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Agenda

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Brexit: implications for the energy market

The outcome of the UK's EU referendum on 23 June 2016 had an immediate effect on the financial markets in the EU and beyond. However, exchange rate effects aside, it is arguable whether it has had any significant impact on the prices of energy commodities. We look at the main features of current UK electricity market policy, before examining two potential consequences of Brexit on the sector

While the effects of the referendum outcome are expected to play out over an extended time period, the price of energy commodities such as oil, gas and coal is ultimately set by global markets. Since the UK's share of overall consumption of these commodities is small, it is doubtful whether the UK's decision to leave the EU will have a significant impact on these markets.

However, the nature of political interventions in the energy market may change significantly. Such interventions play an important role in the UK's energy sector. Indeed, energy is the most subsidised sector in the EU, with approximately £43.6bn of aid targeted at environmental protection and energy saving in 2014.[1]

While decarbonisation and renewable targets are unlikely to be significantly affected (due to the UK's Climate Change Act, and the fact that EU 2030 renewable energy targets are not legally binding for individual member states), EU state aid guidelines currently constrain the UK government in the design of its support schemes for electricity generators. Exit from the EU may open up the UK government's options in creating interventions targeted at specific technologies. However, uncertainty over what form Brexit will take—specifically, whether the UK opts to be part of the European Economic Area, and therefore subject to state aid enforcement by the EFTA Surveillance Authority—may continue to act as a constraint on the UK government in the short term.

The main political interventions in the current electricity market

Support for renewables

Currently, the development of renewable electricity projects in the UK is directly supported through the Renewables Obligation (RO) and Contracts for Difference (CfDs). The RO mechanism[2] is expected to be closed to new projects, and a transition to the CfD mechanism is expected to be completed in 2017.

Under the RO, UK electricity suppliers have to obtain a pre-agreed share of their electricity from renewable sources. Eligible renewable electricity generators receive Renewables Obligation Certificates (ROCs) and subsequently trade their ROCs with electricity suppliers that need ROCs to meet their RO.

The sum received from trading ROCs constitutes a revenue for generators on top of the electricity wholesale price. A penalty system exists such that suppliers that do not own sufficient ROCs to meet their obligation pay a 'buy-out price' into a fund.[3] Effectively, the RO provides a stable premium for renewable generators over their wholesale revenues.

CfDs are contracts between a renewable electricity generator and the CfD counterparty, and specify a 'strike price' that is guaranteed for the length of the contract. The government auctions CfDs in different 'technology pots'.[4] The strike price for a successful project is either the auction clearing price or the administered technology-specific strike price, which essentially constitutes a price cap.[5]

Accordingly, the CfD provides a steady revenue stream for investors, as any difference between market price and strike price is made up by transfers between the generator and the CfD counterparty.

Finally, indirect support to low-carbon generation has been provided through the carbon price floor. This is made up of the price of EU allowances (currently around €5/tCO_2) and a UK-only premium (capped at £18/tCO_2) from 2016/17 to 2019/20.[6] This mechanism results in higher marginal costs for thermal generators, and therefore raises the revenues of low-carbon generators by increasing the market price for electricity.

Support for nuclear power

In 2014, the UK government granted a package of state support for the construction and operation of a new nuclear power plant of 3,200MW capacity at Hinkley Point C (HPC). The package primarily comprises:[7]

- a 35-year CfD with a £92.5/MWh index-linked strike price;
- a State Credit Guarantee of up to £17bn on bonds issued by NNBG (the company building and operating HPC) to finance the project. The Credit Guarantee is a form of insurance contract that guarantees the payment of the debt principal and interest;
- a 'Secretary of State Agreement'. The Agreement provides that investors will receive compensation in case of political shutdown of HPC (for example, if the UK government decides to ban nuclear generation).

Additionally, the government designed the aid package such that compensation to the investor would not be excessive. In particular, the UK:

- determined a market-oriented price for its guarantee;[8]
- negotiated a CfD strike price for which the internal rate of return is in line with returns on renewable projects;[9]
- introduced a number of gainshare mechanisms (regarding construction costs, operating costs and equity), which claw back excess profit and potential refinancing gains that the operator can make after the end of the construction period.

