



Department
of Energy &
Climate Change

ofgem

Making a positive difference
for energy consumers

Statutory Security of Supply Report 2015

Presented to Parliament pursuant to section 172 of the Energy Act
2004 as amended by section 80 of the Energy Act 2011

Ordered by the House of Commons to be printed 15 October 2015



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Introduction

1. This report discharges the Government and Ofgem's respective obligations under section 172 of the Energy Act 2004 as amended by section 80 of the Energy Act 2011, including Government's obligation to report annually to Parliament on the availability of electricity and gas for meeting the reasonable demands of consumers in Great Britain (GB)¹. It also discharges the Government's obligation under certain EU Directives to monitor gas and electricity security of supply issues and publish reports².
2. The technical data presented here has been produced from analysis conducted by DECC, Ofgem and National Grid (NG). The statistics relied on in this document are for GB only where possible. However, in some cases where it is not possible to split the GB data out from the United Kingdom (UK) data, UK statistics have been used. Where this is the case, they have been referred to as UK in the accompanying text.

Electricity

Introduction

3. GB's electricity system has delivered secure supplies to date. While the system continues to face the challenges of decarbonisation and replacing ageing and polluting plant, developments over the last two years show that we have a plan to ensure the lights stay on.
4. The Government reliability standard for security of electricity supply is represented by a Loss of Load Expectation (LOLE) of 3 hours per year. LOLE represents the number of hours per year in which supply is expected to be lower than demand under normal operation of the system. It is important to note that the LOLE metric is not a measure of the expected number of hours in which customers may be disconnected, but represents periods where the system operator may be expected to employ mitigation actions available to it.
5. The use of LOLE is a probabilistic approach – that is, the actual amount will vary depending on the circumstances in a particular year, for example how cold the winter is; whether or not an unusually large number of power plants fail to work on a given occasion; the power output from wind generation at peak demand; and, all the other factors which affect the balance of electricity supply and demand.

¹ Available from: www.statutelaw.gov.uk/Home.aspx

² Directive 2009/73/EC of the European Parliament and the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC augmented by Regulation (EU) 994/2010 of the European Parliament and the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC; and Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC augmented by Directive 2005/89/EC of the European Parliament and of the Council of 18 January 2006 concerning measures to safeguard security of electricity supply and infrastructure investment.

6. In light of the uncertain outlook to electricity security supply during the middle of the decade, DECC, National Grid Electricity Transmission (NGET) and Ofgem worked together to explore options for additional safeguards to consumers, aimed at enabling NGET to maintain system balance.
7. Two new balancing services, Supplemental Balancing Reserve (SBR) and Demand Side Balancing Reserve (DSBR), were first introduced for winter 2014/15. These services assist NGET in balancing the system and provide consumers with an extra layer of protection from potential disruptions to supply. The DSBR scheme provides the opportunity for participating large energy users to receive payments in return for reducing their electricity use during periods of high demand.
8. In 2014/15, NGET procured 1.6GW of SBR and DSBR reserves at a total cost of approximately £31.30m (approximately 40p per customer per year). Ofgem reviewed the costs incurred by NGET and decided to not disallow any of them.
9. For winter 2015/16, NGET has procured 2.4GW of reserves at a total expected cost of £34.70m (approximately 45p per customer per year). This represents a fall in costs from 2014/15 of £4.70/kW-year.
10. In its 2015 Electricity Security of Supply Report³, Ofgem assessed the first three years of National Grid's Future Energy Scenarios (FES). In the report, Ofgem agreed that projected margins could tighten in winter 2015/16 and winter 2016/17. However, the inclusion of the SBR and DSBR tools available to National Grid for winter 2015/16 effectively reduces the risk to security of supply within the level implied by the Government's reliability standard. The risk to security of supply is then expected to fall in 2017/18 due to plant returning to the market.
11. In the medium term, the Government has established a Capacity Market (CM) to bring forward new investment to ensure we have enough capacity to meet peak demand at the lowest cost to consumers. The first auction contracted 49.3 GW of capacity for delivery in winter 2018/19 at a clearing price of £19.40/kW. The result will ensure that enough of our existing capacity will remain open at the end of the decade as well as unlocking new investment, including a large independent gas plant at Trafford.
12. The first phase of Ofgem's Electricity Balancing Significant Code Review (EBSCR) reforms to cash-out arrangements comes into effect this winter. The objective of the reforms is to address issues with balancing arrangements which undermine efficiency in balancing and security of supply.
13. In advance of CM introduction, EBSCR reform has the potential to strengthen the provision of security of supply by the wholesale market – for instance by incentivising suppliers to strike demand-side reduction contracts rather than risk facing the cash-out price on their imbalances. With the introduction of the CM in 2018, EBSCR will help to ensure security of supply is delivered at least cost.
14. The networks, both transmission and distribution, remain reliable but along with the rest of the electricity system, continue to require investment to ensure they continue to facilitate the transition to a low carbon system. Ofgem's price control settlements through its RIIO (Revenue=Incentives+ Innovation+Outputs) model are ensuring this investment takes place and drives further efficiency savings.

³ For more information see:

