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Chapter 5

Plant Margin

Introduction

This chapter brings together information on generation capacity from Chapter 3 (Generation Capacity) and forecast Average Cold Spell (ACS) unrestricted peak demand from Chapter 2 (Electricity Demand) and examines the overall plant/demand balance on the National Electricity Transmission System (NETS) by evaluating a range of potential future plant margins.

However, it is emphasised that **none of the plant margins presented in this chapter is intended to represent our forecast or prediction of the future position.** The primary purpose is rather to provide sufficient information to enable the readers to make their own more informed judgments on the subject. Indeed National Grid believes that the relatively high margins presented in the various tables and figures of this chapter are unlikely to occur in practice for a number of reasons that are discussed in the main text.

The plant margins presented have been evaluated on the basis of a range of different backgrounds. These backgrounds take some account of the uncertainties relating to future generation, which include: the relative likelihood of prospective new future generation projects proceeding to completion; as yet un-notified future generation disconnections (closures), e.g. LCPD closures; and the possible return to service of previously decommissioned plant (or the return to service of plant with TEC currently set at zero). The appropriate contribution towards the plant margin of generation output from wind farms is also considered, as is the potential effect on the plant margin of exports (rather than imports) across External interconnections and the sterilisation of generation capacity by virtue of its location behind a transmission constraint.

There are a number of definitions of plant margin in current usage; and each definition is appropriate to a particular purpose. Naturally, the calculated value of plant margin also varies along with the definition. A discussion of the plant margin definition for the purposes of the NETS SYS is included in Appendix I.

The chapter concludes with a brief report on the related issue of gas and electricity market interaction.

Finally readers are advised that if they are not familiar with Plant Margin terminology that they read Appendix I before studying this chapter. Appendix I explains the Plant Margin terminology used in this chapter.

Plant Margins on Different Generation Backgrounds

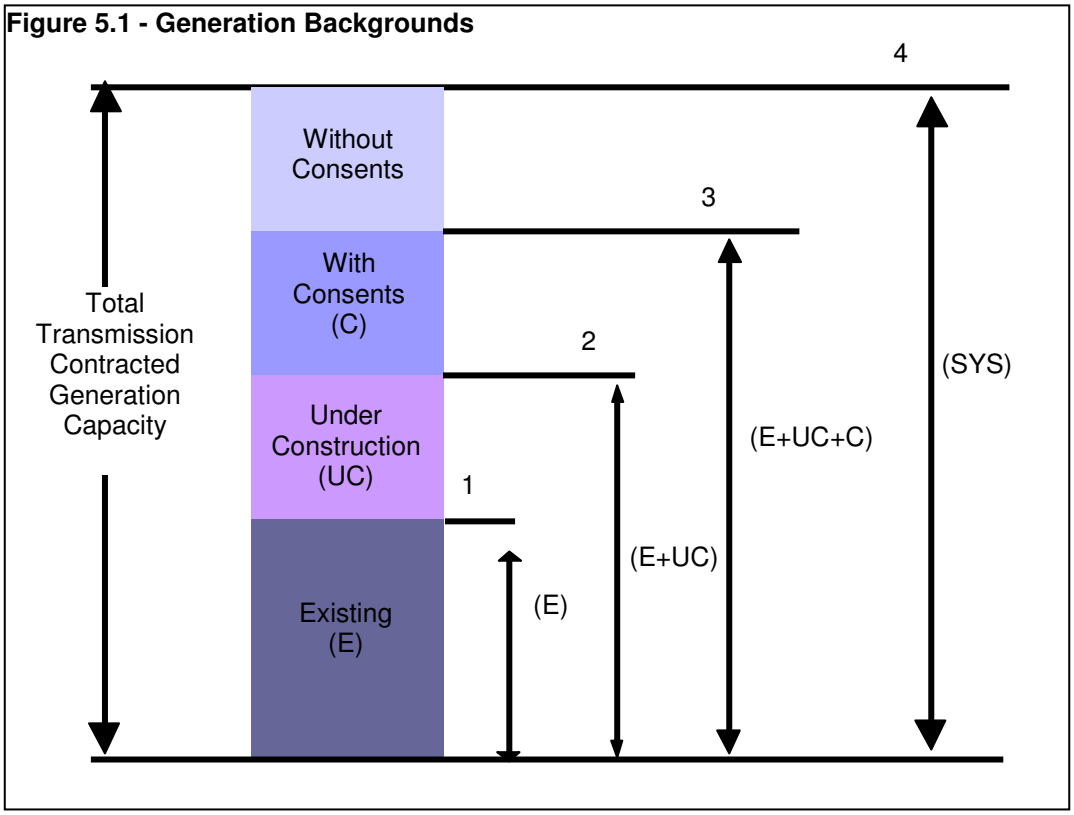
Generation Commissioning Backgrounds

Unless otherwise stated the network analyses (e.g. the illustrative power flows, the loading on each part of the NETS and the fault levels) presented in this Statement are based on the SYS background. Amongst other things, the SYS background includes existing generation projects and those proposed new generation projects for which an appropriate Bilateral Agreement is in place. Accordingly, most of the studies and analyses presented assume that all of the generating plant planned for commissioning over the period from the 2011/12 winter peak to the 2017/18 winter peak, will commission.

