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The EU referendum: Implications for UK Energy Policy

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1. Introduction

The outcome of the referendum about the UK's membership of the EU on June 23 will have far reaching implications; both for the UK's energy policies, and the way in which UK policies and markets will relate to those in the rest of the EU.

Energy policy in both the UK and EU is changing rapidly in response to a range of pressures, policy goals and technological developments. The European Commission recently provided a comprehensive response to some of these developments, with its proposals for an Energy Union.

Irrespective of the outcome of the referendum, the UK will need to relate to the wider energy system(s) of the European mainland and of Ireland. Indeed, it already does so through interconnectors for both electricity and gas, and by participating in the European energy market. This physical infrastructure is certain to stay in place and be used, and may well be expanded. Planned interconnectors with Iceland and Norway will presumably go ahead, whatever the vote on 23 June. This in turn means that, inside or outside the EU, UK energy policy will need to have a substantive relationship with the framework set out in the Energy Union.

Against this background, this policy briefing considers some of the changes that are affecting energy systems and energy policies in the UK and the EU, what the relationship between the UK and the EU might look like, and what some of the implications of alternative referendum outcomes could be.

2. A Changing UK Energy System

The way in which the UK's membership of the EU has affected its energy policy, and more recently its climate policy, has been analysed by one of the authors elsewhere[1] , and will not be rehearsed in full here. However, it is important to note at the outset, that "Energy policy is a shared competence between Member States and the EU, and … [as] detailed under Article 192(2) of the 2008 Treaty of the Functioning of the European Union … the establishment of the single energy market shall not affect 'a Member State's choice between different energy sources and the general structure of its energy supply[2]". There is no proposal under the Energy Union to change this ability of Member States to choose between different energy sources.

The UK's energy system, in common with that of a number of other countries, is undergoing a number of changes, and facing a number of challenges, which need to be managed and addressed irrespective of European governance arrangements. The main relevant issues are:

Deep decarbonisation, as envisaged both in the COP 21 Paris Agreement and the UK's Climate Change Act, neither of which would seem to be dependent on the UK's continuing membership of the EU. Addressing this challenge will require the UK's energy system to be almost completely decarbonised by 2050. Analysis of the least cost pathway to reach this goal concludes that the electricity sector should be largely decarbonised earlier, by 2030[3].

Despite rapid progress in renewable electricity in recent years and the UK's track record as one of the more enthusiastic supporters of climate action within the EU, the attainment of the UK 2020 renewables target is still in considerable doubt.

Reductions in energy demand due to a combination of economic restructuring, energy efficiency and the after effects of the 2008 financial crisis and subsequent recession. The UK's consumption of primary energy has fallen over 15% in the last decade. This has had a large impact on the quantity of energy that will need to be supplied, and therefore the level of investment that will be required for this.

Integrating into the electricity system increasing quantities of renewables, which are likely to be required for cost-effective decarbonisation. In 2015, renewables generated 25% of UK electricity. This is a challenge because some renewables (eg solar and wind) are intermittent; because they have relatively high upfront capital costs but have a near-zero marginal cost of generation; and because increasing numbers of people are installing renewables, especially solar PV, on a decentralised basis. These characteristics pose special challenges for balancing the system centrally, for providing appropriate distribution infrastructure, and for wholesale markets, in which the major component of prices has been short-term operational and fuel costs. Apart from anything else this has implications for how to incentivise investment in enough flexibility to balance the system. The conventional view is that this flexibility should come through gas-fired power stations, which are likely to be required through to 2050, but to be used increasingly to balance the system, rather than operate at a high load factor, because of their carbon emissions. However, as the National Infrastructure Commission demonstrated recently[4], balancing the system could be achieved by a combination of measures including flexible generation, energy storage, demand side response and interconnection.

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New technologies that could revolutionise the way in which energy systems work. As noted above, this includes the increasing availability of options for electricity storage, which promise to make easier the integration of renewables into electricity grids. It also includes the impact of information and communication technologies (ICTs) that are starting to enable 'smarter' networks and new entrants who are challenging established utilities, business models and market arrangements.

