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The Europeanization of the Renewable Energy Directive in France and the United Kingdom

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Abstract:

The European Union's (EU) Renewable Energy Directive (RED) establishes a renewable energy target of 20 per cent by 2020, with binding national targets allocated to each member state. The RED is an important component of the EU's longer-term ambition to reduce greenhouse gas emission by at least 80 per cent by 2050. However, implementation of the Directive has been uneven across the 28 member states, potentially undermining the EU's long-term objectives and its claims to international climate leadership.

This thesis examines the Europeanization of the RED in France and the UK with a specific focus on the electricity sectors of the two countries. It compares the implementation of the renewable energy targets in the highly concentrated, state-controlled French sector with the liberalised UK sector. It identifies the drivers of, and impediments to, the effective implementation of the Directive in the two countries with a particular emphasis on the role of state institutions.

Declaration

This is to certify that:

i. the thesis comprises only my original work towards the PhD except where indicated in the Preface,

ii. due acknowledgement has been made in the text to all other material used,

iii. the thesis is fewer than 100 000 words in length, exclusive of tables, maps, bibliographies and appendices.

Signature Date: 19 December 2019

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My family has been a constant source of love and support. I thank my parents for imparting strong values that have served me well in life, but especially over the past four years. I give particular thanks to my dad who encouraged me to write a school essay on the privatisation of Victoria's State Electricity Sector when I was just 13 years old. My teacher didn't know what to make of it – every other kid wrote about their holidays – but it was the beginning of a lifelong fascination with states and markets.

My wife, Lauren, has lived with the ups and downs of this PhD as much as I have. She believed in me even when I didn't and that belief has had a powerful effect.

Finally, I dedicate this thesis to my children, Finn, Eamon and Clementine. I hope that I have made a very small, but positive, contribution to their future.

Contents

Chapter 1

Introduction

The Renewable Energy Directive (RED) is a central pillar of the European Union's (EU) climate and energy policy framework. It establishes a renewable energy target of 20 per cent by 2020 and allocates binding national targets to each member state. Alongside separate 2020 targets for emissions reductions and energy efficiency, and the EU's emission trading system (ETS), the RED is part of the EU's longer-term emissions reduction strategy that aims to reduce emissions by at least 80 per cent by 2050.

However, as an EU directive, the implementation of the RED is dependent upon member states. A directive is an EU policy mechanism that establishes an overall objective – in this case a 20 per cent renewables target by 2020 – but provides member states with the freedom to develop their own policy frameworks to achieve that objective (Warleigh-Lack, 2008, p. 48).

The European Commission (hereafter 'the Commission') has recourse to legal proceedings in the European Court of Justice (ECJ) to enforce the RED targets, but implementation of the Directive has been uneven across the EU. According to the Commission's 2019 Progress Report (2019a, p. 6), 11 member states have already surpassed their national 2020 targets, a further 10 are expected to meet their final objective, but seven states failed to meet interim targets and were deemed to be at risk of failing to meet their 2020 targets.

The variances are even wider when sectoral performance is analysed. Although the RED does not allocate sectoral targets, member states were required to submit a

National Renewable Energy Action Plan (NREAP) in 2010, which provided a sectoral breakdown of their national targets and outlined the policies that would be implemented to meet the targets. The NREAPs provided indicative targets for the electricity, transport, and heating and cooling sectors. This thesis focuses on the electricity sector, the justification for which is provided later in the chapter. Amongst member states, 12 have already met, or will certainly meet, their sectoral target for electricity, 11 almost certainly will not, while five remain uncertain.

This thesis examines the factors that have either driven or impeded the successful implementation of the RED at the member state level, focusing specifically on the electricity sector. The central proposition is that state institutions are central to the implementation of the Directive and that those institutions are the product of long historical processes that have created path dependencies in policy making that determine how the RED is interpreted and implemented. As state institutions vary between the member states, implementation will also vary.

To test this proposition, the thesis adopts a comparative case study method to compare the response of two countries where state institutions play a very different role in governing the electricity sector: France and the UK. There is a long history of comparative research between the two owing to their many similarities, but also their stark differences. A detailed justification for the choice of France and the UK for this thesis is provided in Chapter 3, with an analysis of previous comparative studies appearing in Chapter 4. However, for the purposes of this introduction it is necessary to note the very different role that the state plays in governing the electricity sector in the two countries. In France, the state has retained a controlling share in the monopoly utility and tightly coordinates the activities of an elite 'technocracy' within the electricity sector. In contrast, the UK has a privatised and liberalised its electricity sector and now has one of the lowest levels of market concentration amongst EU member states.

France and the UK have also performed very differently in relation to the electricity targets outlined in their NREAPs. France established a target of 27 per cent whereas

the UK's target was 31 per cent. A detailed analysis of the targets is provided in Chapter 3, while the case study chapters (Chapter 7 for France and Chapter 8 for the UK) examine the implementation of the targets. According to the latest figures from 2018, France had achieved just 21.2 per cent and was therefore very unlikely to meet its 27 per cent target. In contrast, the UK had effectively achieved its target at the end of 2018, reaching 30.9 per cent (Eurostat, 2018a).

The thesis draws upon institutionalist literature to examine the different state institutions in France and the UK and to understand how they have influenced the implementation of the RED in the two states. The state institutions relevant to the implementation of the Directive are analysed using a layered model that conceptualises the historically dominant ideology as an institution and places it at the 'highest' level. In France, that ideology is statism, whereas in the UK it is economic liberalism. These ideologies constrain and influence the formal institutions of the state and the electricity sector beneath it.

The remainder of this chapter sets out the historical and political context for the thesis. It situates the RED in the context of the EU's claims to climate leadership and analyses the role of the electricity sector in achieving both the objectives of the Directive and the EU's emission reduction commitments. The chapter then concludes with an overview of the thesis' structure.

The RED and EU claims to climate leadership

Schreurs and Tiberghien (2007, pp. 19–24) describe the EU as a:

> [P]olitical entrepreneur, actively setting targets, policies and goals that have become the international standards against which other states have had to react. It has taken the lead in policy innovation, setting examples for others to learn from, and in the politics of persuasion, convincing other states of the importance of joining it in international action.

The EU's leadership ambitions have been evident in international climate negotiations. During the negotiation of the Kyoto Protocol in 1997, the EU committed to the deepest emissions cuts of all industrialised Parties, and then engaged in frantic diplomatic efforts to save the protocol when the United States refused to ratify the agreement in 2001 (Gupta, 2010, p. 643; Wurzel and Connelly, 2010b, pp. 6–10). It again staked out its position well in advance of the next major round of negotiations in Copenhagen in 2009, committing to a 30 per cent emissions reduction target if an agreement eventuated, and a unilateral 20 per cent if no agreement was reached (European Commission, 2009a). While those negotiations ultimately failed due to a major disagreement between the world's two largest emitters, China and the United States, EU diplomacy played an important role in bridging the gap between the two countries ahead of the 2015 negotiations in Paris (Christoff, 2010; Dimitrov, 2010). The subsequent conclusion of the Paris Agreement was due in large part to the persistence and leadership of the EU over the previous three decades (Dimitrov, 2016; Parker and Karlsson, 2017).

Until the mid-1980s, the EU had limited policy competence over environmental and energy related matters. However, the Commission was able to use its limited powers to some effect, drawing upon its competences in economic policy to ensure that varying environmental standards amongst member states did not hinder the operation of the common market (Weale and Williams, 1992, p. 47). The Commission progressively expanded its influence through a series of Environmental Action Programmes, beginning in 1973 (Hildebrand, 1992, pp. 21–3). The third Action Programme, covering the period from 1982 to 1986, was particularly significant for its inclusion of the principle that environmental considerations should be incorporated into agriculture, energy, industry and transport policies (Hildebrand, 1992, p. 22). According to Rehbinder and Steward (1985, p. 19), this 'stretching' of EU competences to expand its influence over environmental policy represented "a considerable extension of Community law and policy at the expense of member states without any express authorisation". However, the establishment of this principle would become important in the later development of climate policy, which

required international and cross-sectoral responses (Weale and Williams, 1992, pp. 45–6).

The EU gained specific environmental powers with the implementation of the Single European Act (SEA) in 1987 (Weale and Williams, 1992, pp. 45–8; Wurzel and Connelly, 2010a, p. 14). The increase of the EU's powers coincided with an increasing awareness of climate change and in 1988, the European Commission formally recognised the scientific consensus around anthropogenic climate change and called for coordinated international action to address the problem (European Commission, 1988). It also outlined a number of possible policy responses and established the European Union's (EU) credentials as an early leader in the response to climate change (Oberthür and Pallemaerts, 2010, pp. 29–32).

In 1990, the Commission committed to stabilise CO_2 emissions at 1990 levels by 2020, and followed this with a comprehensive package of policy proposals in the lead up to the Rio Earth Summit in 1992. The package included energy efficiency measures, financing to encourage renewable energy, the monitoring of CO_2 emissions, and a carbon tax. The energy efficiency and renewable energy measures were adopted, although they were weakened during negotiations with member states, and the tax was vetoed by the UK on the grounds that fiscal measures impinged on the sovereignty of member states (Oberthür and Pallemaerts, 2010, pp. 29–32; Wettestad, 2000, pp. 27–9). The UK, along with France and Italy, had also objected to an initial attempt to assign differentiated emissions reduction targets to member states (Ringius, 1999, p. 139).

Differentiated national targets were central to the Commission's efforts to formulate an EU emissions reduction target ahead of the Kyoto conference in 1997. There was broad recognition amongst member states that the capacity for emissions reductions varied and that national targets should reflect this, but 11 of the then 15 member states rejected targets that were proposed at a European Council meeting in March 1997. The Commission had proposed an emissions reduction target of 15 per cent below 1990 levels, but the individual targets proposed by each of the

member states would amount to just a 10 per cent reduction. The Commission argued that the lower target would undermine the EU's credibility and ease pressure on the United States and Japan at the Kyoto conference (Ringius, 1999, p. 151). The compromise was to accept the lower targets of the member states but still adopt an overall target of 15 per cent. The plan was to then revise the national commitments following the conclusion of the Kyoto negotiations (Jordan et al., 2012, p. 43; Palinkas, 1998, p. 449; Ringius, 1999, pp. 151–2). Regardless of the compromise, the EU's position was the most ambitious amongst the industrialised Parties (Gupta, 2010, p. 643; Wurzel and Connelly, 2010b, pp. 6–10)

The EU eventually agreed to an 8 per cent reduction target under the Kyoto Protocol after the United States refused to increase its own commitment beyond 7 per cent. However, the EU-15 ultimately met its original 15 per cent target by 2012, thus demonstrating the viability of a strategy that incorporated differentiated targets. It was only the second time that such a strategy had been successfully implemented in EU environmental policy following the Large Combustion Plant Directive (LCPD) in 1987, which applied emissions standards to power generation plants (Grubb, 1990, pp. 71–2). However, it became a common feature of subsequent EU policies. In 2001, the EU implemented the precursor to the RED, the Directive on Electricity Production from Renewable Energy Sources (RES), which established an overall target for the electricity sector of 22 per cent by 2010 with differentiated targets for each member state.

The EU ETS, which became the world's first international emissions trading system when it was launched in 2005, also allowed member states to determine national emissions caps (a single EU-wide cap was implemented in 2013).

The RES and ETS will be analysed in Chapter 6, but whereas the EU met its Kyoto target, neither the RES nor the ETS achieved their objectives. The EU fell short of its 22 per cent renewable energy target for electricity under the RES, reaching a final figure of 19.7 per cent (Eurostat, 2018a). The ETS also had a limited impact. Although emissions from the sectors covered by the ETS declined during the first two phases

of the system (2005-2012), studies have concluded that this reduction was either in line with existing trends (Abrell et al., 2011; Delarue et al., 2008; Ellerman and Buchner, 2008) or largely the consequence of the economic downturn that followed the global financial crisis in 2008 (Bel and Joseph, 2015; Declercq et al., 2011). In relation to the power sector, the empirical evidence shows that the ETS has had little impact on emissions, fuel choice or investments in new energy technologies (Chappin and Dijkema, 2009; Convery et al., 2008; Hoffmann, 2007; Newbery et al., 2018, p. 22; Zhang and Wei, 2010, pp. 1809–10). The efficacy of the system had been undermined by the lack of ambition in the national caps and an over allocation of permits by member state governments (Grubb et al., 2005; Skjærseth and Wettestad, 2008, p. 279; Zetterberg et al., 2004). Both the RES and ETS demonstrate how implementation failures can undermine the EU's ambition.

Implementation failures have sometimes created a gap between the EU's stated positions and actual outcomes, thus undermining the EU's claims to climate leadership (Gupta and Ringius, 2001; Kilian and Elgström, 2010; Parker and Karlsson, 2017).

This highlights one of the challenges of developing effective EU policy: given that implementation is dependent upon member states, how do policy-makers account for the many differences amongst member states – including in population size, economic structure and administrative capacities? A policy mechanism used by the EU to this end is the directive, which establishes an overall objective but provides member states with the freedom to develop their own policy frameworks to achieve that objective (Warleigh-Lack, 2008, p. 48). The EU's Renewable Energy Directive (RED) is one such example as it establishes an overall renewable energy target of 20 per cent by 2020 and allocates binding national targets, but does not provide policy prescriptions.

The RED as a central component of EU climate policy

The RED is part of the '20-20-20 package', so called because of its three headline targets for 2020: a 20 per cent share of gross final energy consumption for renewable energy; a 20 per cent improvement in energy efficiency; and a 20 per cent reduction in greenhouse gas emissions on 1990 levels. Parker and Karlsson (2010, p. 935) argue that the final package could "justifiably be called the world's most demanding climate package", and alongside the ETS, it formed one of two pillars of the EU's climate strategy.

The emissions reduction target was to be achieved through a combination of the ETS and binding national targets for sectors not covered by the emissions trading system. The energy efficiency target was legislated under Directive 2012/27/EU, which required member states to renovate 3 per cent of publicly owned buildings per year and reduce final energy consumption by 1.5 per cent per year. However, national targets for overall energy efficiency remained voluntary under the Directive. The RED established individual binding targets for each member state, ranging from 10 per cent for Malta to 49 per cent for Sweden. It also included a 10 per cent target for biofuels in transport fuels (excluding aviation), which was applied evenly across all member states.

The emissions reduction, renewable energy and energy efficiency targets are expected to be updated every ten years, with targets for 2030 being finalised at 40, 32 and 32.5 per cent respectively in June 2018. Each of these components is part of a longer-term emissions reduction strategy that includes a commitment to reduce emissions by at least 80 to 95 per cent below 1990 levels by 2050 (European Commission, 2011a, p. 2). The Commission has outlined its ambition for a net-zero 2050 target with negotiations with member states over this target ongoing at the time of writing.

The RED is therefore a critical component of the EU's longer-term climate commitments. As the EU's strategy focuses so heavily on energy, and applies

stepped targets on a 10-yearly basis, a failure to achieve the targets set for 2020 could jeopardise the 2050 strategy.

The importance of the electricity sector

The RED did not allocate specific sectoral targets but at the beginning of the RED period in 2010, member states were required to submit a National Renewable Energy Action Plan (NREAP) to the Commission, which outlined their planned policy responses to the Directive and provided a sectoral breakdown of their target. Member states were required to provide indicative targets for electricity, transport, and heating and cooling.

Although each of the sectoral targets contributes to the overall target, this thesis focuses specifically on the implementation of the RED in the electricity sectors of France and the UK.

Electricity and heat generation account for a quarter of the EU's emissions, which is the largest share of any sector (Eurostat, 2018b). Globally, the electricity sector is expected to decarbonise more rapidly than other sectors due to the centralised nature of most electricity systems and the fact that low emissions technologies such as renewable energy are more mature than those in other sectors (IPCC, 2014, p. 99; Krey et al., 2014, p. 376; Luderer et al., 2012, p. 10). The importance of electricity sector decarbonisation also grows as transport and industrial processes are increasingly electrified (Rogelj et al., 2015, p. 523). According to the International Energy Agency's (IEA) 2°C scenario, electricity generation must be effectively decarbonised well before 2050 (2014, p. 11). Under this scenario, renewable energy will account for 63 per cent of generation with the remaining share divided amongst nuclear, fossil-fuel generation with carbon capture and storage (CCS) and gas plants without CCS that are only used to balance renewable generation (IEA 2015a, pp. 38-41).

Although there is currently no mandated 2050 target for the electricity sector in the EU, the Commission has developed a scenario that requires levels of decarbonisation in the sector of 96 to 99 per cent by 2050, which is largely consistent with the IEA's 2°C scenario (European Commission, 2011b, p. 6). Decarbonisation will be achieved through a mixture of energy efficiency measures and the continued deployment of low carbon technologies. Under the scenario, the share of renewable energy in final electricity consumption will be between 64 and 97 per cent by 2050, depending on the role played by nuclear and CCS technologies.

The priority given to the electricity sector by the IEA is reflected in the NREAPs submitted by each member state under the RED. If each member states' NREAP is aggregated, renewables will account for 37 per cent of final electricity consumption by 2020, well above the targets for the other two sectors (European Commission, 2011c, p. 5).

The role of state institutions

The scale of electricity infrastructure and the importance of the sector to the overall economy have ensured that the state has played a central role shaping the system. In France, the state retains ownership of the dominant utility, Électricité de France (EDF), despite attempts by the EU to break up state-owned, vertically integrated monopolies in the electricity sector. In the UK, the state has been at the forefront of liberalisation efforts, but the electricity sector remains highly regulated and is still shaped by the priorities of the British state.

The state is particularly influential in the implementation of the RED. The Directive establishes national targets, but does not include specific policy mechanisms to achieve those targets. Implementation at the national level is therefore dependent upon the state. National governments must formulate policies and regulations that will enable the targets to be met, and the bureaucracy and market regulators must have the capacity and competence to implement them. Understanding the state is therefore a crucial component of the thesis.

The investment decisions made by electricity utilities also play an important role, but the scope of the thesis is limited to state institutions. Any analysis of electricity firms is therefore limited to their relationship with the state.

The challenge of decarbonising electricity systems

Transitioning to a low- or zero-carbon electricity system within a timeframe that limits global warming to well below 2°C poses obvious challenges. Literature on socio-technical transitions has demonstrated that large-scale technical transitions normally unfold over decades (Carlsson and Jacobsson, 1997, pp. 272–89; Geels, 2002, pp. 1263–73; Smil, 2017, pp. 23–94). Not only does physical infrastructure have to be replaced, but established rules, norms and interests that provide these systems with stability and perpetuate their existence also have to be altered (Geels, 2002, p. 1257). Transforming the electricity system is particularly difficult given the existence of several lock-in mechanisms that deliver increasing returns to incumbent operators, including the existence of large-scale infrastructure designed for centralised power generation, the sunk costs invested in that infrastructure, the accumulation of specialist knowledge based on existing technologies and the political influence of incumbent interests (Dangerman and Schellnhuber, 2013; Unruh, 2000; Wainstein and Bumpus, 2016). Lock-in mechanisms are therefore embedded in both the physical infrastructure and the formal and informal institutions that govern the system. Given the variation in the structure of markets, the technologies used for power generation and the role of the state in different jurisdictions, these mechanisms will vary across countries.

This thesis argues that the structure of the electricity sectors in France and the UK – including the nature of particular lock-in mechanisms - reflect the institutions of the state. Chapter 5 develops this argument in detail, demonstrating that the highly centralised, state-controlled French power sector embodies France's statist traditions, whereas the liberalised, privatised British power sector embodies the UK's economic liberalism. To understand how the transition to renewable energy will

occur in power generation, and therefore how the requirements of the RED will be met, it is necessary to understand the institutions of the state. This thesis argues that state institutions are the product of long historical processes, which have in turn, created path dependent policy processes that either drive or impede the implementation of the RED.

Contribution to the understanding of institutions and energy transitions

In examining the drivers of, and impediments to the effective implementation of the RED in France and the UK, this thesis makes four related contributions.

First, the thesis builds upon existing studies of the RED, providing a deeper analysis of the Directive by incorporating the role of state institutions. Haas et al. (2011), Klessmann et al. (2011) and Proskurina et al. (2016) have examined the role of specific policies or technologies and their impact on deployment rates of renewable energy in the EU. This thesis also examines those policy and technological factors, but goes further by analysing how institutions influence and shape policy-making and technology choice.

Lehman et al. (2012) consider the lock-in effects that slow the energy transition and examine a range of EU policies to see whether they are working to overcome those effects. Their study offers a useful summary of the technical, economic and political lock-in effects that must be addressed by EU policy, but it does not consider the institutional context that supports those lock-in effects and the structural changes that may be required to overcome them.

Allen et al. (2019) do consider institutions in their study of the RED, but criticise historical institutionalism as a framework, arguing that it assumes that the Directive could not have a positive impact on deployment. Citing Streeck (2016, 2011) and Crouch (2013, 2011), they tie historical institutionalism to a view that capitalism is itself an institution, and one that that is locked-in to increasing marketization and environmental degradation. They argue that the varieties of capitalism (VoC)

literature provides a more useful framework for understanding institutional differences at a national level. However, their understanding of historical institutionalism is very narrow. In reality, historical institutionalism can be applied to individual nation states or individual institutions, and is therefore much closer to VoC than the authors assume. In fact, in the context of this thesis, the VoC literature complements the hybrid historical institutionalism applied throughout this study and is used to analyse state institutions in chapter 4.

