Department for
Business, Energy
& Industrial Strategy

Statutory Security of Supply Report 2020

HC 1009

December 2020

Department for
Business, Energy
& Industrial Strategy

Statutory Security of Supply Report 2020

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Contents

Introduction

1. This report discharges the Government's and Ofgem's respective obligations under section 172 of the Energy Act 2004 as amended by section 80 of the Energy Act 2011, including the 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).

2. The technical data presented here has been produced from analysis conducted by the Department for Business, Energy & Industrial Strategy (BEIS), Ofgem and National Grid. The statistics underpinning 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. The Government is committed to moving away from coal and increasing the share of renewables in electricity generation. We are investing in new energy infrastructure and renewables which will provide for our domestic electricity demand.

4. The Government's reliability standard for security of electricity supply is expressed as a Loss of Load Expectation (LOLE) of three hours per year. LOLE represents the number of hours per year in which supply is expected on average 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[1].

5. National Grid Electricity System Operator's (ESO) Winter Outlook Report for 2020/21[2] forecasts a capacity margin of 4.8 GW in the base case, equivalent to 8.3%, with a LOLE of <0.1 hours/year. Due to uncertainty in demand levels this winter, ESO have also analysed scenarios either side of this. Variations of underlying demand suppression from 0% - the high demand case, to 6% - the low demand case, lead to de-rated margin figures of between 5.9% and 10.9%. In the high demand scenario LOLE is 0.3 hours/year, and in the low demand scenario it is <0.1 hours/year.

[1] Use of LOLE is a probabilistic approach – the actual amount will vary depending on the circumstances in a particular year, e.g. how cold the winter is; the number of plants experiencing unplanned outages; the power output from wind generation at peak demand; and all the other factors which affect the balance of electricity supply and demand.

[2] https://www.nationalgrideso.com/research-publications/winter-outlook

6. This margin is on an underlying demand basis, which aligns with how the ESO calculates the Capacity Market (CM) target capacity recommendations in its annual Electricity Capacity Report.

Capacity Market

7. The purpose of the CM is to ensure security of GB's electricity supply at least cost to consumers, by providing all forms of capacity with the right incentives to be on the system and to deliver electricity when needed. The CM ensures there is sufficient reliable capacity available during periods of electricity system stress, for example during cold, still periods with high demand and low wind generation.

8. The CM works by allowing eligible capacity providers to bid into a competitive auction to provide capacity. Successful capacity providers receive a steady payment to ensure enough capacity is in place to meet demand at times of system stress. These capacity payments incentivise the necessary investment to maintain and refurbish existing capacity, and to finance new capacity where necessary. Capacity providers face penalties if they fail to deliver against their Capacity Obligation – to provide electricity, or reduce demand, when requested during a System Stress Event[3].

9. The CM is technology neutral – it does not seek to procure allocated volumes of capacity from different types of technology. All types of capacity are able to participate – except for capacity providers in receipt of support from other specific policy measures – provided they can demonstrate sufficient technical performance to contribute to security of supply.

10. A Capacity Market Notice (CMN) is a tool available to the ESO to ensure that capacity is available when needed. The CMN is a signal to capacity providers with agreements that the risk of a system stress event in the electricity network is higher than under normal circumstances. It is not a call to bring forward more capacity, but a notice that providers – especially those with capacity agreements – should be alert to the possibility of system notices being issued and be ready to respond as required.

11. CMNs are issued automatically – four hours ahead of a potential System Stress Event – when forecast margins reach 500MW above the ESO's operating reserve level. Last winter (2019/20) it was not necessary for the ESO to issue any CMNs. On 15 September 2020, the ESO issued a CMN at 1:04pm, which was cancelled an hour later as more capacity became available. On 3 December 2020, the ESO issued a CMN at 11:34am which was cancelled an hour later.

12. On 15 November 2018, a judgment of the General Court of the CJEU (Court of Justice of the European Union) ("the CJEU judgment") annulled the European Commission's original 2014 State aid approval of GB's CM. This meant the CM entered a 'standstill' (the "Standstill Period") which prevented capacity agreements being awarded and capacity payments being made and prompted the European Commission to carry out a renewed investigation of the scheme under State aid

[3] A System Stress Event occurs when demand for electricity outstrips supply.

rules. The European Commission's decision, of 24 October 2019, again granted State aid approval to the CM ("the State aid decision").

13. The State aid decision noted that the Government committed to implementing a number of improvements to the design of the CM to reflect recent market and regulatory developments, including those identified through our recent five year review of the effectiveness of the CM ("the Five-year Review").[4]

14. The State aid Decision brought the eleven-month Standstill Period, to an end. The scheme has now been restored in full and on 20 January 2020 the Electricity Settlements Company (ESC) paid over £1bn to capacity providers in full settlement of their deferred capacity payments for the standstill period.

Capacity Auctions

15. Typically, auctions are held one (T-1) and four (T-4) years ahead of the delivery year when capacity must be provided, giving investors certainty over part of the future revenues they will receive. Existing generating capacity competes against new build, Demand Side Response (DSR) and interconnectors, with the auction procuring the mix of capacity which provides best value for consumers.

16. The T-4 auction for delivery in 2022/23 was postponed due to the effect of the Standstill Period. In 2019, the Government made changes to the Electricity Capacity Regulations 2014[5] and the Capacity Market Rules[6] to enable a three year ahead (T-3) auction to be run in early 2020 to replace the postponed T-4 auction.

17. The T-4 auction for delivery in 2023/24 concluded on 06 March 2020 and the results were published on 17 March 2020[7]. The T-1 auction for delivery in 2020/21 concluded on 7 February 2020 and the results were published on 14 February 2020[8]. The T-3 auction for delivery in 2022/23 concluded on 31 January 2020, and the results were published on 07 February 2020[9].

[4] https://www.gov.uk/Government/publications/capacity-market-5-year-review-2014-to-2019
[5] https://www.legislation.gov.uk/ukdsi/2019/9780111187500/contents
[6] https://www.gov.uk/Government/publications/capacity-market-rules
[7] https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/T-4%202019%20DY2023%20Capacity%20Market%20Auction%20Final%20Results%20V1.0.pdf
[8] https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/Final%20Results%20T-1%20Auction%20DY20-21.pdf
[9] https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/Final%20Auction%20Results%20T-3%202019%20(DY%2022-23).pdf

Table 1. List of capacity auctions to be held in 2021

Auction	Delivery year	Auction Start Date
Year ahead Capacity Auction (T-1)	2021/22	2 March 2021
Four year ahead Capacity Auction (T-4)	2024/25	9 March 2021

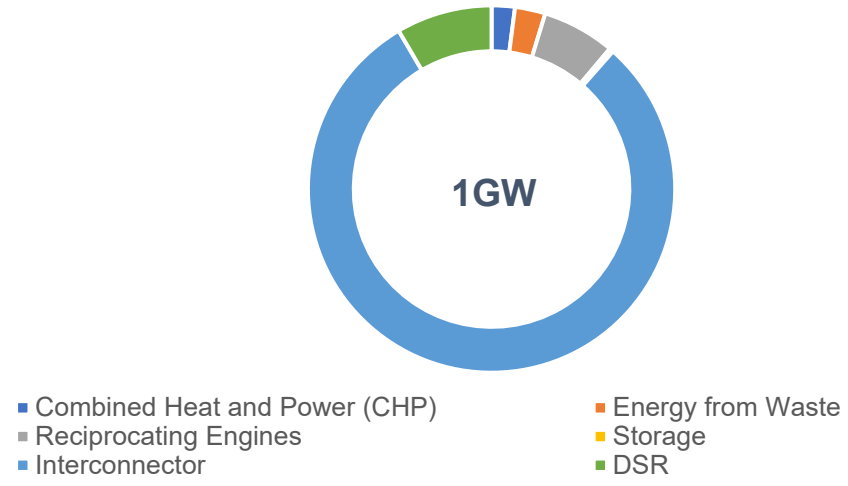
Capacity Market Delivery Year 2019/20

18. 2019/20 was the third full CM Delivery Year.

T-1 Auction results for 2020/21

19. The T-1 auction for delivery in 2020/21 concluded on 7 February 2020, and the results were published on 14 February 2020[10] and secured 1 GW of capacity at a clearing price of £1/kW. Just over 3 GW of capacity entered the auction, of which 33.84% received capacity agreements for delivery.

Figure 1. T-1 Auction results breakdown of Capacity Agreements awarded by technology type in terms of capacity (GW)[11]

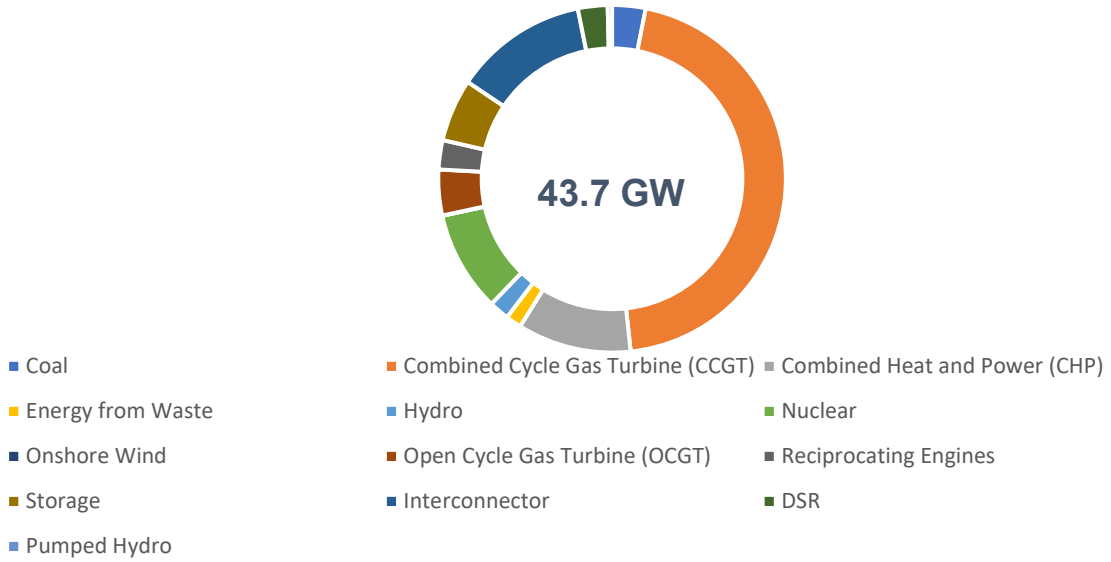


[10] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx
[11] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx

T-4 Auction results for 2023/24

20. The T-4 auction for delivery in 2023/24 concluded on 6 March 2020, and the results were published on 17 March 2020[12]. The auction secured 43.7 GW of capacity at a clearing price of £15.97/kW. Just over 59 GW of capacity entered the auction, of which 73.62% received capacity agreements for delivery.

