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**SECRETARY OF STATE'S SECOND
REPORT TO PARLIAMENT ON
SECURITY OF GAS AND
ELECTRICITY SUPPLY IN
GREAT BRITAIN**

July 2006



Energy Act 2004

Second Annual Report to Parliament on the Security
of Gas and Electricity Supply in Great Britain
by the Secretary of State for Trade and Industry

*Presented to Parliament pursuant to section 172
of the Energy Act 2004*

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Introduction

This is the second annual report to Parliament on the security of gas and electricity supplies in Great Britain as required under section 172 of the Energy Act 2004.

One of the four principal goals of the Government's energy policy is that people and businesses can rely on secure supplies of energy – fuel as well as gas and electricity. This report concentrates on gas and electricity. For markets to deliver secure gas and electricity supplies, Government and the regulator, Ofgem, must ensure that there is appropriate action to facilitate open, liberalised and competitive markets here and abroad. One of the most important ways Government does this is by providing good quality information on security of supply issues. This annual report to Parliament is part of this process.

The Government is concerned about all aspects of security of supply: immediate and longer term security, sources of energy and their reliability, generation capacity, storage and infrastructure, network resilience: they all contribute to the safe, secure energy that the country relies on.

Conscious of changes to the security of energy supplies in the UK, as the UK's own resources decline, the Government and Ofgem in 2001 established the **Joint Energy Security of Supply Group (JESS)** working group, which monitors developments in the gas and electricity market. JESS looks for ways of helping the market to work effectively to secure energy supplies by providing information to market participants to help them plan investment decisions. The most recent JESS report was published in May 2006¹. The JESS working group will be looking to develop its activities in the light of the recommendations of the 'Energy Review – A Secure and Clean Energy Future' which will be reporting its conclusions at around the same time as this report is published. In the first instance this will involve updating the JESS security of supply information on a more regular basis. For example, this report will be supplemented by updating on line those indicators contained in the annexes to the JESS report, but are not included here. It will also involve undertaking an audit of existing security of supply information to identify where there are currently gaps and to learn from the best examples produced by other countries.

1 <http://www.dti.gov.uk/files/file28800.pdf>

North Sea oil and gas will continue to play a key role in helping to meet the UK's energy needs well beyond the next decade. Around 36 billion barrels of oil equivalent (boe) have been produced so far with potentially 20-26 billion boe still to be recovered. The Government continues to work hard with the industry via a number of initiatives to realise this potential. We will take forward steps to maximise domestic oil and gas production by promoting the UKCS as an attractive business environment with minimum regulatory uncertainty and by promoting the exploration and production opportunities to new entrants. In parallel with promoting the North Sea, the 'Fallow' initiative is working to prompt licensees with undeveloped discoveries or undrilled prospects to either progress these themselves (or through engagement with other interested parties) or relinquish them so they can be made available in future Licence Rounds.

In addition, as we move further into import dependency, Government seeks to facilitate the market delivery of new infrastructure to import oil and gas. A Parliamentary Statement of Need was tabled on 16 May 2006². This set out the context for why we need additional gas supply infrastructure – import facilities, storage and pipelines. We therefore need the right gas supply infrastructure in place to help us manage this change. We need a planning consents regime that enables timely consent decisions and helps balance the need of local residents and the national need for reliable gas supply. The Government is working on a comprehensive 3-point programme to help gas supply projects go forward: *legislation* (when Parliamentary time permits) to establish a regime for the storage of gas in *salt caverns offshore*; a *review* of the *onshore* consents regimes; and a *public information programme*, of which this statement forms a part.

Import dependency means that the right commercial arrangements as well as appropriate infrastructure have to be in place. As such the energy market in **continental Europe** becomes increasingly important to us. Government and Ofgem have continued to work with the European Parliament, the Commission and other Member States to promote efficient and effective competitive markets across the EU, which will make a substantial contribution to secure and reliable energy supplies. Creating and sustaining open and competitive markets was a key theme of our Presidency of the EU Council of Ministers, between July and December 2005. The Government and Ofgem welcomed the key messages in the European Commission's Green Paper on a European Strategy for Sustainable, Competitive and Secure Energy published in March 2006³. This consultation document is designed to stimulate ideas on what should be done to deal with practical challenges and problems, with the Commission mandated to produce an action plan for next year's Spring European Council. The UK recently submitted its initial response to the Commission on the proposals outlined in the Green Paper.

² <http://www.dti.gov.uk/files/file28954.pdf>

³ http://ec.europa.eu/energy/green-paper-energy/index_en.htm

The Government and Ofgem welcome the action the Commission is already taking in support of the internal market. Steps are being taken to ensure all Member States have properly implemented existing market legislation, while a sectoral inquiry is also well underway and promising significant results, with antitrust investigations started against a number of companies.

The international dimension is becoming more important to security of our energy supplies. The Government's **International Energy Strategy** sets out our international objectives. Priorities are:

- to work, multilaterally (through organisations such as the EU and International Energy Agency) and bilaterally to press for energy market reform and improved energy sector governance in major producing countries;
- to work, with others, for stable and competitive international oil and gas markets;
- to encourage political and economic stability in key producer countries;
- to improve take-up of renewable energy and a more efficient use of energy globally; and
- to enhance action to improve network resilience, mindful of the threat of terrorism.

This report sets out the outlook for security of energy supplies for this winter outlook and the longer term. It draws on National Grid's preliminary thoughts on next winter. At this stage the outlook for the gas market this winter is uncertain. National Grid make clear that they cannot be sure that it will be as tight as winter 2005-06, but clearly this must be a possibility. Should the coming winter be similar to 2005-06, National Grid suggest that again, under severe weather conditions a significant demand-side response would be required from very large users, particularly power stations, but that supplies to domestic customers would be maintained.

In the longer term, improvements in gas infrastructure that are already under construction will ease the short-term tightness in supply. The market has already responded in anticipation of declining UK gas supplies with new import and storage infrastructure, some of which will be available for the coming winter. More is expected to be available next winter and thereafter. Proposals for the construction of new electricity generating capacity are also coming forward in anticipation of future developments in the electricity supply-demand balance. While in the immediate future such proposals mainly concern further gas-fired facilities, in the longer term renewables, and other alternative technologies, such as low-emission coal generating capacity, are expected to add to the diversity of our generating fleet.

The Government, with Ofgem, will continue to monitor carefully developments in the energy market, both nationally and internationally. We will keep a careful watch for potential barriers preventing the market from functioning effectively and develop appropriate and timely policy responses. And we will ensure that the political and regulatory context is optimally designed to attract needed investment for the continued security of our energy supplies.