Understanding the institutional drivers and impediments to effective implementation allows for an assessment of the RED in the context of the EU's longer-term objectives – the second of the thesis's contributions. Liobikiene and Butkus (2017) link the 2020 targets to the EU's commitment under the Paris Agreement of a 40 per cent reduction in emissions on 1990 levels by 2030 to examine whether existing policies implemented under the 2020 package will be enough to meet the 2030 target. The authors conclude that policies will need to be strengthened in the next phase of the EU's climate strategy, but again they do not consider the important political and institutional context that will either support or impede those stronger policies. To truly assess the effectiveness of the RED in the context of the EU's 2030 and 2050 objectives, it is necessary to consider whether existing institutional structures will support those objectives, and if not, whether the Directive has driven change amongst member state institutions to ensure alignment.

Achieving the 2020 targets can mask issues within individual member states that may prevent the decarbonisation of the electricity sector by 2050. For instance, Poland has set a renewable energy target of 19 per cent under its NREAP, which is likely to be met (Ministry of Energy, Poland, 2016, p. 4). However, more than half of the electricity generated from sources classified as renewable comes from biomass co-fired with coal (Ministry of Energy, Poland, 2016, pp. 6–7). Not only is the sustainability of biomass questionable and its capacity limited by supply and technical constraints (Berggren et al., 2008), it also perpetuates the existing electricity system based on coal-fired generation (Olszewski, 2014). Poland has also failed to strengthen its commitments beyond the 2020 with the official *Energy Policy*

of Poland until 2030 stating only that renewables will have a share of "more than 15 per cent" by 2030 with no specific targets outlined. Some nuclear capacity will be developed, providing an estimated 15 per cent of electricity by 2050, but coal is still expected to be the primary source of power well beyond 2050 (Herbert Smith Freehills, 2015, p. 142). Understanding how institutions have responded to the RED enables an assessment of a member state's capacity to contribute to the EU's long-term decarbonisation strategy.

The third contribution is deepening the understanding of how countries with different levels of state control over the power sector have responded to the RED, and the transition to renewable energy more broadly. The electricity sectors in France and the UK sit at opposite ends of the market liberalisation spectrum. France has largely resisted pressure from the EU to liberalise its electricity sector, which remains almost entirely state-owned and has one of the most concentrated power generation markets in the EU. The UK has been at the forefront of liberalisation and has one the lowest levels of market concentration and a diverse generation mix (European Commission, 2014a; OECD, 2014).

It must be noted that caution should be exercised when extrapolating findings from case study research. Simeon (1976, p. 551) argues that case studies can falsify theory, but it is difficult to develop theory from a small number of cases. This remains true even if theories are only being applied to the 28 member states of the EU. There are significant differences in the composition and characteristics of states in terms of size, levels of economic development, political systems, and cultures. Studying a particular sector adds further complexity. In the case of the electricity sector, there are wide variances in the power generation mix of the states, levels of market concentration, and the degree to which the state controls the market. Electricity sector policy is also driven by different priorities and factors such as energy security, power prices, climate obligations and industrial policy, which will have varying levels of influence over policy outcomes. For instance, Danish citizens subsidise renewable energy development through tariffs on electricity and pay the highest prices in the EU as a result (Eurostat, 2017a). However, this is largely

tolerated as action on climate change is regarded as a priority by the Danish population (European Commission, 2017a). Poland, on the other hand, has some of the lowest electricity prices in the EU, despite the fact that when tariffs are excluded, the basic price is higher than in Denmark (Eurostat, 2017a). This reflects the fact that climate change mitigation is a much lower priority than consumer prices and energy security in Poland (European Commission, 2017a). Given the range of market structures and policy priorities, a comparison between any two states would yield a long list of differences. However, while this necessitates caution it this does not render a study of France and the UK irrelevant for the remaining member states. The purpose of the thesis is not to develop a new theory, but important lessons can still be drawn.

The liberalisation of the UK electricity sector has served as a model for the EU in its attempts to dismantle state monopolies and create a single energy market (McGowan, 2011, pp. 199–202). The EU launched the first of its energy packages in 1996 and, according the Padgett (2003, p. 243), most member states began a convergence toward the UK model of sectoral governance in the period that followed. Additional packages were implemented in 2003 and 2009, and the EU launched a comprehensive energy policy framework, known as the Energy Union in 2015 (European Commission, 2015a). The primary goals of the three packages were to break up vertically-integrated monopolies, open national markets to external competition and develop cross-border networks to facilitate electricity trading across the EU (European Court of Auditors, 2015, pp. 12–3). The EU has had some success in achieving its objectives. Although a single electricity market is yet to emerge, regional markets encompassing several member states have been established.

The energy packages were highly contested, but after a long period of resistance to EU involvement in energy policy, member states have slowly allowed a greater transfer of powers to the EU, which is likely to lead to further liberalisation (Buchan, 2015, p. 345; Eikeland, 2011, pp. 13–37). However, the process of liberalisation is far from uniform across member states or across all market segments. Reforms at both

the EU and member state levels have certainly increased competition, yet several states have only implemented a very limited version of liberalisation, and it many cases, reforms have focussed on the distribution and retail segments of the market rather than on generation.

Of the ten largest member states, ranked by the amount of electricity generated per annum, five have either full or partial public ownership of their largest generation company (IEA, 2014; OECD, 2014). The wholesale (generation) market also remains highly concentrated with twelve member states being served by just one or two power generating companies. This figure had remained constant in the decade to 2015, suggesting that liberalisation in the wholesale market has reached its peak (Eurostat, 2017b). Given that generation is the focus of this thesis, these facts ensure that the French case remains highly relevant.

Both France and the UK may therefore act as a template for states that are close to either end of the liberalisation spectrum - the UK for the more liberal markets such as the Netherlands, Spain and Ireland, and France for those where the state still plays a primary role in the market such as Poland and Greece

Finally, by applying an institutionalist framework to the study of the RED, the thesis also contributes to the empirical research into both Europeanization and sustainable energy transitions. The literature on Europeanization examines the ways in which member state institutions mediate the pressure to adapt to EU policies and practices, and also how those institutions change in response. By examining the factors that have influenced the implementation of the RED in the two member states the thesis will contribute to the empirical evidence on institutional stability and change. There is also a small, but growing, body of research applying institutional theory to the study of energy transitions, and there is considerable scope for applying such a perspective more widely. Studies of energy transitions have commonly drawn upon socio-technical transitions literature, but while this work provides a useful basis for understanding the stages of large-scale change, it lacks a theoretical mechanism for understanding how that change occurs.

Institutionalism can provide the necessary explanatory mechanism (Andrews-Speed, 2016; Lockwood et al., 2017). The following chapter provides a detailed analysis of the Europeanization and institutionalist literature and outlines the analytical framework that is applied to the case study chapters.

The UK and Brexit

Although the UK's departure from the EU has consumed political debates in the UK since the referendum took place in June 2016, the effect of Brexit is of little immediate relevance to this thesis.

Although the UK Government formally began the withdrawal process in March 2017, the country remained a member state of the EU at the time of the thesis' completion. Although the UK Government could have ignored any consequences of failing to meet its RED targets under the assumption that it would no longer be a part of the EU in 2020, there is no evidence that this is the case. As Chapter 8 demonstrates, the UK has played a key role in shaping the EU's climate and energy polices for some years, often demonstrating greater ambition than the Commission and other member states (Ciambra and Solorio, 2015, pp. 157–9). Despite the influence of Eurosceptic sentiment on the country's political discourse, the UK also has an effective state apparatus for implementing EU policies, and has a strong record in this regard (Bulmer and Armstrong, 2003; Bulmer and Burch, 2005). In any event almost all of the required institutional adaptation and policy implementation is likely to have taken place well before the 2020 deadline.

Despite any complexities caused by Brexit, the UK also remains an important case study for understanding how liberalised electricity sectors adapt to the pressures associated with the transition to renewable energy. As a 'first-mover' in market liberalisation, the UK has acted as a model for electricity reforms in other countries and can therefore offer important insights for the ongoing transition (Padgett, 2003, p. 227).

Thesis structure

The following chapter will review the literature on Europeanization and institutionalism, which form the basis of the thesis' analytical framework. Scholars of Europeanization interrogate the processes of diffusion and institutionalisation of EU policies, rules and norms. Conceptually, the Europeanization literature draws heavily from work on new institutionalism, which considers two key questions. The first asks about the ways in which institutions shape political behaviour, and the second about factors that either reinforce institutional stability or bring about change. This thesis employs scholarship on Europeanization to understand how the institutions of France and the UK have responded to the RED and whether they have acted as a driver of, or impediment to effective implementation of the Directive.

Chapter 3 presents the methods and approach used to address the research questions, provides an overview of the structure of the case studies, and outlines the rationale for the selection of France and the UK for study. A comparative analysis of the implementation of RED in these two countries is made to critically examine how each state has responded to the adjustment required. The comparative method allows for an assessment of whether the RED has been effective in two states with markedly different institutional structures.

Chapter 4 examines the role of the state in France and the UK. The chapter is divided into two parts with the first adopting a historical approach to understand how the institutions of the state have developed, with a particular emphasis on the role of the dominant ideology in each state. The second part of the chapter analyses the form and function of the key state institutions.

Chapter 5 applies a similar historical analysis to the institutions of the electricity sectors in the two countries. The first part of the chapter examines the development of electricity networks in France and the UK in the first half of the 20th Century, the nationalisation programs that were implemented in both countries following World War Two and the different responses to the Oil Crisis in the 1970s. The second part of the chapter will examine the key institutions that govern the sector.

Chapter 6 examines the RED in detail, providing an overview of its development and identifying the key drivers behind the policy. The chapter assesses the influence of other factors on renewable energy deployment, including the falling cost of renewable technologies, and other policies such as the ETS and the Large Combustion Plant Directive (LCPD).

Having examined the RED in detail, the following two chapters detail its implementation in two key member states. Chapter 7 examines France, exploring the response of the largely state-owned and highly concentrated electricity sector. Chapter 8 examines the UK and its liberalised power sector. These case study chapters draw upon the preceding chapters to examine how state institutions have shaped the implementation of the RED and how they may have changed in the process.

The concluding chapter summarises the findings of the thesis in order to answer its core question: what factors have either driven, or impeded the effective implementation of the RED. It also outlines potential issues for further research, including those relating to the UK's departure from the EU.

Chapter 2

The Analytical Framework

This chapter examines the literature on Europeanization and institutionalism, arguing that the two provide complementary frameworks for understanding the processes of EU policy development and implementation by member states. The Europeanization literature is utilised to identify and describe these processes, including the role of the Commission in driving ambition, the attempts by member states to upload their policy preferences and the eventual implementation of the Directive at the national level.

However, as Europeanization is not a theory in itself, it cannot explain the factors that either drive or impede those processes. In the context of the RED, institutionalism provides the necessary explanatory framework. The chapter therefore begins with an analysis of Europeanization and institutionalist literature, explaining how the two provide a necessary foundation for the analytical framework utilised throughout the thesis.

The chapter then defines institutions in the context of the thesis, and identifies those institutions that will be analysed throughout. Institutions are conceptualised in a layered fashion that places the historically dominant ideology at the highest level, the formal institutions of the state at the second level, and the institutions of the electricity sector at the third level. The thesis argues that the historically dominant ideology in each state – statism in France and economic liberalism in the UK - has shaped the formal institutions of the state and the electricity sector since the Industrial Revolution. As such, the institutions of the state are deeply embedded and resistant to change.

The institutions most relevant to this thesis will be analysed using a hybrid form of historical institutionalism. In keeping with the central proposition of the thesis that the historical development of institutions has created path dependencies that determine the response to the RED in France and the UK, the analytical framework will draw primarily from historical institutionalism. However, as the chapter indicates, actors and new ideas have been able to penetrate the political systems of each state, particularly following critical junctures. Elements of sociological and discursive institutionalism are therefore also utilised to account for their role in altering institutions.

The chapter then concludes with a critical analysis of empirical studies of Europeanization and institutionalism, particularly as they relate to environmental and energy policies. The objective is to identify empirical and conceptual gaps that this thesis investigates.

Europeanization and the study of the EU

Early research on the EU was influenced by international relations theories and focussed on its formation and how it could be defined as a international organisation (Caporaso, 2006, p. 39). These perspectives provided a 'bottom-up' approach, analysing how the institutions of the EU were created and the role of the member states in their formation (Risse and Börzel, 2000, p. 1). By the mid-1990s, the formal institutions of the EU were largely settled and a shift toward 'top-down' analyses that examined the politics of the EU emerged (Caporaso, 1996, p. 30). This gave rise to the literature on Europeanization, which utilised comparative political approaches to understand the impacts of the EU on its member states (Bache and George, 2006, p. 23; Hix, 1994).

Radaelli (2003, p. 30) usefully defines Europeanization as:

> Processes of a) construction, b) diffusion, and c) institutionalization of formal and informal rules, procedures, policy paradigms, styles, 'ways

> of doing things' and shared beliefs and norms which are first defined and consolidated in the EU policy process and then incorporated in the logic of domestic (national and subnational) discourse, political structures and public policies.

However, this succinct definition loses important nuances necessary for fully understanding what Europeanization entails. EU member states are far from passive subjects in the Europeanization process, as they actively engage in the construction of rules, procedures, policies and norms in an effort to project their own interests through EU institutions. States that are able to 'upload' their preferences to the supranational EU-level minimise the costs of adaptation once EU policies have been finalised (Borzel, 2002). Even when a policy has been finalised, there is further dynamism in the process of diffusion and institutionalisation. A definition of institutions is provided below, but it is sufficient to note that member state institutions mediate the pressure to adapt, interpreting the requirements of the EU and implementing them at the domestic level. However, depending on the adjustment required the institutions themselves might be forced to change (Featherstone, 2003, p. 4; Harmsen, 1999, pp. 82–3; Olsen, 2003).

On this basis, three clarifying points should be made with regards to Radaelli's definition. First, although Europeanization was originally conceived as a 'top-down' approach to analyse the effect of the EU on member states, the Europeanization scholarship has since recognised that it involves complex interactions in which influence flows both ways. Europeanization is therefore both a 'top-down' and a 'bottom-up' process (Dyson and Goetz, 2003, pp. 13–20). This is especially true during the process of 'construction' mentioned by Radaelli. A key element of this thesis is an examination of the role that France and the UK played in the development of the RED, which will contribute to an understanding of the adjustment that was required of each state.

Second, although the term 'Europeanization' is often assumed to mean convergence, with member states gradually moving toward a common set of norms and practices,

its two-way processes may result in uneven outcomes across the EU. Different member states will face varying degrees of adjustment, depending on their ability to project their interests during the policy construction phase. Once the requirements of the EU are finalised, the processes of diffusion and institutionalization result in further divergence as the domestic institutional structures of each state interpret and implement those requirements. The effectiveness of implementation is largely dependent upon the willingness and capacity of the member state institutions to comply with the EU's requirements and given the wide variances in national priorities and institutional capabilities, this process will be different depending on the member state in question. Europeanization examines the processes of diffusion and institutionalisation at the member state level to understand the factors that produce uneven outcomes (Graziano and Vink, 2013, p. 38).

Third, a distinction must be drawn between the process of policy implementation and the more complex processes of Europeanization. In this thesis, 'implementation' is used to describe the policies and regulations applied by France and the UK – here in response to the RED – while, by contrast, 'Europeanization' refers to the broader processes of EU policy development, member state policy implementation, and institutional adaptation that is triggered by the requirements of the EU.

Europeanization and institutionalism

Europeanization is a "phenomenon which a range of theoretical approaches have sought to explain" (Bulmer, 2006, p. 47); however, it is not a theory in itself. To understand how institutions at the member state level mediate the pressure to adapt and produce different responses to the EU, scholars have drawn upon comparative politics, particularly new institutionalism (Aspinwall and Schneider, 2000; Bache and George, 2006, pp. 23–8; Hix and Goetz, 2000).

Although the term 'institutionalism' was coined in the early 20th Century, the study of institutions has a long history in political thought (Crespo, 2016; Uhr, 1995). Features of what later became institutionalism first emerged in the 19th Century

through the German Historical School's (GHS) critiques of classical economics. The GHS premised its arguments on history being the determining factor of a nation's economic performance rather than 'natural' economic laws. The historical approach was criticised for being purely empirical and having no theoretical value, but the GHS was an important antecedent for institutional approaches (Dorfman, 1955; Samuels, 2003, pp. 222–4).

The influence of the GHS spread to the United States where evolutionary economics became the leading alternative to classical economics. Thorstein Veblen was the first proponent of the evolutionary perspective, which questioned the orthodox view that the economy followed a natural law toward equilibrium and that humans and firms made rational choices to maximise economic outcomes. He posited that behaviour was governed by varying levels of conscious reasoning, much of which was guided by institutions (Anderson, 1933, pp. 605–26). Veblen's definition of institutions varied according to the context, but it included informal social practices, 'habits of thought' and formal organisations (O'Hara, 2002, pp. 83–8). This aspect of his work was derived from the GHS, although Veblen (1898) argued that the historical approach was too descriptive and too static, offering few theoretical insights into how institutions might change over time. His remedy was to apply the principles of evolutionary science to economics, under which institutions are constantly changing, albeit very slowly. Conflict between institutions and external developments such as technological innovation were identified as two mechanisms of change, but Veblen also allowed for a degree of individual agency. Although he was much more inclined to see institutions as influencing individual behaviour, he believed that there was some scope for actors to alter institutions.

Subsequent writers expanded upon Veblen's work on institutions leading to the establishment of institutionalism as a distinct framework in the early 20th Century (Ramstad, 1995, p. 1001). The core of institutional economics remained the critique of the rational man, with institutions offered as an alternative explanation for behaviour. Hamilton (1930, p. 417) argued that even the motive of self interest, which was central to classical models, was socially conditioned, while Ayres (1918, p.

54) argued that classical approaches left the “institutional order completely out of its calculations”.

The outlines of institutionalism also emerged in the social sciences from the beginning of the 20th Century. There had already been significant overlap between institutional economics and the social sciences with the former drawing upon political science and sociology in its examination of the role of institutions in shaping economic behaviour. However, a distinct, but related form emerged in the social sciences, particularly in the United States. The initial work of the American institutionalists was narrowly focussed on formal institutions and tended toward descriptive analysis rather than the development of theories (Scott, 2014, pp. 7–8). In this regard, institutionalism had not overcome the weakness of the GHS and the lack of a theoretical foundation was regarded as a fundamental flaw that ultimately limited the utility of the approach. Talcott Parsons (1935) made some attempt at filling this theoretical void by drawing upon the writings Durkheim and Weber, who had written extensively on the role of culture and its reflection in the norms, beliefs and formal institutions of society (Mayhew, 1989, p. 231), but the criticisms remained. One of the most prominent of the new institutionalists, Ronald Coase (1983, p. 230), was scathing of this limited perspective, writing: “Without a theory they had nothing to pass on except a mass of descriptive material waiting for a theory, or a fire”.

Institutionalism was also criticised for underplaying the role of individuals in shaping institutions (Langlois, 1986; Rutherford, 1984; Schotter, 1981). Whereas classical economics assumed that human preferences formed freely and were exogenous to institutional structures, institutionalists assumed the opposite with preferences reflecting the formal and informal institutions in which people interacted. This critique is not entirely valid as many of the early institutionalists explicitly acknowledged that the role of rational individuals had to be incorporated into a theory of institutions (Nee, 1998, pp. 4–5; Parsons, 1990). However, despite this acknowledgment, agency and autonomy were largely absent from their analytical frameworks, and as a result, it could only ever offer a partial theory of institutions.

A theory of institutions must be able to explain how institutions arise, how they change or persist, and how they shape behaviour. On the first of these points, institutionalism originally paid little attention to the development of institutions and simply assumed their existence (Nee, 1998, p. 1). In relation to the second point, institutions were regarded as static and change only came about through external shifts such as large-scale technological change. There was little scope for individuals to shape institutions to meet specific ends. Old institutionalism did have some potential to explain how institutions influence behaviour, but the lack of agency meant that institutionalist accounts provided a very one-sided view of the relationship between individuals and institutions.

Attempts to address the concerns about the lack of intellectual rigour behind institutionalism and its dismissive attitude toward notions of rational individuals led to the development of behaviourism, which became the dominant perspective in political science in the period that followed World War Two.

Behaviourism focussed on the individual with institutions seen in purely functional terms. Institutional outcomes reflected aggregate individual action and any constraints they placed on actors were the result of rational calculations that ultimately maximised benefits (March and Olsen, 1984, p. 735). The relationship between behaviourism and new institutionalism was not dichotomous as they had a shared origin in evolutionary economics and the original version of institutionalism, but there was a clear difference in the role assigned to institutions. By the 1970s, another shift in emphasis was evident as institutions returned to focus and new institutionalism emerged.

There are many similarities between new institutionalism and the old variant, particularly in their critique of the neoclassical paradigm and the idea of man as a rational being (Samuels, 1990, p. 83). Both also saw institutions as actors themselves, having an influence that was independent of individual behaviour. However, there are important differences that necessitate a distinction between the

'old' and 'new' and by examining these differences, important elements of the new institutionalist framework are highlighted.