However, unless plant is already under construction there can be only limited certainty that any particular project will proceed to completion and, accordingly, there are a number of areas of uncertainty relating to the future generation position and consequently the future plant/demand position. These include:

- the possibility of termination or modification of longer term connection agreements before construction or commissioning;
- additional new connection agreements being signed;
- as yet un-notified plant closures;
- possible retention of generation assets by the owner for commercial reasons or the return to service of plant currently held in reserve. Table 3.11 identifies plant which, on the face of it, has the potential to return to service. However, in practice, the majority of this plant belongs to stations that have opted-out of LCPD, and will therefore not generate beyond 2015; and
- the possibility that some transmission contracted generation may not in the event be granted Section 36 consent.

Figure 5.1 - Generation Backgrounds



In view of these uncertainties, four different generation backgrounds have been considered. Each has been selected in recognition of the different level of certainty relating to whether the proposed new transmission contracted plant will, in the event, proceed to completion. These are illustrated in Figure 5.1.

- Background 1: 'Existing Background' (E)
  This background includes all transmission contracted generation plant that is already constructed and connected to either the transmission network or a distribution network
- Background 2: 'Existing or Under Construction Background' (E, UC)
  This background includes all the generation included under background 1, plus all future generation plant under construction.
- Background 3: 'Consents Background' (C)
  A second useful indicator is whether plant has already been granted the necessary consents under Section 36 (S36) of the Electricity Act 1989 and Section 14 (S14) of the Energy Act 1976 (see Chapter 10: "Market Overview"). This background includes all existing plant, that portion of plant under construction that has obtained both S36 and S14 consent where relevant, and planned future plant that has obtained both S36 and S14

consent where relevant. Any 'contracted' generation not already existing that requires S36 and S14 consent but has not obtained both is excluded from this background.

- Background 4: 'SYS Background' (SYS)
  This background includes the existing generation and that proposed new generation for which an appropriate Bilateral Agreement is in place. The fact that a generation project may be classified as 'contracted' does not mean that the particular project is bound to proceed to completion. Nevertheless, the existence of the appropriate signed Bilateral Agreement does provide a useful initial indicator to the likelihood of this occurring.

Table 5.1, Table 5.2, Table 5.3 and Table 5.4 provide subtotals by plant type for each of the four generation commissioning backgrounds for the years 2010/11 to 2017/18 inclusive. Table 5.5 provides totals for each of the four generation backgrounds for the years 2010/11 to 2017/18 inclusive. Table 5.5 also provides peak demands on the basis of the customer based unrestricted demand forecasts given in Chapter 2 (Electricity Demand), and also for the NGET 'Base' economic growth scenario. The forecast demand streams utilised in each of these tables exclude station demand as that element of demand is excluded from the station TEC. Figure 5.2 is a graphical version of the totals given in Table 5.5.