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Chapter 1: Background

- 1.1** Section 172 of the Energy Act 2004 requires the Secretary of State to publish and lay before Parliament a report dealing with the short and long term availability of electricity and gas for meeting the reasonable demands of consumers in Great Britain⁴. This is the second such report. The third annual report on the Implementation of the Energy White Paper will also report separately on security of supply as well as on other aspects of energy policy.
- 1.2** Security of supply is fundamental to the Government's energy objectives as set out in the Energy White Paper 2003⁵. DTI and Ofgem have shared statutory duties towards security of supply and complementary roles in delivering it. The Government sets the overall policy direction and regulatory environment; the structure, performance and regulation of markets are matters for Ofgem, which also regulates monopoly businesses where necessary.
- 1.3** National Grid also has important responsibilities in the context of security of supply. As the primary transporter of gas and electricity it is responsible for ensuring that there is adequate and reliable network capacity to meet anticipated energy transportation requirements. As system operator of the transmission networks it also has responsibility for the residual balancing of both gas and electricity, securing electricity reserve in operational timescales and setting safety monitor levels for gas storage.
- 1.4** The market framework creates strong incentives on participants to contribute to security of supply. The publication by National Grid of an annual outlook for the winter ahead also plays a key role in providing information to market participants and enabling them to take informed actions in the light of this. Much of the factual information in this report about the outturn last winter and the prospects for the coming year is from National Grid.

⁴ <http://www.opsi.gov.uk/acts/acts2004/40020--o.htm#172>

⁵ <http://www.dti.gov.uk/files/file10719.pdf?pubpdfload=03%2F660>

- 1.5** Ofgem published National Grid's winter consultation document on 16 May 2005⁶. This stated that the supply-demand outlook for 2006-07 is particularly uncertain and it is not clear at this stage whether the position will be more or less tight than it was in 2005-06. This year National Grid will be publishing a second round of consultation in July drawing on initial responses before the final Winter Outlook document is published in September.

⁶ http://www.ofgem.gov.uk/temp/ofgem/cache/cmsattach/15058_8406b.pdf

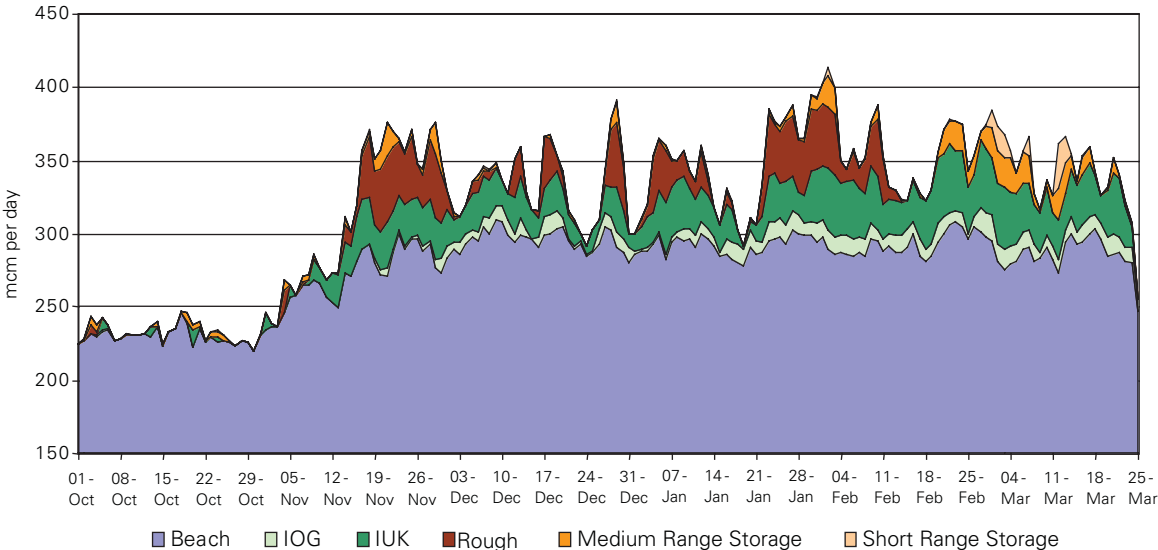
Chapter 2: Supply-demand balance for 2005-06

2.1 The winter of 2005-06 was the coldest experienced across parts of Great Britain since 1995-96. In particular there were two prolonged cold spells in November and again in March. It was not however the 1 in 10 winter across the whole country that some early reports have suggested. The two cold spells were reflected in peaks of demand and subsequent price rises that resulted in significant gas market demand side response from power stations and energy intensive users. For most of the winter there were few supply problems. However, flows of gas from the continent through the interconnector with Belgium were running at well below full capacity despite high prices. The loss of the Rough long-range storage facility in February exacerbated the tight supply-demand balance during the March cold spell.

Gas

2.2 Gas demand over the winter, as shown in the chart overleaf, was met from UK Continental Shelf (UKCS) production, storage and imports from Norway, through the interconnector and the Liquefied Natural Gas (LNG) import facility at the Isle of Grain.

Chart 2.1: Gas Supply Buildup



Source: National Grid

- 2.3** Demand was highest during early February, the highest daily demand of 411 million cubic metres (mcm) being on 2 February 2006. This was 1.9% lower than the 2004-05 highest daily gas demand of 419 mcm and, 8.7% lower than the record demand of 450 mcm on 7 January 2003.
- 2.4** The forecast maximum beach gas delivery (which comprises UKCS production and Norwegian gas supplies via existing interconnecting pipelines) was 327 mcm per day for last winter – although National Grid's forecast assumed flows would be 90% of that i.e. 302 mcm per day. In fact the highest beach gas delivery actually recorded on any day was 309 mcm. Differences between forecast and actual deliveries are generally thought to be due to plant availability and reservoir decline, although commercial factors may also have been relevant.
- 2.5** Deliveries of gas from storage, through the interconnector with Belgium and via the LNG import facility at the Isle of Grain contributed to the supply-demand balance. Long, mid and short range storage facilities were all virtually full going into the winter, with the new mid-range facility at Humbly Grove coming on stream in November. Use of storage followed a different pattern to that in earlier years. Stocks were drawn on heavily during the cold spell in November and December as can be seen from the chart above. Following some re-injection in the interim, there were further calls on mid- and short-range storage in March because of the late cold spell and the loss of the Rough long-range storage facility following a fire on 16 February. As demand fell back following the end of the cold spell, there was a further re-injection into mid-range storage from late March into April.
- 2.6** The interconnector with Belgium is capable both of importing and exporting gas. The direction of flow generally reflects differentials between the day-ahead prices in the UK and Zeebrugge. The interconnector was therefore in import mode throughout most of the winter. However, despite these price differentials, the interconnector flowed at well below full capacity for most of the winter. The Commission are currently investigating why this was the case.
- 2.7** The LNG facility at Isle of Grain also began importing for the first time this winter. Flows through the terminal followed a similar pattern with interconnector imports being well below capacity in the early part of the winter, but picking up later (rising from 2.3 mcm/day in November to 12.6 mcm/day in March).