First, institutionalism was initially far less accommodating of any individual agency and saw human behaviour as product of culture (Mayhew, 1989, p. 319). More recent perspectives are far more nuanced, arguing that although institutions are a constraining factor, individuals retain a degree of choice based on rational thinking. Rutherford (1989, pp. 304–8) argues that 'new institutionalism' is far closer to classical and behaviourist perspectives than its proponents recognise as it retains the 'rational man' at its core. As a consequence, it makes the same flawed assumptions about individual agency and efficient outcomes as the classical and behaviourist perspectives that it is supposedly critiquing. According to Rutherford new institutionalism is reductive in that it regards institutions as a reflection of the aggregate preferences of individuals, and functionalist, in that institutions serve these preferences. He argues that this ignores the very distinct possibility that causation can flow the other way, with the preferences of individuals being shaped by institutions. This critique has some validity in relation to specific new institutionalist perspectives in economics and the rational choice variant of institutionalism that is discussed in detail below, but it fails to recognise the diversity in institutional thought and therefore overstates the role that individual action plays in new institutionalism. The sociological and historical variants of institutionalism – also detailed in the following section - retain the core hypothesis that institutions shape preferences and constrain behaviour, and recognise that this often results in unintended consequences and sub-optimal outcomes. However, incorporating individual agency was necessary to better reflect the reality that institutions are often deliberately constituted, albeit within the constraints of those institutions that already exist.

The second difference between the old and new institutionalisms is the understanding of how institutions change. In minimising the role of individual agency, old institutionalism has little explanatory power in relation to endogenous institutional change. By finding some balance between agency and institutional

constraint, new institutionalism was better placed to explain how institutions changed (Nee, 1998, p. 1).

A third difference can be found in the theoretical underpinnings of the two institutionalisms. Old institutionalism tended toward descriptive analysis using a methodology that Peters (2012, p. 3) describes as "largely that of the intelligent observer attempting to describe and understand the political world seen by him or her in non-abstract terms". New institutionalists have made efforts to develop *theories* of institutions that can explain how they form, how they maintain stability or change, and how they influence outcomes. The theoretical value of institutionalism is examined later in the chapter.

Finally, new institutionalism has become very diverse and incorporates a number of variants that offer different perspectives on the role and function of institutions. There were certainly disagreements amongst the old institutionalists and a degree of evolution between the writers of the early 20th Century and those who adopted the framework in the two decades preceding the Second World War. However, it is possible to identify a common framework that could be labelled as 'institutionalism'. New institutionalism, on the other hand, incorporates several distinct perspectives, each of which will be outlined in the following section.

Types of new institutionalism

Writing on new institutionalism offers a range of interpretations of how institutions are formed, the role they play and how they might change (Featherstone 2003, p. 6-10; Bache & George 2006, pp. 23-8).

Rational choice institutionalism is the most similar to the new institutionalist economics developed by Williamson (2000, 1985) and North (1990, 1986). It examines how formal institutions constrain the behaviour of actors, but posits that rational actors accept those constraints as a way of overcoming collective action dilemmas. Individual actors seek to further their own interests and if every actor is

pursuing their objectives independently, the collective outcomes may be sub-optimal. By providing a framework that allows for a coordination of interests, or at least provides some predictability as to how each actor might behave, institutions reduce transaction costs (Hall et al., 1996, pp. 944–5).

Historical institutionalism concerns itself with the way in which institutions have developed over time, and how those developments influence current political activity. It focuses on notions of path dependence and lock-in, whereby decisions taken in the past limit the number of available options in the present. Small changes can therefore have significant, unforseen consequences in the long-term. Path dependence and lock-in do not just refer to physical infrastructure, but also to political influence. Political lock-in can occur when power asymmetries are created, ensuring that incumbent actors are able to defend their positions at a political level.

Sociological institutionalism places greater emphasis on informal institutions, particularly culture (Campbell, 1998), whereas historical and rational choice perspectives emphasise the role of formal institutions. Until the 1970s, there was often a distinction made between formal institutions, which were formed rationally and operated to maximise efficiency, and culture. Sociological institutionalism argued that the two were inseparable and that an understanding on the former was impossible without understanding the latter (Hall et al., 1996, pp. 946–7). Institutional structures are shaped by the culture in which they are formed, explaining differences across countries, even when they have the same external characteristics.

Finally, *discursive institutionalism*, emphasizes the importance of ideas and discourse in shaping institutions (Campbell and Pederson, 2001; Schmidt, 2008). It is closest to sociological institutionalism in giving greater priority to informal institutions, but places specific emphasis on the ways in which ideas and discourse trigger changes to institutions (Campbell and Pederson, 2001, p. 11). Elements of discursive institutionalism are incorporated within the analytical framework to account for the role of actors and ideas in shaping the response to the RED. However, this thesis

argues that although ideas and discourse are important considerations, they are still bound by the institutions in which they form and are transmitted.

Hix and Goetz (2000, p. 18) identify four uses of institutionalism in studies of Europeanization, which broadly align with these variants of institutionalism:

> (i) explanations that operate principally at a macroinstitutional level and conceive of both European integration and, in particular, the national effect primarily in institutional terms; (ii) accounts that adopt a broad understanding of institutions, but again understand the European effect primarily in institutional terms; (iii) studies that stress individual utility calculations (a 'logic of consequentially') in explaining Europeanisation effects; and (iv) analyses that likewise emphasise individual behaviour, but refer to a 'logic of appropriateness' in explaining patterns of national reaction to European integration

Historical institutionalism is best suited to the first two uses, while the second two utilise rational choice and sociological institutionalisation. However, Hix and Goetz (2000, p. 18) also note that “the old dichotomy between institution and actor-centred approaches seems to have been fundamentally eroded”. This is true of institutionalism more broadly with considerable crossover between all variants of new institutionalism increasingly evident (Aspinwall and Schneider, 2000, p. 2; Bulmer, 2006, p. 51). More recent scholarship on historical institutionalism, for example, has become less deterministic, acknowledging the role that actors or movements can play in creating change, while maintaining the important role that institutions play in shaping behaviour (Bell, 2011). Likewise, agent-based perspectives do not ignore the historical development of institutions and the role they play in influencing action, but argue that political actors have greater scope to change those institutions than historical institutionalists allow for (Hall et al., 1996, p. 942; Steinmo and Thelen, 1992, pp. 2–3). This is not to suggest that the demarcation between the different types of institutionalism has been eliminated, only that a focus on one does not preclude the use of elements from the other

three. The final section of this chapter will identify which elements of the four institutionalisms are to be utilised throughout the thesis and thus define the analytical framework. However, it is first necessary to define what is meant by the term 'institution'.

Defining institutions

As institutionalism emerged as a critiques of the classical economic paradigm, institutions were often defined by what they were not rather what they were. This point was made by one of the early institutionalists, John Commons (1931, p. 648):

> The difficulty in defining a field for the so-called institutional economics is the uncertainty of meaning of an institution. Sometimes an institution seems to mean a framework of laws of natural rights within which individuals act like inmates. Sometimes it seems to mean the behaviour of the inmates themselves. Sometimes anything additional to or critical of the classical or hedonic economics is deemed to be institutional. Sometimes anything that is 'economic behaviour' is institutional. Sometimes anything that is 'dynamic' instead of 'static', or a 'process' instead of commodities, or activity instead of feelings, or mass action instead of individual action, or management instead of equilibrium, or control instead of laissez faire, seems to be institutional economics.

New institutionalists have been more active in defining institutions, although debates remain about what should be included. North (1990, p. 4) defines institutions as "any form of constraint that human beings devise to shape human interaction". This includes formal and informal rules, but North draws a distinction between institutions, which he describes as the rules of the game, and organisations, which are the players. North's institutionalism focussed on economic institutions, but those grounded in political science do not make such a clear distinction between institutions and organisations. Steinmo and Thelen (1992, p. 2) identify the key political institutions as the "rules of electoral competition, the structure of the party

systems, the relation among various branches of government, and the structure and organization of economic actors like trade unions".

Although Steinmo and Thelen's definition identifies formal political institutions, it only infers the important role that informal institutions, such as norms, play. Hall and Taylor (1996, p. 938) explicitly account for cultural and normative elements, defining institutions as: "Formal and informal procedures, routines, norms and conventions embedded in the organizational structure of the polity or political economy". Bringing the two definitions together, it is possible to see how the informal institutions are embedded in the formal institutions of the political system. However, the question remains, how do these different types of institutions interact and how does that effect policy development and implementation.

To begin to understand these questions Simeon (1976) identifies five typical approaches to understanding the factors that influence policy development. These factors are the environment, ideas, power, institutions and process. The environment is broadly defined and includes characteristics such as demography, geography, GDP, and levels of industrialisation. Ideas are the cultural and ideological frameworks that shape the assumptions of policy-makers. Power refers to the distribution of interests within a society and the resources available to them. Institutions are the formal rules and structures of political system and process refers to the policy-making procedures that occur within those institutions. If an institutionalist perspective is applied, each of the five approaches describes a different type of institution, and Simeon argues that they should be combined into a single framework.

Scott (1994, p. 56) makes an attempt at creating a very simple, single framework by layering these different elements and then explaining how each is related to the other. He proposes three levels of institutions:

1. Meaning systems which contain related behaviour patterns, which contain
2. symbolic elements, including representational, constitutive and normative components, that are

3. enforced by regulatory processes.

According to this layered model, meaning systems – which include culture and ideology - are the driving force of institutional structure. There is a cascading effect as cultural and ideological elements influence the shared values and institutions of society. The problem with this explanation is that culture is the determinant of all else and there is no possibility that influence can flow upwards.

Williamson (2000) has a similar multi-layered approach that categorises institutions into four levels. At the highest level are informal institutions such as customs, traditions and norms that essentially form the culture of a state or region. They are deeply embedded and change is only evident over very long periods of time. The second level consists of the formal political, economic and legal institutions. Although not as deeply embedded as the informal institutions of the first level, change at the second level is also likely to be incremental. Major shocks such as war or financial crisis can create opportunities for fundamental change, but such occurrences are the exception rather than the rule. At the third level are the institutions of governance, which are defined by the formal institutions of the second level. They include policies, laws, firms, and markets and are much more susceptible to change. The fourth level includes behaviours that influence individual transactions and determine prices and markets, reflecting Williamson's focus on economics.

Williamson's categorisation has been criticised for underplaying the role of informal institutions and for assuming that change is a top-down process, in much the same way as Scott (Kingston and Caballero, 2009, pp. 167–8). However, by accounting for these critiques the four-level categorization is useful for understanding how different types of institutions are influenced by the structures that exist above them, and also provides a starting point for studying processes of change. Different mechanisms of change are required for the different levels, but change at one level will influence those beneath it. It should be noted that the process of change is not entirely top down, with the possibility that changes at lower levels can effect change

at the higher levels. This is in keeping with Schattschneider's famous observation that 'new policies create new politics' (1935, p. 288). The influence is not always one-way.

This thesis draws upon the work of Simeon, Scott and Williamson to identify and analyse the role played by institutions relevant to the Europeanization of the RED. It adopts a similar multi-layered conceptualisation of institutions, proceeding by first analysing the institutions of the state (Chapter 4), and then examining the specific institutions of the electricity sector (Chapter 5). Chapter 4 begins with an analysis of the cultural elements, or 'meaning systems' that Simeon, Scott, and Williamson refer to in their respective works.

This thesis focuses specifically on ideology, arguing that a dominant ideology has been evident in France and the UK since the Industrial Revolution, and that those ideologies - statism in France, and economic liberalism in the UK - have shaped the formal and informal institutions of the state.

Chapter 4 therefore begins with a historical analysis of the dominant ideologies that have shaped the state's role in the economy and society in France and the UK. The term 'ideology' is a "highly flexible conceptual tool" (Gerring, 1997, p. 957) that has been the subject of debate since it was first used by Antoine Destutt de Tracy in the aftermath of the French Revolution (Eagleton, 2013, pp. 1–2). This thesis adopts Freeden's (1998, p. 16) definition, which encapsulates the role of beliefs and principles as organising principles in political systems. Ideologies are:

> Idea complexes containing beliefs – encompassing consciously or unconsciously held values, understandings, interpretations, myths and preferences – which support or contest political arrangements and processes, as well as providing plans of actions for public political institutions

Having examined dominant ideologies in France and the UK, the second half of Chapter 4 will examine the formal institutions of the state with an emphasis on the ways in which those ideologies have shaped their structure and function. The importance of this ideological influence was noted by Crozier (1964, p. 7) in his seminal study of the French bureaucracy, which noted that "as soon as one embarks on a study of the pathology of organisations, cultural analysis becomes an indispensable tool which permits the delineation of the global theory and its application in different cultural contexts". The state institutions that govern the electricity sector are then examined in Chapter 5.

Institutionalism and the state

Chapter 1 outlined the crucial role that state institutions have played in the implementation of the RED. It is therefore important to understand how the state is understood in institutionalist literature.

State theory has much in common with institutionalism with both re-emerging in the 1970s following the behaviouralist turn in the decades following World War Two (Krasner, 1984, p. 223). Hall (1993, p. 276) identifies a division in theories of the state, with one side viewing the state as autonomous from other societal organisations, such as interest groups and political parties, and the other seeing the state as just one of a range of actors, albeit a very powerful one. Institutionalist perspectives are positioned between the two and have three related features. First, whereas state-centric perspectives tend to view the state as a unified whole, institutionalist perspectives recognise that the state is comprised of a number of separate institutions that may be independent of each other and have conflicting priorities (Hall, 1994, p. 7). Second, unlike behaviouralist approaches, institutionalism argues that state institutions possess a degree of autonomy and are not simply vessels through which the preferences of society are expressed (Skocpol, 1985, pp. 4–8). Balancing this is a recognition that there is a two-way flow of influence between state institutions and other societal actors such as interest groups and political parties (March and Olsen, 1984, p. 738). Stepan's (1978, p. xii) definition

of the state encapsulates these key elements and provides a framework for the analysis in this thesis:

> [T]he state must be considered as something more than the "government." It is the continuous administrative, legal, bureaucratic and coercive systems that attempt not only to structure relations between civil society and public authority in a polity but also to structure many crucial relationships within civil society as well. Consolidated modern states should be compared not in terms of whether they structure such relationships, but in terms of the degree to which, and the means through which, they do so.

Institutionalism captures the different elements contained within Stepan's definition and therefore forms the basis of the theoretical framework used throughout the thesis. The specific elements examined are the policy-making processes, political parties, the civil service, market regulators and the state's relationship with electricity market operators. However, what Stepan's definition lacks that institutionalism can also account for is the dominant ideology that shapes the state's role. A key element of the theoretical framework being tested is that different understandings of the state's role have developed through long historical processes, leading to the creation of different institutions and different path dependencies in France and the UK. To broadly summarise classic comparative works featuring France and the UK, such as Esping-Andersen (1990) and Hall and Soskice (2001), the French state is seen as a guarantor of welfare, which has led to high levels of state intervention relative to other developed countries. In the UK, the state is seen as the guarantor of individual freedom, which has manifested itself in the market-oriented institutional structure of the economy. These are very basic characterisations and the many nuances that are found in reality are detailed throughout the thesis, but in testing the proposition that institutions have deep historical roots, a form of historical institutionalism will be adopted as the framework. However, before

explaining the specific elements of the framework adopted for the thesis, it is first necessary to address the theoretical value of institutionalism.

Institutionalism as a theoretical framework

As noted in the brief history of institutionalist thought above, institutionalism has often been criticised for its lack of theoretical value. Old institutionalism was faulted for being too narrow in its focus on specific cases and new institutionalism for coming "to mean so many things to so many people that it is essentially meaningless" (Hamilton, 1962, p. 309). In relation to the first of these critiques, theory is not necessarily an essential element of social science research (Della Porta, 2008, p. 227). Many institutionalists have remained deliberately atheoretical with a focus on providing detailed answers to "why" questions that apply to specific circumstances (Steinmo, 2008, pp. 134–5). This was certainly the approach of the original institutionalists of the German Historical School, but the characterisation of old institutionalism as being atheoretical is not entirely accurate. There was certainly a focus on empiricism, but as Peters (2012, p. 6) argues, the old intuitionalists "were speaking theory without necessarily knowing it. This was true despite the specific rejection of many of these scholars…of theory as their goal, or of theory being a respectable goal for social analysis".

Peters lists a number of features that provided a theoretical foundation that new institutionalists later built upon, even if those contributions were often inadvertent, not always apparent and largely disjointed. First, the focus on institutions influenced the structuralism of the later institutionalists, which posited that if the key institutional structures of society could be identified it would be possible to predict the behaviour of the system. Second, although the detailed descriptive analyses of the old institutionalists grounded studies in specific times or locations and made generalization difficult, it did highlight the need to study social systems as a whole and to identify the complex interconnections between institutions and individuals. The new institutionalists understood that comparison is important for the development of theory (Dogan and Pelassy, 1990), and therefore sought to find the

middle ground between examining the complexities of political systems and identifying the similarities across different systems. The third contribution was the identification of history as an important factor in shaping institutions and shaping political outcomes. With its roots in the German Historical School, institutionalism saw a link between the historical development of institutions and their functioning in the present day. This historical element was missing in the behaviourist tradition, but returned in new institutionalism, particularly the historical variant that is the core of this thesis' analytical framework. The final contribution was the normative element that underpinned much of the institutionalists work. In arguing that individuals did not make rational decisions isolated from the culture and social institutions in which they interacted, old institutionalism identified an important constraint on the 'rational man'. The behaviourIsts criticised this normative element, arguing that the inability to measure norms meant that institutionalism lacked a scientific basis, but the fact that it is difficult to measure does not mean that it is unimportant. This fact was recognised by the new institutionalists, and normative factors became a critical element of their analyses.

In relation to the second part of Hamilton's critique that institutionalism has come to incorporate so much that it is essentially meaningless, it is true that institutions can be broadly defined to include everything from formal organisations to norms and expectations, but it is a workable framework if bounded by precise definitions. The work of Simeon, Scott and Williamson, which was detailed in the first part of the chapter, provides the basis for a useful framework for categorising specific institutions. With this framework established, institutionalism can offer answers to two essential questions. The first relates to the ways in which institutions shape political behaviour, placing constraints upon actors, and the second to the factors that either reinforce institutional stability or bring about change. In the context of this thesis, the literature is utilised to understand how the state institutions of France and the UK have responded to the RED. It examines how domestic political institutions have influenced the implementation of the Directive, but also how they have changed in response.

It is possible to produce a thick description of a particular case or cases and still provide explanatory value and institutionalism provides the necessary tools. The specific elements of institutionalist thought that can answer the crucial questions of how institutions influence behaviour and how they might change are outlined in the following sections.

Institutional stability and change

In addition to different perspectives on the formation and role of institutions, the various forms of institutionalism provide different explanations of stability and change. Accounting for the mechanisms of reproduction or change within institutions is a crucial question for this thesis as it examines the implementation of an EU Directive that requires change of the two member states in question. Understanding whether the RED challenges or reinforces existing institutional structures can only be done once those mechanisms are understood, and as Thelen (1999, p. 399) notes, mechanisms of institutional stability and change must be considered together.

In broad terms there are two types of change, the first brought about by exogenous shocks, such as war or economic collapse. Such shocks are known as critical junctures in institutionalist literature and they can create windows for significant change by overwhelming existing political structures. Once settled those changes have long-lasting effects, creating path dependencies that make it difficult to create alternative pathways (Capoccia and Kelemen, 2007). Lipset and Rokkan (1967) introduced the notion of critical junctures in their study of Western European political parties, arguing that parties formed along the lines of societal cleavages that emerged following the Industrial Revolution. Those cleavages were still the basis of party alliances in the second half of the 20th Century.

Chapter 4 will examine how critical junctures throughout the 20th Century have altered the institutions of the state in France and the UK. The combined shocks of the Great Depression and World War Two, and then later the economic crisis of the 1970s saw significant ideological shifts in both France and the UK, which in turn

triggered changes to the formal institutions of the state. Given the importance of electricity systems to national economies, those shocks were mirrored in the sector and are examined in Chapter 5.

However, incremental, endogenous change is possible and can be equally significant in shaping institutions, albeit over longer time scales. Streeck and Thelen (2005a, pp. 8–9) identify four types of institutional change, beginning with *displacement*, or the replacement of existing institutions with new ones. *Layering* involves new rules being applied alongside existing ones without displacement occurring. *Drift* is a situation where there are no changes to rules, but their impact is altered by changes to the wider environment. *Conversion* occurs when existing rules are interpreted or applied in new ways. Each of these types of incremental change are evident to varying degrees in the transition to renewable energy in France and the UK and are examined in the case study chapters.

Path dependence and institutional change

Path dependence is a critical concept in historical institutionalism, but Mahoney (2000, p. 507) criticises some uses of path dependence for being "little more than the vague notion that 'history matters' or that the past influences the future". Goldstone (1998) distinguishes between general laws and path dependency, arguing that although the two are often conflated, they offer very different explanations of historical outcomes. General laws dictate that, given certain initial conditions, a particular outcome will *inevitably* result. Path dependent processes are different in that outcomes are *dependent upon choices* made at intermediate points from the initial condition. Multiple outcomes are therefore possible, but as choices are made, possible future pathways become increasingly limited. General laws and path dependent processes can interact to make certain outcomes more likely, but historical analysis should distinguish between the two in explaining outcomes.

