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GB Seven Year Statement
2009

Introduction to the Executive Summary

This 2009 Great Britain Seven Year Statement (GB SYS) is the fifth Statement to be produced since the British Electricity Trading and Transmission Arrangements (BETTA) came into effect on 1 April 2005.

With the introduction of BETTA, National Grid, in its role as Great Britain System Operator (GBSO), is required to produce a single GB SYS covering the whole of Great Britain on an annual basis. The two Scottish transmission licensees are required to assist National Grid in preparing the Statement pursuant to their licence obligations

This 2009 GB SYS presents a wide range of information relating to the transmission system in Great Britain including information on demand, generation, plant margins, the characteristics of the existing and planned GB transmission system, its expected performance and capability and other related information. Amongst other things, this information should assist existing and prospective new Users of the GB transmission system in assessing the opportunities available to them for making new or further use of the GB transmission system in the competitive electricity market in Great Britain.

This Executive Summary provides a brief description of some of the key points contained in the main text. For a more complete picture on any particular topic, including the terminology used, the reader is advised to consult the relevant section of the main text. In particular, readers unfamiliar with BETTA are advised to refer to the chapter in the main text titled "Market Overview" **Market Overview**, which provides a high level overview of BETTA and also reports on related issues such as governance, institutional and contractual arrangements, and for the first time, touches on the development of offshore generation and the timetable for implementation of the new offshore regime.

It should be noted that the demand forecasts and generation background, on which this document is based, are not National Grid's forecasts of the most likely developments over the next seven years but are the demand forecasts received from customers and the factual list of existing and proposed generation projects that have a signed connection agreement. Consequently, care must be taken when interpreting the results as there is a degree of uncertainty associated with both the level of future demands and the number of generation projects opening or for that matter closing. However, for comparison purposes we do include our own demand forecasts but due to commercial confidentiality we are unable to show the equivalent level of detail on future generation project developments.

The data and results presented in this summary are correct as at 31 December 2008 (the data freeze date) and do not include changes included in the Quarterly Updates which are issued on a regular basis (at intervals of approximately three months). The first Update will be issued soon after the main Statement and will report on changes that have occurred since the data freeze date.

Electricity Demand (See Chapter 2)

The main forecasts of electricity demand to be met from the GB transmission system presented in this Statement are based on information submitted by Customers who take (or propose to take) electricity from the system and consequently are not National Grid's forecasts. However, for comparison, our own view of demand growth is also included. Unlike the 'User' based forecasts, which include details of individual Grid Supply Point demands, the NGET forecasts are national projections for Great Britain.

Unless otherwise stated, all demand forecasts presented are in respect of the Average Cold Spell (ACS) winter peak and include transmission losses, distribution losses and exports to External Systems across External Interconnections. The forecasts are in respect of the time of simultaneous peak on the GB transmission system and are unrestricted (i.e. take no account of demand response/management by customers). This prudent approach in transmission planning is made on the basis that demand response/management by customers cannot be fully relied upon to be enacted at peak times.

User Based Forecasts

Correcting historical actual demands to ACS conditions eliminates the weather effects and gives a better indication of the underlying pattern of annual peak demand. Correcting winter weekday peak demands in 2008/09 to ACS conditions yields a provisional 'unrestricted' peak of 59.0GW; a decline of 2.4GW on the previous winter's ACS peak.

The major factor in the decrease in demand over the last year has been the effect of the economic downturn. General energy efficiency measures such as energy saving light bulbs have also contributed to the decrease. The decrease in demand also includes a 50MW reduction in interconnector exports at peak to Northern Ireland.

Peak unrestricted demand on the GB transmission system in ACS (average cold spell) conditions, as projected by the system 'Users', increases from the provisionally estimated outturn of 59.0GW in 2008/09 to 64.1GW by 2015/16. This represents a growth rate of 1.1% per annum as indicated in **Figure E.1** . **Figure E.1** includes recent outturns together with the current User forecasts of ACS peak demand on the GB transmission system.

Figure E.1

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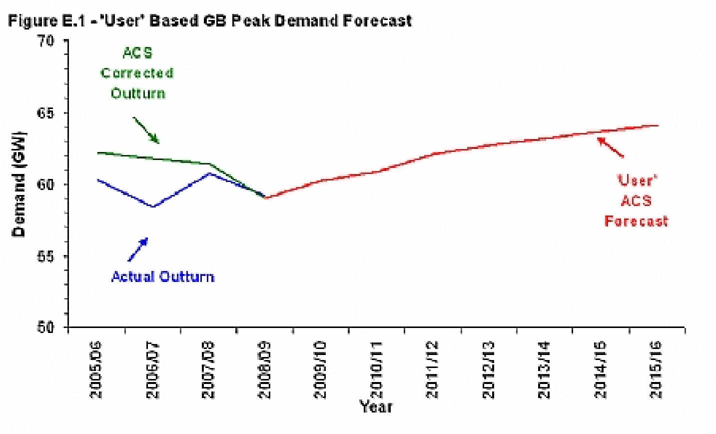

National Grid View of Demand Growth

We have also prepared our own 'base' forecast of peak demand and annual electricity requirements, together with 'high' and 'low' transmission system demand scenarios. For the 'high' and 'low' demand scenarios, combinations of favourable and adverse developments are assumed which yield high and low transmission system demands. For example, in the low scenario better progress towards the government's 2010 targets and beyond for combined heat and power and renewables is assumed, resulting in stronger growth in embedded generation. In contrast, in the high demand scenario there is a much slower take-up of such schemes and hence embedded generation. These assumptions, along with variations for other factors such as economic growth, result in a fairly wide range of outcomes for transmission system demand.

Figure E.2 compares our base, high and low demand forecasts with the User based forecasts. Under the 'base' forecast the ACS 'unrestricted' peak demand decreases from 59.0GW in 2008/09 to 56.9GW in 2010/11, and then shows minimal growth to 57.8GW in 2015/16.

Figure E.2

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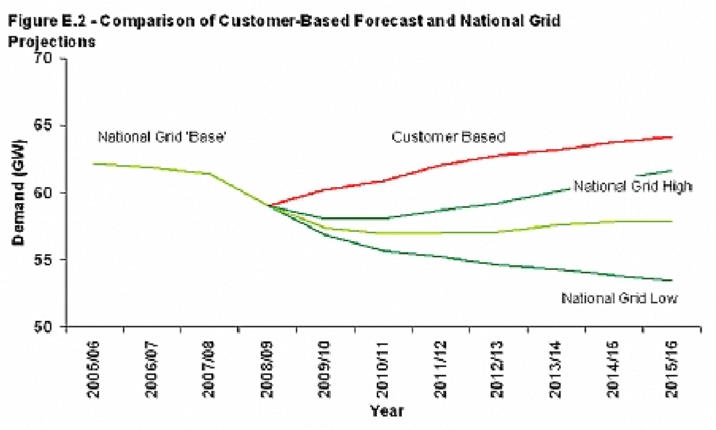

Throughout the period covered by this year's forecast, the User based forecast is more optimistic than National Grid's 'Base' forecast and is higher for all years than National Grid's High growth scenario projections. In the past, the User based forecasts have tended to underestimate the likely impact of embedded generation on system demand, which results in higher demand forecasts. Furthermore, the User based forecasts were submitted last June based on demand seen in 2007/08. The National Grid forecasts benefit from being based on demand seen in 2008/09, when peak demand fell against the background of an economic downturn.

In general, the level and location of generation remains the major factor in determining the need for transmission reinforcements. However, in some areas (e.g. where demand exceeds generation) it is demand that can exert the greater influence and as such there is an increasing need for accurate demand forecasts in terms of both level and location.

Generation (See Chapter 3)

Chapter 3 presents information on all sources of generation, which are used to meet the ACS Peak GB Demand. Accordingly, this chapter reports on all power stations directly connected to the GB transmission system, whether they are classified as Large, Medium or Small, all directly connected External Interconnections with External Systems and all Large power stations, which are embedded within a User System (e. g. distribution system).

In recognition of the uncertainties associated with the future, unless otherwise stated the information presented relates to existing generation projects and only those proposed new generation projects which are classified as "transmission contracted". Hence the SYS generation background is a factual list of contracted sites and is not a forecast of which generators are expected to remain in operation or which proposed new generation projects are deemed most likely to proceed to completion. Consequently, care must be taken when interpreting the overall capacity figures as a number of stations will close due to the Large Combustion Plant Directive (LCPD) and many of the proposed projects will not progress to a connection. In addition there may be some non-contracted projects not included within the SYS that may proceed to a connection during the seven years.

Figure E.3

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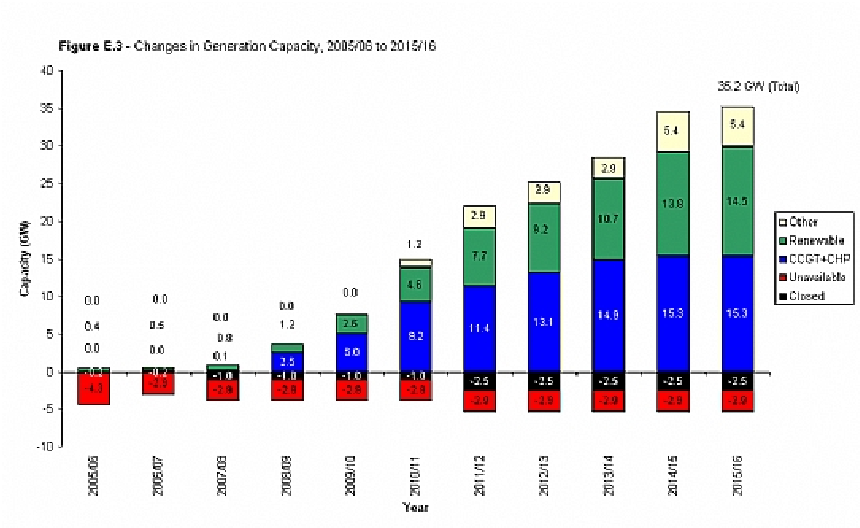

Figure E.3 illustrates the increase in generation capacity of plant since 2005/06. Notified reductions in capacity from plant closures and from plant being placed in reserve have been taken into account. However, no allowance has been included for those stations that will close on or before 31st December 2015 due to opting out of the LCPD. These closures amount to 12GW of coal and oil capacity and have been left in because of the uncertainty over closure date and the potential for them to be available at peak in 2015/16 if the peak is prior to Christmas.

A feature of the future commissioning stream, shown in Figure E.3, is the relatively high level of activity in relation to capacity increases indicated for the years 2010/11 (7.4GW) and 2011/12 (7.0GW). In this year some 16.1% of the new capacity is from Wind generation (mostly onshore) which is to be located in Scotland. Similarly, some 16.9% of the new capacity is from Wind generation (mostly offshore) which is to be located in England & Wales. It is worth remembering, however, that, in the event, there may well be a more graded increase in activity over a number of years. The fact that a project is currently 'transmission contracted' is not an absolute guarantee that the project will proceed to completion since there are other factors, which may also influence that outcome (e.g. financing, fuel prices, planning consents etc.).

Figure E.4

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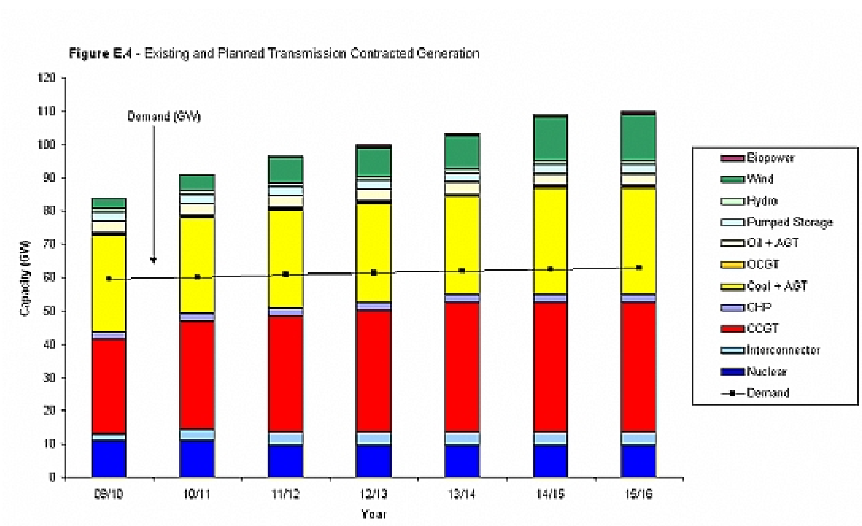

Figure E.4 illustrates the generation mix over the period from 2009/10 to 2015/16 and includes both existing and proposed new transmission contracted generation. The aggregate power station capacity (TEC and/or 'Size of Power Station') is reported to rise from 83.6GW in 2009/10 to 109.8GW by 2015/16. This represents an overall increase of 26.2GW, or 31.3% of the 2009/10 total, over the period from the 2009/10 winter peak to the 2015/16 winter peak. This net increase is made of the following:

- an increase of 10.3GW in CCGT capacity (+12.3%);
- an increase of 5.8GW in onshore wind generation capacity (+6.9%);
- an increase of 5.3GW in offshore wind generation capacity (+6.3%);
- an increase of 3.3GW in coal generation capability (+4.0%);

- an increase of 2.1GW in new import capability (+2.5%);
- an increase of 0.85GW in Biomass capacity (+0.5%);
- an increase of 56MW in Hydro capacity (+0.1%); and
- a decrease of 1.45GW in Nuclear Magnox capacity (-1.7%).

