significant change in European or national energy policies. Such changes can be expected to be driven by policymakers for reasons that are in the wider interests of consumers.

---

[22] Our indicative analysis aiming to quantify the impact of the floor on transmission charges is set out in Appendix 2.

Upside for consumers from revenue above the cap

3.34. The application of a cap on revenues for project NEMO could also provide benefits to consumers through reduction of network charges. The amount of congestion revenue that the interconnector can generate is not limited, and the maximum that the link may generate is dependent on the magnitude and duration of price differentials between the two markets, as well as the link availability in any given year. In a similarly extreme example of the 'best case' scenario for consumers, we assume that the interconnector will earn twice the level of the cap. In this example we assume that a £51m surplus (revenue above the cap) reduces network charges in both countries. In such a scenario, GB TNUoS charges would reduce by £25.5m, which could reduce domestic bills by £0.26 per year.

3.35. The likelihood of this 'best-case' scenario being realised is also low. If such interconnector revenues were consistent then, within a developer-led framework, we would expect to see other responses, such as increased generation or interconnector investment. Therefore congestion revenues generated by trades across NEMO may reduce.

3.36. Although this best-case scenario is unlikely to occur, any windfall gains made by developers over a five-year assessment period will be redistributed to consumers as a result of the functioning of the cap. Any such gains will be equally split between GB and Belgium, regardless of the prevalent direction of electricity flows across the interconnector within the assessment period.

Impact of onshore reinforcement costs for NEMO

3.37. Another possible impact on consumer bills will come from the costs of onshore reinforcements in both GB and Belgium. In GB these will be recovered through higher transmission (TNUoS) charges. These costs are socialised across network users.

3.38. In GB it is the duty of National Grid Electricity Transmission (NGET) as SO to ensure that costs of connecting interconnector assets to the onshore grid are economic and efficient, as set out in Condition C18 of the Electricity Transmission Licence. Further, it is the responsibility of NGET as relevant TO to ensure that any onshore reinforcements are economic and efficient. Ofgem ensures TO investment is economic and efficient through the RIIO-T1 price control. This restricts the amount of money that the TOs can recover from their charges to network users, who pass these costs on to customers through energy bills.

3.39. At the Belgian end of the link, network reinforcements are needed to connect the interconnector but also to connect a number of offshore generators to the national transmission system. The cost of developing these network assets are socialised through network tariffs paid by Belgian users.

Impact on vulnerable consumers

3.40. While we recognise that any price impact may be more keenly felt by vulnerable consumers, we consider that any price impact as a result of applying a cap and floor to NEMO will primarily affect the wholesale market and that this should not have a disproportionate impact on retail prices for any single consumer group. Further, we consider that any price impact would be fairly small, with a £1 annual impact on bills a reasonable estimate of the upper limit of GB consumer costs, even in the worst case scenario shown above.

3.41. Further, the impact on consumers at the floor, or as a result of onshore reinforcements, would be funded through network charges and as such would not disproportionately impact any specific consumers group. Similarly, any re-distribution of revenue above the cap would be returned to consumers through network charges. We note that the impact on consumers, including vulnerable consumers, will be determined by the final cost of GB reinforcements.

3.42. For these reasons, we do not consider that there will be a material specific impact on any particular consumer groups, including vulnerable consumers.

Impact on competition

Impact on electricity wholesale markets

3.43. Market integration, and the resulting benefit from competition, is a key aim of European energy policy and forms a large part of the Third Package legislation.

3.44. Interconnection enables cross-border electricity flows and therefore results in geographically larger electricity market areas. This allows more market players to participate in both generation and supply. New entrants can help to drive innovation and efficiency across connected markets.

3.45. The Brattle study presents an analysis of the estimated impacts of NEMO on competition in the GB and Belgium generation markets in 2020. This considers four measures of market concentration – the Concentration Ratio (CR), the Herfindahl-Hirschmann Index (HHI), the Pivotal Supplier Index (PSI) and the Residual Supplier Index (RSI). The Brattle analysis only considers the year 2020 and is provided in full in the supporting documentation to this IA.

3.46. In Table 3.2, below, we set out what we consider from the Brattle analysis to be the main impacts of the NEMO interconnector for GB. This shows the concentration ratios CR(1) and CR(3), as well as the HHI value and change in HHI, for pre- and post-NEMO scenarios. The concentration ratios give the percentage of market share held by a number of generators in the market – so CR(1) gives the share of the GB generation market held by the largest firm, and CR(3) gives the share of the GB generation market held by the three largest firms.

3.47. The HHI value is the sum of the square of the market shares of the firms in the GB generation market. The HHI scale ranges from 10,000 (a complete monopoly) to zero (a theoretical fully competitive market). A HHI value of 1800 is generally recognised by competition authorities as the threshold for a highly concentrated market (ie as a benchmark for cases to raise a market power issue).[23]

3.48. The Brattle study analyses the market concentration ratios against two theoretically extreme scenarios, shown in Table 3.2. The first scenario (largest company allocation) assumes that the full NEMO capacity is allocated to the largest player in each of the markets. Conversely, the second scenario (atomistic competition) assumes that the NEMO capacity is equally held by 10 new independent market entrants. In practice, capacity is not allocated to particular parties but allocated through auctions with demand driven by price differentials. We therefore consider that the second scenario (atomistic competition) is a closer representation of reality than largest company allocation.

3.49. Based on this analysis, the CR(1) and CR(3) show that, for GB, the NEMO link will have little effect on the market share of the biggest players, even in the scenario whereby all NEMO capacity is held by the largest player. We consider that this is a result of the large size of the GB generation market as compared to the capacity of the NEMO link.