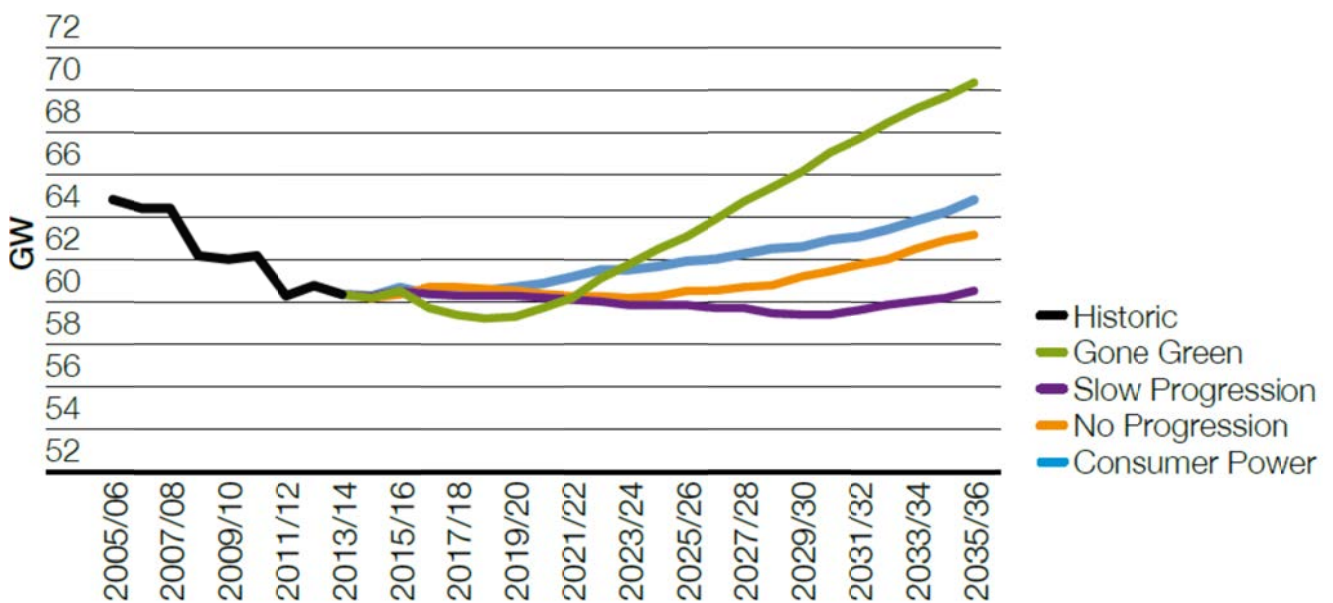
https://www.ofgem.gov.uk/sites/default/files/docs/2015/07/electricitysecurityofsupplyreport_final_0.pdf

15. This chapter lays out the current outlook for electricity security of supply in Great Britain (GB) for the coming four years.

Demand

16. Chart 1.1 shows historic and forecast trends of average cold spell peak total electricity demand from National Grid. This includes demand met by generation which is connected to the transmission network as well as embedded generation (generation that is connected directly to the distribution network). Peak electricity demand has been declining in recent years; peak demand levels were around 60 GW over winter 2014/15 down from around 66 GW in 2005/06.
17. NG has published four scenarios for electricity demand as part of the UK FES work: under their Gone Green (GG) scenario it will take until 2027 to see peak electricity demand rise to the level it was in 2005/6; whereas the Consumer Power (CP) scenario it takes until 2035/36. In No Progression (NP) and Slow Progression (SP) peak electricity demand does exceed 2005/6 levels at 63 GW and 60 GW respectively.⁴

Chart 1.1 Future Development of ACS Peak Demand



Source: National Grid Future Energy Scenarios 2015

Demand Side Response (DSR)

18. NG typically has around 3 GW of Short Term Operating Reserve (STOR) contracted, and dispatches STOR 5 days out of 7. To provide a snapshot of the types of providers participating in STOR, from mid-August to mid-September 2014, 1.56 GW of ‘non-Balancing Mechanism’ (non-BM) providers were contracted in STOR – this broadly equates to DSR provision (a further 1.19 GW of STOR coming from larger generators). Of the 1.56 GW of DSR in STOR, around 115 MW (7%) was actual ‘load reduction/turn-down’ – meaning organisations reducing the amount of electricity they take from the grid – for example, by turning off refrigeration or air conditioning units for a short period of time. The remainder of the 1.56 GW was made up of smaller ‘on-site’ generators – including diesel, gas, hydro, combined heat and power (CHP) and biomass. During mid-August to mid-September 2015, 1.65 GW of ‘non-Balancing Mechanism’ (non-BM) providers

⁴ <http://www2.nationalgrid.com/uk/industry-information/future-of-energy/future-energy-scenarios/>

were contracted in STOR, however, the volume coming from 'load reduction/turn-down' is not known at this time.

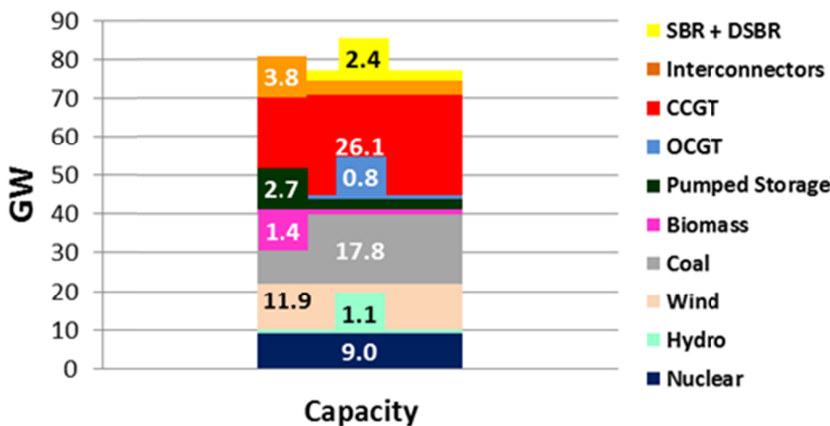
19. The Transmission Network Use of System (TNUoS) charging regime is used to pay for the recovery of installation, reinforcement, maintenance costs and renewal of assets by the owners of the transmission network. The split of charges between generation and demand customers used to be fixed at 27% / 73%. This, however, now varies year to year with the Transmission Tariffs for 2015/16 set to recover 23.20% of revenue from generation and 76.80% from demand⁵ (with an estimated 30% of this by large industrial and commercial electricity consumers).
20. In its 2015 Winter Consultation, NG stated that levels of customer demand management related to triad were similar to the previous year with approximately 1.2 GW experienced on high demand days throughout the triad period (November to February). The de-rated volume of Demand Side Balancing Reserve (DSBR) service contracted for winter 2014/15 was 136 MW and 133 MW for winter 2015/16. This represents an additional source of demand side support to manage electricity margin challenges.

Supply

Present Capacity

21. National Grid's FES and Winter Outlook Report assumes a total of approximately 70 GW of generation capacity⁶ to be available this winter (2015/16) for National Grid's base case. Chart 1.2 shows the breakdown.