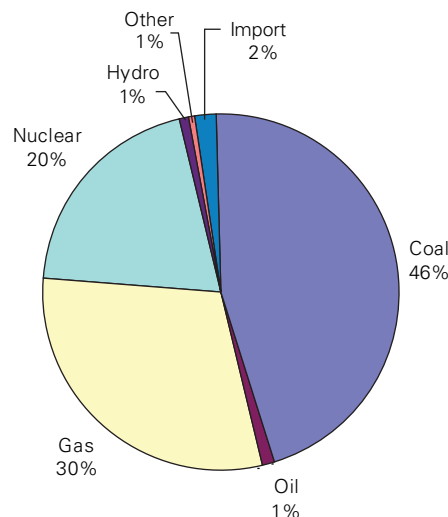
2.8 National Grid's winter outlook report for 2005-06 forecast that there was likely to be a higher degree of demand-side response in response to higher prices arising from the forecast tightness in the gas supply-demand balance than in previous winters. In the event there was a considerable demand downturn – both from generators and big industrial users – on days when the supply-demand balance was tight. In particular in response to higher gas prices, some gas-fired electricity generators reduced their gas consumption at times of low electricity demand, typically at a rate of around 20 mcm/day below the level implicit in National Grid's load duration curve. On a smaller scale, demand-side response was also observed from other large industrial users, averaging around 7mcm/day over the top 100 demand days. In addition shippers made commercially arranged gas interruptions on 69 days during the winter, in particular during late February and early March.

2.9 In anticipation of a tighter than normal gas market, National Grid introduced the Gas Balancing Alert (GBA) should the demand-supply balance reach a pre-determined level. The principle behind the GBA system is similar to the Notice of Inadequate Margin (NISM) in the electricity market. It is a signal to the market rather than an indication that an emergency situation is imminent. In the event, despite the tightness in the gas market, only one GBA was issued on 13 March 2006. This had the desired effect of re-balancing the market without coming close to an emergency situation.

Electricity

2.10 Winter demand was met with a mix of generation, as shown in the chart below. This includes input from previously mothballed plant at Grain and Killingholme that was brought back into service for the winter.

Chart 2.2: Electricity supplied in the UK by fuel, winter 2005/06



Source: DTI Energy Trade

- 2.11** The highest electricity demand last winter was 60.3 GW for the half-hour ending 17:30 on Monday 29 November 2005. This compares to the highest demand of 59.5 GW for a single half-hour in 2004-05. These figures are of net customer demand management and include power station own use.
- 2.12** National Grid issued *Notices of Inadequate System Margin* (NISMs), when the amount of available electricity generation in excess of demand fell below a specified level in a given period, signalling a need for more electricity generating capacity to be made available. NISMs were issued on five occasions over the winter. Whilst this is typical of recent winters and low by historic standards, it is difficult to compare year on year as National Grid regularly revises the thresholds for issuing NISMs. On each occasion the market responded with the necessary additional capacity, which resulted in the cancellation of the NISM. One High Risk of Demand Reduction (HRDR) notice was issued on 29 December.
- 2.13** The Anglo-French interconnector was generally in import mode during winter 2005-06, although not always at full capacity. On a typical day last winter, the UK imported electricity from France during the three periods of highest demand when spot wholesale electricity prices were higher in the UK than France. Equally, the UK tended to export electricity during the same three periods when wholesale prices were higher in France.

Chapter 3:

Supply-demand balance: short-term outlook winter 2006-07

3.1 National Grid's Consultation on Winter 2006-07 is in three phases for the first time. A consultation document was published on 16 May. A further consultation document will be published in July based on initial responses. National Grid will then publish a final Winter Outlook Report in September. This process should ensure that National Grid's analyses of the supply-demand situation for the coming winter are as accurate as possible.

Gas

3.2 Under average winter conditions, daily gas demand for January 2007 is currently expected to be around 350mcm. In a severe winter, daily demand might be expected to rise to well over 500mcm.

3.3 New import and storage facilities should increase the UK's capacity to import and store gas from winter 2007-08, but these are not expected to contribute significantly before the end of this winter. For example, there may be delays to the commissioning of the BBL pipeline, and Langeled is not expected to be at full capacity across the whole winter until the Ormen Lange field is producing. The Humbly Grove storage facility will be available for a full winter for the first time in 2006-07.

3.4 Set against this, supplies from the UKCS are expected to continue to decline. Maximum UKCS deliverability for winter 2006-07 is expected to decline by about 9% on last winter and is forecast to be about 267mcm/day – it is important to note that this figure does not include Norwegian imports.

3.5 National Grid's analysis points to an overall supply-demand situation similar to last winter, though there is more uncertainty attached to the completion and utilisation of the new import infrastructure projects, and the interactions between them (for example displacement). UKCS production availability will remain critical, as will ensuring the market framework delivers appropriate price incentives to ensure adequate imports and demand side response at times when the UK market needs these.

- 3.6** Despite the anticipated tightness in gas supply this winter, gas will be available to most consumers under all reasonable scenarios. Any delivery shortfalls in normal weather can be resolved through gas from storage and from demand side response, particularly from the electricity generators. In extreme weather conditions, greater user response would be needed. Available gas supplies for domestic consumers would not be affected even under the most extreme scenarios but some of this response might come from major industrial and commercial users willing to reduce demand in response to high wholesale prices.

Electricity

- 3.7** National Grid's forecast winter peak demand for an average cold spell during winter 2006-07 is 62.9 GW. This demand figure includes a 0.3 GW flow to Northern Ireland (across the Moyle interconnector).
- 3.8** Some 75.6GW of generating capacity is presently expected to be available for winter 2006-07. In addition there is some 1.9GW of mothballed plant out of service, of which it is estimated 0.8GW may be capable of returning to service in time for winter 2006-07. There is a further 1.1GW of mothballed plant that is unlikely to be capable of returning for this winter. The interconnector with France is also capable of delivering 2GW of imported electricity at full capacity.
- 3.9** The headline plant margin (that is the amount by which total generating capacity exceeds peak demand) is around 21% based on a Transmission Entry Capacity (TEC) contracted generation capacity of 76.3GW.
- 3.10** Key factors affecting resilience are plant reliability; the extent to which mothballed plant returns to the system; the flexibility to switch between gas-fired generation and coal- and oil-fired plant and to switch to back up fuels; the availability of electricity imports; and weather conditions. Because of the contribution of gas-fired power stations, a tight position in gas supplies will also have a knock on effect on electricity, although the impact is lessened by the availability of power stations using alternate fuels and gas-fired power stations capable of running distillate fuel. National Grid's consultation explores the interplay between some of these factors.

- 3.11** National Grid consider that the levels of generation above will be sufficient to meet demands expected under average cold spell conditions. National Grid also believes that the projected levels of generation will be adequate under severe winter conditions (-2C for 30 days, +2C for 60 days) on the assumption that we do not experience high levels of plant breakdown and that there is sufficient non-power gas demand response to enable adequate gas-fired generation to continue to run.

Chapter 4:

Supply-demand balance:

Long-term outlook

4.1 This chapter focuses on a similar time period to the work of the Joint Energy Security of Supply group (JESS) and looks at the UK supply-demand balance in gas and electricity over the next seven to ten years. More detailed information can be found in the sixth report of the JESS group that was published on 16 May 2006.

Gas

Gas demand

4.2 Forecasts of projected demand vary but the broad picture is for little if any growth in gas demand from 2006 to 2014. National Grid's forecast⁷ suggests a 2% per annum increase in demand between now and 2015 – a total increase in annual gas demand of 22% by 2015, with peak demand growing at the marginally higher rate of 25%.