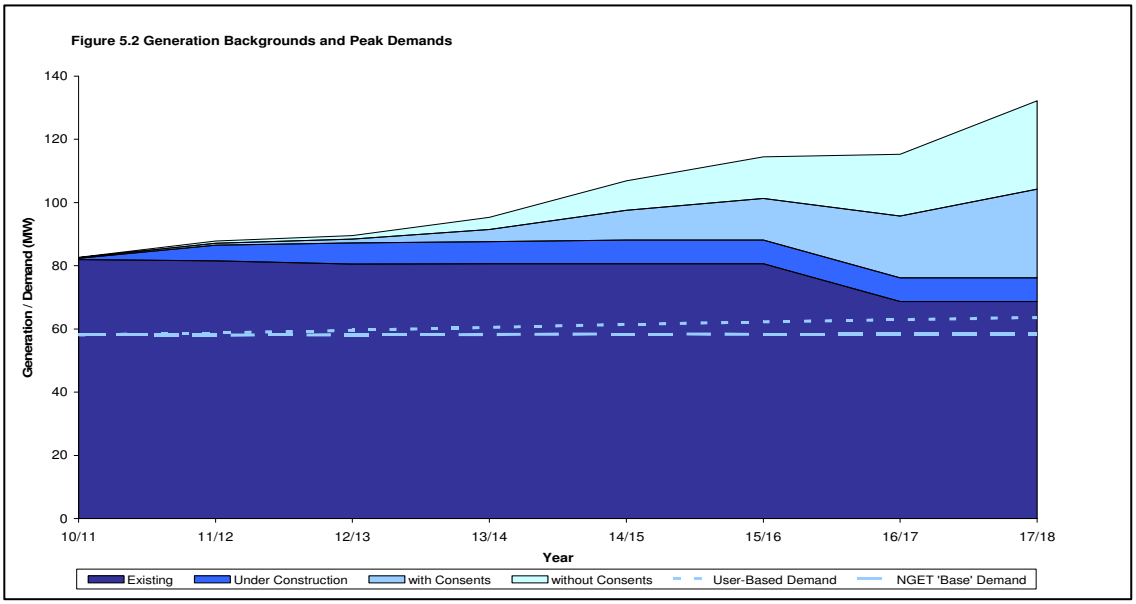
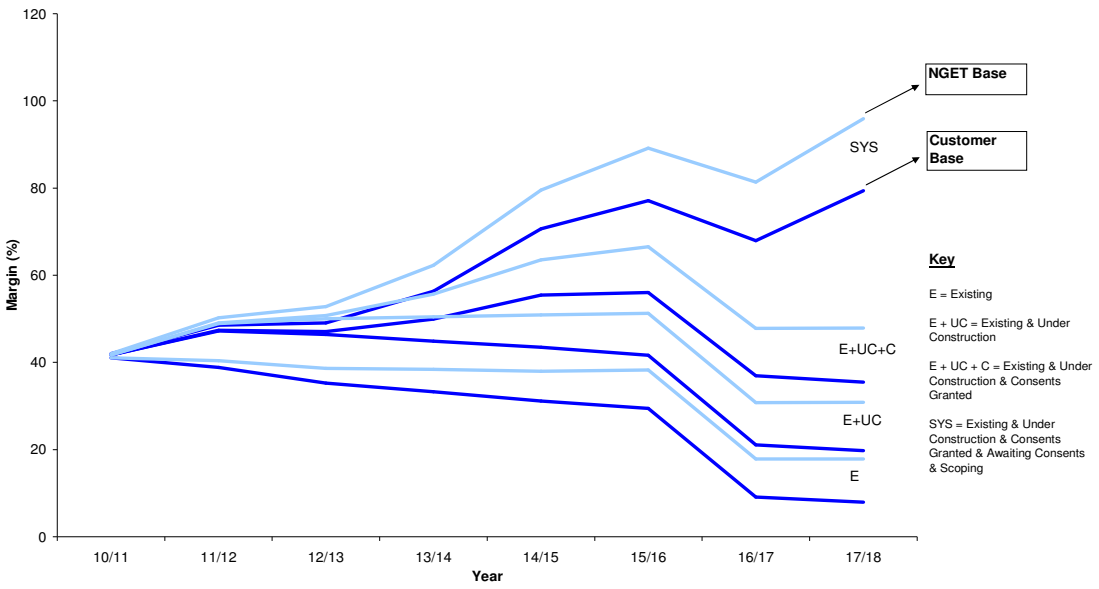


Table 3.3(a) and Table 3.3(b) of Chapter 3 identify, amongst other things, the amount of 'transmission contracted' generation planned to connect beyond 2010/11. For a more detailed view of this data showing how much of the remaining new 'transmission contracted' generation has, where relevant, obtained the necessary S36 and S14 consents, and how much has yet to obtain consent, please see table F.8 located in appendix F.

Table 5.6 and Figure 5.3 compare plant margins derived from the customer based demand forecast with those derived from our own base view of future demand growth given in Table 2.3. This is repeated for each of the above backgrounds to give six sensitivities in all, along with the SYS Background plant margins.

Figure 5.3 Plant Margins for Various Generation Backgrounds



Generation Disconnection (Closure)

Generators are only required to give 6 months notice of closure of existing plant, which means that it is possible for us to receive formal notice of closure of plant within the first year of this Statement. It is important to read the Quarterly Updates to this Statement to identify any changes since the data was frozen for this NETS SYS on 31 December 2010.

The effect on the potential future plant margin of a particular assumption on future generating closure may, of course, be readily assessed. For example, if it were assumed that say 1GW of additional generating plant were to decommission (close) by the year 2017/18 (i.e. when the demand less station demand is some 58.4GW (as presented in Table 2.3**),** the Plant Margin in that year would be reduced by around 1.7 percentage points (i.e. 100*1GW/58.4GW = 1.7%) relative to the margins shown in Table 5.6 and the related figures.