The largest change is due to the 10.3GW increase in CCGT plant capacity over the period. On this basis, the capacity of CCGT plant will overtake that of coal by 2010/11. By 2015/16, CCGT capacity will exceed coal capacity by 6.5GW and account for 32.0% of the total transmission contracted installed generation capacity. Note that this growth in CCGTs of 10.3GW excludes those stations under construction that are contracted to connect in 2009/10 e.g. Langage, Marchwood, Immingham, Starythorpe, Severn Power (phase 1) and West Burton (phase 1) which amount to 5GW. In addition there are a number of other CCGTs under construction e.g. Severn Power (phase 2), West Burton (phase 2&3) and Grain which amount to 2.6GW and are included in the 10.3GW figure.

The second largest reported increase is due to the growth in Wind generation, with onshore wind accounting for a 6.9% increase and offshore wind accounting for a 6.3% increase in overall capacity. Wind generation capacity (both onshore and offshore) is set to rise to 11GW by 2015/16. Currently around 1.8GW of wind is under construction with 1.2GW due to connect in 2009/10 and 0.6GW contributing to the 11.1GW growth over 2009/10 to 2015/16.

The above capacities do not include the embedded Medium and Small generation and embedded External Interconnections with External Systems. The capacity of such embedded generation sources is the subject of **Embedded and Renewable Generation**.

It should be remembered that the above figures reflect the current contracted position and take no account of future uncertainty. As mentioned previously, it is reasonable to suppose that further new applications for power station connections will be received and, at the same time, some existing contracts may be modified or terminated and some existing power stations will close.

Embedded and Renewable Generation (See Chapter 4)

The focus of this chapter is on embedded Medium and Small power stations and embedded External Interconnections with External Systems. Embedded Large power stations are reported in the previous chapter.

Much of the existing and future embedded generation is either in the form of combined heat and power (CHP) projects or in the form of renewable projects. This chapter considers these two types of generation source, their growth, the implications for the GB transmission system and other related issues. In so doing, the chapter also reports on non-embedded renewable sources of generation (e.g. wind farms).

Consistent with the Government’s drive for growth in renewable generation a high proportion of the 26.2GW of contracted future Large or directly connected generation projects are wind farms, either onshore or offshore. Around 43% of the projected 11.1GW growth in such wind farm installed capacity is located in Scotland. Overall, wind farm capacity, both embedded and directly connected, is projected to grow from 5.0GW (2.1GW embedded and 2.9GW large/transmission connected) in 2009/10 to 16.0GW by 2015/16 with all the growth (11.1GW) coming from large/transmission connected. Embedded wind is seen by National Grid as negative demand and as a consequence is netted of the demand within the distribution networks.

National Grid recognises the importance of climate change issues and that the Government’s targets for growth in CHP and renewable generation are likely to lead to a continuing growth in embedded generation. It is important for National Grid to play its part in facilitating this growth by ensuring that any transmission issues arising are appropriately addressed. At present, no insurmountable transmission problems associated with accommodating new embedded generation projects are foreseen. Indeed, the properties of the interconnected transmission system are such as to facilitate embedded generation growth regardless of location.

Nevertheless, this does not preclude the potential need for reinforcements to the GB transmission system, the extent of which would be a function of the system location of the new plant. For example, the extent, and therefore cost, of GB transmission reinforcement would be a function of the volume of offshore wind located off the England and Wales coast or onshore wind located in Scotland.

National Grid’s responsibility in the Balancing Mechanism is to balance generation and demand and to resolve transmission constraints. The persistence effect of wind (i.e. its output is naturally subject to fluctuation and unpredictability relative to the more traditional generation technologies) coupled with the expected significant diversity between regional variations in wind output means that, while the balancing task will become more onerous, the task should remain manageable. Provided that the necessary flexible generation and other balancing service providers remain available, there is no immediate technical reason why a large portfolio of wind generation cannot be managed in balancing timescales.

It is anticipated that balancing volumes and costs will increase as the wind portfolio increases. National Grid estimation of these volumes and costs will be highlighted via a separate consultation report on future system operations which is due to be published in May 2009.

In the longer term, we do not think it likely that there will be a technical limit on the amount of wind that may be accommodated as a result of short term balancing issues, but economic and market factors will become increasingly important.

Plant Margin (See Chapter 5)

This chapter brings together information on generation capacity and forecast ACS unrestricted peak demand from previous chapters and examines the overall plant/demand balance on the GB transmission system by evaluating a range of potential future plant margins. The chapter concludes with a brief report on the related issue of gas and electricity market interaction.

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 judgements on the subject. The plant margins presented have been evaluated on the basis of a range of different backgrounds.

In view of the uncertainties, relating to the future generation position, three 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.

- Background 1: '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.

- Background 2: '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. 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 3: 'Existing or Under Construction Background' (E, UC)

This background is essentially the same as background 2 but excludes all future generation plant not yet under construction.

Figure E.5 compares plant margins derived from the customer based demand forecast with those derived from our own base view of future demand growth for the above three backgrounds; giving six sensitivities in all.

Figure E.5

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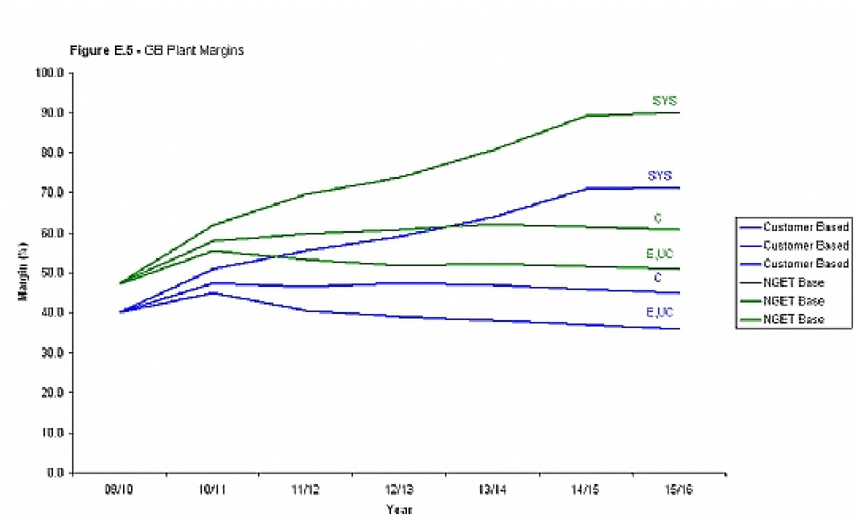

The main text considers a number of other factors, which can influence the value of plant margin. These include: as yet un-notified future generation disconnections (e.g. LCPD closures); the possible return to service of previously decommissioned plant (or the return to service of plant with TEC currently 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.

To illustrate this last point, additional plant margins have been calculated for a number of arbitrary assumptions relating to the availability of wind generation capacity at the time of the winter peak as per customer based forecasts. **Figure E.6** displays plant margins for wind capacity availability assumptions of 40%, 30% and 0%. The SYS background (i.e. with an inherent 100% wind capacity assumption) is also included for comparison.

An alternative way to look at margins would be to look at the two lowest scenarios for each demand and generation background combination in 2015/16, i.e. the Existing & Under Construction backgrounds with firstly the customer based demand forecasts and then National Grid's demand forecasts, and then incorporate wind at zero capacity and the LCPD closures. Then these plant margins would fall from 36% to 13% and 51% to 26% respectively. Hence if the customer based demand forecasts did materialise then the current portfolio of generation and those under construction wouldn't be enough to meet margin requirements and some additional new plant would be required; whereas, if National Grid's demand forecasts did materialise then margins would be sufficient.

Figure E.6

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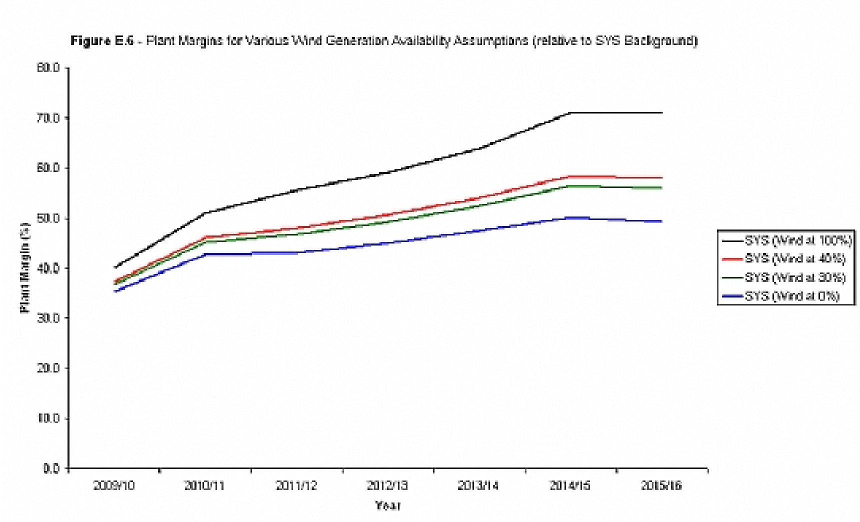

The margins displayed in **Figure E.5** and **Figure E.6** should not be taken at face value. The net result of the various uncertainties associated with the future plant/demand position is to produce a wide range of possible outcomes. In recognition of this, we have developed our own view of the likely developments into the future, which we consider alongside the SYS based backgrounds when undertaking our investment planning processes.

Transmission System Performance and Capability (See Chapters 6, 7 & 8)

The requirements placed on the transmission system depend on the size and geographical location of both generation and demand. However, it is generation that tends to exert the greater influence.

Figure E.7 summarises the Scotland (SHETL), Scotland (SPT), North, Midlands and South disposition of all transmission contracted generation (both existing and planned) in the years 2009/10 and 2015/16.

Figure E.7

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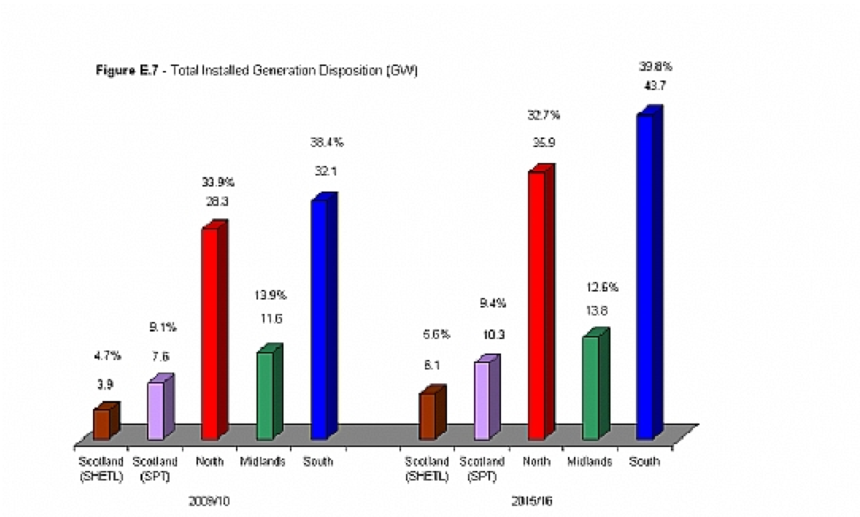

However, more importantly, it is the generation actually used in meeting the demand on the day, which determines the power flows at any given time. The 'GB Generation Ranking Order', which is explained in **GB Transmission System Performance**, is used to determine which generation is operated for the study purposes of this Statement.