Figure 2. T-4 Auction results breakdown of Capacity Agreements awarded by technology type in terms of capacity (GW)[13]



T-3 Auction results for 2022/23

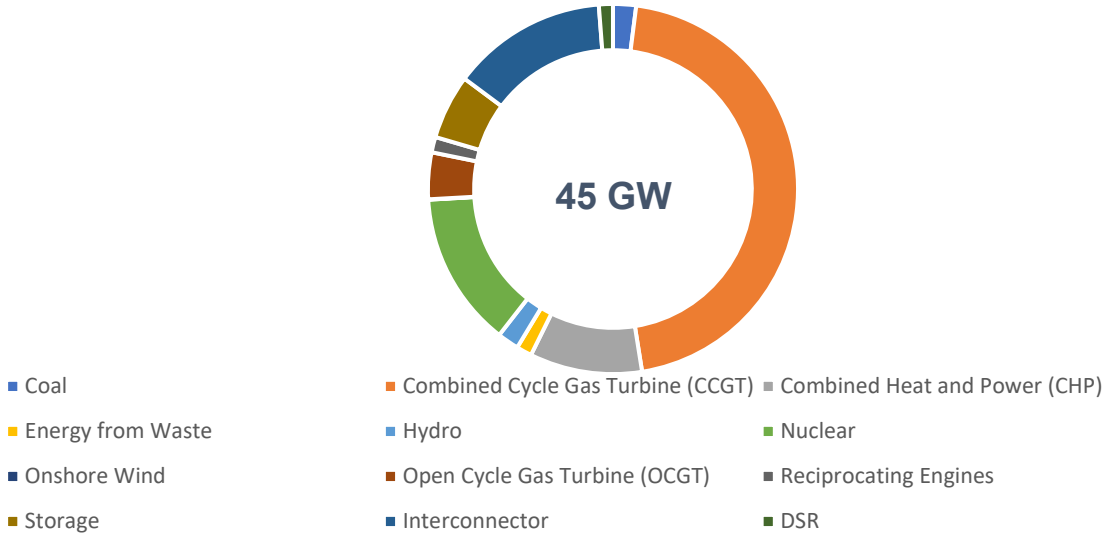
21. The T-3 auction for delivery in 2022/23 concluded on 31 January 2020, and the results were published on 07 February 2020[14]. The auction secured 45 GW of capacity at a clearing price of £6.44/kW. Just under 60 GW of capacity entered the auction, of which 76.38% received capacity agreements for delivery.

[12] https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/T-4%202019%20DY2023%20Capacity%20Market%20Auction%20Final%20Results%20V1.0.pdf

[13] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx

[14] https://www.emrdeliverybody.com/Capacity%20Markets%20Document%20Library/Final%20Auction%20Results%20T-3%202019%20(DY%2022-23).pdf

Figure 3. T-3 auction results breakdown of Capacity Agreements awarded by technology type in terms of capacity (GW)[15]



Capacity Market Payments

22. ESC records show that £496m was paid out to CM agreement holders during from October 2019 to March 2020[16].

23. In addition, in January 2020, ESC was able to act promptly and issue over £1bn of back payments for the Delivery Year 2018/19 to Capacity Providers who were available during the Standstill Period. These payments were a major milestone in the restart of the Capacity Market scheme, which followed the suspension of payments to generators and collections from suppliers as a result of the CJEU judgment.

Improvements to the Capacity Market

24. The Government ran a consultation[17] between 3 February 2020 and 2 March 2020 ("the Future Improvements Consultation") seeking views on proposals to implement five of the six commitments referenced in the State aid Decision, as well as a review of the exclusion from the CM of plants with long-term contracts for providing Short Term Operating Reserve (LT STOR) and other minor improvements. Following the consultation, a series of changes were made to the Electricity Capacity Regulations 2014[18] and Capacity Market Rules[19], including implementing the five commitments and removing the exclusion of LT STOR contract holders from competing in the CM.

[15] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx
[16] https://www.lowcarboncontracts.uk/annual-reports
[17] https://www.gov.uk/Government/consultations/capacity-market-proposals-for-future-improvements
[18] https://www.legislation.gov.uk/uksi/2020/697/contents/made
[19] https://assets.publishing.service.gov.uk/Government/uploads/system/uploads/attachment_data/file/897600/The_Capacity_Market__Amendment___No._2__Rules_2020.pdf

Carbon Dioxide Emission Limits in the Capacity Market

25. The EU Electricity Regulation (Regulation (EU) 2019/943)[20], which entered into force on 4 July 2019, introduced a requirement for capacity mechanisms to apply carbon emissions limits. This includes in relation to existing Capacity Market Units (CMUs) (those which had a commercial production start date before 4 July 2019) from July 2025 at the latest. The Government consulted between July and September 2019[21] and introduced changes to the Capacity Market Rules to introduce carbon emissions limits. These changes came into force on 30 June 2020 and prevent the most carbon intensive existing capacity (including coal) from competing in auctions for delivery years from 1 October 2024. All new build plant are subject to the carbon emissions limits for delivery years from 1 October 2020.

Coronavirus 'Easements'

26. The Government recognised that the coronavirus pandemic, and actions taken to limit its spread, could affect the ability of some Capacity Providers to meet certain CM milestones and deadlines. In April 2020, the Government ran a consultation[22] on proposed easements to support Capacity Providers whilst ensuring security of supply.

27. The easements were introduced in June and July 2020 through changes to the CM legislation[23]. The easements are applied in a time-limited manner in that they are only applicable to CM participants that meet specified conditions, and/or expire after a certain period. The Government will keep the need for further easements under review and may come forward with proposals in due course, if necessary.

Panel of Technical Experts

28. The Panel of Technical Experts (PTE) is an independent advisory group which is appointed by Government to advise on technical aspects of the CM. The PTE has a technical function – to impartially scrutinise and quality assure the analysis the ESO undertakes for the annual Electricity Capacity Report (ECR). The PTE produce an annual report giving an independent view on the ESO's methodology, and to assist the Secretary of State for BEIS to set the parameters for the CM auctions. The most recent PTE report was published in July 2020 [24]. The panel's remit does not include wider policy issues.

Demand

29. The coronavirus pandemic had a significant impact on the electricity market in 2020. Demand fell by as much as 18% in between 23 March 2020 (when lockdown was announced) and 4 July 2020 (when restrictions started to ease), compared to pre-

[20] https://eur-lex.europa.eu/eli/reg/2019/943/oj
[21] https://www.gov.uk/Government/consultations/capacity-market-carbon-dioxide-emissions-limits
[22] https://www.gov.uk/Government/consultations/capacity-market-proposal-to-relax-the-rules-temporarily-in-response-to-covid-19
[23] https://www.gov.uk/Government/consultations/capacity-market-proposals-for-future-improvements
[24] https://assets.publishing.service.gov.uk/Government/uploads/system/uploads/attachment_data/file/900062/panel-technical-experts-report-on-2020-electricity-capacity-report.pdf

pandemic expectations. A new record low for national demand[25] was set on 28 June overnight when it fell to just 13.4GW caused by lower than normal demand and high windfarm output (which reduces transmission system demand). The demand shock has had adverse effects on the industry including very high balancing costs to manage the impact of low demand on the system when there was high wind and solar penetration, and for generators and suppliers who had to unwind hedged positions in the wholesale market at a financial loss.

30. Electricity system balancing costs rose to unprecedented levels caused by the impact of coronavirus. According to the latest data from National Grid, balancing costs of £815 million for March to August 2020 were 31% higher than forecast, and 44% higher than the same time last year. Higher costs were driven by constraint payments (paying generators to turn on or off to maintain system security) to gas, wind and interconnector assets in the Balancing Mechanism especially during periods of high renewable penetration. New services were also procured by the system operator to manage low demand including Optional Downward Flexibility Management and a bilateral contract with EDF Energy to curtail output from Sizewell B. The unforeseen costs – which are paid by consumers via charges levied on generators and suppliers - have caused a cap to be introduced for some charges to be deferred to 2021/22 to help manage costs.

31. Demand has recovered progressively as restrictions were lifted. As of October 2020, demand has returned to near normal expectations and is on average 1-2% below pre-pandemic forecasts. However, the pandemic situation remains uncertain so demand going into winter 2020/21 is uncertain and will depend in part on further lockdown restrictions. According to the National Grid ESO Winter Outlook, normalised transmission system demand is expected to peak at 44.7GW, which is lower than last winter. This peak demand includes a 5% reduction due to the pandemic based on recent months and based on current generation availability data is sufficient to meet normalised demand during this winter.

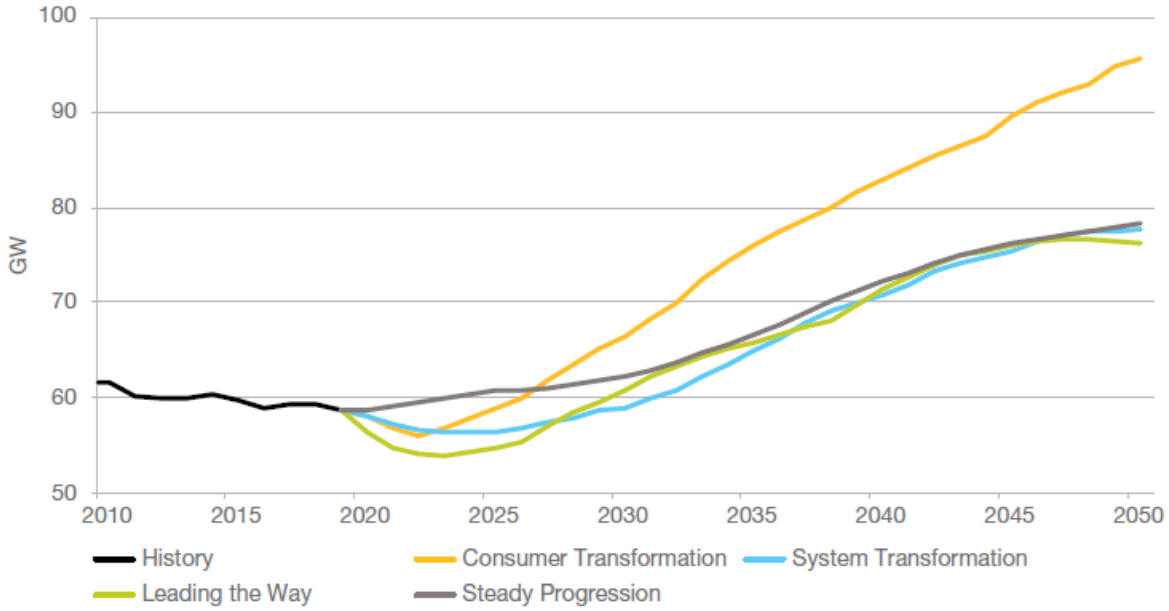
32. In relation to the longer term, National Grid ESO has published four scenarios for electricity demand for the next 30 years of the energy system as part of its UK Future Energy Scenarios (FES) project[26]. The 2020 FES contains three scenarios that met the Net Zero target by at least 2050.

33. Consumer Transformation is a scenario which achieves net zero emissions in 2050 by electrifying large amounts of demand and assuming a high degree of societal change in terms of end user consumption. System Transformation also achieves net zero in 2050 but assumes less societal change and relies more on hydrogen for decarbonisation. Leading the Way has the highest level of societal change and meets net zero slightly ahead of 2050 via a combination of electrification and hydrogen. Steady Progression does not achieve net zero emissions by 2050.

34. Figure 4 shows historic and forecast trends of underlying peak electricity demand from National Grid ESO. 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) above 1 MW.

[25] Initial National Demand Out-turn excludes pumped storage demand, transmission losses, interconnector demand, etc.
[26] https://www.nationalgrideso.com/future-energy/future-energy-scenarios

Figure 4 – Electricity peak demand (including losses) in GW[27]



Demand Side Response

35. Flexibility is essential in order to integrate high volumes of low carbon power, heat and transport. Demand Side Response (DSR) enables us to use electricity more flexibly and decarbonise our electricity system more cost-effectively. It refers to action taken by consumers, in response to a signal (such as price) to reduce or increase the amount of electricity they take off the grid at a particular time. DSR can help consumers save money and improve system efficiency, by using electricity at times that are beneficial to the system and being rewarded for doing so. It can also support the integration of intermittent renewables and defer or avoid the need for costly network upgrades and new generation capacity. We are removing barriers to the increased participation of consumers in DSR through actions set out in BEIS and Ofgem's 2017 Smart Systems and Flexibility Plan.

36. Since the Transitional Auctions held in the CM in 2014 and 2015, which focused on encouraging DSR and distributed generation providers to offer more capacity in the CM, the amount of DSR capacity winning CM agreements has been increasing.

37. Following amendments made the CM legislation after the Future Improvements consultation[28], DSR can now prequalify to bid for agreement lengths of up to fifteen years, if they can demonstrate they meet certain capital expenditure thresholds.

38. Table 2 shows the increasing amounts of DSR winning capacity agreements. Note delivery years from 2022/23 onwards only include T-3 and T-4 auction results.

