

# **2008 GB Seven Year Statement Update**

**October 2008**

## **INTRODUCTION**

We are pleased to present the October 2008 Update to our 2008 GB Seven Year Statement. The Updates are issued at regular intervals (normally quarterly), each reporting on the main developments since the previous issue and largely reflecting information changes notified to us by our customers. This is the third Update of our 2008 GB Seven Year Statement and reports on changes notified to us up to 31<sup>st</sup> October 2008.

## 1. 'GB SYS BACKGROUND' SUMMARY

	2008 GB SYS	May 2008 Update	August 2008 Update	October 2008 Update
Total Generation Capacity by 2014/15 (GW)	109.6	<b>107.8</b>	<b>107.8</b>	<b>107.8</b>
Total CCGT Capacity by 2014/15 (GW)	39.7	<b>38.5</b>	<b>38.5</b>	<b>38.6</b>
Unavailable Generating Units by 2014/15 (GW)	2.9	<b>2.9</b>	<b>2.9</b>	<b>2.9</b>
Plant Margin – 2008/09 (%)	28.6	<b>28.0</b>	<b>28.1</b>	<b>28.1</b>
Plant Margin – 2014/15 (%)	64.3	<b>61.6</b>	<b>61.7</b>	<b>60.7</b>

### Notes:

1. Generation capacity values are based on station TEC values where possible.
2. Unavailable generating units are given in Table 3.11 of the GB SYS.

## 2. GENERATION

In the tables in the following sections, data in bold italics indicates differences between this update and the previously published contracted position. The Consents column refers to Section 36 and (where appropriate) Section 14 consents for generation projects.

### 2.1 Transmission Access

Access to the GB Transmission System is provided through arrangements with NGET, acting as GBSO, under the Connection and Use of System Code (CUSC). The CUSC has applied across the whole of Great Britain since BETTA "go-live" (1 April 2005). Prior to BETTA "go-live", the CUSC applied in England and Wales but different arrangements applied in Scotland. The pre BETTA go-live generation offers and agreements between relevant TOs and Users were converted into GB Offers and Bilateral Agreements under Standard Condition C18 of the Electricity Transmission Licence. The requirements of C18 have now been met and all the relevant Bilateral Agreements are now in place.

### 2.2 Transmission Networks Quarterly Connections Update – October 2008

The Transmission Networks Quarterly Connections Update is a new document produced by NGET which provides information on the status of generation agreements. The document is intended to complement the Seven Year Statement updates, and can be viewed on the following web page.

[http://www.nationalgrid.com/uk/Electricity/GettingConnected/gb\\_agreements/](http://www.nationalgrid.com/uk/Electricity/GettingConnected/gb_agreements/)

## 2.3 Planned Transmission Contracted Generation up to 2014/15

This section gives details of future generation projects relevant to this update. The Changes reported are changes relative to the previously reported contracted position, and include:

1. East West Cable One Ltd have signed a contract to connect 375MW of new interconnector capacity with the Republic of Ireland at Pentir 400kV substation by 31/10/11. Transmission reinforcements will be complete by 31/10/15, when the capacity will be firm.
2. The completion date for Brine Field CCGT has been deferred to 31/10/12.
3. The completion date for Drakelow D CCGT has been deferred to 31/03/11, and the TEC has been increased to 1320MW.
4. The following onshore windfarms are now under construction: Beinn an Tuirc extension, Edinbane, Crystal Rig 2 and Longpark (from the BWEA website).
5. Thanet offshore windfarm is now under construction (from the BWEA website).
6. Fairwind (Orkney) wind farm (formerly 126MW in 2013) has terminated its contract.
7. Brine Field and Partington CCGTs have received their consents (update received from DECC).

Further details are given in the table below.



## 2.4 Existing Transmission Contracted Generation

No changes have been reported to existing generation in this update.

## 2.5 Transmission Contracted Generation beyond 2014/15

The following table lists generation projects with commissioning dates beyond 2014/15.

