No Deal Brexit

Security of Energy Supply

Heads-up for Data Centre Operators

March 2019

Although we consider a No Deal Brexit to be less likely than a structured exit from the EU, operators have (rightly) been asking about the implications of No Deal on energy security of supply. In broad terms, Government is not anticipating that a No Deal (or any other Brexit) scenario will result in additional interruptions to power supply or frequency fluctuations. Interconnectors will still continue to function but the way that energy is traded across them will change because we will leave the EU's Internal Energy Market. Essentially we will revert to the trading arrangements in place before the Capacity Allocation and Congestion Management Guideline was implemented under the 2009 energy package. The 2009 energy package itself will be domesticated into UK law. Government has been preparing legislation to this effect. Some observers consider that prices may rise as a result of these changes but they are unlikely to result in a supply crisis. Operator concerns focus on the following three areas:

1. Gas supply for electricity generation
2. Electricity supply from Interconnects
3. Diesel supply for emergency running

Government has published a No Deal Technical Briefing on the energy markets. While this is targeted primarily at energy suppliers, implications for large energy users can be deduced from the content. We have made some enquiries and compiled these provisional notes.

Electricity Generation in the UK: background

Some operators may recall that we ran a Data Centres Risk Radar Briefing back in 2016 when Robert Sanford from DECC (now BEIS) kindly joined us to explain how energy demand and supply were managed in the UK. He emphasised that electricity generation is a market, that almost all supply issues relate to asset failure rather than generating capacity, and that demand approaches capacity only for very limited periods of time in the daily cycle. Broadly speaking, this is still the case. A briefing document was produced from the discussion which provides context.

Our total electricity supply in 2017 was 358 TWh. We generated 339 TWh ourselves and imported 18.2 TWh. We also exported 4.3 TWh. Net imports amounted to 4.2% of total supply.

Our total demand was 301 TWh, down marginally on the previous year (303).

Figure 1 from DUKES, shows the total generated and imported supply, losses, usage and export.

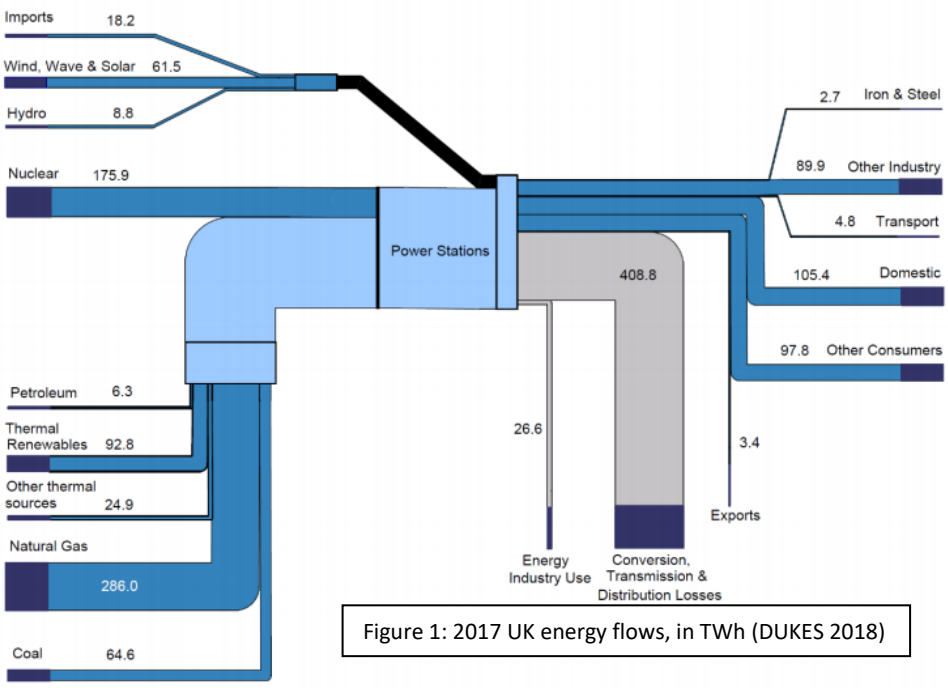


Figure 1: 2017 UK energy flows, in TWh (DUKES 2018)