[27] https://www.nationalgrideso.com/future-energy/future-energy-scenarios
[28] https://www.gov.uk/Government/consultations/capacity-market-proposals-for-future-improvements

Table 2. Amount of DSR winning capacity agreements by Capacity (MW) [29]

Delivery Year (all auctions)	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24
DSR capacity (MW)	521	616	654	1390	1292	534	1168

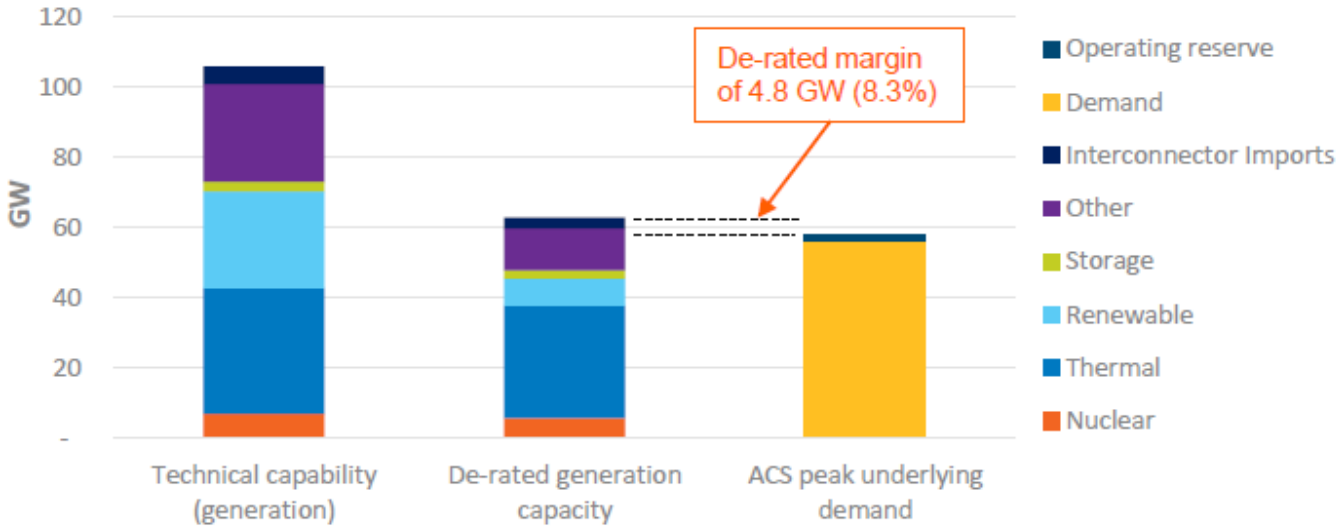
39. The precise volume of DSR currently used in GB remains unknown because DSR arrangements between businesses can be organised independently of network owners. It is also not always clear what proportion of DSR is achieved by using on-site back up generation versus turning demand down/off. However, findings from the evaluation of the first TA estimated that 10-15% of delivered capacity was turn-down DSR.

Supply

Present Capacity

40. National Grid ESO's 2020 Winter Outlook Report assumes a total maximum capacity of 100.7GW this winter (not taking account of any potential breakdown or outage).

Figure 5: Supply margin in relation to generation capacity and demand



[29] https://www.emrdeliverybody.com/CM/Auction-Results-1.aspx

Electricity Storage

41. Flexibility is essential in order to integrate high volumes of low carbon power, heat and transport. Electricity storage enables us to use electricity more flexibly and decarbonise our electricity system more cost-effectively. It can offer supply or demand to the electricity system within seconds to minutes, and is widely used by National Grid, alongside other technologies, to balance and maintain the integrity of the electricity system. It can also support the integration of intermittent renewables and defer or avoid the need for costly network upgrades and new generation capacity. We are facilitating the deployment of storage through actions to remove barriers and reform markets as set out in BEIS and Ofgem's 2017 Smart Systems and Flexibility Plan[30].

42. According to the ESO there is currently around 4GW of electricity storage capacity in GB, with around 3GW from pumped hydro and just over 1GW from battery storage, 160MW of which became operational in 2019/20.

43. All recent growth in storage capacity has been through the deployment of lithium ion batteries, with the exception of a 49.9 MW (250MWh) liquid-air storage project awarded £10m grant this year through the Government's Energy Innovation Portfolio. The £75m Highview Power CRYOBattery™ plant intends to demonstrate the world's first large-scale commercial liquid air energy storage system in Greater Manchester.

44. There is further potential for other storage technologies to deploy in future, such as those using novel battery chemistries, new-build pumped hydro, compressed air and liquid air energy storage or gravitational storage. The Government will continue to support storage technologies by removing barriers, reforming markets and investing in innovation.

45. For example, Vehicle to Grid (V2G) storage holds potential to deliver further flexibility. In January 2018, the Government awarded £30 million to several wide-ranging V2G projects, including feasibility studies, research and development programmes, and demonstration projects involving approximately 1,000 V2G-ready vehicles in real world situations. These projects have placed the UK as a world leader in V2G technology research, with the feasibility studies and three out of four R&D projects now complete and some of their learnings shared; one example is V2GB, a project which included research into the value and drivers of V2G in the UK energy system[31].

Electricity Networks

Current network reliability

46. The networks, both transmission and distribution, remain reliable. The historic overall reliability of supply has been high, with reliability for the transmission network at 99.999967% for financial year 2019-20[32].

47. As part of the price control process, Ofgem sets target and incentive rates for the number of customer interruptions and customer minutes lost for each Distribution

[30] https://www.gov.uk/Government/publications/upgrading-our-energy-system-smart-systems-and-flexibility-plan
[31] https://es.catapult.org.uk/reports/vehicle-to-grid-britain/
[32] https://www.nationalgrideso.com/document/177156/download

Network Operator (DNO). The Interruptions Incentive Scheme incentivises DNOs to invest in and operate their networks to manage and reduce the frequency and duration of power cuts experienced by their customers, whilst maintaining focus on minimising network costs and securing optimal value for consumers.

48. The standards 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. They cover a range of activities, including restoring supply during an unplanned interruption and providing notice periods for planned interruptions. All DNOs met their Interruptions Incentive Scheme targets for unplanned interruptions in 2018-9, apart from SSES. Customer interruptions have fallen by 14% throughout RIIO-ED1 (the current price control) and the duration of interruptions has reduced by 10%[33].

49. Offshore Transmission Systems connect offshore generation (such as wind) to the wider National Electricity Transmission System. The regulatory system for Offshore Transmission Owners is distinct to Onshore Transmission Owners because regulatory performance incentives are based on system availability, rather than loss of supply. This ensures offshore generators are able to export energy with minimal disruption. For the financial year 2019-20, the annual availability of offshore networks was 99.20%[34].

Future developments of electricity networks

50. To continue providing a reliable electricity system and to facilitate the transition to net zero, networks require ongoing investment. Ofgem's price control settlements through its RIIO (Revenue = Incentives + Innovation + Outputs) model are ensuring this investment takes place and drives further efficiency savings. The 2013 to 2021 transmission price control (RIIO-T1) started on 1 April 2013. Ofgem has approved funding of up to £22.50bn for expanding, replacing and maintaining the GB transmission network for RIIO-T1.

51. Transmission owners provide quarterly updates on their major projects to BEIS and Ofgem. The latest update shows that 3.20 GW of network capacity is under construction, with 11.75 GW delivered since February 2012[35].

52. Ofgem issued its Final Determinations for RIIO-T2, the next transmission price control, earlier in December 2020[36]. The Final Determinations show a lower level of approved funding than in RIIO-T1 but include the potential for significant additional investment through flexibility mechanisms. The RIIO-T2 price control will be effective from April 2021 and run for five years.

53. The 2015 to 2023 price control for the Distribution Network is ongoing. There are 14 regional electricity DNOs that are regulated through RIIO-ED1. Ofgem has approved overall funding of £24.6bn across GB for the period 1 April 2015 to 31 March 2023. This represents a major investment in the distribution network. Consultation has started on the second price control period, RIIO-ED2, with Ofgem

[33] https://www.ofgem.gov.uk/system/files/docs/2020/02/riio-ed1_network_performance_summary_2018-19.pdf
[34] https://www.nationalgrideso.com/document/177156/download
[35] https://www.gov.uk/Government/publications/electricity-transmission-networks-major-projects-update
[36] https://www.ofgem.gov.uk/publications-and-updates/riio-2-final-determinations-transmission-and-gas-distribution-network-companies-and-electricity-system-operator

reviewing responses to their consultation on the Sector Specific Methodology[37]. The decision is expected in December 2020.

Interconnection

54. Great Britain currently has 6 GW of electricity interconnector capacity with mainland Europe and the Irish electricity market. This consists of:

    - a 2 GW link to France (IFA);
    - a 1 GW link to France (IFA 2) which commissioned in November 2020;
    - a 500 MW link with Ireland (East-West);
    - a 1 GW interconnector with the Netherlands (BritNed);
    - a nominally rated 500 MW link between Great Britain and Northern Ireland (Moyle); and
    - a 1 GW interconnector with Belgium (Nemo Link).

55. There is a significant pipeline of further interconnectors at various stages of development – if all the projects that have applied to Ofgem for regulatory approval come forward, they would bring our total interconnection capacity to nearly 18 GW. Many of these projects are being brought forward under Ofgem's cap and floor regulatory regime, which was put in place in 2014 to encourage investment in projects that will benefit consumers by providing a minimum return for project developers (the floor) whilst ensuring that consumers benefit from excess revenues accruing to developers by limiting the maximum return (the cap). Ofgem announced a review of the Cap and Floor regime and approach to new electricity interconnectors in summer 2020[38].

56. There are three projects currently under construction, which will add 3.8 GW of capacity:

    - ElecLink – 1 GW to France (via the Channel Tunnel);
    - NSL – 1.4 GW to Norway, scheduled for completion in 2021; and
    - VikingLink – 1.4 GW to Denmark, scheduled for completion in 2023.

[37] Ofgem, Consultations and Decisions (RIIO-ED2)
[38] https://www.ofgem.gov.uk/system/files/docs/2020/08/open_letter_-_interconnector_policy_review.pdf

Liquidity in the GB wholesale power market

57. Energy market firms buy and sell their electricity in the wholesale market. The wholesale market allows participants to trade 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.

58. 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 plants with negative consequences for security of electricity supply.

59. Following concerns by Ofgem and industry about the lack of liquidity in the wholesale electricity market, Ofgem activated the 'Secure and Promote' licence condition on 31 March 2014. Ofgem's monitoring of the market since 2014 showed mixed results with an improvement in peak load liquidity but no step change in churn.

60. On 18 November 2019, Ofgem suspended the Secure and Promote Market Making Obligation (MMO)[39]. The Secure and Promote Supplier Market Access Rules and Reporting Requirements continue to remain in effect.

61. Ofgem has continued to monitor the market since the suspension. Our monitoring shows:

    - Traded volumes in the wholesale market were stable in the months following the suspension i.e. from Q4 2019 to Q1 2020. However, total over-the-counter trading from Q1 to Q3 2020 fell to 596TWh, down from 652TWh during the same period in 2019. This reduction in year to date volume could be a reflection of the electricity demand shock and uncertainty owing to coronavirus, as opposed to an impact of the suspension.

    - Churn[40] has also been relatively stable since the end of last year. It averaged 3.8 from 2014 to Q3 2019 while Secure and Promote was in operation. So far, the churn from year to August has remained very similar to the average prior to the suspension. This stable churn reflects lower trading volume and lower demand, which is keeping the ratio stable.

    - There has been a reduction of over the counter peak load[41] volumes since the suspension. Total trade from Q1 to Q3 2020 fell to 43TWh, down from 63TWh during the same time in 2019. This is a 32% fall compared to the 9% fall in total traded volumes. We have also seen a marked shift in traded volumes to the prompt markets[42] away from future delivery contracts. This is driven by an increasing share of renewable generation, uncertainty regarding the future of carbon pricing, the suspension of the MMO, and the coronavirus pandemic.

[39] https://www.ofgem.gov.uk/system/files/docs/2019/10/rwe_schedule_b_decision_2.pdf
[40] Churn is the number of times electricity which is generated in the market is subsequently traded.
[41] Peakload contract is for physical delivery between 07:00 to 19:00 during working days.
[42] Prompt is a contract for delivery in the near-term i.e, day ahead, week ahead, balance of the month, etc.