Decommissioning

Table 3.6 lists generating units, that have either been formally notified by the owner as decommissioned (effectively TEC=0) or simply notified zero TEC covering the seven year period of this Statement; the total capacity of this plant is just over 2.9GW. Some, or all, of this plant has been retained by its owners for commercial reasons (e.g. placed in reserve or mothballed) and may under certain circumstances be returned to service at some future date (see "Decommissionings" in Chapter 3).

However it is unlikely that all this capacity could be returned to service. Of the 2.9GW, perhaps some 500MW to 1GW has the greatest potential to return to service. Even then, it should also be borne in mind that, were individual plants to be re-commissioned/returned to service, the full previous capacities may not necessarily be realised.

The effect on the potential future plant margin of a particular assumption on re-commissioning generating units may again be readily assessed. For example, if it were assumed that say a 500MW unit were to re-commission by the 2017/18 winter peak**,** the plant margin in that year would be increased by around 0.9 of a percentage point (i.e. 100*0.5GW/58.40GW) relative to the margins shown in Table 5.6 and Figure 5.3.

The broad system effect of recommissioning mothballed plant is a function of the size and location of the particular plant or tranche of plant. The effects of returning any individual plant to service must necessarily be considered on a case by case basis both in terms of the overall system impact and on a site specific basis.

Wind Farm Contribution to Plant Margin

Within Appendix I referred to earlier in this chapter it is explained that the definition of Plant Margin, is such that no allowance is made within its calculation for the intermittent nature of the output and the level of output that, in consequence, can be relied upon from wind power plants at the time of system peak. This is unlike the assumptions on wind plant output underlying the system analyses, which are presented and discussed in "Modelling of the Planned Transfer" in Chapter 7 and in Chapter 8 (Transmission System Capability).

However, to enhance transparency and promote greater understanding within this chapter, additional plant margins have been calculated for a range of assumptions on the availability of wind generation capacity at the time of the winter peak as per customer based forecasts. Nevertheless, it should be remembered that such a range is quite arbitrary in the context of plant margin.

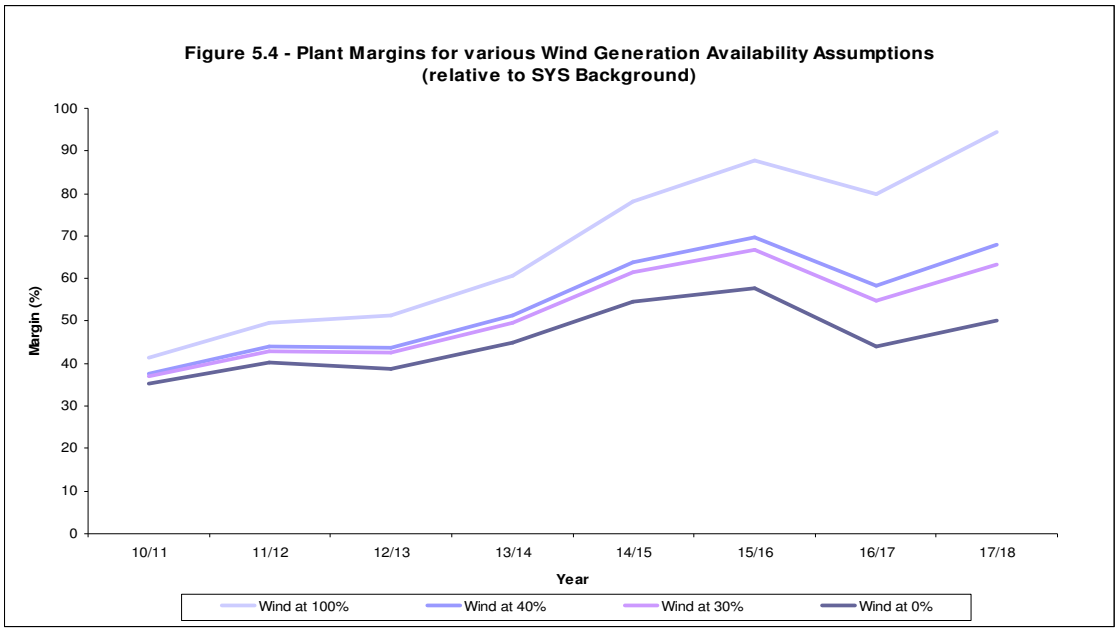


Table 5.7 and Figure 5.4 display plant margins for wind capacity availability assumptions of 40%, 30% and 0%. The SYS background (i.e. with an inherent 100% wind capacity assumption), as given in Figure 5.2 and Table 5.4, is also included for ease of comparison.

The effect of the LCPD closures in 2016/17 can be seen in Figure 5.3 and Figure 5.4.