Changes to the contracted position include:

1. Perth 38MW wind farm have terminated their contract.
2. Intergen (UK) Ltd have signed a contract to connect 840MW of new CCGT generation (South Holland power station) at Spalding North 400kV substation by 31<sup>st</sup> October 2022.
3. Intergen (UK) Ltd have signed a contract to connect 840MW of new CCGT generation (Thames Haven power station) at Mucking Flats 400kV substation by 31<sup>st</sup> October 2023.
4. EDF Development Company Ltd have signed a contract to connect 1600MW of new nuclear generation at a new 400kV substation at Hinkley Point West by 31<sup>st</sup> October 2019.
5. E.ON UK plc have signed a contract to connect 1600MW of new nuclear generation at Oldbury-on-Severn 400kV substation by 1<sup>st</sup> April 2020.
6. EDF Development Company Ltd have signed a contract to connect 1670MW of new nuclear generation at Wylfa 400kV substation by 31<sup>st</sup> October 2017.

The following table gives further details.

Station Name	Capacity (MW)	Company	Plant Type	Licensee	Completion Date
Perth	-	Wind Energy (Dunan) Ltd	Onshore Wind	SHETL	-
South Holland	840	Intergen (UK) Ltd	CCGT	NGET	2022
Thames Haven	840	Intergen (UK) Ltd	CCGT	NGET	2023
Hinkley Point West	1600	EDF Development Company Ltd	Nuclear EPR	NGET	2019
Oldbury-on-Severn	1600	E.ON UK plc	Nuclear EPR	NGET	2020
Wylfa B	1670	EDF Development Company Ltd	Nuclear EPR	NGET	2017
<b>TOTAL</b>	<b>6550</b>	<b>MW</b>			

## 2.6 Transmission Entry Capacity Data

The table below gives the contracted generation TEC values applicable for winter peak 2009/10. As stated in the Use of System Charging Methodology, these values will be used to derive the 2009/10 TNUoS tariffs.

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
NGET	Aberthaw	RWE Npower plc	1692		Directly Connected
NGET	Alcan Lynemouth	Alcan Aluminium UK Ltd		420	Embedded
NGET	Baglan Bay	Baglan Operations Ltd	552		Directly Connected
NGET	Barking	Barking Power Ltd	1000		Directly Connected
NGET	Barry	Centrica Barry Limited	245		Embedded
NGET	Brimsgate	Enfield Energy Centre Ltd	408		Directly Connected
NGET	Connahs Quay	E.ON UK plc	1380		Directly Connected
NGET	Corby	Corby Power Ltd	401		Embedded
NGET	Coryton	Coryton Energy Co Ltd	800		Directly Connected
NGET	Cottam	Jade Power Generation Ltd	2000		Directly Connected
NGET	Cottam Development Centre	E.ON UK plc	395		Directly Connected
NGET	Cowes	RWE Npower plc	145		Embedded
NGET	Damhead Creek	Scottish Power (DCL) Limited	805		Directly Connected
NGET	Deeside	Deeside Power Dev Co Ltd	505		Directly Connected
NGET	Derwent	Derwent Co-Generation Ltd	228		Embedded
NGET	Didcot	RWE Npower plc	2009		Directly Connected
NGET	Didcot B	RWE Npower plc	1550		Directly Connected
NGET	Didcot GTs	RWE Npower plc	100		Directly Connected
NGET	Dinorwig	First Hydro Company	1644		Directly Connected
NGET	Drax	Drax Power Ltd	3906		Directly Connected
NGET	Dungess B	British Energy Generation Ltd	1081		Directly Connected
NGET	Eggborough	Eggborough Power Ltd	1940		Directly Connected
NGET	Fawley	RWE Npower plc	1036		Directly Connected
NGET	Fawley CHP	Npower Cogen Trading Ltd	158		Embedded
NGET	Ferrybridge B	Keadby Generation Ltd	1986		Directly Connected
NGET	Ffestiniog	First Hydro Company	360		Directly Connected
NGET	Fiddlers Ferry	Keadby Generation Ltd	1987		Directly Connected
NGET	French Interconnector	Interconnections Business	1988		Directly Connected
NGET	Glandford Brigg	Regional Power Generators Ltd	260		Embedded