Support for thermal generation

Support for thermal generation stems from an objective of generation adequacy and security of supply, in an electricity system that is increasingly reliant on intermittent renewables that drive wholesale price volatility.

A margin between electricity and fuel prices is necessary for thermal generators to remunerate their fixed costs, including a return on investment. Occasional price 'spikes' also support this objective while providing a capacity investment signal. However, the market arrangements may prevent prices rising to the required level, and there may be concerns that high prices will be politically unacceptable. This can therefore lead to the 'missing money' problem, and inefficient investment and new market entry.[10] Increased price volatility can also lead to capital market frictions, since it is difficult to raise debt on the prospects of infrequent and uncertain price spikes. To address these potential issues, the UK government has established the Capacity Market.

The Capacity Market takes the form of centrally managed annual auctions to procure a pre-defined level of capacity in advance of an anticipated delivery requirement. Capacity operators bid into the auction, and successful bidders receive a steady capacity payment for the availability of their capacity. This payment is received in addition to the wholesale price of electricity sold. A system of financial penalties applies when operators do not deliver on their contract.

In the first two auctions for delivery of capacity in 2018/19 and 2019/20, 49.3GW and 46.4GW of capacity were procured respectively at clearing prices of £19.40/kW/year and £18/kW/year.[11] Regular and constant capacity payments provide greater stability of revenues and hence make it easier to finance new thermal generation, although the Capacity Market has so far largely supported existing thermal generation capacity.

Interactions with the EU framework

UK government interventions in the energy sector are heavily influenced by the EU's environmental targets and legislative framework.

EU targets

The EU 20-20-20 targets aim at a 20% reduction in greenhouse gas emissions relative to 1990 levels; 20% of energy supply coming from renewable sources; and a 20% increase in energy efficiency. Going forward, the EU has developed the 2030 Climate Framework, which sets the emissions reduction target at 40%, and the renewable and efficiency targets at 27%.[12]

In order to meet its emissions target, the EU has also developed the Emissions Trading System (ETS), which now covers emissions in the aviation, power and heat, and industrial sectors. Member states have also adopted emissions targets for sectors not covered in the ETS (in an 'effort-sharing decision'), legally binding national targets on renewable energy, and non-binding measures regarding energy efficiency. As a member of the EU, the UK has taken a number of measures towards fulfilling these objectives, as described above.

To meet its greenhouse gas emissions target, the UK introduced the Climate Change Act in 2008, which set out successively increasing carbon-reduction targets over five-year periods.[13] Overall, the UK is outperforming its EU target on carbon emissions reduction.[14]

The EU Renewable Energy Directive sets the UK's renewable energy target at 15%.[15] In order to achieve this, the UK is planning for 30% of electricity, 12% of heat and 10% of transport energy to come from renewable sources by 2020.[16]

State aid rules

In order to prevent member states from distorting competition and trade in the internal market by granting selective aid to certain undertakings, the European Commission has

instituted state aid guidelines that provide a framework for assessing various state interventions. The rules that apply to the energy sector are contained within the 2014 Energy and Environmental Aid Guidelines (EEAG). Any aid granted in an EU country must be in line with the principles shown in Figure 1.[17]

The existence of such rules constrains the design of government support for generation investment in EU member states. Over recent years, the UK government has cleared several of its support schemes with the European Commission.

Aid to renewables

The Commission found that the UK CfD scheme was in line with the 2014 EEAG rules.[18] The aid supports a common EU objective by increasing the share of renewables in electricity generation and encouraging environmental protection.

The UK was also able to show that aid was minimised because the competitive bidding process was open to all generators producing electricity from renewable energy sources, on a non-discriminatory basis. Within each pot, CfDs do not favour specific technologies, and allocation rules are clear, transparent and non-discriminatory.

Lastly, CfD allocation is determined on a market-based principle, which limits distortions to competition and trade in the single market. Within each category, renewable energy producers compete with each other to win the subsidy contracts.