Energy security in a context where the UK is becoming more dependent on the imports of fossil fuels (most importantly gas) it needs, in a world where geopolitical instability is significant. Currently the UK imports little gas from Russia, its LNG imports from Norway and Qatar seem relatively secure and the US may become a major gas exporter in the near future. Furthermore, the price of oil and other fossil fuels has fallen recently.

Decarbonising heat and transport, at least part of which is likely to be achieved by their electrification through the increasing use of electric vehicles, combined heat and power (CHP) and heat pumps. This introduces further challenges and opportunities, especially when combined with ICT, for balancing the grid.

[1] See Dutton, J., 2016. Energy Policy. In C. Burns, A. Jordan, & V. Gravey, eds. *The EU Referendum and the UK Environment: An Expert Review*. pp. 26–35. Available at: http://environmenteuref.blogspot.co.uk/ [2] Quoted from Dutton, J., 2016. p.28. [3] Ekins, P. et al., 2016. The Future Role of Natural Gas in the UK. UKERC Research Report. London: UKERC. [4] National Infrastructure Commission (2016) Smart Power. London: National Infrastructure Commission.

3. The EU Energy Union

All European countries are facing the above challenges to a greater or lesser extent. Indeed the proposal for an Energy Union was largely introduced to enable EU Member States to address these challenges in a coordinated and integrated way. The European Commission's proposals[5] seek to address the following five 'dimensions' of European Energy Policy:

Energy security, solidarity and trust. This is currently being interpreted to refer to the dependency on Russian gas, which is particularly relevant to some Eastern European countries.

A fully integrated European energy market. This refers to both infrastructure, such as interconnectors and transmission lines, and market coordination and regulation.

Energy efficiency, leading to demand reduction. This refers particularly to buildings and transport, and is one of the pillars of the EU climate and energy policy.

Decarbonising the economy. This contains the other two pillars of the 2030 EU Climate and Energy Package, namely emissions reduction (including through the EU ETS) and the further deployment of renewables after 2020.

Research, innovation and competitiveness. This recognises the need the need to develop and deploy new technologies, such as renewables, smart grids, carbon captures and storage (CCS) and nuclear, if climate and energy policy objectives are to be met.

The Framework Strategy was followed up with a number of other more specific announcements form the Commission, including a consultation on a new energy market design[6], which opens up options for addressing the changing nature of electricity systems; a *State of the Energy Union 2015*[7], released shortly before COP 21, which outlines progress towards the Energy Union and next steps; and a *Sustainable energy security strategy*[8], which is largely focused on the security of natural gas.

At the same time as the *State of the Energy Union 2015*, 28 Country Factsheets for each of the EU Member States were released. The UK Factsheet[9] indicates that for most issues, the UK energy system is similar to the average for the EU as a whole. The UK has lower than average (but growing) import dependency for fossil fuels, and higher diversity of gas suppliers; a lower level of interconnection; similar levels of fuel poverty to the EU average; electricity end-user industrial prices that are slightly above the EU average; and gas end-user industrial prices that are significantly lower.

It is worth noting that the ambitions of the Energy Union for an integrated energy market and energy security in Europe extend beyond the EU, and are reflected in the European Energy Community Treaty, which consists of the EU and Albania, Bosnia and Herzegovina, Kosovo, Macedonia, Moldova, Montenegro, Serbia and Ukraine as contracting parties, with Armenia, Georgia, Norway and Turkey as observers. The main requirement of the Treaty is that non-EU countries adopt the EU's *acquis communautaire* in the field of energy, in return for technical and investment assistance and support in respect of energy security.

There is currently no clear plan or consistency from the European Commission on how the five policy dimensions of the Energy Union will interact with each other, and it is as yet unclear what the structure and content of Energy Union governance will be. Questions regarding the roles of member states and European institutions, and the hierarchy of them, remain unanswered. Similarly, who the key actors will be and how policies are to be achieved and legislated have not been defined[10].

Elements of the five dimensions are paradoxically complimentary and contradictory. For example, seeking to reduce dependency on fossil fuels, while simultaneously seeking to secure future and more diverse imports of natural gas. It is also unclear as yet how the new policy areas will interact with existing policy frameworks for energy, climate, and the internal energy market.

