



Department  
of Energy &  
Climate Change

# More interconnection: improving energy security and lowering bills

December 2013

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## 1. Executive summary

1. This document sets out Government's views on further interconnection, in particular on objectives and the network planning and project assessment of interconnection.
2. Together with the analytical report, commissioned by Government and published alongside this document, it fulfils the commitment made in DECC's Electricity System publication last year to improve Government's evidence base on interconnection.

### **Government supports appropriate further interconnection**

3. Interconnection has the potential to contribute to Government's energy security, affordability and decarbonisation objectives, including through facilitating the single European electricity market. Government supports an appropriate increase in interconnection capacity through projects that efficiently deliver on these objectives.
4. Evidence commissioned by Government, published alongside this document, shows that more interconnection than we currently have is likely to be in GB's interest. Under some scenarios, GB consumers could see benefits to 2040 of up to £9billion (net present value).
5. It is clear from the analysis that GB's security of supply would be enhanced by further interconnection, providing that electricity prices reflect scarcity and interconnector flows reflect prices. Interconnection is also one of the technologies that can assist with the integration of further low-carbon generation.
6. Government is already taking action and recently supported projects to Norway, Belgium, France and the Republic of Ireland to become European Projects of Common Interest (PCI). Government is also seeking views, through the current Electricity Market Reform (EMR) consultation, on how non-GB interconnected capacity might participate in the GB capacity market in time for the 2015 auction, in recognition of the potential for further interconnection to contribute to security of supply.

### **Consumers need to be confident that investments will be value for money**

7. The evidence also indicates that interconnection projects can have very different and uncertain impacts, some negative, depending on: the markets involved; the connection point into the transmission system; timing; and how European energy systems evolve.
8. Impacts include those on consumers - households and businesses - so it is important that they have confidence that projects provide benefits and value for money across different future scenarios.

9. In the past, allocation of full risk to developers has been the means to ensure efficiency and avoid stranded assets - developers face the full upside benefits and downside risks.
10. It is timely to reconsider the current GB approach and functions in respect of interconnection for a number of reasons:
- the increasing significance of EU and regional network planning and identification of PCIs, which necessitates Member State contributions
  - the relatively large number of interconnection projects now being considered, which could have different impacts on GB
  - removal of locational signals on interconnector developers for efficiently connecting to the GB onshore network
  - investor uncertainty on the treatment of revenues (following a cap on project returns imposed on a previous project by the European Commission), and Ofgem's subsequent work developing a 'cap and floor' regulatory approach which would see consumers sharing project risk
  - questions as to whether price arbitrage opportunities adequately capture the benefits of interconnection, including security of supply

### **An improved system for network planning and assessment**

11. Government considers that further consideration of interconnection and its impacts is necessary in relation to overall network planning (in terms of opportunity identification) and project assessment.
12. Government believes that the primary aim within an improved system for network planning and assessment of interconnection should be to protect the interests of GB consumers in electricity networks, in particular in relation to bills and security of supply, as well as (to the extent relevant) decarbonisation. With bill impacts in mind, Government would expect to continue to see within an improved system an approach that harnesses the benefits of competition, as far as possible, in delivering new infrastructure.
13. With regards to the network planning of new interconnection, Government believes that at a minimum it would be useful, within an improved system, for a coordinating party to have a role in undertaking high-level analysis of the potential interconnection opportunities. A light-touch approach along these lines would signal to developers and inform Government in respect of its PCI decisions. This would be the case regardless of how future interconnection is regulated and owned, although the degree of coordinated planning would be likely to differ.

Government welcomes Ofgem's examination of these issues, and implementation of solutions, as part of its ITPR project.

14. On project assessment, by which we mean consideration of impacts and relative efficiencies, Government believes that Ofgem would be well-positioned to ensure this took place, either directly or through another suitable party, while minimising any impact to project timelines. This would be particularly necessary if consumers could be exposed to significant costs. Again, Government welcomes Ofgem's detailed consideration of these issues, and implementation of solutions, as part of the ITPR project.
15. Given that one new project can impact on another, where appropriate and practical, projects should be considered alongside each other.
16. Government does not consider a formal role for itself in network planning or approving project assessment (beyond that already in place for approving UK PCIs) to be necessary, but may wish to contribute relevant information and views given the link to PCI decisions and the potential diplomatic dimension.

### **Delivering a clear regulatory regime to facilitate investment**

17. In addition to network planning and assessment issues, a number of interconnector investors are seeking regulatory certainty on the degree to which the revenues of future projects might be regulated, and how assets might be delivered and owned.
18. Ofgem has been developing a cap and floor regime for an interconnector project to Belgium, and has recently published a consultation on its impact assessment for providing a proposed cap and floor for that project. Ofgem expects to make its final decision in the first quarter of 2014. Ofgem has also recently published a joint consultation with the French regulator on the regulatory treatment for ElecLink, a proposed fully merchant interconnector between GB and France. Government welcomes this work.
19. As part of the ITPR project, Ofgem is assessing the appropriate regulatory regime for interconnection beyond the Belgium project, for both existing mature projects in the pipeline and for the longer term. Options under consideration include the existing merchant model, a cap and floor, and a fully regulated approach. Ofgem intends to consult on its emerging thinking in spring 2014. We recognise the need for existing, mature projects to know how they will be regulated. We also recognise that it is important to test the delivery model for the longer term - including on regulation of revenues and ownership of assets - and support the timely implementation of an integrated and enduring regulatory regime through the ITPR project.