Pierson (2000) draws upon the notion of increasing returns, which was first developed in economics literature, to explain how path dependence is reinforced.

Outcomes are not necessarily optimal, but the costs of diverting from the current path far outweigh those of remaining. This creates a lock-in whereby the structure of an institution is continually reinforced, as the costs of dismantling it and creating an alternative are prohibitive.

However, path dependency and lock-in do not necessarily result in inefficient outcomes. Liebowitz and Margolis (1995) distinguish between three types of path dependence. *First-degree path dependence* occurs when there is some sensitivity to starting points, but no consequent inefficiency. *Second-degree path dependence* arises when a lack of information leads to an inefficient outcome, but the inefficiency is only recognised as inefficient in retrospect. *Third degree path dependence* is a situation where an inefficient path is pursued, even when remedial action can be taken to alter the outcome. It is an important distinction in the context of the RED as it is possible that path dependencies dictate the types of policies implemented in response to the Directive, but not the overall outcome. This is precisely the purpose of a directive as a form of EU law.

It is also possible that path dependence and lock-in also create processes that undermine the institution over time (Greif and Laitin, 2004). This is consistent with Thelen's (1999, p. 400) observation that "knowing how institutions were constructed provides insights into how they might come apart". Hanrieder and Zürn (2017) identify two types of reactive sequences that can trigger the eventual collapse of an institution. The first is termed 'power-outcome decoupling' and refers to a situation where there is a mismatch between powerful actors and institutional rules. For example, an organisation may allocate a single vote to each actor, thus giving greater weight to weaker actors. More powerful actors may resent the fact that they are unable to wield what they regard as due influence and decide to either move to a competing organisation, or establish an entirely new one. The second is termed the 'authority-legitimacy link' and refers to a situation where an institution loses legitimacy in the eyes of those that are subject to the regulations either directly or indirectly. Legitimacy is especially important where authority is delegated to the institution, allowing that institution to make decisions that may be against the stated

interests of its members. Transparent decision-making procedures and appeals to the common good are just two strategies to maintain legitimacy, but if there are perceived biases in the outcomes those subject to the regulations may work to undermine the legitimacy of the institution. The EU is an example of a body that has had powers delegated to it by its member states and must work to maintain legitimacy.

It is also important to note that lock-in mechanisms can be drivers of positive outcomes. In their seminal work on the "wicked problem" of climate change, Levin et al. (2012) argue that positive lock-in mechanisms can be created to advance climate change mitigation, an approach that has been subsequently expanded upon by a number of authors who argue that policy should be designed with these mechanisms in mind (Jordan and Matt, 2014; Rietig and Laing, 2017).

Agent-centred approaches to stability and change

The normative element of the authority-legitimacy link points to two other potential weaknesses in the concept of path dependence, namely the focus on formal institutions and the minimal role of agents. Fioretos (2017, p. 13) argues that although path dependence is good at explaining the stability of institutions with clearly defined rules, such as constitutions, it is less useful in relation to institutions that rely on informal practices, which have lower thresholds for change and are therefore less prone to lock-in. New institutionalism, and historical institutionalism in particular, has also been criticized for being static and deterministic, only being able to describe stability but not change (Schmidt, 2008, pp. 313–4; Steinmo, 1993, p. 12). According to this critique, the essential problem is a lack of agency in existing accounts.

However, both the importance of informal practices and the potential of agents to initiate change have already been incorporated into existing approaches. In their defence of new institutionalism, Mahoney and Thelen (2010) note that institutions distribute power and resources unevenly and argue that this distribution is often the

result of ambiguous compromises. Rules, particularly informal ones, are also open to interpretation, meaning that institutional arrangements are not necessarily stable and reinforcing, providing ample opportunity for actors to challenge existing arrangements. Steinmo (2008, p. 130) notes that the role of ideas is increasingly being incorporated into historical institutionalist analyses. He argues that although ideas have largely been neglected in political thought, their impact on history and politics should be important considerations. Bell (2011, p. 894) also argues that actors and ideas matter in institutionalism "because institutions define roles not final behaviours and roles always need to be interpreted." These more nuanced versions of institutionalism argue that institutional structure is not the sole determinant of political outcomes, but maintain that they do play a crucial role in shaping those outcomes.

Empirical evidence of Europeanization

The various forms of new institutionalism have been applied to comparative studies of member states. These studies aim to identify the types of institutions that best enable effective implementation of EU policies. The two most prominent hypotheses relate to institutional compatibility and veto points (Giuliani 2003, pp. 135-137). The institutional compatibility hypothesis suggests that member states that mirror the EU's institutional structure of dispersed power and consensual decision-making are better able to influence and adapt to EU policy (Bulmer, 1998, p. 76; Hix and Goetz, 2000). The reason is twofold. First, the dispersed power allows more points of entry for new interests, allowing them to demonstrate competence in niche markets and build trust with policy-makers at multiple levels. States with centralised authority favour incumbent interests and allow little space for new entrants. Second, the EU is seen simply as another authority in an already dispersed decision-making structure. This creates a greater level of democratic legitimacy, and therefore acceptance, relative to a centralised polity where interests are more narrowly defined by a central authority (Schmidt 2007). Institutional compatibility can be examined at a national level to understand broad patterns of Europeanization but empirical work has tended to examine compatibility at an individual policy level. Here the focus is

on the institutions that are relevant to the implementation of a particular policy. This case-specific approach recognises that EU policy is not uniform in its development or application.

The 'veto points' hypothesis is seemingly the antithesis of the institutional compatibility perspective, arguing that dispersed power and consensual decision-making are a hindrance to effective implementation of EU policy. Tsebelis (2002, p. 19) defines veto players as "individual or collective actors whose agreement is necessary for a change in the status quo". In cases where EU policy requires adjustment at the member state level, the more veto players involved in the process, the less likely that the policy will be implemented effectively. However, the empirical evidence supporting either thesis is mixed and the distinction is clouded once individual cases are examined.

Knill and Lenschow (1998) examine the implementation of four EU environmental policies in Germany and the UK. They begin by distinguishing between regulatory structure, which refers to formal decision-making structures and regulatory style, which refers to the way in which regulation is formulated. Regulatory structures can be characterised as either centralised and concentrated or dispersed and fragmented. Regulatory styles can be categorised as either interventionist, where top-down decision-making procedures allow for little flexibility, or mediative, which provides greater scope for negotiation and the participation of multiple interests. Based on these categories, Germany and the UK are near polar opposites. Germany's federal structure creates a dispersed decision-making structure, whereas the UK has a more centralised structure with any dispersal occurring along sectoral lines within government departments rather than geographic lines. Germany also has an interventionist style with formalised rules and limited interest representation in the policy making process, whereas the UK has a mediative style.

Knill and Lenschow begin with a version of the institutional fit hypothesis, positing that effective implementation of EU policies is dependent upon alignment between the policy and the regulatory styles and structures of the member state. EU policy

that places high adjustment pressure on a member state by challenging existing structures and styles will be resisted. However, the examination of the four policies found that this was true in only half of the cases, suggesting that the explanatory framework required strengthening. The authors maintain that where there is high adjustment pressure, caused by a significant mismatch between the EU policy and the institutions of the member state, those member states will resist change, leading to poor implementation. However, in cases where the adjustment pressure is more moderate, the analysis must be broadened to include the policy context. A misalignment between the institutional requirements of the EU policy and the structures of the member state may not result in ineffective implementation if the content of the policy aligns with the policy direction of the member state. This reduces the perceived adjustment pressure and allows for any institutional requirements from the EU to be seen as complementary rather than conflicting.

Interestingly for this thesis, Knill and Lenschow also argue that their study highlights the UK's greater capacity for institutional reform relative to Germany (p. 607). The UK's centralised, majoritarian political system has fewer veto points making change far easier relative to Germany. They cite the significant shift toward stronger environmental policies in the second half of Margaret Thatcher's Prime Ministership as an example. Knill and Lenschow's conclusions therefore incorporate elements of both the institutional fit and veto point theses, arguing that they have explanatory powers under different circumstances.

Haverland's (2000) study of the implementation of the Packaging and Packing Waste Directive in Germany, the Netherlands and the UK challenges the institutional fit thesis entirely, arguing that it has little predictive power. The UK had the lowest institutional compatibility of the three states, yet it made the most significant adjustment and met the EU's requirements well before Germany and the Netherlands. Haverland identified the presence of fewer institutional veto points as the key determinant of successful implementation. Although Germany required only incremental adjustment, its consensual decision-making procedures and dispersed authority created multiple veto points that ultimately slowed implementation. The

reverse was true in the UK where political authority is centralised and veto points are fewer.

Haverland's conclusions are supported by the more recent work by Gollata and Newig (2017) who studied the implementation of EU air quality directives in Germany. They note that although national transposition has been successful, actual implementation by sub-national authorities has been poor.

Bailey (2002) provides a critique of Haverland's perspective in his review of the Packaging and Packing Waste Directive. He argues that Haverland's definition of implementation is too narrow as it includes only transposition into national law (legal and administrative implementation) and not the practical implementation of the policy. This practical element of implementation is the most important as it relates to actual policy outcomes and has been the most common point at which EU environmental policy fails (2002, pp. 792–3). Once the broader definition is applied, the argument that institutional veto points are the critical determining factor is far weaker as it is only apparent at the transposition phase, but not at the practical stage where 'goodness-of-fit' is still relevant.

Knill and Liefferink (2007, pp. 179–95) also found that Germany had a poorer record than France, Spain and the UK in the implementation of three EU environmental Directives, but provide a more nuanced explanation than Haverland. They argue that institutional compatibility can play an important role, stating "the probability of effective implementation decreases with an increasing level institutional adaption pressure on domestic regulatory styles and structures" (p. 185). However, like the earlier study from Knill and Lenschow, they also argue that a focus on institutional compatibility is only a reliable predictor where the institutional adaption pressure is either very high or very low. When the pressure is between these two poles it is necessary to include an examination of the specific interest constellations operating within member states (p. 194). This perspective provides a balance between rational choice and sociological institutionalism and is similar to the conceptualization of Europeanization outlined by Börzel and Risse (2003, pp. 57-80). According to this

perspective, there are two logics for domestic change. One is driven by formal EU legislation that creates pressure to change and may trigger a redistribution of resources toward new interests that can facilitate change. The other is driven by 'norm entrepreneurs' that advocate for the adoption of EU norms to advance their interests. Norm entrepreneurs and the socialisation of EU norms and policies are highlighted in sociological perspectives on Europeanization (Börzel & Risse 2003, p. 59). However, formal institutions still play a crucial role in governing how various actors interact.

By utilising institutionalist perspectives to assess the implementation of the RED, this thesis expands upon the two dominant hypotheses of institutional compatibility and veto points to examine the effect that the historical development of institutions and the creation path dependencies has on Europeanization. In doing so, it will also make a contribution to the understanding of energy transitions. As the RED is a crucial component of the energy transition in the EU, this thesis will contribute to an understanding of what the drivers of, and impediments to, change are.

Empirical evidence on energy transitions

Institutionalist perspectives are also beginning to be employed to understand the energy transition, but there is a lack of empirical work. Existing studies of energy transitions have tended to use the socio-technical transition literature as a framework for understanding what is a very large and complex change to the energy system (Geels, 2014). However, this literature lacks a theoretical foundation for understanding how change occurs. Institutionalism can provide the necessary explanatory mechanism (Andrews-Speed, 2016; Lockwood et al., 2017).

Socio-technical systems theory first emerged in the 1950s to understand the poor performance of the state-owned British coal mining industry, which had not increased productivity despite increased mechanisation (Trist 1981, p. 7). The theory that emerged posits that organisational structure is dependent upon the interaction of social and technical elements, rather than just increases in technological inputs. In

this regard, it had many similarities to evolutionary economics, although it explores wider social aspects such as beliefs, interpretations, debates and networks rather than just material aspects such as resources, competition, prices and market selection (Geels 2011, p. 30).

Recent socio-technical transitions studies have applied the multi-level perspective (MLP), which outlines three levels that are crucial to the development of new technologies. The first, and most specific level is that of the niche where innovations are given space to develop in protected parts of the market. (Kemp, Schot & Hoogma 1998 pp. 175-198; Geels 2002, pp. 1257-1274). Niches are necessary in the early stages of technological development as new technologies face significant barriers relating to the many factors that provide the existing regime with stability, including technological lock-in, sunk costs, existing knowledge and supply chain networks, and political support.

Regimes form the second, more general level. This is where the incumbent socio-technical system exists, sustained by both the material aspects of the system, such as physical infrastructure, the actors within it, such as firms, universities, research bodies, interest groups and consumers, and the set of formal and informal rules that govern interactions within the regime (Geels 2002, p. 1260; Geels 2004, p. 903). Change at the regime level is normally incremental but as technologies emerge from the niche level they begin to challenge the incumbent regime, possibly leading to transition.

The regime is situated within the landscape, which is the third and broadest level. The landscape level includes macro considerations such as the whole economy and cultural values. A prime example of a landscape issue is climate change because it is external to the energy system, which sits at the regime-level, but influences the selection of technologies in the energy system.

Although the MLP outlines three levels, the processes of change are not linear and influence flows both ways. Geels (2002 p. 1261) describes the MLP as a ‘nested

hierarchy' where "regimes are embedded in landscapes and niches within regimes" For instance, changes at the landscape level can place pressure on the regime level, providing an opportunity for new technologies to emerge from niche markets to challenge the incumbent regime. This is one of several potential pathways for socio-technical transition.

Although the MLP provides a broad framework for understanding socio-technical systems, the role of actors and their interactions within those systems are particularly underdeveloped (Smith et al. 2005, p. 1492; Genus & Coles 2008, p. 1440). Geels (2011, p. 30) acknowledges the validity of this critique, but argues that the complex interactions that occur between actors can be drawn out by combining the MLP with other theoretical frameworks. Geels et al. (2016) utilise institutionalism, particularly the typology of institutional change first developed by Streeck and Thelen (2005a), to examine low-carbon energy transitions in the UK and Germany. They find that the informal and formal institutions in the two countries have shaped the transition pathways adopted in the two countries. In Germany, a strong civil society, a tradition of environmentalism and opportunities for German manufacturers to benefit from the transition has allowed new entrants, particularly small-scale, community-based installations to disrupt incumbents. The UK's market-based approach has acted as a barrier to new entrants, resulting in a transition pathway driven by the large incumbent utilities. This thesis expands upon this work, but examines the historical development of institutions more deeply to understand how they have formed and how those histories either impede or drive the transition.

Hybrid historical institutionalism as the primary analytical framework for the thesis

Andrews-Speed (2016, p. 222) argues that in order to understand the transition to a low-carbon energy system, it is necessary to draw upon all four forms of institutionalism. Given the complexity of the transition, which touches upon political, legal, economic and social structures, it is a valid point. Historical institutionalism can explain the origins of institutions, identify path dependencies, and explain how power is distributed between institutions; rational choice institutionalism is useful

for understanding transaction costs; sociological institutionalism examines the role of culture and ideology, and discursive institutionalism the role of ideas and discourse. As noted in the overview of institutionalism, the demarcation between the four forms has blurred with most institutionalist studies drawing upon various aspects of each. This thesis adopts a similar approach, although given the focus on the political institutions that govern the electricity sector, it will draw most heavily from historical institutionalism.

The electricity systems of France and the UK are characterised by large-scale infrastructure, tight regulation and deeply embedded institutions. That structure has developed over a long time scale, creating several lock-in mechanisms in the process. Large utilities are favoured by increasing returns that accrue to incumbent operators, and any change is likely to be incremental. The scale of the infrastructure and the importance of electricity to the overall economy have also ensured that the sector is heavily regulated. Understanding how these regulations are formed requires an analysis of how power is distributed across institutions and between the state and firms. All of these factors lend themselves to an analysis using historical institutionalism as a framework.

Actors and ideas will be considered alongside the historical development of institutions. Although the thesis argues that a dominant ideology has shaped institutions over the past three centuries, that ideology is not static. Actors and new ideas have penetrated the political systems in France and the UK at various times and shifted the politics of the country into a different direction. For example the transition of the UK electricity sector from the traditional state-owned, vertically integrated monopoly to a privatised system under Margret Thatcher demonstrates how structures can change rapidly with a change of government.

However, long historical processes have also shaped the ideas and norms that are evident within the electricity sector, particularly as they relate to the role of the state. This sector has always been considered to be of strategic importance to national economies and its structures normally reflect the principles that govern the

state's role in the broader economy (Cooper, 2017, pp. 3–4; Hughes, 1983, p. 2). The *dirigiste* traditions of France are evident in the largely state-controlled electricity sector, whereas the more liberalised sector in the UK reflects the free-market orientations of the UK. The differences between the two states became particularly evident during the 1980s as the UK broke from the post-war Keynesian consensus, but the divergence can actually be traced back as far as the Industrial Revolution when Britain opened its markets to leverage its advantage in industrial production and France sought to protect its industries in order to catch-up (Bairoch and Burke, 1989, p. 7; Shafaeddin, 1998, pp. 13–4). The influence of history and its effect on the development of institutions in the two countries will be explored in detail in the case study chapters. Historical institutionalism therefore remains the primary analytical tool, albeit in a hybrid form that incorporates sociological and discursive perspectives.

Applying the analytical framework to the implementation of the RED

The thesis applies the hybrid historical institutionalist analytical framework to the institutions of the state, identifying how inherent path dependencies have influenced the implementation of the RED. As noted above, this thesis examines those institutions in a layered fashion, beginning with the historically dominant ideology of the state. It then looks at how that ideology has shaped the formal institutions of the state and the electricity sector.

When applied to the French case study, the thesis considers how France's historically dominant statist ideology has influenced the form and function of the institutions of the state. It explores whether the state's centralised control of the dominant, state-owned utility has allowed it to direct a rapid transition to renewable energy on a scale that matches the transition to nuclear energy between 1974 and 2000, or whether the path dependencies inherent in the nuclear power program have constrained France's ability to meet its RED target.

When applied to the UK case study, the thesis considers how neoliberalism has shaped British institutions and whether the state's lack of direct control over the power sector means that it cannot drive the necessary changes to the electricity system to meet the RED targets, or whether it provides sufficient flexibility to implement ambitious policies.

Chapter 3

Methodology

This chapter outlines the methods used to test the proposition that the historical development of state institutions has created path dependencies in policy-making, which in turn determine the capacity of France and the UK to effectively implement the RED. The thesis adopts a comparative case study approach to examine the response of two countries where the state has played a very different role in governing the electricity sector. The cases examine the historical development of key state institutions using process tracing methods that draw upon historical analyses, identifying path dependencies that are likely to influence the implementation of the RED. The thesis then examines the influence of those path dependencies through detailed document analysis and interviews with actors involved in the policy-making process.

This chapter begins by establishing the criteria for assessing the 'effective implementation' of the RED in the context of this thesis. It then provides an outline of the comparative case study method, followed by a detailed justification for the selection of France and the UK as case studies. Finally, the specific methods for addressing the core research question are provided.

Effective implementation and institutional adaptation

This thesis considers whether France and the UK have implemented policies that effectively meet the requirements of the RED. The primary measure of effectiveness is the national targets outlined by each member state in the National Renewable Energy Action Plans (NREAPs). Although the 2020 deadline has not yet been reached, the NREAPs include interim targets and member states are required to submit a bi-annual reports to the Commission that provide a clear indication of trajectories. The

most recent national reports were published in December 2017. France's electricity target for 2020 is 27 per cent. The UK's target is 31 per cent.

As Chapter 1 outlined, the thesis also considers the implementation of the RED in the context of the EU's 2050 decarbonisation strategy. The thesis will therefore assess whether the RED has established a long-term decarbonisation pathway in the power sectors of France and the UK. This assessment will analyse trend data for renewable energy deployment and power sector emissions trajectories, but more importantly, it will draw upon the examination of state institutions in the two countries to assess whether those institutions have the capacity to execute a long-term decarbonisation strategy.

Comparative case study method

The comparative method aims to provide an in-depth comparison of a small number of cases and is distinct from experimental and statistical methods which preference breadth over depth. Case studies are normally "the only scientific method available for macrodimensional, interdimensional and institutional processes" (Della Porta, 2008, p. 202), with case comparison used for research that focuses on difference (Ragin and Amoroso, 2011, p. 135). Studies of Europeanization are particularly suited to the comparative method as it allows for an examination of how states with different institutional variables (cultural, social, political or economic) have applied the same policy (Giuliani, 2003, pp. 135–6).

There are competing perspectives on appropriate methods for social science research, which Della Porta (2008) classifies as variable-oriented versus case-oriented research. Proponents of the former, such as King et al. (1994), argue that research should isolate variables and aim to produce findings that can be generalised. Steinmo (2008) outlines the alternative approach which views variables as complex and interdependent and seeks to explain outcomes in particular cases rather than build predictive theories. The latter approach is particularly suited to historical research that provides deep analysis of contingent outcomes. However,

the two approaches need not be mutually exclusive and this thesis adopts elements of both in its objectives and methods. The primary objective is to explain the implementation of the RED in France and the UK, but given that each sits at opposite ends of a continuum representing state control of the electricity sector, lessons can be drawn for other EU member states with levels of state control similar to either France or the UK.