- Bid-offer spreads[43] have widened overall since the suspension of Secure and Promote as they are no longer subject to a ceiling. So far this year, baseload spreads have remained close to the historical (2009 to 2013) average at 1% which is above the spreads during the MMO but still remains in a medium to high liquidity range. Peak load products have widened more with an average of 1.9% with some differences between products, driven by lower traded volumes. This is above the historical average (2009 to 2013) of 1.4%.

62. Since the suspension, Ofgem has continued to monitor market liquidity with a view to assessing the impact and the need for intervention. Ofgem commissioned NERA economic consulting to conduct an options assessment and model the welfare benefits of intervention. The NERA report was published in January 2020[44].

63. Ofgem has taken into account the NERA modelling, market monitoring and a quarterly trader survey. Ofgem announced mid-October that it would not be intervening in the power market for the time being given inconclusive evidence that intervention would yield positive welfare benefits.

[43] Bid-offer spread is the difference between the buy and sell price. The narrower spread the more confidence that the price reflects market fundamentals.
[44] https://www.ofgem.gov.uk/publications-and-updates/update-liquidity-policy-review-publication-nera-economic-consulting-options-assessment-report

Gas

Introduction

64. GB's gas system has delivered securely to date and is expected to continue to function well, with a diverse range of supply sources and sufficient delivery capacity to more than meet demand. The UK Continental Shelf (UKCS) remains a major source of gas in the GB market, with the remainder imported from a variety of sources, including pipelines from Norway, interconnection with the Continent through the IUK and BBL pipelines and some of the largest liquified natural gas (LNG) import infrastructure in Europe.

65. 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 (i.e. through its use as a fuel source for domestic heating and cooking, and for various industrial uses) and indirectly (i.e. because of its role in electricity generation). Past analysis by BEIS (including that undertaken for the 2017 Strategic Assessment of Gas Security of Supply[45] and the 2018 National Risk Assessment[46]) and by Ofgem has provided valuable insight into the nature of the risks to our gas security, building an evidence base that UK gas supply infrastructure is resilient to all but the most extreme and unlikely combinations of severe infrastructure and supply shocks. Nonetheless there is always future uncertainty – for gas this includes wider energy system changes required to deliver low carbon energy in line with our net zero ambition, increasing import dependency and the future mix of sources of gas (both domestic and international).

Supply

66. GB benefits from a diverse range of gas supply sources, including domestic production, pipeline imports from Norway and mainland Europe, and LNG from global markets. GB's gas supply infrastructure can sustain a 1-in-20 peak day demand as required under National Grid's Gas Transporters Licence. This is defined as the amount of infrastructure (pipes and compressors etc.) needed to transport the gas that would be required by customers in the coldest day of winter, in the coldest winter we can expect in a 20-year period.

67. To date, the GB gas system has reliably delivered a secure supply. Security of supply reports by Ofgem and by BEIS have concluded that the GB market is generally secure.[47] BEIS's strategic assessment of gas security of supply, published on 12 October 2017, noted that GB will have enough import capacity to deliver under high demand and the resilience to cope with severe shocks to the system.

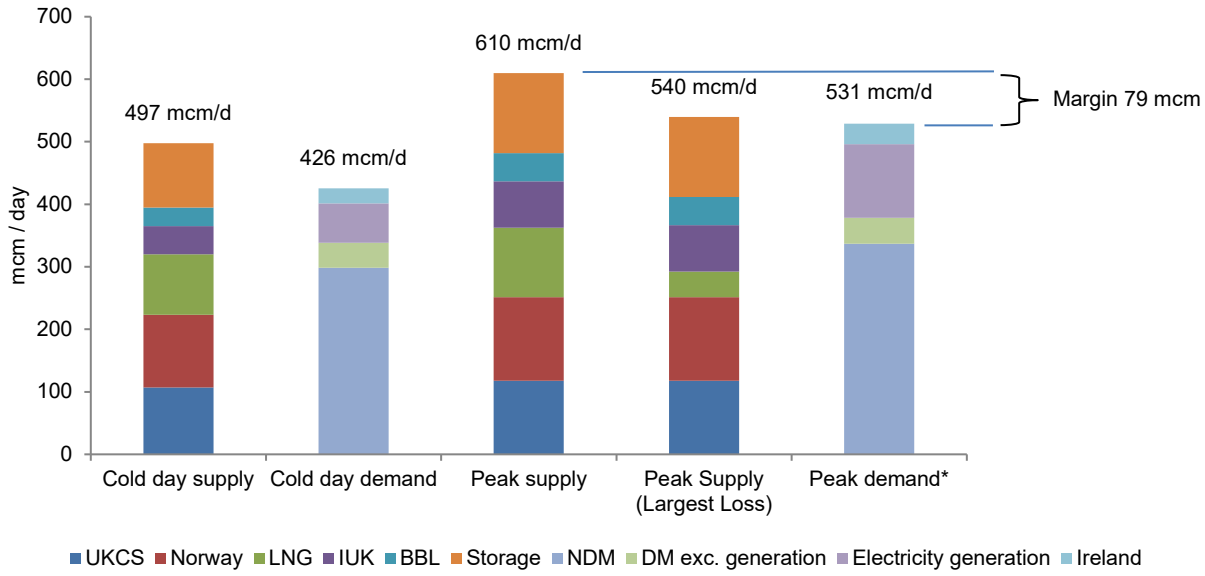
[45] Gas Security of Supply: Strategic Assessment and Review, BEIS, 2017
[46] UK National Risk Assessment on Security of Gas Supply, BEIS, 2018, https://www.gov.uk/Government/publications/uk-national-risk-assessment-on-security-of-gas-supply-2018
[47] Recent Security of Supply Reports

- Gas security of supply: strategic assessment and review (by BEIS, supported by CEPA analysis, October 2017)
- 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).

68. The UK's N-1 calculation (whether peak demand could still be met if the single largest piece of infrastructure fails) is updated annually in the National Grid Winter Outlook Report. The test calculated that the UK exceeded the target of 100% with a score of 101.6%, meaning the UK has more infrastructure than is required to meet demand (including exports to the Republic of Ireland) on the coldest day in 20 winters, even if the single largest piece of infrastructure (an LNG pipeline) fails. The N-1 calculation is a numerical, point-in-time assessment using maximum technical capacity of supply and storage infrastructure.

69. Figure 6 below shows forecasted demand and supply in peak day and a cold day over the coming winter. In both forecasted scenarios demand can be met.

Figure 6. Supply and Demand Forecast Winter 2020[48]



Import capacity and outlook

70. GB has a diverse range of sources of gas supply, including domestic production, pipeline imports from Norway (predominantly via the SAGE, FLAGS and Vesterled pipelines) and mainland Europe (Belgium via the IUK interconnector; and the Netherlands via the Balgzand-Bacton Line interconnector), LNG from global markets to terminals at Milford Haven (South Hook and Dragon) and the Isle of Grain, and storage (which is not strictly speaking a 'source' of gas, but is an important source of supply flexibility).

71. Currently, the UK has import deliverability[49] of ~56 billion cubic metres per year (bcm/y) from Norway, ~43 bcm/y from capacity connected to the Continent, and ~49 bcm/y from LNG import terminals[50]. Capacity is not itself a measure of utilisation. To date, GB has always secured the gas required; and BEIS, Ofgem and National Grid analysis has all concluded that it will remain well positioned to do so. National Grid's

[48] https://www.nationalgrideso.com/research-publications/winter-outlook
[49] Nameplate deliverability figures may differ from actual operational deliverability.
[50] https://www.nationalgrid.com/uk/gas-transmission/insight-and-innovation/gas-ten-year-statement-gtys

FES [51] 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 secure the necessary gas is an appropriately incentivised, flexible and accessible market. This is discussed under Market Functioning below.

72. As United Kingdom Continental Shelf (UKCS) production declines, imports will play an increasing role in meeting UK gas demand. However, UKCS production still remains the main source of UK gas supply, meeting around 50% of gas demand last year[52].

73. Despite the longer-term trend of a decline in UKCS production, net imports remained comparatively stable in 2019 as both imports and exports were relatively flat on 2018 However, within this there was a shift as pipeline imports fell by 28% in 2019[53] while imports of LNG more than tripled

74. LNG accounted for around 39% of total imports in 2019. This was driven by increased LNG export capacity from countries such as the US. Europe acted as a balancing market as increased global LNG supply overtook the growth in demand in Asia. This reduced prices and made the UK one of the key markets for balancing this global oversupply of LNG. However, despite this increase, 2019 LNG imports were still only around 73% of the peak levels reached in 2011, when we saw relatively low levels of pipelined imports from mainland Europe and Norway compared to subsequent years.

75. Norway remained the principal source of UK gas imports (Figure 7) despite a 21% decrease in 2019, meeting 57% of the UK import volumes over the year. For LNG, Qatar remained the primary supplier at nearly half of all volumes although the mix of LNG sources has become increasingly diversified in recent years. After importing to the UK LNG market for the first time in 2017, export volumes from Russia and the USA have increased to 34 TWh and 33 TWh in 2019, respectively, forming 33% of LNG imports combined.

76. Of EU Member States, only Sweden, France, and Belgium benefit from a more diverse range of import sources than the UK, as shown in Figure 8. Alongside the flexibility and resilience provided by this diversity of import supply, the UK also benefits from significant levels of production, strengthening the resilience of the system.

[51] https://www.nationalgrideso.com/future-energy/future-energy-scenarios/fes-2020-documents
[52] https://www.gov.uk/Government/statistics/natural-gas-chapter-4-digest-of-united-kingdom-energy-statistics-dukes
[53] This figure includes pipeline imports via the IUK and BBL interconnectors.

Figure 7. Gas imports by country 2019[54]