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
NGET	Grain	E.ON UK plc	1355		Directly Connected
NGET	Great Yarmouth	RWE Npower plc	420		Embedded
NGET	Greater Gabbard Offshore Windfarm	Greater Gabbard Offshore Winds Limited	500		Directly Connected
NGET	Hartlepool	British Energy Generation Ltd	1207		Directly Connected
NGET	Heysham	British Energy Generation Ltd	2406		Directly Connected
NGET	Hinkley Point B	British Energy Generation Ltd	1261		Directly Connected
NGET	Immingham	Immingham CHP LLP	1218		Directly Connected
NGET	Indian Queens	Indian Queens Power Ltd	140		Directly Connected
NGET	Ironbridge	E.ON UK plc	964		Directly Connected
NGET	Keadby	Keadby Generation Ltd	735		Directly Connected
NGET	Killingholme (NP)	Centrica KPS Limited	665		Directly Connected
NGET	Killingholme (Powergen)	E.ON UK plc	900		Directly Connected
NGET	Kings Lynn A	Centrica KL Ltd	340		Embedded
NGET	Kingsnorth	E.ON UK plc	1966		Directly Connected
NGET	Langage	Centrica Langage Ltd	905		Directly Connected
NGET	Little Barford	RWE Npower plc	665		Directly Connected
NGET	Littlebrook D	RWE Npower plc	1245		Directly Connected
NGET	Marchwood	Marchwood Power Limited	900		Directly Connected
NGET	Medway	Medway Power Ltd	700		Directly Connected
NGET	Oldbury-on-Severn	Nuclear Decommissioning Authority	470.4		Directly Connected
NGET	Peterborough	Centrica PB Ltd	405		Embedded
NGET	Ratcliffe-on-Soar	E.ON UK plc	2021		Directly Connected
NGET	Rocksavage	Rocksavage Power Company Ltd	748		Directly Connected
NGET	Roosecote	Centrica RPS	229		Embedded
NGET	Rugeley B	Rugeley Power Ltd	1018		Directly Connected
NGET	Rye House	Scottish Power Generation Ltd	715		Directly Connected
NGET	Saltend	Saltend Cogeneration Company Ltd	1100		Directly Connected
NGET	Seabank	Seabank Power Ltd	1234		Directly Connected
NGET	Sellafield	Nuclear Decommissioning Authority	155		Embedded
NGET	Severn Power	Severn Power	425		Directly Connected
NGET	Shoreham	Scottishpower (SCPL) Limited	420		Embedded

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
NGET	Shotton	Gaz De France Generation Ltd	210		Embedded
NGET	Sizewell B	British Energy Generation Ltd	1200		Directly Connected
NGET	South Humber Bank	Centrica SHB Ltd	1285		Directly Connected
NGET	Spalding	Spalding Energy Company Ltd	880		Directly Connected
NGET	Staythorpe	RWE Npower plc	1700		Directly Connected
NGET	Sutton Bridge	EDF Energy (Sutton Bridge Power) Limited	800		Directly Connected
NGET	Taylor's Lane	E.ON UK plc	144		Embedded
NGET	Teesside	Teesside Power Ltd	1875		Directly Connected
NGET	Thanet Offshore Windfarm	Thanet Offshore Wind Ltd	300		Embedded
NGET	Tilbury B	RWE Npower plc	1131		Directly Connected
NGET	Uskmouth	Uskmouth Power Company Ltd	363		Directly Connected
NGET	West Burton	West Burton Ltd	1987		Directly Connected
NGET	West Burton B Power Station	EDF Energy plc	435		Directly Connected
NGET	Wilton	Sembcorp Utilities Teesside Ltd	60		Directly Connected
NGET	Wylfa	Nuclear Decommissioning Authority	980		Directly Connected
SHETL	Aigas	SSE Generation Ltd	20		Directly Connected
SHETL	Ardkinglas, Clachan (SRO)	Scottish Hydro-Electric Power Distribution plc	19.25		Embedded
SHETL	Ark Hill Wind Farm, Glamis (SRO)	Renewable Energy Systems UK Ltd	BELLA	12	Embedded
SHETL	Baldovie Waste to Energy Plant	Dundee Energy Recycling Ltd	BELLA	8.3	Embedded
SHETL	Ballindalloch Muir Wind Farm, Balfroun	Npower Renewables Ltd	BELLA	20.8	Embedded
SHETL	Beinn An Turic Wind	CRE Energy Ltd	BELLA	30	Embedded
SHETL	Beinn Ghlas Wind	Beaufort Wind Limited	BELLA	8.66	Embedded
SHETL	Beinn Tharsuinn	CRE Energy Ltd	29		Embedded
SHETL	Ben Aketil Wind	Ben Aketil Wind Farm Ltd	BELLA	28	Embedded
SHETL	Bowmore - Islay	Scottish Hydro-Electric Power Distribution Ltd	BELLA	6.2	Embedded
SHETL	Boyndie Wind	Boyndie Wind Energy Limited	BELLA	21	Embedded
SHETL	Braes of Doune	Braes Of Doune Wind Farm (Scotland) Ltd	74		Embedded
SHETL	Burgar Hill (NWP) Orkney	RWE Npower plc	BELLA	6	Embedded
SHETL	Cairn Uish Wind, Rothes	Rothes Wind Limited	BELLA	50.6	Embedded
SHETL	Cashlie	SSE Generation Limited	11.12		Embedded
SHETL	Causeymire	Causeymire Windfarm Limited	BELLA	54	Embedded