Chart 1.2 Generation capacity for winter 2015/16 assumed for National Grid base case (Slow Progression)

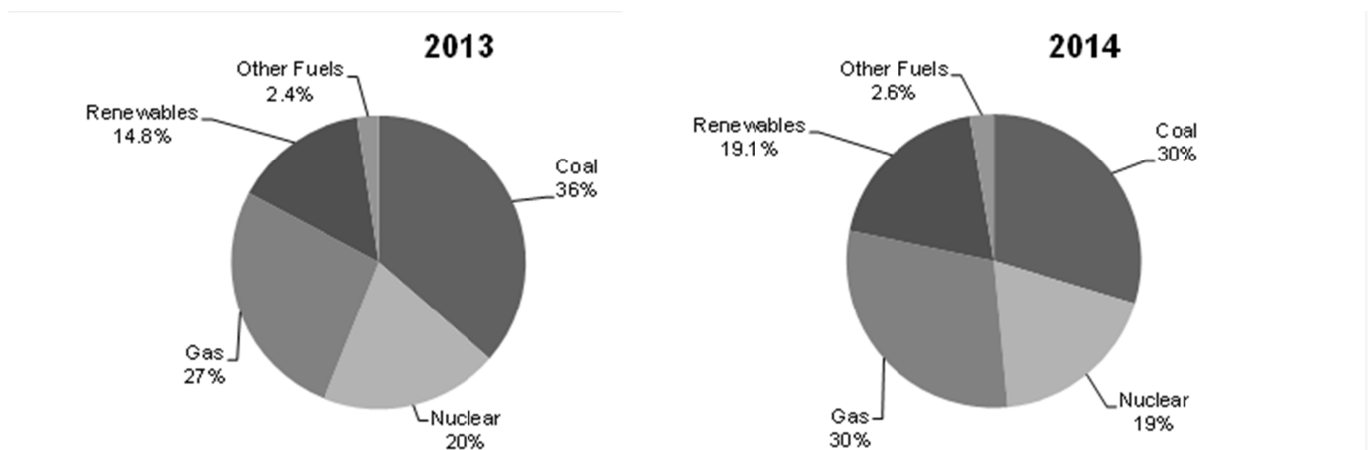


Source: National Grid Winter Outlook Report 2015

⁵ (<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=39383>),

⁶ 70GW figure excludes SBR/DSBR and interconnectors

Chart 1.3 Shares of Electricity generation, by fuel, in 2013 and 2014



Source: DUKES 2015

Pumped Storage

22. In GB there is around 2.8 GW of pumped storage capacity. This technology can be operated flexibly, meaning it can come on and off the electricity system within seconds; and is widely used, alongside other technologies, by NG to balance and maintain the integrity of the electricity system. There are no firm plans for significant new storage sites in GB at present.

Electricity Networks

Current network reliability

23. Onshore Transmission Owners face statutory obligations and regulatory incentives to create an operating environment designed to reduce unsupplied electricity. The historic overall reliability of supply has been impressive. For instance, during the financial year 2013/14, overall reliability for the network stood at 99.99%.
24. Offshore Transmission Owners are incentivised to maintain availability of their offshore transmission systems. This ensures offshore generators are able to export energy with minimal disruption. For the financial year 2013/14 the average availability of offshore transmission systems was over 99%.
25. As part of the price control process, Ofgem set target and incentive rates for the number of customer interruptions and customer minutes lost for each Distribution Network Operator (DNO). The 'Interruptions Incentive Scheme' (IIS) incentivises DNOs to invest in and operate their networks to manage and reduce the frequency and duration of power cuts experienced by their customers. This amounts to 99.98% availability for year.
26. There are standards to encourage DNOs to meet certain expected levels of service and to provide payments to end customers in the event of individual standards not being met. The standards cover a range of activities, including restoring supply during an unplanned interruption and providing notice periods for planned interruptions. The Electricity (Standards of Performance) Regulations 2015 were introduced on 1 April 2015 increasing the compensation payable to those who suffer an interruption and reducing the time needed to be eligible for this payment from 18 to 12 hours.

Future development of electricity networks

27. The 2013 to 2021 transmission price control (RIIO-T1) started on 1 April 2013. Ofgem has approved funding of up to £21.50b (2009-2010 prices) for expanding, replacing and maintaining the GB transmission network for RIIO-T1.
28. In addition, the TOs provide quarterly updates on their major projects to the Electricity Networks Strategy Group (ENSG – a high level industry group chaired by DECC and Ofgem). The latest update shows that 8.80 GW of network capacity is under construction for delivery by mid-2018, with 5.35 GW delivered since February 2012.
29. As part of the first price control for the 14 regional electricity DNOs under the RIIO process Ofgem has approved overall funding of £24.60b across GB for the period 1 April 2015 to 31 March 2023. This represents a major investment in the distribution network. It also represents value for consumers through a £2b reduction on what the DNOs had initially asked for in their business plans submitted in summer 2013. DNOs themselves had proposed £700m reductions following the rejection of their plans at the ‘fast-track’ stage, but Ofgem has determined they can go further and included a further £1.30b savings. This reduction is slightly lower than proposed at the draft determination (£1.40b). The key additional savings that Ofgem identified were found through an analysis which says that smart grids will deliver higher benefits; a comparative assessment on DNO costs, and a differing view to the DNOs on the impact of real price effects.
30. The Connect and Manage grid access regime introduced by DECC enables new generation projects to connect to the network once their enabling works have been completed. Since February 2011, a total of 201 large generation projects⁷ have signed Connect and Manage offers, representing a capacity of over 37,000 MW. Connection dates for these projects have been brought forward by an average of five years compared to the previous ‘Invest and Connect’ approach.

Interconnection

31. GB currently has 4 GW of electricity interconnector capacity with mainland Europe and Ireland. This consists of a 2 GW link to France (IFA), a 500 MW link between Wales and Ireland (East-West), a 1 GW interconnector with the Netherlands (BritNed), and a nominally rated 500 MW link between Scotland and Northern Ireland (Moyle).
32. The Moyle interconnector continues to have a reduced technical capacity of 250 MW due to a failure in one of the cables in 2012.
33. In August 2014, Ofgem extended its cap and floor regulatory regime, initially developed for Nemo interconnector between GB and Belgium, to other near-term interconnectors. The regime aims to incentivise investment by providing a minimum return for project developers (the floor) whilst protecting consumers from excess revenues accruing to developers by limiting the maximum return (the cap).
34. The new interconnector regime has supported Final Investment Decisions (FIDs) on new interconnectors linking the GB market to Belgium (1 GW NEMO project planned for 2019) and Norway (1.4 GW NSN project planned for 2020). Ofgem has also made decisions to grant cap and floor regulatory regime, in principle, to another two interconnectors to France (1.4 GW FAB Link and 1 GW IFA2), one interconnector to Denmark (1GW Viking Link project) and one to Ireland (500 MW GreenLink project). These four projects are yet to make their FIDs but each is aiming to be operational by the early 2020s.

