

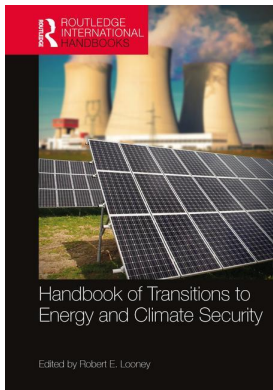
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The Great British energy transition?

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The Great British energy transition?

Caroline Kuzemko

Introduction

The UK is often held up as an example of ‘best practice’ in terms of its transition towards a low carbon and secure energy system. This is not least because of the, at the time groundbreaking, Climate Change Act of 2008 which committed the UK to legally binding, long-term carbon emissions reduction targets and a series of carbon budgets. This chapter will argue, however, that beneath these ambitious government targets there has been insufficient progress in policy-making to effect profound system change. The UK’s Committee on Climate Change (CCC) has recently announced that if the UK is to meet its fourth and fifth carbon budgets it urgently needs to implement new policies and send clear long-term signals to investors.¹ Indeed climate targets are only really helpful in practice if they provide enough impetus and direction for political and market actors to respond with sustainable innovations that can facilitate profound system change.

What this chapter also makes more overt is that there are different types of transition processes, and a glance across the other chapters in this book confirms this observation. It is therefore worth briefly characterizing the UK’s energy transition thus far. It has tended to place as heavy an emphasis on energy security as it has on climate change mitigation and it has, furthermore, tended not to challenge traditional energy market structures such as centralized generation and transmission systems and the traditional utility model favoured by the ‘Big 6’ gas and electricity companies. Policymaking decisions have been influenced over time by market liberal ideas that place a heavier emphasis on the role of markets in delivering goods and services, thereby arguably reducing the range of possibilities for state action. However, where state interventions have been considered necessary, such as the new Capacity Market, these have often been in support of existing energy infrastructures. What has been important, therefore, to how the UK’s energy transition has unfolded is not just the influence of political norms but also the particular configurations of pre-existing energy structures.

To argue that market liberal ideas have constrained Britain’s energy policy choices is not new,² but to emphasize the influence of embedded energy structures is more novel. However, to do so is also a more overt articulation of the idea underpinning the structure of this book in that sections have been designed according to whether countries are carbon producing, carbon

consuming or intermediate. For example, one important aspect of how the UK has so far transitioned its energy sector is that fossil fuels have historically played such an important role within its economy not just in terms of taxes paid and export revenues, but also in terms of employment. This has underpinned the possibility for traditional energy companies to play a particular role in society as well as for them to have established, formal and informal, links with policy-making actor groups.

Because of the importance of the domestic political and energy context in characterizing the current transition this chapter presents an historically informed analysis of the UK energy system. This shows how energy infrastructures developed over time, the importance of energy within the political economy, and how different political institutions influenced policy choices at points in time. The analysis is split into three phases: the post-World War II era of establishing universal access; privatization and liberalization under Conservative administrations (from 1979 to 1997); and the slow emergence of what we would recognize as today's 'low carbon' energy transition (1997 to 2015). Each phase finds its roots, and starting points, in the previous phase.

British energy in historical context

In some senses the UK's energy system has always been in transition and throughout the modern age, i.e. from the Industrial Revolution onwards, energy in its different forms has played an increasingly important role. At each stage of economic, social and technological development and in each energy transition, from coal to oil and from oil to gas, more and more energy was used. There are those that have argued that access to significant quantities of indigenous coal was a significant factor underpinning Britain's role as an economic powerhouse in the 19th century.³ Others have made similar arguments with regard to access to indigenous oil and American imperial power in the 20th century.⁴ For these reasons energy industries, first coal and later oil and gas, have historically enjoyed a central position within the British political economy.

Post-World War II: centralization, nationalization and public access

Throughout the late 19th and early part of the 20th century municipal utilities played a central role in the provision of various goods and services, and in this way the British electricity system had initially developed in a distributed manner. In the post-World War II (WWII) phase, however, this was to change and one aspect of the modern British energy system was established – its heavy centralization. In 1942 a new Ministry of Fuel and Power was established, initially with the intention of ensuring adequate energy provision for military as well as commercial and domestic purposes.⁵ After the war the Ministry of Fuel and Power was kept on as a government department, but energy policy objectives and design changed significantly. The principal objective of energy policy became to produce the energy required to provide social goods and, importantly, to grow the economy which had shrunk considerably over the course of World War II. Energy was seen as a pre-requisite for economic growth, the 'rule of thumb' was that GDP growth of 3% would be built upon growth in electricity demand of around 7%, as well as essential to some of the wider aims of the newly emerging Welfare State.⁶

The state took a central role in building the network infrastructure and electricity generation plant necessary to ensure universal access, as well as later in building gas pipelines to distribute North Sea gas nationally. Many private undertakings were nationalized and municipal utilities lost their responsibility for providing energy services to local populations.⁷ During this era coal

remained central to the provision of heating and electricity, and the coal sector still employed many hundreds of thousands of people in mining communities across Wales and Northern England in particular. By 1969, however, with the physical infrastructure to support universal access and growing national demand in place, and with the National Coal Board and the Central Electricity Generating Board managing energy service provision, it was decided that the Ministry of Power was no longer required.