By way of illustration, **Figure E.8** shows the Scotland (SHETL), Scotland (SPT), North, Midlands and South disposition of installed generation (also shown in **Figure 3.4**) together with the regional ACS peak demand disposition. In both 2009/10 and 2015/16, the installed generation in Scotland (SHETL), Scotland (SPT), North and the Midlands exceeds demand, in some areas by a substantial amount. In the South, there is a more even balance in 2009/10 with installed generation exceeding demand generation by a small amount. However, by 2015/16 installed generation exceeds demand significantly. Superficially, this would imply only relatively modest power transfers across the system.

Figure E.8

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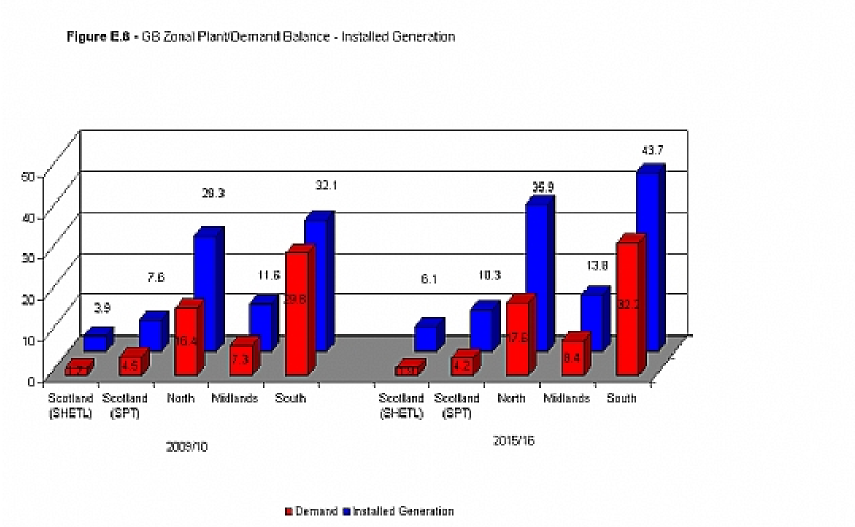

However, when the generation expected to be used to meet the demand is considered, a different picture emerges as illustrated in Figure E.9. Again generation in Scotland (SHETL), Scotland (SPT) and the North exceeds demand in both years. However, in the Midlands and South much of the generation becomes non-contributory (i.e. not used in meeting the demand) such that the demand exceeds generation, by a substantial margin in the South, in both years; implying higher power transfers from the northern parts of the system, through the Midlands to the South. The power transfers at the time of peak under the 'SYS background', are reported in more detail in **GB Transmission System Performance**.

Figure E.9

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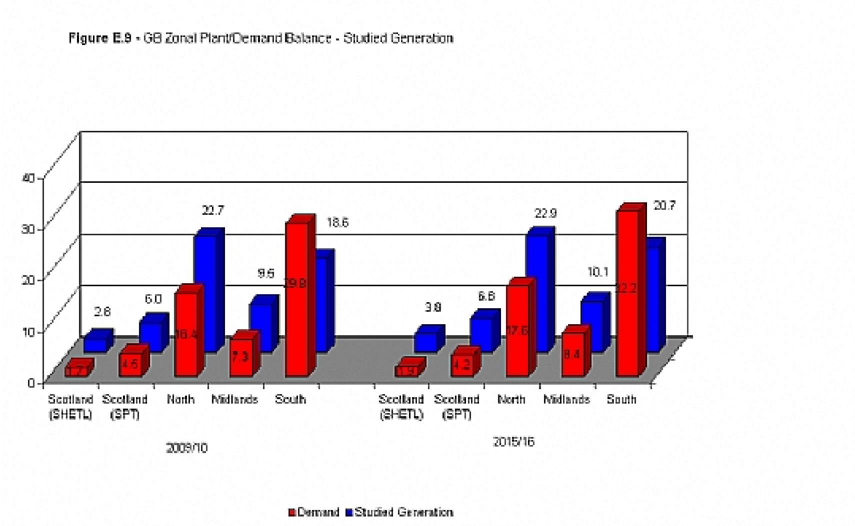

There are a number of boundaries on the GB transmission system that serve to illustrate the performance of the system. The main text of this Statement introduces 17 critical boundaries which, amongst other things, are used in determining the need or otherwise for transmission system reinforcement/investment. These boundaries relate to 17 SYS zones, which are also identified in the main text.

It should be noted that the 17 boundaries used in this Seven Year Statement serve as useful indicators of system capability but the apparent capabilities derived are dependent on the precise generation and demand background used. **Table 7.3**, of the main text, provides a useful reference overview of the power transfers, under the 'SYS background', across each of the 17 main system boundaries. The transfers are based on the expected contributory generation plant rather than installed capacity.

However, it is recognised that the 'SYS background' does not necessarily represent the most likely outturn. There is uncertainty associated with the demand forecasts and in particular with future generation developments. These factors will affect future power transfers, transmission system capabilities, the need or otherwise for transmission system reinforcements and the opportunities for making new or further use of the transmission system.

In view of this, we have presented the 'SYS background' transfers and capabilities against the backdrop of a range of probabilistic transfers. These probabilistic transfers reflect our current views on the likelihood of the various generation and demand uncertainties. This presentation is intended to provide a more meaningful view of future transfers, promote a better appreciation of the future uncertainty we face in planning our system and enable the reader to make more informed judgements on the opportunities for making new or further use of the transmission system.

The main text of this Statement (see **Transmission System Capability**) includes probabilistic transfers for all 17 boundaries. As an example, the results for two key boundaries are given in **Figure E.10** and **Figure E.11**. With the predominant high north to south power flows seen on our system, these two boundaries (i.e. the SPT to NGET boundary and North East and Yorkshire boundary) are particularly important.

Figure E.10

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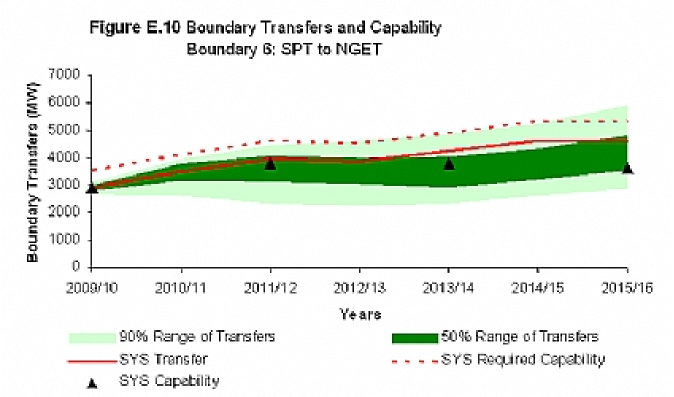

Figure E.11

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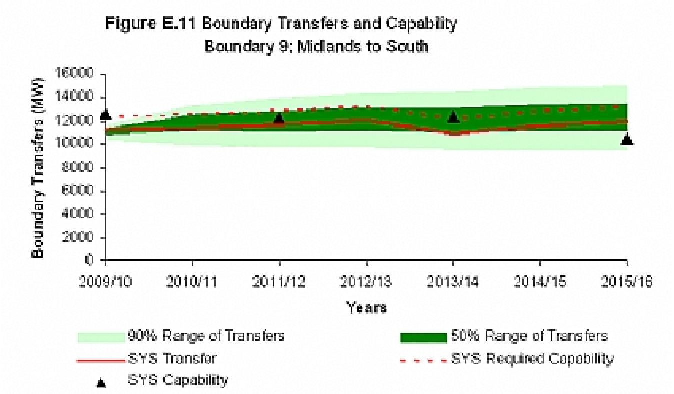


Figure E.10 and **Figure E.11** show the boundary transfer (SYS Transfer), required capability (SYS Required Capability) and actual capability (SYS Capability); all derived on the basis of the 'SYS Background'. These are displayed against a backdrop (shaded areas) of our current view of the probable transfer range.

The required capability is simply the boundary transfer enhanced by an allowance for security (referred to as the Interconnection Allowance) to take some account of variations in weather, generating plant availability and demand forecasting error either side of the boundary.

For the SYS Capability, two types of capability have been analysed: thermal and voltage. Where the voltage capability is less than the thermal capability, the voltage capability is given. The boundary capability may be further reduced at other times for stability reasons.

Turning now to the probabilistic transfer ranges (shaded areas); the darker shaded central band extends (on the vertical axis) from the 25th to the 75th percentiles of the range of probabilistically derived transfers, and thus includes 50% of all such transfers across the boundary at the time of system peak. The wider area, encompassed by the lighter shaded bands runs from the 5th to the 95th percentile and thus, together with the dark band, includes 90% of transfers. The remaining 10% lie outside the shaded range. The fan of probabilistically derived transfers can be compared with the deterministic planned transfer for the single deterministic SYS background.

It does not follow that the probabilistic transfer arising from a background considered to be likely will necessarily be captured within the envelope range shown on the diagram. Nor does it follow that all the most commonly occurring transfers have highly probable backgrounds. In our Generation Uncertainty Model (GUM), all backgrounds are equally probable. Nevertheless, the range of transfers displayed in the fan diagram does provide a very useful indicator of the most probable future planned transfer across the boundary given the possible combined effects of the various sources of generation and demand uncertainty. GUM can then be interrogated to reveal the details of any background underlying any transfer (point on the fan diagram) for further detailed analysis.

In the example given in **Figure E.10**, the SYS Planned Transfer lies towards the top of the probabilistic range of Planned Transfers while the SYS capability is in the lower part. There is hence a chance of lower peak flows than suggested by the SYS background; however, significant reinforcements will nevertheless be required in the very near future to facilitate even the lower parts of the range of probabilistic transfers.

In the example given in **Figure E.11**, over the latter part of the planned period, the SYS Planned Transfer lies within the range of the probabilistic transfers. At the same time, the SYS capability falls to the lower end of the probabilistic range which indicates a high probability of further reinforcements being required.

This presentation, which is reported in detail in the chapter on **Transmission System Capability** in the main text, is useful for highlighting issues around the timing of transmission reinforcements too far ahead of need and also for illustrating future opportunities. Please note that, whilst the 'SYS capabilities' displayed on **Figure E.10** and **Figure E.11** are appropriate for the 'SYS background' and 'SYS transfers', they do not necessarily correspond to the backgrounds covered by the probabilistic transfer range. Each background captured within the probabilistic analyses will have a unique set of boundary transfers and boundary capabilities.

The following provides a summary of the key indications for the future development of the GB transmission system taking account of the transfer levels and the boundary flows for the 'SYS background'; however, these developments need to be considered in light of the probabilistic potential range of flows.

- The major North-South flow boundaries B1 (SHETL North West Export), B2 (North to South SHETL), B4 (SHETL to SPT), B5 (North to South SPT), B6 (SPT – NGET), B7 (Upper North), B11 (Northeast & Yorkshire) and B16 (Northeast, Trent & Yorkshire) all show steady growth in power transfers throughout the SYS period. This is a result of an increased power export through Scotland and into England, due primarily to contracted renewable energy developments throughout Scotland;
- For B8 (North to Midlands) and B9 (Midlands to South) the power transfer fluctuates with generation changes north of the boundary however there is a general trend of increasing power transfer across the boundary.
- Central London import (B14) show a trend of steadily increasing transfers reflecting the increasing demands due to the Olympics and the lack of new generation projects within this zone;
- West Midlands import (B17) shows an initial reduction in transfer due to generator connection, with very little change across future years due to a balance between increasing demands and some generator openings;
- There is a general trend with reducing transfers across the South Coast import (B10), South & Southwest import (B12) and South West import (B13) reflecting new plant that might be expected to commission in the South and Southwest in line with present contractual positions.

There is a general trend with reducing transfers across South & Southwest import (B12), the South Coast import (B10) and South West import (B13) throughout the SYS period, reflecting new plant that might be expected to commission in the South and Southwest in line with present contractual positions.

In view of the uncertainty associated with the ‘SYS background’, the timing of the construction of infrastructure reinforcements is managed such that investments are made to well defined system requirements. This means that, generally, construction is deferred as far as is practicable to avoid undertaking investments that may turn out to be unnecessary, e.g. where transmission contracted generation does not in the event proceed. At the same time, in recognition of the individual TOs' obligations relating to the facilitation of competition, flexibility is planned into the GB transmission system such that it does not unduly inhibit the development of future projects and more recently the potential developments associated with strategic investment which is discussed in more detail in Chapter 8. However, we do ensure that we can provide an efficient, co-ordinated and economic system, compliant with the security standards, as required by the Electricity Act 1989 and the Transmission Licences.