⁷ Transmission connected and large embedded generation projects only

35. An additional 1 GW project to France, ElecLink, is proceeding under the “merchant-exempt” route, and there are a number of further, less mature projects in development. Ofgem intends to open a second cap and floor application window in 2016.

Market Functioning

36. Energy market firms buy and sell their electricity in the wholesale market. The wholesale market allows participants to trade in a range of products that enable them to meet their obligation to supply energy whilst also enabling them to mitigate risk. The degree of access to these products relates to the liquidity of the market: low levels of market liquidity can be indicative of an uncompetitive market.

37. Poor liquidity in the wholesale market can prevent consumers from fully realising the benefits that competition can deliver in terms of downward pressure on bills, better service and greater choice. It can also obscure or weaken price signals, inhibiting long term investment decisions in new generating plant with negative consequences for security of electricity supply.

38. Ofgem is concerned about the lack of liquidity of the wholesale electricity market. Ofgem’s liquidity project has examined poor liquidity in the electricity wholesale market and the potential barriers that this poses to competition and entry in the market. After extensive consultation, Ofgem activated the ‘Secure and Promote’ licence condition on 31 March 2014, with the aim of ensuring that all parties can access the wholesale market effectively and that robust reference prices are available from the wholesale market. The project is now monitoring the success of the licence condition and Ofgem published its first annual report on 9 September 2015.⁸

39. Ofgem’s monitoring shows an improvement in liquidity in the wholesale market over the first year of the licence condition, which is positive for security of supply, but a decline in liquidity during the most recent quarter of monitoring in Q2 2015. Many factors could have contributed to the results in liquidity since Secure and Promote, therefore, it is difficult to draw definitive conclusions. Ofgem continues to monitor the effect of the reforms.

Gas

Introduction

40. GB’s gas system has delivered security to date and is expected to continue to function well, with sufficient capacity to deliver to meet demand. The UK Continental Shelf (UKCS) remains a major source of gas in the GB market, with supplies also coming from a variety of international partners via pipelines and LNG cargoes. There are a range of future supply outlooks, but all show sufficient gas available from the combination of domestic, regional and global markets.

41. Gas is a central part of the GB energy system and gas security is of importance to all parts of society and the economy, both directly (for instance through its use as a fuel source for domestic heating and cooking) and indirectly because of its relationship with electricity security. Past analysis by DECC and by Ofgem has provided valuable insight into the nature of the risks, building an evidence base that the GB gas system is robust to all but extreme and unlikely combinations of events. Nonetheless there is always future uncertainty – for gas this includes wider energy system changes required to deliver lower carbon energy and the range of possible future sources of gas (domestic and international).

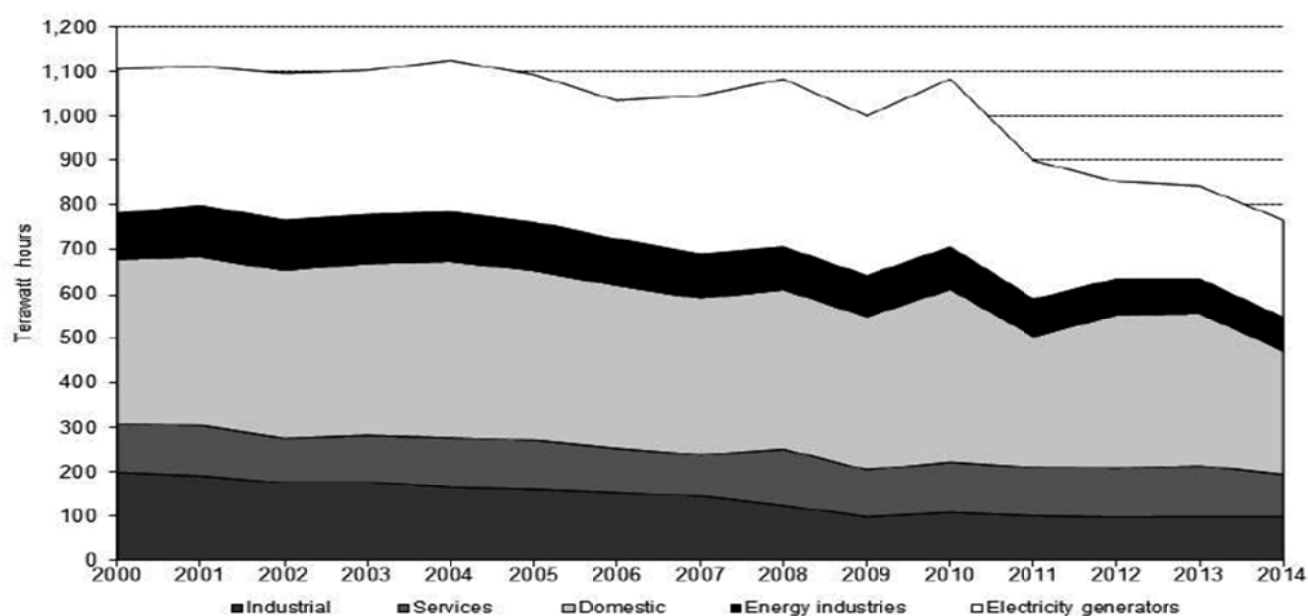
⁸ The annual report may be found on Ofgem’s site here: <https://www.ofgem.gov.uk/publications-and-updates/wholesale-power-market-liquidity-annual-report-2015>

42. To ensure we can set the right strategic direction on security, we must ensure we have the right evidence base. DECC, therefore, proposes to introduce a process of regular, systematic assessment to examine the risks to the system and the level of security we can expect it to deliver. We will repeat this at regular intervals to ensure that we have a sound forward view at all times. We expect to undertake a fundamental assessment in 2016 and at approximately 5 year intervals thereafter, and we will draw on this to undertake annual reviews in line with our Statutory of Security Supply Report commitment.

Demand

43. Chart 2.1 shows annual gas usage by sector since 2000, with overall gas consumption continuing to fall in 2014. Over the period significant reductions in gas used for power generation were notable but there was also an increase in gas use by the services sector and modest increases by domestic users.

Chart 2.1 annual gas usage by sector since 2000



Source: DUKES 2015

44. Gas demand in Q1 2015 was 9.70% higher compared to Q1 2014. An increase in gas use versus Q1 2014 was seen across all sectors, with domestic and other final use showing increases ranging between approximately 12 and 14%. This was driven primarily by the cooler average temperatures in Q1 2015 versus Q1 2014.