Operator Concern #1: Gas Supply for Electricity Generation

Gas made up 40.4% of our generating mix in 2017 (figures again from DUKES 2018). Almost half of our gas is domestic. Of the remainder, 90% was imported from outside the EU: 75% from Norway via pipeline and 15% as LNG from a variety of countries. Government has put in place legislation to ensure that, post Brexit, gas trading continues to work as it does now. Some gas is traded via interconnectors but the balance of this trade tends to be exports over imports. Gas supplies, especially LNG, are currently plentiful and forecasts to late spring are for prices to remain relatively low which indicates that the market is not expecting any Brexit related gas security issues. This suggests that Brexit-related changes in EU trading relationships will have a very limited impact on gas markets, and with it gas generating capacity. Normal factors affecting wholesale prices (currency, weather, availability) will continue to apply.

Figure 2, electricity generation by sources, UK 2017 (DUKES 2018)

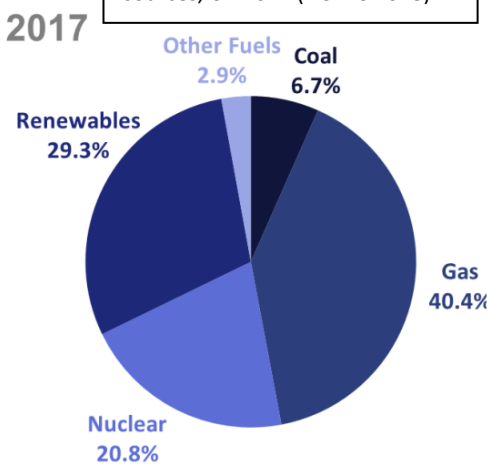
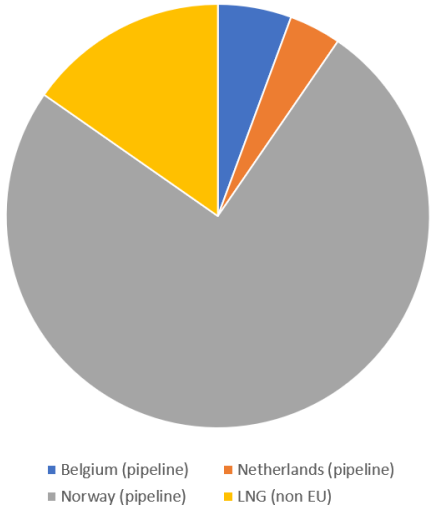


Figure 3, Gas imports by sources, UK 2017 (DUKES 2018)



Operator Concern #2: Electricity Supply from Dutch, French, Irish (and Belgian) Interconnects

As figure 1 shows, not all our electricity is generated in the UK, we import and export electricity through interconnects with France, the Netherlands and Ireland. In January 2019 another Interconnect opened between the UK and Belgium, which further improves mutual security of supply. Although they are two-way, the net balance of power in 2017 from established interconnects was into the UK. National grid modelling of supply and demand already factors in high, medium and low interconnector scenarios.