A number of significant connection and infrastructure reinforcements to the GB transmission system are currently planned. In addition to the construction of new overhead lines and substations, these include the use of devices that not only maximise the use of the existing transmission system thereby limiting environmental impact, but also enable rapid network modifications to meet changing system requirements. To this end we use, amongst other things, quadrature boosters, which are capable of being relocated at a later date together with Relocatable Static Var Compensators (RSVCs). We have also authorised the reprofiling (i.e. retensioning of the overhead line circuits to reduce the sag between towers) of strategic overhead line circuits to increase the permitted operating temperature and thereby increase their load carrying capability.

By exploiting the capability of the existing transmission system through the installation of quadrature boosters and reactive compensation and overhead line conductor re-profiling, we will continue to maximise the use of our existing lines.

Opportunities for New Generation and Demand (See Chapter 9)

Generation Opportunities

As in previous years, Figure E.12 provides an indication of the opportunities for new generation across the 17 SYS Study Zones. The opportunities are interpreted as the ability to connect new generation without an associated need for major transmission reinforcement, which could in turn lead to delays caused by the need for planning consent and possible Public Inquiry. The red areas on the diagram would imply limited opportunity for connection in those zones given the level of transmission reinforcement required. Whilst the diagram correctly represents the opportunity for connection to a compliant network, it should be noted that Ofgem’s open letter dated 8th May provides the opportunity for new generation projects to connect under a derogation in advance of the wider system reinforcements being delivered. This interim measure is intended to be in operation until the implementation of the enduring transmission access arrangements which are currently being consulted upon with the industry. We therefore advise customers to contact National Grid if they are interested in making a connection to the transmission system so that the likely lead times for connection can be properly assessed against the background commercial and regulatory framework.

In the generation context, opportunities are interpreted as the ability to connect new generation without an associated need for major transmission reinforcement, which could in turn lead to delays caused by the need for Planning Consent and possible Public Inquiries.

Figure E.12 separates the 17 SYS Study Zones into five opportunity groups, namely: VERY LOW, LOW, MEDIUM, HIGH and VERY HIGH. The figure also provides an indication of the capacity of new generation that can be accepted in the individual zones of each opportunity group without the need for major transmission reinforcement.

It does not follow that all the generation capacity within an opportunity group could be located at one site within a zone. In some zones, for example the London Zones, a considerable spread would be necessary. Nor does it follow that the capacities indicated for each zone within an opportunity group could be accepted together. Moreover, please note that there is little opportunity for further connections in the northern zones.

Whilst levels of opportunity have been attributed to the five opportunity groups, it does not follow that the full opportunity capacity indicated could be used up without further detailed consideration. For instance, whilst the Central South Coast (zone 16) falls into the ‘medium opportunity category, any additional development might require major transmission reinforcement.

The proposed connection of a significant volume of new transmission contracted generation in the SHETL area, substantially made up of wind farms, is dependant on the completion of transmission reinforcements, including the proposed Beauly/Denny transmission reinforcement. The Beauly/Denny reinforcement is included as part of the SYS background for commissioning by 2013/14. However, elements of this reinforcement are currently the subject of a Public Inquiry and, consequently, the final commissioning date may vary, which would impact the opportunities.

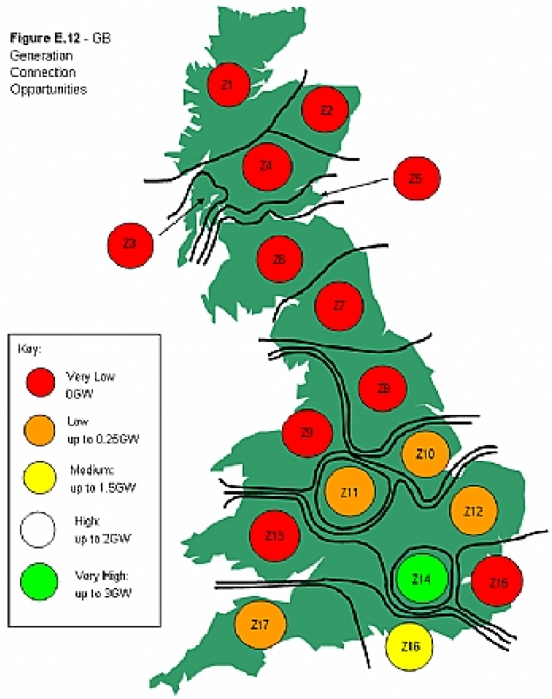
The analyses of boundary power transfers show that, with the material increase in new generation (26.2GW) planned for the next seven years, the resultant power flows through the Scottish and English grid systems to the South would require significant reinforcement. On this basis, it would be unlikely that any new applications for generation projects in Scotland or the north of England can be accommodated within the seven year period covered by this Statement. However, the proposed new transmission access rules (see below) are expected to change the emphasis by providing an opportunity for earlier transmission access for new generation projects.

The above guidance is necessarily general and emphasises the need to consider individual prospective generation developments on their merits at the time of application. A message arising from the guidance is that new generation located in the South is less likely to incur the need for major inter zonal transmission reinforcement and possible time delays than generation located in the North.

Notwithstanding the above opportunity messages, we will continue to comply with our licence obligations to make offers and will endeavour to meet our customers requirements including those relating to timescales.

Figure E.12

Click to load a larger version of FigureE.12 image



Transmission Access Review

The current transmission access review is also relevant in the context of future opportunities for generation access to the GB transmission system.

This review was announced in the Government's Energy White Paper 2007 and is being led by Ofgem and the Department for Business, Enterprise and Regulatory Reform (BERR) now DECC. The review covers the present technical, commercial and regulatory framework for the delivery of new transmission infrastructure and the management of the existing grid capacity to ensure that they remain fit for purpose as the proportion of renewable generation on the system grows.

Access to the GB transmission system is provided through arrangements with National Grid, acting as GBSO, under the Connection and Use of System Code (CUSC). The CUSC sets out the contractual framework for connection to, and use of, the GB transmission system. The CUSC has applied across the whole of Great Britain since BETTA was introduced on 1 April 2005.

The review includes the consideration of different models of transmission access, and to support this part of the review, National Grid has raised a suite of CUSC amendments and charging methodology modifications which could be used as building blocks to implement a number of different access models. Each of these models could be expected to provide an opportunity for earlier transmission access to new generation projects.

Strategic Investment

The information contained in this year's SYS does not reflect the recent work undertaken for the Energy Networks Strategy Group (ENSG) – Our Electricity Network – A Vision for 2020. Whilst the work carried out for ENSG identifies a set of transmission reinforcements that would facilitate the connection of renewable generation to help meet the Government's 2020 climate change targets, there is still further work required to agree a revised regulatory regime to deal with this anticipated investment. It is expected that a new regulatory regime will be developed during 2009 and these reinforcements may then form part of the SYS background in 2010.

Demand Opportunities

New demand of up to 150MW could be connected within most zones without requiring major transmission reinforcement.

An exception might be the introduction of such a step-change of load at certain points within or around some southern areas. For example, the London area has a large demand; approaching one tenth of the GB system peak demand. The London boundary is close to its thermal limit although planned work will ensure continued compliance. A large step-change in demand might, dependent on exact location, require major reinforcement. Each case again needs to be considered on its own merits.

Market Overview (see Chapter 10)

Chapter 10 provides an overview of BETTA and reports on related issues such as governance, institutional and contractual arrangements, and for the first time, touches on the development of offshore generation and the timetable for implementation of the new offshore regime.

Offshore Electricity Transmission

The arrangements described are subject to continual change and review either via legislative processes or through normal electricity industry governance. In addition to this, Ofgem and DECC are currently working together to implement a new regulatory regime for electricity transmission networks offshore. This is intended to enable significant volumes of offshore renewable generation to connect from UK offshore waters.

The Energy Act 2004 provides powers for the Secretary of State to make changes to electricity codes, agreements and transmission and distribution licences for purposes connected with offshore transmission or distribution. A final consultation on the regulatory framework for the offshore regime was issued by Ofgem and DECC in March 2009. This consultation contains the changes that the Secretary of State is expected to designate in June 2009.

From June 2009 (Go-active), it is expected that a 12 month transitional period will commence prior to full Go-live of the regime in June 2010. From Go-live onwards it will be a prohibited activity to own transmission equipment in offshore waters (which is deemed to be equipment operating at greater than or equal to 132kV) without holding a transmission licence.

From Go-live, National Grid's role as GBSO will extend to cover offshore areas (the Renewable Energy Zone). This means that National Grid will take responsibility for operating any offshore transmission assets.

The main feature of the new regime is the proposal to allocate offshore transmission licences (and hence the ownership of offshore transmission equipment) via a competitive tender process.

During the transitional period from Go-active to Go-live, Ofgem will run transitional tenders to identify the Offshore Transmission Owners (OFTOs) for offshore generators who are either already operational or have satisfied certain criteria and are progressing with the design and construction of their connections to shore. In parallel with this activity, National Grid will be revising the contractual arrangements with these sites to reflect the fact that, from Go-live, these sites will connect to the transmission system at the offshore platform rather than at the onshore point of connection. This will result in these offshore users entering into Bilateral Connection Agreements with National Grid, in the same way as onshore transmission connected generation.

Looking further forward, offshore users will apply to National Grid for connection to the transmission system in the same way as any other user. National Grid has transmission licence obligations to respond to an application to connect with an offer within three months of such an application. This Initial Connection Offer will detail the onshore works required to connect up the offshore developer. It will also take account of any information provided by the offshore developer in terms of likely offshore cable routes, landing points etc, but in the absence of such information will contain high level assumptions about the likely offshore transmission requirements. Ultimately, National Grid will ensure that any offer provided to an offshore user will be in accordance with its transmission licence obligations to act in an economic and efficient manner.

Once signed, the offer will trigger a tender process, to be run by Ofgem, to identify an OFTO for that connection. National Grid expects to provide information from the offer to inform the tender process. Once an OFTO has been identified, a Transmission Licence will be granted and the OFTO will accede to the SO-TO Code. Once the OFTO has acceded to the STC, then National Grid will interface with the OFTO in a similar way to the way in which it interfaces with the Scottish Transmission Companies. The OFTO will provide National Grid with a Transmission Owner Construction Agreement (TOCA) which describes the offshore works to be undertaken.

National Grid will then incorporate these works into the offer to the offshore user via an Agreement to Vary. Once this is signed, the construction activities will begin.

Some of the expected key milestones are given below:
March 2009: Final consultation on the Offshore Transmission Regime issued by OFGEM and DECC
March 2009: Crown Estate receives bids for Round 3 exclusive licences
May 2009: Commencement of section 92 of the Energy Act 2004 and section 44(1) and (2) of the Energy Act 2008 to enable the Authority to make regulations to enable the first round of tenders to begin shortly after Go-active
24 June 2009: Go-active commencement of sections 90 and 91 of the Energy Act 2004
Summer 2009: First tenders commence
From summer 2009: The Crown Estate announces preferred bidders for Round 3 zones
June 2010: commencement of sections 89 and 180 of the Energy Act 2004 and section 44(3) of the Energy Act 2008