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
SHETL	Ceannacroc	SSE Generation Limited	20		Embedded
SHETL	Clachan	SSE Generation Limited	40		Embedded
SHETL	Clunie	SSE Generation Ltd	61.2		Directly Connected
SHETL	Culligran	SSE Generation Ltd	19.1		Directly Connected
SHETL	Deanie	SSE Generation Ltd	38		Directly Connected
SHETL	Deucheran Hill Wind	E.ON UK Renewables Ltd	BELLA	15	Embedded
SHETL	Drumderg Wind Farm, Dalrulzion	SSE Generation Limited	BELLA	32	Embedded
SHETL	Dummuies Windfarm, Inch	Dummuies Windfarm Huntly Limited	BELLA	10.4	Embedded
SHETL	Edinbane Wind, Skye	AMEC Wind	42.75		Directly Connected
SHETL	Eredine Forest (An Suide)	Npower Renewables Ltd	30		Directly Connected
SHETL	Errochty	SSE Generation Ltd	75		Directly Connected
SHETL	Fairburn Wind Farm	SSE Generation Limited	BELLA	40	Embedded
SHETL	Farr Windfarm	Farr Windfarm Limited	92		Directly Connected
SHETL	Fasnakyle G1 & G3	SSE Generation Ltd	46		Directly Connected
SHETL	Fasnakyle G3 & G4	SSE Generation Limited	23		Embedded
SHETL	Finlarig	SSE Generation Ltd	16.5		Directly Connected
SHETL	Flotta Terminal	Talisman Energy (UK) Limited	BELLA	10	Embedded
SHETL	Foyers	SSE Generation Ltd	300		Directly Connected
SHETL	Glenmoriston	SSE Generation Ltd	37		Directly Connected
SHETL	Glens of Foudland Wind (SRO)	Glens Of Foudland Wind Farm Ltd	26		Embedded
SHETL	Gordonbush Wind	SSE Generation Limited	70		Directly Connected
SHETL	Grudie Bridge	SSE Generation Limited	BELLA	18.7	Embedded
SHETL	Houstry Wind, Dunbeath	Boulfruich Wind Farm Limited	BELLA	14	Embedded
SHETL	Inverawe	SSE Generation Limited	BELLA	25	Embedded
SHETL	Invergarry	SSE Generation Ltd	20		Directly Connected
SHETL	Inverurie Paper Mills	International Paper (UK) Ltd	BELLA	7.5	Embedded
SHETL	Kilbraur	Kilbraur Wind Energy Limited	67		Directly Connected
SHETL	Kilmorack	SSE Generation Ltd	20		Directly Connected
SHETL	Kingsburn Wind farm, Fintry, Stirling	Kingsburn Wind Energy Ltd	BELLA	20	Embedded
SHETL	Kinlochleven	Alcan Aluminium UK Limited	BELLA	30	Embedded
SHETL	Kirkwall	Scottish Hydro-Electric Power Distribution plc	BELLA	15.5	Embedded