The Nord Stream gas pipeline

Ongoing disunity in the EU regarding the expansion of the Nord Stream gas pipeline from Russia to Germany neatly encapsulates a number of issues and tensions within Energy Union dimensions. Vice President for Energy Maros Sefcovic has questioned the need for more import capacity when EU gas demand has been falling in recent years. However, the Nord Stream 2 developers have argued that declining indigenous output and forecasts for higher demand further into the future underline the case for the new pipeline. Germany has pointed to the role the pipeline could play in securing future supplies of gas and diversifying supply routes, both of which are key tenets of the Energy Union framework. But Poland – currently a key transit state for EU gas imports – has argued the pipeline could increase EU dependency on Russia gas and therefore decrease energy security, particularly in eastern Europe. It has also been argued that diverting gas flows away from Ukraine could deprive it of revenues and hamper its economic recovery, arguably undermining the EU-Ukraine Association Agreement signed in 2014. The situation with Ukraine also raises the question of how robust an external dimension of the Energy Union would be.

[5] European Commission, 2015. A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy, COM/2015/080 Final, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2015%3A80%3AFIN [6] European Commission, 2015. Launching the public consultation process on a new energy market design, COM(2015) 340 final, http://ec.europa.eu/energy/sites/ener/files/documents/1_EN_ACT_part1_v11.pdf [7] European Commission, 2015. State of the Energy Union 2015, COM/2015/0572 final, http://ec.europa.eu/priorities/energy-union-and-climate/state-energy-union_en [8] European Commission, 2015. Towards Energy Union: The Commission presents sustainable energy security package, press release, February 16, http://europa.eu/rapid/press-release_IP-16-307_en.htm [9] European Commission, 2015. Country Factsheet United Kingdom, SWD(2015) 242 final, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015SC0242&from=EN [10] Froggatt, A. and Hadfield, A., 2016. Deconstructing the European Energy Union: Governance and 2030 Goals. UKERC, Exeter Energy Policy Group and Canterbury Christchurch EGG Working Paper. London: UKERC.

4. The implications for the UK energy sector of the UK remaining in the EU

In the event that the UK decides to remain in the EU, questions might arise as to how consistent current UK policy is with existing EU climate and energy policy, and with the Energy Union aspirations for the future. For example, the EU 2030 package envisages at least 27% renewables, which implies further expansion in the UK of both renewable electricity and, to an even greater extent, renewable heat. The appetite of the current UK government for the policies that would be necessary to achieve this is far from clear. Despite rapid progress in renewable electricity in recent years and the UK's track record as one of the more enthusiastic supporters of climate action within the EU, the attainment of the UK 2020 renewables target is still in considerable doubt. There is also a related question about the extent to which the UK would be willing to work with other Member States to develop a more co-ordinated approach to renewables deployment. According to research co-funded by UKERC, the potential economic benefits from such an approach would be very significant[11].

The situation is similar with energy efficiency policy, in respect of which UK policy is now looking weak. Moreover, it is likely that the UK's capacity market would need significant reform to make them consistent with other aspects of the Energy Union, and any changes to the wholesale trading arrangements that might be necessary better to accommodate the zero marginal cost characteristic of renewables would also need to be thought through and implemented with the Energy Union in mind. However, there have already been calls to improve the operation of the UK's system of capacity payments[12], and the government has now proposed stronger incentives. There is no reason for thinking that any such reforms could not be brought into line with Energy Union considerations, while wider reforms to the UK's energy market could doubtless be implemented in close cooperation with the EU's Agency for the Cooperation of Energy Regulators (ACER), in the operation of which the UK has historically been quite influential[13].

5. The implications of Brexit for the UK energy sector

With a vote to leave the EU (and therefore the Energy Union) much would depend on whether the UK remained part of the Internal Energy Market (IEM) (like Norway), or whether it was able to negotiate a bilateral trading arrangement with the EU (like Switzerland). It is currently very unclear as to which option would be available and desirable to the UK and, if the latter, on what terms. If the UK remained part of the IEM its influence on its evolution would be much more limited than as an EU Member State. This would represent a significant change because the UK has had a substantial influence on EU energy market developments, particularly in respect of its leading role in pushing for market liberalisation through successive Energy Packages since the 1990s[14].