Gas supply

4.3 Declining production from the UKCS will be supplemented by growing imports. A number of major projects currently under development or construction will substantially increase the UK's capacity for import and storage of gas. In addition to the projects scheduled for commissioning during winter 2006-07 (see Chapter 3), others include the Langeled pipeline to bring gas to Great Britain from Norway, two new Liquefied Natural Gas (LNG) import terminals at Milford Haven, and a new pipeline from the Netherlands. Further expansion to the Isle of Grain import facility and to the Belgium interconnector are also planned over the same period. Table 1 in the Annex provides a list of all the new import and storage facilities that are either planned or under active construction and expected to be in place

⁷ National Grid: Transporting Britain's Energy 2006, Development of Investment Scenarios, July 2006 (to be published following industry forum on 13th July).

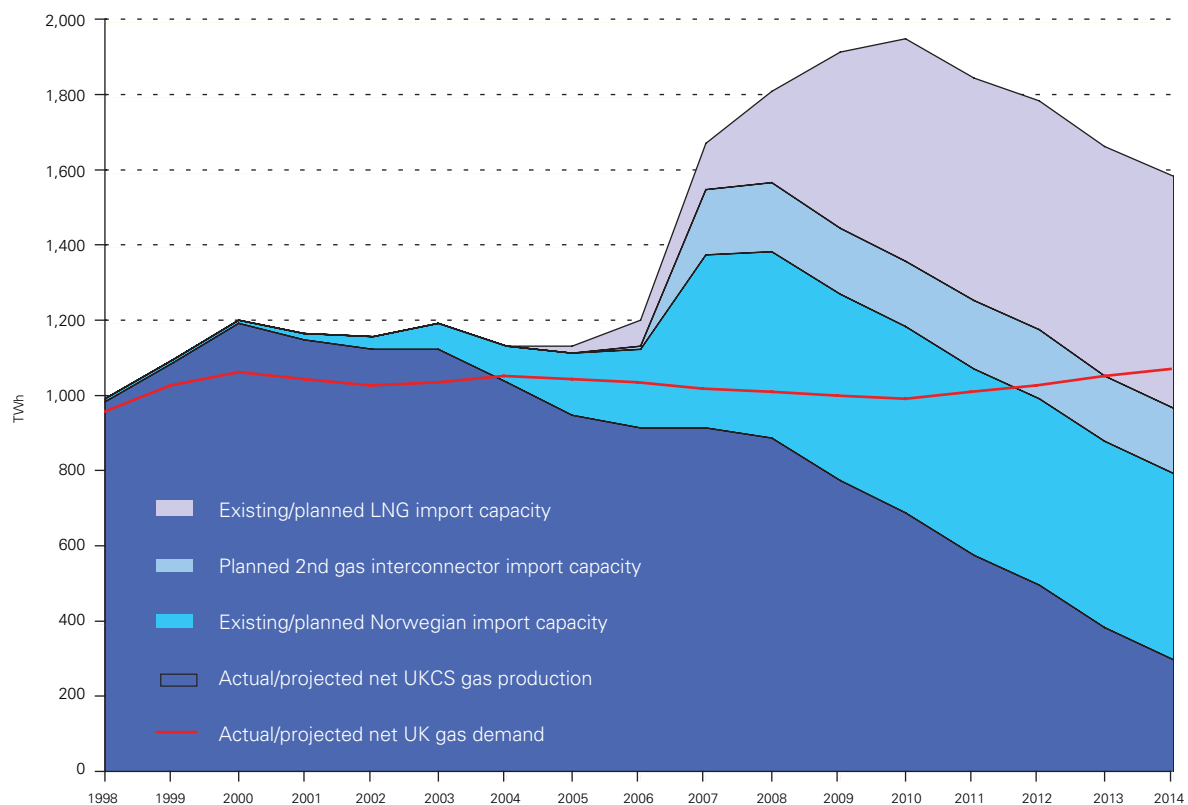
before 2010. These projects mean that by 2010-11, import projects should increase the capacity to import gas to GB by approximately 100bcm pa and the maximum daily deliverability is expected to be 300mcm/day.

4.4 New storage projects in the public domain are expected to effectively double the UK's total storage capacity – an increase of approximately 2bcm by 2008-09. These new projects will provide GB with important additional flexible sources of gas supply to meet winter peak demand.

4.5 Beyond the winter of 2006-07, the combined scale of the market's planned importation and storage projects indicates sufficient new infrastructure to create a margin of supply capability over demand in gas. This does of course depend on the timely delivery of a sufficient proportion of these projects. It is also important to underline that the availability of capacity does not guarantee the delivery of gas.

4.6 Looking further out, Britain's gas import dependency is forecast to grow as UKCS production continues to decline with net imports meeting perhaps a third of UK annual gas demand by 2010 and four fifths or more in 2020.

Chart 4.1: Annual UK gas demand and supply infrastructure



Source: JESS Report April 2006

Sources of imported gas

- 4.7** Russia holds around a third of the world's proven gas reserves (2004 estimate). Over 80% of the world's proven gas reserves, at end 2004, are located in the Middle East, Africa, Europe and Russia; many of these are within potential pipeline distance. Within Europe, the Netherlands and Norway have around 4 trillion cubic metres of gas reserves (2004 estimate).
- 4.8** The UK is increasingly part of the integrated EU gas network, which draws gas from as far afield as Russia and North Africa and may soon do so from Central Asia and Iran. At present most of the EU's imported gas is supplied by pipeline, often over considerable distances, on long-term contracts. While this creates potential exposure to political threats to cut off the gas supply and to disruption of supply by political and economic instability, in practice such incidents have been extremely rare. Moreover the UK's chief supplier of piped gas for the foreseeable future will be Norway and the UK has much experience of importing Norwegian gas.
- 4.9** Access to LNG markets through facilities at Milford Haven and the Isle of Grain will also increase the diversity of available sources and import routes.
- 4.10** The sourcing of gas supplies from overseas is a matter for market participants. Commercial operators have every incentive to make their own assessment of the merits of supplies from different countries and thereby to ensure diverse sources of gas, supply routes and entry points so as to reduce the risks arising from supply interruption from any one source. Current UK gas market arrangements are already delivering a number of competing gas import projects, potentially delivering gas from such diverse sources as Norway, the Netherlands, Russia, Algeria, Qatar and other LNG exporters.

Gas Quality

- 4.11** On occasion, it is expected that certain of these imports may not comply with the UK's gas quality specifications. In June 2003 the then Energy Minister announced the launch of a 3-phase gas quality exercise to examine interoperability issues arising. Work to identify the scale of the issues involved and the available policy options to address these is now complete. All the available evidence points to a strong case for retaining the current gas quality specifications. In December 2005 the Government moved to a public consultation on this basis.

- 4.12** Completion of the 3-phase gas quality exercise will also put the UK in a strong position to influence developing proposals at European level for harmonised cross-border gas quality specifications. This will offer the best opportunity of ensuring that any proposals are conducive to the efficient operation of a single EU gas market and are in the UK's best long-term interests.