The variable-oriented elements of the research design are most evident in the case selection criteria. In selecting cases, King et al. (1994, p. 133) emphasise the importance of unit homogeneity, with the aim being to identify cases that are as similar as possible in every regard with the exception of the explanatory variable. For this thesis, case study selection is therefore based on differences in the role of the state in governing the electricity system, but similarities in other major variables such as size (GDP, population, and total electricity generation), electoral systems, competence for electricity policy at the national level, and the required rates of renewable energy deployment under the RED. A range of other potential variables remain that influence renewable energy deployment, including other EU and domestic policies, technological development, and energy prices, but these factors can be accounted for and assigned their proper weight through detailed case study analysis.

The combination of careful case selection and a detailed narrative of the implementation of the RED in the chosen states is designed to overcome a potential weakness of the comparative method, summarised succinctly by Lijphart (1971, p. 685) as “many variables, small number of cases”. He recommends that a comparative analysis be supported by further statistical work, but Collier (1993, pp. 111–3) argues that robust findings can be derived from an in-depth, *small-n* research design that controls for some key variables through the case selection process and accounts for others through a detailed written analysis.

It is important to note that limiting variables through case selection does not necessarily imply that causal relationships are of a necessary or sufficient nature

(Box-Steffensmeier et al., 2008, p. 24; Mahoney and Goertz, 2006) and the case study analyses allow for equifinality by providing rich descriptions of the specific circumstances under which the RED was implemented by France and the UK. However, with these caveats in mind, lessons may still be applied to other member states.

Case selection

France and the UK offer an immediate contrast in state control of the electricity sector, and the role of the state more generally. However, a number of other member states could provide rich material for a study of renewable energy policy and there is a range of state types that can be contrasted. It is therefore necessary to consider all member states against a list of criteria that controls for key variables while allowing a comparison of the role of the state.

For this thesis, as noted above, cases were selected on the basis of similarities in ***size*** (GDP, electricity generated and emissions), ***competence*** for electricity policy at the national level, ***voting systems*** (proportional or majoritarian) and the required ***adjustment*** under the RED.

Applying these criteria allows the thesis to focus on the effect of path dependencies that have developed through the different historical development of state institutions. Each criterion is explained in detail below, beginning with size, which is the basis of narrowing the selection process from the 28 member states to the following six: France, the UK, Germany, Italy, Spain and Poland.

Size

Size refers to measures of GDP, electricity generation and overall emissions, all of which are closely correlated. The five largest economies in the EU are Germany, the UK, France, Italy and Spain. They are also the five largest generators of electricity. Poland is the eighth largest economy, but the sixth largest electricity generator, the

fifth largest source of overall emissions, and second largest emitter from electricity generation.

Size is not necessarily an important criterion in comparative research as it is possible that smaller countries, or even regions, can produce findings that can be generalised at larger scales or simply provide interesting narratives. For example, Denmark and Latvia are two of only five member states that are expected to generate over 50 per cent of their electricity from renewable sources by 2020. Understanding why this is the case has already drawn the attention of several scholars, particularly in the case of Denmark (Lewis and Wiser, 2007; Lipp, 2007; Meyer, 2004). However, smaller member states tend to be anomalies, clustering around the top and bottom of renewable energy rankings and those at the top rely on a single technology (wind in Denmark and hydroelectricity in Latvia). Such cases may be useful for understanding the development of a particular technology, but most member states will rely on a range of technologies and policies to meet their targets, therefore the smaller member states were excluded from consideration.

The largest member states also have the most influence over EU climate and energy policies and the greatest impact on the EU's overall rate of renewable energy. More importantly, they also provide compelling cases for the examination of historical institutional development and related path dependencies. Larger states possess the resources and competencies to drive the transition to renewable energy, but they also face entrenched interests in the electricity sector that influence policy development. The largest ten power companies in the EU by revenue were headquartered in one of five countries: Germany, France, the UK, Spain and Italy (Prospex, 2016, p. 3). Again, Poland is the exception with no companies in the top 10, but the state has a controlling share of the three largest generating companies. On the basis of size alone, all six make for compelling case studies.

Competence for electricity policy at the national level

France and the UK are both unitary states characterised by the centralisation of political power at the national level. There have been attempts to transfer greater powers to the regions in both countries, but authority over energy policy remains at the national level. In France, a number of decentralization laws were passed in the 1980s and 1990s that aimed to provide regions with greater scope for economic development (Hancké, 2001, p. 311). However, energy and climate policy remains the domain of the central government. The UK went further than France through the process of devolution that saw powers transferred to parliaments in Scotland, Wales and Northern Ireland. The devolved administrations do exercise some authority over energy policy, particularly in Scotland, which has advocated for stronger renewable energy targets. However, overall energy policy is still directed from London (Cowell et al., 2013, pp. 50–4).

Poland is also a unitary state with centralised control of energy policy, but in Germany, Spain and Italy, authority is divided between the central government and states/regions. In Germany, energy policy is divided between the federal government and the 16 states (*Länder)*. Although primary legislative responsibility lies with federal ministries, the *Länder* possess significant administrative powers, including the regulation of local energy utilities, oversight of small-scale distribution networks, and planning approvals for grid expansion projects (IEA, 2013, pp. 32, 114, 132).

Spain is divided into 17 autonomous regions, which possess significant legal competence over energy policy. Regions have responsibility over distribution networks, and for approving electricity generation plants of less than 50MW, which would include a large proportion of renewable energy facilities (IEA, 2015, pp. 18–9).

In Italy, regions also possess considerable authority over energy policy. There have been attempts made at streamlining and centralising energy policy, including the development of a National Energy Strategy in 2013. However, regions still possess

significant administrative duties relating to renewable energy projects and electricity distribution (IEA, 2017a, pp. 20–3)

Voting systems

The previous chapter examined the debate surrounding 'institutional fit' and 'veto points' in the Europeanization literature. Essentially, the 'institutional fit' thesis argues that consensual systems of government based on proportional voting systems are best able to adjust to EU requirements as they match the institutional structure of the EU. The 'veto points' thesis argues that such systems produce more opportunities for actors to oppose action, therefore slowing the adjustment to EU requirements. There is also evidence that countries with proportional representation are more likely to have stronger environmental policies than those with majoritarian systems (Lockwood et al., 2017, p. 316). Proportional systems tend to produce coalition governments that provide an opportunity for a wider range of interests to be included in the policy-making process. This has given greater scope to the environmental movement to influence policy relative to majoritarian systems that favour a narrower group of established interests (Dolsak, 2001; Fredriksson and Millimet, 2004; Lachapelle and Paterson, 2013).

France and the UK both have majoritarian systems of government. In fact, they are the only two EU member states that do not use a form of proportional voting for the main chamber of parliament (ACE Electoral Knowledge Network, 2017). The selection of these two countries therefore greatly reduces the system of government as a potential variable.

Level of adjustment required

Héritier (2001, p. 44) outlines three conditions that must be met for Europeanization to occur. First, there must be a *mismatch* between existing member state policy and EU policy, which forces the member state to adapt its own policies to meet the EU's requirements. Germany does not meet this condition as it was a key driver in the formation of the Directive and the final outcome largely reflected its preferences

(Nilsson et al., 2009, pp. 4454–62; Vogelpohl et al., 2017, pp. 50–2). Germany has had strong renewable energy policies in place since the early 1990s and the RED represented a continuation of existing domestic policies rather than a radical challenge (Hake et al., 2015, pp. 537–9). Spain had been another early leader in the deployment of renewable energy and its position largely mirrored that of Germany through the negotiation phase (Solorio and Fernandez, 2017, pp. 147–8). However, the financial crisis of 2008 had a severe impact on the Spanish economy and led to dramatic declines in government support schemes for renewables. Although the crisis was felt across the EU, the effects were particularly damaging in Spain and would likely bias a study of the period following the implementation of the RED. Italy also faced little pressure to adjust having exceeded the electricity sector target set under its NREAP in 2012 (European Commission, 2015b, p. 4).

Poland's required adjustment was also minimal. The country's target for the electricity sector target of 19.13 per cent (up from about 7 per cent in 2010) was one of the weakest amongst member states, placing it above only Czechia, Malta, Luxemburg and Estonia (European Commission, 2016a). Not only is the required growth in Poland's renewable capacity relatively small, but more than one-third of electricity generated from sources classified as renewable comes from biomass co-fired with coal (European Commission, 2017b). Rather than challenging the incumbent system, the use of biomass simply reinforces the dominance of coal-fired power generation (Olszewski, 2014)

Amongst the largest economies of the EU, France and the UK faced the most significant adjustment. Although France's electricity system has the second lowest emissions intensity in the EU (after Sweden), this is due almost entirely to its reliance on nuclear energy, which the RED excludes. Nearly 15 per cent of France's electricity consumption came from renewables in 2009, but over 80 per cent of this was from long-established hydro plants that were not expected to increase generating capacity (Andriosopoulos and Silvestre, 2017, p. 380). Other forms of renewables, such as wind, solar and biomass, were expected to lift the total share of renewables in France to 27 per cent by 2020, but given that the share of non-hydro renewables

had grown from 0.5 per cent to just 2.2 per cent in the decade prior to 2010, the deployment rates would have to increase considerably.

The scale of the challenge facing the UK was equally as large. Although the UK has one of the lowest renewable energy targets under the RED at 15 per cent, its target for the electricity sector of 31 per cent compares favourably with other major economies, Germany (38.6 per cent), France (27 per cent) and Italy (26.4 per cent) (European Commission, 2010). However, the UK was starting from a low base in 2010 with less than 8 per cent of electricity consumption sourced from renewables (European Commission 2016). Similar to France, it had to rapidly increase the rate of deployment in order to meet the RED targets.

Héritier's second condition for Europeanization is *political willingness to adapt* to the EU's requirements. Four of the countries under consideration can be said to meet this condition, with Spain and Poland being the exceptions. As noted above, Spain had been a leader in renewable energy policy until 2008, but its political commitment and economic capacity faltered following the financial crisis (Gürtler et al., 2019; Solorio and Fernandez, 2017). Poland's unwillingness to promote renewable energy deployment is based on a desire to protect its coal sector, which continues to supply nearly 80 per cent of the country's electricity (European Commission, 2017b; Skjærseth, 2014). This unwillingness was clear in Poland's slow transposition of the RED into national law, which it failed to do before the Directive's stated deadline of December 2010. The Commission referred the transposition failure to the Court of Justice of the European Union in 2013, which found in the Commission's favour. However, Poland did not seek to address the ruling until the Renewable Energy Sources Act came into effect in 2016 (Jankowska, 2017, p. 155).

Germany has set a renewables target of 38.6% for the electricity sector by 2020, making it one of the most ambitious member states when those with large-scale hydro capacity are excluded. Longer-term targets have also been established with renewables expected to provide 80 per cent of Germany's electricity by 2050 (Federal Ministry for Economic Affairs and Energy, 2016, p. 4). Italy demonstrated its

commitment by increasing renewable capacity by nearly 60 per cent between 2010 and 2015 to achieve its target (European Commission, 2017b), and France and the UK also meet this condition, having accepted the targets assigned under the RED, and establishing long-term climate and energy plans out to 2050 (Herbert Smith Freehills, 2015).

The third condition is the *capacity for change*. Capacity is largely dependent upon the ability of member state institutions to absorb and adapt to the requirements of the EU and is the focus of this thesis. With Germany and Italy ruled out due to lack of adjustment pressure, Spain excluded due to the potential bias caused by the impact of the financial crisis, and Poland due to its weak targets and unwillingness to develop any significant renewable energy capacity, France and the UK are obvious cases for comparison. Both are large states that face a significant adjustment to meet the requirements of the RED. They have also demonstrated a political willingness to implement long-term emissions and renewable energy targets.

Examining cases through process tracing

Given the historical focus of the case studies, process tracing methods are used to construct a detailed narrative of the implementation process in each country. Process tracing is "a procedure for identifying steps in a causal process leading to the outcome of a given dependent variable of a particular case in a particular historical context" (George and Bennett, 2005, p. 176). In the context of this thesis, it is used to test whether causal links exist between the historical development of state institutions, the creation of path dependencies and the capacity of France and the UK, to effectively implement the RED.

The process tracing analysis of the development of the RED combines detailed document analysis with elite interviews with policy-makers involved in the process. The document analysis begins with the development of the precursor to the RED, the Directive on Electricity Production from Renewable Energy Sources (RES), which was implemented in 2001. It traces the evolution of the EU's position through an

analysis of Green and White Papers released by the Commission, alongside reports from the relevant European Parliament Committees and the Council of Ministers, and speeches by key actors. A similar analysis is undertaken of the positions adopted by France and the UK using the equivalent documents from national institutions. This document analysis is supported by interviews with key actors involved in the development of the RED and the published first hand account of Claude Turmes (2017), the member of the European Parliament who acted as rapporteur for the Directive. Semi-structured interviews were conducted with current and former members of the three main bodies of the EU, the Commission, the European Parliament and the European Council as well as actors from France and the UK.

The use of interview data in qualitative research is constrained by practical factors such as time, cost and the availability of decision-makers, which in turn can amplify the potential of subjective interview data to bias research findings (Rathbun, 2008, pp. 686–7). Interview data can give disproportionate weight to certain perspectives depending on the availability of interviewees and the quality of their responses. These constraints influenced this research project, particularly given that negotiations over the RED were finalised a decade prior to the research taking place. A number of officials who participated in the development of the Directive are now either retired, or in very senior positions within various institutions and were therefore unable to participate in the research. However, these constraints are common to any project that utilises elite interviews as a data source and they can be mitigated if an in-depth analysis of secondary sources is applied (Berry, 2002, pp. 680–2). The document analysis is therefore the primary method for gathering data with the interviews used to clarify or confirm information and to support the findings.

The interview data is also utilised to support document analyses in Chapters 7 and 8, which analyse the implementation of the RED in France and the UK. These case study chapters provide an overview of energy policy since World War Two, followed by a more detailed examination of the evolution of renewable-specific policies since the 1990s. By comparing policy settings prior to the beginning of the RED period in 2009

with the requirements of the Directive and post-2009 policy, an understanding of the policy adjustment is further developed.

Chapter 4

The institutions of the state in France and the United Kingdom

This chapter tests the proposition that the differences in the structure and function of the state institutions relevant to the implementation of the RED in France and the UK are the result of long historical processes, and therefore deeply rooted and resistant to change. The chapter analyses these historical processes to understand how those state institutions were formed, the role they currently play, and the circumstances under which they might change.

The first part of the chapter examines the role of the state in France and the UK from a historical perspective. In the context of this thesis, ideology is conceptualised as an institution in itself, and one that shapes the state's role and influences the form and function of its formal institutions. The thesis contends that there is a dominant ideology evident in each state that is deeply rooted in historical experiences. Although there have been periods of ideological convergence between France and the UK, that dominant ideology has reasserted itself over time. In broad terms, the French state has been shaped by statism whereas various forms of economic liberalism have shaped the British state. To demonstrate this, the first part of the chapter will apply a historical analysis of the state's role in the two countries. It will begin with a brief analysis of the period between the Industrial Revolution and World War Two before focusing more specifically on the post-war period.

The second part of the chapter then examines the formal institutions of the state that are relevant to the implementation of the RED in both countries. It draws upon the analysis of Part I to understand how those institutions have been shaped by the

historically dominant ideology. Those institutions of the state are divided into three categories. The first is *politics and the distribution power*, encompassing voting systems, political parties, parliaments, and the allocation of powers. The second is *administrative traditions and structures in the civil service*; and the final category is *state investment and control of industry*. The succeeding chapter applies a similar, but more focussed, analytical approach to the electricity sectors in both countries.

Ideology and the role of the state

In the introduction to their edited volume on varieties of capitalism, Hall and Soskice (2001, p. 13) argue that an understanding of history is essential to an understanding of institutions:

> "[I]nstitutions of a nation's political economy are inextricably bound up with its history in two respects. On the one hand, they are created by actions, statutory or otherwise, that establish formal institutions and their operating procedures. On the other, repeated historical experience builds up a set of common expectations that allows the actors to coordinate effectively with each other. Among other things, this implies that the institutions central to the operation of the political economy should not be seen as entities that are created at one point in time and can then be assumed to operate effectively afterwards."

The varieties of capitalism literature draws heavily upon institutionalist literature (Hay, 2005; Martin, 2005) and will be utilised throughout the chapter to understand how historical processes have produced different types of institutions in France and the UK.

France and the UK share many similarities in terms of economic size, population, and a broad commitment to democratic principles. However, the histories of the two countries have also diverged at critical junctures, creating important differences in the state's role. France's political economy has been subject to major convulsions

over the centuries, caused by revolutions, wars and financial collapse. Although the UK has experienced its own crises since the Industrial Revolution, they were less frequent and less severe than those experienced by France (Rose, 1989, pp. 1–5). The French Revolution created more than a decade of instability; the Great Depression had a deeper economic impact on France than all other large Western economies (Garraty, 1973, pp. 938–41); and while Britain's economy continued to expand during the Second World War, France's economy contracted, leaving it in a more perilous position than it had been at the end of the First World War (Kuisel, 1981, p. 187). By contrast, the UK's relative geographic isolation, wealth and stable political institutions ensured that it was better insulated from the various turmoils that afflicted the Continent from the beginning of the Industrial Revolution to the end of World War Two (Gamble, 1994a, pp. 47–8; O'Rourke, 2006; Rose, 1989, pp. 40–1). These factors were conducive to the development of free trade and free enterprise in the UK – the central tenets of economic liberalism.

As the first nation to industrialise, Britain established a clear economic advantage over other European powers during the 18th and 19th Centuries. By 1860, the UK was between 40 and 60 years ahead of its neighbours and sought to exploit its position of strength by opening international markets, either by persuasion or force (Bairoch and Burke, 1989, p. 7; Gamble, 1994, p. 48). France had employed a very selective and centralised effort to promote certain industries even before the Industrial Revolution. In the late 17th century, Louis XIV's finance minister, Jean-Baptiste Colbert, created a doctrine that placed the economy in the service of the state and implemented a number of measures to protect French industry (Cole, 1939, p. 340).

In summarising the reasons that Britain gained an economic advantage over France during the 18th century Crouzet (2017, p. 174) describes the two economies as such:

> England was thus a country of *laissez-faire*, in which the field was left free for individual initiative. In France, on the other hand, the guilds survived and their members resisted the development of

> large-scale enterprises and the introduction of new techniques. Moreover, Colbertist regulations, by prescribing detailed standards of workmanship, discouraged innovations. And in England, such vestiges of corporate regulation and public control as did survive, as for example in the woollen industry, had precisely the effect of encouraging routinism.

Following the convulsions of the French Revolution, Napoleon took power in 1804 and implemented a large-scale, state-led modernisation program. Napoleon regarded economic prosperity as the solution to resolving the social tensions that had caused such division in the past, and placed the state at the centre of efforts to modernise the economy. Power was centralised in Paris and structures to facilitate cooperation between government departments, firms and worker groups were created. Public works were initiated, and the finance sector was reformed with the state supporting the creation of a commercial banks to provide loans to large-scale ventures (Evans and Godin, 2004, p. 54). According to Suleiman (1974, p. 13) "The structure of the modern French state owes more to Napoleon than any of his predecessors or successors".

The purpose of this brief summary of the British and French states during the Industrial Revolution is not to contribute to the already vast literature on industrialisation, but instead to demonstrate that the outlines of British economic liberalism and French statism were evident during the 18th and 19th centuries. These ideas and the economic structures have not remained static over the centuries and critical junctures such as war and economic shocks are recognised in institutionalist literature for their potential to bring about significant change (Capoccia, 2015; Capoccia and Kelemen, 2007; Olsen, 1996, pp. 252–3). Two such critical junctures – the twin shocks of the Great Depression and World War Two, and the economic crisis of the 1970s – had a particular impact on the state institutions relevant to this thesis and are analysed in the sections below.

More evolutionary adjustments have also occurred in response to changing governments, new ideas, economic circumstances and an array of other influences. Again, the potential for such shifts are also recognised by forms of new institutionalism that allow for a degree of agency, including the hybrid historical institutionalism adopted in this thesis (Nee, 1998, p. 1; Streeck and Thelen, 2005b, pp. 8–9). However, even during periods of convergence between France and the UK, important differences remained and the outlines of the economic philosophies that defined the two states in the 18th century were still evident. The liberal tradition waned in Britain with the decline of the once powerful Liberal Party beginning in the 1920s, but the economic tenets, if not the social ones, re-emerged strongly in the 1980s. Although the Conservative Party retained a strong element of statism well into the 1970s (King, 1973, pp. 306–9), they returned market principles to the centre of economic policy with the election of Margaret Thatcher in 1979. Milton Friedman once said of Thatcher that she was "not in terms of belief a Tory. She is a nineteenth-century Liberal" (in Leach, 1987, p. 157).

France too has retained many of the core elements of its 18th century economic philosophy. In fact, Colbertism was still cited as an influence on French industrial policy well into the 20th century, with comparisons drawn between the policies of the late 17th century and the *dirigiste* approach to economic development adopted following World War Two (Finon, 1996; Guery, 1989; Papon, 1975). The following sections will provide a more detailed examination of the post-war period, with an analysis of the key state institutions, as they exist today.