All that can be said for sure at this stage is that a vote to leave the EU would result in a period of uncertainty of at least two years for the UK energy sector, and perhaps longer if necessary for arrangements with the EU to be been sorted out; and that given the energy system changes that are happening in the UK and elsewhere, a UK energy system that is more integrated with that on the European mainland and Ireland is likely to be cheaper than one that is relatively isolated.

A report and subsequent note by Vivid Economics for National Grid[15] estimates that the extra costs due to the uncertainties introduced by Brexit could be up to £500m, although this headline figure is subject to a number of caveats. The highest risks they identify include increased investment costs in the energy sector, decreased market coupling (which could feed through into higher prices), decreased investment in interconnectors in the longer-term, and decreased long-term gas security.

As Vivid Economics also note, there are unlikely to be significant cost savings from the UK leaving the EU, because the UK has domestic policies in areas covered by the EU – for example, on reductions in emissions of greenhouse gases, phase-out of coal-fired power stations, and renewable electricity – which are as ambitious, if not more so, as those for the EU as a whole. Of course, these policies could be changed were the UK no longer to be a member of the EU, and it is likely that some of those in favour of Brexit would be in favour of weakening climate mitigation policies too[16].

If, under Brexit, the UK were to be accepted as a member of the European Economic Area (EEA), it would, like Norway, be subject to EU energy policy without having any representation in EU institutions. Were the UK not to seek to join the EEA, it would still be highly beneficial to it to remain in the EU's internal energy market, not least because the majority of UK gas imports come via pipelines from other EU Member States and Norway. In 2014, 73% of imports came from these sources[17]. However, Vivid Economics considers that even if the currently proposed interconnectors were to go ahead, the extra uncertainties resulting from the UK being outside the EU would result in their cost being higher.

There is also the issue with Brexit of whether and how the UK would seek to extract itself from EU energy and climate policies such as the EU ETS (Emissions Trading System), renewables targets, and energy efficiency policies such as product standards. It is possible that there would be the option of remaining 'inside' the EU ETS in the event of Brexit. If not, extracting UK emitters from the ETS could take considerable time. If the UK chose not to remain part of the European Economic Area, however, it is more likely that the UK would also leave the EU ETS. As Tim Rayner and Brendan Moore have argued, the UK's previous track record as a pioneer of emissions trading for greenhouse gases could lead to a new UK emissions trading scheme being developed[18]. This would take time, but could then be linked back to the EU ETS. In the meantime, however, withdrawal from such policy mechanisms could significantly weaken the impetus for EU climate policy.

All these matters would of course become much more complicated if a vote for Brexit were to lead to another referendum on Scottish independence, which were to result in a vote for an independent Scotland within the EU.

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[11] Strbac, G. et al., 2016. Delivering future-proof energy infrastructure. Report for the National Infrastructure Commission. Imperial College London and University of Cambridge. [12] See, for example, Orme, B. 2016 'Incapacitated: Why the capacity market for electricity generation is not working, and how to reform it', March, IPPR, London, http://www.ippr.org/publications/incapacitated [13] For example, the Chairman of Ofgem until 2013, Lord John Mogg, is still Chair of ACER's Board of Regulators [14] Dutton, J., 2016. Energy Policy. op. cit. [15] Vivid Economics 2015 'Impact of Brexit on the UK energy sector', report prepared for National Grid, November, http://www.vivideconomics.com/publications/the-impact-of-brexit-on-the-uk-energy-sector and Vivid Economics 2016 'The impact of Brexit on the UK energy sector: An assessment of the risks and opportunities for electricity and gas in the UK', March 29, http://www.vivideconomics.com/wp-content/uploads/2016/03/VE-note-on-impact-of-Brexit-on-the-UK-energy-system.pdf [16] Rayner, T. and Moore, B., 2016. Climate Policy. In C. Burns, A. Jordan, & V. Gravey, eds. The EU Referendum and the UK Environment: An Expert Review. pp. 15-25. [17] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/447631/DUKES_2015_Chapter_4.pdf. In 2014 UK imported 45% of its natural gas. [18] Rayner, T. and Moore, B., 2016. Climate Policy. op. cit.