Disbanding the Ministry of Power turned out to have been badly timed given the ‘oil shocks’ of 1973 and 1979. Over the course of the 1970s complacency gave way to acute concern and awareness that total global energy consumption had, over the previous decades, been doubling every 15 years.⁸ Although Britain had remained quite dependent on coal for basic services, it was also becoming increasingly addicted to oil – largely due to the rapid expansion of car ownership. The depth and breadth of public and political concern were unsurprising given how deeply embedded energy had become within society, the sudden quadrupling of oil prices in 1973 and the various economic and social knock-on effects across Britain. The response was a wide review of energy policy and the re-establishment, in 1974, of a Department of Energy (DoE).⁹ The price shocks had caused a refocus on questions of energy supply security and were interpreted as an overt example of the dangers associated with dependence on foreign imports. As such, the policy response was to provide greater support for domestically based, nuclear and coal, energy industries as well as greater consideration of how to improve energy efficiency.

Oil and gas had, however, been discovered in the late 1960s in the UK Continental Shelf (UKCS) region of the North Sea and production from these sites started in the 1970s. With the renewed focus on domestic energy production post-1973 the government announced its intention to boost output from the UKCS with the intention of becoming ‘self sufficient’ by the end of the decade.¹⁰ So although diversity in terms of source and geographic location of energy was being overtly encouraged, and at this stage also by the International Energy Agency, there ran alongside a tendency to concentrate on energy independence and on *domestic* production as an antidote to insecurities in international markets.

New Conservatives 1979 to 1997: privatization and liberalization

Ultimately, as it turned out, Britain was to become an exporter of oil and gas and this lasted for almost two decades (the 1980s and 1990s), and as a consequence it started to pay less attention to questions of energy supply security once more. This provided, yet again, a different context for domestic energy policy. But other, yet more significant, changes were also taking place in Britain during the 1980s. Margaret Thatcher was elected Prime Minister in 1979. She, and her Conservative Party, were firmly convinced of the merits of a smaller state, of markets as economic actors and of privatization and liberalization. From 1982 onwards, under the guidance of the Secretary of State for Energy Nigel Lawson, the energy sector was profoundly transformed with the emphasis on liberalization and on the privatization of ownership.¹¹ Energy was also radically reframed: it went from being a ‘public good’ of vital socio-economic importance to a service that can, and should, be provided by market actors who would, in turn, be incentivized to focus on economic efficiency through competition.¹² This was partly based on the assumption that growing competition in the sector would allow for prices to fall, thus facilitating energy affordability and protecting consumers.¹³ Furthermore, it was held that security of supply would be enabled through freely trading international markets, underpinned by co-operative, market-based agreements.¹⁴

Although most of the focus during the Conservatives’ long term in office was on enacting processes of privatization and liberalization, there was some progress on low carbon energy

policy. In 1990 a new delivery programme called the ‘Non-Fossil Fuel Obligation’ (NFFO) was implemented. The Electricity Act 1990 had enabled the raising of a fossil fuel levy to pay for the NFFO, once permission had been received from the European Commission for this subsidy. The NFFO was open to bids from renewable generation, but it had really been set up as a means to subsidize nuclear generation given that nuclear had proven too difficult to privatize, mainly for financial reasons.¹⁵ The legacy of commitment to nuclear, initiated post-World War II and reinvigorated in the aftermath of the 1970s oil shocks, continued but this time in an attempt to fully marketize energy. In this way, sustainable energy policy became about supporting non-fossil fuel generation, with the emphasis on nuclear, but less about specific and targeted policy to support renewable electricity generation which required different, low risk support structures like the feed-in-tariff (FiT) that had been implemented in Germany in 1990.¹⁶

Although the NFFO was supposed to be a ‘market-mimicking’, competitive programme, payments per kilowatt-hour (kWh) for the first round of the NFFO were agreed between civil servants and generators before they entered their contract bids so that little competition occurred in practice.¹⁷ Later rounds were more competitive, but the low cost-cap put in place to reduce the average price per kWh of each round meant that many renewable plants could not qualify for support. Those renewable generators, mainly onshore wind, that managed to qualify for NFFO support then faced an uphill struggle to gain planning permission. By 1997, after seven years of operation, electricity generated from renewable sources, at just under 3% of electricity, was not much more than when the NFFO was first implemented.¹⁸