The successive shocks of the Great Depression and World War Two

The shock of World War Two wrought significant changes to domestic politics in France and the UK. Both countries had suffered immensely during the war, although it had a far greater impact on France than the UK. Whereas wartime production saw the British economy expand by over 10 per cent between 1939 and 1945, the size of the French economy halved over the same period (Maddison Project, 2018).

In the effort to re-build Western Europe after the war, and to avoid the policy mistakes of the Great Depression that included fiscal tightening and closed borders, a consensus formed around the ideas of Keynesianism (Ruggie, 1982; Williamson, 1983). In this respect, there was a convergence between France and the UK, although there were distinct differences in the application of Keynesian principles across the two countries.

As Fletcher (1987, p. 187) notes, policies are often uncritically described as 'Keynesian' and may actually bear little relationship to Keynes' actual economic theories. Even where Keynesianism has had a clear influence, different countries applied different principles at different times (Weir, 1989, pp. 53–4). This was certainly the case with France and the UK. Whether these differences were the result of the differing institutional structures of the state, or the ability of political actors to form effective coalitions of different societal groups, has been the subject of considerable debate (Hall, 1989, pp. 11–13). It is a debate worth reviewing as it has important parallels to this thesis.

In comparing the adoption of Keynesian principles as a response to the Great Depression in the United States, Britain, Germany, France and Sweden, Gourevitch (1984) argues that building coalitions of support was the key to successfully adopting Keynesian principles. Policy-makers in the United States, Sweden and Germany were able to mobilize support across industry, agriculture and labour to overcome orthodox economic thinking and to implement countercyclical policies. This actor-centred approach was challenged by Weir and Skocpal (1985) in a similar study of the United States, Sweden and Britain. They argued that state structures and policy legacies actually determined the response to the Depression by essentially shaping the political orientation of actors and then determining whether new ideas (i.e. Keynesian theories) were able to reach policy makers (1985, p. 109). Through the adoption of a hybrid historical institutionalism, this thesis aims to build a bridge between these two perspectives by acknowledging that actors possess a degree of autonomy outside of institutions, but also arguing that the possible range of

responses is limited by existing institutional structures, particularly when the dominant ideology is considered as an institution.

The Gourevitch and Weir-Skocpal studies agree that in the pre-war period of the 1930s, the United States and Sweden were able to mitigate the worst effects of the Depression through the application of Keynesian principles. The UK and France were less successful, although the latter was absent from Weir and Skocpal's work. The common denominator in all cases, with the possible exception of France, was the role of the state. In the countries where the state had played an active role in the management of the economy, Keynesian ideas were implemented prior to the war. Where the state had a weaker role, specifically in the UK, there was strong resistance to an economic theory that required the state to stimulate demand to counter economic cycles. It was what Gourevitch (1984, p. 121) describes as a "cultural hegemony of economic orthodoxy in the first nation to have industrialised".

The correlation between countries where the state played an important role in managing the economy and the successful implementation of Keynesian policies may be counterintuitive given that the United States is regarded as a success whereas France was a failure. However, the United States applied highly interventionist economic policies, including strong infant industry protections, throughout the 19th century and the first half of the 20th century, and only embraced economic liberalism following World War Two (Shafaeddin, 1998, pp. 13–4). Bairoch and Burke (1989, p. 30) describe the United States during the 19th century as the "mother country and the bastion of modern protectionism". It is not, therefore, surprising that the state possessed the capacity to stimulate the economy through large-scale public works programs as a response the Great Depression.

Of the five countries included in the Gourevitch and Weir-Skocpal studies, France was a unique case in that it was slow to adopt Keynesian principles despite its statist traditions. However there were several mitigating factors that mean that France's experience does not invalidate the correlation between Keynesianism and state control of the economy. First, Keynes' work was not widely known in France prior to

World War Two. His major work, *General Theory of Employment, Interest and Money*, was not translated into French until 1942, and his previous works were not widely circulated (Rosanvallon, 1989, pp. 172–3). However, Keynes' ideas were not dissimilar to France's statist traditions (Rosanvallon, 1989, p. 177), so the question as to why the state did not intervene to stimulate the economy remains relevant.

France's statist traditions had weakened in the first half of the 20th century as economic liberalism increasingly influenced policy, even amongst governments of the centre-left (Bopp, 1946, p. 308). Second, the effects of the Great Depression were felt much later in France than they were in other industrialised economies. A combination of public expenditure and the devaluation of the franc in 1929 meant that industrial production continued to rise in France even as the UK and the United States plunged into crisis (Sauvy, 1969, p. 22). René Duchemin, the head of the national employers federation, argued in 1931 that France's slower development relative to the United States and Germany proved "that French methods, often middling but always prudent, are best and reflect the people's genius" (in Kuisel, 1981, p. 93). Nevertheless, by 1935, industrial production was in sharp decline and unemployment was rising. The Popular Front was elected in 1936 under socialist Léon Blum, and a series of reforms that included state-supervised collective bargaining, large wage increases and a 40-hour week were implemented (Garraty, 1973, p. 939). However, these reforms were regarded by the leftist government as a re-statement of French statist traditions rather than the application of new Keynesian thinking (Rosanvallon, 1989, pp. 171–7).

Following the initial reforms, the Popular Front adopted a more cautious approach, with Blum urging workers to exercise "moderation and restraint" in an effort to placate France's industrial interests (Garraty, 1973, p. 941). That such an attempt at finding a compromise between the left and the right failed was indicative of the fractious politics under the Third Republic (1870-1940), which was characterised by a series of short-lived governments. After losing power in June 1937, Blum returned to power in March of 1938, this time under the influence of economic aide, Georges Boris, who had written a study of Roosevelt's New Deal and was one of the few

French economists familiar with Keynes' work (Garraty, 1973, p. 941). Blum proposed another series of reforms based on the experience of the United States, but when they were rejected by the Senate, he resigned and was replaced by the centre-left Édouard Daladier. Between 1936 and 1939, successive governments did take a more active role in the economy with the railroads, the Bank of France and Air France all nationalised. However, these interventions were made on an ad hoc basis and according to Jules Moch (1953, p. 98), a socialist minister in the post-war government, "there was no coordinating plan in these changes". Keynesianism therefore failed to take root in the one European nation where it may have been expected to gain the most traction, but the slow onset of the Depression, the influence of liberalism on the right of politics, and a failure to regard Keynesianism as anything other than a re-statement of existing principles on the left, meant that it had little influence on French policy in the 1930s. These specific mitigating factors ensure that Weir and Skocpal's thesis that there was a correlation between the adoption of Keynesian principles and existing ideologies remains valid. This is an important point for the thesis as it demonstrates that existing ideologies influence the absorption of new ideas.

A second relevant point also emerges from the analysis of the response to the Great Depression. The fact that the absorption of Keynesianism in France was slowed, in part, because of the influence of economic liberalism demonstrates that ideologies are not static. However, as Rosanvallon (1989, p. 171) notes, "France is the country in which the penetration of Keynesian doctrine took place most slowly, but its ultimate triumph was perhaps more complete there than virtually anywhere else". The influence of Keynesianism in France following the war and its manifestation in a new form of statism is examined in the section below, but this does demonstrate that while there are shifts in ideology over time, its roots are deep and countries tend to return to a dominant ideology over time. This point will be explored further throughout the remainder of this chapter.

The political dynamic in France changed dramatically as a result of World War Two. According to Rosanvallon (1989, p. 186) the war "represented a cultural break: the

ordeal of the war transformed the view French society took of the state". The liberal economic policies of the pre-war period had been discredited and a new generation of leaders emerged from the resistance movement with an ambition to restore France's economic prestige. Amongst the new leaders, there was a clear consensus that major structural reform and modernisation of the economy was required, although the particular methods were the subject of considerable debate (Kuisel, 1981, pp. 157–86). While the economic liberalism of the pre-war period had been discredited, the role of the state was not immediately clear. There was a strong leftist faction advocating strongly for a socialist model, but the provisional post-war government under Charles de Gaulle forged a middle path between liberalism and socialism that would be variously described as *dirigisme, étatisme* or *colbertisme* (Kuisel, 1981, p. 187; Levy, 2015, p. 393).

The state took control of coal, gas, and electricity production, along with much of the transport (rail and airlines), banking and insurance sectors (Kuisel, 1981, p. 202). A number of institutions that would cement the role of the state in the economy were also created. The Ecole Nationale d'Administration (ENA) was created in 1945 to centralise the education of future public servants, the Commissariat du Général Plan was established to coordinate industrial development through a series of five-year plans with the Institut National de la Statistique et des Études Économiques (INSEE) designed to collate economic data in support of the Commissariat (Hall, 1986, p. 140).

World War Two also proved to be a critical juncture in the history of the British state, which also developed a more statist and technocratic approach to managing the economy in the post-war period. The war effort had required significant state control over the economy and the apparatus and personnel managing that control were largely retained after the war (Tomlinson, 1994, pp. 162–3). This coincided with a shift to the left amongst the electorate, leading to the election of the first majority Labour Government in 1945 (Foster, 1993, p. 23). Like France, a program of nationalisations was implemented, and the welfare system was strengthened, with

the creation of the National Health Service (NHS) the shining example of the UK's new priorities (Webster, 2002, p. 1)

The change in the UK's economic priorities was apparent in the negotiations on what would become the international post-war settlement. U.S. officials were particularly focused on ensuring an open international trading regime, whereas the British were more concerned with full employment and economic stability (Ikenberry, 1992, pp. 289–91). At the domestic level, Conservative opposition to Labour's economic program softened and a consensus formed between the major parties around a number of key principles including the maintenance of the welfare state; the goal of maintaining full employment; the existence of a mixed economy where state-owned and private firms played roles in the economy; and the participation of unions through consultation (Pugh, 2008, p. 276; Ramsden, 1980, pp. 110–1; Saville, 1993, p. 38). In the 1960s, there was also a growing interest in French planning methods as the Government sought to develop 'national champions' in a number of key industries (Brittan, 1964, p. 207).

Although there was a degree of convergence between France and the UK around Keynesian ideas, France established a much stronger role for the state (Rosanvallon, 1989, p. 171) The British state also began withdrawing from the economy much earlier than the French. Although it continued to provide financial support for key industries, levels of trade protection were being lowered from the early 1950s (Tomlinson, 1994, pp. 221–4).

Gerschenkron (1962) makes the point that France's statism was a necessary response to its weaker economic position relative to other industrialised countries. In order to close the gap, the state was required to appropriate and distribute resources centrally. This applies as much to the Industrial Revolution as it does to the post-war period. France had already lagged behind Britain on nearly every economic measure from the beginning of the Industrial Revolution and by the beginning of the 20th century it had also been surpassed by Germany (Crafts, 1984). The humiliation of the Second World War had compounded France's sense of

economic failure, and the dominance of the United States was quickly identified as a new economic threat in the post-war period, even as it supplied the financial means for the French recovery (Levy, 2015, p. 396; Servan-Schreiber, 1968).

However, while the economic conditions to support Gerschenkron's argument existed, they can only provide a partial explanation for France's adoption of such a strong statist approach. The other important element was a statist tradition to call upon (Hayward, 2017; Levy, 2015). In their examination of the Europeanization of nation state identities Marcussen et al. (1999, p. 614) argue that "any new idea about political order, in order to be considered legitimate, must resonate with core elements of older visions of the political order such as 'state-centred republicanism' in France, [and] 'parliamentary democracy and external sovereignty' in Great Britain." Although used in a different context to this thesis, the argument applies equally to the ideology that shapes the role of the state. The Second World War was a critical juncture for both France and the UK but the existence of a strong statist tradition in France, combined with its dire economic situation, provided for a much deeper role for the state in managing the economy.

Faltering economies of the 1970s and the response of the state

The Keynesian consensus in France and the UK was aided by a period of steady economic growth, which resulted in full employment, growing wages and rising standards of living. Relative to France, the UK's recovery from the war was slower and less consistent, although France was starting from a much lower base. During the 1950s and 1960s the UK's average rate of growth was 2.2 per cent, compared to France where, in the midst of *les trente glorieuses,* it was 4.6 per cent (Pugh, 2008, pp. 276–80).

By the early 1970s, the UK was no longer a bastion of economic liberalism and in terms of state ownership and welfare spending, it had more in common with Germany and France than it did with the United States (King, 1973, pp. 291–302). There remained an ideological divide between the Labour Party and the

Conservative Party over state ownership with the Conservatives maintaining their position that private enterprise was superior to state control, but in practical terms the divide was not nearly as significant. When in government between 1951 and 1964, the Conservatives did not reverse the vast nationalisation program implemented by the previous Labour Government or the key welfare measures such as the NHS (Page, 2011, pp. 25–9).

However, the post-war consensus in the UK had been buttressed by the strong economy, but it began to fray in the late 1960s as inflation and unemployment trends turned negative. In the lead up to the 1970 election, the Conservative Party adopted a number of economically liberal policy positions, including commitments to avoid wage and price caps, reduce taxation and public expenditure and minimise the role of trade unions. The Conservatives won power, but the program was largely abandoned within two years as a recession in 1971 and the near collapse of several large firms saw the Government return to Keynesian reflation of the economy in its budget of 1972 (Fry, 2004, pp. 225–6; Wass, 2008, pp. 36–7). The Oil Shock of 1973 sent an already fragile economy into a full-blown stagflation crisis with the country falling into recession in 1974 and inflation rising to 25 per cent in 1975 (World Bank, 2018). The economic downturn brought the ideological divisions between the two major parties to the surface and ultimately brought an end to the post-war consensus (Childs, 2006, pp. 173–5).

When the Labour Government came to power after winning the February 1974 election, it and adopted a Keynesian approach to economic policy with the aim of stimulating growth and maintaining income levels rather than addressing inflation (Burk and Cairncross, 1992, pp. 13–4). However, the crisis deepened as attempts to control inflation through public sector wage caps led to mass strikes, and the value of the pound continued to slide despite government intervention (Hickson, 2005, pp. 47–114). In December 1976, the Government was forced to accept a conditional loan from the IMF, which was followed by a brief recovery as the Government implemented a series of deflationary measures to stabilise the economy (Rogers, 2009, pp. 982–8; Wass, 2008, pp. 307–58). However, the ‘winter of discontent’ in

1978-79, where the effects of particularly cold winter were exacerbated by disruptions to public services, saw a significant shift in public support away from the Labour Government and created the conditions for a landslide victory for Margaret Thatcher's Conservative Party in 1979 (Fry, 2004, pp. 230–6).

If the post-war consensus had been damaged in the 1970s, it was completely dismantled under Margaret Thatcher's Government. There was a significant shift toward a market-oriented economy with the curtailment of union power, the privatisation of state-owned firms and the deregulation of labour and financial markets. According to MacLean (2006, p. 198) the national strategy was "to promote labour and capital market flexibility and to offer UK and overseas companies a free hand in making investment decisions." It was essentially a withdrawal of the state and a transfer of power to the private sector.

The response to the economic problems of the 1970s was no less radical in France. Rather than a neoliberal, market-driven agenda, however, France implemented *la grande alternance* – a series of reforms implemented by the Socialist Government of François Mitterrand that included nationalisations of major firms, a reduction in working hours, and increases in annual leave, the minimum wage and welfare payments (Evans and Godin, 2004, p. 182). Those reforms soon came into serious question, however, as both the trade and budget deficits ballooned, ultimately forcing the Government into a policy 'U-turn'.

The policies of Thatcher and Mitterrand were seemingly radical at the time, but they drew upon ideologies that had been deeply embedded in the political economy of the two countries since the 18th century. Even the U-turn that followed *la grande alternance* in France occurred within this framework. The Gaullist parties on the centre-right were very vocal in their criticisms of the Socialist Government in the early 1980s, focussing on what they saw as the excesses of the Socialist Government, but not the broader practice of the government intervening in the economy (Hanley, 2001, pp. 307–10). The Socialist Party accepted the constraints imposed by the international economy and softened its *dirigiste* economics, but declared that its

socialist objectives would still be pursued through regulation and the entrenchment of citizens' rights (Hanley, 2001, pp. 304–5).

In the UK, the ideology of the Thatcher era was only partially reversed by the Labour Government that gained power in 1997. Labour began to abandon its traditional statist positions following defeat at the 1987 election and by the time it reached power a decade later, it continued the transformation of the UK from what Cerny and Evans (2004, pp. 51–5) describe as an industrial welfare state to a competition state, defined earlier by Cerny (1997, p. 251) as a "quasi-enterprise association" seeking to promote competitiveness and marketization in response to globalisation. The UK has therefore embraced globalisation as a process of neoliberal orthodoxy that aligns with traditional role of the state in the UK. However, globalisation, together with the neoliberal aspects of Europeanization, have posed a greater challenge in France where questions about their impact on state power have been repeated since 1981 (Culpepper et al., 2006; Meunier, 2000; Sapir, 2006; Smith, 2004).

Globalisation points to a type of institutional change that is not triggered by an external shock, or critical juncture. Instead, an exogenous force imposes constraints upon state action, potentially creating a mismatch between the traditional role of the state and its ability to implement policies consistent with that role. Levy (2017) argues that French governments no longer have the ability to intervene in the economy in any meaningful due to the fact that the institutional structure that allowed for state coordination of the economy had been diluted since Mitterrand's U-turn of 1983. However, while the forces of globalisation and Europeanization have undoubtedly had an impact on France, they have been filtered through the existing institutional framework rather than changing that framework fundamentally. They have also impacted different sectors of the economy unevenly. The section below on state investment and control highlights how the state has maintained control over important sectors of the economy and the following chapter demonstrates that France has resisted the EU's liberalisation measures in the electricity sector. Some recent political history is also illustrative.

When Nicolas Sarkozy came to the French Presidency in 2007, he promised market-based reforms including lower taxation, labour market flexibility, and a rationalisation of public expenditure (OECD, 2012a, p. 17). However, when the global financial crisis hit in 2008, there was an abrupt shift in rhetoric with Sarkozy demonstrating a willingness to intervene that seemed closer to traditional French regulatory practice than economic liberalism (Jabko and Massoc, 2012, pp. 563–3). *Laissez-faire* capitalism was blamed for the crisis and Sarkozy made a number of interventions as part of a €26 billion stimulus package that focussed primarily on French industry. The banking and automotive sectors were rescued through various measures and the energy sector was also given support. In return, the Government announced that it would provide greater oversight of any firm that it had a share in and pushed for specific concessions including a promise from energy giant, Total, that it would keep five refineries open for five years, and disallowing French car manufacturers from making cars for the French market in foreign plants (Economist, 2010). It was an approach described as *neo-dirigisme*, which is a form of policy that does not involve nationalisation or protectionism, but rather the temporary re-regulation of the economy and strategic state investment in industry to promote development and job creation (Leruth, 2017, p. 75).

It is clear that the role of the state in France and the UK has shifted in response to both critical junctures, such as the economic crisis of the 1970s, and more subtle exogenous pressures such as globalisation. However in both instances France and the UK adopted positions that were consistent with the traditional role of the state. It is therefore evident that the ideologies that shape the state's role have deep roots and have continued to influence the structure and function of institutions.

Part II of the chapter will delve deeper into the specific institutions of the state to understand the extent to which those ideologies persist and the influence they have had on their structure and function.

Part II – The Institutions of the State

As the state returned to the centre of comparative political studies in the 1970s and 1980s (see Chapter 2), several influential works identified a distinction between strong and weak states, with France being an example of the former, and the UK an example of the latter (Katzenstein, 1978; Krasner, 1978; Wilks and Dyson, 1983). As a strong state, France was characterised by powerful state institutions that exercised a high degree of autonomy. Zysman (1977, p. 194) describes it as "an instrument of centralizing power, created apart from society, almost in opposition to it, and thus at least partially autonomous". The UK, on the other hand, was characterised by weak state institutions with a de-centralised bureaucracy and independent industry meaning that non-state actors had a much greater influence over policy-making.

The analysis of the role played by the state above demonstrates that this dichotomy is still broadly true with the French state being more influential in shaping social and economic conditions than its UK counterpart. However, the strong state-weak state hypothesis has been criticised on two levels. First, it cannot be assumed that the state is a single unit, rather it is comprised of a number of institutions that may have differing influence and priorities, which can create internal divisions (Hall, 1994, p. 7). Second, these internal divisions differ across sectors of the economy; therefore it is necessary to apply meso-level analyses to understand state authority in specific contexts (Atkinson and Coleman, 1989, pp. 47–9). The remainder of this chapter will focus on the first critique, analysing state institutions at a macro-level to understand their relationship to each other and their influence in the policy process while the following chapter will examine the institutions of the electricity sector specifically.

Politics and power: Policy styles, political parties, and the distribution of power

Lijphart (2012, pp. 1–4) argues that policy styles are determined by whether states have majoritarian or consensual political systems. France and the UK both have majoritarian systems, and are, in fact, the only two member states that do not use a form of proportional voting for the main chamber of the national legislature (ACE

Electoral Knowledge Network, 2017). France's semi-presidential system has produced periods of cohabitation where the President and Prime Minister come from different parties, but this outcome is now less likely since Presidential terms were shortened in 2000 to match legislative terms, and elections for the latter were set to always occur within a month of the former (Sauger, 2017, p. 316).

Majoritarian systems differ from consensual systems, such as Germany's, that disperse power and are more likely to produce coalition governments (Lijphart, 2012, pp. 9–45). Majoritarian systems also tend toward two-party systems with broader ideological coalitions than consensual systems where multiple parties form on the left and right depending on their priorities (Rose, 1989, p. 271).