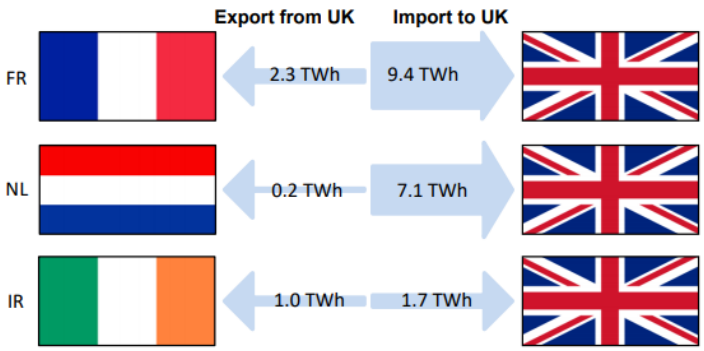


Figure 4, Electricity Imports and Exports, 2017 (DUKES 2018)

Under a No Deal Brexit, access to these interconnects will not cease (government has been making the necessary legal adjustments to ensure this and regulators have recently signalled approval of these amended access rules) but the trading arrangements will change. Currently the UK is part of the EU's Internal Energy Market and benefits from its implicit electricity trading mechanism. Through a process known as market coupling, algorithm based allocation enables power to be traded cross-border between EU partners very efficiently.

In a No Deal scenario, the UK would drop out of this market and trading would become explicit, where capacity is then auctioned on the open market. Capacity and power are purchased separately and this is less efficient as the process requires accurate forecasting of price and direction of flow. New access rules will set the terms and conditions for this new trading arrangement. Observers have found that implicit

trading uses cross border capacity much more efficiently than explicit trading. If the UK leaves with a Brexit deal then existing arrangements will remain unchanged until the end of the transition period.

Operator Concern #3: Diesel Supply for Emergency Running

Broadly speaking, a No Deal scenario could drive up prices, primarily due to currency fluctuations, but the UK is not reliant on the EU for diesel. The most likely reason for a diesel shortage would be end users stockpiling supplies.

The UK is both a significant importer and exporter of crude oil.

Figure 5 sets out UK oil flows. Note that the two sides will not balance exactly due to losses, and that biofuels are not included.

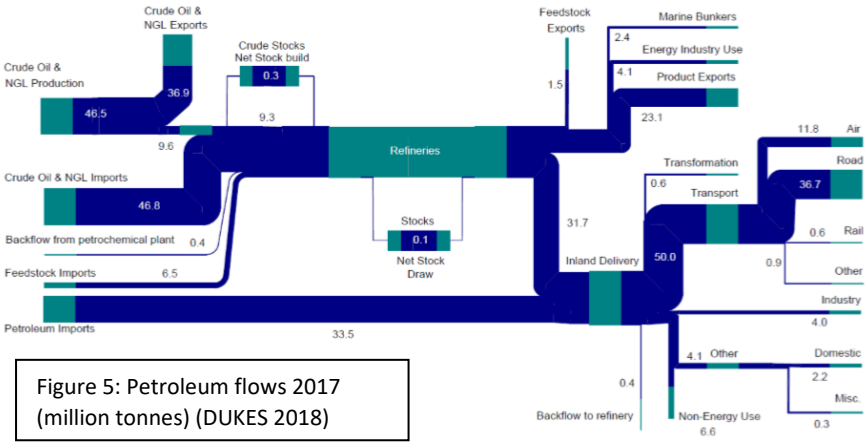
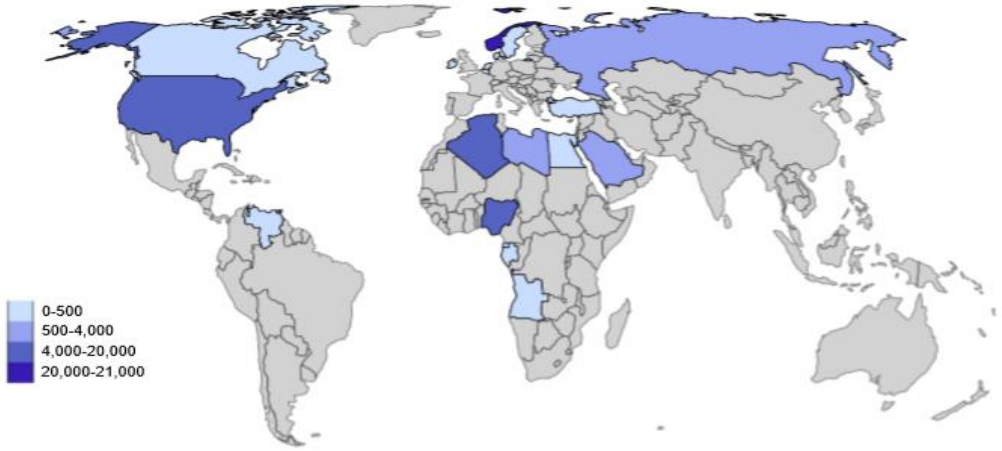