Slightly more progress was made in terms of buildings energy efficiency in particular. Towards the end of their time in office the Conservative government initiated an energy efficiency programme – targeted at buildings improvements with some emphasis on disadvantaged customers.¹⁹ The programme, then called the Energy Efficiency Standards of Performance (EESoP), was started in 1994 and was jointly developed and managed by the electricity regulator, Offer, and the Energy Savings Trust.²⁰ This programme, and its later iteration the Energy Efficiency Commitment (EEC), did result in a quite considerable wave of new insulation in easy to treat homes.²¹

In 1992, once the government was confident that energy had been sufficiently marketized, they disbanded the Department of Energy whose very name smacked of ‘economic planning’ according to Margaret Thatcher.²² Through passing responsibility for energy services to market actors, and reducing formal political organization around energy to a small Energy Directorate within the DTI, knowledge about the increasingly complex energy extractive and utility sectors ended up in the private sector.²³ Two ‘independent’ regulators were established, one each for gas and electricity, and these were to be paid for by energy companies. In this way the specific design principle of the new regulators was to remove regulation from the influence of ‘politics’ but not necessarily from private energy industry actors, especially as so much knowledge needed to regulate resided with them.²⁴

It is important to note that the energy system remained heavily centralized and, after an initial proliferation of companies involved, through various mergers and acquisitions the gas and electricity sector became dominated by six large companies. Partly because of the ready availability of domestic gas from the UKCS the UK was becoming increasingly reliant on gas for cooking, heating and electricity. Coal usage had dropped from 74% of overall energy in 1960 to 18% in 1998 and gas had risen from zero to 34% in the same time period.²⁵ UKCS oil and gas also became important in revenue terms for the UK, with some arguing that tax revenues from oil and gas helped to underpin the stronger economy in the 1990s. Indeed, oil revenues had risen six-fold between 1979 and 1985 to one-tenth of the Chancellor’s budget.²⁶

In environmental terms, the switch from coal to gas for electricity generation in the 1990s resulted in a significant downturn in CO₂ emissions.²⁷ It is this switch along with the de-industrialization of the British economy and the economic downturn from 2008 to 2014 that have helped Britain to so far stay on track in terms of meeting emissions targets. Indeed, between 1990 and 2015 emissions have fallen by 36%.²⁸ With significant indigenous production of gas the UK became less focused on energy supply security, and energy became a less discussed policy issue – partly also because of a degree of confidence in the private sector to deliver energy goods and services.

1997 to 2010: a 'low carbon' energy transition emerges

In the late 1990s climate change mitigation started to appear more heavily on the political agenda, indeed the New Labour administration that came to power in 1997 had made Manifesto commitments to addressing environmental issues and to expanding the production of renewable energy. New Labour's narrative, in opposition, had also focused on a critique of the Conservatives' close dealings with energy companies, sometimes referred to as 'fat cats', whilst arguing for greater efforts to address social issues such as energy poverty. Their 1997 Election Manifesto pledged carbon dioxide emission cuts of 20% over 1990 levels by 2010 and that 10% of electricity should be supplied by renewable sources, also by 2010.²⁹ They claimed that they would:

put concern for the environment at the heart of policymaking, so that it is not an add-on, but informs the whole of government ...³⁰

The early Labour Years: 1997–2005

In effect, however, for the first terms in office Labour's approach to energy policy was more about continuity than change, especially in its overt commitment to energy liberalization, markets, and competition. This commitment was made clear in the 1998 Competition White Paper and in an early departmental review of energy policy.³¹ Indeed, in terms of policies pursued at the time, the main emphasis was on completing the liberalization of the gas sector and on merging Offer and Ofgas to form Ofgem through the Utilities Act 2000. It is significant that responsibility for energy policy remained with the 'Energy Directorate', a sub-division of the Department of Trade and Industry (DTI) which was above all mandated to achieve competitive and freely trading markets in Great Britain.³² As such the assumption remained that climate change policy, amongst other political goals, was to be achieved through liberalized, competitive markets. This quote from a 2001 review of energy policy encapsulates the thinking:

[m]arkets can be a more effective instrument for delivery of government policy than more traditional mechanisms.³³

In 2002 a new support mechanism for low carbon energy, the Renewables Obligation (RO), was implemented and this was more of a market (or economic) mechanism than the NFFO. An obligation was now placed on suppliers to purchase and supply a certain amount (from 3% in 2002 to 10.4% by 2010) of generated electricity from renewables in order to gain tradeable renewable obligation certificates. There were no contracts for generation from specific projects, no price or contract length stipulated in the RO and developers of renewable energy had to negotiate with a supplier for all agreements.³⁴ As a result of these arrangements renewable

generators had to carry yet more risk, especially given that suppliers were not keen to sign contracts for too long and renewables generators had little visibility of price beyond the short-term contract. This system tended to reward large companies that could take and manage such risks. Indeed, renewable electricity generation did expand with the support of the RO, but projects tended to be large-scale and ownership of renewables remained in the hands of large generators.