## 2. Introduction

20. Interconnection is the physical linking of electricity transmission systems across borders<sup>1</sup>. It is the means by which cross-border trade in electricity can take place, which impacts on competition, prices, energy security and the integration of renewable energy sources<sup>2</sup>.
21. The purpose of this document is to set out Government's views on further interconnection: Government recognises the benefits from further interconnection, wants to see additional, appropriate investment and believes there should be a more strategic approach. This document sets out the challenges for delivering further interconnection and work underway to address them. It describes the variation in impacts that interconnection can have and the Government's objectives for more interconnection – in the GB consumer interest, using competitive pressures to deliver, and making a strong contribution to the single European electricity market. It then outlines how Government believes network planning and assessment of interconnectors could be improved to facilitate these objectives.
22. Published alongside this document is an analytical report by Redpoint, commissioned by Government, assessing the impacts of further interconnection on GB<sup>3</sup>. The report has informed this document and fulfils the commitment made in DECC's Electricity System publication of 2012<sup>4</sup> to improve Government's evidence base on interconnection.

### Interconnection development to date

23. Britain has 4GW of interconnection through four interconnectors – 2GW to France (through the interconnector known as IFA), 1GW to the Netherlands (BritNed) and two links of around 500MW each to the Irish grid (Moyle and East-West).

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<sup>1</sup> The Electricity Act 1989 defines interconnection as: "so much of an electric line or other electrical plant as--

(a) is situated at a place within the jurisdiction of Great Britain; and

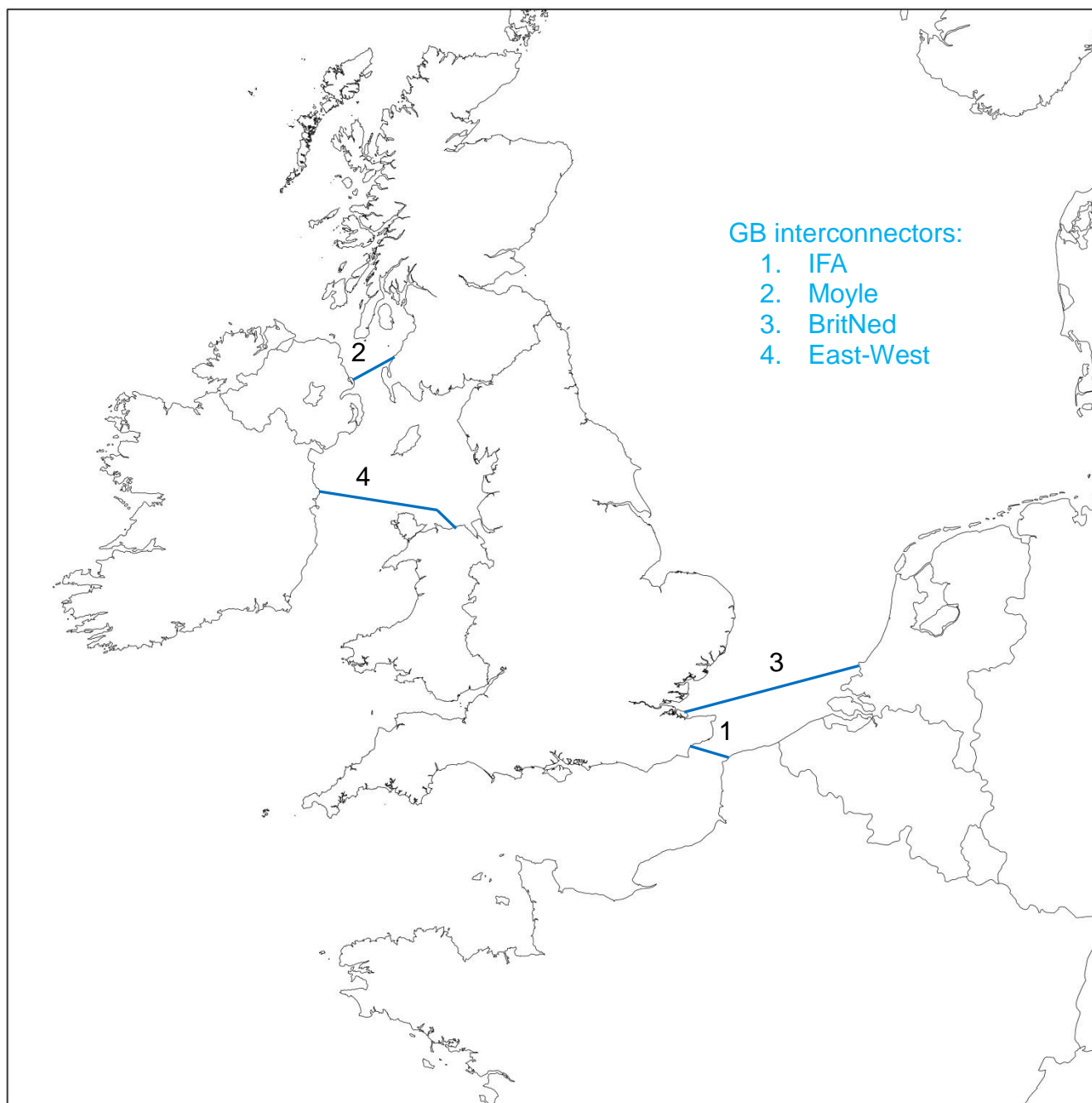
(b) subsists wholly or primarily for the purposes of the conveyance of electricity (whether in both directions or in only one) between Great Britain and a place within the jurisdiction of another country or territory."