Figure E.1 - 'User' Based GB Peak Demand Forecast

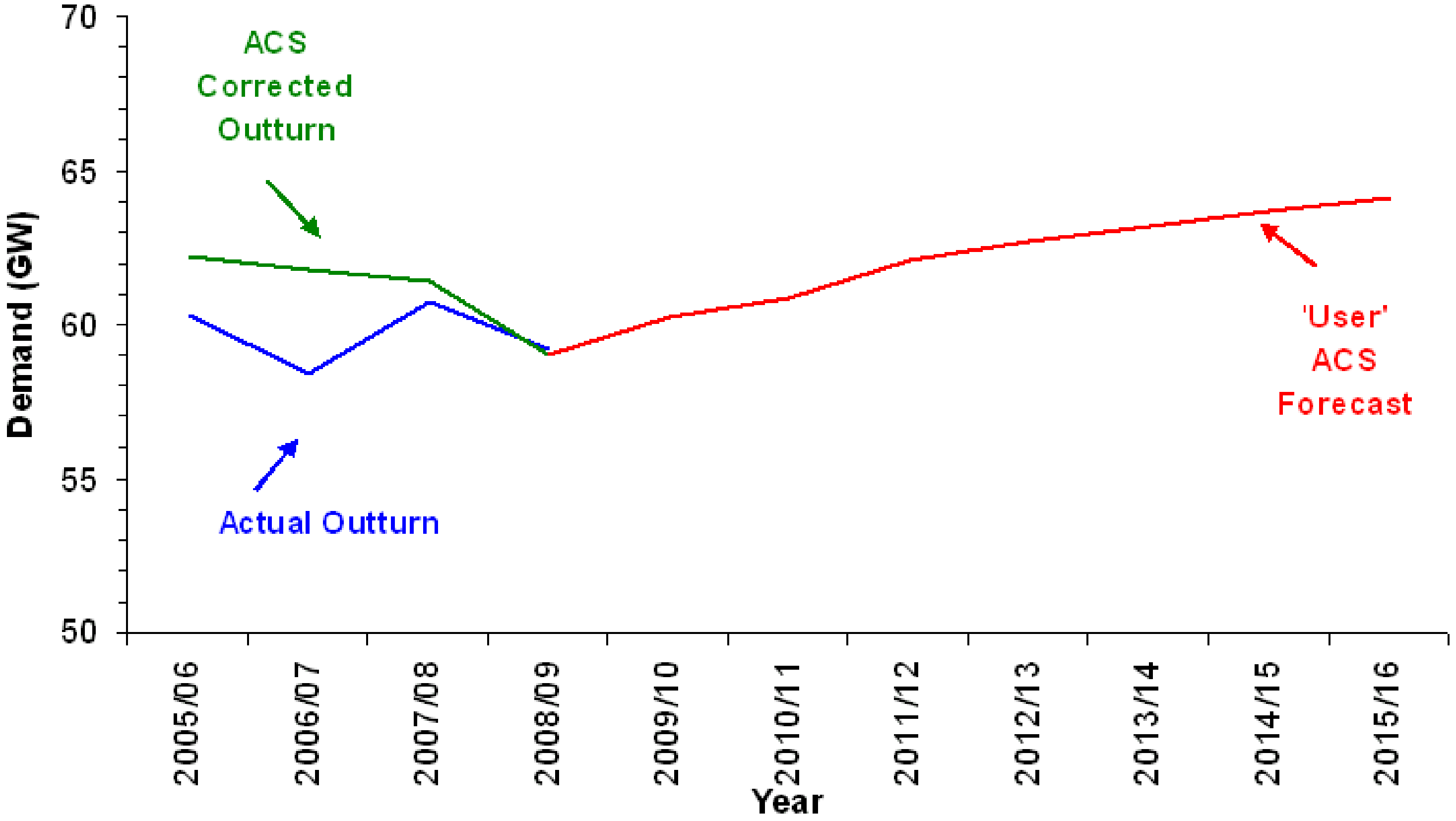


Figure E.2 - Comparison of Customer-Based Forecast and National Grid Projections

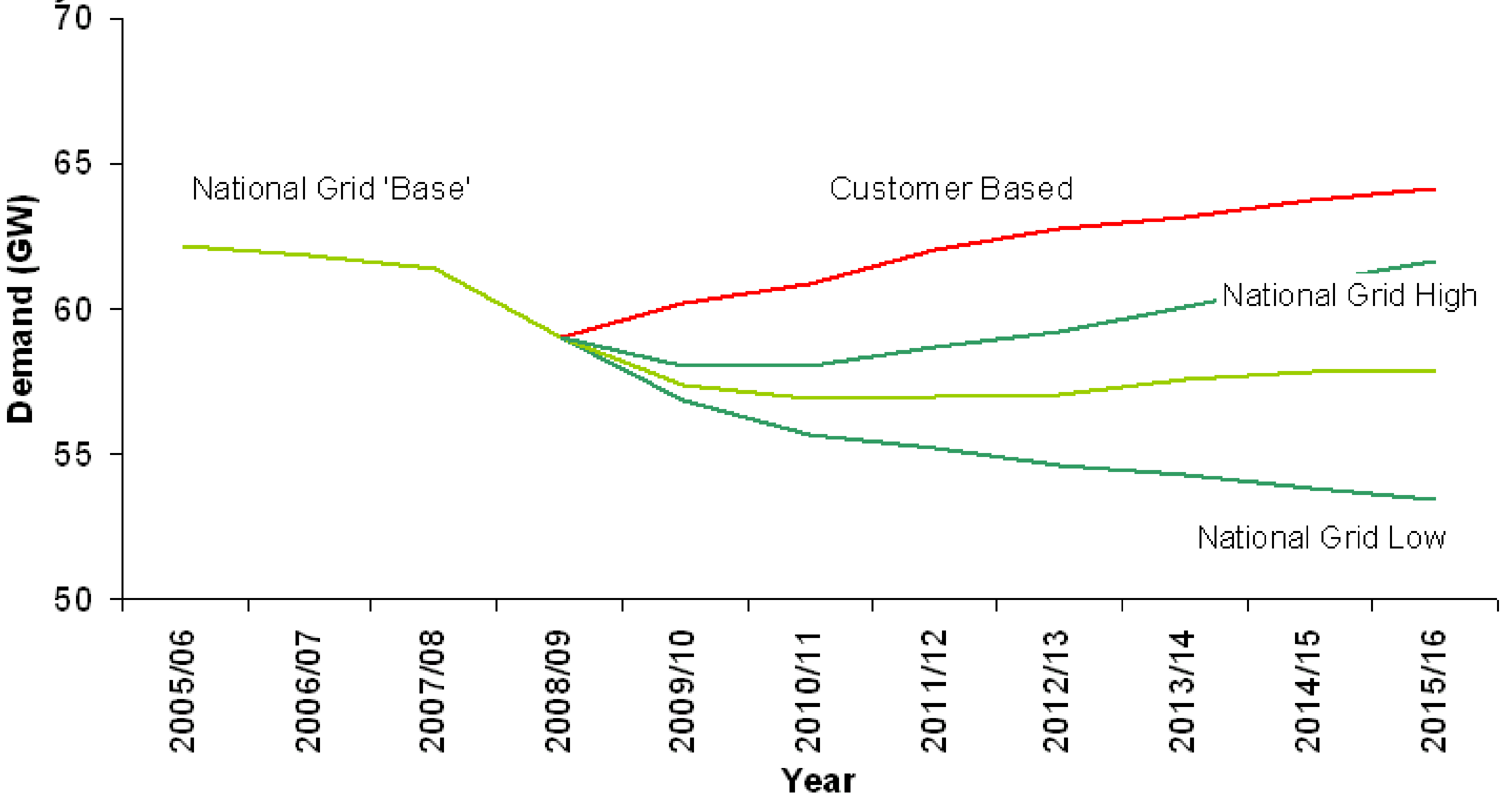


Figure E.3 - Changes in Generation Capacity, 2005/06 to 2015/16

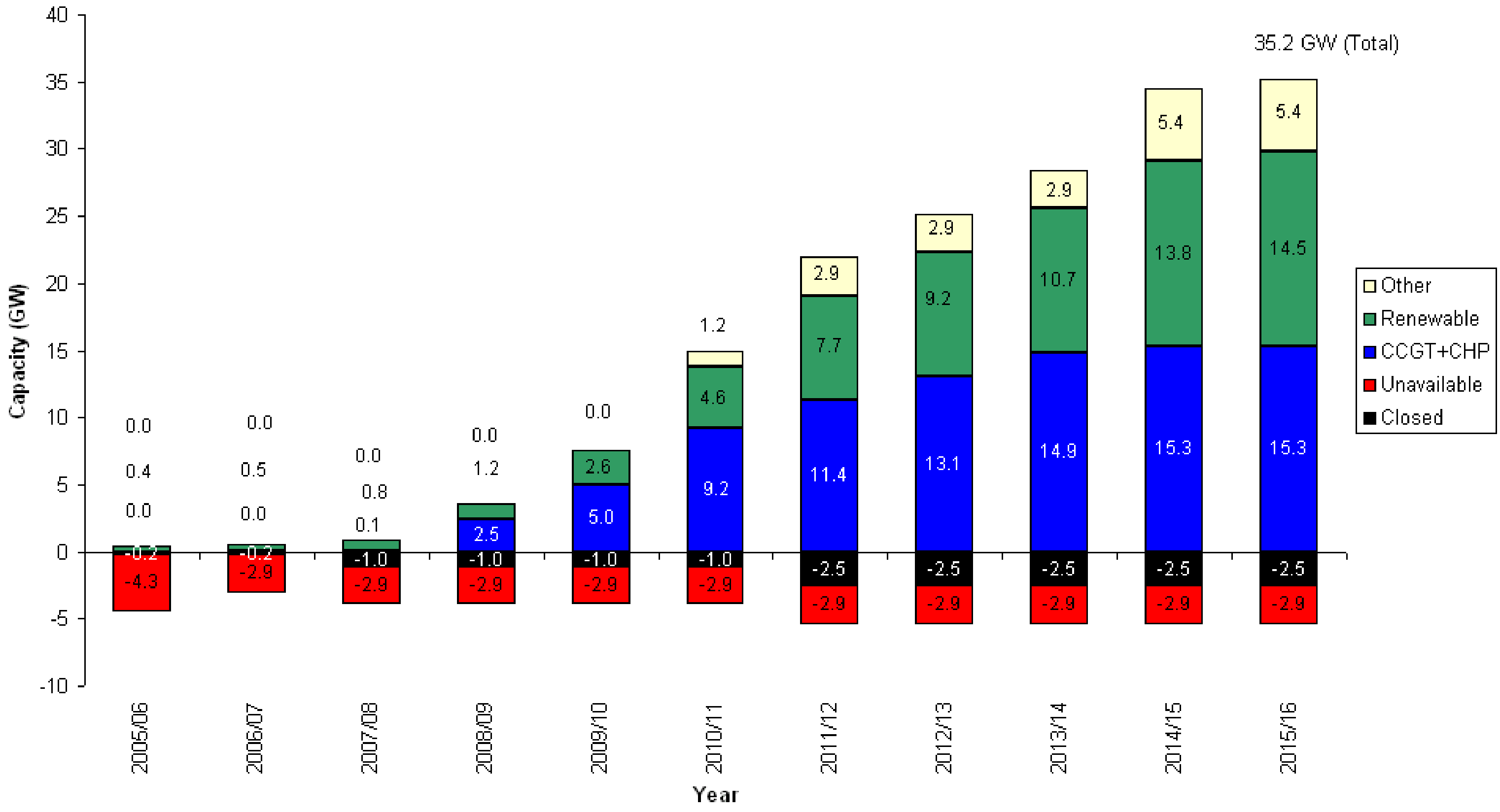


Figure E.4 - Existing and Planned Transmission Contracted Generation