Import and Export Assumptions across Interconnections with External Systems

Appendix F Table F.13 sets out the notional import and export capabilities across the External Interconnections at the time of our ACS Peak Demand. The table shows that the IFA link provides a nominal import/export capability of 1988MW each way; although the link is normally used for imports. Similarly the Netherlands link will provide an import/export capability (from 2010/11 onwards) of 1320MW import and 1390MW export and again the link will normally be used for imports. The link to the Republic of Ireland will provide an import/export capability (from 2011/12 onwards) of 500MW import and 500MW export, and the link will normally be used for exports. The link with Northern Ireland has a nominal export/import capability of 500MW export and 80MW import. In this case the link will normally export. For the purpose of evaluating plant

margins, import capabilities across External Interconnections are treated as float and exports are treated as negative generation.

Transmission Congestion

Transmission congestion exists on certain parts of the NETS and this is considered in Chapter 8 (GB Transmission System Capability). Congestion occurs when the transfer capability of certain parts of the transmission system is insufficient to carry the power transfers arising from the unconstrained operation of generating plant. In such circumstances, generation is either constrained on or constrained off to avoid violation the Licence Standard in relation to system operation. Plant, which is constrained off, may be considered to be 'sterilised' in that it is unable to contribute to meeting the demand and may therefore be regarded as non contributory towards the overall GB plant margin.

Recent and forecast growth in generation in Scotland is significant, partly due to the high volume of new renewable generation seeking connection in the area. Transmission reinforcement works are in place to enhance transmission capability across the boundaries between the SHETL system, the SPT system and the NGET system. For timescales of likely connection dates in particular areas please refer to Chapter 9 Figure 9.1.

Amongst other things, Chapter 8 (Transmission System Capability) explains that the ‘planned transfer’ from Scotland to England exceeds the expected capability of that transmission boundary in some years even with the planned transmission reinforcements to enhance that capability. Accordingly, some of the generating capacity in Scotland will need to be constrained off and, consequently, may be regarded as ‘sterilised’. The level of plant required to be constrained off varies through the period. However, as a generalised illustration, if it were assumed that say 1GW of generating plant in Scotland were constrained off at, say, the time of the 2010/11 peak to limit the power flows from Scotland into England to within acceptable levels, then this would effectively reduce the overall plant margin, in that year, by around 1.7 percentage points (i.e. 100*1GW/57.6GW = 1.7%).

Interpretation

Broad Overview

It is worth repeating that, while plant margins based on several backgrounds have been considered, we do not attach any probability to the likelihood of occurrence of any particular background, including the SYS background. The range of backgrounds has been considered to enable readers to form their own view on potential future plant margins and do not represent our predictions of the future outcome.

Appendix I explains that a margin of installed generation capacity over peak demand is necessary for security of electricity supply and is not surplus or excess capacity. That section also explains that, for the purpose of calculating plant margins, power station TEC has been used. Power station TEC is net of station demand. Accordingly, the demand used in the calculation of plant margin also excludes station demand.

As a general observation, plant margins are generally numerically similar to the equivalent margins published in last year’s Statement. National Grid do not believe that the relatively high margins shown in Figure 5.3 and Table 5.6 will occur in practice; particularly in respect of the later years. Amongst other things, those margins do not assume any plant is removed from service through disconnection (other than that assumed for nuclear magnox and LCPD affected plant) or added through the return to service of currently unavailable (or decommissioned) plant. Nor do they take any account of additional new connection agreements being signed or the possibility that some transmission contracted plant may not, in the event, proceed to completion.

In particular the margins of Figure 5.3 and Table 5.5 take no account of wind farm intermittency. When reduced availability in wind farm output is taken into account, the apparent margins are naturally reduced significantly as illustrated in Figure 5.4 and Table 5.6. The potential for

transmission congestion to 'sterilize' portions of installed generating capacity provides further scope for reduced margins.

The National Grid based forecast demands are lower than their equivalent User-based demands and this is reflected in the higher plant margins calculated using the National Grid based forecast demands.

The margins for 2010/11 should be viewed against the background of higher certainty (e.g. relating to demand forecasts and plant availability) associated with the earlier years. Thus, a lower margin in the earlier years may provide the same level of generation security as a higher apparently higher margin in later years.

Finally, it is stressed that none of the margins presented can, at this stage, be said to be 'correct'. However, the most probable margins are considered to be captured by the wide range given. This range of backgrounds, qualified by the comments on the potential for closures, the possibility of terminations, the possible return to service of plant that is currently unavailable, and the potential sterilisation of generating plant, may assist readers in formulating their own views on the subject. Table 5.7 attempts to give an indication of margins that have actually occurred in recent years.