Importantly, however, Labour faced growing challenges of their climate and energy policies. In 2000 the Royal Commission on Environmental Pollution (RCEP) had been overtly critical of the over-reliance on markets to fix complicated environmental problems, such as climate change.³⁵ In 2002 a new review of energy policy, this time conducted by a team put in place by the Prime Minister's Office, was undertaken.³⁶ Although the review was initiated mainly due to a growing awareness that UKCS oil and gas production was in decline after many years of high depletion rates, it presented a yet greater challenge to existing climate policy. It suggested the adoption of more formal energy efficiency and renewable energy targets as well as a new, single government department that should be responsible for climate change, energy and transport policy.³⁷

As part of its response, in the 2003 White Paper on energy, the government made some more effort to silence these critiques: most significantly in the form of newly articulated energy policy objectives. These new objectives included a commitment to reduce carbon emissions by 60% by about 2050 and to ensure that every home in Britain is adequately and affordably heated.³⁸ This meant that energy policy was specifically set to achieve climate-related objectives whilst previous objectives had been focused on energy supply security and the promotion of competitive markets. It is worth noting, however, that the preferred means of achieving these remained, at this stage, largely market based.³⁹

A transition emerges: the energy security-climate nexus

By 2006, the politics of energy and climate change was starting to shift again, but political and energy structures remained important in influencing energy policy decisions. Pressure on the government to become more involved in energy policy had continued to mount. The argument continued that Britain's over-reliance on markets and market-based mechanisms, such as the emissions trading scheme (ETS) and the RO, left it at risk of not meeting new emissions reduction and energy poverty targets.⁴⁰ Indeed, one report claimed that, corrected for the outsourcing of energy-intensive industries and for coal to gas substitution, and adding back shipping and aviation, carbon consumption had risen almost 20% between 1990 and 2005.⁴¹

At the same time, however, Britain was also becoming increasingly concerned about energy security once more – not least as North Sea oil and gas flows had begun to taper off and Britain had become an importer of oil and gas again. The timing could not have been more difficult in that Britain's new reliance on imports coincided with escalating oil and gas prices, growing Chinese energy demand, the Russia-Ukraine gas transit dispute and a new emphasis on energy supply security across Europe. In response to these changing circumstances by 2006 security was being articulated as one of the 'immense' challenges facing the UK as a nation.⁴²

Growing political, and to an extent popular, concern about energy security also resulted in new questions about energy policy. Another review of energy policy was undertaken,⁴³ and this was followed by another White Paper in 2007, just four years after the previous White Paper. Here the tone changed quite significantly: concerns about unstable foreign supplies of oil and gas led to a re-emphasis on the need for 'home-grown' energy and concerns about resource scarcity became more widespread. This new tone did not go unnoticed by climate change

groups which started to argue that increasing support for renewables and growing domestic energy production were complementary strategies.⁴⁴ At the same time, emissions targets had become formalized and reinforced by Tony Blair's commitment to the EU 20–20–20 agreement. As a result of this commitment Britain now had a fixed renewable energy target, 15% of total energy, as well as an energy efficiency target that it had to meet by 2020.⁴⁵ The renewable target was going to be a big ask for the UK, given that in 2007 renewables were still less than 3% of energy.

These new targets, the combination of challenges around climate change and energy security thinking and the related politicizations of energy policy did lead to some quite significant governance changes.⁴⁶ A new government department was formed in 2008, the Department for Energy and Climate Change (DECC), with specific mandates to ensure energy security and affordability, and climate change mitigation.⁴⁷ In a break from the previous emphasis on markets and competition the newly appointed Secretary of State for Energy, Ed Miliband, started to speak openly in terms of the need for a 'strategic role for government' in the delivery of energy goods and services as well as in terms of an 'energy transition'. The gas and electricity regulator, Ofgem, received a new 'sustainability' mandate in order to allow it to take environmental considerations into account when making regulatory decisions.⁴⁸ 2008 also saw the creation of the Climate Change Act and another new body, the Committee on Climate Change (CCC). This Climate Change Act was widely held up as being the first of its kind in that it not only set legally binding CO₂ emissions reduction targets up until 2050, of at least 80%, but it also set out a series of 5 year carbon budgets to 2022.⁴⁹ The CCC was instituted in order to measure progress towards meeting carbon budgets and emissions targets, to hold the government to account and to provide advice on climate change.