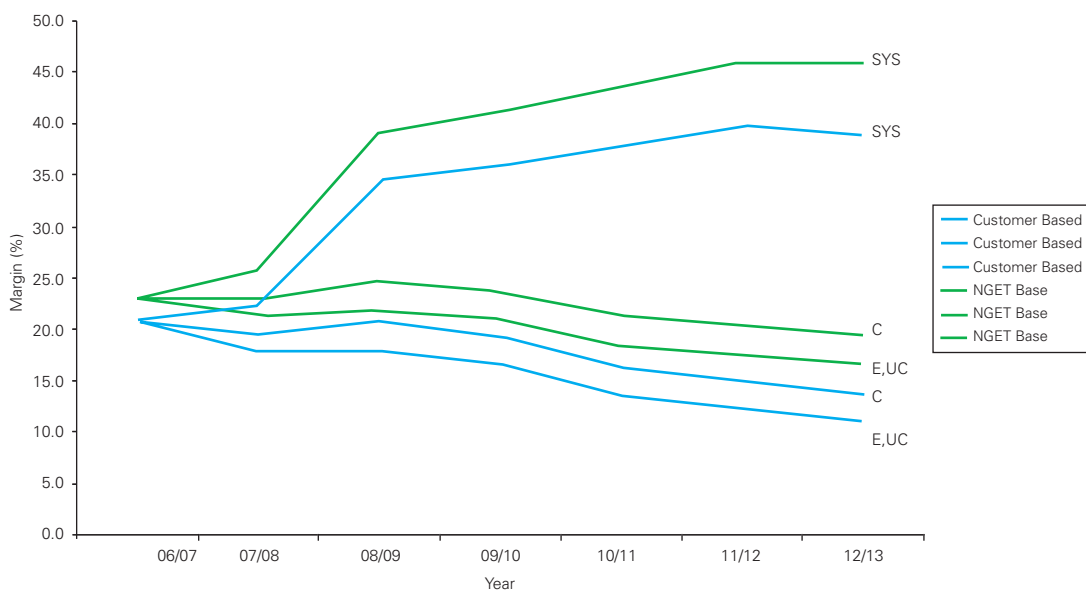
Electricity Supply

- 4.13** Generating capacity directly connected to the Great Britain transmission system is expected to total about 74.7GW in 2006-07. Development over the following years will depend on the amount of new generating capacity that is added, offset by any closures. Taking into account, as a base case, only existing power stations and those for which consent has been obtained under both section 36 of the Electricity Act 1989 and section 14 of the Energy Act 1976 where necessary, and notified reductions in capacity from plant closures or plant being mothballed, the level of contracted generation capacity would increase to 77.7GW by 2012/13 (including the interconnector). This should not be taken as a forecast of total additional generating capacity, because of the timing and other uncertainties around both new build and closures. Furthermore, significant new generation that is only indirectly connected to the transmission system is expected.
- 4.14** A list of new electricity projects with consent under section 36 and under section 14 is at table 2 in the Annex – indeed, Langage is now being built. The Government is also aware of proposals for investment in additional generating capacity that have been announced but for which no formal application for consent has yet been made and applications that have been made but not yet granted.
- 4.15** Additional factors that may affect future generating capacity totals include the return to service of plant currently held in mothball and the retirement of existing plant, which may not have been formally notified as yet. These are commercial decisions for the owners of such plant and will depend on their own view of many factors including likely future developments in the electricity market and their own requirements within it. Key issues that might affect those decisions include environmental legislation, in particular the Large Combustion Plants Directive (LCPD) and the lifetimes of existing nuclear plant, as well as wider commercial considerations. Details on the prospective plant closure dates in terms of both the LCPD and nuclear lifetimes were published in the last JESS report.

4.16 The *plant margin* (see Chapter 3) is sometimes used as a broad indicator of security of energy supply, although it does not capture fully all the factors that may have an impact on the reliability of energy supply.

4.17 Projections obviously depend on which assumptions of supply and demand are used. The chart below, taken from National Grid's Seven Year Statement, illustrates the range of possible outturns for the plant margin when calculated on the basis of different assumptions about future demand and supply.

Chart 4.2: GB plant margins



Source: National Grid

4.18 The blue lines are based on National Grid's customers' views of future demand mapped against three possible supply scenarios⁸; while the green lines match the same three supply scenarios with National Grid's own assessment of likely future demand.

⁸ SYS: In addition to all existing plant: plant where an appropriate contract is in place for connection to and use of the transmission system, less notified reductions in capacity from plant closures or plant being mothballed
 C: In addition to all existing plant: plant that has obtained consent under section 36 of the Electricity Act and section 14 of the Energy Act 1976, less notified reductions in capacity from plant closures or plant being mothballed
 E, UC: In addition to all existing plant: plant which is actually under construction, less notified reductions in capacity from plant closures or plant being mothballed

Chapter 5:

Delivery Networks – security of supply outlook

- 5.1** Ofgem in its role as regulator for the energy networks continues to monitor the reliability of networks and to ensure that companies have the right incentives to ensure that investment occurs when and where it is needed, and that network development, maintenance and operation occurs in an efficient manner that provides the maximum benefit to consumers.
- 5.2** The legal and regulatory framework is geared towards ensuring that transmission and distribution systems provide efficient and timely investment to ensure sufficient network capacity and reliability so that available supplies of gas and electricity can be transported to energy consumers. With the price control allowances, licence obligations and incentives, overall decisions on investment into their networks are determined by the transmission and distribution companies themselves.
- 5.3** Following the 2003 blackouts experienced in London and the West Midlands, Ofgem introduced a new electricity transmission network reliability incentive scheme for National Grid, reinforcing the existing obligations regarding network security. The incentive scheme came into effect in January 2005. These incentive arrangements utilise an annual baseline for the amount of energy, measured in megawatt hours (MWh), unsupplied by the transmission network each year. If National Grid is unable to supply available energy due to infrastructure failure and the level of energy unsupplied exceeds the baseline, it can be penalised by up to 1.5 percent of its revenue. Where the level of energy unsupplied falls below the baseline, National Grid will be rewarded by up to 1.0 per cent of its revenue.

Network reliability

Electricity: transmission

- 5.4** Ofgem monitors closely the performance of electricity and gas networks. For electricity, National Grid's figures in relation to the electricity national grid

show that it is around 99.9997-99.9999 per cent reliable and that distribution networks have seen improvements in service with power cuts down by 11 per cent since privatisation.

- 5.5** On the England and Wales electricity transmission system there were 11 loss of supply events in 2004/05. This resulted in 888MWh being lost from the transmission system – equivalent to around 0.0003% of all electricity transmitted during the period¹⁰. Of this 888MWh lost, only 58MWh was the result of interruptions to 4 or more customers, which is around 93% lower than for the previous financial year.
- 5.6** During 2004/05, there was a combined total of seventeen loss of supply events on the Scottish transmission system, summing to around 231MWh. This represents around 0.0006%² of all electricity transmitted across the Scottish transmission systems. Of these seventeen events, only thirteen affected four or more customers, representing a fall of 7% over the previous year. In volume terms, the fall in lost supply to four or more customers was around 46%.