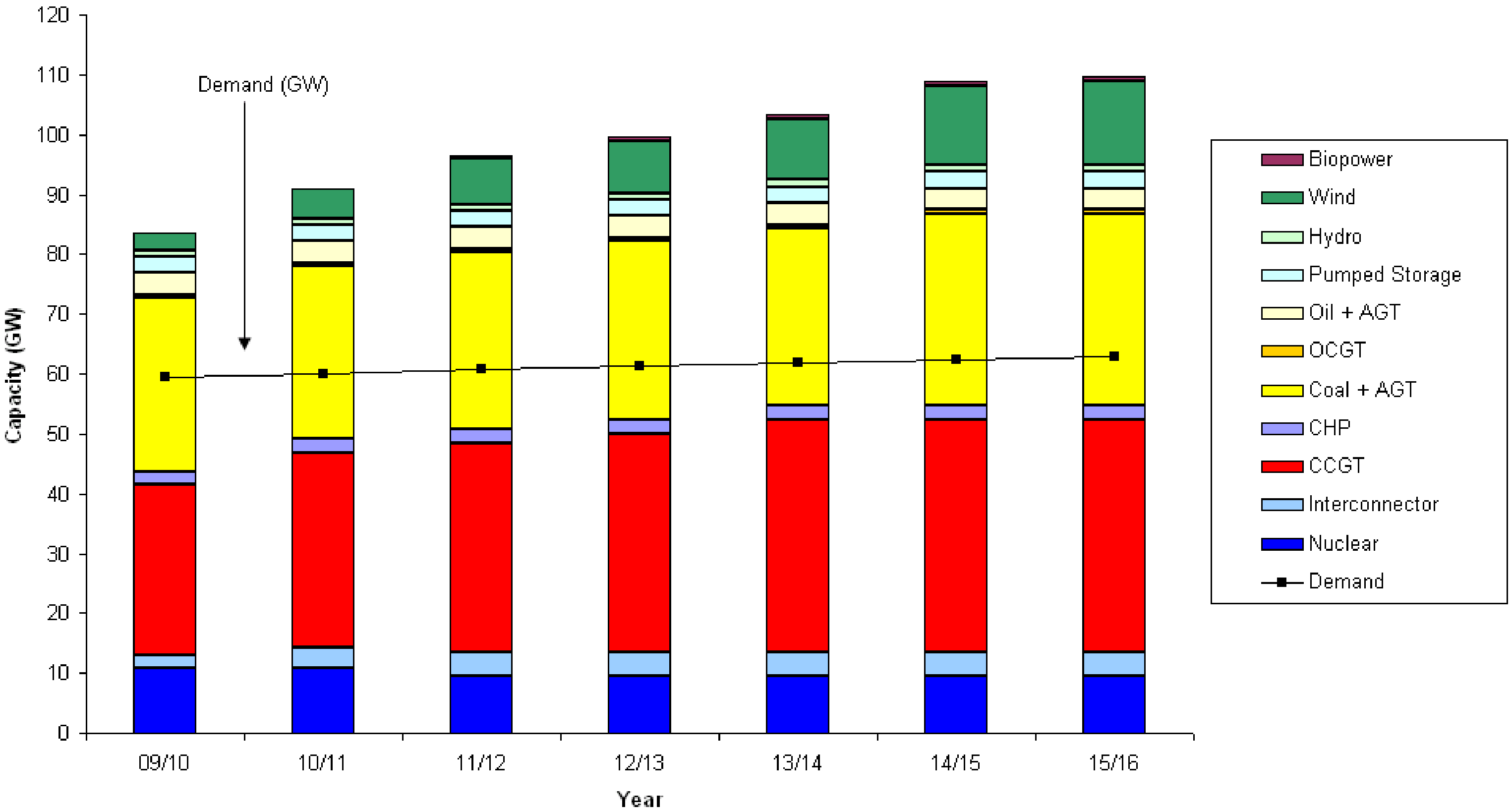


Figure E.5 - GB Plant Margins

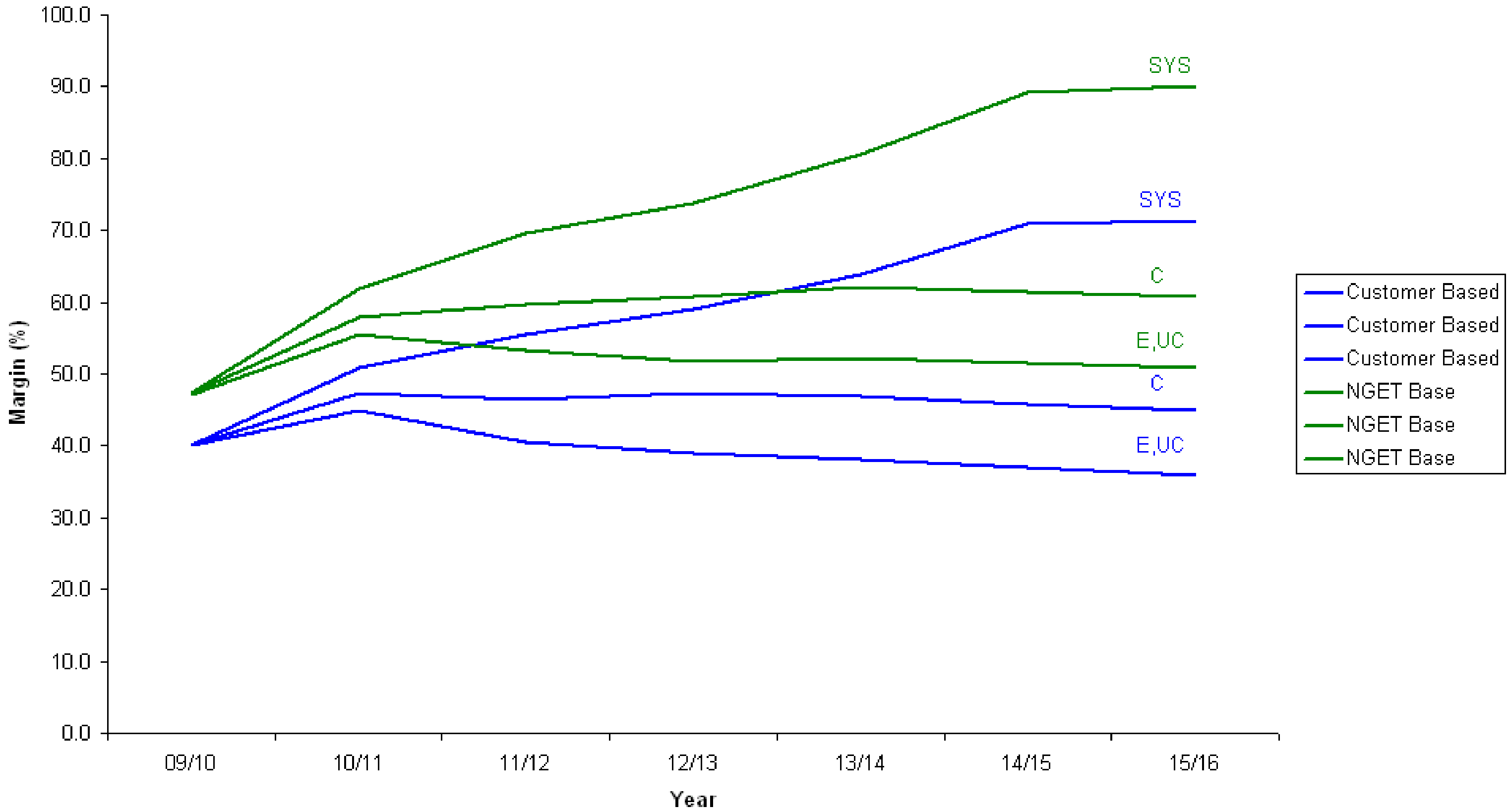


Figure E.6 - Plant Margins for Various Wind Generation Availability Assumptions (relative to SYS Background)

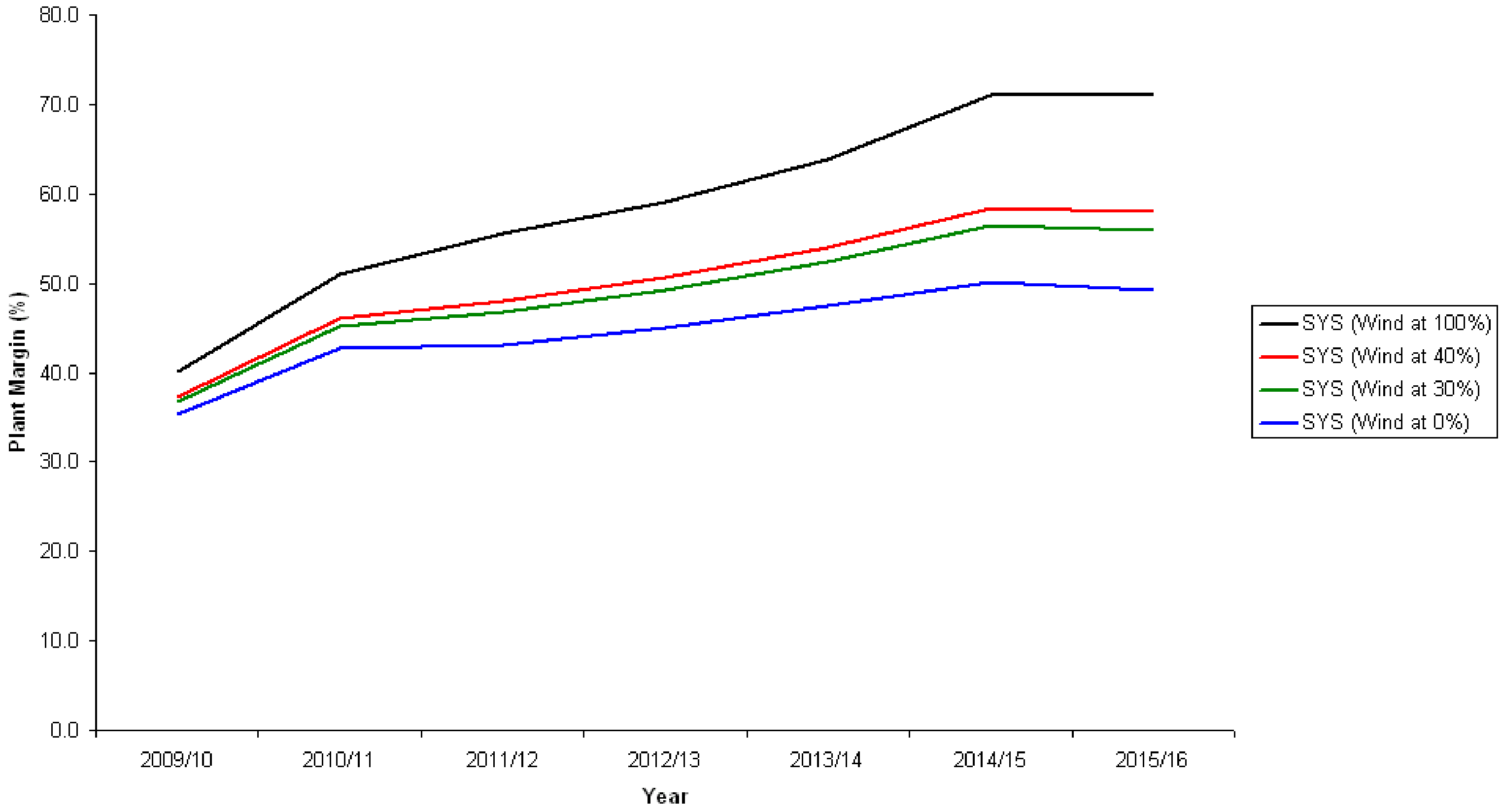


Figure E.7 - Total Installed Generation Disposition (GW)