However, as argued elsewhere, targets are not sufficient in driving profound, sustainable practice change – especially given the embedded and path dependent nature of energy regimes.⁵⁰ What are needed, therefore, are strategies, policy instruments and regulations that can support new ways of producing and using energy. In the aftermath of the 2008 changes to policy objectives, and in recognition that existing policy was not doing enough to support a sustainable transition, a series of new energy strategies and policies were announced. These included the first 'Low Carbon Transition Plan'; new and reasonably ambitious support programmes for energy efficiency (CERT and CESP); funding for four carbon capture and storage (CCS) demonstration plants; and a feed-in-tariff (FiT) for medium and small-scale renewable generation. The level of announced support for CCS was indicative of a desire to extend the use of coal and gas electricity generation and was more suitable to the interests of existing energy generation actors than a stronger push for renewables.

New priorities: fiscal austerity and energy security

In 2010, after 13 years in office, Labour lost the general election to a coalition of Conservatives and Liberal Democrats. Again, as had been the case when New Labour came to power in 1997, energy policy was initially marked more by consistency than by anything else. Both the Conservatives and Liberal Democrats had made Manifesto claims about their commitments to climate change – the Conservatives having dubbed the coalition 'the Greenest Government ever'. Over time, however, it became apparent that the emphasis of the coalition was as much on energy supply security as on climate change, as well as on fiscal austerity and the proper functioning of markets.

Mainly in answer to fears about insufficient generation of electricity in the future a new Capacity Market was created in 2014 as part of the wider Electricity Market Reform policy.

This Capacity Market, although theoretically open to demand side response, was mainly designed in order to enable sufficient back-up electricity generation capacity and to ensure security of supply as intermittent renewables grew as a percentage of electricity generation. Furthermore, the payments were grandfathered which meant that existing coal and gas plants could be paid for agreeing to deliver future supplies of electricity and this meant, in practice, that coal plants that might have been shut by 2022 would be able to continue operating.⁵¹ Those that had hoped that the Capacity Market would enable greater demand side response in electricity markets were disappointed, not least newly formed aggregators, like Tempus Energy, looking to establish new business models predicated on aggregating domestic loads.⁵²

This tendency to reward existing generators was reflected in decisions taken to support a new wave of nuclear electricity reactors. Nuclear, like large-scale coal and gas generation, fits well with the existing centralized electricity system and nuclear industry representatives, especially Electricité de France (EDF), had made much of nuclear's low carbon and domestic credentials. The new low carbon generation support system, Contracts for Difference (CfDs), was used to offer a fixed (strike) price of between £89.50 and £92.50/MWh for a period of 35 years for the new nuclear facility Hinkley Point C.⁵³ This payment was especially generous in terms of fixing the payment for such a long period – partly because EDF had made it clear that they would not invest without a clear indication of profitability. Although at this stage, despite Chinese funding, it remains somewhat unclear whether this complex and expensive deal will go ahead, if it does there will be less available funding for large-scale renewable projects. This is because the total amount of support offered per annum through CfDs is capped by the Treasury through the Levy Control Framework.⁵⁴ In addition the CfD support system, like the RO before it, requires a degree of professionalization from generators to succeed in bidding, and this tends to exclude small and medium-scale enterprises from this line of funding.⁵⁵ Partly for this reason although renewable electricity generation has grown quite significantly over the past few years, much of this growth has come from large-scale wind plants.

Another notable aspect of energy policy under the coalition, and then under the Conservatives since the 2015 election, is the degree to which economic policy has influenced decisions. The coalition's response to the 2008 crisis and the subsequent growth in the UK's public indebtedness, partly caused by bailing out troubled banks, was to pursue an overall economic policy of fiscal austerity. This initially involved significant cuts in public spending and a cross-governmental re-focus on economic efficiency. For energy, aside from nuclear investments, this became about controlling the near-term costs of the newly established 'low carbon' transition. At the same time, given the historically important role of energy in terms of tax income and employment, the government has become increasingly focused on changing the regulatory regime in order to establish conditions supportive to the maximum extraction of Britain's fossil fuels.⁵⁶