3.50. The HHI values reinforce the finding that the NEMO link will have a minimal impact on market concentration in GB. The HHI value increases (ie the market becomes more concentrated) in the scenario whereby all NEMO capacity is allocated to the largest firm, and decreases (ie the market becomes less concentrated) when the capacity is shared between new entrants. The change in HHI (ΔHHI) shows that the impact is likely to be small in magnitude, which again reflects the large size of the GB generation market in comparison to the size of the NEMO link.

3.51. The Brattle analysis shows that the link can slightly reduce market concentration in GB and also in Belgium (and so enhance competition) provided that there are safeguards to ensure that the capacity is not reserved in order to boost market power of the largest producers in either market. The development and implementation of the European Network Codes for electricity should provide such safeguards (for example with the introduction of market coupling and the “Use It Or Sell It” mechanism for explicit interconnector capacity rights).[24] These market-based

[23] This HHI value of 1800 as a threshold for a highly concentrated market is recognised by competition authorities and across academic literature globally. A relevant example is a study prepared by London Economics for the European Commission’s DG Competition Report on Energy Sector Enquiry, January 2007: http://ec.europa.eu/competition/sectors/energy/inquiry/electricity_final_execsum.pdf

[24] European Network Codes are a set of rules that aim to facilitate the harmonisation, integration and efficiency of the European electricity market. These are developed by ENTSO-E in response to Framework Guidelines issued by the Agency for the Cooperation of Energy Regulators (ACER). More information is available at: http://ec.europa.eu/energy/gas_electricity/codes/codes_en.htm

mechanisms have been introduced in order to avoid the hoarding of cross border capacity by dominant market parties.

Table 3.2: Competition assessment in GB: Concentration ratios and HHI test

	Largest company allocation		Atomistic competition	
	Pre-NEMO	Post-NEMO	Pre-NEMO	Post-NEMO
Concentration ratios				
CR(1)	34%	35%	12%	12%
CR(3)	49%	49%	27%	27%
HHI Test				
HHI Value	1492	1541	515	502
ΔHHI		49		-13

3.52. The Brattle study concludes that, overall and under most plausible scenarios, the NEMO interconnector is likely to have a small but positive impact on competition. This impact is more pronounced in the Belgian market. As a result of interconnector access arrangements (auction based and clearly set out in European legislation) we consider it likely that the capacity on the interconnector will be utilised in a manner more akin to the atomistic competition scenario used in the Brattle study (ie with capacity shared by a number of firms). Therefore we consider that the NEMO interconnector should have a small but positive impact on competition in both the GB and Belgian electricity markets.

3.53. Given the size of the interconnector compared to the size of the existing GB generation market, and the potential for interconnection to increase market participation and enable participation of new entrants as discussed above. We do not consider there to be a material specific impact on smaller market participants compared with larger players.

Impact on existing and future interconnectors

3.54. The NEMO link will have an impact on existing and planned electricity interconnectors.

3.55. The Brattle study estimates the impact that NEMO may have on existing interconnectors. This can be found in Chapter 3 of the study. This estimates the impact on revenues of existing interconnectors to be small. These impacts are driven by the changes in flows across other interconnectors as a result of the NEMO interconnector. All other things being equal, an increase in cross-border capacity could reduce revenue on existing interconnectors. As the demand for cross-border capacity is also likely to change over time, for example with the increase in variable generation, the overall impact of NEMO on other interconnectors is however uncertain. The impacts presented in the Brattle analysis will be subject to the modelling assumptions around relevant market prices and underlying market conditions and so contain uncertainties. We welcome stakeholder views on this aspect of the Brattle analysis and the impact of NEMO on other interconnector projects.

Impact on security of supply

Cross-border balancing and ancillary services

3.56. The NEMO interconnector will give GB and Belgium access to a greater range of potential tools for provision of balancing and ancillary services and more general security of supply benefits. The national TSOs have access to a larger range of options to take in the short term to enable them to balance supply and demand in real time.

3.57. Cross-border balancing arrangements between TSOs at either end of existing interconnector links are currently in place; however, arrangements vary on each interconnector, with some more developed than others. Provisions are in place for interconnectors to contribute to cross-border balancing if there is spare capacity on the asset following gate closure. In certain situations, TSOs can use interconnection as a congestion management tool, by adjusting interconnector flows to reflect transmission constraints. Emergency arrangements also exist, for example to enable cross-border SOs to provide assistance at times of system stress in one interconnected market. The aim of the Network Code on Electricity Balancing is to eventually harmonise EU cross-border balancing arrangements via interconnectors, and it is likely that Network Code's initial provisions to this effect will be in place by the time NEMO becomes operational.[25]

3.58. Currently, arrangements for cross-border balancing arrangements between GB and interconnected markets are in place across IFA (France) and BritNed (Netherlands) to varying degrees. GB has reasonably mature cross-border balancing arrangements in place with RTE, the French TSO, across IFA. These trades enable both TSOs to balance the system more efficiently. However, the contribution of BritNed to cross-border system balancing is considerably less, as the balancing market arrangements in the Netherlands are not immediately compatible with those in GB. SO-SO trades over the BritNed interconnector are relatively rare.

3.59. The European Commission recently commissioned an IA on a European Electricity Balancing Market in the context of the Network Code on Electricity

[25] The Network Code on Electricity Balancing is being developed by ENTSO-E in response to the Framework Guidelines on Electricity Balancing issued by ACER. The latest information is available at: http://networkcodes.entsoe.eu/market-codes/electricity-balancing/

Balancing.[26] This suggested that the estimated benefit of cross-border balancing between GB and France was €40-€51m per year, based on 2011 trades. The cost of setting up such a system was estimated at about £1m, and the report notes that trading in balancing energy *'could generate considerable net benefits'*.