Generation Market Drivers

As a result of the various uncertainties, not all of which have been reported in this chapter, there is the potential for a wide range of possible outcomes relating to generation. As a consequence, we have developed our own view of the likely developments into the future, which is considered alongside the SYS based backgrounds when undertaking our investment planning processes, but this is not detailed in this document.

In developing our own view of available generation capacity going forward, we have made an assessment of the potential impact of a number of physical, environmental and commercial drivers. The physical drivers include the ageing population of certain classes of generating plant. Environmental drivers include the impact of the introduction of the 2005 EU Emissions Trading Scheme (ETS) from 2008, the Large Combustion Plant Directive (LCPD) from 2008 and the development of offshore wind farms. Commercial factors, which are entwined with the drivers outlined above, include the impact of forward prices, generator rationalisations, mothballing of plant and ancillary services. In addition, developments in the commercial framework would influence the generation capacity available.

Gas and Electricity Market Interaction

The interconnected electricity transmission system in Great Britain provides for the efficient bulk transfer of power from sources of electricity generation to the demand centres. The main benefits of the NETS are outlined in "The Benefits of an Interconnected Transmission System" in Chapter 4. Amongst other things, the transmission system provides for power stations to be located remote from the demand centres. The choice of power station location would take account of a wide range of considerations including financing, environmental factors, land availability, fuel availability and cost, potential savings in fuel transportation costs and transmission access, as well as taking account of our Transmission Network Use of System (TNUoS) charges which we levy on our customers for making use of our transmission system. Transmission Network Use of System charges are described in Chapter 10 (Market Overview).

Table 5.4 shows that CCGT capacity has the potential to exceed coal capacity by 2017/18 as the major plant type.

Gas is transported from producer to gas consumer (e.g. CCGT power station) via National Grid's gas transmission network for which transportation charges are levied. Thus, CCGT power stations could be viewed as a producer on the electricity transmission system and a consumer on the gas transmission network. This dual role gives rise to a degree of interaction between the electricity and gas markets. In particular, there are two elements in the gas market that

have the potential to affect the level of available generation capacity: 'interruptible gas services' and 'CCGT arbitrage'.

Interruptible Gas Arrangements & Off Peak Capacity Product

The current interruptible arrangements apply until 30th September 2012. This is a service National Grid Gas offers to its customers which provides for lower gas transportation charges but, at times of high gas demand, allows it to shut off some or all of the gas supplied to the supply point for a specified maximum number of days within a year.

Gas supply could be interrupted by National Grid when there are transportation constraints on the National Gas Transmission network. In addition Shippers or Suppliers of gas can commercially interrupt their customers (e.g. CCGT station) either to balance their demand and supply portfolios or to sell gas onto the open market.

However, many of the power stations that would be affected (i.e. those with interruptible gas supplies) have back up supplies of distillate oil. Thus, providing there are no technical problems relating to switching to and from distillate oil, and providing adequate distillate capacity is available, then electricity generation can be maintained.

New market arrangements have been introduced which are effective from 1st October 2012 where the current National Transmission System (NTS) interruption arrangements are replaced by an off peak capacity product available via a day ahead pay-as-bid auction. National Grid NTS will be able to scale back such capacity holdings to manage constraints on the gas system.

CCGT Arbitrage

Gas-fired stations have the potential to respond to market price signals, decreasing their gas consumption when the electricity price is lower than the price of burning gas. This ability to arbitrage between gas and power is not restricted to power stations with National Grid Gas interruptible contracts. In recent experience some firm CCGT power stations have self-interrupted over the winter for commercial reasons.

The willingness of the CCGTs to commercially interrupt themselves will be determined by the spark spread, which is itself influenced by the ability of the power generation sector to switch to other fuels and the level of electricity demand. Given the within-day profile of electricity demand, there is more scope for gas-fired generators to reduce their gas demand outside the peak half-hours of the day, as well as at other times of low electricity demand, such as at weekends and during holiday periods and either burn alternative fuel or switch generation to another station, burning coal or oil, within their portfolio of stations.

National Grid have carried out a detailed analysis to estimate the potential extent of CCGT arbitrage/demand side response within England and Wales, the results of which can be found in our 2010/11 Winter Outlook Report published in October 2010:

http://www.nationalgrid.com/uk/Gas/TYS/outlook/

Looking forward, we think that there is a strong case for all prospective new CCGTs to fit alternative fuel capability in order to provide additional flexibility to deal with periods of gas-electricity interactions, especially given the projected increase in gas' share of the electricity generation market.