Examples of this refocus on maintaining aspects of the existing energy system, for economic reasons, are the new tax and regulatory regime for oil and gas (including shale) and the newly established National College for Onshore Oil and Gas. As was argued at the time, the decision to better enable British fossil fuel extraction was taken partly for energy security reasons, i.e. to support domestic production, but also because of the expectation of economic returns, which in the case of shale gas were expected to be 'huge'.⁵⁷ Shale gas extraction, however, faced high levels of local opposition, which resulted in local authorities refusing to give planning permission. In response the government ruled that decision-making on planning should be taken away from local authorities and made by the Secretary of State for Energy as well as setting up long-term investment funds to be paid to areas 'hosting' shale gas developments. The commitment to shale is further supported by the argument that gas can act as a useful 'bridging fuel' within a

sustainable energy transition. However opponents in the House of Commons' Environmental Audit Committee have argued that large-scale extraction of shale gas is unlikely until at least the mid-2020s, by which stage it would most likely be competing with renewables rather than coal.⁵⁸

In sum although a nascent governance plan for a 'low carbon' transition had started to emerge by 2008, since the 2010 general election there has been arguably relatively less support for renewable energy and for energy efficiency. The previous energy efficiency schemes, CERT and CESP, had been reasonably ambitious in terms of the amount of energy they were designed to save.⁵⁹ The new buildings efficiency plan announced in 2013, which included the Energy Company Obligation (ECO), was designed with an implicit annual reduction target of only 30 TWh (versus CERT's 104 TWh savings target).⁶⁰ After the 2015 election even these embattled energy efficiency measures have been discontinued, as was the zero carbon homes policy. In addition, partly in response to local opposition to wind farms and to the continuing policy of fiscal austerity, it was decided that the relatively successful small-scale FiT and support for onshore wind will both be phased out.⁶¹ Again, these changes have been made in order to cut the near-term costs of the transition. Although carbon budgets and the Climate Change Act commitments remain in place, British energy policy has, since 2010, become increasingly subject to a broader economic policy of fiscal austerity, increasing Treasury control over the costs and ensuring supply security.

The British energy transition: low carbon, domestic and centralized

The principal arguments underpinning this chapter are that there are different types of transitions and that political and energy institutions have tended to influence energy governance decisions as well as the types of changes that have been taking place in British energy markets. The UK stands out in comparison to other, arguably more progressive, countries in that it considers nuclear energy to be sustainable (hence the 'low carbon' transition), in that new renewable generation tends to be large-scale and large company owned and in that demand reduction and flexibility have so far taken a back seat. The previous two sections have shown how political institutions, such as the market-liberal mindset but also changes in government, and energy structures, such as the pre-existing energy industry, have tended to narrow choices down and maintain aspects of the status quo. This section will explore in more detail how certain governance choices have influenced the *nature* of the energy transition that is taking place in Britain.

Policies put in place to meet emissions reduction and renewable energy targets have supported growth in renewable electricity generation in particular. Indeed renewables had grown to 17.8% of electricity consumption by 2014.⁶² It is also notable that overall gas and coal consumption have fallen over the past few years, although coal's and gas' share of electricity generation remains at 30%, whilst nuclear's share of electricity generation is also falling but remains at 19%.⁶³ Much of the improvement in take-up of renewable energy can be accredited to the FiT and RO support policies, although there is more argument over the degree to which energy efficiency policies have contributed to lower energy demand figures. UK final energy consumption has fallen by 8.1% since 1990.⁶⁴ Government documents assign some of the fall to milder winters,⁶⁵ albeit the sharp falls also coincide with the 2008 financial crisis and subsequent declines in economic growth. It is also notable that final consumption of electricity has been rising reasonably steadily since 1985, partly due to the sharp increase in use of electrical appliances.

These statistics point towards some changes in the UK energy system, most notably that 'low carbon' electricity's share of generation had reached 39% by 2014, however it is considered

important here that many of the principal characteristics of the British system remain intact.⁶⁶ It is still a centralized system, with a bias towards large-scale generation, and residential supply markets remain dominated by the Big 6, who have maintained an ability to be influential within policy and regulatory decision-making processes.⁶⁷ It is also considered important that 'low carbon' electricity, including nuclear, is considered an important measurement, whilst other countries tend to focus on renewables when referring to sustainable energy supply. The sections below analyse these tendencies in more detail, as well as explain what implications they have for longer-term trends.