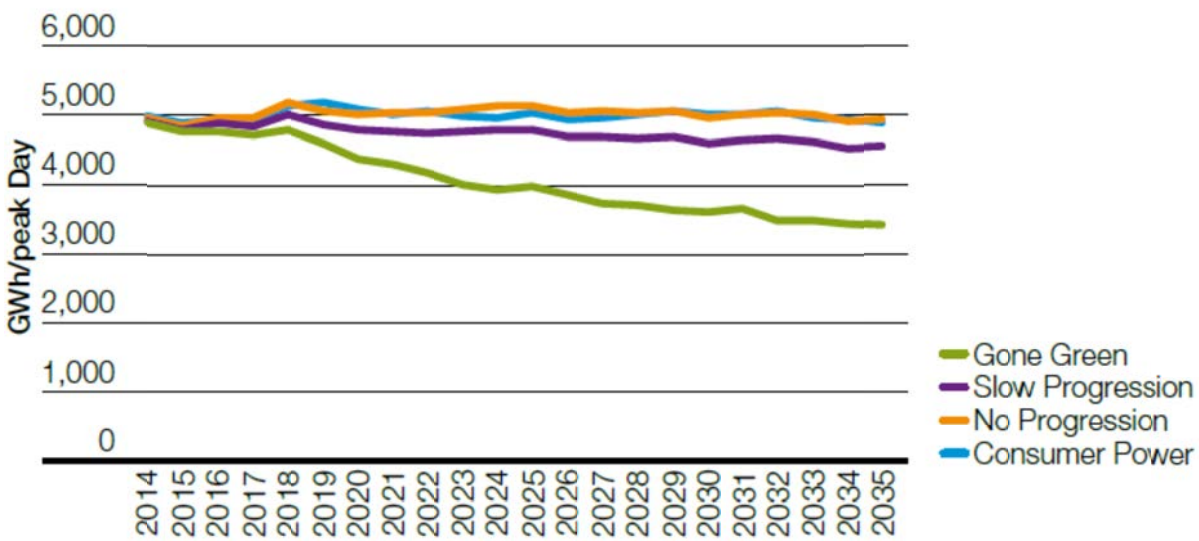
45. Demand for natural gas from the industrial sector also increased in Q1 2015 versus Q1 2014, being 8.40% higher for the iron and steel industry and 2.30% higher for other industries. Similar to domestic demand, these increases were driven primarily by the cooler average temperatures in 2015. Though the smaller increases compared to that seen in the domestic sector reflects the industrial sector relying less on gas for space heating than other sectors.

46. As with electricity, NG has published four scenarios for gas demand as part of the UK Future Energy Scenarios work. These show a range of possible futures to 2035; under Gone Green and Slow Progression gas usage declines by varying degrees, under Consumer Power and No Progression there is a slight rise. In addition to meeting annual demand, the gas market's ability to meet demand on a peak day is important for security of supply. In general, a peak day demand is over double the average daily gas demand. Gas market participants build redundancy

into their supply arrangements, above the minimum amount to meet peaks, to manage the risk that other capacity may not be available.

- 47. The peak winter day demand for 2014/15 was 366-mcm, which was 99-mcm lower than the record winter peak day demand in December 2010. For the coming winter demand is forecast to be 300-mcm/d, whereas on a particularly cold day demand could rise to 465-mcm/d which is still well within 613-mcm/d deliverability.
- 48. Looking further forwards, NG scenarios also cover gas peak demand: under their No Progression and Consumer Power scenarios peak gas demand will remain steady out to 2035. Under the Slow Progression scenario peak gas demand would slightly decrease by 10% to 4500 MWh and there will be a more substantial decline under Gone Green.

Chart 2.2 Gas peak day demand



Source: National Grid Future Energy Scenarios 2015

Demand Side Response (DSR)

- 49. Ofgem decided to introduce a DSR mechanism to be developed by NG, subject to a successful trial. Such a mechanism should encourage greater participation by industrial and commercial gas consumers, enabling them to signal their willingness to be interrupted at a specific price before emergency disconnections are reached. This would allow NG to interrupt consumers in a more efficient way and provide an additional tool to prevent involuntary interruptions to supply.

Supply

50. To date, the GB gas system has reliably delivered secure supply. Security of supply reports by Ofgem and by DECC⁹ have tended to confirm that the GB market is generally secure to all but extreme and unlikely combinations of events. As set out above, DECC is placing this analysis process on a more strategy and systematic basis.
51. Most recently, DECC's Risk Assessment on Security of Gas Supply, submitted to the European Commission in June 2014, found that, in the short to medium term, UK gas supply infrastructure is resilient to all but the most extreme and unlikely combinations of severe infrastructure and supply shocks. The UK n-1 calculation exceeds the target of 100% with a score of 112-13% and 109% including exports to Ireland. This Risk Assessment is repeated biennially.
52. National Grid FES also examines the adequacy of supply to meet demand. As set out above, the greatest system challenge is to meet peak demand. Chart 2.3 shows that in all scenarios, maximum deliverability of gas infrastructure exceeds projected peak demand. This is lowest in the 'Slow Progression' scenario at 50-mcm/d in 2035 and in the other scenarios the margin is considerably greater. This supply capacity is after an N-1 test i.e. even after the loss of the largest single piece of infrastructure (both LNG terminals at Milford Haven – a loss of 86-mcm/d. It does include other existing infrastructure (pipelines, LNG, peak storage deliverability and projected capacity of the UKCS) at 100% availability but also assumes that no new infrastructure is built.

