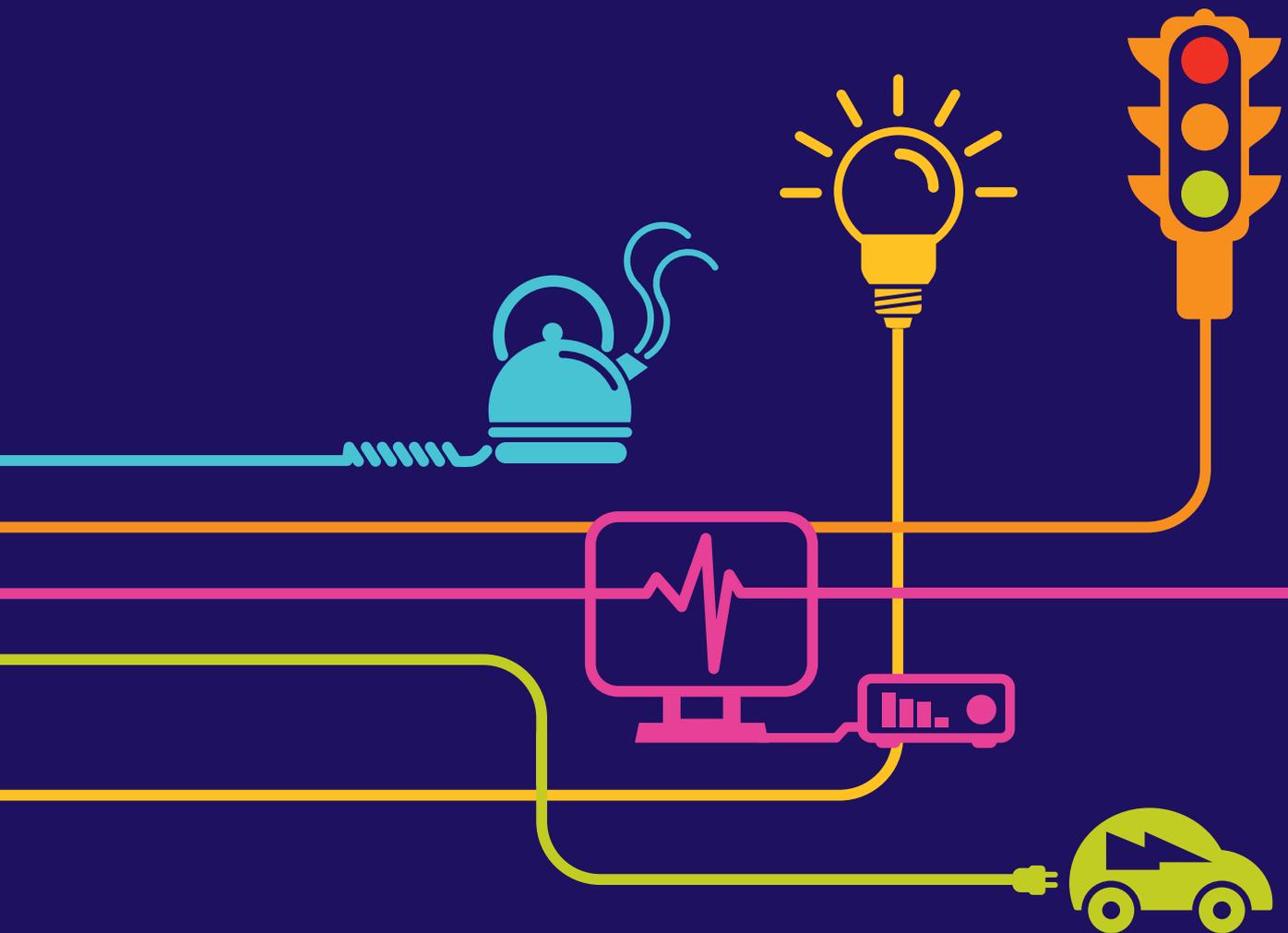


# Richborough Connection Project

Project Need Case





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Issue 1

June, 2013

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## 1. Introduction

- 1.1. This Need Case (the "Report") is part of the pre-application procedures adopted by National Grid Electricity Transmission plc ("National Grid") for major infrastructure projects that may require an application to the Secretary of State for development consent, with the Planning Inspectorate<sup>1</sup> ("PINS") being responsible for examining the application and then making a recommendation to the relevant Secretary of State for determination.
- 1.2. Its purpose is to inform interested parties of the need to plan the extension of the National Electricity Transmission System (the "Transmission System") in the south east of England in order to connect the proposed 1000MW (or 1GW) electricity interconnector (Nemo Link<sup>®</sup>) between Belgium and Great Britain, connecting at Richborough, near Sandwich in Kent and, at the same time, continue to ensure that National Grid complies with its licence standards.
- 1.3. This Report does not propose how the necessary transmission connection could be achieved, nor does it deal with the costs or the route corridor associated with any of the options. These aspects will be covered separately in supporting documents, and other information regarding the Richborough Connection Project, that can be found on the National Grid website at <http://www.nationalgrid.com/uk/Electricity/MajorProjects/RichboroughConnection>.
- 1.4. The structure of the remainder of this document is as follows: Section 2 describes, as background, an overview of the electricity market in Great Britain and National Grid's role; Section 3 describes the legislative and regulatory framework under which National Grid operates; Section 4 describes the Transmission System in the vicinity of Richborough and the need for new significant transmission infrastructure, whilst Section 5 gives a glossary of terms.

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<sup>1</sup> Further information is available on the National Infrastructure Planning website at <http://infrastructure.planningportal.gov.uk/>.

## **2. Background**

### *Overview of Electricity Industry*

- 2.1. A single electricity market serves the whole of Great Britain. In this competitive wholesale market, generators and suppliers trade electricity on a half hourly basis. Generators produce electricity from a variety of fuel sources, including coal, gas, nuclear and wind, and sell the energy produced via the wholesale market. Suppliers purchase electricity in the wholesale market and supply to end customers.
- 2.2. The peak electricity demand in Great Britain is over 60GW and occurs during winter. The combined capacity of all generators and interconnectors connected to and/or using the Transmission System is greater than this peak demand. This excess is generally referred to as Plant Margin.