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
SHETL	Lairg	Scottish Hydro-Electric Power Distribution plc	BELLA	50	Embedded
SHETL	Lerwick A	SSE Generation Limited	BELLA	28	Embedded
SHETL	Lerwick B	SSE Generation Limited	BELLA	37	Embedded
SHETL	Livishie	SSE Generation Ltd	15		Embedded
SHETL	Loch Carnan - South Uist	Scottish Hydro-Electric Power Distribution plc	BELLA	11.8	Embedded
SHETL	Lochay	SSE Generation Ltd	47		Directly Connected
SHETL	Luichart	SSE Generation Ltd	34		Directly Connected
SHETL	Marine Energy Test Centre	The European Marine Energy Centre Ltd.	BELLA	7	Embedded
SHETL	Millennium Wind	Millenium Wind Energy Ltd	65		Directly Connected
SHETL	Mossford	SSE Generation Ltd	18.66		Directly Connected
SHETL	Nant	SSE Generation Ltd	15		Directly Connected
SHETL	Novar	Beaufort Wind Limited	BELLA	18.5	Embedded
SHETL	Orrin	SSE Generation Ltd	18		Directly Connected
SHETL	Paul's Hill Wind	Paul's Hill Wind Limited	BELLA	70	Embedded
SHETL	Peterhead	SSE Generation Ltd	1524		Directly Connected
SHETL	Pitlochry	SSE Generation Ltd	15		Embedded
SHETL	Quoich	SSE Generation Ltd	18		Directly Connected
SHETL	Rannoch	SSE Generation Limited	BELLA	44	Embedded
SHETL	Shin	SSE Generation Limited	BELLA	18.62	Embedded
SHETL	Sloy G1 & G4	SSE Generation Limited	72.5		Embedded
SHETL	Sloy G2 & G3	SSE Generation Ltd	80		Directly Connected
SHETL	St Fillans	SSE Generation Limited	BELLA	16.8	Embedded
SHETL	Stoneywood Mills (Wiggins Teape Stoneywood)	Arjo Wiggins Fine Papers Limited	BELLA	12	Embedded
SHETL	Stornoway (Battery Point)	Scottish Hydro-Electric Power Distribution plc	BELLA	22.3	Embedded
SHETL	Taits Mills	Thomas Tait And Sons Ltd	BELLA	8	Embedded
SHETL	Tangy Wind, Argyll	SSE Generation Limited	BELLA	19	Embedded
SHETL	Torr Achilty	SSE Generation Limited	15		Embedded
SHETL	Tummel	SSE Generation Limited	BELLA	34	Embedded
SPT	Aikengall	Community Windpower Ltd	48	48	Embedded
SPT	Arecleoch	CRE Energy Ltd	150		Directly Connected
SPT	Black Law	CRE Energy Limited	134		Directly Connected

Licensee	Station	Owner	TEC	Station Capacity	Embedded / Directly Connected
SPT	Bowbeat	E.ON UK plc	BELLA	33	Embedded
SPT	Cockenzie	Scottish Power Generation Ltd	1102		Directly Connected
SPT	Cruachan	Scottish Power Generation Ltd	440		Directly Connected
SPT	Crystal Rig	Crystal Rig Windfarm Limited	BELLA	62.5	Embedded
SPT	Crystal Rig II	Fred Olsen Renewables	200		Directly Connected
SPT	Dalswinton	Dalswinton Wind Farm (Scotland) Limited	30		Embedded
SPT	Dun Law Extension	CRE Energy Ltd	29.75		Directly Connected
SPT	Earlsburn	Earlsburn Wind Energy Limited	BELLA	35	Embedded
SPT	Fallago	North British Windpower Ltd	144		Directly Connected
SPT	Fife	SSE Generation Ltd	123		Directly Connected
SPT	Glendoe	SSE Generation Ltd	51.5		Directly Connected
SPT	Grangemouth	Grangemouth CHP Ltd	120		Embedded
SPT	Greenock Wind Farm	Greenock Wind Farm (Scotland) Limited	55		Embedded
SPT	Hadyard Hill	SSE Generation Ltd	117		Directly Connected
SPT	Hunterston	British Energy Generation Ltd	1089		Directly Connected
SPT	Longannet	Scottish Power Generation Ltd	2304		Directly Connected
SPT	Mark Hill Wind Farm	Catamount Energy Limited	99		Directly Connected
SPT	Minsca	Minsca Wind Farm (Scotland) Limited	37.5		Embedded
SPT	Moyle Interconnector	Moyle Interconnector Ltd	80		Directly Connected
SPT	Roths Bio-Plant	Npower Cogen Limited	52		Embedded
SPT	Steven's Croft	E.ON UK plc	BELLA	45	Embedded
SPT	Toddleburn	I & H Brown (Econnect)	36		Directly Connected
SPT	Tongland	Scottishpower Generation Ltd	BELLA	33	Embedded
SPT	Tormywheel	PM Renewables Ltd	BELLA	32.4	Embedded
SPT	Torness	British Energy Generation Ltd	1200		Directly Connected
SPT	Whitelee	CRE Energy Limited	322		Directly Connected