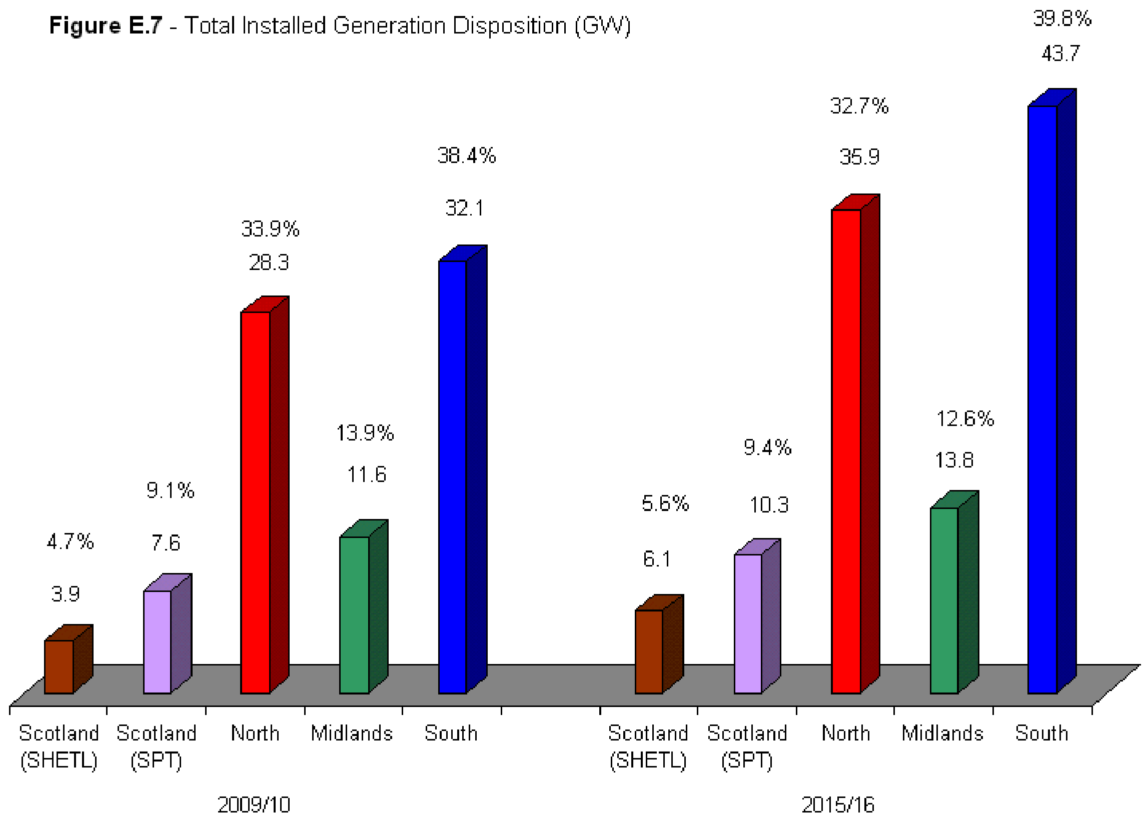


Figure E.8 - GB Zonal Plant/Demand Balance - Installed Generation

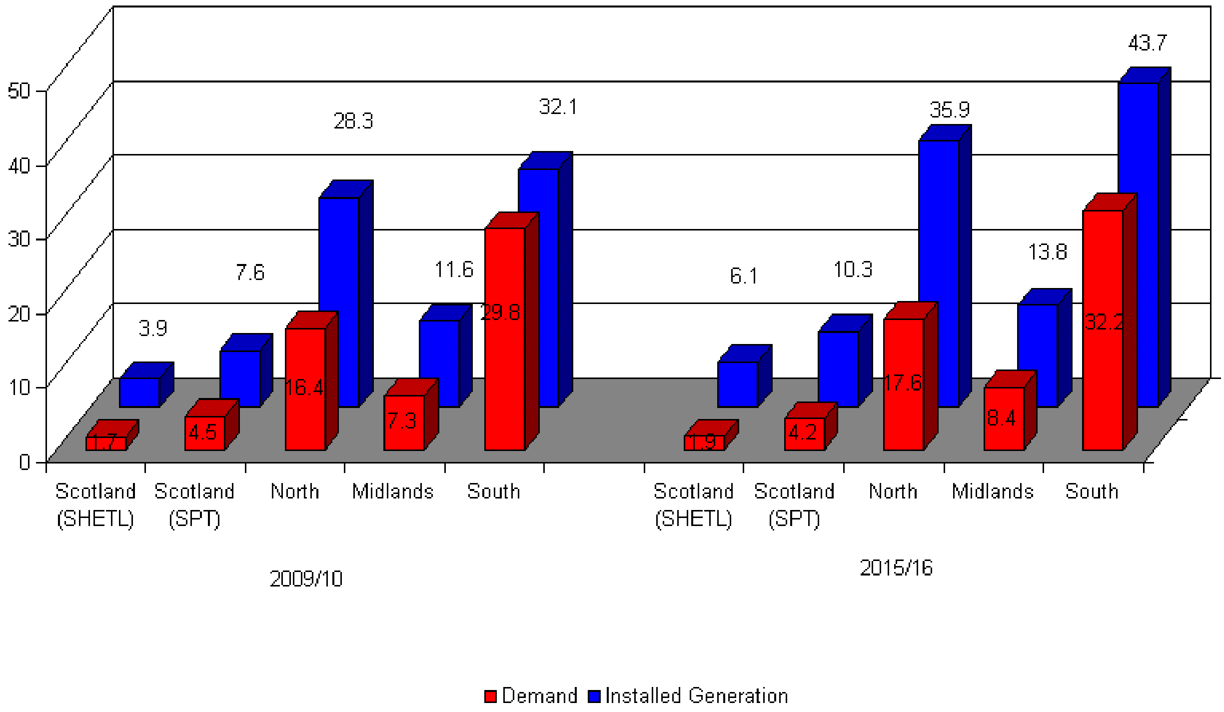
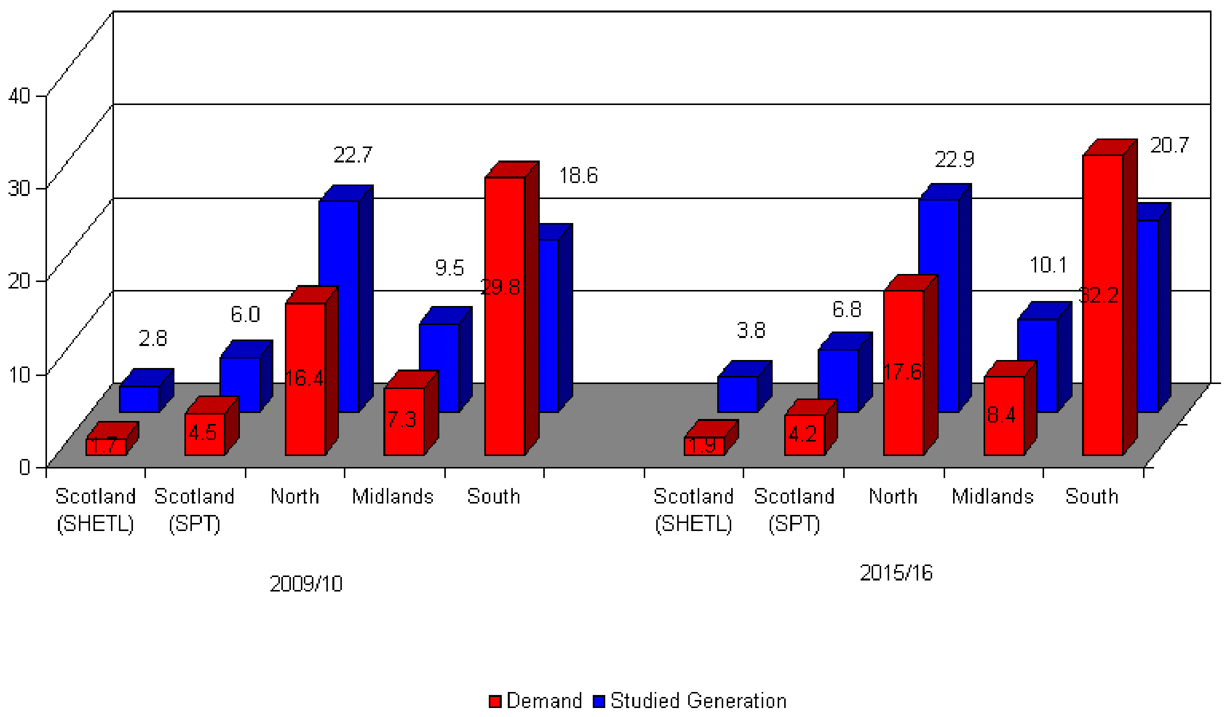


Figure E.9 - GB Zonal Plant/Demand Balance - Studied Generation



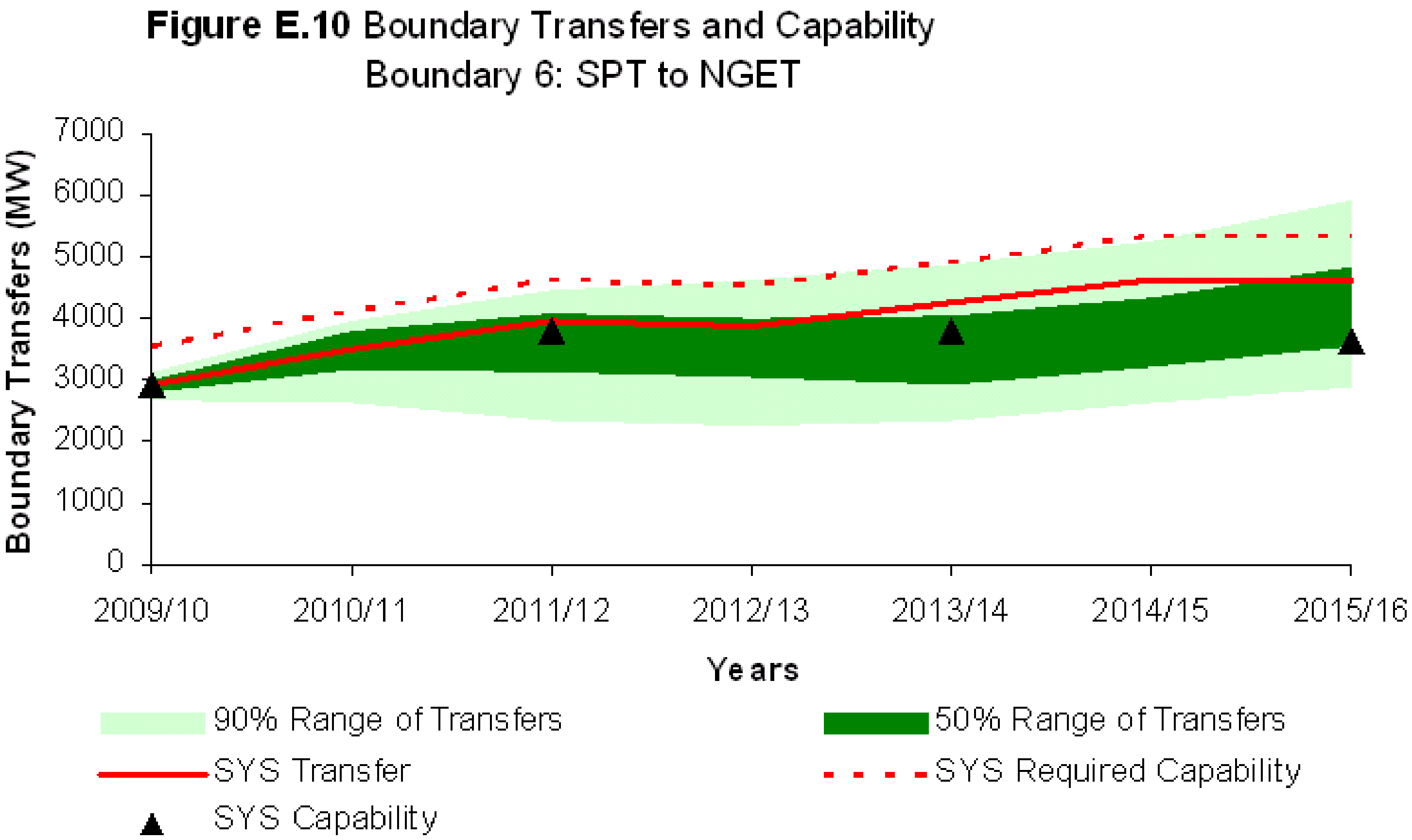


Figure E.10 Boundary Transfers and Capability
Boundary 6: SPT to NGET
Boundary Transfers (MW)
7000
6000
5000
4000
3000
2000
1000
0
2009/10
2010/11
2011/12
2012/13
2013/14
2014/15
2015/16
Years
90% Range of Transfers
50% Range of Transfers
SYS Transfer
SYS Required Capability
SYS Capability