3.60. We consider that further development of interconnector capacity with different markets can enable GB to realise benefits in cross-border balancing trades. It is important to acknowledge that, currently, the balancing arrangements in Belgium are aligned more closely with those in the Netherlands and may not lend themselves to development of advanced cross-border balancing frameworks with GB.[27] However, as the Network Code on Electricity Balancing is likely to be in place by the time NEMO becomes operational, we do not consider that the current arrangements preclude the development of efficient cross-border balancing frameworks between GB and Belgium in the future.

3.61. The exchange of cross-border balancing and ancillary services could help to ensure that both GB and Belgium are well-equipped to cope in times of system stress – for example, if demand is significantly higher than expected or if a generator experiences an outage and therefore cannot produce its contracted output. However, it is important to note that this benefit may only be realised in scenarios whereby both member states are not facing similar unplanned outage or high demand situations at the same time.

3.62. We realise that increased interconnection generally will have an impact, and potentially generate costs, for the GB and Belgian TSOs as a result of import and export onto the national transmission systems. For example, there may also be challenges faced by TSOs as a result of further interconnection, from power swings and consequent ramping of interconnector flows, management of reserve and frequency stability. We seek input from stakeholders on the potential impact of NEMO on this issue and ask for detail on the likely magnitude of these costs.

Generation adequacy and market integration

3.63. More generally, the NEMO link will enhance the integration of European network infrastructure and so will generally improve security of supply through ensuring generation adequacy and enabling market integration with Europe.

---

[26] The IA on European Electricity Balancing Market was commissioned by the European Commission and undertaken by Mott MacDonald. This is available at: http://ec.europa.eu/energy/gas_electricity/studies/doc/electricity/20130610_eu_balancing_master.pdf

[27] Elia and Tennet, the Dutch TSO, have recently launched a pilot cross-border balancing project in the context of the Network Code on Electricity Balancing. Further information is available at: http://www.elia.be/en/about-elia/Users-group/ad-hoc-taskforce-balancing/Cross-border-Balancing-Belgium-Netherlands

3.64. Our Electricity Capacity Assessment Report 2013 sets out the risks to security of supply in GB and presents estimated de-rated capacity margins[28] over the next six winters.[29] The assessment presents a Reference Scenario that shows risks to security of supply increasing faster than expected previously, but still peaking in 2015/16 at around 3 hours of Loss of Load Expectation (LOLE) (or 4% of de-rated capacity margins). Beyond 2016, the Reference Scenario of the Capacity Assessment report shows a potential recovery in risks, driven by demand reductions and the entry of new gas and wind capacity to the market. This trend is consistent with scenarios for GB reported in the ENTSO-E Scenario Outlook and Adequacy Forecasts.[30] However the outlook is uncertain and dependent on assumptions around reductions in demand materialising. There are also uncertainties relating to the closure and mothballing of gas plants and the direction of interconnector flows going forward.

3.65. The UK Government has introduced an Energy Bill that will make significant changes to the electricity market including significant new incentives for renewables, low carbon and backup capacity.[31] Proposed capacity auctions to be held starting from 2014 could bring new capacity into service by 2018/19.

3.66. ENTSO-E set out information and analysis on generation adequacy in European markets in their Scenario Outlook and Adequacy Forecasts.[32] In Belgium, the unavailability of two nuclear plants (with an approximate capacity of 2GW) depressed the generation capacity available last winter, and imports across existing interconnectors helped to maintain secure supplies.

3.67. The recent return to service of both units prevents the margin in Belgium from being tight in the short term. It is expected that the planned retirement of old thermal units and the phase-out of nuclear generation in Belgium will be offset by the incentivised development of new thermal plants, the development of demand side management and new interconnection developments such as NEMO.

3.68. Beyond 2016, the ENTSO-E report suggests that the completion of new generation capacity in Belgium will lead to generation adequacy at times of peak demand, without any specific contribution from the NEMO link. However, the flexibility provided by NEMO is expected to enhance security of supply by increasing the power system reliability margin in Belgium and interconnected countries. Further, the Belgian government is planning to launch a tendering process for new capacity to ease margins after 2017. The Brattle analysis discussed above estimates tight

[28] The de-rated capacity margin is the average excess of available supply over peak winter demand.
[29] Our 2013 Capacity Assessment was published in June 2013. The report is available at: https://www.ofgem.gov.uk/publications-and-updates/electricity-capacity-assessment-report-2013?docid=5&refer=Markets/WhlMkts/monitoring-energy-security/elec-capacity-assessment
[30] See https://www.entsoe.eu/publications/system-development-reports/adequacy-forecasts/. The GB summary can be found in Section 6.14 on page 74 of the System Adequacy Forecasts report.
[31] https://www.gov.uk/government/collections/energy-bill
[32] See https://www.entsoe.eu/publications/system-development-reports/adequacy-forecasts/. The Belgium national adequacy summary can be found in Section 6.3 on page 59 of the System Adequacy Forecasts report.

capacity margins in Belgium in 2025; however, action taken by the Belgian government since the Brattle report was drafted will impact on the market position in future and therefore the Brattle report needs to be considered in light of these more recent developments.

3.69. In summary, both GB and Belgium are likely to address potential security of supply challenges prior to construction of NEMO. Both countries may be able to realise further security of supply benefits from the NEMO link upon its completion.