### 3. CAPACITY TOTALS, PEAK DEMANDS AND PLANT MARGINS

#### 3.1 Generation Capacities

This table gives information on capacity totals for all directly-connected and Large Power Stations, and include the capacity and background changes reported in Section 2. The winter peak demands are customer-based forecasts in MW and are used to calculate plant margins in section 3.2. Capacity values are based on station TEC values where possible.

Generation Background	Total Capacity (MW)						
	08/09	09/10	10/11	11/12	12/13	13/14	14/15
GB SYS background (SYS)	79558	83987	89946	95929	99308	102827	107803
Consents (C)	79558	83782	87174	89711	91248	91718	91757
Existing or Under Construction (E,UC)	79459	82285	84818	85248	85248	85248	85256
Winter Peak Demand	62100	63000	63700	65400	65900	66600	67100

Notes:

1. The figures are based on the assumed year of commissioning or decommissioning.
2. The SYS background includes all planned generation with or without Section 36 and/or Section 14 consent.
3. The Consents background includes all planned generation with Section 36 and/or Section 14 consent.
4. The Existing or Under Construction background includes all generation projects currently under construction and all planned closures of generation.
5. The capacity totals above do not include the importing TEC values for the Moyle Interconnector (80MW) or the East-West Interconnectors (875MW from 2011/12 onwards), as the interconnectors are assumed to be exporting to Northern Ireland and the Republic of Ireland at the time of winter peak.
6. The winter peak demands (customer-based forecast) are used in section 3.2 to calculate plant margins for each of the above backgrounds; these demands exclude station demand, but include the export to Northern Ireland (300MW) and the export to the Republic of Ireland (875MW from 2011/12 onwards).
7. Plant contracted for 2008/09 and under construction includes the following: Immingham Stage 2, Langage, Marchwood, Aikengall, Whitelee Stage 2, Glendoe Hydro, An Suidhe, Ardinglas and Millennium Stage 2.
8. Projects assumed to be under construction in 2008/09 (for connection beyond 2008/09) include Staythorpe Stages 1, 2 and 3, Netherlands Interconnector Stages 1, 2 and 3, Grain Stages 1 & 2, Severn Power Stages 1 & 2, Thanet offshore windfarm, West Burton B Stages 1, 2 and 3, Crystal Rig 2, Dun Law extension, Longpark, Whitelee Stage 3, Beinn an Tuirc 2, Edinbane, Kilbraur Stage 2, Millenium Stage 3, Tullo and Fasnakyle Hydro Extension.

#### 3.2 Plant Margins

The following projected margins are based on the capacity totals for the three generation backgrounds and the customer-based demand forecasts given in section 3.1 above.

Generation Background	Plant Margin (%)						
	08/09	09/10	10/11	11/12	12/13	13/14	14/15
GB SYS background (SYS)	28.1	33.3	41.2	46.7	50.7	54.4	60.7
Consents (C)	28.1	33.0	36.9	37.2	38.5	37.7	36.7
Existing or Under Construction (E,UC)	28.0	30.6	33.2	30.3	29.4	28.0	27.1

## 4. TRANSMISSION SYSTEM

This section reports on significant changes to the planned transmission system, or revisions to construction programmes. Table 6.2 of the main statement gives further details of contracted transmission schemes.

### North Wales (by 2015)

Establish a new 400kV circuit from Wylfa to Pentir. Connect the new circuit into the vacated Generator 4 bay (X490) at Wylfa, and into the bay currently occupied by the Deeside 1 circuit at Pentir. At Pentir, transpose the Deeside 1 circuit onto the Bus Coupler 1 circuit, with the bus coupler being replanted. Install a new 400kV circuit breaker in the reserve bus-section bay at Pentir. Extend Main busbar 2 and Reserve busbar 2 at Pentir 400kV substation.