Supply not demand focused policy

Here we turn to arguments outlined elsewhere about the importance of effective demand management within a sustainable energy system transition. Governance arrangements for gas and electricity, in Britain as elsewhere, have long been designed with an emphasis on providing secure supply for consumer demand, what some refer to as a 'predict and provide' mentality.⁶⁸ This mentality was traditionally predicated on assumptions about the relationship between energy demand and economic growth. Consequently, as energy service demand has grown, an infrastructure geared toward meeting, as opposed to influencing, that demand has also grown. As we move to transition the energy sector sustainably, however, it is becoming increasingly clear that this will be easier and less costly the smaller energy demand is, whilst flexible demand is also a better route to balancing electricity markets than building more (costly) back-up supply.⁶⁹

By contrast to these arguments, however, British energy policy has still remained for the most part supply focused in its attempts to meet carbon emissions targets. This is perhaps unsurprising for a country with a long history of indigenous fossil fuel production and with large, economically strong energy companies. It is also partly the case because the EU 20–20–20 renewable energy target was so far off the UK's position at the time, and this left policymakers with little choice but to focus on renewable generation support policies. EU 20–20–20 efficiency targets, on the other hand, were more loosely defined and are more about making sure that demand is less than it might otherwise have been.⁷⁰ By classifying nuclear electricity as 'sustainable' and committing to a new generation of nuclear plants the UK has also had to focus much of its policy-making attention on securing funding and on creating a sufficiently rewarding support scheme. Aside from these low carbon supply policies the government has, as argued above, also recently concentrated much political capacity towards securing new tax and regulatory regimes to boost domestic oil and gas industries.

Taken together all these supply-side policies, many of which support traditional energy business models, have required a high degree of political and financial capacity, potentially to the detriment of demand management innovations. The commitment of political capacity to supply measures is important given limited energy governance capacities,⁷¹ and overall political conditions of fiscal austerity since 2010. There have been a number of energy efficiency policies over the years, some targeted at industry and some at households, with varying degrees of ambition in terms of reduction in energy use. As we saw above the most recent buildings efficiency policies, the ECO and Green Deal, were limited in their ambition and have since been scrapped. The lack of current household energy efficiency policy is significant in that so much still needs to be done. Although gas demand has fallen since 2004, reductions in the domestic and services sectors have been far lower than those in industrial and electricity generating sectors. For example, demand for space heating in the domestic sector has grown substantially since 1970.⁷² It is estimated that in order to meet the UK's goal of reducing emissions by 80% by

2050 it will be necessary to reduce emissions from buildings to near zero by 2050.⁷³ At the same time DECC estimates that, on the basis of current policies, demand will be similar in 2030 to the position in 2013.⁷⁴

Far less has been done to encourage demand-side response in electricity markets. Demand-side response, to reduce peak demand and improve flexibility, is considered a central tenet of an efficient and cost effective transition. This is not just because of the need to integrate intermittent renewables but also because demand response can contribute to a more cost efficient system and a more secure and affordable transition.⁷⁵ As with energy efficiency, not enough is being done on flexibility, and there are concerns that peak electricity demand will continue to increase over the coming decades thereby encouraging the construction of yet more expensive generation.⁷⁶ For example, the Capacity Market was supposed, in theory, to allow for demand-side response to be able to bid in but, thus far, companies seeking to get paid for demand-side response have found it very difficult to take part. This is partly because fossil fuel generation is being offered contracts of up to 15 years, whilst demand response companies are being offered contracts of 12 months. One company, Tempus Energy, argues that this favours polluting power stations over cheaper demand reduction and flexibility options and, on that basis, they are facing the British government in a European Court.⁷⁷ The inability so far to design policies that better enable demand-side response places the energy transition at a disadvantage in comparison to some US states, such as New York, where energy markets are being re-designed specifically with demand-side innovations in mind.⁷⁸

Scale and centralization

Taken as a whole, British energy governance over the past few decades has also done little to destabilize the system of centralized power generation. This is not just evident in the support of large-scale nuclear generation but also in the kinds of renewable projects that have been funded. Most funds that have been made available to support new renewables, through the RO and subsequently the CfD, have been allocated to large-scale projects – hence the dominant position within renewables of on- and offshore wind. This is directly to do with the design of the RO and CfDs in that certain levels of professionalization are demanded in order to qualify for contracts either with supply companies, as was the case with the RO, or within the CfD tender process. Another aspect of renewable energy development in Britain is that new renewable power plants tend to be owned by large utility companies. This type of renewable expansion stands in strict contrast to the kind of ‘distributed energy revolution’ seen in other countries like Germany and Denmark. The German FiT was designed specifically so that it would be applicable to small and medium-sized renewable operators, and the distributed nature of its energy system has been further underpinned by a high degree of citizen and community ownership.