Impact on sustainable development and the environment

Integration of variable renewable generation

3.70. The EU has committed to increasing the proportion of renewable energy in energy consumption to 20% by 2020.[33] The 2009 Renewable Energy Directive set a target for the UK to achieve 15% of its energy consumption from renewable sources by 2020.[34] Similarly, GB has a decarbonisation target by 2050 in the Climate Change Act 2008.[35] Reducing the carbon emissions of the electricity generation sector through installation of renewable generation is a key area through which progress towards decarbonisation can be made.

3.71. Variability is a major challenge for renewable generation. Increased interconnection can help to reduce problems associated with variability of generation output – for example, allowing GB to import energy at times when wind generation output is low. The need to deliver more cross-border infrastructure to support the integration of renewable energy sources has been highlighted by the European Commission in the Energy Infrastructure Package.[36]

3.72. Currently, excess generation, including renewable generation, is curtailed in situations when demand is low (ie renewable generation is producing a surplus) or when transmission systems do not have sufficient capacity to export the electricity generated.

3.73. Increased interconnection with neighbouring markets provides the opportunity for cross-border flows of electricity when supply exceeds demand. As volume of variable wind generation increases, in GB and Ireland as well as on the continent, varying flows across interconnectors can help to accommodate fluctuations in wind output. Cross-border flows would therefore help to achieve more efficient dispatch of renewables.

[33] European Commission, '20 20 by 2020: Europe's climate change opportunity'. Available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0030:FIN:EN:PDF
[34] The 2009 Renewable Energy Directive (2009/28/EC) is available at: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=Oj:L:2009:140:0016:0062:en:PDF
[35] The Climate Change Act 2008 can be viewed at: http://www.legislation.gov.uk/ukpga/2008/27/contents
[36] Regulation 347/2013 on guidelines for trans-European energy infrastructure: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF

3.74. Generally, more efficient integration of variable generation could also reduce constraint payments that are currently made by the system operator (SO) and funded through network charges.

3.75. Additional cross-border capacity would allow for the more efficient dispatch of generation between GB, Belgium and interconnected countries. For example, export of renewable, low carbon electricity at times when this cannot be used in GB may offset the use of carbon intensive generation in Belgium.

3.76. As discussed in the section above, construction of the NEMO interconnector could potentially enable TSOs in GB and Belgium to draw upon cross-border balancing and ancillary services when necessary. If realised, this could further enable the integration of renewables and ensure economic purchase of system services.

Impact on investment in alternative low-carbon technologies

3.77. Investment in project NEMO has the potential to reduce the need for alternative low carbon enabling projects. Technologies such as demand side response (DSR) and electrical storage are being developed in order to meet challenges such as variability of renewable energy sources. The extent to which NEMO addresses these issues may have implications for the development of these alternative low carbon enabling technologies. At this stage we do not consider the impact of the development of NEMO on these technologies to be significant.

Impact on the environment

3.78. We consider there are several potential environmental impacts of project NEMO. This section will focus on the localised environmental impacts of the development of the NEMO interconnector.

3.79. We consider that the construction of the interconnector will have localised negative impacts on the environment. Construction is likely to result in visual disamenity, noise, localised vehicular pollution and transformation of the surrounding environment.

3.80. We expect National Grid NEMO Link Ltd and Elia, as project developers, to address localised construction-related impacts wherever possible, including through consultation with local stakeholders and communities. Planning and consent applications were submitted to British, French and Belgian planning authorities in March 2013. More information on the environmental impact of the project and how the project is planning to address environmental issues will be available in project planning and consenting documents and the associated Environmental Statement.[37]

[37] The Nemo Link Environmental Statement Volume 1 (February 2013) can be found at: http://www.nemo-link.com/pdf/Nemo-Link-UK-Marine-Environmental-Statement.pdf

3.81. The choice of technology used in the plans for project NEMO's onshore converter stations and substations has environmental impacts. The interconnector plans to join Voltage Source Converters (VSCs) at either end of the subsea cable. VSCs have a smaller footprint than conventional converter stations (Line Current Converters). We consider the onshore visual impact of the development of the interconnector (ie of the converter stations) to be moderate relative to other electricity infrastructure developments.

3.82. The interconnector will be sited onshore at Richborough, Kent, GB and Zeebrugge, Belgium. Both sites are 'brownfield' sites, meaning that they have previously been utilised for industrial development. As such, the project developers have avoided the use of sites that may be more environmentally sensitive.

3.83. We will give due consideration to decisions that have been justified, including on environmental grounds, when examining the efficiency of the investment in the cost assessment process. As part of this IA, we seek views on the likely environmental impact(s) of the choice of technology as discussed above.

Impact on health and safety

3.84. We recognise that the Health and Safety Executive (HSE) is the principal regulator of safety and consider it to be important to support the functions that they perform.

3.85. We consider the potential negative impacts of development of the cap and floor regime for project NEMO to be the normal health and safety risks associated with the installation, operation and maintenance of the interconnector and associated equipment. We consider that these can be controlled by safe working practices and complying with relevant legislation.

3.86. It is the responsibility of National Grid NEMO Link Ltd and Elia, as project developers, to ensure compliance with legal health and safety requirements.

4. Risks and unintended consequences

Chapter Summary
This chapter provides an overview of some general risks of applying the cap and floor regime to project NEMO. It also outlines mitigating actions that are planned or have been taken where relevant.

Question box

Question 4: Have we correctly identified the risks associated with applying the cap and floor regime to project NEMO?

Question 5: Do you agree that the mitigating actions taken are appropriate for reducing the potential risks identified?

Question 6: Are there any other risks of applying the cap and floor regime to project NEMO that you consider should be addressed?

4.1. This chapter sets out the perceived risks and potential unintended consequences associated with the application of the cap and floor regime to project NEMO.