Hinkley Point C aid[19]

Aid granted by the government to HPC posed a new challenge to the European Commission, as the EEAG Framework does not apply to nuclear generation. HPC was the Commission's first decision in terms of aid for nuclear generation, and therefore set a precedent for future assessment of such aid.

In its analysis, the Commission acknowledged the existence of the market failures shown in Figure 2.

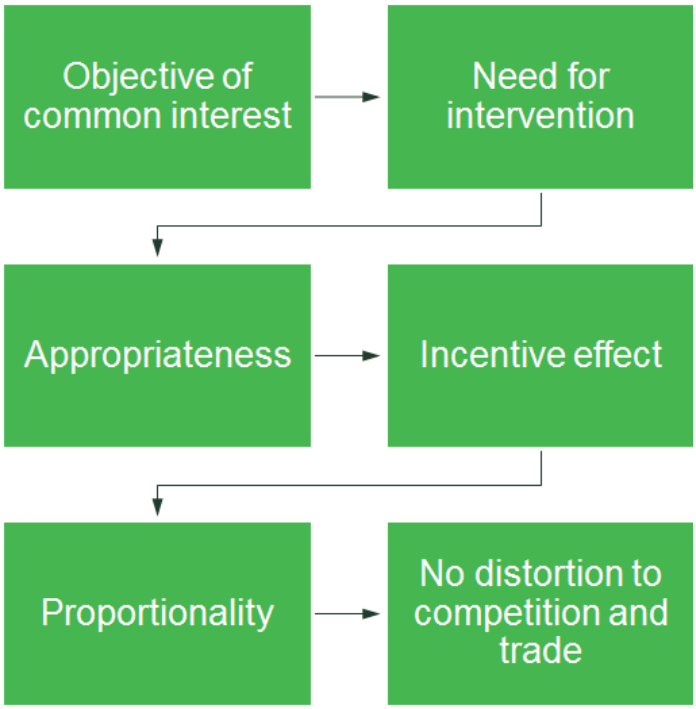
In order to ensure that the aid granted to HPC was proportional and did not lead to overcompensation, the HPC investment contract had to incorporate a number of claw-back mechanisms, as mentioned above.

Capacity Mechanism[20]

In 2014, the UK also cleared its Capacity Market scheme with respect to the EEAG. In its assessment, the Commission examined the necessity, appropriateness and proportionality of the measure.

The UK was able to demonstrate that the risk to security of supply made intervention necessary, and that the Capacity Market was the best option to address this issue. The Commission also found that the aid was

Figure 1 EEAG assessment principles



Source: Oxera, based on 2014 EEAG.

Figure 2 Market failures in the case of HPC

Note: CPF, carbon price floor.

Source: Oxera, based on European Commission (2013), 'State aid SA. 34947 (2013/C) (ex 2013/N)—United Kingdom, Investment Contract (early Contract for Difference) for the Hinkley Point C New Nuclear Nuclear Power Station', 18 December.

proportional because of specific features in the scheme's design. In particular, competitive bidding, and the fact that the mechanism is technology-neutral, ensure that procurement of capacity takes place at the lowest possible cost for consumers.[21] The possibility for interconnectors to participate in the scheme ensures that generators in other EU member states are not disadvantaged by the scheme, and curbs potential distortions to competition and trade in the single market.[22]

Potential consequences of Brexit

What could be the effect on UK energy policy and the UK energy sector of lifting the restrictions set by the EU environmental targets and state aid framework?

Decarbonisation and renewable targets

In terms of renewables, long lead times for investment in new renewable generation mean that projects that needed to meet the 2020 targets will already be sufficiently advanced that any change in government policy following the referendum outcome is unlikely to affect the chances of the UK meeting its 2020 renewable energy target.

In addition, given that the EU 2030 renewable target is not expected to be binding on individual member states, it is hard to see how Brexit would significantly affect renewable support beyond 2020. Overall, it appears unlikely that the impact of Brexit on renewable investment will be large.