Because ownership of new renewable generation remains in the hands of large generators the economic benefits that can be gained through the somewhat generous RO system have accrued to a small number of companies.⁷⁹ This has implications for which kinds of energy companies are part of the transition, as well as for how the economic benefits of the transition are distributed. Relying on incumbent market actors to fund and drive innovations tends to mean less room for innovative, new business models to enter markets and drive change.⁸⁰ Innovative new businesses have faced barriers to entry in the UK partly due to the dominance of traditional utilities, but also due to the persistence of regulations, corporate codes and licences designed decades ago and in the context of privatization and liberalization.⁸¹

Concentrating the benefits of the transition in incumbent rather than new hands, whilst distributing the costs quite broadly via consumer bills, also incurs political risks. The UK energy

transition is less well embedded socially especially given popular opposition to the construction of onshore wind, from which local communities receive little tangible benefit, and given rising energy bills as a result of policy costs. By contrast, in Germany renewable policy has been designed partly around the notion that local objections to unsightly onshore wind farms can be lessened if local residents know that they, and/or the local community, can benefit through part ownership of that renewable generation.⁸²

Households, energy poverty and acceptance of the transition

The question of how economic costs have been distributed has also been an important component of fuel poverty in Britain, partly because it has been important within the wider politics of energy transition acceptability. Various governments have paid quite a bit of rhetorical attention to keeping the costs of the transition down, albeit analysis has shown that some policies chosen, for example the RO, have ended up costing more in practice than alternatives, such as the German FiT.⁸³ The marked tendency to focus on near-term over long-term cost control can partly be explained with reference to growing popular opposition to rising energy bills as well as by the government's commitment to fiscal austerity.

Indeed, consumers have faced significant gas and electricity price increases over the past decade, and not just because of the growing cost of policies. Limited competition amongst the Big 6 suppliers, rising wholesale prices and a tendency by suppliers to very quickly pass on increases, but to be slow about passing on price reductions, have also impacted upon the prices paid by some customers. In addition, the 'Big 6' incumbent gas and electricity suppliers that 'inherited' customers at the time of privatization have managed to retain quite a few customers, that haven't switched supplier, on standard variable tariffs (SVTs) that are higher than those offered to customers that actively switch.⁸⁴ As a result customers on SVTs, which are often also vulnerable households, pay a higher proportion of policy costs as well as making an important contribution to suppliers' otherwise lacklustre margins.

Partly as a result of these practices and because of the ongoing economic downturn energy poverty has been on an upward trend in Britain since 2007. Specifically on the most recent available figures, and despite the 2007 commitment made to eradicate fuel poverty in the UK where practicable, in 2013 there were 4.5 million households living in fuel poverty representing 17% of all UK households.⁸⁵ National Energy Action (NEA) provide more details by suggesting that there were 41,000 needless deaths across the UK, between 2010 and 2015, directly attributable to vulnerable citizens inhabiting cold homes.⁸⁶ Predictions are that, based on current policies, the (medical) costs and suffering associated with fuel poverty are likely to increase and the National Health Service (NHS) will need to spend £22 billion treating cold-related morbidity over the next fifteen years.⁸⁷

Part of the problem is, as already mentioned, that many vulnerable customers are on higher tariffs for electricity and for gas, but another part of the problem is that many vulnerable citizens live in badly insulated homes that are not energy efficient. Energy efficiency policies, such as CESP and the ECO, were targeted specifically at hard-to-treat homes with vulnerable and/or fuel poor inhabitants.⁸⁸ This is partly because improvements for the 'easy-to-treat' homes had to a great extent already taken place under the ESSoP, EEC and CERT programmes, but also due to increased buy-in to the argument that efficiency could improve living conditions. Ironically, however, in 2014 when rising prices were blamed by energy companies on the impact of policy costs that are passed on through bills, the government reduced the Energy Company Obligation (ECO), one of the few policies left that sought to directly address efficiency and fuel poverty.⁸⁹ As such what has proven more important is concern over short-term costs and the interests of

the main energy suppliers as opposed to securing the medium-term benefit of improved housing stock and fewer winter deaths.

Conclusions

This book is about transitions to a secure and low carbon energy system. The British example has shown how contextualized energy transitions are and how contingent they are on how political and energy institutions inter-relate to privilege certain forms of energy and types of transition. The question that emerges from these observations is, however, whether the UK is predestined to pursue a centralized, supply oriented, ‘low carbon’ transition simply because of the types of institutions and energy regimes upon which its political systems have been built. This would present a somewhat bleak proposition given arguments about how important demand management, including distributed energy, demand reduction and flexibility, are to long-term, cost effective transitions.⁹⁰ However, it can also be argued that it is in understanding the precise character of individual country governance for sustainable energy transitions that we can identify precise impediments to change. It is only by being specific about which aspects of governance tend to constrain rather than enable sustainable changes that we can better communicate what needs to change, and what the solutions should be, in ways that are tangible to elite and wider audiences.

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