4.2. The risks will be considered alongside mitigating actions that we plan to take, or have already taken, to reduce the likelihood of the risk being realised and/or unintended consequences in the event of the risk being realised. If these risks were realised they could lead to costs for consumers, in the form of higher bills, which may reduce the welfare gains outlined in Chapter 3.

4.3. Our initial view is that the benefits of applying the cap and floor regime to project NEMO outweigh any potential risks that may arise, particularly when the mitigating actions are taken into consideration.

4.4. As discussed in Chapter 1, we value stakeholder input into our development of the regulatory regime for project NEMO. We seek views on the risks and mitigation measures discussed in this chapter.

Cap and floor regulatory framework

Risk

4.5. There is the potential for the floor to be set at a level which overexposes consumers to risk. Similarly, the cap may be set at a level at which high returns are not passed through to consumers.

Consequence

4.6. Consumer underwriting of the project increases through provision of a high floor. Developers would therefore earn returns in excess of the risk that they bear.

Mitigation

4.7. We are proposing to set the floor at a level where the provision of floor revenue alone ensures a commercially unviable project would not be brought forward. The floor is intended to allow an efficient developer with an efficient financing structure to operate, maintain and finance debt obligations but that the project delivers negative net present value operating at this level. To achieve this objective, we are conducting a cost assessment to set the baseline capex and opex estimates for an economic and efficient interconnector (final levels will be determined following an ex-post capex review and a re-estimation of opex closer to operation). This level is set for the duration of the regulatory regime. The floor on returns reflects prevailing market rates at the time funds are committed. This framework is discussed in further detail in our March 2013 consultation.

Existence of perverse incentives for developers

Risk

4.8. There is a risk that the cap and floor could create perverse incentives around link availability. The partial exposure to market related costs (these are netted off from gross congestion revenues and this net congestion figure assessed against the level of the cap and floor to determine if the cap or floor has been breached), and the foregone revenue from the interconnector being down, provides a strong incentive for developers to maintain high interconnector availability. It also incentivises them to repair any outages in a timely and efficient manner in most instances.

4.9. Concerns have been raised about the following situations arising over an assessment period:

(i) Revenue above the cap flows back to consumers, so the developer faces limited incentive to keep the link available once these levels have been reached within any five-year assessment period; and

(ii) The developer will receive floor revenue at the end of the assessment period irrespective of how far below the floor net revenue is. Market related costs have been either partially or fully passed through to consumers in this case.

Consequence

4.10. The existence of perverse incentives could lead to decreased link availability resulting in the wider system benefits of the link not being fully realised. In addition, it could mean consumers face higher bills through either the TNUoS rebate from revenue being above the cap not being maximised or a larger top-up to the floor payment being required.

Mitigation

4.11. To align developers' and consumers' interests in case i), and protect the interest of consumers in case ii), we have proposed an availability incentive, as set out in our March 2013 consultation.

4.12. We are proposing a symmetric financial incentive to be applied at the cap. This addresses the perverse incentive that may arise in situation i) since the cap, against which net revenue is assessed, would be adjusted up or down depending on the availability of the interconnector.

4.13. We are also proposing to make the floor payment conditional on licence conditions around availability not being breached, ie availability being above a predefined threshold or adequately justified.

Distortion in cost reporting

Risk

4.14. We noted in our June 2011 consultation that there may be a risk of distorted cost reporting when either the cap or floor is activated (or is expected to be activated). This could lead to inefficiencies in interconnector operation. This risk may exist when, for example:

(i) A developer that also owns onshore transmission may be incentivised to report costs related to onshore activities as costs of the interconnector business in order to maximise the total return of its onshore and interconnector activities, especially for costs whose allocation is not easily monitored (eg labour).

(ii) There may be inconsistent allocation by the interconnector owner between the different 5-year assessment periods to either avoid hitting the cap or ensure the floor is activated. Further, the operator may shut the cable down once the cap or floor is activated in order to complete maintenance originally planned for the following assessment period.

Consequence

4.15. These perverse incentives may decrease link availability and have negative impacts on the tariffs charged to grid users, for example if consumers need to top the revenues up to the level of the floor.

Mitigation

4.16. Licence conditions will be introduced that require developers to comply with the regulatory instructions and guidance (RIGs) reporting requirements. This performance data (costs, revenue and availability) will have to be audited and false reporting would mean the developer could face licence revocation.

4.17. Application of an availability incentive should help to mitigate the likelihood of this risk occurring (especially in relation to point 4.14(ii) above).

Stranding risk

Risk

4.18. This risk may arise if the NEMO project is built but subsequently underutilised. As a result, the asset could be partially stranded (ie utilisation of the interconnector is well below efficient levels) and consumers would therefore bear the cost through topping up revenues to the floor (if revenues were to be below the floor).

Consequence

4.19. If NEMO revenues are significantly, or entirely, funded by the floor then the resulting cost to consumers would be higher. TNUoS charges could increase in order to top the developer revenues up to the floor, and this would be passed on to consumers through network charges on energy bills.

Mitigation

4.20. If the interconnector were to be underutilised, this is most likely going to be as a result of significant changes in market or network conditions.[38]

4.21. Under this scenario we could review the proposed regime, which has been designed on the basis that there will be sufficient congestion revenues to fund the project costs. If necessary, we could consider changes to the regulatory regime where appropriate. Any changes would only be made in specific situations and would be subject to consultation.

4.22. We believe that commercial incentives continue to be in place for project NEMO. Our proposal for five year assessment periods will allow us to undertake periodic reviews of the regime.

[38] This is because the floor will be set such as to ensure that the project would not be commercially viable if revenues are at the floor level, therefore providing a strong incentive on the developers not to progress the project in such a case.