<sup>2</sup> For the purposes of this document a distinction is drawn between interconnection and joint projects under the Renewable Energy Directive where generation located outside of GB could be connected directly and exclusively to the GB grid. This is because such projects are principally about generation even though they are likely to require an interconnector licence. The focus of this statement is solely on interconnection between transmission systems.

<sup>3</sup> <https://www.gov.uk/government/publications/more-interconnection-improving-energy-security-and-lowering-bills>

<sup>4</sup> [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/48550/6099-elec-system-assess-future-chall-full.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48550/6099-elec-system-assess-future-chall-full.pdf)

Figure 1: Map of existing GB interconnectors



24. IFA, which connects England with France, was developed in the mid-1980s by the state-owned Central Electricity Generating Board on the GB side and its French counterpart. Moyle, which goes between Scotland and Northern Ireland, began operation in 2002 and is a mutualised company wholly owned by Northern Irish consumers. BritNed was developed as a merchant project jointly between National Grid Interconnectors Limited<sup>5</sup> and TenneT, the

<sup>5</sup> A commercial arm of National Grid plc.



Dutch Transmission System Operator (TSO). It came online in 2011. The most recent interconnector to be developed was the East-West Interconnector between Wales and Ireland which became active in 2012 – a project undertaken by the Irish TSO EirGrid and wholly underwritten by Irish consumers.

### Challenges in delivering further interconnection

25. Further interconnection can bring benefits, as described in Section 3, and the EU is working towards the creation of a single market in electricity which will be made possible by more interconnection. Whilst there is a large pipeline of projects for GB, comparatively few have been delivered (GB has 4GW of interconnection) - the reasons for which need to be understood.
26. Geography is undoubtedly important - GB being an island necessitates longer cables than if we had land borders and for them to be subsea. This means the costs of delivering interconnection are higher than on mainland Europe, and involve greater risks than onshore network development.
27. The regulatory regime may also be significant. At present in GB, interconnection is taken forward under a developer-led, merchant model. Under this approach, private developers identify market opportunities, construct and operate the assets, and take the full upside and downside risk on revenues. 'Market opportunities' primarily means price differences between the two markets, such that parties wish to pay the interconnector owner for capacity to trade electricity (congestion rents). This must, of course, be weighed against the costs of building and operating the interconnector. Merchant projects seek exemptions from various aspects of EU legislation, in particular around the use of revenues from the interconnector<sup>6</sup>.
28. The developer-led, merchant model harnesses market forces in identifying the most efficient interconnector opportunities. That the developer takes the full risk on revenues ensures that this is done carefully. And consumers are insulated from having to subsidise what might turn out to be a non-commercial project through their electricity bills. As a result, the risk of expensive sub-sea assets being developed that are under-utilised (stranded assets) is low.
29. In mainland Europe, interconnection is in many respects an extension of the domestic transmission networks that happens to cross national boundaries. Consequently, the

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<sup>6</sup> See Article 17 of Regulation (EC) no. 714/2009, available at: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:211:0015:0035:EN:PDF>

predominant continental European model is for the transmission owners to build interconnection as they would build their domestic networks – namely as part of their regulated asset base. There can therefore be a lack of familiarity with the GB approach in potential connecting countries.

30. Of our four interconnectors, only BritNed was delivered under the merchant regime. In approving BritNed’s exemption application the European Commission imposed a cap on the returns for the project to reflect its view on the risk of the investment<sup>7</sup>. This represented a considerable limit to the upside for the project with no commensurate floor on the downside. This has left a number of interconnector developers wary of the merchant model, meaning this approach is unlikely to deliver the levels of interconnection that are likely to be optimal for GB consumers.
31. In addition, there are also questions about the extent to which in practice it captures and rewards the full range of benefits from interconnection.
32. For all of these reasons, Government believes it is right to think about how GB approaches interconnection. There are a number of initiatives already underway to address the delivery challenges, which we describe next. In Section 4 Government sets out what its objectives are for further interconnection and in Section 5 gives its view on how interconnection planning and assessment could be improved.