Table 5.1 - Capacity by Plant Type (E)								
Plant Type	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
Biomass	45	45	45	45	45	45	45	45
CCGT	29022	29022	29022	29022	29022	29022	29022	29022
CHP	2069	2069	2069	2069	2069	2069	2069	2069
Hydro	1113	1113	1113	1113	1113	1113	1113	1113
Large Unit Coal	4342	4342	4342	4342	4342	4342	2284	2284
Large Unit Coal + AGT	21440	21440	21440	21440	21440	21440	17517	17517
Medium Unit Coal	1102	1102	1102	1102	1102	1102	0	0
Medium Unit Coal + AGT	1131	1131	1131	1131	1131	1131	0	0
Nuclear AGR	8246	8246	8246	8246	8246	8246	8246	8246
Nuclear Magnox	1390	960	0	0	0	0	0	0
Nuclear PWR	1207	1207	1207	1207	1207	1207	1207	1207
OCGT	578	578	578	578	578	578	478	478
Oil + AGT	3636	3636	3636	3636	3636	3636	0	0
Pumped Storage	2744	2744	2744	2744	2744	2744	2744	2744
Small Unit Coal	783	783	783	783	783	783	783	783
Wind Offshore	997	997	997	997	997	997	997	997
Wind Onshore	2093	2128	2128	2135	2135	2135	2135	2135
Total Capacity (MW)	**81938**	**81543**	**80583**	**80590**	**80590**	**80590**	**68640**	**68640**

Table 5.2 - Capacity by Plant Type (E+UC)								
Plant Type	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
Biomass	45	45	45	45	45	45	45	45
CCGT	29022	32172	32922	32922	32922	32922	32922	32922
CHP	2069	2069	2069	2069	2069	2069	2069	2069
Hydro	1113	1113	1113	1113	1113	1113	1113	1113
Large Unit Coal	4342	4342	4342	4342	4342	4342	2284	2284
Large Unit Coal + AGT	21440	21440	21440	21440	21440	21440	17517	17517
Medium Unit Coal	1102	1102	1102	1102	1102	1102	0	0
Medium Unit Coal + AGT	1131	1131	1131	1131	1131	1131	0	0
Nuclear AGR	8246	8246	8246	8246	8246	8246	8246	8246
Nuclear Magnox	1390	960	0	0	0	0	0	0
Nuclear PWR	1207	1207	1207	1207	1207	1207	1207	1207
OCGT	578	578	578	578	578	578	478	478
Oil + AGT	3636	3636	3636	3636	3636	3636	0	0
Pumped Storage	2744	2744	2744	2744	2744	2744	2744	2744
Small Unit Coal	783	783	783	783	783	783	783	783
Wind Offshore	1198	1906	2557	2842	3354	3354	3354	3354
Wind Onshore	2281	2989	3305	3436	3436	3436	3436	3436
Total Capacity (MW)	**82327**	**86463**	**87220**	**87636**	**88148**	**88148**	**76198**	**76198**

Table 5.3 - Capacity by Plant Type (E+UC+C)								
Plant Type	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
Biomass	45	97	97	97	97	97	97	97
CCGT	29022	32172	32922	34282	38463	39983	40969	40969
CHP	2069	2069	2069	2069	2069	2069	2069	2069
Hydro	0	0	0	0	0	0	0	0
IGCC with CCS	1113	1113	1113	1113	1113	1113	1113	1113
Large Unit Coal	4342	4342	4342	4342	4342	4342	2284	2284
Large Unit Coal + AGT	21440	21440	21440	21440	21440	21440	17517	17517
Medium Unit Coal	1102	1102	1102	1102	1102	1102	0	0
Medium Unit Coal + AGT	1131	1131	1131	1131	1131	1131	0	0
Nuclear AGR	8246	8246	8246	8246	8246	8246	8246	8246
Nuclear Magnox	1390	960	0	0	0	0	0	0
Nuclear PWR	1207	1207	1207	1207	1207	1207	1207	1207
OCGT	578	578	578	578	578	578	478	478
Oil + AGT	3636	3636	3636	3636	3636	3636	0	0
Pumped Storage	2744	2744	2744	2744	2744	2744	2744	2744
Small Unit Coal	783	783	783	783	783	783	783	783
Wind Offshore	1198	1906	2557	3395	3907	3907	3907	3907
Wind Onshore	2281	3033	3664	4168	4305	4376	4389	4389
Woodchip	0	0	0	350	350	350	350	350
Total Capacity (MW)	**82327**	**86559**	**87631**	**90683**	**95513**	**97104**	**86153**	**86153**