5. Direct costs and post implementation review

Chapter Summary
This chapter outlines our current thinking on the direct costs that will be associated with applying the cap and floor regime to project NEMO. It then sets out initial thoughts on our approach to reviewing the implementation of the cap and floor regime for project NEMO.

Question box

Question 7: Do you have any views on the direct costs that we anticipate will be incurred in applying the cap and floor regime to project NEMO?

Question 8: Do you have any views on our approach to post-implementation review of the impacts of applying the cap and floor to NEMO?

5.1. In Chapter 3 we have considered the impacts and potential risks that could result from the application of the cap and floor regime to NEMO. We note that it is also important to consider direct costs associated with implementing this regulatory regime (such as the cost of additional systems or staff costs) and whether these direct costs of implementing the regime could be prohibitively expensive.

5.2. Additionally, we need to consider the appropriateness of undertaking a post-implementation review for the application of the cap and floor regime to project NEMO. This could take place at a number of points in the future. Undertaking a post-implementation review can help to ensure that the benefits of the regime (as set out in Chapter 3) have been realised and that the potential risks (as highlighted in Chapter 4) were minimised.

5.3. This chapter sets out what we consider to be the likely costs incurred in implementing the cap and floor regime for project NEMO. It also sets out the options that we are considering for carrying out a post-implementation review. We welcome stakeholder views on these costs and review options.

Other impacts, costs and benefits

5.4. There may be a number of one-off and ongoing costs to industry associated with the implementation of the cap and floor regime for project NEMO. However, we do not expect these costs to be significant, especially when considered against the benefits that the project could provide to consumers, or when compared with the cost of the investment as undertaken by the developers.

5.5. The NEMO developers have incurred costs to date in developing the project. Once the interconnector is operational, they will incur costs including annual reporting on availability and any other within-period reporting required as part of the regime.

5.6. The five-year review of revenues against the cap and floor will also require developer resource. We expect that these costs will relate to the compilation and submission of reports, and meeting with regulatory authorities.

Post-implementation review

5.7. As set out as part of our IA process, following implementation of the cap and floor regime for project NEMO, we intend to review its impact to assess whether we have fully identified the costs and benefits associated with the cap and floor regime.

5.8. Our preferred option for post-implementation review would involve undertaking a high-level review of the impact of the regime for NEMO in line with the financial assessment periods on a five-yearly basis.

5.9. We have noted in Chapter 3 that there may be an impact on consumer bills, and that a number of wider system benefits could be realised following the implementation of the cap and floor regime for NEMO. Only after an assessment will we be able to assess these impacts and the degree of cross-border price convergence. This will also allow us to assess consumer impacts against any breaches of the cap or the floor.

6. Conclusions and next steps

Chapter Summary
This chapter outlines our initial conclusions on the impact of applying the cap and floor regime to project NEMO. It then sets out an overview of our next steps.

Question box

Question 9: Do you have any views on the initial conclusions in this chapter?

Question 10: Do you have any views on the next steps we plan to take in implementing the cap and floor regime for project NEMO?

Conclusions

6.1. This document has set out the potential impacts that we consider to be relevant to the application of the cap and floor regime to project NEMO. Overall, we expect interconnection to offer benefits to GB, Belgian and other European consumers. We expect project NEMO to provide such benefits both directly (as consumer benefits) and indirectly (as security of supply, competition, environmental and sustainability benefits).

6.2. We recognise that with the application of a floor there is an element of risk that network charges funded through consumer bills may increase. However, our analysis as set out in Chapter 3 shows that the magnitude of any such increase is likely to be small. Further, we consider that the risk of such an increase is very low, and that this risk could be offset by the re-allocation of revenue above the cap (in the event that developers earn revenues over the cap).

6.3. Modelling the impact of NEMO on GB wholesale market prices is sensitive to the assumptions in the modelling itself and is therefore subject to significant uncertainty. The modelling in the Brattle analysis indicates that the impact of NEMO is likely to be small – increasing GB wholesale prices in some time periods and reducing these in others. We consider that this potential small increase in the short term is offset by the benefits that the NEMO interconnector can bring over the lifetime of the project, which are presented in this paper.

6.4. Overall, our initial view is that the implementation of the cap and floor regime for NEMO represents a low direct financial risk to consumers, and we expect the benefits to outweigh any such risk.

6.5. This initial conclusion supports the finding of other work that has examined the impact of increased interconnection between GB and neighbouring electricity markets, such as the European Commission's Communication on the internal energy market and Energy Infrastructure Package publications. Implementation of the cap and floor regime for project NEMO enables GB to make progress towards integration with European energy markets.

Related work areas

6.6. Our work on the Integrated Transmission Planning and Regulation (ITPR) project continues alongside the work on a regime for project NEMO. As part of ITPR we are exploring options for our approach to interconnection between GB and other countries. Our most recent open letter can be found on our website.[39]

6.7. In August 2012, the Department of Energy and Climate Change (DECC) acknowledged that interconnection has the potential to reduce the total cost of the GB electricity system and increase the security of supply to GB consumers. DECC committed to developing an evidence base of different interconnection scenarios, and exploring the most appropriate way to develop interconnection capacity.[40] This work is ongoing and DECC aim to publish initial findings before the end of the year.

Next steps

6.8. This consultation will run for eight weeks. The deadline for responses is 13 February 2014. Details on how to respond can be found in Appendix 1.

6.9. Following the close of the consultation period, we will review responses from stakeholders. We will undertake further internal analysis as appropriate and intend to publish an updated version of this Impact Assessment alongside our decision in spring 2014.