Figure E.11 Boundary Transfers and Capability
Boundary 9: Midlands to South

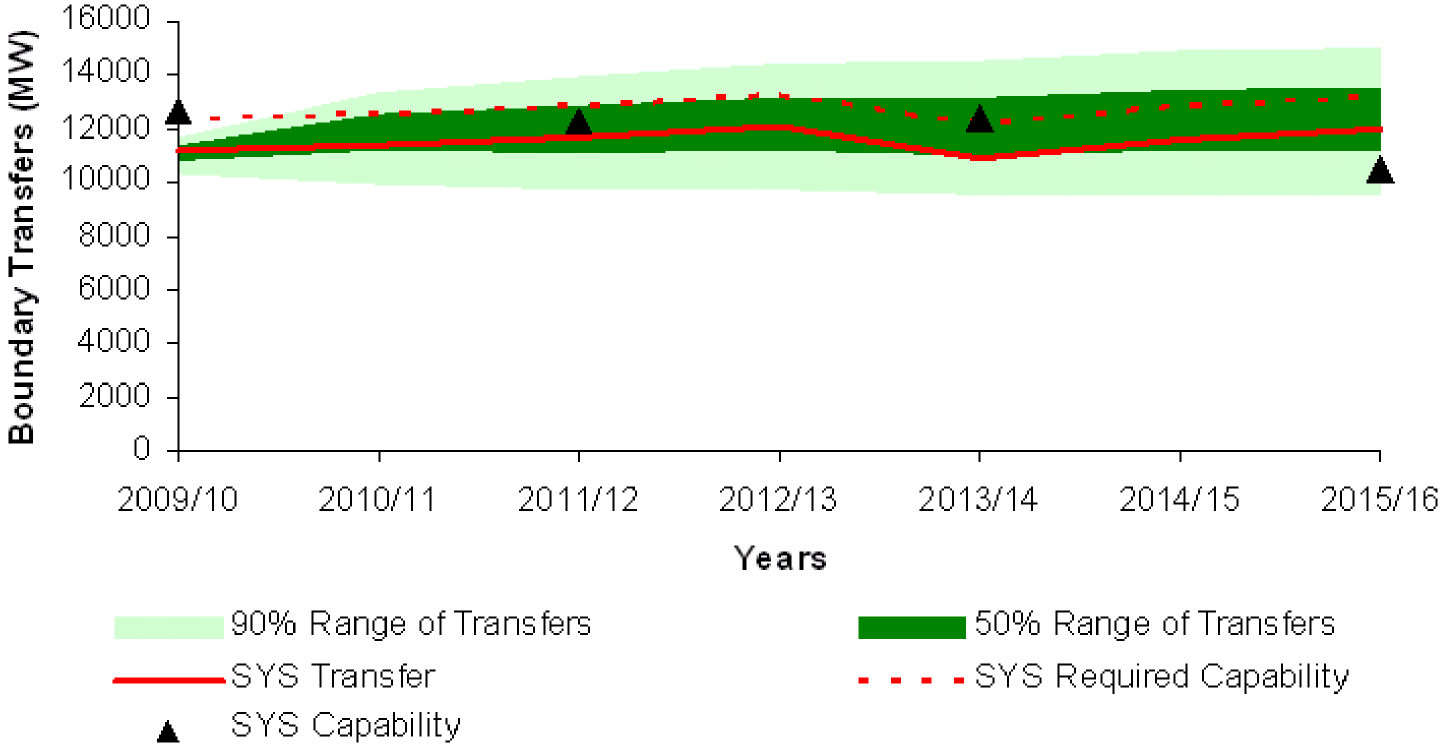


Figure E.12 - GB Generation Connection Opportunities

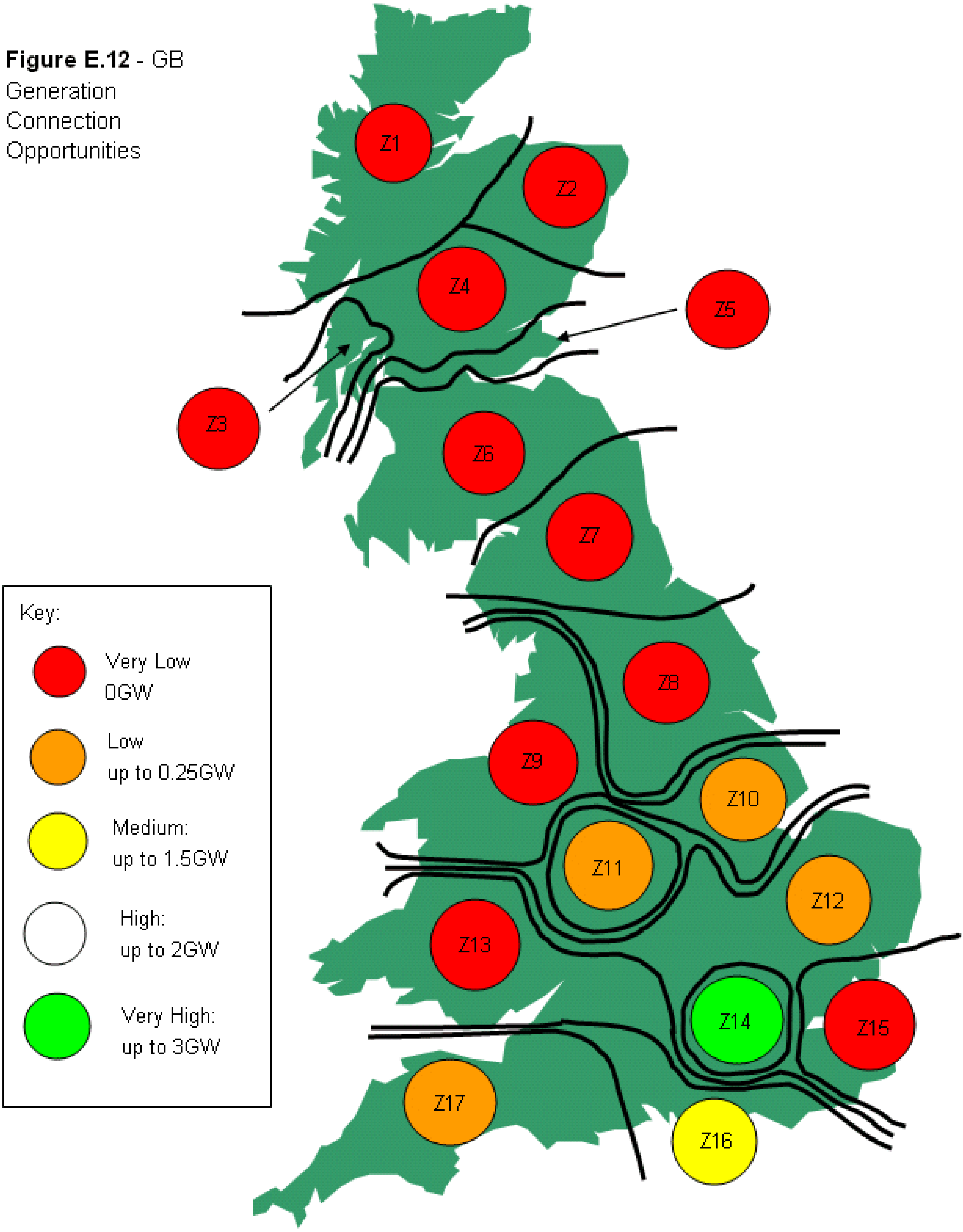


Figure 3.4 - Total Installed Generation Disposition (GW)

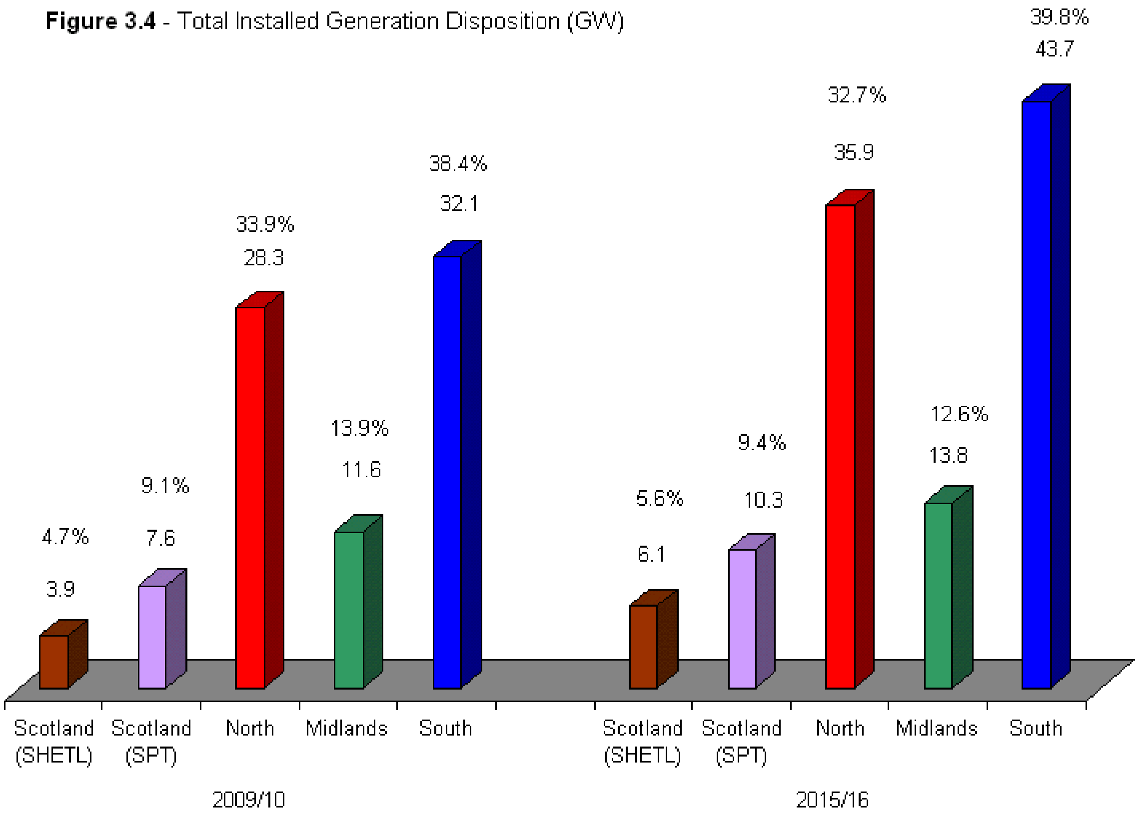


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Table 7.3 - Studied Boundary Generation, Demand and Transfer (MW)

Boundary	Boundary NAme	Quantity	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
B1	SHETL North West	Effective Generation	961	954	942	792	1075	1437	1437
B1	SHETL North West	Demand	506	512	516	523	529	536	536
B1	SHETL North West	Planned Transfer	455	442	426	269	546	901	901
B2	SHETL North - South	Effective Generation	2232	2216	2186	2061	2381	2905	2905
B2	SHETL North - South	Demand	1089	1105	1116	1128	1139	1151	1151
B2	SHETL North - South	Planned Transfer	1143	1111	1070	933	1242	1754	1754
B3	Sloy	Effective Generation	258	322	318	317	315	311	311
B3	Sloy	Demand	66	67	65	66	67	68	68
B3	Sloy	Planned Transfer	192	255	253	251	248	243	243
B4	SHETL - SPT	Effective Generation	2846	3011	2971	2843	3181	3754	3754
B4	SHETL - SPT	Demand	1698	1709	1725	1744	1762	1781	1781
B4	SHETL - SPT	Planned Transfer	1148	1302	1246	1099	1419	1973	1973
B5	SPT North - South	Effective Generation	5234	5419	5324	5012	5363	5829	5829
B5	SPT North - South	Demand	2886	2899	2900	2901	2920	2967	2967
B5	SPT North - South	Planned Transfer	2348	2520	2424	2112	2443	2862	2862
B6	SPT - NGET	Effective Generation	8815	9491	9961	9917	10336	10778	10778
B6	SPT - NGET	Demand	5912	5934	5953	5948	5978	6041	6041
B6	SPT - NGET	Planned Transfer	2903	3557	4008	3970	4358	4737	4737
B7	Upper North	Effective Generation	11682	12317	12734	13718	14116	16501	16501
B7	Upper North	Demand	8711	8720	8748	8803	8867	9104	9104
B7	Upper North	Planned Transfer	2972	3597	3986	4915	5248	7397	7397
B8	North - Midlands	Effective Generation	31376	31299	31484	32335	31463	33117	33117
B8	North - Midlands	Demand	21984	21784	22433	22651	22790	23168	23168
B8	North - Midlands	Planned Transfer	9392	9515	9051	9684	8673	9950	9950
B9E	Midlands - South (Export)	Effective Generation	40851	41343	42071	42861	41935	43004	43004
B9E	Midlands - South (Export)	Demand	29710	29678	30393	30683	30853	31310	31310
B9E	Midlands - South (Export)	Planned Transfer	11141	11666	11677	12177	11082	11694	11694
B9I	Midlands - South (Import)	Effective Generation	18494	18642	18668	18574	19952	19386	19386
B9I	Midlands - South (Import)	Demand	29634	30308	30345	30752	31034	31079	31079
B9I	Midlands - South (Import)	Planned Transfer	-11141	-11666	-11677	-12177	-11082	-11694	-11694

B10	South Coast	Effective Generation	2983	2940	2552	2537	2524	3307	3307
B10	South Coast	Demand	6949	7028	6990	7028	7078	7116	7116
B10	South Coast	Planned Transfer	-3966	-4088	-4439	-4491	-4554	-3809	-3809
B11	North East & Yorkshire	Effective Generation	23188	23143	24352	24745	25087	26871	26871
B11	North East & Yorkshire	Demand	14614	14364	14617	14875	14982	15294	15294
B11	North East & Yorkshire	Planned Transfer	8573	8779	9735	9870	10105	11577	11577
B12	South & South West	Effective Generation	8923	10756	10123	10351	10116	9905	9905
B12	South & South West	Demand	11856	12048	12006	12080	12180	12234	12234
B12	South & South West	Planned Transfer	-2933	-1292	-1883	-1729	-2063	-2329	-2329
B13	South West	Effective Generation	1773	1747	1714	1704	1696	2496	2496
B13	South West	Demand	2655	2676	2654	2670	2690	2703	2703
B13	South West	Planned Transfer	-882	-929	-939	-966	-994	-208	-208
B14	London	Effective Generation	1242	1224	1201	1195	1557	1525	1525
B14	London	Demand	10029	10331	10482	10738	10833	10756	10756
B14	London	Planned Transfer	-8787	-9107	-9281	-9542	-9275	-9232	-9232
B15	Thames Estuary	Effective Generation	4425	2483	2960	2937	2905	3003	3003
B15	Thames Estuary	Demand	2021	2107	2108	2139	2160	2172	2172
B15	Thames Estuary	Planned Transfer	2404	376	851	798	745	832	832
B16	North East, Trent & Yorkshire	Effective Generation	29235	29808	30579	30936	31245	32903	32903
B16	North East, Trent & Yorkshire	Demand	15333	15126	15376	15644	15738	16072	16072
B16	North East, Trent & Yorkshire	Planned Transfer	13902	14682	15202	15292	15507	16831	16831
B17	West Midlands	Effective Generation	3427	3379	4360	4334	4313	3854	3854
B17	West Midlands	Demand	7008	7132	7201	7263	7306	7364	7364
B17	West Midlands	Planned Transfer	-3580	-3752	-2841	-2928	-2993	-3510	-3510