## Work to address interconnection delivery challenges

### Ofgem’s cap and floor model development

33. Following the European Commission’s decision on BritNed’s exemption application, Ofgem is considering (with its Belgian counterpart) a new ‘cap and floor’ regulatory model for a proposed interconnector with Belgium (Project Nemo). If implemented, this would offer the upside of a revenue floor (providing certainty to developers) as well an appropriately determined cap (to protect consumers), whilst retaining the market incentives within those bounds. A floor would mean there would be potential consumer underwriting of the project, requiring greater scrutiny of the potential impacts on consumers.
34. Ofgem has recently published<sup>8</sup> an impact assessment on Project Nemo and is planning on publishing its decision on the potential application of a cap and floor for Project Nemo in the

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<sup>7</sup> [http://ec.europa.eu/energy/infrastructure/exemptions/doc/doc/electricity/2007\\_britned\\_decision\\_en.pdf](http://ec.europa.eu/energy/infrastructure/exemptions/doc/doc/electricity/2007_britned_decision_en.pdf)

<sup>8</sup> <https://www.ofgem.gov.uk/ofgem-publications/85112/nemoiafinal.pdf>

first quarter of 2014 (including its decision on any final design parameters). The development of this approach has contributed to a recent upturn in developer interest in other projects. Whether cap and floor will be available in addition to the merchant approach beyond Nemo is a decision Ofgem plans to consider within its Integrated Transmission Planning and Regulation (ITPR) project, and on which it plans to consult in spring 2014.

35. Ofgem has also recently published a consultation on a request by ElecLink - a proposed fully merchant interconnector between GB and France that would go through the Channel Tunnel - for an exemption from certain aspects of EU legislation described above.<sup>9</sup>

### Ofgem's Integrated Transmission Planning and Regulation (ITPR) project

36. ITPR is looking at broader questions about network planning and regulation across the onshore, offshore and interconnection regimes. It aims to ensure that the regulatory framework can continue to facilitate efficient, coordinated and economic development of the network over the long-term.

37. Within ITPR, Ofgem is considering the merits of different approaches for identifying and developing interconnection, and in its November open letter<sup>10</sup> it committed to consult in spring 2014 on this. Government recognises the three key issues that Ofgem identified in its ITPR emerging thinking document<sup>11</sup> with respect to interconnection:

- a. First, how should project opportunities be identified and assessed? By developers, more centrally or both – and who should determine what adequate capacity is (this issue is considered within this document, in Section 5)?
- b. Second, the degree to which project revenues are fixed? Not at all (the merchant model), to some extent (a cap and floor), and/or to a large extent (fully regulated)?
- c. Third, how should interconnector assets be delivered? By merchant developers, through competitive tender, and/or by an incumbent network owner?

38. There are of course interdependencies between these questions. So, for instance, a move towards more regulation of revenues is likely to involve further scrutiny of the efficiency and

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<sup>9</sup> <https://www.ofgem.gov.uk/publications-and-updates/request-eleclink-exemption-under-article-17-regulation-ec-7142009-gb-france-interconnector>

<sup>10</sup> <https://www.ofgem.gov.uk/publications-and-updates/open-letter-update-integrated-transmission-planning-and-regulation-project>

<sup>11</sup> <https://www.ofgem.gov.uk/publications-and-updates/integrated-transmission-planning-and-regulation-project-emerging-thinking>

impacts of the project in question. Some options being considered by Ofgem could require changes to legislation in order to implement them.

39. These questions are also relevant to the related strand of Ofgem's ITPR work on the licencing framework and regulatory arrangements for transmission connecting non-GB generation (such as wind in the Republic of Ireland) to the GB transmission system. Ofgem consulted on this in November<sup>12</sup> and will look to provide further clarity on the appropriate regulatory route in spring 2014.

#### Ofgem's reform of cash-out arrangements

40. Ofgem's proposed reform of cash-out pricing under the Electricity Balancing Significant Code Review<sup>13</sup> should also help the case for interconnection investment. By allowing, as it would, GB prices to better reflect scarcity, prices would become spikier with consequent further opportunities for interconnector developers and greater capture of the potential security of supply benefits of interconnection.

#### Government's Electricity Market Reform (EMR)

41. Government's Electricity Market Reform (EMR) is relevant for interconnection in two ways. First, by having more intermittent low carbon generation on the system, interconnectors' role in balancing the system can become more valuable (see Section 3). Second, there is on-going work by Government with stakeholders, other EU Member States and the European Commission, to try to find a way for interconnected capacity to participate in the GB Capacity Market in time to compete in the 2015 capacity auction<sup>14</sup>. Government believes that interconnection and further integration with the single energy market could provide considerable value to ensuring security of supply, following successful implementation of the EU target model.

42. Enabling interconnection to participate in the Capacity Market is a complex issue and no policy model could be found for the first capacity auction that would retain value for money for GB consumers at the same time as respecting the principles of the target model.

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<sup>12</sup> <https://www.ofgem.gov.uk/publications-and-updates/regulation-transmission-connecting-non-gb-generation-gb-transmission-system>

<sup>13</sup> <https://www.ofgem.gov.uk/electricity/wholesale-market/market-efficiency-review-and-reform/electricity-balancing-significant-code-review>

<sup>14</sup> The issue of security of electricity supply to GB is a key priority for Government and, to this end, the Capacity Market, which is intended to ensure sufficient investment in the overall level of reliable capacity needed to provide secure electricity supplies, is planned to come into effect in 2014

Government is committed to continue to work with industry stakeholders to seek a policy solution, and has sought views through the October 2013 Electricity Market Reform consultation<sup>15</sup>. It is important that there is continued coordination between Government's work on this and Ofgem's ITPR analysis into the security of supply benefits from, and incentives for, further interconnection.