Electricity: Distribution

- 5.7** Electricity distributors face certain quality of service standards aimed at guaranteed standards of performance. These standards set service levels that must be met in specific individual cases and incidents. If the electricity distributor fails to provide the level of service required, it must make a payment to the customer affected, subject to certain exemptions and, in certain cases, taking account of weather conditions prevailing at that time. This includes among others, measuring response times to certain network failures; restoration of supplies; and the number of interruptions experienced by a particular customer each year
- 5.8** Over the year April 2005 to March 2006, the total number of customer interruptions was around 21 million. The total number of customer minutes lost was 1,966 million. To put this in perspective, the previous year (April 2004 to March 2005) there were around 22 million customer interruptions and the total number of customer minutes lost was 2,268.5 million. It should be noted that the total number of customer interruptions has been falling steadily. The number of interruptions in 2005-06 was around 4.5% lower than 2004-05.

⁹ Electricity transmitted across the England and Wales transmission system during this period was around 315TWh.

¹⁰ This is based on transmission of 7.6TWh in SHETL's area and 31.8TWh in Scottish Power's area.

Gas

- 5.9** During the winter 2005-06 no days were lost to National Grid interrupting supplies on the National Transmission System (NTS) under contractual arrangements, compared to four days in the previous winter. This is due to the introduction of uniformed network code modification 13A, which removed the ability of NG NTS to interrupt for supply/demand purposes.
- 5.10** Due to availability of data, domestic and Industrial and Commercial non-contractual interruptions to supply are reported where the time taken to restore supplies is greater than 24 hours. On this measure there were 4,395 interruptions to supplies on National grid's distribution networks between April and September 2004, whereas there were 2,377 interruptions to supplies between October 2004 and March 2005.
- 5.11** In May 2005 National Grid were authorised to sell 4 of its DN networks to new DN operators. Therefore interruption data is supplied by both NG and the new DN operators. That new information was not available at time of publication.

Winter Outlook

- 5.12** For the coming winter, National Grid have assessed that both the gas and electricity networks have the physical capacity to meet the published transportation requirements of cold winters, due to its assessment of:

- High network availability.
- Outage programme due to be completed.
- High availability of gas compressor stations.
- The benefit of continued high levels of investment in its networks.

Distribution companies are incentivised to develop, maintain and operate their networks in an efficient manner and combined with incentives, to respond to and resolve network outages for example those related to storm damage to local networks.

- 5.13** Over a **longer-term** time frame, National Grid's planning statements provide associated outlook for network investment needs. Market participants are able to participate in these processes and also more directly can provide signals, for example via the long-term entry auctions in gas. Therefore, both the national grid and local distribution networks face incentives to ensure that available electricity and gas supplies can be delivered in an efficient manner.

Chapter 6:

Emergency Preparedness

- 6.1** No system can guarantee that there will be no disruption to electricity. Our energy generation and distribution companies have very good systems for restoring power where necessary, and these systems are the bedrock of our emergency response structures. There are, however, scenarios where energy failures are so severe and widespread as to constitute a national emergency requiring the involvement of Government and joint national action. The Government, Ofgem and the industry are working together to ensure that we have robust and appropriate mechanisms to cope with any such emergencies.
- 6.2** DTI's and industry's plans for handling gas and electricity emergencies have been thoroughly reviewed and greatly enhanced over the last year. This work has been carried out under the auspices of the Energy Emergencies Executive (the E3) that was established to oversee the structures and practices of our energy emergency planning. It is chaired by DTI and includes Ofgem, National Grid and all major industry participants. The Executive provides a high level link between government and industry.
- 6.3** E3 has developed robust, and thoroughly tested, plans¹¹ and it will continue to work to ensure that they remain fit for purpose. The emergency plans were tested in a series of exercises in September and October 2005, and the lessons learned from these experiences have been incorporated in the latest emergency plans. There is also an extensive training programme across Whitehall and industry. Further exercises are planned for 2006-07, including procedures for recovering from a total electricity system shutdown (Black Start) and from a major telecommunications failure.

¹¹ http://www.dti.gov.uk/energy/domestic_markets/security_of_supply/incident_response_plan.pdf

Annex

Table 1: Planned major new gas projects (as at July 2006)

Background:

Approvals for major energy projects are generally sought from national government, whereas local government deals with smaller projects.

Gas Import Infrastructure

Project	Owner/Proposer	Size	Date	Status	Under Construction
Langeled South pipeline supplying gas from the Ormen Lange gas field development and other Norwegian fields	Norsk Hydro / Shell Norge	Pipeline capacity about 70 Mcm/day	First gas planned 2006/07	Pipeline construction has commenced	Yes
Statfjord Late Life project; delivery via FLAGS pipeline	Statoil	17 Mcm/day at plateau	First gas planned 2007/08	Project approved by both UK and Norwegian Governments	...
Compressors at Zeebrugge to increase import capacity into UK	Interconnector UK	Second stage to increase capacity from 44 Mcm/day to 66 Mcm/day	Second stage is planned for December 2006	Phase 2 construction on schedule	Yes
Interconnector from Balgzand to Bacton (the 'BBL' pipeline)	BBL	Potential capacity up to 44 Mcm/day	First gas planned December 2006	Under construction	Yes

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Project	Owner/Proposer	Size	Date	Status	Under Construction
Isle of Grain LNG import and storage facility; redevelopment of existing site	National Grid	Phase 2 expansion for an additional 25 Mcm/day	Phase 2 due for completion in Q4 2008	Contracts have been awarded for Phase 2	Yes
South Hook LNG terminal at Milford Haven	Qatar Gas / Exxon-Mobil	Phase 1 up to 33 Mcm/day; Phase 2 additional 26 Mcm/day	First gas Phase 1 in Q4 2007; Phase 2 2009	Under construction. Contracts awarded for Phase 2	Yes
Dragon LNG terminal at Milford Haven	Petroplus/BG/ Petronas	First train up to 16.5 Mcm/day, up to a maximum of 27 Mcm/day during peak periods	First gas Q4 2007	Under construction. Planning permission facing legal challenge	Yes
LNG terminal at Norseia Oil Terminal, Teesside	Conoco Philips	To be confirmed	To be confirmed	Pre-planning	...
Canvey Island LNG	Calor	To be confirmed	To be confirmed	Planning	...
Teesside Gasport	Excelerate	11Mcm/day	Planned for December 2006	Planning	...