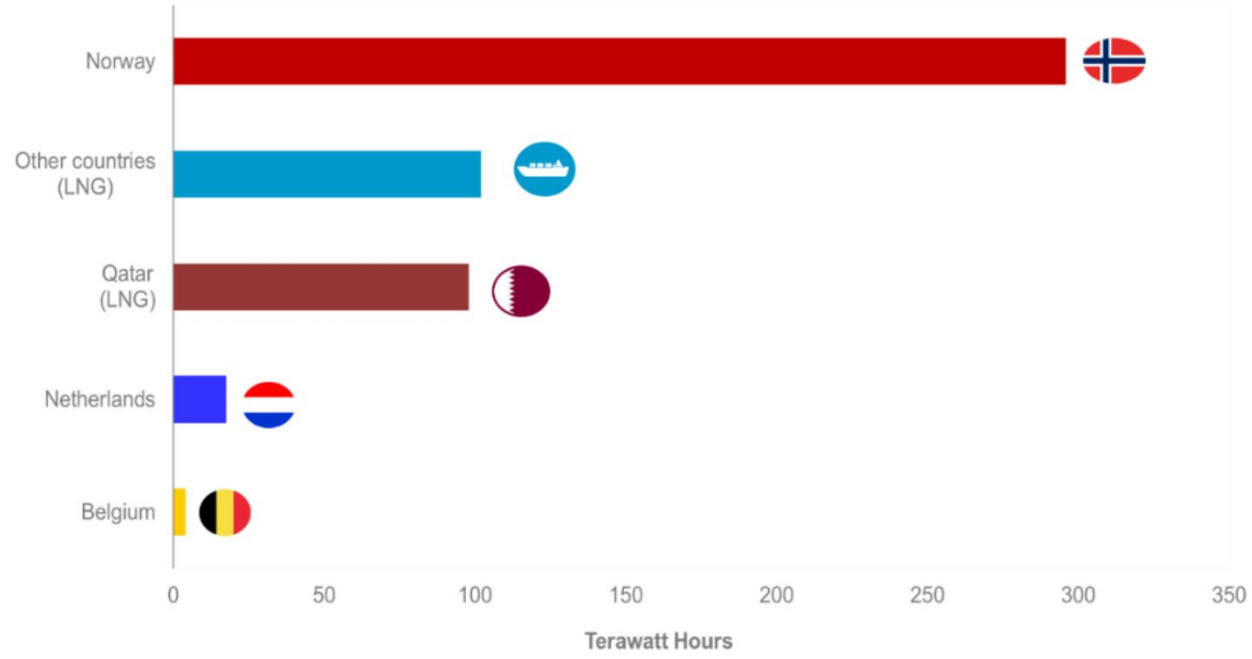
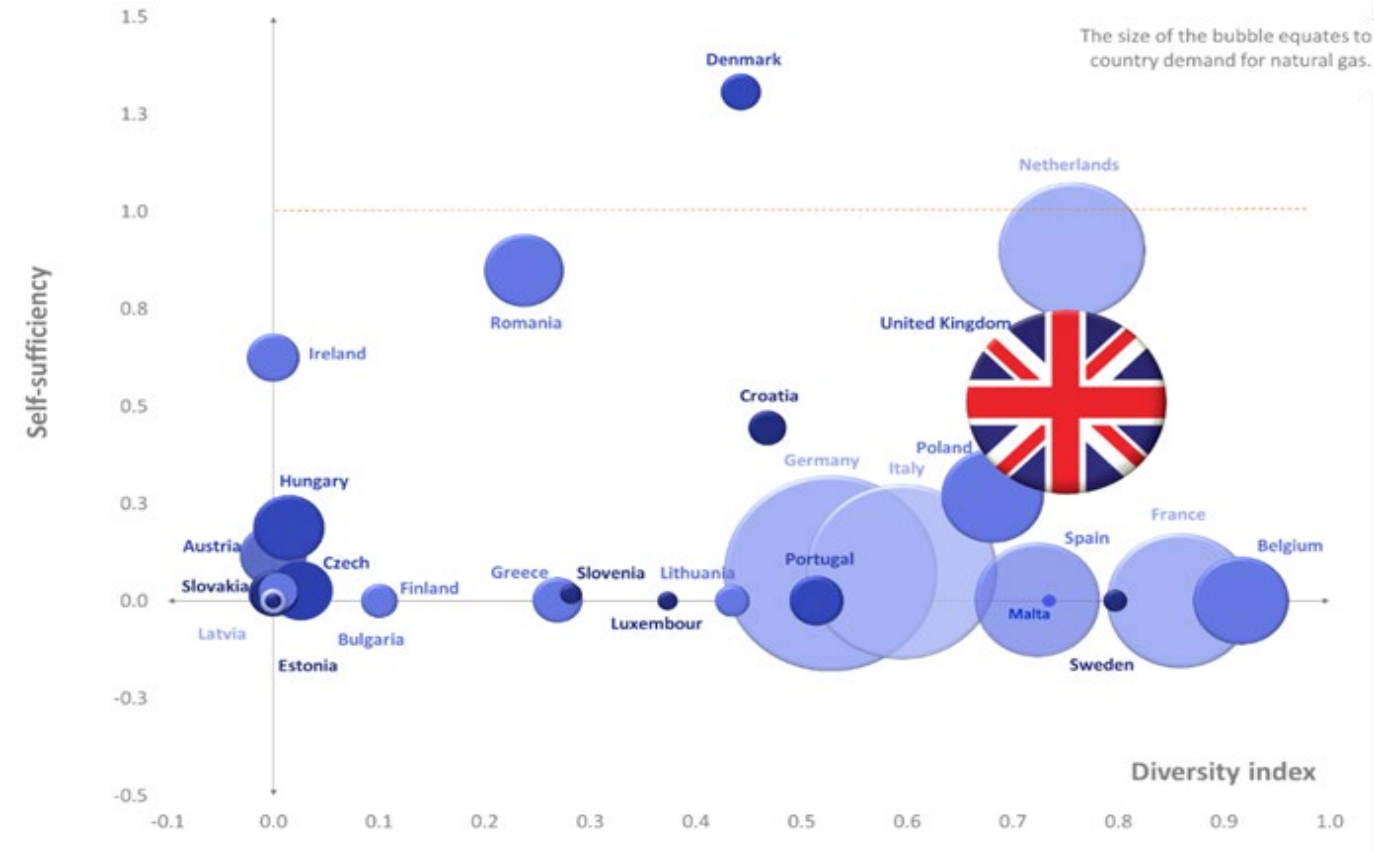


Figure 8. Import Source and Dependence, EU Member States[55]



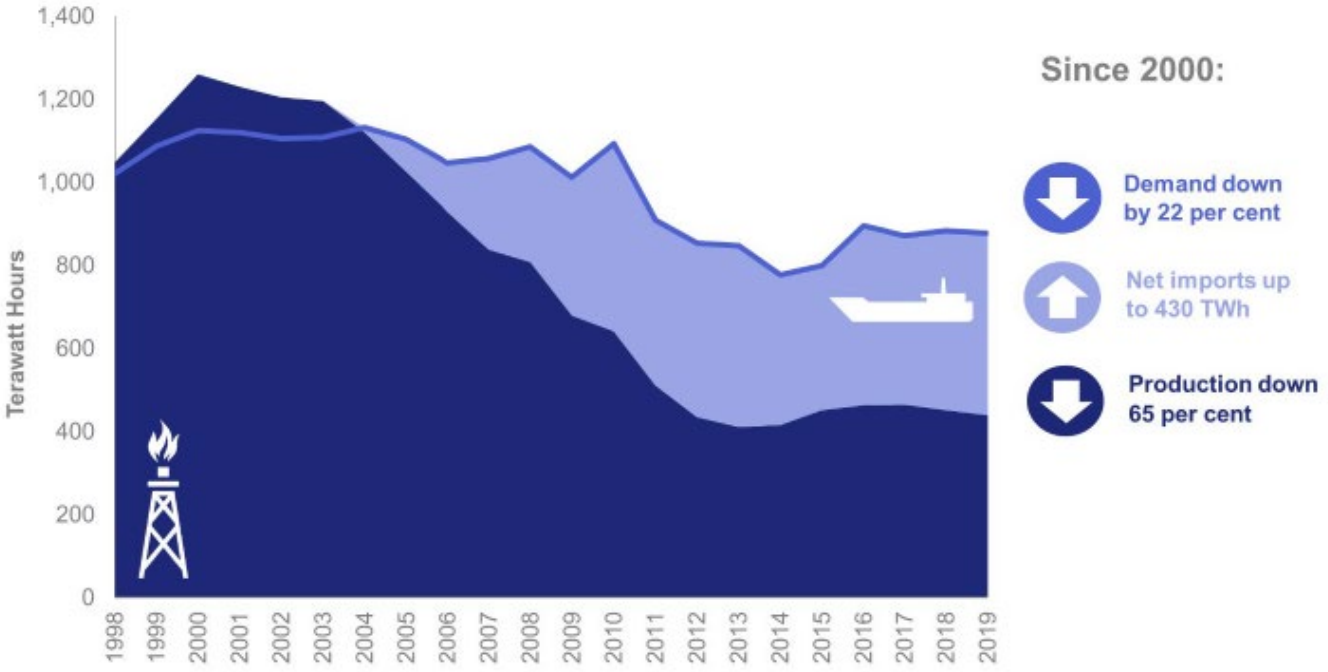
[54] https://www.gov.uk/Government/statistics/digest-of-uk-energy-statistics-dukes-2020
[55] https://www.gov.uk/Government/publications/energy-trends-december-2019-special-feature-article-diversity-and-security-of-gas-supply-in-the-eu-2018

Production

77. Domestic UK Continental Shelf (UKCS, also referred to as North Sea gas) is a key source of gas for the UK, accounting for 38% of gas supplies in winter 2019/20[56] and for 46% of gas supplies in 2019 overall. UK natural gas production in 2019 decreased by 2.9 % compared with 2018 to 439 TWh. The longer-term trend has been a pattern of decline and continued into 2019 following the closure of the Theddlethorpe gas terminal in August 2018 and the Rough storage facility, from which the last of the cushion gas has now been extracted.

78. Mirroring the long-term trend in declining gas production since the turn of the century, gas production fell in 2019 and remained two-thirds below the peak levels seen in 2000[57]. Despite this decline, the UK remains one of the two major gas-producing nations within Europe, alongside the Netherlands, and domestic production matches over half of UK demand.

Figure 9. Changes in UK gas production and demand, 1998 – 2019[58]



79. The Oil and Gas Authority estimates that there are 260 billion cubic metres of proven and probable (2P) gas reserves, of which 174 billion cubic metres are proven reserves[59]. There has been a steady decline in 2P reserves since 1994 (as shown in Figure 9), initially associated with a higher rate of production. At the end of 2019 cumulative production plus 2P reserves was 2,971 billion cubic metres. The apparent

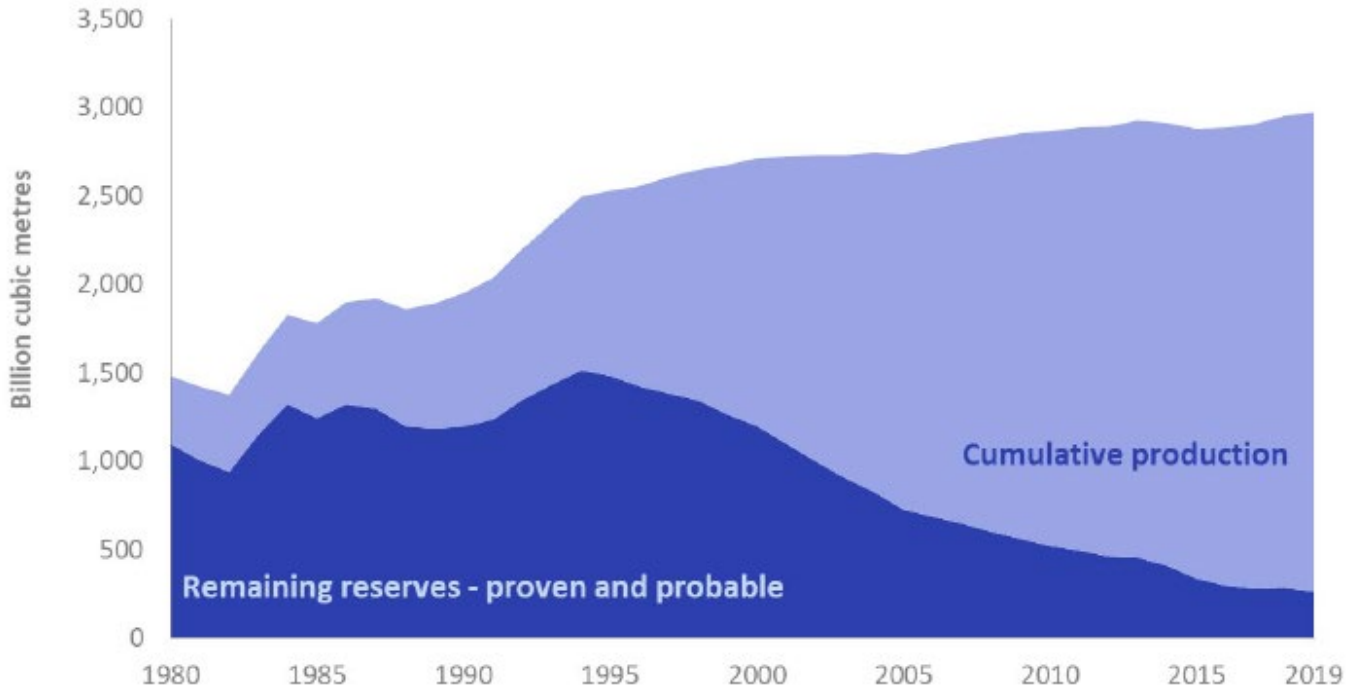
[56] https://www.nationalgrid.com/uk/gas-transmission/documents/131756-gas-winter-review-and-consultation-2020
[57] https://www.gov.uk/Government/statistics/natural-gas-chapter-4-digest-of-united-kingdom-energy-statistics-dukes
[58] https://www.gov.uk/Government/statistics/natural-gas-chapter-4-digest-of-united-kingdom-energy-statistics-dukes
[59] https://www.gov.uk/Government/statistics/uk-energy-in-brief-2020

decline in reserves in 2015 was due to re-classification of some reserves that had not yet been sanctioned - these will be included in future as and when sanctioned.