Construct a new 400kV circuit from Pentir to Trawsfynydd by:

- Establishing a new 400kV three-bay single-switch mesh AIS substation at Penisarwun, connecting the Pentir-Dinorwig 2-Trawsfynydd 400kV circuits
- Installation of approximately 6km of XLPE cable across the Glaslyn estuary
- Reconductoring the existing overhead line sections between Penisarwun and Trawsfynydd with 2 x 700mm<sup>2</sup>
- Connecting the new circuit into the existing disconnecter bay on Mesh Corner 3 at Trawsfynydd 400kV substation
- Installation of an F3 ferroresonance quenching scheme on the SGT 3 disconnecter

### North Wales (by 2017)

Increase the thermal capability of the existing Pentir-Trawsfynydd 400kV circuit by doubling up the cable sections between Pentir and tower 4ZC157, between Trawsfynydd and tower 4ZC5, and the cable section across the Glaslyn estuary.

Hotwire the Legacy sections of the Deeside-Trawsfynydd-Legacy 1 & 2 circuits for operation at 90°C.

### Overhead Line Works (by 2017)

Hotwire the Drakelow-Hams Hall 400kV circuits for operation at 90°C.

### Hinkley Point West (by 2019)

Construct a new 8-bay 400kV GIS double-busbar substation (Hinkley Point West) at Hinkley Point (adjacent to the proposed Hinkley Point C 400kV GIS substation), with two feeder bays, one bus coupler, one bus section, two interbus reactor bays and two skeletal generator bays. Install two new 3000MVA 400kV interbus reactors. Reconfigure the Hinkley Point C 400kV GIS substation, transferring both Seabank circuits to the new Hinkley Point West 400kV GIS substation and re-use two feeder bays for the cable/tower interconnector circuits to the EDF substation (through reactors).

### Oldbury-on-Severn (by 2020)

Construct a new six-bay, double-busbar 400kV substation at Oldbury-on-Severn, consisting of two feeder bays, one bus coupler, one skeletal generator bay and one skeletal station transformer bay. Construct new Tockington – Oldbury-on-Severn and Oldbury-on-Severn – Melksham 400kV circuits, by utilising the existing NGET 132kV route and a short section of line currently owned by WPD.

Underground the following overhead lines, as the new 400kV route needs to cross these circuits:

- Iron Acton - Whitson 1 & 2

- Iron Acton - Oldbury-on-Severn 2 & 3

### **Overhead Line Works (by 2020)**

Reconductor the existing overhead line section of the Hinkley Point-Melksham double circuit with GAP conductor (L2 towers), and install 2 x 850mm<sup>2</sup> AAAC at 90°C on the new build section of the overhead line route (L12 towers).

Reconductor the existing overhead line section of the Hinkley Point-Seabank double circuit with GAP conductor (L2 towers), and install 2 x 850mm<sup>2</sup> AAAC at 90°C on the new build section of the overhead line route (L12 towers).

Reconfigure the Melksham 400kV line entries by swapping one of the Hinkley Point-Melksham circuits with one of the Bramley-Melksham circuits. Construct a short section of new overhead line (approximately 800m) between the line entries of the above two circuits.

Reconductor the existing overhead line section of the Bramley-Melksham double circuit with GAP conductor (L2 towers), and install 2 x 850mm<sup>2</sup> AAAC at 90°C on the new build section of the overhead line route (L12 towers).

### **Underground Cable Works (by 2020)**

Double the cable circuits on the Cowley-Minety section of the Hinksey cables.

### **Spalding North (by 2022)**

Extend the Spalding North 400kV busbars for two new section bays, one new coupler bay, three new line bays (one existing line bay to have underpass), and three new generator bays. Construct two new 400kV bus section bays and install new breakers. Construct two new 400kV line bays and install new breakers. Construct a new 400kV coupler bay and install a new breaker.

Construct a new 5.5km 400kV double circuit overhead line from the Spalding North substation and connected via a double-turn-in arrangement to the existing Walpole-Bicker Fen overhead line route, to form a Walpole-Spalding North double circuit and a Spalding North-Bicker Fen double circuit.