Figure 5: Petroleum flows 2017 (million tonnes) (DUKES 2018)

Crude Oil exports were over 34 million tonnes in 2017, up from 2016, the bulk going to the Netherlands, France, Germany, the US, followed by Korea and China. Almost all our imports of crude oil in 2017 came from outside the EU: from Norway, Algeria, Nigeria, USA and Russia, in roughly that order. 31% of imports came from OPEC.

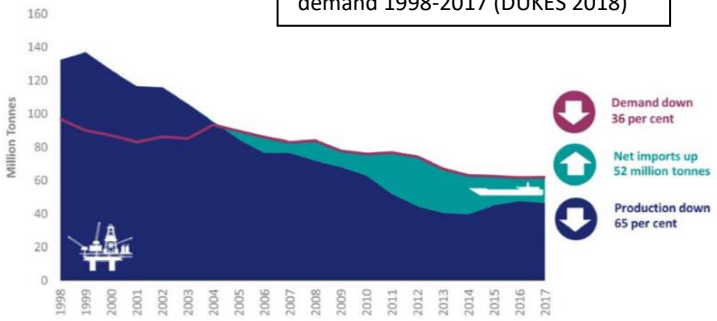
Figure 6: Source of UK Crude Oil Imports 2017 (million tonnes) (DUKES 2018)



Generally, UK oil production has reduced significantly over the last two decades, from a peak of 137 million tonnes in 1999 to 47 million tonnes in 2017. However, around 40% of the UK's primary energy is still extracted from our continental shelf (UKCS).

The overall demand for oil products in the UK is around 65 million tonnes, though not all of this is used for energy production (some for instance is used for plastics or other chemical feedstocks).

Figure 7: Primary oil supply and demand 1998-2017 (DUKES 2018)



Further Reading

Govt No Deal Energy Briefing:
https://www.gov.uk/guidance/energy-and-climate-after-brexit#uk-electricity-market

Sector Page on Gas
https://www.gov.uk/guidance/gas-markets-and-preparing-for-eu-exit

Industrial and Commercial Shippers and Suppliers Group (ICoSS) Brexit Assessment
Useful analysis from commercial and industrial gas and electricity suppliers.
https://www.icoss.org/uploads/publications/ICoSS%20Brexit%20Assessment.pdf

DUKES (Digest of UK Energy Statistics).
This is a really useful and comprehensive overview of UK energy:
https://www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2018-main-report

Our Risk Radar Briefing Session Page (be sure to scroll down to the orange bars)
https://www.techuk.org/events/briefing/item/8000-risk-radar-session-energy-security-of-supply
Or use these direct links to the session contents.

- Our Briefing Notes
- Slides from DECC
- Slides from Schneider Electric

Balancing Mechanism Reporting Service
Useful source of forecast information and some historical information
www.bmreports.com

Gridwatch: GB National Grid Statistics
Current state of UK (and French) grid as well as download of historical information.
www.gridwatch.templar.co.uk/

Annual 'Outlook' Publications
Regular National Grid seasonal forecasting.
https://www.nationalgrideso.com/insights/winter-outlook

Future Energy Scenarios
Longer term strategic view of energy to around 2050.
https://www.nationalgrideso.com/insights/future-energy-scenarios-fes

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Emma Fryer, March 2019