- 2.3. Network infrastructure is needed to ensure that electricity can be transported from where it is generated to where it can be used. The Transmission System transports bulk supplies of electricity from generating stations and interconnectors to demand centres. Distribution systems operate at 132kV and below in England & Wales and are mainly<sup>2</sup> used to transport electricity from bulk infeed points (interface points with the Transmission System) to the majority of end customers.
- 2.4. Electricity is also traded in the wholesale market by generators and suppliers in other European countries. Interconnectors provide connection with the transmission systems in France, Northern Ireland and the Netherlands which are used to import electricity to and/or export electricity between the transmission systems.

### *Drivers for Change*

- 2.5. The electricity industry in Great Britain is undergoing unprecedented change. Up to 12GW of coal-fired power stations are expected to close in the next few years as they are not able to meet the requirements of European Large

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<sup>2</sup> Distribution systems can transport power from distribution connected generating stations to the NETS.

Combustion Plant Directive (LCPD)<sup>3</sup>, which defines limits for the emission of certain pollutants into the air from large combustion plant and is expected to come into full effect by 1<sup>st</sup> January 2016. At a broadly similar time, 7.5GW of existing nuclear capacity is expected to come to the end of its original expected operating life. The volume of the expected reduction in existing generating capacity (and therefore a reduction in Plant Margin), means significant additional investment in new generating and interconnection capacity would be needed to ensure existing minimum standards of security of supply are maintained.

2.6. In addition, the UK has two key environmental targets relating to renewable energy and greenhouse gas emissions.

- A target of 20% of European Energy (including electricity, heat & transport) to come from renewable sources by 2020<sup>4</sup> (known as the 20/20/20 vision) that is part of the European Union's (EU) integrated energy and climate change proposal. The Renewable Energy Strategy<sup>5</sup> (published in July 2009) identified that, for the UK to meet its share of the EU target (UK's share is 15% of energy sources including electricity, heat & transport), about 30% or more of the UK's electricity would have to come from renewable sources.
- A target of 80% reduction in greenhouse gases from 1990 levels by 2050 which is incorporated in the UK Climate Change Act<sup>6</sup> and goes further than the EU 20/20/20 vision. This equates to a 34% reduction in greenhouse gas emissions by 2020 as specified<sup>7</sup> by the Climate Change Committee<sup>7</sup>.

2.7. The need to achieve environmental targets will require a large part of that investment to be in generation from low-carbon sources, such as wind, nuclear and efficient gas-fired plant.