Demand

80. Whilst gas is a critical part of the UK's energy demand, the long-term trend is downwards, gas demand in 2019 was more than a fifth (22%) lower than in 2000 (Figure 9). Most notably, industry demand has shrunk by 45% since 2000. Demand for power generation and domestic demand has also shrunk by 17 and 16%, respectively, despite a rising population and growing number of homes. Increased efficiencies, including greater levels of home insulation, are in part responsible for this. Despite the overall downwards trend, there are notable peaks that correspond with weather variations, which generate a greater demand for space heating in homes and offices.

Figure 10. Gas reserves and cumulative production, 1980-2019[60]



81. Gas demand in 2019 decreased by 0.7% compared to 2018 to 878 TWh. In contrast to the cold weather brought over by the 'Beast from the East' in the first quarter of 2018, 2019 saw milder temperatures. This contributed to an annual 0.9% reduction in domestic consumption for gas (Figure 11). Similarly, industrial usage fell by 1.2%, with slight decreases in most sectors, contributing to an overall decrease in final consumption of 0.9%. Gas demand for transformation, including electricity and heat generation, fell by 1.5%. This includes gas used for electricity generation which decreased by 1.6% because of the continued increase in output from renewable

[60] https://www.gov.uk/Government/statistics/uk-energy-in-brief-2020

sources. The only broad sector that saw an increase was in the energy industry (by 6.1%) and this was due to increased demand for Oil and Gas extraction.

Figure 11. Changes in gas demand over time, 2000-2019[61]

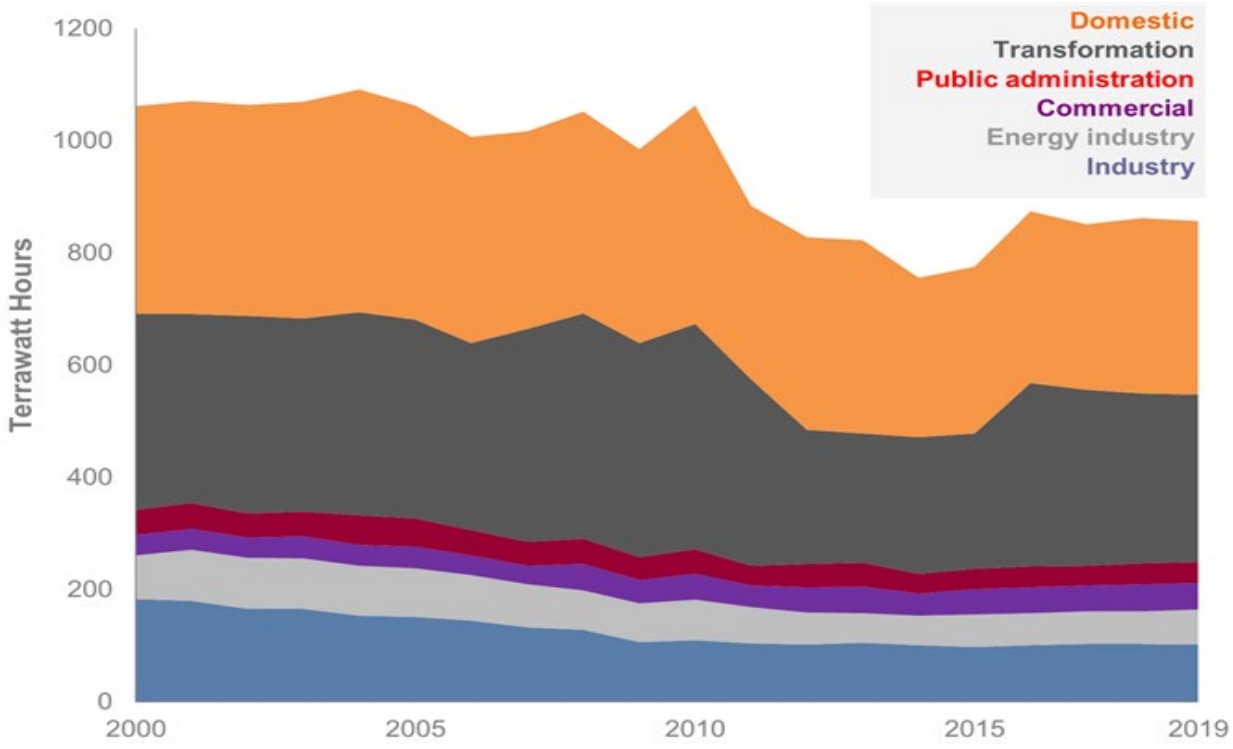
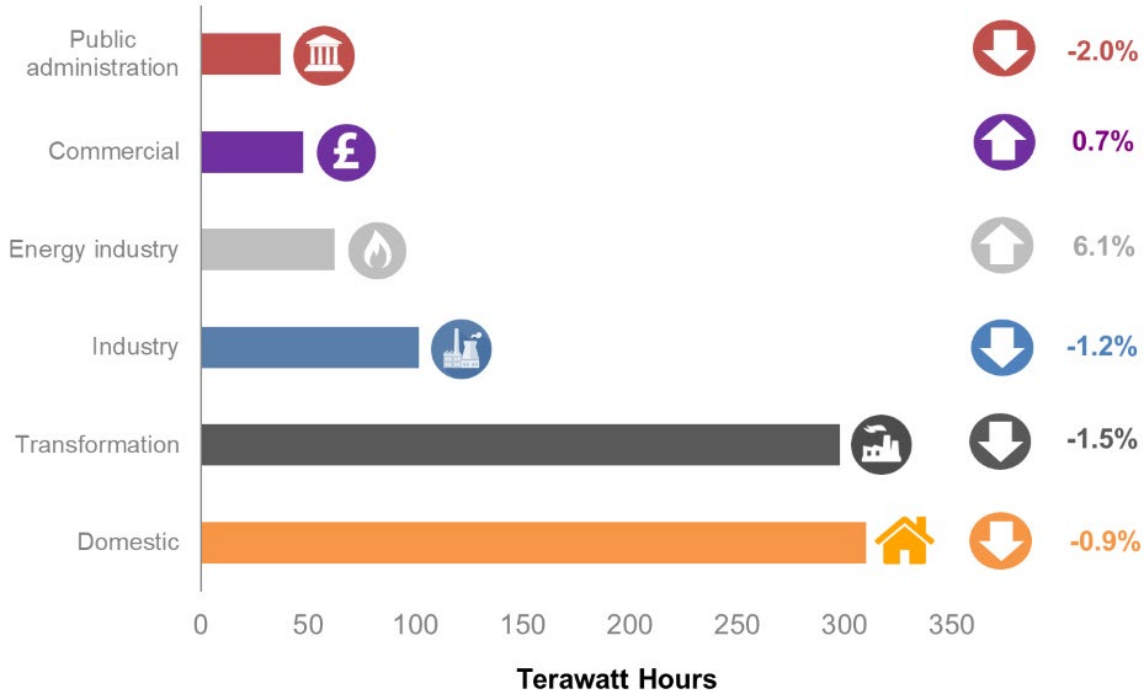


Figure 12. Changes in annual gas demand by sector, 2019[62]



[61] https://www.gov.uk/Government/statistics/digest-of-uk-energy-statistics-dukes-2020
[62] https://www.gov.uk/Government/statistics/digest-of-uk-energy-statistics-dukes-2020

Demand side response

82. The conclusions of Ofgem's Gas Significant Code Review (SCR)[63] placed an obligation on National Grid to develop a centralised DSR mechanism to encourage greater demand-side participation from industrial and commercial users. National Grid's proposed DSR methodology was approved by Ofgem and went live in October 2016.

83. This service allows large gas consumers to offer, via a centralised platform, to reduce the amount of gas they use during times of system stress in exchange for a payment. To date, this platform has only been deployed once, in March 2018, after the issuing of a Gas Deficit Warning (now known as a Gas Balancing Notification following approval of Unified Network Code Modification No. 675 in July 2019). At that time, no DSR offers were placed on the centralised platform and no involuntary demand-side measures were taken by National Grid.

Gas Storage

84. Storage itself does not produce gas but allows gas from other sources (whether domestic or imported) to be held until times of high demand.

85. There is currently around 1.5 billion cubic metres (bcm) of gas storage capacity in GB[64]. Storage takes in gas when it is low priced (usually at times of oversupply such as in the summer) and returns it to the system when prices are high (usually during peak demand). Some storage sites operate over short timescales (days/weeks) while other facilities exploit longer term seasonal differences. GB storage does not operate as a 'strategic reserve' of gas – providing a large volume of gas to be used in case of an emergency but otherwise not used. Instead, the value of storage lies in its ability to operate flexibly in response to relatively short-term price signals.

86. The economics of storage relies on the variations in gas price over time (the spreads). For long range storage, this is summer-winter (seasonal) spreads and for short range storage it is a combination of seasonal and shorter-term spreads. Seasonal volatility in the gas market has declined, which can be explained by the diversity of supply sources and capacity of infrastructure, both in the UK and across Europe. In particular, seasonal spreads have declined significantly, impacting the economics of storage facilities in the UK. We will continue to monitor the value of long-term storage as the dynamics of the gas market continue to evolve.

[63] https://www.ofgem.gov.uk/publications-and-updates/gas-security-supply-significant-code-review-conclusions
[64] https://www.ofgem.gov.uk/publications-and-updates/gb-gas-storage-facilities-2020

Market Functioning

87. The GB 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 Netherland s' comparable in size. In 2019, total traded volumes were approximately 1,349 bcm in the GB market[65]. 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.

Network Reliability

88. The UK gas transmission network achieved 99.999% reliability in 2019/20[66]. The distribution network that carries gas directly to consumers is equally robust, with a reliability rating of 99.998% for 2018/19 across gas distribution network operators, the most recent year for which data are available[67].

Covid-19 Impacts on the Gas Market

Gas supply

89. GB's gas system has delivered securely to date and is expected to continue to function well, with a diverse range of supply sources and sufficient delivery capacity to more than meet demand. The diversity in supply includes pipelines from the UK and Norway continental shelf (UKCS & NCS), interconnection with the Continent through the IUK and BBL pipelines and three Liquified Natural Gas (LNG) terminals, meaning GB has one of the largest amounts of LNG import infrastructure in Europe.

90. In addition, the UK has a number of gas storage facilities, which act as a source of system flexibility when responding to short-run changes in supply and demand.

91. At the time of the first lockdown in March 2020, global LNG supply was continuing to hit record highs and overtook the rate of growth of demand, leading to global oversupply even before the COVID crisis.

92. In the early part of this year, supply to GB increased significantly due to the reduction in Asian demand. Europe was continuing to act as a balancing region to absorb excess global LNG supply. March LNG loadings in Britain were 37% higher than the previous year, while in April total LNG delivered rose by 7% year on year[68].

[65] https://www.ofgem.gov.uk/data-portal/wholesale-market-indicators
[66] https://investors.nationalgrid.com/news-and-reports/reports/2019-20/plc
[67] https://www.ofgem.gov.uk/publications-and-updates/riio-1-gas-distribution-annual-report-2018-19
[68] https://subscriber.icis.com/commodity/issue/view/energy%2Fpublication-e-esgm/energy%2Fissue-heren-esgm-20201103?closeLink=/commodity/188/1/1/archive

93. Despite total LNG deliveries still almost 14% up from 2019 levels over the gas summer, the progressive curtailment of US cargoes in response to the challenging global price environment has begun to have an effect as we move into the gas winter. In September, deliveries were 45% below 2019 levels, while in October this difference widened further to 56%.

Gas demand

94. Demand for gas is affected by many factors including weather, electricity demand and renewable generation.

95. In the early stages of the pandemic, several factors suppressed gas demand as the UK experienced a widespread closure of schools and non-essential businesses during the first national lockdown between 23 March – mid-May.