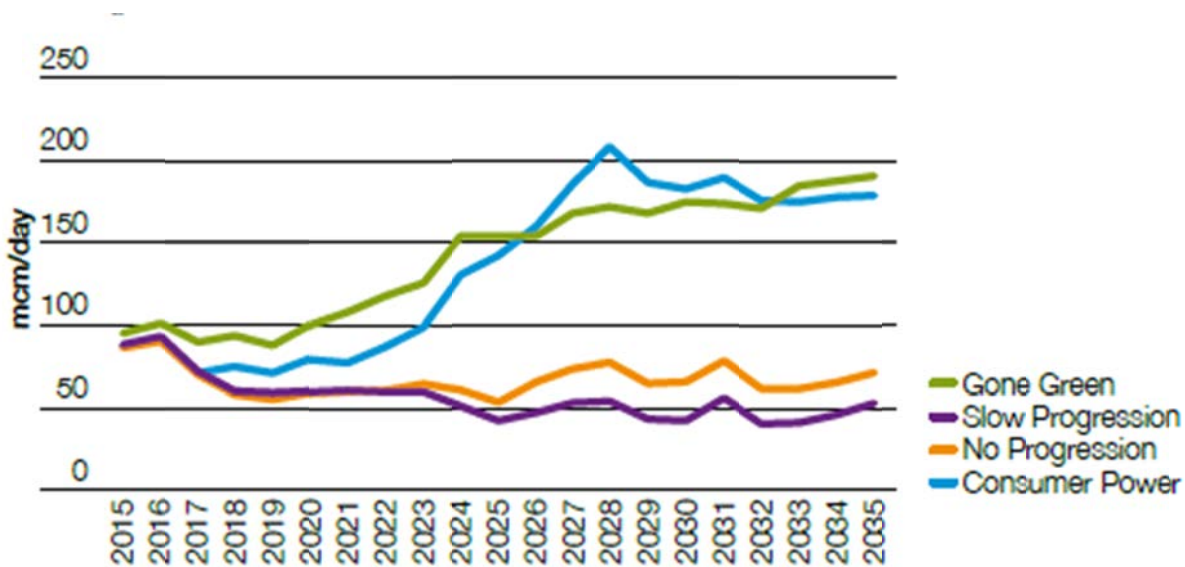
⁹ By DECC:

The Impact of Gas Market Interventions on Energy Security (for DECC by Redpoint, July 2013)
Gas Security of Supply Report (Ofgem requested by DECC, November 2012)
GB Gas Security of Supply and Options for Improvement (for DECC by Pöyry, March 2010).

By Ofgem:

Gas SCR (for Ofgem by Pöyry, January 2014)
Gas Security of Supply Report: Further Measures Modelling (for Ofgem by Redpoint, November 2012)
GB Gas Security of Supply and Future Market Arrangements (Report to the Gas Forum by Pöyry, October 2010)

Chart 2.3 Gas margins



Source: National Grid Future Energy Scenarios 2015

Import Capacity and outlook

- 53. The UK has a diverse range of sources of gas supply, including domestic production, pipeline imports from Norway and mainland EU, LNG from global markets and storage. GB’s gas supply infrastructure is able to deliver approximately 613-mcm/d.
- 54. GB currently has an import deliverability of 53.70-bcm/y from pipelines connecting to Norway, 46.40-bcm/y from capacity connected to the Continent and 53.10-bcm/y from LNG import terminals.
- 55. Capacity is not itself a measure of utilisation. To date, GB has always brought the gas required; and DECC, Ofgem and National Grid analysis all tend to confirm the view that it will remain well positioned to bring the gas needed. National Grid FES notes that there are a wide range of possible supply patterns but that the gas market provides enough gas from Europe and beyond to make up the difference between GB’s indigenous supply and demand. A key factor in GB’s ability to bring the necessary gas it is an appropriately incentivised, flexible and accessible market. This is discussed under *Market Functioning* below.

Storage

- 56. Storage does not itself produce gas, but allows gas from other sources (whether domestic or imports) to be held until times of high demand.
- 57. Last winter the total storage capacity was 4.60-bcm. This was 100% full at the start of winter and this dropped to 17.70% full at the lowest point on 28 March 2015. This is an aggregate figure, and short range storage may cycle between empty and full over the course of a winter. Long range storage typically fills over summer and empties over winter, but even long range storage may inject new gas during the winter at times of low demand.
- 58. GB gas storage is expected to provide 4.20-bcm over the coming winter, this figure being somewhat below the capacity of recent years due to infrastructure constraints at Rough. Based on assessments of current storage sites, National Grid estimate deliverability for this winter is

approximately 146-mcm/d. This is up from 129-mcm/d last winter; this is due to increases at Aldbrough, Hill Top and Stublach. Given the diverse nature of the GB gas market National Grid expect sufficient flexibility and diversity across all sources to cope with the reduction in storage space for the coming winter.

Market Functioning

59. The UK gas market is one of the most liquid and developed markets in the world. The National Balancing Point (NBP) is by far one of Europe's largest traded gas markets, with only the Netherlands comparable in size, a position which has developed over recent years. In 2014, total traded volumes were approximately 21,000 TWh in the GB market. There is a diverse range of products and platforms available for those looking to trade at the NBP. This includes a wide range of forward and spot contracts with significant trading volumes throughout. Furthermore, market concentration is at healthy levels, indicating competition between participants: the 10 largest shippers were responsible for around 54% of market activity¹⁰.
60. This liquidity is evidenced by high churn rates at the NBP, the number of times a unit of gas is traded between extraction and consumption (one indicator of liquidity). Although churn rates vary with seasonality, GB continues to perform well on this indicator, with churn steadily increasing to an average of around 25 in 2014; a number in excess of 10 is taken by industry commentators to indicate gas hub maturity. This churn rate was notably higher than gas hubs on Continental Europe with the exception of the Dutch TTF. High liquidity benefits security of supply as it provides international gas producers with effective markets where they can bring gas, and also the means by which gas consumers can indicate their willingness to buy.
61. Overall, the UK gas market has the characteristics of a developed and competitive market. This assessment was supported by the ongoing Competition and Markets Authority (CMA) Energy Market Investigation; the CMA considered the wholesale gas market in the early stages of their investigation and confirmed in their updated issues statement that they did not find any causes for concern¹¹.

Network Reliability

62. The UK gas transmission network achieved 100% reliability in 2014/15. System reliability is assessed as no supply losses to firm supply points. During winter 2014/15, there was no requirement to interrupt any customers supplied directly from the National Transmission System (NTS) on any occasion. No other transporter or emergency interruption to customers supplied directly from the NTS was required.
63. The distribution network that carries gas directly to consumers is equally robust, with a reliability rating of 99.99%.
64. In the future, the network will need to be able to react to the complications of greater gas demand volatility as gas is used as a back-up fuel for increased wind-power generation capacity. Ofgem is facilitating more network flexibility; RIIO-T1 allowed £26.40m of ex ante expenditure so that National Grid Gas maintains the 1-20 obligations in Scotland and allows the possibility of further funding for network flexibility if Ofgem deems it appropriate.