Gas Storage Infrastructure

Project	Owner/Proposer	Size	Date	Status	Under Construction
Aldbrough storage	Joint development between Statoil and Scottish and Southern Energy	420 Mcm storage capacity	Commissioning Q3 2007	Approved	Yes
Holford storage, Cheshire	Scottish Power	170 Mcm storage capacity	Proposed commissioning 2008	Approved	Yes

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Project	Owner/Proposer	Size	Date	Status	Under Constr- uction
Welton storage facility	Star Energy Ltd	435 Mcm storage capacity	2008	Local planning has refused permission but an appeal is likely	...
Preesall storage facility	Cantaxx	Total capacity 1.7 bcm	Proposed operational 2009	Public Inquiry held: awaiting decision	...
Aldbury Phase 1	Star Energy Ltd	160 Mcm storage capacity	Proposed commissioning 2007/08	Pre-planning	...
Aldbury Phase 2	Star Energy Ltd	Up to 715 Mcm storage capacity	Proposed commissioning 2010	Pre-planning. Drilling required	...
Bletchingly storage facility	Star Energy Ltd	900 Mcm storage capacity	Proposed commissioning 2009	Pre-planning. Drilling required	...
Saltfleetby Gas Storage	Wingas	600 Mcm storage capacity	Proposed commissioning Q4 2008	Pre-planning	...
Caythorpe Gas Storage	Warwick Energy	210 Mcm, storage capacity	Proposed commissioning Q2 2007	Being processed	...
Portland Gas storage	Edon Resources/ Portland Gas Ltd	990 Mcm dependent on test results	Proposed operational by 2010	Being processed by local planning. Test wells due to be completed Q1 2006	...
Stublach Gas storage facility	INEOS Enterprises	540 Mcm storage capacity	Proposed commissioning 2009	Approved	

Newly completed and commissioned projects (as of July 2006)

Project	Owner/Proposer	Size	Date	Status	Under Constr- uction
Compressors at Zeebrugge to increase import capacity into Bacton	Interconnector UK	Increase from 25 Mcm/day to 47 Mcm/day		Construction now complete and extra capacity available	
Isle of Grain LNG import and storage facility; redevelopment of existing site	National Grid	Phase 1, 13 Mcm/day; Phase 2 expansion additional 25 Mcm/day		Phase 1 construction complete and has received several cargoes	
Humbly Grove storage facility	Star Energy Ltd	280 Mcm storage capacity		Facility operational	

Key: ... indicates that the project has yet to reach the stage where construction can begin.

**Table 2: Planned major new electricity projects
(as at July 2006)**

As a consequence of the Secretary of State's powers under section 36 of the Electricity Act 1989¹² and section 14 of the Energy Act 1976 the DTI gains an appreciation of the potential significant new electricity capacity planned to be built in England and Wales. In Scotland significant new electricity generating stations are authorised by Scottish Ministers and DTI are formally only involved if it is oil or gas-fired capacity where clearance is also required from the Secretary of State for Trade and Industry under section 14 of the Electricity Act 1989.

Station	Owner	Size (MW)	Type	Distillate back-up	Status	Under Construction
CCGTs						
Staythorpe	RWE npower	1,630	CCGT	Yes ¹³	Approved November 2000	Preliminary ground work begun
Langage, South Devon	Wainstones (Carlton Power) Option acquired by Centrica	1,010	CCGT	Black start and back up fuel issues are still under discussion	Approved November 2000	Preliminary work begun
Marchwood, Hampshire	ESBI (Republic of Ireland Electricity Board)	800	CCGT	No	Approved November 2002	No Expected to start in 2006
New Pembroke Power Station	RWE npower	2,000	CCGT		Being processed	...
Partington	Bridestones Development Ltd	380	CCGT		Being processed	
New Drakelow Power Station	E.On	1,220	CCGT		Being processed	...
New Isle of Grain Power Station	E.On	1,200	CCGT		Being processed	...
West Burton	EDF Energy	1,270	CCGT		Being processed	...
Sutton Bridge B	EDF Energy	1,260	CCGT		Being processed	...
Uskmouth	Severn Power	800	CCGT		Being processed	
Total CCGTs		11,570 MW				

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The table shows CCGT approvals from November 2000 (when the stricter consents policy was lifted) and state of play on applications for stations over 50 MW.

Station	Owner	Size (MW)	Type	Distillate back-up	Status	Under Construction
CHPs						
Corus, Port Talbot, South Wales	Sun Coke Company	130	Coke fired CHP		Being processed	...
West Thamesmead	CDCE Ltd	140	Gas CHP		Being processed	...
Immingham	Immingham CHP	Extension from 700 to 1,230	Gas CHP		Being processed	...
Other CHPs	Various	411	Gas CHP		Approved since November 2000	Varies
Total CHPs		1,211 MW				

Station	Owner	Size (MW)	Type	Status	Under Construction
Integrated coal gasification combined cycles ICGCC					
Hatfield Colliery	Coalpower	430	ICGCC	Approved August 2003	No
Total ICGCCs		430 MW			
Dual-firing					
Indian Queens		AES	Dual oil/gas capability	Approved September 2001	No
Littlebrook	RWE npower		Dual oil/gas capability	Approved August 2002	No

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Station	Owner	Size (MW)	Type	Status	Under Construction
Renewables and energy from waste					
Paul's Hill, Moray	Natural Power Consultants Ltd	56 9	Onshore windfarm	Approved March 2003 Extension approved December 2005	Yes ...
Hadyard Hill, South Ayrshire	SSE Generation Ltd	130	Onshore windfarm	Approved December 2003	Yes
Crystal Rig windfarm extension, Scottish Borders	Natural Power Consultants Ltd	62.5	Onshore windfarm	Approved May 2004	No
Farr, Invernessshire, Highland	Npower Renewables	112.5	Onshore windfarm	Approved October 2004	No
Braes of Doune, Stirling	Airtricity	100	Onshore windfarm	Approved October 2004	No
Scout Moor, nr Rochdale Lancashire	United Utilities & Peel Holdings	65	Onshore windfarm	Approved May 2005	No
Crystal Rig 2, Scottish Borders	Natural Power Consultants Ltd	90	Onshore windfarm	Approved July 2005	No
Little Cheyne Court, Walland Marsh, Kent	National Wind Power	78	Onshore windfarm	Approved October 2005	No
Causeymire	National Wind Power	55.2	Onshore windfarm	Approved November 2005	No
Plashett's Northumberland	The Banks Group	66	Onshore windfarm	Being processed	...
Keadby North Lincolnshire	RES Ltd	78	Onshore windfarm	To go to public inquiry	...
Tween Bridge, Thorne, Lincolnshire	United Utilities	84	Onshore windfarm	To go to public inquiry	...
Fullabrook Down, North Devon	Devon Wind Ltd	66	Onshore windfarm	To go to public inquiry	...
Orby Marsh, Skegness	M Cauldwell	54	Onshore windfarm	Being Processed	...
Ray, Northumberland	AMEC	60	Onshore windfarm	Being Processed	...
Middlemoor, Northumberland	Npower Renewables	75	Onshore windfarm	Being Processed	...