96. The lockdown began at the end of the gas winter when temperatures were on the rise and heating-based demand was already set to decline. May 2020 itself was an abnormally warm and sunny month.

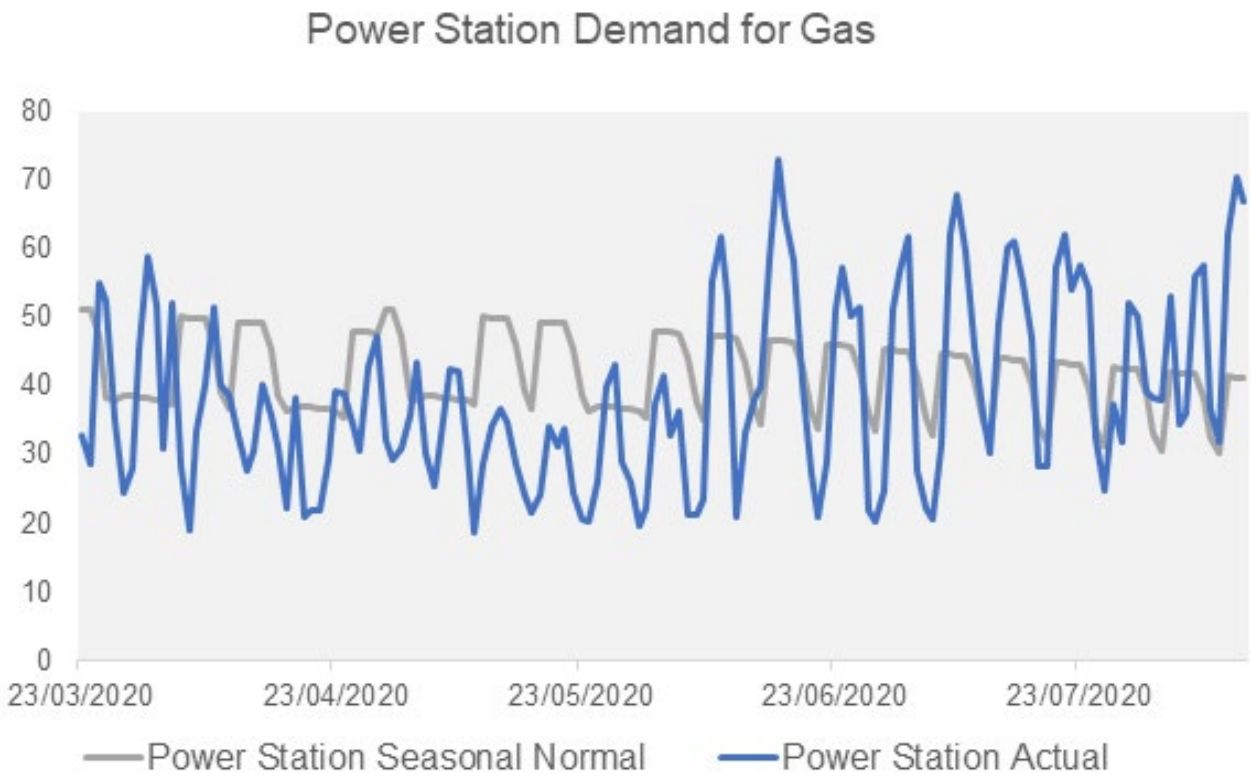
97. Data from National Grid showed that total gas used by residences and businesses connected to the distribution networks still fell by around 8% during this period relative to modelled forecasts[69], even after adjusting for these weather impacts. This suggests some reduction in gas demand associated with the lockdown measures.

98. Another key factor affecting demand since March was the fluctuation in the amount of gas used power stations for electricity generation. Between 23 March – mid-May, we saw an approximate 17% reduction in their demand relative to modelled forecasts. Typically wind and solar output were also high, which reduced the need to use gas for generation to balance the electricity system.

101. Since mid-May, average daily power station demand has returned to seasonal norms. The chart below also shows that power station demand has peaked considerably higher than the seasonal normal, especially on those very hot days when we witnessed spikes in air conditioning usage. This trend of demand returning to normal levels also occurred in National Transmission System (NTS) connected industrial and local distribution zone (LDZ) offtake.

[69] From National Grid data provided to BEIS, 2020

Figure 13 Power Station Demand for Gas during 2020[70]



[70] From National Grid data provided to BEIS, 2020

Oil

Introduction

102. Oil currently meets over a third of primary energy demand and is the main energy source for transport, meeting virtually all the UK's needs. Other uses include industrial processes, domestic heating and as feedstock for petrochemical, industrial and construction products and processes. Domestic crude oil (including natural gas liquids) production in 2019 grew for the second consecutive year following new projects that came online towards the end of 2017. Production in 2019 stands at 38% of the UK's peak in 1999 and is not sufficient to meet demand. In addition, much of the type of crude oil produced in the UK is more profitable for the export market, meaning imports remain important[71]. The sector plays a key underpinning role for the whole of the UK economy as well as offering significant direct benefits socially, economically and in terms of resilience.

103. The UK's oil supply chain continues to deliver security of supply and is expected to continue to function well, with sufficient capacity to meet demand, as well as respond to supply shocks. The UK is well placed in the global oil markets (crude and product), trading extensively in all oil types and with significant import and export infrastructure at coastal locations able to source fuels from around the globe, notably from the Amsterdam-Rotterdam-Antwerp oil hub.

104. Analysis by BEIS has provided valuable insight into the risks of specific point failures in our downstream oil supply infrastructure. The evidence shows that the UK fuel supply is resilient to most shocks where the market can adapt as it has done historically. However, for the case of very short-term disruptions, BEIS has identified some measures that could increase our fuel resilience, most notably through an ability to lease additional truck and trailers to the supply chain, which we have held since late 2016.

Primary Oil Supply and Demand

105. All data are sourced from the Digest of UK Energy Statistics[72] unless otherwise specified.

106. Demand for primary oils decreased by 1.9% in 2019. Transport contributes to more than 70% of total demand, and transport fuels fell by 1.1% in 2019.

107. Production of crude oil and natural gas liquids, in 2019, increased by 1.9% compared to 2018. This represents the highest level of indigenous production since 2010.

108. While production of crude oil would have been sufficient to meet 88% of UK refinery demand in 2019, there has been an increase in the diversity of sources coming into the UK. This has reduced the impact of a disruption to any one source of supply on

[71] https://www.gov.uk/Government/statistics/digest-of-uk-energy-statistics-dukes-2020

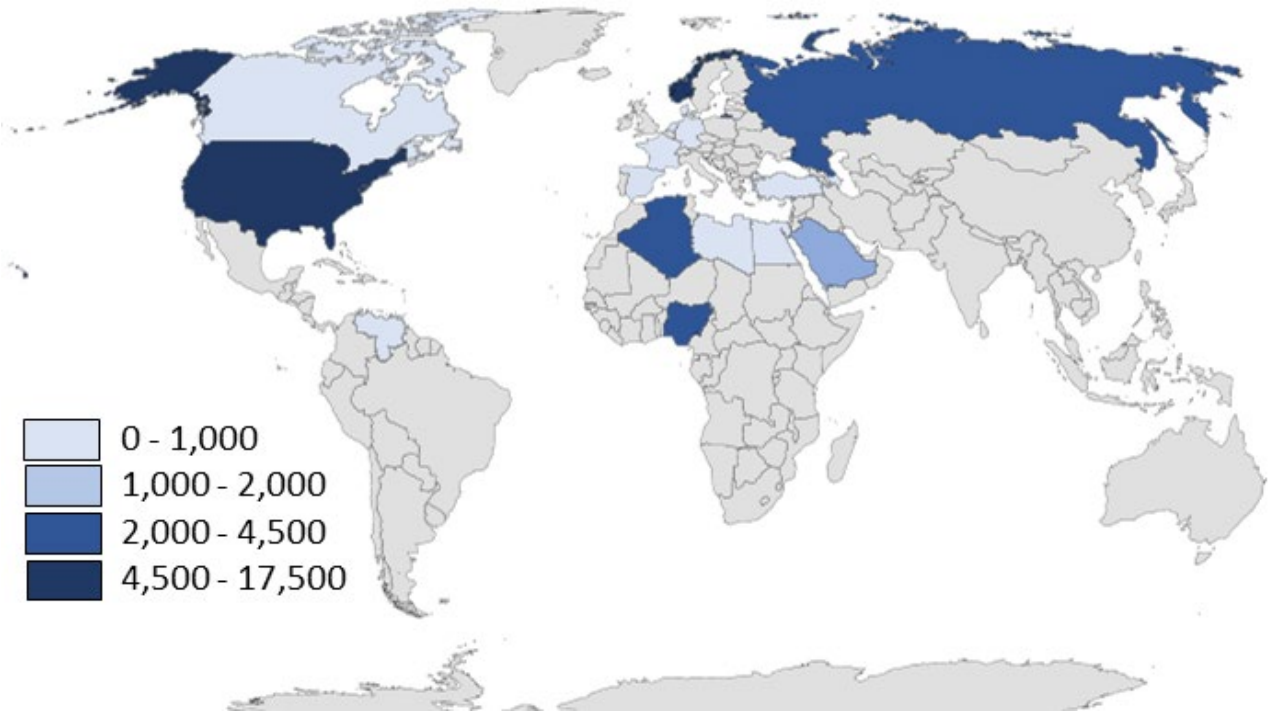
[72] https://www.gov.uk/Government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes

the UK. In 2018 and 2019 we saw record low use of indigenously produced crude in UK refineries as market pressures drove North Sea exports.

109. The UK trades extensively in primary oils globally, exporting to meet demand for Brent crude from refineries in the Middle East and importing from Norway and increasingly from the US. In 2019 the UK imported 52 million tonnes of primary oils, comparable to 2018 and meeting 88% of total demand.

110. Figure 14 shows the diversity of sources of crude imports in 2019. For further information, see the article Diversity of supply for oil and oil products in OECD countries, 2019[73].

Figure 14. Source of UK crude oil imports 2019 (thousand tonnes)[74]



111. The main source of the UK's imports has historically been Norway given its proximity to the UK and similarity in its crude types. UK imports from Norway remained stable in 2019 compared to 2018, with Norway providing 39% of total UK imports. However, this current stability follows recent sharp decreases in supply from Norway; in 2016 Norway provided 62% of UK imports, which dropped to 39% by 2018.

112. Imports from OPEC countries accounted for just 20% of the UK's crude imports in 2019 at 9.0 million tonnes, this being a 36% reduction compared to 2018. Most imports from OPEC countries come from Algeria and Nigeria, with both showing substantial reductions by one-half and three-quarters, respectively, in 2019. Imports

[73] https://www.gov.uk/Government/publications/energy-trends-september-2020-special-feature-article-diversity-of-supply-for-oil-and-oil-products-in-oecd-countries-in-2019
[74] https://www.gov.uk/Government/publications/energy-trends-september-2020-special-feature-article-diversity-of-supply-for-oil-and-oil-products-in-oecd-countries-in-2019

from the US continue to rise and in 2019 stood at 11.4 million tonnes, a 50% increase compared to 2018 as US exports reached new record highs since the lifting of the crude export ban at the end of 2015.

113. The UK is a significant exporter of crude oils as well as an importer. Crude oil exports remained stable at 41 million tonnes in 2019, following the 18% increase in 2018 due to strong production and favourable price spreads resulting in strong demand for Brent crude from Asia. The UK remains a net importer of primary oil products at 7.3 million tonnes in 2019, a 0.6 million tonne decrease compared to 2018. This is relatively stable when looking back at 2018 where we saw a sharp decline in net imports of primary oils as they almost halved to 7.9 million tonnes compared with 2017.

114. The Oil and Gas Authority (OGA) estimates there are 481 million tonnes of proven and probable oil reserves at the end of 2019. Of this amount, 390 million tonnes are proven reserves.

Refined Product Demand and Supply

115. UK refineries have continued to rationalise and optimise their operations and refinery production remains at just 63% of peak levels in 1998. Despite recent rationalisation in the sector the UK's refineries produced 61 million tonnes of product in 2019. Relatively stable production in recent years has been at least partially due to higher margins for refinery operators following a fall in crude prices in 2016.