### European developments

43. There is also activity at the EU level, with legislation (the 'TEN-E Regulation')<sup>16</sup> enshrining a process for identifying priority cross-border projects every two years. These priority projects receive 'Projects of Common Interest' (PCI) status enabling them to benefit from potentially faster planning and permitting procedures, potential regulatory incentives, and possible access to financial support from the Connecting Europe Facility (CEF)<sup>17</sup>.
44. The first PCI list was adopted in October 2013. Government supported six interconnection projects as PCIs (to France, Norway, and Belgium, and an interconnector between Northern Ireland and the Republic of Ireland), as well as four renewables trading projects with the Republic of Ireland with the potential to also increase interconnection capacity<sup>18</sup>. The PCI list recognises that where there is more than one project to any given market, that these projects are potentially in competition with each other and may well not all be necessary. The TEN-E Regulation requires all national regulators to publish their methodology and the criteria used to evaluate electricity and gas PCI investments and risk by 31 March 2014.
45. The market related EU network codes<sup>19</sup>, which harmonise the timeframes in which capacity is allocated and traded, aim to introduce a standard set of market rules across Europe and promote the implementation of a competitive pan European market. These changes have the potential to improve the case for interconnector investment through more efficient utilisation of the assets.

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[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/255254/emr\\_consultation\\_implementation\\_proposals.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/255254/emr_consultation_implementation_proposals.pdf)

<sup>16</sup> Regulation (EU) 347/2013: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF>

<sup>17</sup> [http://ec.europa.eu/energy/mff/facility/connecting\\_europe\\_en.htm](http://ec.europa.eu/energy/mff/facility/connecting_europe_en.htm)

<sup>18</sup> The Government also supported a smart grid project between Northern Ireland and the Republic of Ireland, and four gas projects involving Northern Ireland and the Republic of Ireland (three are pipeline projects and one is storage).

<sup>19</sup> An overview of the network codes is available here: <https://www.entsoe.eu/major-projects/network-code-development/>

### 3. Impacts of interconnection

46. The impacts from interconnection can be felt by electricity consumers<sup>20</sup>, producers and the developers of interconnectors. They can also be felt on both sides of an interconnector, and beyond. There are often trade-offs between the affected groups and impacts can be both benefits and costs or risks.
47. There are a range of benefits that interconnection can provide. It can enable the most efficient location of generation, increase competition and lead to reduced electricity bills. By giving access to generation beyond national borders it can improve security of supply, providing market prices reflect scarcity and flows across interconnectors follow prices. Interconnection can also help with the integration of intermittent sources of energy and the associated system balancing. It can also help provide ancillary services such as frequency response.
48. These benefits need to be weighed against the costs or risks associated with interconnection. Interconnection is costly infrastructure which, given uncertainties about the future state of European energy systems, carries a risk of being under-utilised. Interconnection, even if benefiting the interconnected area as a whole, creates winners and losers – prices can go up as well as down, and may do both over the lifetime of the asset. However, recent EU legislation enables PCI electricity interconnector projects to apply for their investment costs to be shared in light of the benefits and costs to both sides<sup>21</sup>.
49. Security of supply could be compromised if the arrangements for both allocating interconnector capacity and cross-border trading are not suitably transparent, responsive or predictable. These issues are being addressed through the EU network codes on Capacity Allocation and Congestion Management (CACM) and Balancing. Interconnectors, like generators, can also have an impact on the domestic network necessitating reinforcements. Unlike for generation, none of these impacts are paid for by interconnector projects, meaning other network users must bear them.
50. Some of the potential benefits from interconnection could also be delivered by other technologies. In particular Demand Side Response, back-up generation or storage can all offer solutions to system balancing challenges.

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<sup>20</sup> i.e. users of electricity – which includes domestic households but also businesses and other organisations.

<sup>21</sup> Article 12 of <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF>

51. The accompanying Redpoint report has assessed the impacts on GB of different levels of further interconnection, to different countries over different time periods. The analysis includes generation costs, wholesale power prices, carbon emissions and costs, interconnector dispatch and network reinforcement costs. It looks at the time period 2015-2020.
52. The report looks at four possible future energy scenarios. Three of the scenarios analysed use Redpoint's own commercial assumptions, and one scenario uses DECC's EMR reference case assumptions. The scenarios were designed to represent a range of futures that were likely to have important influences on the impacts from further interconnection – one in particular saw GB becoming a significant net importer of electricity, one saw significantly higher levels of intermittency across Europe requiring greater flexibility, one saw low gas prices and thus low utilisation of interconnectors, and one saw carbon prices converge across Europe. The design of the scenarios by Redpoint was purely for the purposes of this specific piece of research, and no scenario should be seen as a forecast of the future.
53. The analysis did not look at specific interconnection projects that are in development, but rather it was conducted so that the conclusions could be taken at as broad a level as possible to help Government understand the impacts of further interconnection for a range of different future energy scenarios. Nothing should therefore be read into the capacities or markets that have been analysed with respect to actual proposed projects.
54. There are a number of key points that emerge from the analysis.
- a. First, interconnection can have significant impacts on GB welfare and GB consumers.
  - b. Second, those impacts can vary enormously, depending on the energy scenario and the interconnection configuration being tested. In the case of this analysis, benefits for GB consumers, for example, range from around £9 billion NPV<sup>22</sup>, to a cost to GB consumers of around £9.5 billion NPV.<sup>23</sup>
  - c. Third, some additional interconnection above current levels is likely to be beneficial in a range of energy scenarios. The optimum amount of additional interconnection, however, is highly dependent on the scenario – with around

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<sup>22</sup> NPV is net present value, in 2012 real terms.