In theory, Brexit should give the UK more discretion in its contribution towards meeting EU decarbonisation targets. In practice, however, the UK is still bound by the Climate Change Act 2008, which imposes a 50% reduction in carbon emissions by 2025 as compared to 1990 levels. The UK government also recently adopted its fifth Carbon Budget, which covers the period 2028–32 and would represent an additional constraint on any discretion exercised by a future government.

Finally, given that the carbon emissions price implied by the price of EU Allowances is very low compared to the carbon price floor, the UK's commitment to carbon emissions pricing appears to be much stronger than it is in the wider EU. Hence, if the UK ceased to be part of the EU ETS, it is difficult to see how this could have a significant effect on its carbon pricing policy.[23]

EU restrictions on state aid

Given the UK's decision to leave the EU, the need to comply with state aid guidelines will largely depend on the exit scenario. In any scenario where the UK retains full access to the single market, it is highly likely that it would also remain subject to EU state aid rules.

Material change could occur in scenarios where the UK does not retain full access to the single market. In this scenario, the UK would in theory be free to design support schemes that incentivise investment in specific generation technologies. This would be likely to benefit new nuclear generation, which is difficult to fit into a competitive contract award framework due to its larger capacity increments and longer construction lead times.

To meet its objective of decarbonisation, the government would be able to sign long-term contracts with investors in new nuclear projects without undertaking thorough analysis to prove the existence of market failures and the avoidance of overcompensation. The requirement for claw-back mechanisms would also no longer apply. This is likely to speed up the delivery process of new nuclear capacity and reduce uncertainty for developers.

Finally, with regard to thermal capacity, there has been a concern that the Capacity Market has not encouraged sufficient investment in new combined cycle gas turbine (CCGT) power plants, but has instead supported a significant amount of new diesel generation, which is seen as being more polluting.[24] EU state aid rules, and the requirement for technology-neutrality in the Capacity Market, have been the most significant barrier to the ability of the UK government to promote new CCGT investment over diesel. If the UK is no longer bound by EU state aid rules, it will be possible to make the mechanism more targeted at specific generation technologies such as CCGT.

Conclusion

Overall, with a higher price of carbon emissions in the UK than in other EU member states, and no binding 2030 renewable targets on individual member states, the result of the EU referendum does not appear to be likely to change the broad thrust of government policy towards decarbonisation. Depending on the precise exit scenario, the main change is likely to be to the way in which the decarbonisation agenda is delivered, with a potential shift from the development of renewables to alternative and potentially cheaper solutions, such as more rapid switching from coal to gas generation and new nuclear.

[1] European Commission, Eurostat, http://ec.europa.eu/eurostat/tgm_comp/refreshTableAction.do;jsessionid=P122vHbG7isewJfjQXhzt9UTE8JjbjCTYlvvgA5VNjPXdXbMz94a!-203992104?tab=table&plugin=1&pcode=comp_sa_01&language=en, accessed 4 July 2016.

[2] The RO is closing gradually over 2015 for large new PV installations, 2016 for all onshore wind capacity, and 2017 for all new generation capacity.

[3] The proceeds of the fund are then allocated on a proportional basis among the suppliers that presented ROCs. In 2014–15, the buy-out price was £43.3 per ROC. While the ROCs are tradable commodities and therefore do not have a fixed price, the government considers that their long-term value is the buy-out price plus a 19% premium. Source: Ofgem (2014), 'The renewables Obligation (RO) buy-out price and mutualisation ceiling 2014-15', 12 February.

[4] Established technologies, less established technologies, and biomass. Established technologies mainly comprise wind and solar, while less established technologies mainly comprise offshore wind, biomass and combined heat and power (CHP). Biomass conversion will be integrated in established technologies from 2017.

[5] In principle, the strike price is set to allow the median project within a group of projects to have similar returns under both the RO and CfDs.

[6] HM Revenue & Customs (2014), 'Carbon price floor: reform and other technical amendments', 19 March.