---

[39] Our most recent ITPR open letter, setting out priorities and next steps following our June 2013 emerging thinking consultation, is available at: https://www.ofgem.gov.uk/publications-and-updates/open-letter-update-integrated-transmission-planning-and-regulation-project

[40] DECC's 'Electricity System: Assessment of Future Challenges – Summary', August 2012 is available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48549/6098-electricity-system-assessment-future-chall.pdf

Appendices

Index

Appendix 1 - Consultation Response and Questions

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

1.2. 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.

1.3. Responses should be received by 13 February 2014 and should be sent to:

Stuart Borland
European Electricity Transmission
Ofgem, 9 Millbank, London. SW1P 3GE.
Cap.Floor@ofgem.gov.uk

1.4. 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.

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

1.6. Next steps: Having considered the responses to this consultation, we intend to undertake further work as necessary in order to publish an updated version of the impact assessment alongside our policy decision document. We are aiming to publish our decision in spring 2014. Any questions on this document should, in the first instance, be directed to:

Stuart Borland or Matthew Grant
European Electricity Transmission
Ofgem, 9 Millbank, London. SW1P 3GE.
020 7901 7134/0526
Cap.Floor@ofgem.gov.uk

CHAPTER: Three

Question 1: Have we correctly identified the impacts that applying the cap and floor regime to project NEMO would have on:
- Consumers;
- Competition;
- Security of supply;
- Sustainable development and the environment; and
- Health and safety?

Question 2: Are there any specific areas in which we should further analyse and/or quantify the impacts of applying the cap and floor regime to project NEMO?
Question 3: Are there any additional impacts of applying the cap and floor regime to project NEMO that we should consider?

CHAPTER: Four

Question 4: Have we correctly identified the risks associated with applying the cap and floor regime to project NEMO?
Question 5: Do you agree that the mitigating actions taken are appropriate for reducing the potential risks identified?
Question 6: Are there any other risks of applying the cap and floor regime to project NEMO that you consider should be addressed?

CHAPTER: Five

Question 7: Do you have any views on the direct costs that we anticipate will be incurred in applying the cap and floor regime to project NEMO?
Question 8: Do you have any views on our approach to post-implementation review of the impacts of applying the cap and floor to NEMO?

CHAPTER: Six

Question 9: Do you have any views on the initial conclusions in this chapter?
Question 10: Do you have any views on the next steps we plan to take in implementing the cap and floor regime for project NEMO?

Appendix 2 - Worked example of the potential consumer exposure as a result of the cap and floor

1.1. This appendix shows how we have derived figures that estimate the impact of the cap and floor on network charges for GB, and the subsequent impact on consumer bills. This is independent of any consumer bill impacts as a result of changes in wholesale electricity prices due to NEMO.

1.2. The worked example below is purely illustrative. It is based on indicative figures as presented in and alongside our March 2013 consultation. All figures are in real terms. We also note that for simplicity, the calculations of the cap and floor in this Appendix are based on a simple average of revenues at the cap and floor rather than a calculation of an annuity.

Level of the cap and floor

Costs/finance parameters

- Project capex of £500m
- Regime length = 25 years
- Opex = 2% of capex
- Floor on returns = 1.6%
- Cap on returns = 8.4%
- Average RAV = half initial capex = £250m
- Regulatory return = Average RAV * cap/floor on returns
- All costs in 2013 prices

Cap and floor levels

Level = Depreciation (project capex/regime) + opex + regulatory return cap (floor)
Level = 500/25 + 0.02*500 + 250 * [0.084 or 0.016]
Cap = 20 + 10 + 21 = £51m in 2013 prices
Floor = 20 + 10 + 4 = £34m in 2013 prices

Cap and floor breaches – impact on consumers

Maximum downside risk

1.3. The 'worst case' scenario for consumers arises when the interconnector earns no congestion revenue and the full top-up to the floor payment is made. The cost is split 50:50 between GB and Belgium, with a £17m (50% of £34m) contribution coming from each. This results in an additional cost of £(5.35x10^-5) per kWh, based on total electricity consumption in 2012.[41] This is equal to an average of £0.17 per household per year, based on typical domestic consumption of 3200kWh.[42]

Maximum upside benefit

1.4. The amount that the interconnector could earn in congestion revenue above the cap is not limited. It would be dependent on the magnitude and duration of price differentials between the two power markets and link availability in that year. For the 'best case' scenario for consumers, we make the simplifying assumption that the interconnector earns twice the level of the cap, ie £102m, in this example.

1.5. Splitting the £51m surplus that would flow back to TNUoS payers in both countries, in this case, results in a £25.5m reduction in GB TNUoS charges. This is equivalent to £0.26 per household per year in 2013 prices.

1.6. The likelihood of these extreme scenarios being realised is low. In the downside case, the top-up to the floor payment is only made if licence conditions around availability have not been breached (ie preventing consumers paying for an unused asset). In addition, the floor payment is intended to be a commercially unviable place for the developer to operate and so they have incentive to maximise congestion revenue. If such interconnector revenues above the cap were consistent then, within a developer-led framework, we would expect to see other responses, such as increased generation or interconnector investment. Therefore congestion revenues generated by trades across NEMO may reduce.

1.7. In both the downside and upside case, the consideration of congestion revenues over the five year assessment period means the impact of one good or bad year should be quite small. On balance, exposing consumers to this level of risk and benefit in return for the benefits of interconnection being realised seems prudent.