¹⁰ Wholesale Energy Markets in 2015, Ofgem September 2015

¹¹ https://assets.digital.cabinet-office.gov.uk/media/54e378a3ed915d0cf7000001/Updated_Issues_Statement.pdf

Oil

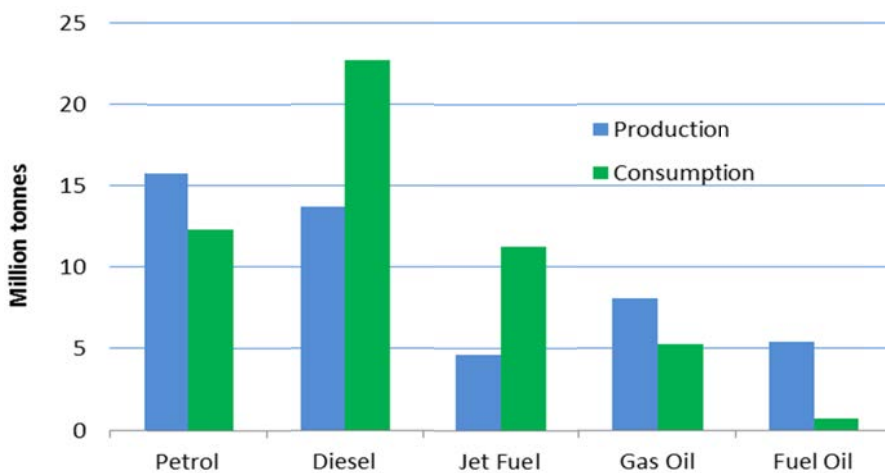
Introduction and summary

- 65. This chapter sets out a summary of key facts and figures on UK oil demand and supply, production and imports. Historic data is provided as well as, where possible, forecasts out to 2030 and has been compiled using DECC data. As with all scenarios, a wide margin of uncertainty is inherent in the projections and future supply and demand will depend on a range of factors.
- 66. Oil currently meets around a third of primary energy demand and is the main energy source for transport, meeting virtually all of the UK's needs, including electricity generation, industrial processes, domestic heating and as feedstock for petrochemical, industrial and construction products and processes.

Demand

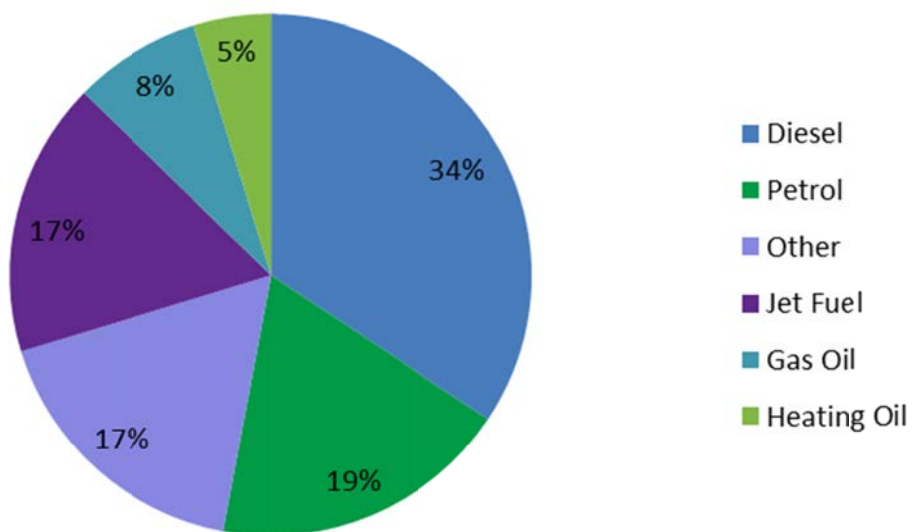
- 67. Demand for oil in the UK is set to decrease further in the long term in order for the UK to meet its 2050 climate change objectives and rebalance the economy towards more sustainable and secure energy supplies.
- 68. In 2014, UK refinery production was 26% petrol, 23% diesel and 8% aviation fuel, with the remaining 43% primarily being other light and heavy distillates.
- 69. Approximately 38% of fuel produced by UK refineries in 2014 was exported, of which 38% was petrol and 18% fuel oil.
- 70. The UK is increasingly reliant on importing diesel road fuel and jet fuel to meet demand. In 2013, the UK became a net importer of petroleum product for first time since 1984. Re-aligning refinery output to better match UK demand would require substantial investment in new processing/conversion units.