Rokkan (1999, pp. 280–340) suggests that political parties form along cleavage lines that differ between countries. For example, cleavages might exist along the centre (city) and the periphery (regions); the church and the state; or capital and labour. Consensual systems allow for multiple cleavages and therefore multiple political parties whereas majoritarian systems tend to divide along a single cleavage. These cleavages have deep historical roots and once formed, they tend to 'freeze', as they have in the UK where the Conservative or Labour Parties have dominated politics since World War Two. However, Rokkan notes that France is an exception to the 'freeze' thesis. Daalder (2001, p. 44) traces this back to the French Revolution which "created persistent divisions in French political development, burdening the legitimacy of successive regimes, complicating the formation of strong nationwide political parties and leading to alternative *rassemblements*, plebiscitary adventure, and repeated institutional tinkering rather than stable party politics". As a consequence, party traditions in France are less stable, and splits and the emergence of new parties are not uncommon (Haegel, 2017, p. 379; Sauger, 2009). The emergence of Emmanuel Macron under the self-created *En Marche* banner is a clear demonstration the fluidity of French party politics. However, since World War Two, government has normally been controlled by a single party that can be broadly labelled as left or right, with periods of cohabitation the exception rather than the rule.

In theory, a majoritarian, two-party system offers less policy stability across electoral cycles and greater scope for radical change (Wood, 2001, pp. 255–6). Political parties in the UK and France therefore possess significant potential to enact radical social and economic change and the previous section noted times when that potential has been realised. In the UK, the sharp turn toward Keynesianism, including the wide-ranging program of nationalisations, came after the election of the first majority Labour Government in 1945, and the sharp turn toward neo-liberalism came after the Conservative defeat of the Labour Government in 1979.

Both countries therefore possess strong executives with political parties having considerable scope to implement their policies (V. Schmidt, 1996, pp. 21–2). Any account of state institutions in France and the UK must therefore allow for a degree of agency, acknowledging that ideas, as expressed through political parties and then projected through government, can alter the trajectory of social and economic systems. Part I of this chapter demonstrated that critical junctures provide particularly fertile ground for the implementation of new ideas, but it also highlighted how pervasive long-standing ideologies about the role of the state have been over time. Despite some abrupt shifts following critical junctures, both the UK and France have tended toward long standing traditions in terms of the state's role in society. The role of the state is therefore a normative constraint, but it is also reflected in more formal institutions, specifically the civil service and the state's relationship with industry, which may further constrain executive power.

This is particularly evident in what Hayward (1982) identifies as France's 'dual policy style', which is characterised by 'heroic' and 'humdrum' policy making. The former involves complex planning, long-term timeframes and often large-scale infrastructure and demonstrates France's "*capacity* for policy initiative, a *potential* for far-sighted planning and a *propensity* to impose its will when this is necessary to obtain public objectives" (1982, p. 116). The deployment of nuclear power, which is analysed in the following chapter, is identified as a prime example of 'heroic' policy making. The 'humdrum' style is the more mundane, day-to-day administration that is

largely carried out by the civil service, working closely with large industrial actors. The two policy styles are not mutually exclusive, particularly in the case of 'heroic' policy-making, as a failure to align the two styles will result in policy failure. Hayward gives the example of a proposed waterway between the Rhine and Rhône rivers, which was eventually abandoned and notes that the key difference between the nuclear program and the waterway proposal was the lack of support from key administrative and industrial actors. This points to the fact that state power in France does not reside with the executive alone but is dispersed between a highly autonomous civil service and powerful industrial interests. The origins of this power dynamic and whether it remains today will be explored in the following two sections.

Administrative traditions and the structure of the civil service

The larger role played by the state in France relative to the UK is reflected in the size of the civil service in both countries with nearly four times as many civil servants employed in France (Ministere de l'Action et des Comptes Publics, 2017; Office for National Statistics, 2017). Much like the role of the state, the structure and function of the bureaucracies in the UK and France have long histories. Peters (2008) and Silberman (1993, pp. 120–58) argue that the structure and administrative procedures of the French civil service are rooted in the 'Napoleonic tradition', which promoted centralisation, detailed laws and codes, and technical and legal specialisation amongst its administrators. Lowe (2011) also traces the history of the British civil service from the second half of the 19th century, arguing that it has undergone a process of evolution rather than being subject to any radical change. Those claims are consistent with the central proposition of this thesis and are tested below through an analysis of the French and British civil services in the period from the end of World War Two.

The most significant development in French public administration following the war was the creation of the ENA in 1945, which centralised the recruitment and training of an elite corps of public servants (Levy, 2015, p. 396). The school was modelled on the *grand écoles*, most of which had been created to train military engineers.

Utilising this model was deliberate and it embedded several cultural elements that would influence the French public service in the decades following the war (Bezes and Lodge, 2007, p. 125). The first was to understand policy-making as a technical process rather than a political one, where the only barrier to problem resolution was a lack of information or expertise (Hall, 1986, pp. 176–8). The second was to reinforce a formal hierarchy where written rules and rank were adhered to strictly (Crozier, 1964, pp. 214–6). The third was to strengthen an existing sense of elitism amongst public servants. The bureaucracy was seen to sit above politics and market forces, defending the public interest, or as Schubert (1961, p. 93) described it: "defending the castle against a horde of savage, ruthless mercenaries of selfish interests".

The elitism of the French civil service gives it a degree of autonomy and assertiveness not found in its British counterpart (Hayward, 1986, p. xiii) – a feature that will be explored more fully in the following chapter. The French civil service had grown in strength under the Fourth Republic (1946-1958), as constant division weakened the executive and the parliament. When the Fourth Republic collapsed and was replaced by a constitution that gave greater authority to the president, the civil service retained its influence in the policy-making process (Hatch, 1986, p. 152).

The civil service in the UK tends to be more generalist than its French counterpart and is more likely to draw upon outside expertise. Consultation with industry was a built-in feature of the British civil service from the end of the war with a number of bodies established to formalise channels of communication. If economic planning was necessary for the reconstruction of Britain, then it was argued that consultation would differentiate British planning from the type employed by authoritarian states (Tomlinson, 1994, p. 163).

Industry contacts also grew to become a feature of the French bureaucracy in the 1960s. However, this shift from being almost entirely autonomous to welcoming the views of other economic actors occurred within the existing elite framework. Relationships with senior managers in the corporate sector were justified on the

basis that outside expertise would only enhance the policy-making process, thus it remained consistent with the prevailing ethos of policy making as a technical process (Hall, 1986, pp. 176–7). Given the considerable control the state retained over many of the largest firms, the circle of expert advice also remained very small. It was also very common for graduates of ENA to complete a mandatory period of public service before assuming senior roles amongst the leading French firms, or taking roles as political advisors (Birnbaum, 1982). State ownership, the dominance of single firms in each sector and the close relationship between senior civil servants and managers formed the basis of France's meso-corporatism, which is analysed in the following section.

The structure and function of the French civil service remained largely unchanged between 1945 and 2000 (Bezes and Jeannot, 2011, p. 192). However, the period since 2000 has been marked by a series of reforms with three particular trends worth noting. First there has been an increase in the 'agencification' of the French bureaucracy with the creation of a number of autonomous bodies in areas such as health, food, energy and research (Bezes, 2017, pp. 260–1). The purpose has been to de-politicise the bureaucracy, and it is particularly relevant for the implementation of the RED. Both the UK and France have created advisory bodies to guide climate and energy policy – the Committee on Climate Change (CCC) in the UK, and the High Council for Climate (HCC) in France – with the purpose of providing science-based advice, free from political interference (Lockwood et al., 2017, p. 318). Their precise roles and their influence on policy will be examined in Chapter 5.

The second trend has been the use of external consultants in the policy-making process. Since 1945, expertise has largely been drawn from a small circle of elites within the bureaucracy and amongst the leaders of France's largest firms, but over the past two decades there has been an increasing level of contact with consultancy firms, think tanks and universities (Berribi-Hoffmann and Grémion, 2009, pp. 50–9). This trend has coincided with a third trend, identified by Bezes (2017, p. 256) as a move toward "performance-based government". Mirroring the practices of the British civil service, the French bureaucracy has been increasingly subject to

performance indicators and efficiency dividends, reflecting an increasing neo-liberal influence on the French state (Bruno, 2013; Eyraud, 2013; Hibou, 2012).

There have been two periods of reform in Britain, the first following the Fulton Committee report in 1968, and the second toward the end of the Thatcher era. The Fulton Committee was formed at a time when the first signs emerged that the post-war consensus was beginning to fray and the central role of the state was being questioned. In opposition, the Conservative Party had already proposed that business principles should be introduced to the civil service to increase efficiency (Fry, 1995, p. 5). Despite the profile of the Fulton Committee, its recommendations were limited to a number initiatives that sought to reinforce rather than reform the structure of the civil service (Fry, 1981; Lowe, 2011). One example was the creation of the Civil Service College, which was to provide training for civil servants. An initial proposal was to model the College on the French ENA, but ultimately it was established with a much narrower remit to train existing civil servants, and once established, the quality of its programs were poorly regarded (Lowe, 2011, pp. 312–8).

Lowe (2011, p. 11) attributes the failure of British reforms in the 1960s and 1970s to "continuing confusion, both within Parliament and amongst the public about the proper role – and thus size – of government". That confusion was due in large part to an ideological division within the Conservative Party. Whereas the Labour Party was supportive of the traditional role of the civil service, there was a conflict within the Conservative Party between statist elements and economic liberals. The internal debate went unresolved during the Heath Government from 1970 and 1974, but the question was resolved decisively in the favour of the economic liberals once Margaret Thatcher became Prime Minister in 1979 (Fry, 1995, pp. 5–35). Between 1979 and 1992 there was a 24 per cent decline in the number of civil servants, reflecting the Conservative Government's objective to reduce the size of the state (Rhodes, 1994, p. 140).

Rhodes (1994, pp. 138–9) argues that the combined effects of privatisation, the loss of function to agencies and the limiting of public servant autonomy through an emphasis on managerial accountability and greater political control all served to hollow out the state in the UK. As was the case with Thatcher's economic program, very little changed with the election of the Labour Government in 1997, leaving the civil service with a much reduced capacity to govern markets and implement large-scale programs (Lowe, 2011, p. 1). One change that did occur under the Blair Labour Government was an increase in the use of special advisors, which assumed many tasks normally executed by senior civil servants. This had the effect of increasing the politicisation of the civil service (Van der Meer et al., 2007, p. 43).

The bureaucracies of France and the UK have reflected the role of the state in the two countries since World War Two. Reforms in the UK are a continuation of a long-term trend toward the shrinking of the state and therefore consistent with the dominant ideology of economic liberalism, which preferences private interests over public administration. French reforms have introduced a number of practices that mirror those of the UK civil service, including the creation of independent agencies, the use of outside consultants and greater accountability for civil servants. However, French reforms never matched the depth of those in the UK, and France's civil service remains highly centralised, hierarchical and still draws heavily upon the elite *écoles* for staff (Baron, 2013, p. 108; Bezes and Lodge, 2007, pp. 124–8).

State ownership, investment and control

Hayward's thesis about 'dual policy styles' identifies the autonomy of the civil service and the power of industrial interests as constraints on the authority of the executive in France. The previous section demonstrated that despite reforms to the French civil service, its deeply rooted structures and traditions ensure that it has largely retained that autonomy. This section now evaluates the state's relationship with industrial interests, comparing it with the UK's approach to state ownership, investment and control.

In the varieties of capitalism (VoC) literature, France is categorised as a coordinated market economy (CME), similar to Germany. However, corporate interests are more consolidated in France, therefore it is better described as a meso-corporatist system (Cawson et al., 1987). Muller and Saez (1985) identify the key feature of this *corporatisme à la française* as the close relationship between a specialised segment of the administration and a monopolised corporation that is normally owned by the state. Poppe and Cauret (1997, p. 214) identified EDF as a prime example of the meso-corporatist system, arguing that the company was an extension of the state and that the interests of the two were indistinguishable. However, Poppe and Cauret were writing in the 1990s, therefore it is necessary to consider whether the meso-corporatist structure still exists, particularly given the influence of globalisation and Europeanization on the relationship between the state and markets.

Strange (1996) wrote one of the most influential works on states and markets, arguing that markets limit the ability of the state to make strategic policy. States are opposed to markets and as the importance of the latter increases the former will continue to decline. Hyperglobalists such as Ohmae (2005) take the argument further arguing that the increase in trade and the free movement of information and capital will eventually render the state obsolete. This view is rejected by several authors who argue that although the globalisation may have altered the role of the state, it retains a pivotal role in economic governance (Hirst et al., 2009, pp. 256–7). Mann (1997, p. 479) argued that although states may have lost some power in recent decades "the nation-state clearly does systematically structure many economic networks. The ownership, assets and R&D of 'multinational' corporations (including banks, mutuals and insurance firms) remain disproportionately in their 'home' state, and they still lean on it for human capital, communications infrastructures and economic protectionism". As long as firms remain rent-seekers, as Bourdet (1988) claims, they will continue to have a bias toward their home state and thus ensure that nation states continue to play an important role.

Schwartz (2010, p. 1) notes the broader role that the state plays in shaping markets, arguing that there is a symbiosis between the two. States "selectively create and

enforce property rights that maintain markets; property rights sustain the accumulation of capital and growth incomes that create the regular and substantial sources of revenues which sustain states". The state's role may have changed from one of direct control, but it still plays a crucial role in shaping markets through regulation, and shaping firm behaviour through coordination and strategic investment of public money. Finally, the institutional structure of the state influences the structure of the economy. Hall and Soskice (2001, p. 9) note that "In any national economy, firms will gravitate toward the mode of coordination for which there is institutional support". There are, therefore, multiple ways in which the state controls, or at least influences markets, even where direct control has been eroded through processes of globalisation.

Again, the debate is more prevalent in France where the traditional role of the state is seen to be threatened by globalisation and Europeanization whereas the UK is seen to be the archetypal globalised state (Sapir, 2006, p. 381), although Smith (2004, p. xi) argues that the debate is given additional prominence in France because it offers a convenient excuse for the country's poor economic performance since the 1980s. However, the evidence outlined below makes clear that the French state has much greater influence over firms and markets than the British state, and that despite a significant reduction in France's direct control over firms, the core elements of the meso-corporatist system have been retained.

Beginning with direct control, or state ownership, there is a significant difference between the UK and France. There are 16 majority-state-owned or statutory corporations in the UK compared to 51 in France. The discrepancy is even higher if companies where that state has a minority share are included, or the definition of 'state-owned' is broadened to include regional and municipal ownership. State-owned firms in the UK, including those with minority state-ownership, employ less than 0.5 per cent of the workforce compared to nearly 7 per cent in France (OECD, 2018a, 2017).

The UK privatised nearly all of its state-owned enterprises under the Conservative Government between 1979 from and 1997. There were few privatisation under the Labour Government that followed, but that owed more to the fact that most assets had been privatised rather than any ideological opposition (Robinson, 2003, p. 42). In France, a number of companies that were nationalised in the early 1980s were quickly returned to private ownership in the mid-1980s. A second series of privatisations then took place when Jacques Chirac assumed the Presidency in 1995. However, while the state lost direct control, the privatisation program kept the large strategic firms in the hands of a corporate elite with close connections to the state (Hancké, 2001, pp. 307–14).

Public ownership is the most obvious form of state control, but in what Hall and Soskice (2001, p. 8) label coordinated market economies (CMEs), control can manifest itself through the facilitation of cooperation between firms. CMEs are characterised by non-market relationships, which may take the form of interlocking shareholdings, cooperative relationships between suppliers and customers or joint research programs. The corporatist German system is the exemplar of the CME approach, and Hall and Soskice have been criticised for including France under the same label as it lacks the decentralised coordination of firms of varying sizes that characterises Germany (Culpepper et al., 2006, p. 30). However, France's shift from a state-coordinated economy to an elite-coordinated economy has created cooperative networks amongst France's largest firms. The state is at the centre of formal networks, but informal networks - formed as graduates of the ENA cycle through the senior ranks of government, the bureaucracy and corporations - also ensures the perpetuation of a statist corporate culture (Hancké, 2001, pp. 312–4).

Franks and Mayer (2005, pp. 30–45) offer a slightly different conceptualisation of corporate governance in the UK and France, describing the former as an 'outsider' system and the latter as an 'insider' system. The 'outsider' system is characterised by a large number of publicly listed companies, dispersed ownership and well-established takeover markets. This compares to 'insider' systems where ownership is far more concentrated and finance is more likely to be sourced from banks, internal

reserves or the state. To illustrate this point, Franks and Mayer (2017, p. 31) analyse the non-financial, publicly traded firms in several countries and find that in the UK, over 75 per cent have dispersed ownership where no party controls more than 25 per cent of the shares. In France, the figure is closer to just 30 per cent. British firms are also more likely to rely on capital markets than banks and internal reserves to finance their activities and are also less likely to have interlocking board or shareholder relationships with other firms. This results in weaker relationships between suppliers and customers and provides less protection against foreign takeover (Franks and Mayer, 2005, pp. 32–3; Tylecote and Visintin, 2008, p. 101).

Studies of electric vehicle (EV) development, the bank rescue that followed the eurozone crisis, and the development of waste-to-energy technology demonstrate that France's meso-corporatism is still operational. In the case of EV's, Calef and Goble (2007) detail the close coordination between the government, research agencies, car manufacturers and EDF, which would benefit from the electrification of transport systems. This high-level coordination ensured that the policy received very little public attention and was not opposed by any incumbent interests. Similar dynamics are observed by Jabko and Massoc (2012) with the bank rescue where decisions were made in a closed decision-making process that brought together a small group of high-powered public officials and bankers. Likewise, McCauley (2016) notes how waste-to-energy policy is centralised and excludes broader societal input.

France and the UK are similar in their dependence upon large firms for employment and economic activity relative to other EU member states. Within the EU, they have the lowest proportion of jobs and value added created by small and medium-sized enterprises (SMEs) (Abel-Koch et al., 2015, p. 20; Stawińska, 2011, p. 17). Each also has 20 companies amongst the largest 500 in the world (Fortune, 2018). This outcome is the result of different processes in the two countries. The French promoted national champions in strategic industries through the 1960s and 1970s (Hayward, 1986, pp. 30–8), and then provided significant state-aid to support those companies in the early 1980s (V. Schmidt, 1996, p. 124). Finally, it forced consolidation amongst nationalised firms before they were privatised, or partially

privatised, in the mid-1980s (Hancké, 2001, pp. 316–8). In the UK, where the strategic direction of companies has been driven by shareholders and the profit motive, rather than the 'stakeholder and social objectives' model of CMEs (Vitols, 2001, pp. 343–58), growth has been achieved through mergers, acquisitions and international expansion. Where large firms dominate industry, central coordination is possible if the state institutions are structured accordingly, as they are in CMEs.

Conclusion

This chapter examined the historical development of dominant ideologies France and the UK and analysed the way in which those ideologies shaped the formal institutions of the state. The analysis indicated that since the Industrial Revolution France has tended toward statism and the UK toward economic liberalism. The differences in the formal institutions of the two states in France and the UK can be attributed to these different ideologies. The French state has retained direct control over important sectors of the economy (including the power sector), the civil service possesses a high degree of internal expertise and autonomy from the government, and sectoral policy-making is often the result of meso-corporatist compromises. In the UK, the state does not control firms directly, relying on regulation and market-based policies to drive behaviour. The British civil service is smaller than its French counterpart, is more dependent on outside expertise and is more responsive to the political priorities of the government of the day.

However, it is important to note that institutions - including ideology - are not static. Critical junctures have offered opportunities for new ideas to permeate, with pronounced shifts a particular feature of UK politics since World War Two. The UK adopted Keynesian economic policies in the period following World War Two, converging toward France's statist model. The UK then returned to economic liberalism following the economic crisis of the 1970s and the election of Margaret Thatcher in 1979. The relative influence of political parties in the UK, and a civil service that is more responsive to the political imperatives of the government

relative to the autonomous French civil service, means that significant political and institutional change is more likely in the UK.

Institutional change could also occur on an incremental basis. Ideas can permeate through the political culture of a country, triggering incremental changes. Cole (2014, p. 123) notes that "French responses to change are embedded in precise contexts, but they are not literally pre-shaped", but it is an observation that applies equally to other countries. It suggests that weight must be given to ideas and actors in any institutional analysis. However, it also suggests that the institutions in which they operate bind actors and shape the transmission of new ideas.

An examination of the pressures that globalisation has placed on states demonstrates that France and the UK have responded through existing notions about the state's role. Globalisation as an exogenous force has altered the role of the state and forced adjustments, particularly in France, but the French state has responded not by retreating, but by altering its forms of control.

The persistence or retreat of the state was examined through an analysis of key state institutions. Since the election of the Thatcher Government in 1979, the UK has progressed steadily down the neoliberal path, privatising state-owned assets, reducing the size of the civil service and strengthening the power of the markets by encouraging the free flow of capital. France has a much higher level of public ownership and where privatisation has occurred, it has been able to maintain a significant degree of control through formal and informal networks between the state and industry.