[41] Total energy consumption (2012 figure) is taken from the Government's Digest of UK Energy Statistics (DUKES, p134, Table 5.2). Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/225067/DUKES_2013_published_version.pdf
[42] Typical domestic consumption value for single rate meter, medium consumption, as of September 2013. More information is available at: https://www.ofgem.gov.uk/sites/default/files/docs/decisions/tdcv_decision_letter_final_2.pdf

Appendix 3 - Glossary

A

AC

Alternating current

Ancillary services

Contracted services (such as frequency response and black start) available to the System Operator in order to maintain balance and to ensure the security and quality of electricity supply across the system.

Article 16(6)

A provision under European Commission (EC) regulation No. 714/2009. It governs usage of revenues from interconnection.

Authority

The Gas and Electricity Markets Authority.

B

BritNed

1000MW electricity interconnector between Great Britain and Netherlands, operational since April 2011.

C

Capital expenditure (capex)

Expenditure on investment in long-lived network assets, such as gas pipelines or electricity overhead lines.

Corporate finance

Traditional approach to funding a business where the funds are backed by the whole company rather than any specific assets.

Cost of capital

The minimum acceptable rate of return on capital investment. It includes both the cost of debt to a firm, and the cost of equity.

Cost of debt

The effective interest rate that a company pays on its current debt. Ofgem calculates the cost of debt on a pre-tax basis.

Cost of equity

The rate of return on investment that is required by a company's shareholders. The return consists both of dividend and capital gains. Ofgem calculates the cost of equity on a post-tax basis.

CREG

Commission de Regulation de l'Electricite et du Gaz, Belgian Energy Regulator.

D

DC

Direct current, unidirectional flow of electric charge.

DECC

Department of Energy and Climate Change.

Demand-side Response (DSR)

An active, short term reduction in electricity consumption either through shifting it to another period, using another type of generation, or simply not using electricity at that time.

Depreciation

Depreciation is a measure of the consumption, use or wearing out of an asset over the period of its economic life.

E

Elia

Belgian Transmission System Operator

EIP

Energy Infrastructure Package

ENTSO-E

European Network of Transmission System Operators for Electricity.

EU

European Union.

G

GB

Great Britain.

H

HVAC

High Voltage Alternating Current.

HVDC

High Voltage Direct Current.

I

IFA

Interconnexion France-Angleterre. 2000MW HVDC electricity interconnector between France and GB.

Integrated Transmission Planning and Regulation Project (ITPR)

A project to review the Great Britain (GB) electricity transmission arrangements for system planning and delivery that currently apply to onshore, offshore and interconnector assets.

Interconnector

Physical links which allow for the transfer of electricity across borders.

Interest during construction (IDC)

The financing cost allowed by the national regulatory authorities (NRAs) during the construction phase.

L

Loss of Load Expectation (LOLE)

It is the mean number of hours per year in which supply does not meet demand in the absence of intervention from the System Operator.

M

Market coupling

Method of organising implicit auctions, where a single power exchange operates across the connected areas and manages the capacity between them.

MW

Mega Watt.

N

National Electricity Transmission System Operator (NETSO)

The entity responsible for operating the GB electricity transmission system and for entering into contracts with those who want to connect to and/or use the electricity transmission system.

National Grid Electricity Transmission (NGET)

NGET owns and maintains the onshore high-voltage electricity transmission system in England and Wales. It also acts as the National Electricity Transmission System Operator for GB.

National Grid Interconnector Limited (NGIL)

A wholly owned subsidiary of National Grid plc and holder of an interconnector licence. NGIL jointly own and operate the IFA interconnector (with the French Transmission System Operator, RTE) and the BritNed interconnector (with the Dutch Transmission System Operator, TenneT).

National Grid NEMO Link Limited

A wholly owned subsidiary of National Grid plc and holder of an interconnector licence for NEMO. Joint developer of project NEMO with Elia.

NEMO

Proposed 1000MW interconnector between Belgium and Great Britain.

NRA

National Regulatory Authority.

O

Ofgem

Office of Gas and Electricity Markets.

O&M

Operations and maintenance.

Operating expenditure (Opex)

Expenditure on the day to day operation of a network such as staff costs, repairs and maintenance and business overheads.

P

Post-tax return

A rate of return which is received by investors and which excludes corporate taxes paid out of pre-tax returns.

Pre-tax return

A rate of return which includes the cost of corporate income tax, ie the post-tax rate of return plus the required tax.

Project finance

An alternative form of finance to corporate or traditional finance. Under project finance any funds are linked specifically to that project and investors have no recourse to the parent company if the project is delayed or fails.

Price control

The control developed by the regulator to set targets and allowed revenues for onshore network companies. The characteristics and mechanisms of this price control are developed by the regulator in the price control review period depending on network company performance over the last control period and predicted expenditure in the next.

R

Regulatory Asset Base (RAB)

Assets that are accounted for when setting the Regulatory Asset Value for a given Transmission Owner.

Regulatory Asset Value (RAV)

The value of the assets that is used by the regulator when setting an allowed level of revenue.

RIIO-T1

The first onshore electricity transmission price control under the RIIO framework, which will apply from 1 April 2013 to 31 March 2021.

S

System Operator (SO)

The entity charged with operating the GB high voltage electricity transmission system, currently NGET.

T

Third party developers

Potential interconnector operators that are not existing operators of an onshore transmission network.

TNUoS charges

Transmission Network Use of System charges.

Transmission Owner (TO)

An owner of a high-voltage transmission network or asset.

Transmission System Operator (TSO)

Entity in charge of operating transmission assets, either for electricity or gas.

V

Variable/variability

The nature of generation with output that is not continuous.

Appendix 4 - Feedback questionnaire

1.1. 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.

1.2. Please send your comments to:

Andrew MacFaul
Consultation Co-ordinator
Ofgem
9 Millbank
London
SW1P 3GE
andrew.macfaul@ofgem.gov.uk