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Station	Owner	Size (MW)	Type	Status	Under Construction
Renewables and energy from waste (continued)					
Windy Standard extension	Natural Power Consultants Ltd	90	Onshore windfarm	Application submitted December 2001	...
Whitelee, East Renfrewshire	Scottish Power	322	Onshore windfarm	Application submitted January 2002	...
Greenock, Inverclyde	Airtricity	59	Onshore windfarm	Application submitted May 2003	...
Gordonbush, Highland	SSE Generation Ltd	87.5	Onshore windfarm	Application submitted June 2003	...
Clashindarroch, Aberdeenshire	AMEC wind	129	Onshore windfarm	Application submitted July 2003	...
Aultmore, Moray	AMEC wind	62	Onshore windfarm	Application submitted October 2003	...
Kilpatrick Hills, West Dunbartonshire	Airtricity	60	Onshore windfarm	Application submitted December 2003	...
Abercairny, Perth and Kinross	Catamount Energy Ltd	66	Onshore windfarm	Application submitted January 2004	...
Calliacher, Perth and Kinross	I & H Brown Ltd	62.1	Onshore windfarm	Application submitted February 2004	...
Hartestanes, Dumfries and Galloway	CRE Energy Ltd	282	Onshore windfarm	Application submitted March 2004	...
Ewehill, Dumfries and Galloway	Scottish Power	92	Onshore windfarm	Application submitted March 2004	...
Griffin, Perth and Kinross	Greenpower (Griffin) Limited	216	Onshore windfarm	Application submitted April 2004	...
Dersaloch, South Ayrshire	CRE Energy Ltd	78	Onshore windfarm	Application submitted July 2004	...
Baillie, Highland Developments	Dudley	75	Onshore windfarm	Application submitted July 2004	...
Berry Burn, Moray	Force 9 Energy	78.3	Onshore windfarm	Application submitted September 2004	...
Kyle, East Ayrshire	AMEC	300	Onshore windfarm	Application submitted October 2004	...
Afton, East Ayrshire	E.On	74.25	Onshore windfarm	Application submitted November 2004	...
Clyde, South Lanarkshire	Airtricity	622.8	Onshore windfarm	Application submitted November 2004	...

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Station	Owner	Size (MW)	Type	Status	Under Construction
Renewables and energy from waste (continued)					
Lewis, Eilean Siar	Lewis Windpower	702	Onshore windfarm	Application submitted November 2004	...
Carraig Gheal, Argyll and Bute	Greenpower (Carraig Gheal) Limited	75	Onshore windfarm	Application submitted November 2004	...
Waterhead Moor, Largs, Ayrshire	SSE Ltd	132	Onshore windfarm	Application submitted November 2004	...
Muaitheabhal, Eilean Siar	Beinn Mhor Power	399	Onshore windfarm	Application submitted December 2004	...
Dunmaglass, Highland	RES Group	100	Onshore windfarm	Application submitted February 2005	...
Spireslack, East Ayrshire	The Scottish Coal Company	59.6	Onshore windfarm	Application submitted April 2005	...
Fallago Ridge, Scottish Borders	North British Wind Energy	114	Onshore windfarm	Application submitted May 2005	...
Harrows Law, West Lothian	SSE Ltd	111	Onshore windfarm	Application submitted June 2005	...
Mark Hill, South Ayrshire	Catamount Energy	84	Onshore windfarm	Application submitted August 2005	...
Limmer Hill, South Lanarkshire	West Coast Energy Ltd	99	Onshore windfarm	Application submitted August 2005	...
Dunbeath, Highland	West Coast Energy Ltd	69	Onshore windfarm	Application submitted August 2005	...
Blackcraig Hill, Dumfries and Galloway	SSE Generation Ltd	69	Onshore windfarm	Application submitted September 2005	...
Glenkirk, Highland	Eurus Energy UK Ltd	102	Onshore windfarm	Application submitted September 2005	...
Lochluichart	LZN Ltd	129	Onshore windfarm	Application submitted November 2005	...
Rhyl Flats, off Rhyl, North Wales	Npower Renewables	150	Offshore windfarm	Approved December 2002	No
Barrow, off Walney Island, Cumbria	DONG	90	Offshore windfarm	Approved March 2003	Yes
Burbo Bank, off Wirral/Crosby	Seascope Energy	90	Offshore windfarm	Approved July 2003	No

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Station	Owner	Size (MW)	Type	Status	Under Construction
Renewables and energy from waste (continued)					
Robin Rigg, Solway Firth	Powergen	216	Offshore windfarm	Approved March 2003 by the Scottish Executive	No
Inner Dowsing, off Skegness, Lincolnshire	OWP	120	Offshore windfarm	TWA Order ¹⁴ approved 21/10/03	...
Lynn, off Skegness, Lincolnshire	AMEC Offshore	108	Offshore windfarm	TWA Order approved 21/10/03	...
Cromer, off Cromer, Norfolk	Norfolk Offshore Wind Limited	108	Offshore windfarm	TWA Order approved 21/10/03	...
Gunfleet Sands, off Clacton, Essex	GE Wind Energy	108 windfarm	Offshore	TWA Order approved, 21/10/03	...
Shell Flat, off Cleveleys, Blackpool, Lancashire	Cirrus Energy	324	Offshore windfarm	Application for TWA Order being considered	...
Teesside, off Redcar	EDF (Northern Offshore) Ltd	90	Offshore windfarm	Being processed	...
London Array, off Margate, Kent	LAL	1,000	Offshore windfarm	Being processed	...
Greater Gabbard, off Suffolk Coast	Greater Gabbard Offshore Ltd	500	Offshore windfarm	Being processed	...
Thanet, off Foreness Point, Kent	Thanet Offshore Wind Ltd	300	Offshore windfarm	Being processed	...
Gwynt y Mor, off Llandudno	Npower renewables	750	Offshore windfarm	Being processed	...
Braevallich, Argyll and Bute	Innogy hydro	2.5	Hydro	Approved March 2003	No
Kingairloch, Highland	SSE Generation Ltd	3.5	Hydro	Approved March 2003	No
Garrogie, Highland	Innogy hydro	2	Hydro	Approved June 2003	No
Fasnakyle extension, Highland	SSE Generation Ltd	7.5	Hydro	Approved March 2004	No
River E, Highland	Innogy hydro	3	Hydro	Approved May 2005	No

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Station	Owner	Size (MW)	Type	Status	Under Construction
Renewables and energy from waste (continued)					
Glendoe, Highland	SSE Generation Ltd	100	Hydro	Approved July 2005	No
Douglas Water, Argyll and Bute	Innogy hydro	3	Hydro	Approved November 2005	No
Stronelaig, Highland	Innogy hydro	10.3	Hydro	Application submitted June 2003	...
Allt Hallater, Argyll and Bute	Npower renewables	1.9	Hydro	Application submitted January 2004	...
Keltneyburn Hydro Ltd	Keltneyburn	2.2	Hydro	Application submitted November 2004	...
Inverlael, Highland	Npower Renewables	3	Hydro	Application submitted March 2005	...
River Braan, Perth and Kinross	Npower Renewables	2.9	Hydro	Application submitted July 2005	...
Carnoch, Highland	Npower Renewables	1.5	Hydro	Application submitted October 2005	...
Innerhadden, Perth and Kinross	Innerhadden Hydro Ltd	1.4	Hydro	Application submitted December 2005	...
Belvedere, London	Riverside Resources	70	Energy from waste	Approved 15 June 2006	...
Peterborough	Peterborough Renewable	174	Energy from waste	To go to public enquiry	...
Ince, Cheshire	Peel Environmental	95	Energy from waste	Being Processed	...
Total Renewables and energy from waste			10,679 MW		
In addition the Scottish Executive are aware of proposals for 17 further onshore windfarms totalling around 2,335 MW and 10 further hydro schemes totalling around 31 MW					

12 Section 36 consent can be transferred or sold on to another company.

13 However, there is some uncertainty about whether this will be built.

14 TWA Order = Transport and Works Act Order.

Key: ... indicates that the project has yet to reach the stage where construction can begin.

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