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The Many Futures of Decarbonisation
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Energy policy tends to focus on technologies for decarbonising supply with little or no reference to demand. Separating supply and demand like this closes lots of doors. Our aim is to re-open them.

One obvious method of meeting carbon targets is to decarbonise electricity supply and develop technologies which are more efficient (Committee on Climate Change 2015). There are established methods of evaluating the range of technologies that might be adopted to this end, and of assessing their likely uptake and impact on carbon emissions (Committee on Climate Change 2016).
Such modelling exercises inevitably make assumptions about demand: that is, about what energy is used for in society, and about how much energy future decarbonised systems will have to supply. The normal technique for arriving at such estimates is to take present patterns of consumption as the benchmark modified by recognised trends, for instance in population or economic growth (Department of Energy & Climate Change 2015). In taking this approach, conventional methods of analysis take *demand* as such out of the equation.

The challenge of decarbonisation is routinely understood to be one that relates to the qualities of the energy *supply* system only: carbon emissions are generated as carbon-intensive fossil fuels are burnt to produce 'useful' energy, such as electricity. To decarbonise is to do the same but without so much carbon: for example, to produce the electricity by other means, generally through switching to renewable or lower-carbon generation technologies such as wind power or nuclear.[1] The ambition of meeting present levels of demand depends on *matching* current patterns of electricity consumption. This way of thinking supposes that the future will be much like the present, but populated by different technologies. In such visions, low carbon generation systems are joined by new generations of efficient energy-using technologies: heat pumps, electric cars and so on. At least that is the idea.

There are two obvious problems with this approach. First, it assumes that technologies of supply and related appliances (heating systems and other such devices) are essentially neutral in the sense that they can be simply replaced by new, decarbonised or more efficient equivalents. In practice, substitutions of this kind are never simple and are in fact likely to have far-reaching implications for the details of ordinary consumption and practice. Second, it is now widely agreed that efficiency and the decarbonisation of supply might not be enough. According to Obama the Paris Agreement will 'open the floodgates of low carbon innovation … but more will be needed' (Milman 2016). In other words, bringing all possible forms of decarbonising to bear on current level of demand would still be insufficient to meet long term carbon reduction targets.

One way out of this impasse is to think again about how matters of demand figure in decarbonisation strategies. As Strbac and colleagues observe, '[i]f we are flexible towards our electricity consumption, much less infrastructure will be required allowing us to meet

[1] https://www.theccc.org.uk/charts-data/ukemissions-by-sector/power/

decarbonisation targets at a severely reduced cost' (Strbac, Konstantelos et al. 2016: 16). This is an obvious point – if demand is expected to be very much lower, there are likely to be more, and probably more economical means of meeting it: but what does it mean to be 'flexible' towards our electricity consumption?

Current scenarios and methods already make many assumptions about the scale and character of future demand – including about economic growth. But what if there is no economic growth? In such a scenario calculations of the costs and benefits of acting on climate change would be very different (Barker 2017). In recessions, levels of energy consumption often decline (Burke, Shahiduzzaman et al. 2015) and global patterns of energy use may follow very different trajectories. This is not the only reason why patterns of demand evolve. Following Strbac's observation, above, and taking this further, it would be possible to embark on the project of identifying and evaluating a range of 'decarbonising' strategies with reference to a range of possible demand scenarios.

Rather than taking the present, and associated trends, for granted and rather than thinking of these as having a life of their own (independent of carbon or energy policy), it would make sense to re-set expectations of demand: for example, to imagine a world in which practices at home, at work and in moving around entail, let's say, a third of the energy that is used today.

There are important questions to consider about how this or any other configuration of demand might be realised, but the point is that if demand was expected to be lower than at present, different possibilities for decarbonisation would come into view. Relevant technological responses and priorities would not be the same as those associated with present models which are tied to only one interpretation of future demand. There could be different packages of assumptions about demand twinned with new combinations of decarbonisation strategies. And by including demand in the equation many other options and possibilities would come into view, some of which might well be much more 'cost effective' (or simply effective!) than those currently under consideration.

References

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