<sup>23</sup> The model looked at net welfare as comprised by consumer, producer and interconnector owner welfare. The precise distribution between the three categories needs to be considered with caution. There are also interactions with the capacity market which have not been modelled.

13GW by 2040 optimal for GB consumers under a high GB importing scenario, compared with an additional 1GW under a low gas price scenario. In the low gas price scenario, 2GW of further interconnection would actually lead to negative GB consumer welfare. In considering priority investment opportunities, it is important to look at the impacts and performance of projects across the range of diverse scenarios, to identify “least regret” investments.

- d. Fourth, the characteristics of the connecting markets are highly relevant to the impacts. This is likely to be in terms of their generation mix, demand profile and distance from GB (affecting interconnector costs). Indeed, these can be more important than the level of interconnection. For instance, in the high GB importing scenario, in general higher levels of interconnection are more beneficial for GB consumers than lower levels. However, 4GW of interconnection with hydro-focussed markets had benefits to consumer welfare of around £2.5 billion, whereas in another configuration just over 7GW of interconnection, with a more southern European focus, had a negative impact on consumer welfare of around £2.3 billion.
- e. Fifth, further interconnection in general is beneficial for security of supply if prices reflect scarcity and flows reflect prices.

55. We consider that the level and variability of impacts of further interconnection as highlighted above, in conjunction with some of developments and delivery barriers mentioned in the previous section, justifies the taking of a more strategic approach in GB to interconnection. This is explored in the following sections.



## 4. Government's objectives for further interconnection

56. Government believes that further interconnection is likely to be beneficial for GB and GB consumers, as well as our European partners. It has the potential to contribute to the three pillars of our energy policy – affordability, security and decarbonisation, including through facilitating the single electricity market. We support interconnection projects which can efficiently support these outcomes.
57. In recognition of this, Government has supported six interconnection projects as PCIs (to France, Norway, Belgium, and between Northern Ireland and the Republic of Ireland), as well as four renewables trading projects with the Republic of Ireland with the potential to also increase interconnection capacity, in the first list adopted in October 2013<sup>24</sup>.
58. Government welcomes the range of policy and regulatory initiatives described in Section 2 – including on cap and floor for Project Nemo, ITPR, cash-out reform and implementation of the EU target model – which can be expected to facilitate further interconnection, and looks forward to their timely delivery. Section 2 also describes how Government is seeking views on how non-GB interconnected capacity might participate in the GB capacity market.
59. Given the scale of the impacts from further interconnection, their variation between markets and capacities and with consumers potentially taking on project risk, Government wants to see a more strategic approach to interconnection. Consumers need to have confidence that future interconnection projects will represent good value. With this in mind, Government's objectives for further interconnection are set out below<sup>25</sup>.

### GB consumer interest objective

60. The primary aim for further interconnection should be to protect the GB consumer interest in electricity networks in particular electricity bill and security of supply impacts, as well as (to the extent relevant) decarbonisation for current and future consumers.
61. Subject to the above, other considerations that may be of interest to GB consumers could include assisting with economic growth, tax receipts and job creation.

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<sup>24</sup> The list recognises that where there is more than one project to any given market, that these projects are potentially in competition with each other and may well not all be necessary.

<sup>25</sup> These objectives relate to the principal objective and the duties set out in section 3A of the Electricity Act 1989.

62. Interconnection with markets that have a complementary generation mix and demand profile to GB and are balanced in respect of their own security of supply, are the most likely to satisfy this objective. The ordering of projects is also relevant with regards to maximising GB consumer benefits, given earlier projects can impact on the arbitrage opportunities of later projects.
63. Where the benefits of interconnection would not fall equally on each country, the TEN-E Regulation<sup>26</sup> enables for project developers of non-merchant PCIs to apply for costs to be allocated in line with this (Cross Border Cost Allocation). Such a mechanism could also be considered for other interconnection projects, through developer and regulator discussion.
64. It is worth noting that the consumer interest is often viewed differently in other countries. In all the European countries we studied where there was the potential for interconnection with GB, the TSO(s) responsible for building interconnection is wholly or partially owned by the state. The same is often the case for electricity generators. Thus elsewhere the separation between consumer and interconnector owner (and sometimes the producers) is less distinct than in the GB context.

### Competition objective

65. Competitive pressures in the delivery of interconnection should, as far as possible, be maintained in order to keep downwards pressure on costs and maximise sources of investment and innovation in the sector. The existing developer-led, merchant model is by its nature competitive – any party, subject to the provisions in the Electricity Act, is able to bring forward and deliver projects. Should other delivery models be made available by Ofgem, they also ought to aim to harness the benefits of competition to drive value for money.