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<sup>3</sup> European Union Large Combustion Plant Directive: [http://eur-lex.europa.eu/LexUriServ/site/en/oj/2001/l\\_309/l\\_30920011127en00010021.pdf](http://eur-lex.europa.eu/LexUriServ/site/en/oj/2001/l_309/l_30920011127en00010021.pdf)

<sup>4</sup> European Energy Directives, Europe's climate change opportunity : [http://www.energy.eu/directives/com2008\\_0030en01.pdf](http://www.energy.eu/directives/com2008_0030en01.pdf)

<sup>5</sup> Renewable Energy Strategy: [http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/Renewable%20Energy%20Strategy/1\\_20090717120647\\_e\\_@@\\_TheUKRenewableEnergyStrategy2009.pdf](http://www.decc.gov.uk/assets/decc/What%20we%20do/UK%20energy%20supply/Energy%20mix/Renewable%20energy/Renewable%20Energy%20Strategy/1_20090717120647_e_@@_TheUKRenewableEnergyStrategy2009.pdf)

<sup>6</sup> Climate Change Act 2008: [http://www.opsi.gov.uk/acts/acts2008/ukpga\\_20080027\\_en\\_1](http://www.opsi.gov.uk/acts/acts2008/ukpga_20080027_en_1)

<sup>7</sup> The Committee on Climate Change (CCC): <http://www.theccc.org.uk/>

### The Role of Interconnectors

- 2.8. Interconnectors are a fundamental part of the developing European energy infrastructure. Great Britain has an existing interconnector capacity of approximately 3.5GW comprised of connections to France, Northern Ireland and the Netherlands.
- 2.9. Greater interconnection will not only contribute to the achievement of a properly functioning European energy market but it will also enhance security of supply in both Great Britain and Europe. Further, interconnection will provide an important mechanism for responding and managing both intermittency and excess power associated with renewable generation.
- 2.10. Further interconnection is envisaged between Great Britain and Ireland, France and Norway.

### National Grid's Role

- 2.11. Transmission of electricity in Great Britain requires permission by a licence granted under Section 6(1)(b) of the Electricity Act 1989 ("the Electricity Act"). National Grid has been granted a transmission licence and is therefore bound by the legal obligations primarily set out in the Electricity Act and transmission licence.
- 2.12. National Grid is the operator of the high voltage transmission system for Great Britain and its offshore waters and is the owner of the high voltage transmission system in England & Wales<sup>8</sup>.
- 2.13. Part of National Grid's role is to provide the contractual interface with demand customers, generators and owners of interconnectors that are seeking to connect to or that are already connected to the Transmission System.
- 2.14. National Grid is also responsible for the on-going development of the Transmission System which it must do in compliance with the Licence and Legislative Framework as described in Section 3.

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<sup>8</sup> The transmission network in Scotland is owned by SP Transmission Limited in southern and central Scotland and by Scottish Hydro Electric Transmission Limited in the north of Scotland. Offshore transmission networks will be owned by transmission licensees following the grant of new licences by Ofgem.

### 3. The Licence and Legislative Framework

- 3.1. Transmission of electricity is a licensable activity in Great Britain under the Electricity Act 1989 (as amended) (“the Electricity Act”).
- 3.2. National Grid owns and operates the transmission system within England and Wales <sup>9</sup> and is licensed under Section 6(1)(b) of the Electricity Act. As such, it is bound by legal obligations set out in the Electricity Act and the licence.
- 3.3. Under Section 9(2) of the Electricity Act National Grid has a duty:
  - 3.3.1. to develop and maintain an efficient, co-ordinated and economical system of electricity transmission; and
  - 3.3.2. to facilitate competition in the supply and generation of electricity.
- 3.4. Section 38 and Schedule 9 of the Electricity Act 1989<sup>10</sup> also requires National Grid, when formulating proposals for new lines and other works, to:

*“...have regard to the desirability of preserving natural beauty, of conserving flora, fauna, and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest; and shall do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects”.*
- 3.5. Licence Condition C8 (Requirement to offer terms) sets out obligations on National Grid relating to making offers to provide connections to the Transmission System. In summary, where any person applies for an offer National Grid shall offer to enter into an agreement(s)<sup>11</sup> to connect, or to modify an existing connection, to the Transmission System and the offer shall make detailed provision regarding:

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<sup>9</sup> National Grid also operates, but does not own, the transmission systems within Scotland.

<sup>10</sup> Electricity Act 1989 c29

<sup>11</sup> Paragraph 6 of Licence Condition C8 sets out exceptions where National Grid is not obliged to make an offer e.g. where to do so would put it in breach of certain other contracts or regulations.