Chart 3.1: Production and Consumption of Key Petroleum products 2014



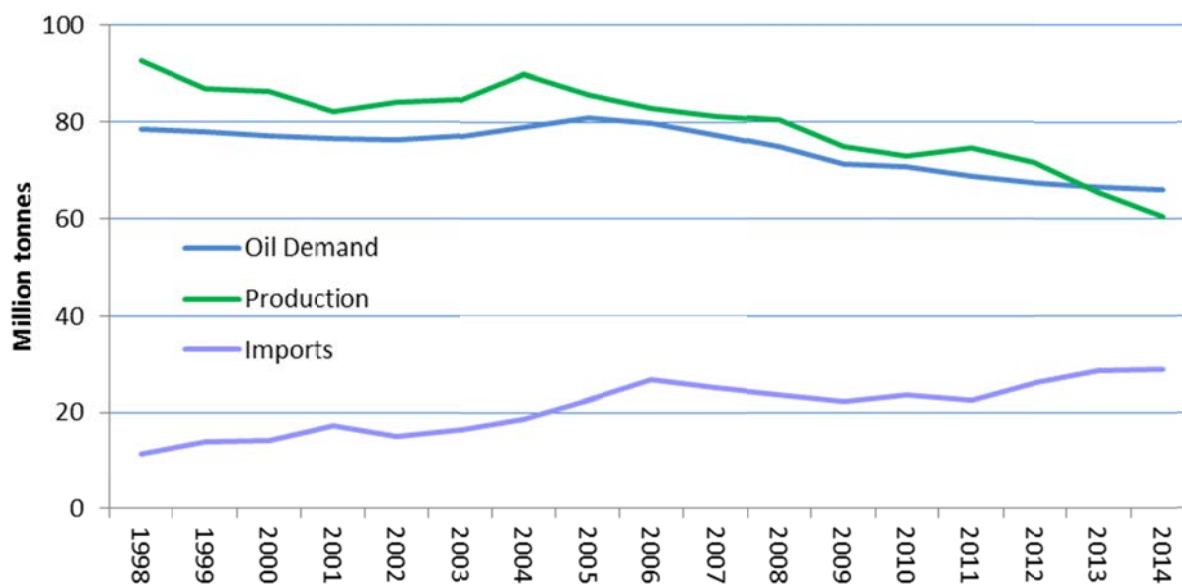
Source: Dukes 2015

Chart 3.2: UK 2014 oil demand by petroleum product type



Source: Dukes 2015

Chart 3.3: UK Oil Demand, Production & Imports



Source: Dukes 2015

Source: DUKES 2014 and DECC Energy Trends 2014

Supply

UK Oil Production

71. Oil production from the UK Continental Shelf (UKCS) peaked in 1999 and declined at an average rate of around 7% per year until 2010. Between 2013 and 2014, however, production only decreased by 1.80%, a far smaller drop than that seen in recent years. The actual rate of future decline will depend on the level of investment and the success of further exploration.
72. The current estimate of remaining recoverable hydrocarbon resources from the UK's offshore resources is in the range 11 to 21 billion barrels of oil equivalent. The founding of the Oil and Gas Authority this year as an Executive Agency of DECC represents a critical step in implementing the recommendations contained in Sir Ian Wood's 2014 report ("Wood Review") into maximizing economic recovery from the United Kingdom's Continental Shelf ("UKCS").

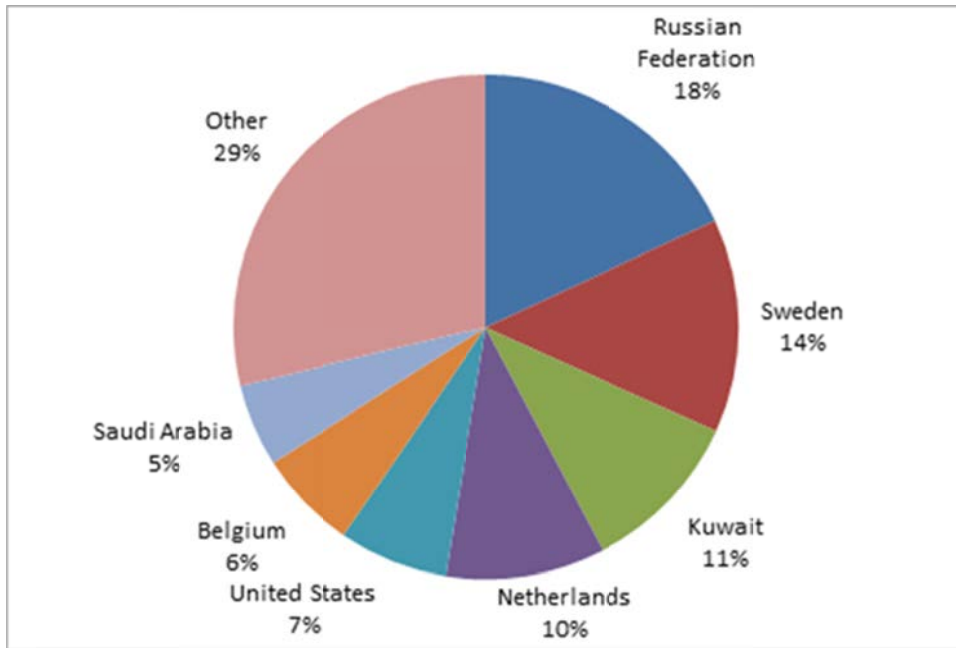
Crude oil

73. The UK both imports and exports crude oil, and the direction of this trade is dependent on the prevailing market conditions. Historically, around 2/3rds of the UK's crude imports have come from Norway, although this has decreased in recent years and stands at 46% in 2014. Imports from the OPEC countries have increased significantly, in particular from Algeria.
74. The UK's own production of crude oil would be sufficient to meet nearly two thirds of UK refinery demand, but the increase in the diversity of sources coming into the UK would reduce the impact of a disruption to any one source of supply on the UK. In 2014, less than 20% of UK crude oil production was used by UK refineries.

Refined product imports

75. The UK has a well-developed infrastructure for the trade of both crude oil and petroleum products, and, as Chart 3.4 illustrates, sources its petroleum products from a diverse range of countries. In the main, Russia and European countries export large volumes of diesel to the UK, but Kuwait, Saudi Arabia and India are major trading partners for jet fuel.

Chart 3.4: UK Oil Product Imports



Source: Dukes, 2015

Resilience

76. The UK remains well supplied by a combination of domestic refining and imported fuels and there were no significant disruptions to the end supply of oil products and fuels during 2014. There have been increased reports of illegal pipeline tapping incidents causing short-term interruptions and DECC is working with the industry and National Crime Agency through the Pipeline Security Forum to consider how to respond to this.
77. Milford Haven refinery ceased refining during the course of 2014 but continued to operate as an import terminal. This contributed to a 7.80% fall in UK refinery production to 60.30 million tonnes of product in 2014, down from 65.40 million tonnes in 2013. The market will continue to drive changes in the supply sector, however, HMG recognises the benefit of ensuring that a mix of domestic refining and imports remains viable in the UK, so far as market conditions allow.

Emergency Oil Stocks

78. The UK holds emergency stocks of oil to respond to major disruptions to the global oil market as part of its membership of the European Union and International Energy Agency. In order to meet its international obligations the UK directs oil companies that are substantial suppliers of oil products to the UK to hold stocks that can be released in an emergency. In 2014, the UK's obligation was approximately 12 million tonnes of crude oil and petroleum products, similar to levels in 2013.

Conclusion

79. Following the oil price shocks of 2014, there remains as a great deal of uncertainty globally, both on the demand and supply side for oil. In the UK, oil demand is expected to stay relatively constant both in the short and medium term.
80. There has been a modest fall in North Sea production and overall, UK production is around thirty per cent lower than in 2000. Exports of crude oil are now at their lowest level since 1978 and in 2014, net imports of primary oils decreased by nine per cent due to a fall in refinery demand as UK refinery production also fell.
81. In 2014, the UK was a net importer of petroleum products by more than 6 million tonnes, the highest figure since 1984 (due to the miner's strike).
82. Although there has been little change in overall petroleum product demand, imports have increased, especially diesel. The UK continues to import high levels of both diesel and jet fuel.

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