

The Dangers of Energy Politics for the UK

It seems astonishing that some of the most critical issues in UK life have been subject to short-term political processes instead of longer-term endeavour. The handling of UK energy strategy leaves much to be desired. The fact is that we face a 'trilemma' caused by the opposing pulls of climate change, national security and the cost of energy. Will it be possible to resolve these tensions and keep the lights on? These issues are the elephants in the chamber during the current discussion of the Energy Bill in parliament.

First, the nation is committed to legislation to reduce CO₂ emission by 80% by 2050 and this requires action relating to the sectors of transport, heat and power. Much of the change being considered revolves around developing the electricity sector with attempts to reduce the carbon intensity from 500 to 100 g/KWh. Of course it is easy to cast aside the reality that long-term electricity usage is expected to grow double by 2050 to 1750 TWh/yr).

The UK currently depends on gas, coal, oil and nuclear sources. But many of our coal plants will close in the next few years and all current nuclear capacity will expire within nine years leaving a potential gap in our capacity that may be filled post 2020 by new nuclear - meantime options might include wind (expensive and intermittent) or greater use of gas turbines (locking us into electricity at high carbon intensity) or simply not closing some of the intended coal plants. Our ability to deliver decarbonisation leans heavily on methods for carbon capture, at present yet to demonstrated at scale and with potentially high costs.

Second, what about the cost of energy? In the UK we experience high energy costs for domestic and industrial manufacturing. There is much uncertainty whilst the Energy Bill and the Electricity Market Reforms are in progress. Public tolerance of rising energy costs is running thin, especially in comparison with other nations. There is significant energy poverty. Electrification carries a high tariff due to the needed investment in transmission and distribution infrastructure. It has been estimated that the UK energy policy will require £161bn to deliver by 2020 alone and there must be doubts this is a credible outcome from the Energy Bill, given the lack in confidence for investment in the UK. At its worst this is projected to mean rises in energy bills by 30% in 2020 and 100% by 2030, by which time the requirement is estimated to be £376bn.

Finally, there is on-going concern about security of supply. Currently we have only one interconnect into Europe (of 3GW capacity), although this is being expanded. We have a projected strong dependence on the import of gas and we are well equipped for transfer of liquefied natural gas from tankers ships. The government, wisely, favour a diversified approach to balance risks. The future yield of fracking may change the equation in some ways. The UK is fortunate to have examined many options with careful analysis by the key government departments. However, questions remain as to whether we can be nimble and secure our energy needs?

We have no cost effective way of providing for the storage of energy like wind power. This is why there is a growing imperative to convince policy makers and researchers to ensure that large scale energy storage solutions are explored. Here at the University of Birmingham we have been exploring energy storage using hydrogen fuel (and have our own filling station, cars, boat and train running on such systems). We are also committed to opening-up new methods in the use of clean 'liquid air energy storage' using cryogenic liquids. Batteries have their place but if progress is to be made we need low cost large-scale storage solutions, that do not consume mineral and metal resources, and we need them fast.

So what advice can we give politicians?

- There is a need to look at integrated solutions for power, transport and heat, not isolated pragmatic interventions that carry one-off job creation storylines (solar fitters and making more 'smart' (sic) meters)
- UK contribution to climate change is of course tiny on the global stage. So we must balance our aspirations as leaders of the pack with reality and focus on changes that also bring business value (and there are indeed many such opportunities in buildings, local heat systems, efficiency projects etc). There is a need to demonstrate clear economic benefits as drivers for change.
- 'Wrong time, wrong place energy' is endemic with renewable systems and we must find ways to store energy and despatch it when needed. Energy storage urgently needs special considerations in legislation, regulation and market stimulation.
- Politicians seem to have adopted rather aggressive stances to energy companies of late. Energy has become a centrepiece for political rhetoric. There should be a more measured and mature understanding of the sector and the challenges it is facing.
- There is great prospect to deliver higher percentage dependence on renewables for UK but the current pathway and timeline is not well conceived. A backstop of nuclear and fossil fuels will be needed to buffer the pathway before proper storage technology will ensure robust secure renewable provision.
- There is a need for certainty in an uncertain investment environment. This would provide clarity for investors on revenues. There is need for greater transparency on costs. There needs to be work done on setting the carbon floor price and emissions performance standards. At present these all add up to weak signals for investors in low carbon innovation.

It's clear that politics needs to catch up with the pace of the economy and debate as the appetite for climate change and decarbonisation undergoes a shift in the face of European growth and decline. There is a need to be backing several pathways in the UK, but the system is not used to operating in fast changing environment where new fuels and processes (e.g. fracking) arise. Nimbleness will be required in the face of uncertainty but this should not displace clear decision making. One senses that short term perspectives balanced on gas will win the day in place of a coherent long term ambitions. The current Energy Bill needs to be bold to wrestle the trilemma and ensure key issues of storage technology, power capacity, simplified business drivers and carbon intensity are addressed.

Professor Richard A. Williams (</staff/profiles/university/richard-williams.aspx>) *OBE FEng FTSE*, is Professor of Energy and Mineral Resources Engineering and Pro-Vice Chancellor, University of Birmingham.