- 3.5.1. the carrying out of works required to connect to the Transmission System;
  - 3.5.2. the carrying out of works (if any) in connection with the extension or reinforcement of the Transmission System; and
  - 3.5.3. the date by when any works required to permit access to the Transmission System (including any works to reinforce or extend the Transmission System) shall be completed.
- 3.6. Licence Condition C17 (Transmission System security standard and quality of service) requires National Grid at all times to plan, develop and operate the transmission system in accordance with the National Electricity Transmission System Security and Quality of Supply Standard ("NETS SQSS").

#### **4. The Existing Transmission System and Need for New Infrastructure**

- 4.1. The transmission system in England & Wales consists of approximately 7200km of overhead lines and a further 700km of underground cabling, operating at 400kV and 275kV. 400kV circuits operate at a higher voltage which gives them a higher power carrying capability than the equivalent 275kV<sup>12</sup> circuits.
- 4.2. The overhead lines and cables connect around 340 substations to form a highly interconnected network. The substations provide points of connection for around 80 power stations and for connections to the local distribution networks, which operate at voltages from 132kV down to 240V (at which voltage it is distributed to domestic consumers). Switches within substations allow the network to be reconfigured either: following faults which occur from time to time on overhead lines or underground cables; to disconnect lines and cables so that maintenance can be safely undertaken; and to adjust the electrical characteristics of the transmission system to suit the different patterns of flow of electricity that arise depending on which power stations are operating and the how much demand is being taken at each substation.

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<sup>12</sup> Transmission circuits operating at 275kV were generally constructed before 400kV transmission system was available.

- 4.3. As well as connecting to generation and demand, National Grid's transmission system connects to the transmission system in southern Scotland, owned by SP Transmission Limited, which is in turn connected to the transmission system in northern Scotland, belonging to Scottish Hydro Electric Transmission Limited. Subsea interconnectors also link National Grid's system to France and to the Netherlands, while SP Transmission's system has a subsea connection to Northern Ireland.
- 4.4. Much of the Transmission System was originally constructed in the 1960s, whilst upgrades and additions have been made since to serve increasing consumer demand and to connect new power stations which have been required both to meet increasing demand and to replace other power stations that reach the end of their operating lives.

#### The Need for New Infrastructure

- 4.5. In 2008 an application was made to connect a 1000MW (or 1GW) electricity interconnector at Richborough, near Sandwich in Kent. The project, named Nemo Link<sup>®</sup> is being jointly developed by National Grid Interconnectors Limited and Elia, the Belgian transmission system operator. The application requires National Grid to provide an offer of connection which must comply with the requirements of the NETS SQSS.

#### *Electricity Transmission in the vicinity of Richborough*

- 4.6. The Transmission System in Kent, see Figure 1, forms part of the transmission infrastructure which runs between the Greater Thames estuary, along the North Kent plain and on towards Sussex and to the South West.
- 4.7. The Transmission System in the area was originally constructed in the 1960s and the Dungeness A nuclear power station was connected to the network in 1965. The Transmission System was subsequently upgraded in 1972 to provide a connection to Dungeness B nuclear power station. It also provides a connection to the interconnector between England and France at Sellindge. The England-France Interconnector is a 2000MW high voltage direct current (HVDC) link between the French and British transmission systems with ownership shared between National Grid and Réseau de Transport d'Electricité (RTE). The landing point is at Baker's Gap, near Folkestone from where the

interconnector is cabled underground to Sellindge converter station which is in turn connected to the Transmission System.



Figure 1: Transmission System in the South East

4.8. The transmission network in Kent and Sussex consists of 400kV overhead line routes:

- along the south coast between Dungeness and Ninfield (north of Bexhill) (4ZJ) continuing west to Bolney (4VM);
- running north from Dungeness to Sellindge (between Ashford and Folkestone) (VO);
- continuing north from Sellindge to Canterbury and then heading west to Kemsley (ZV);
- from Kemsley running west to Northfleet (TP), and from Northfleet running west to Rowdown (ZZT).

- 4.9. There is currently no electricity transmission infrastructure in the immediate vicinity of the proposed location of Richborough. Therefore in order to provide a transmission connection, new significant transmission infrastructure is required between Richborough and the existing Transmission System, the nearest point being located some 18-25km away.
- 4.10. The analysis of transmission connection options can be found in the Richborough Connection Strategic Options Report for the South East Region, dated June 2013.

## **5. Glossary of Terms**

AC	Alternating current
GW	Gigawatt (1000 million watts)
HVDC	High Voltage Direct Current
Interconnector	An electrical connection between separate electricity systems
km	Kilometre
kV	Kilovolt (1000 volts)
MW	Megawatt (1 million watts)