[7] European Commission (2013), 'State aid SA. 34947 (2013/C) (ex 2013/N)—United Kingdom, Investment Contract (early Contract for Difference) for the Hinkley Point C New Nuclear Power Station', 18 December.

[8] In the case of HPC, the European Commission concluded that aid would be limited to a minimum, with a guaranteed fee based on the rating category of BB/Ba (a fee of 295 basis points, based on the average of 102 European corporate credit default swaps in the BB category, as of 9 September 2014).

[9] European Commission (2014), 'COMMISSION DECISION of 08.10.2014 ON THE AID MEASURE SA.34947 (2013/C) (ex 2013/N) which the United Kingdom is planning to implement for Support to the Hinkley Point C Nuclear Power Station', 18 October, para. 483.

[10] The missing money problem refers to the possibility that price spikes, on which investors rely to recoup their costs, are not allowed to occur through a mixture of regulatory and policy measures. This would lead to a shortfall in revenues for investors relative to the level required for them to make a normal rate of return.

[11] Capacity providers can participate in the Capacity Market if their capacity is greater than 2MW. In particular, the mechanism is open for demand-side response, storage operators and interconnectors. However, the Capacity Market excludes capacity providers that already receive support (beneficiaries of CfDs and ROs, for example). National Grid (2014), 'Final Auction Results. T-4 Capacity Market Auction. 2014'; and National Grid (2015), 'Provisional Auction Results. T-4 Capacity Market Auction for 2019/20'.

[12] European Commission, 'Climate action: 2020 climate & energy package', http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm; and European Commission, 'Energy: 2030 Energy Strategy', http://ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy, both accessed 6 July 2016.

[13] Specifically, 23% for 2008–12, 29% for 2013–17, 35% for 2018–22, and 50% for 2023–27. Committee on Climate Change, 'Carbon Budgets and targets', https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/carbon-budgets-and-targets/, accessed 6 July 2016.

[14] Committee on Climate Change, 'How the UK is progressing', https://www.theccc.org.uk/tackling-climate-change/reducing-carbon-emissions/how-the-uk-is-progressing/, accessed 6 July 2016.

[15] Committee on Climate Change, 'Climate Change Legislation in the EU', https://www.theccc.org.uk/tackling-climate-change/the-legal-landscape/european-union-legislation/, accessed 6 July 2016.

[16] According to the National Renewable Energy Action Plan for the UK, Article 4 of the Renewable Energy Directive 2009/28/EC.

[17] Oxera (2014), 'Running out of power? Commission moderates state aid reforms for energy', *Agenda*, April, http://www.oxera.com/Latest-Thinking/Agenda/2014/Running-out-of-power-Commission-moderates-state-ai.aspx.

[18] European Commission (2014), 'State aid SA. 36196 – United Kingdom Electricity Market Reform – Contract for Difference for Renewables', 23 July.

[19] European Commission (2013), 'State aid SA. 34947 (2013/C) (ex 2013/N)—United Kingdom, Investment Contract (early Contract for Difference) for the Hinkley Point C New Nuclear Power Station', 18 December.

[20] European Commission (2014), 'State aid SA. 35980 (2014/N-2) – United Kingdom Electricity market reform – Capacity Market', 23 July.

[21] Operators of demand-side response, storage capacity and interconnectors (from 2015 onwards) have the right to bid into the capacity market.

[22] Oxera's research indicates that, due to differences in carbon taxation, as well as differences in transmission and balancing charges, there is currently no level playing field for competition between generators in Great Britain and connected markets. See Oxera (2016), 'Brexit: implications for the GB electricity market', June, http://www.oxera.com/Latest-Thinking/Publications/Reports/2016/Brexit-implications-for-the-GB-electricity-market.aspx.

[23] If the UK left the EU ETS, the impact on the scheme and the EU Allowance price would depend on how the scheme parameters were adjusted to reflect this development. In theory, it should be possible to neutralise the effect of the UK leaving the scheme on the EU Allowance price.

[24] See Department of Energy & Climate Change (2016), 'Consultation on further reforms to the Capacity Market', 1 March.