Table 5.4 - Capacity by Plant Type (SYS)								
Plant Type	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
Biomass	45	97	97	851	1730	1730	1730	1730
CCGT	29022	32172	32922	34717	39738	41258	45258	45258
CHP	2240	2240	2240	2240	2240	2240	2240	2240
Hydro	1113	1113	1113	1113	1113	1113	1113	1113
IGCC with CCS	0	0	0	800	800	800	800	800
Large Unit Coal	4342	4342	4342	4342	4342	4342	2284	2284
Large Unit Coal + AGT	21440	21440	21440	21440	21440	21440	17517	17517
Medium Unit Coal	1102	1102	1102	1102	1102	1102	0	0
Medium Unit Coal + AGT	1131	1131	1131	1131	1131	1131	0	0
Nuclear AGR	8246	8246	8246	8246	8246	8246	8246	8246
Nuclear EPR	0	0	0	0	0	0	0	3340
Nuclear Magnox	1390	960	0	0	0	0	0	0
Nuclear PWR	1207	1207	1207	1207	1207	1207	1207	1207
OCGT	578	578	578	578	578	578	478	478
Oil + AGT	3636	3636	3636	3636	3636	3636	0	0
Pumped Storage	2744	2744	2744	2744	2744	2744	2744	2744
Small Unit Coal	783	783	783	783	783	783	783	783
Tidal	0	0	0	10	10	10	10	110
Wind Offshore	1198	2406	3057	4395	6734	10313	13457	18087
Wind Onshore	2281	3033	4166	4850	6945	7234	7461	7849
Woodchip	0	0	0	350	350	350	350	350
Total Capacity (MW)	**82498**	**87230**	**88804**	**94535**	**104869**	**110257**	**105678**	**114136**

Table 5.5 - Capacity Totals and Peak Demands (MW)									
Background	**Generation / Demand (MW)**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
1	Existing Generation	81938	81543	80583	80590	80590	80590	68640	68640
2	Generation Under Construction	389	4920	6637	7046	7558	7558	7558	7558
3	Subtotal (1+2)	82327	86463	87220	87636	88148	88148	76198	76198
4	Generation with Consents	0	96	411	3047	7365	8956	9955	9955
5	Subtotal (3+4)	82327	86559	87631	90683	95513	97104	86153	86153
6	Generation without Consents	171	671	1173	3852	9356	13153	19525	27983
7	Total (5+6)	82498	87230	88804	94535	104869	110257	105678	114136
8	Customer-Based Peak Demand	58100	58744	59594	60493	61462	62260	62933	63630
9	NG 'Base' Peak Demand	58100	58085	58141	58258	58422	58306	58285	58265

Table 5.6 - Plant Margins (%)									
Demand Forecast	**Generation Background**	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
Customer-Based	Existing	41.0	38.8	35.2	33.2	31.1	29.5	9.1	7.9
Customer-Based	Existing and Under Construction	41.7	47.2	46.4	44.9	43.4	41.6	21.1	19.8
Customer-Based	Existing and Under Construction and with Consents	41.7	47.4	47.1	49.9	55.4	56.0	36.9	35.4
Customer-Based	All Generation	42.0	48.5	49.0	56.3	70.7	77.1	68.0	79.4
NGET 'Base'	Existing	41.0	40.4	38.6	38.4	38.0	38.2	17.8	17.8
NGET 'Base'	Existing and Under Construction	41.7	48.9	50.0	50.4	50.9	51.2	30.8	30.8
NGET 'Base'	Existing and Under Construction and with Consents	41.7	49.0	50.7	55.7	63.5	66.6	47.8	47.9
NGET 'Base'	All Generation	42.0	50.2	52.8	62.3	79.5	89.1	81.3	95.9

Table 5.7 - Plant Margins (%) for Various Wind Generation Availability Assumptions (relative to SYS Background)								
Generation Background	**2010/11**	**2011/12**	**2012/13**	**2013/14**	**2014/15**	**2015/16**	**2016/17**	**2017/18**
SYS (Wind at 100%)	42.0	50.2	52.8	62.3	79.5	89.1	81.3	95.9
SYS (Wind at 40%)	38.4	44.6	45.3	52.8	65.5	71.1	59.8	69.2
SYS (Wind at 30%)	37.8	43.6	44.1	51.2	63.1	68.1	56.2	64.7
SYS (Wind at 0%)	36.0	40.8	40.3	46.4	56.1	59.0	45.4	51.4

Table 5.8 - Plant Margins: Historical Outturns					
Year	**Total Capacity - January Update (MW)**	**ACS Corrected Peak Demand, excluding Station Demand (MW)**	**Plant Margin based on ACS Corrected Peak Demand (%)**	**Actual Peak Demand, excluding Station Demand (MW)**	**Plant Margin based on Actual Peak Demand (%)**
2005/06	75064	61600	21.9	59600	25.9
2006/07	76955	61200	25.7	57800	33.1
2007/08	76867	60800	26.4	60100	27.9
2008/09	79459	58400	36.1	58600	35.6
2009/10	82559	57649	43.2	58710	40.6
2010/11	90582	58100	55.9	59100	53.3