### Single European electricity market objective

66. Government supports the single European electricity market and recognises the central role that interconnectors play in its realisation. It is therefore important to ensure that appropriate levels of interconnection, in line with the previous two objectives, are delivered to provide a strong contribution to the further development of the single market.

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<sup>26</sup> Article 12 of <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:115:0039:0075:EN:PDF>

## 5. Improving interconnection planning and assessment

67. In order to meet the objectives outlined in the section above, Government believes that it is timely to reconsider the current approach to interconnection planning and assessment for the reasons set out below. More specifically, Government considers there should be a more strategic approach to interconnection to improve:

- network planning of interconnection - identifying at a high level the most beneficial opportunities for further interconnection; and
- assessment of specific interconnection project proposals, in particular if consumers could be exposed to significant costs, to protect consumers and ensure the efficient and economic development of the network.

68. There are a number of factors which lead us to these views which are described below, including supporting Government to discharge its role in approving PCIs. We consider that fulfilling the two functions described in the paragraph above is compatible with retaining competitive pressures to minimise the cost of delivering further interconnection. Government welcomes Ofgem's detailed consideration of these issues, and implementation of solutions, as part of the ITPR project.

### Network planning of interconnection

69. At present no entity in GB is responsible for determining what level of further interconnection GB should be seeking, which opportunities should be considered as priorities, and where the most efficient locations on the network for connections might be. It is these functions that we are referring to when we use the phrase 'network planning of interconnection'.

70. In other countries we have studied, such interconnection planning is commonplace, primarily by TSOs (see Table 1). In GB, the System Operator is not expressly tasked at a domestic level with undertaking such analysis. In its Electricity Ten Year Statement, the System Operator identifies interconnection projects it is aware of and which have connection agreements, but there is no assessment of priority opportunities or how much more interconnection might be appropriate.

Table 1: Comparison of network planning of interconnection in selected European countries

Country	Interconnection planning?	Roles in respect of network planning of interconnection
Great Britain	X	N/A
Belgium	✓	TSO planning; Regulator consultation; Government approval
Denmark	✓	TSO planning; Government approval
France	✓	TSO planning
Germany	✓	TSO planning; Regulator approval
Iceland	✓	TSO and Regulator planning
Ireland	✓	TSO planning; Government approval
Netherlands	✓	TSO planning
Norway	✓	TSO & Government planning
Spain	✓	TSO planning; Government approval
Sweden	✓	TSO and Government planning

Source: DECC analysis

71. At the EU level, the European Network of TSOs (ENTSO-E) is tasked with developing and updating every two years a coordinated ten year non-binding European plan of network investments, in particular interconnection, in order to move closer to a single electricity market. This Ten Year Network Development Plan (TYNDP) identifies, at a European level, where further interconnection could be beneficial to reduce bottlenecks in power flows. That no single party has an equivalent role at a GB level means that GB contributions to the TYNDP may be more limited than they otherwise could be.

72. The current approach means GB is responsive rather than proactive in identifying priority investment opportunities. This could mean that GB does not capture the full benefits of what further interconnection development has to offer by not considering priority opportunities for delivery of interconnection to markets that offer the greatest benefits.

73. Another important factor is that where an interconnector connects to the GB transmission system can have significant onshore network impacts. In light of the EU Second and Third Energy Packages interconnectors do not pay Transmission Network Use of System (TNUoS)

charges. This means the resulting impacts on the onshore network in terms of reinforcement (which interconnector developers now no longer have an incentive to minimise) must be paid for by other network users and, ultimately, consumers<sup>27</sup>.

## Interconnection project assessment

74. Prior to Ofgem's work on the Belgian project, the extent of project assessment undertaken was particularly light touch – in respect of either impacts or relative efficiencies. As the Redpoint analysis shows, there are potentially large differences in the impacts from connecting to different markets in different ways. This situation is likely to be less tenable should consumers start to at least partially underwrite project revenues, as would be the case under a cap and floor approach.
75. The sheer number of projects in the pipeline brings this issue more sharply into focus. Government is aware of at least twelve new interconnection projects at different stages of development and inevitably some of these will be competing with each other, have different efficiencies and will affect each other's commercial viability. The current first-come-first-served approach leaves open the possibility that less beneficial projects could go forward at the expense of more beneficial projects that are being developed.
76. Also relevant in this regard is that Member States are required by the TEN-E Regulation to take decisions every two years about granting specific projects PCI status. With the benefits that come from PCI status, it is important that Government has good evidence on the impacts on the GB consumer interest from different projects, particularly if some were to be at least partially underwritten by GB consumers.
77. Project assessment is standard in the other EU countries we have studied – either by TSOs, regulators or Government, or a combination thereof (see Table 2 below).