116. Refinery production is not matched to demand on a product basis meaning that the UK also trades widely in oil products. Figure 15 shows how the UK is increasingly reliant on imports to meet demand for oil products. Net imports remained at 13 million tonnes in 2019. The market will continue to drive changes in the supply sector and the Government recognises the benefit of ensuring that a mix of domestic refining and imports remains viable in the UK, so far as market conditions allow.

117. The UK is one of the largest importers of jet fuel and road diesel in the OECD, and one of the largest exporters of petrol. Figure 16 shows how production of petrol outstrips demand, whereas only just over half of diesel and around 40% of jet fuel demand can be met with domestic production.

Figure 15. UK Petroleum product demand, production and imports, 1998-2019[75]

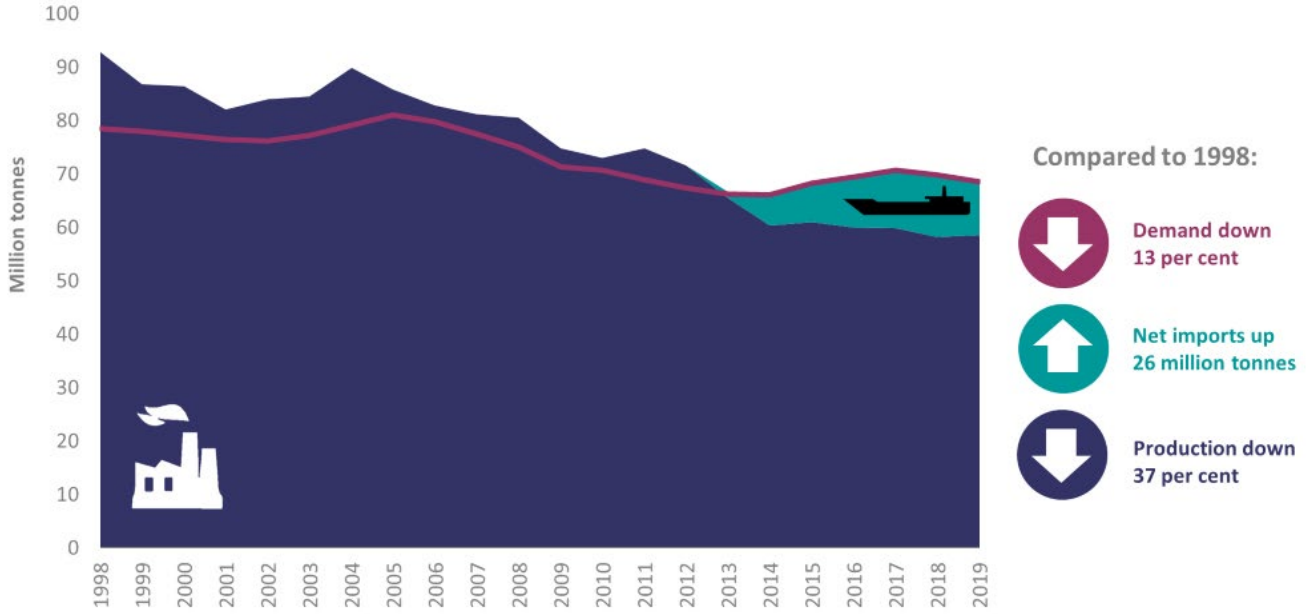
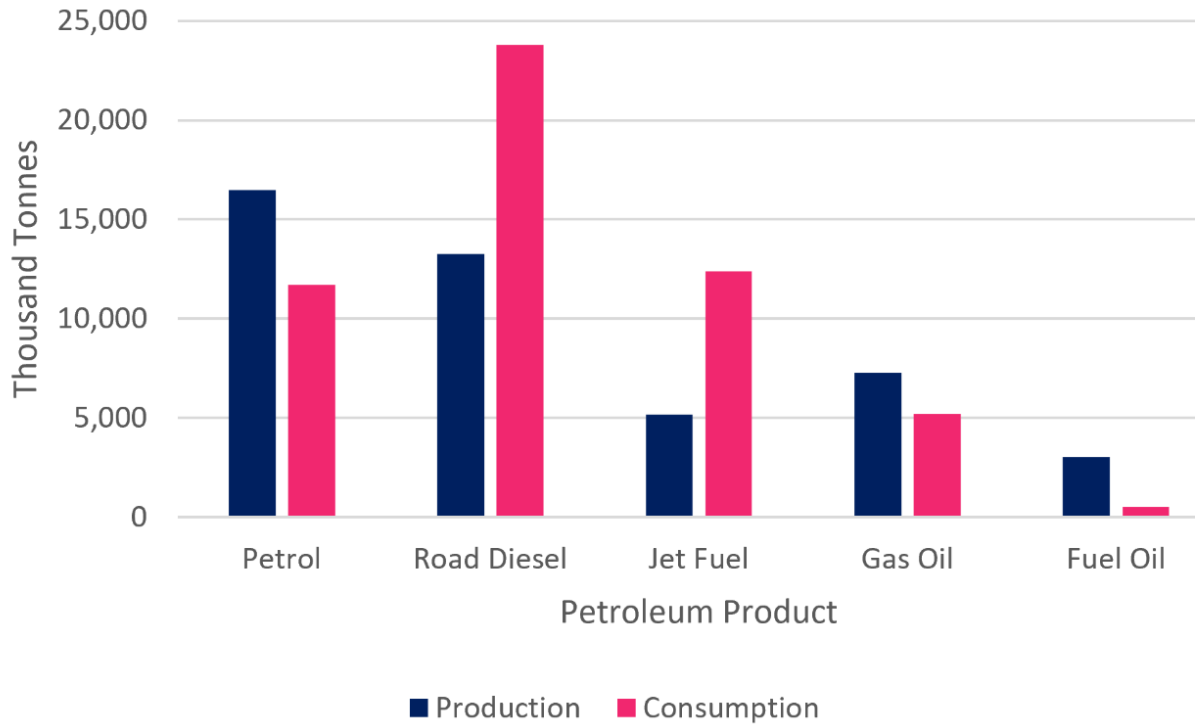


Figure 16. Production and consumption of key petroleum products, 2019[76]



[75] https://www.gov.uk/Government/statistics/digest-of-uk-energy-statistics-dukes-2020
[76] https://www.gov.uk/Government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes

118. In 2019 imports of petroleum products decreased by 5.5% to 33.3 million tonnes, which was predominantly road diesel and jet fuel to meet transport needs. Nearly half of product exports are petrol because of the surplus from UK refineries. Major destinations of petrol exports include the US and the Netherlands, which acts as a trading hub.[77] In 2019 exports fell again, by 7.2% to 20.7 million tonnes.

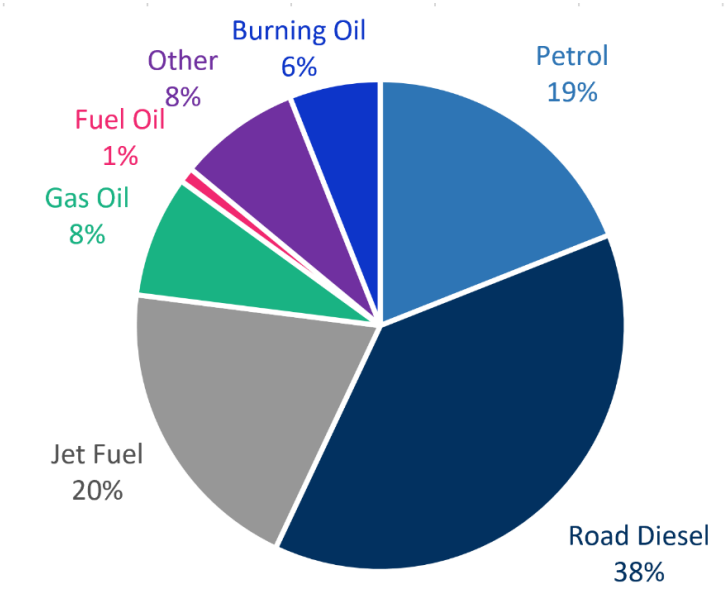
119. Demand for oil products decreased for the second year running by 1.9% in 2019. Over 70% of total demand is for transport (Figure 18), and transport fuels decreased by 1.1%. Demand from the petrochemical industry, which consists of 9% of total demand also decreased by 6.6%.

Table 3. Demand for oil products[78]

Petroleum Product	Quantity (million tonnes)
Petrol	11.7
Road Diesel	23.8
Jet Fuel	12.4
Burning Oil	3.4
Gas Oil	5.2
Fuel Oil	0.5
Other	5.0

[77] https://www.gov.uk/Government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes
[78] https://www.gov.uk/Government/statistics/petroleum-chapter-3-digest-of-united-kingdom-energy-statistics-dukes

Figure 17. UK oil demand by petroleum product type, 2019[79]



Covid-19 Impacts on the Oil Market

120. In the second quarter of 2020, demand for primary oils by UK refiners was down by more than a quarter compared to 2019 and reached the lowest level on record at 10.2 million tonnes as operations were minimised in response to depressed demand for refined products (mainly for transport fuels) during the Covid-19 pandemic. Energy Trends shows detail on crude and oil product production and demand patterns in 2020[80].

121. The drop in refinery demand meant that imports also fell to a record low, making the UK a net exporter of primary oils for the first time since 2005.

122. Production of crude oil from the North Sea remained stable through the first six months of the year but fell away by 10% in the three months to September 2020 compared to 2019. Maintenance that had been postponed earlier in the year to aid with social distancing measure at terminals was undertaken

123. Demand for refined products reached record lows in the second quarter of 2020 as the impact of the lockdown measures taken in response to the Covid-19 pandemic took effect. Transport demand fell by more than half compared to the same period last year, with all three key transport fuels (petrol, diesel, and jet fuel) at record lows due to restrictions on travel announced on 23rd March 2020.

[79] https://www.gov.uk/Government/statistics/uk-energy-in-brief-2020

[80] https://www.gov.uk/Government/statistics/oil-and-oil-products-section-3-energy-trends

124. During Q2 2020 jet fuel demand fell by more than 85% compared to 2019.

125. Road fuel demand fell to the lowest on record during Q2 2020, with a 40% fall in diesel and 48% fall in petrol compared to the same period in 2019. The smaller decline in diesel can be partially attributed to some commercial fleets remaining active throughout the pandemic to deliver goods.

126. Restrictions eased in late May and continued to ease further as the quarter progressed. Road fuel demand has shown some signs of recovery from May onwards but demand for jet fuel remains at record lows because of continued restrictions on international travel.

Resilience

127. 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 2019-20. On the outbreak of coronavirus in early 2020, BEIS worked with the fuels supply industry to ensure that the major companies had robust contingency plans for maintaining supply and to monitor staff absences in critical roles. BEIS also monitored the impact on demand and stock levels at a large sample of petrol forecourts across GB.[81]

Emergency Oil Stocks

128. 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. At the end of 2019, the UK held over 15 million tonnes of stocks. Of this total, 13 million tonnes were held for emergency purposes, broadly equivalent to around 61 days of consumption. These stocks are held both in the UK and overseas under contractual arrangements that allow stocks to be purchased if necessary.

EU Exit and the end of the Transition Period

129. The Government recognises the importance to businesses and households of having access to an affordable, secure and sustainable supply of energy. The UK's exit from the EU has not altered the fact that our energy system is resilient and secure, and our energy is drawn from a number of sources. GB has one of the most reliable energy systems in the world and we remain confident in maintaining our secure energy supply. The Government has been working closely with industry and regulators across the sector to ensure measures are in place to deliver continuity of

[81] https://www.gov.uk/Government/statistics/oil-and-oil-products-section-3-energy-trends, Experimental statistics on average road fuel sales and stock levels (monthly)

supply in all scenarios. BEIS has delivered a package of secondary legislation under the powers of the European Union (Withdrawal) Act 2018 which will amend retained EU law to ensure it functions effectively after the end of the transition period.

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