### **Transmission Works (by 2022)**

Reconductor the Staythorpe-Ratcliffe 400kV overhead line circuit with GAP conductor for 75°C operation.

At Sundon 400kV substation, install two new 400kV 2000MVA series reactors in the Sundon-Wymondley and the Sundon-Pelham 400kV circuits.

Upgrade the Waltham Cross-Tottenham (ZBC route) to 400kV and re-conductor with GAP. Similarly upgrade the Hackney-Tottenham YYJ route.

Install two new 400kV quadrature boosters of 3000MVA continuous rating on the Burwell-Pelham 400kV circuits. Install new gantry towers at Pelham 400kV substation, reconductoring with two spans of 3x700mm<sup>2</sup> AAAC and installing associated down leads.

### **Mucking Flats (by 2023)**

Construct a six-bay in-line double busbar AIS substation directly adjacent and to the north of the Rayleigh Main-Tilbury 400kV ZJ route between towers ZJ033 and ZJ034 at the point of convergence with the Coryton-Rayleigh/Tilbury 400kV ZJA route. This will consist of 3 skeletal generation bay spaces (i.e. busbar extension) to cater for each CCGT generator circuit to be populated, 2 bays to facilitate a loop in to the existing Rayleigh Main-Tilbury 400kV circuit, and 1 bay for a bus coupler breaker.

Create a single-circuit temporary bypass on the Coryton South-Tilbury 400kV circuit between towers ZJ025 and ZJ027 to remove the need for a double circuit outage. Turn in the Rayleigh-Tilbury 400kV overhead line circuit to the new 400kV substation at Stanford Le Hope using 2x850mm<sup>2</sup> AAAC downleads on to gantries to match the rating of the conductor forming the Rayleigh-Tilbury route following reconductoring associated with the Bradwell connections. Construct one new "DJT" tension tower to facilitate the loop-in to Stanford le Hope (existing adjacent towers are suspension towers only).

### **Transmission Works (by 2023)**

Install two new switchable 400kV 3000MVA series reactors and compounds to be on the Norwich-Bramford circuits at Norwich (Bramford discounted due to parallel activities associated with the nuclear generation connection). Install two sets of 3x700mm<sup>2</sup> AAAC downleads at Norwich main for the Bramford and Sizewell circuits.

Install two new 400kV quadrature boosters (QBs) on the Barking-West Ham circuits of 3000MVA continuous rating at Barking via extended Gas insulated Busbar connections, requiring extension of the existing Barking substation site, replacing the existing 2000MVA QB units at West Ham.

Bypass the existing West Ham QBs and new 400kV cable to uprate connections into West Ham substation of which immediate connections will be made via a gas-insulated busbar extension.

Re-conductor both Barking-West Ham 400kV circuits (ZR route, 12km) with 2x620mm<sup>2</sup> Matthew GTZACSR (GAP) conductor at 170°C.

Reconductor the overhead line section of the Littlebrook-Hurst VN route (from Littlebrook to Crayford, some 5.42km) using 2x570mm<sup>2</sup> Sorbus AAAC conductor for 400kV operation.

Construct a thrust-bored cable tunnel from Hurst to Crayford with equivalent rating to the Hurst-Eltham cable tunnel (1217/1190/1100MVA Winter/Spring & Autumn/Summer rating).

Replace the 2.12km cable from Crayford to Hurst on the VN route with 2 x 400kV XLPE cable elements rated at 1770MVA.

Install two new 400/275kV 1100MVA interbus SGTs at Hurst on the Littlebrook-Hurst circuits along with revised cable interfaces on mesh corners 4 and 2, in line with circuit transpositions proposed under the South London medium term strategy work.

Install two new 400kV Quad Boosters of 3000MVA continuous rating on the new Lydd-Rowdown circuits.

Install a new bus coupler at Rayleigh Main 400kV substation, and re-distribute the ZT circuits, such that that Bradwell-Rayleigh circuit 1 is re-distributed to the Rayleigh main busbar 1. Move the Rayleigh Main-Coryton South circuit southwards to allow space to extend Rayleigh Main. This work will be conducted at the same time as that associated with works at Rayleigh associated with the connection of a new Rayleigh-Bradwell 400kV double circuit.

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