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<sup>27</sup> NGET is consulting on an interim process for ensuring economic and efficient connections for interconnectors to be implemented prior to the conclusion of ITPR. The consultation can be found here: <http://www2.nationalgrid.com/uk/services/electricity-connections/policies-and-guidance/>

Table 2: Comparison of interconnection project assessment in selected European countries

Country	Project assessment under current model?	Roles in respect of interconnection project assessment
Great Britain	X <sup>28</sup>	N/A <sup>29</sup>
Belgium	✓	TSO assessment; Government approval; Regulator consultation
Denmark	✓	TSO assessment; Government approval
France	✓	TSO assessment; Government approval
Germany	✓	Regulator assessment with TSO input
Iceland	✓	Government assessment
Ireland	✓	Regulator & Government assessment
Netherlands	✓	Regulator assessment
Norway	✓	TSO assessment; Government approval
Spain	✓	TSO assessment; Government approval
Sweden	✓	TSO assessment; Government approval

Source: DECC analysis

## A way forward

78. Government recognises that ITPR is considering these issues, as well as the revenue regulation and delivery models for further interconnection. Based on analysis to date, Government's views on how the interconnection planning and assessment gaps could potentially be filled are set out below. Government welcomes Ofgem's detailed consideration of these issues, and implementation of solutions, as part of the ITPR project.
79. Government recognises the balance that needs to be struck in carrying out planning and assessment at a point in time when there is sufficiently detailed information for it to be meaningful, whilst also minimising developers' sunk costs.

<sup>28</sup> However, the process being developed for the potential application of a cap and floor approach to Project Nemo does involve cost assessment.

<sup>29</sup> *ibid*

80. In respect of network planning of interconnection, the key gap to be filled is an assessment of the level of additional GB interconnection that would be in line with the objectives outlined above. This analysis should consider interconnection alongside alternative technologies that can provide some of the same benefits, such as DSR and electricity storage.
81. As well as the level of interconnection, there should also be an assessment of the most beneficial markets to prioritise opportunities for further interconnections with, as well as favourable connection points onto the GB network. This information should be made available to the market. It can therefore help to guide project development efforts towards the kinds of infrastructure that may receive positive assessments and be likely to gain PCI status. However, other project proposals should be considered, subject to them also satisfying the objectives of further interconnection set out above.
82. There is a good argument for a system coordination role to consider these opportunities for more interconnection in an objective, impartial and proportionate manner. The identification of opportunities could be made public and feed into the development of the EU TYNDP. Ofgem could have a role in ensuring this analysis was undertaken in such a manner.
83. In respect of project assessment, Government considers that Ofgem would be well-placed to ensure this took place, either directly or possibly through another suitable party. There are a number of gateways within the existing system where necessary project assessment could be undertaken, including at the planning application, connection offer, licensing and revenue regulation/exemption application stages. As stated already, our view is that the earlier on in a project's lifecycle this takes place, the better. We recognise appropriate project assessment will look different depending on the regulatory model used to deliver the project in question.
84. Given the interactions between projects, project assessment may not be as effective if it was undertaken on projects in isolation compared to considering projects together that are being developed roughly in parallel. Assessing projects alongside each other would be more likely to enable mitigation of the risk that less beneficial projects crowd out more beneficial ones.
85. One approach to this could be to use the two-yearly PCI cycle to assess projects in a comprehensive way and enable, where necessary, comparison of them. The advantage of tying assessment to this cycle is that it is already in place throughout Europe. However, any changes for the future should seek to minimise uncertainty for existing, mature projects. And any assessment should seek to minimise impacts on project timelines.
86. Government does not consider a formal role for itself in network planning (as defined earlier, in terms of identifying interconnection opportunities) or approving project assessment

(beyond that already in place for approving UK PCIs) to be necessary, but would wish to offer views to the organisations planning and assessing, as well as developers themselves, given the link to PCI decisions and the potential diplomatic dimension. The kinds of matters on which Government might be interested in offering views would be in line with its principal objectives under the Electricity Act, in particular affordability, security of supply and (to the extent relevant) decarbonisation. The diplomatic dimension might include, for instance, relevant international agreements. Government would also expect to be able to rely on the network planning and assessment analysis that is undertaken for fulfilling its responsibilities in approving relevant PCIs.



## 6. Next steps

87. ITPR is the principle vehicle through which the challenges around further interconnection outlined in this document can be addressed. It is right, in Government's view, for them to be considered in a holistic way, as ITPR is doing. Government hopes that its policy objectives for interconnection and the views it has set out here on a way forward for interconnection network planning and project assessment are useful to the ITPR project in helping to resolve these challenges in a timely fashion.
88. This document has not addressed the important questions around the appropriate enduring GB model(s) for the regulation (if any) of revenues and ownership of assets for further interconnection. These are being considered by Ofgem. Government notes that Ofgem expects to make its regulatory decision on the cap and floor for Project Nemo in the first quarter of 2014.
89. Given the desire for a number of other projects to have regulatory certainty soon, Government welcomes Ofgem's commitment to consult in spring 2014 on options for the network planning and evaluation, regulation and delivery of interconnection projects, and to then consult on initial conclusions for ITPR overall in summer 2014.
90. Government will itself continue to work with stakeholders and the European Commission to try to find a way for interconnected capacity to participate in the 2015 capacity auction. The EMR consultation closes on 24 December and Government is aiming to respond in spring 2014. Both Government and Ofgem are aware of the interactions between this work and Ofgem's ITPR analysis, and will continue to work closely as thinking and proposals develop.

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