The conceptualisation of France as a 'strong' state therefore still holds despite the pressures of globalisation and Europeanization. However, as noted by Hall (1994) and Skocpal (1985), and discussed in Chapter 2, the state should not be seen as a unitary actor, but rather as a collection of institutions, each with their own interests and varying degrees of autonomy. This is particularly true in France where the civil service and industrial interests, via their connections to the state, possess power

that can sometimes conflict with the executive. In his study of renewable energy policy in France, Szarka (2004, p. 24) notes that the power of the state is often compromised by meso-corporatist compromises. This chapter has argued that the meso-corporatist compromise is actually a feature of the French state, but it is noteworthy that Szarka identifies the nexus between the state and industrial interests as an impediment to renewable energy policy as it suggests a misalignment of the dual policy styles that Hayward analysed in his work. Szarka's study was written before the implementation of the RED. Whether the misalignment has persisted, or whether the executive, the civil service and the industrial interests have coordinated their positions during the time of the implementation of the RED in France is the central question of Chapter 7.

For the UK, the question that rises from the analysis in this chapter is slightly different. The dominant neoliberal ideology has diminished the state's influence over the market, which limits the capacity of state institutions to influence the private interests that will ultimately deliver the required renewable energy generation. Whether the state still possesses the necessary authority to drive the market toward the transition will be the focus of Chapter 8. Before the implementation of the RED can be examined in Chapters 7 and 8, however, it is first necessary to analyse the specific institutions of the electricity sector.

Chapter 5

The Electricity Sectors of France and the United Kingdom

The previous chapter identified and analysed the key institutions of the state that are likely to either drive or impede the implementation of the RED in France and the UK. The chapter included an analysis of the dichotomy between strong states and weak states that was articulated by Katzenstein (1977), Krasner (1978, pp. 55–60) and Dyson (1983), noting that France was broadly typical of the former and the UK broadly typical of the latter. However, it also acknowledged the validity of critiques that note the failure of the strong state-weak state thesis to identify internal divisions caused by conflict between state institutions.

This chapter addresses a second critique that argues that the characterisation of strong and weak states adopts a macro-level approach that does not necessarily hold at the sectoral level (Atkinson and Coleman, 1989; Wilks and Wright, 1987). Case studies have highlighted contradictions between the characterisation of states as either strong or weak, and their actual role in specific industries such as automobile manufacturing (Church, 1994, pp. 106–7) and banking (Johal et al., 2012) in the UK, and telecommunications (Bartle, 2002; Cawson et al., 1987) and textiles (Underhill, 1988) in France. These case studies demonstrate the need to connect the macro analysis of the state's role in the broader economy with the meso analysis of the specific sector in question.

This chapter provides that analysis by examining the specific institutions of the electricity sectors and their relationship to the state. It is divided into two sections. Part I examines the historical development of the electricity sector and its relationship to the state. Part II then identifies and analyses the current institutions of the sector. The macro and meso level analyses contained in Chapters 4 and 5 then

provide the foundation for the specific analysis of the implementation of the RED that will follow in Chapters 7 (the UK) and 8 (France).

Electricity and the state

Chapter 1 outlined the importance of the electricity sector for emissions reduction efforts, but the sector has also been an essential element in the industrialisation and economic expansion of nations since the end of the 19th century (Cooper, 2017, pp. 3–4). Given its central economic role, the structure and governance of the electricity sector normally reflects the broader political and economic ideologies of a state. Hughes (1983, p. 2) describes electricity systems as "cultural artefacts", going on to state that:

> Electric power systems made in different societies – as well as in different times – involve certain technical components and connections, but variations in the basic essentials often reveal variations in resources, traditions, political arrangements, and economic practices from one society to another and from one time to another.

This is clear in the cases of the UK and France where the structure of the sector has mirrored shifts in the role of the state for more than a century. Critical junctures, such as the Great Depression, World War Two and the economic crisis of the 1970s, have altered the structure of the electricity sector as much as they altered the role of the state, but the sector currently mirrors the dominant ideology of the state.

The highly liberalised UK electricity sector is the embodiment of the economic liberalism that has characterised the British state, particularly since the 1980s. In electricity generation, the UK currently has the lowest levels of market concentration amongst EU member states, no company holds more than a 25 per cent share of the market, and the state does not hold shares in any electricity company (Energy UK, 2015; Eurostat, 2017b; Ofgem, 2018a). The UK's generation mix is also highly diversified with no single fuel-type responsible for more than 50 per cent - gas at 40

per cent is the largest, with renewables (30 per cent) and nuclear (20 per cent) also accounting for significant shares (European Commission, 2017b)

The French sector with a single, state-owned utility at its core has been characterised as "part of the great French tradition of 'Colbertism', the tradition of strong state interventionism in industry and technology" (Finon, 1996, p. 21). France has one of the most concentrated wholesale electricity markets in the EU (behind only Malta and Cyprus), with EDF holding a share of about 85 per cent. Power generation is also dominated by a single technology with nuclear accounting for about 75 per cent of the total (European Commission, 2017b, 2014b).

Part I - The development of the electricity sectors in the UK and France

Liberalism versus nationalisation in the UK electricity sector: 1900-1973

The UK's electricity network initially developed according to the same *laissez-faire* principles that had characterised the country's industrial development during the 18th and 19th centuries (Tomlinson, 1994, pp. 49–55). A lack of national coordination meant that a complex patchwork of regionally based grids developed, owned by either private companies or municipalities (Hannah, 1979, p. 148, 1979, pp. 24–5, 1979, pp. 36–8). As a consequence, by the 1920s, economies of scale were lost, electrification rates had fallen well behind the United States and Germany, and productivity and economic expansion were being retarded (Foreman-Peck, 1994, pp. 259–63; Hannah, 1979, pp. 37–8; Hughes, 1983, pp. 227–4).

The UK's first national electricity plan was developed in 1926 and the Central Electricity Board (CEB) was created in the same year with the objective of establishing a synchronised, national grid. Consistent progress on interconnections was made from 1926 and the efficiency of generation plants also improved to the point where they had matched the output of the benchmark U.S. producers by the end of the 1930s. However, after initial progress, inherent inefficiencies in the governance of the electricity network impeded further gains in the late 1930s.

Although interconnections had created the foundations for a national grid, decisions were still made at the regional level which favoured the construction of smaller generation plants rather than larger, more efficient plants that would service larger areas of the country (Hannah, 1979, pp. 134–6).

Overcoming these inefficiencies became the subject of considerable debate between the two major political parties, with the fate of the electricity sector tied to a broader ideological battle about the role of the state. The Labour Party advocated for full nationalisation, while the Conservatives preferred to maintain dispersed ownership while gradually building interconnectors and increasing coordination (Saville, 1993, pp. 37–8). Even these incremental reforms were opposed by a number of Conservative MPs who saw any form of state intervention as a precursor to socialism (Hannah, 1979, pp. 330–1).

Debates about nationalisation in the UK were of secondary importance during the Second World War, although the Labour Party continued to advocate for central control (Hannah, 1979, p. 289). The argument was strengthened by a 1943 government report, which concluded that the war effort was being hampered by the UK's poor industrial output. The report identified the fragmented nature of British industry, a lack of investment, and a lack of inter-firm cooperation on research as the three causes of the UK's poor performance (in Barnett, 1986, pp. 268–71). The report provided a powerful argument for the Labour Party, which won its first ever majority in the 1945 election and pledged to implement a program of nationalisations (Hannah, 1979, p. 347; Saville, 1993, pp. 41–2). The Government passed the Electricity Act in 1947, which nationalised more than 500 generation and supply bodies and created fourteen area electricity boards under the control of the British Electricity Authority (BEA). The coal sector was also nationalised, ensuring that the entire system, from the sourcing of fuel to the distribution of electricity, was brought under state control (Kuisel, 1981, p. 193).

Bi-partisan support for nationalisation became a feature of British politics after the 1945 election. Opposition amongst the Conservative Party backbench remained, but

the election defeat of 1945 gave rise to a new generation of Conservative leaders who accepted state ownership as a necessary political, if not economic, reality (Saville, 1993, p. 38). When the Conservatives returned to power in 1951, state control was maintained, and until 1979, any policy differences between the two major parties focussed on improving the performance of state-owned enterprises rather than returning them to private ownership (Foreman-Peck, 1994, pp. 300–14; Helm, 2004, p. 14). However, the economic crisis of the 1970s, the subsequent breakdown of the post-war consensus, and the election of the Conservative Government in 1979 saw a radical shift in the structure of the economy, every bit as significant as the nationalisations of the 1940s.

The UK response to the Oil Crisis

Although the impact of the Oil Crisis on the UK's energy supply was less severe than in France, its economic impacts reverberated more widely. The previous chapter analysed the economic crisis in the UK in the 1970s, which saw the economy fall into recession in 1974, inflation rise to 25 per cent in 1975, and the Government accepting a conditional loan from the IMF in 1976 (Hickson, 2005, pp. 47–72). The Oil Crisis was a contributing factor as it sent the current account into the negative and contributed to a steep rise in inflation (Hendry, 2001; Rowlatt, 1988). Workers' demands for wage increases to keep pace with inflation only exacerbated the problem with mining unions particularly aggressive in their demands as they sought to leverage the increased importance of domestic coal and gas production (Wass, 2008, pp. 38–42).

However, in terms of energy security, the UK was better insulated from external shocks than France. In the early 1970s, coal provided over 85 per cent of the country's electricity, almost all of which was sourced from domestic reserves (Department for Business, Energy & Industrial Strategy, 2013; MyGrid UK, 2017). The UK had also enacted protectionist measures in the 1960s to ensure that domestic coal was utilised instead of imported oil, including a tax on fuel oil, a ban on coal

imports from the United States and forcing the Central Electricity Generating Board (CEGB) to burn coal rather than oil to produce electricity (Chick, 2007, pp. 9–11).

Discoveries of oil and gas in the North Sea in the 1960s and 1970s turned the UK into an "island of coal on a sea of gas" (McGowan, 2011, p. 189), providing the UK with a further supply cushion that muted the effect of the Crisis (Surrey, 1990, pp. 42–3). The UK was able to reduce its oil consumption at a faster rate than France, Germany, the United States or Japan, by increasing gas production by over 300 per cent between 1970 and 1975 (BP, 2016). The Oil Crisis also led to the UK's first investments in renewable energy technologies in 1975, but given the abundance of fossil fuels, the program was limited to R&D and did not produce large-scale commercial technologies (Brown, 1993, p. 280).

The access to natural resources, combined with the Labour Government's commitment to Keynesian principles, meant that the UK adopted expansionary policies to offset the effects of the economic downturn rather than deflationary policies to counter inflation. As a result, energy efficiency measures were given little priority in the UK, unlike the United States, West Germany, France and Japan, where reducing the dependence on oil imports became a priority (Burk and Cairncross, 1992, pp. 13–4; Wass, 2008, pp. 39–40). The ratio of energy used to industrial output in the UK worsened in the two years immediately following the crisis following steady improvement in the five years prior to 1973 (Jenne and Cattell, 1983, pp. 114–5).

Increasing state control of the French electricity sector: 1900-1973

Like the UK, France's early electricity network was characterised by an inefficient patchwork of privately owned networks and regionally based monopolies, but this was a consequence of the state protecting local monopolies rather than the limits of a *laissez-faire* market (Lucas and Papaconstantinou, 1985, p. 4). However, in the first three decades of the 20th century, France gradually established an institutional structure that reduced fragmentation and inefficiencies, enabling the country to

increase rates of electrification much faster than the UK (Foreman-Peck, 1994, pp. 259–63; Hannah, 1979, pp. 37–8).

First, in order to ensure that the monopoly concessions were not abused, France established *la Direction de l'électricité* in 1919, which was responsible for oversight and policy development within the sector. The directorate was staffed by engineers from the *grand corps*, who understood the efficiencies of long-distance transmission and structured concessions to encourage the construction of networks that could deliver power from its source to population centres (Lucas and Papaconstantinou, 1985, pp. 4–5). Second, the state took partial ownership of several electric utilities, a strategy that enabled the construction of a unified grid in the northeast of the country in the 1920s (Kuisel, 1981, pp. 66–7).

Despite progress in the 1920s and 1930s, the sector stagnated during the Depression with high debt loads and inconsistent revenues preventing the private sector from raising the necessary capital to expand the grid (Frost, 1991, p. 1). The need for large-scale investment and centralised control, combined with the growing political power of the socialist left, made nationalisation increasingly likely in the lead up to World War Two (Lucas and Papaconstantinou, 1985, p. 10; Smith, 2006, p. 393). Following the War, the development of the national electricity grid was seen as a necessary prerequisite for the reconstruction and modernisation of the economy, and given that the state was the only actor capable of providing the necessary investment, the grid was brought under national control in 1946 (Chick, 2007, p. 84; Frost, 1991, pp. 1–36).

The French response to the Oil Crisis

The Oil Crisis had a significant impact on France's energy supply, and its response reflected deep concerns about energy security, but also concerns about the country's power and independence. A British Foreign Office cable sent a month prior to the onset of the Oil Crisis described France as being "pathologically sensitive about any possible implication that Europe is in any sense subordinate to or

dependent upon the United States. It is strangely like a sort of Third World psychosis towards the colonial power" (in Gfeller, 2012, p. 9). In this context, an increase in import dependency represented a threat to French independence.

Overall oil consumption in France had grown by 130 per cent in the decade prior to the crisis, driven to a large extent by the displacement of coal by oil in electricity generation (BP, 2016). France possessed only small reserves of coal and as the price of oil continued to improve prior to the crisis, coal usage halved between 1967 and 1972, while the use of oil doubled (Chick, 2007, pp. 11–3; Lucas and Papaconstantinou, 1985, pp. 15–7). As a consequence of France's dependence on oil, it was extremely vulnerable to the 500 per cent price increase that occurred between 1972 and 1980 (Johnson, 1980, p. 817).

French policy-makers assumed that the circumstances of the Oil Crisis would continue into the long-term and made the decision to rapidly expand the country's nuclear power capacity (Chick, 2007, p. 29). The Messmer plan - named after Prime Minister Pierre Messmer - was announced in 1974 (Araújo, 2017, p. 86). By 1980, 19 reactors had been built, with plans to complete a further 30 by 1985 (Wade, 1980, p. 884). Within a decade of the Oil Crisis, France had increased the consumption of nuclear power by a factor of ten (BP, 2016).

Nuclear had not been the only available option to France and other countries that faced similar threats to energy security adopted different approaches. West Germany and Japan, for example, were also heavily dependent upon imported oil (BP, 2016), yet the response in those two countries was very different to that of France.

In a study of the policy approach taken by the United States, France, West Germany and Japan, Ikenberry (1986, p. 106) found that the response of these countries varied according to the role and structure of the state. He argues that:

> The state as actor and the state as structure are related: at moments of crisis and change, as during the oil shocks, the distinctive structure of the state itself shapes and constrains the substance of strategic policy. The policy instruments and institutional resources available to government elites form the most important determinants of adjustment policy when crisis presents new challenges to government.

In each of the four countries studied by Ikenberry, the response was consistent with state's role in the broader economy. The United States was the least vulnerable of the four countries with domestic production still meeting two-thirds of oil demand at the beginning of the crisis (BP, 2016). After initially making attempts to regain control over international oil markets by coordinating the activities of the largest Western nations, the U.S. government adopted what Ikenberry (1986, p. 116) terms as a "defensive market approach". This market-based approach essentially allowed the increased prices to flow through the economy. Japan and Germany had no oil reserves and therefore the crisis posed a much greater threat to energy security. Both countries adopted a corporatist approach that focussed on industry competitiveness. Here the state played the role of a coordinator with the objective of improving the efficiency of industry and to increase exports to counter the impact that the increase in the oil price had had on the balance of payments (Ikenberry, 1986, pp. 113–5). France "drew upon well developed state institutions and state-owned enterprises in petroleum and nuclear energy to pursue the neo-mercantilist option" (Ikenberry, 1986, p. 111). The essential feature with regards to the electricity sector was the large-scale expansion of the country's nuclear generation capacity with state institutions at the centre of the program. High-level coordination between the state-run energy research agency, the *commissariat à l'énergie atomique* (CEA); the state-owned utility, Électricité de France (EDF); and the state-owned nuclear reactor business, Framotome, allowed France to build 58 reactors between 1973 and 2000.

Ikenberry's analysis warrants further attention, as the response to the Oil Crisis, and the development of nuclear power more specifically, reveals significant insights into the state institutions of France and the UK. Three questions have particular relevance for this thesis. First, what was it about France's state institutions that led to such a firm commitment to nuclear? Although the United States, Germany, Japan and the UK also increased their nuclear power capacities following the crisis, the share of nuclear in total generation never exceeded 30 per cent in any of those countries, whereas it reached nearly 80 per cent in France (OECD, 2018b). Second, if state institutions shaped the development of the nuclear sector in the 1970s and 1980s, which elements of those institutions remain today; and third, how relevant is the energy transition that occurred following the Oil Crisis to the transition to renewable energy today? The following section will answer the first of these questions, with subsequent sections on the energy transition and the institutions of the electricity sector addressing the other two.

State institutions and the deployment of nuclear power

In assessing France's transition from coal and oil to nuclear power in the electricity sector, Gruebler (2010, p. 5174) argues that it is "legitimately considered as the most successful scaling-up of a complex and capital-intensive energy system in the recent history of industrialised countries." It is therefore an example of a successful large-scale energy transition, comparable in some respects to the transition to renewable energy at the national level (Solomon and Krishna, 2011). The nuclear transition differs from the renewable transition in that it involved a single, standardised technology – the pressurised water reactor (PWR) – whereas the renewable transition involves multiple technologies, multiple scales and multiple business models (Bumpus and Comello, 2017; IEA, 2017b, pp. 64–7; Verbong and Geels, 2010). However, the scale of the two transitions is comparable. In the 25-year period to 2000, the share of nuclear in France's electricity generation mix grew from 7 per cent to 76 per cent (OECD, 2018b), while the share of renewables in the period from 2005 to 2030 is expected to grow from 13.5 per cent to 40 per cent in 2030 (IEA, 2016, p. 168). Whether the institutional structure that was established to enable the

transition from coal and oil to nuclear power still functions and whether it can be recalibrated to enable a transition to renewable energy is a central question for this thesis.

Nuclear power has not been as central to power generation in the UK, although it has supplied between 20 and 25 per cent of electricity since 1990 (European Commission, 2017b). However, under a central scenario developed by BEIS, the share of nuclear in the UK's generation mix is expected to grow from 21 per cent in 2016 to about 30 per cent in 2030, and given that seven of the eight plants currently in operation are due to close before 2030, an additional 14GW would be required to reach that share (Department for Business, Energy & Industrial Strategy, 2018a, p. 32). Problems in the development of new capacity, which are analysed below, call this particular scenario into question, but the Government re-affirmed its commitment to nuclear energy through the publication of an industrial strategy for the sector in 2018 (Department for Business, Energy & Industrial Strategy, 2018b).

Finon and Staropoli (2001) identify a number of institutional factors that enabled France to develop its nuclear capacity at a scale, and within a timeframe that was unmatched anywhere else in the world. First, there was broad political support for the program, which ensured regulatory stability and allowed the state to mobilise its full resources to achieve objectives that were seen to be in the national interest. Second, the state's direct control over the sector's resources enabled a high degree of coordination. The Ministry of Industry facilitated cooperation between the state nuclear research agency, CEA, the monopoly utility, EDF, and the nuclear reactor producer, Framatome - a triumvirate described as the "god and two titans" (Grubler, 2010, p. 5176; Jasper, 1992, p. 655)

There had been considerable tension between the CEA and EDF in the 1960s as they each advocated for different reactor designs. The CEA wanted to adopt the French-designed natural uranium gas graphite (UNGG) reactor while EDF argued that the American-designed light-water reactors (LWR) would be more economical and easier to standardise (Hecht, 1998, p. 297). Ultimately, the American design was adopted

and the role of the CEA was altered twice in the 1970s to make it more commercially oriented rather than a purely research-based body. This enabled greater cooperation between EDF and CEA as the latter was no longer focussed entirely on the development of its own reactor designs (Lucas and Papaconstantinou, 1985, pp. 23–5). The choice of the LWR design, combined with a highly concentrated electromechanical industry that supplied EDF enabled France to leverage the benefits of standardisation and economies of scale (Rangel and Lévêque, 2012, p. 4).

A similar debate about nuclear technology type also took place in the UK in the 1960s. In 1965, a government White Paper had called for one new reactor to be commissioned every year between 1970 and 1974, totalling 8GW (Rush et al., 1977, p. 100). Similar to France, the state nuclear research body, the Atomic Energy Authority (AEA), advocated in favour of a domestic design (the advanced gas-cooled reactor - AGR), whereas the state-owned utility, the CEGB, argued in favour of the LWR. Unlike France, however, the Department of Trade and Industry ultimately sided with the research agency over the utility and the AGR was adopted (Finon and Staropoli, 2001, p. 186).

Despite the apparent similarities between France and the UK in the institutional structure of their respective nuclear sectors in the 1960s and 1970s, there were important differences that produced distinct outcomes in the two countries. First, despite being a state-owned firm, EDF operated within the French bureaucratic tradition of serving the public interest, and therefore maintained its independence in relation to technology choice (IEA, 2000, p. 91). In the case of nuclear reactors, the American design was deemed to serve that interest (Hecht, 1994, pp. 660–1). In the UK, the public interest was supposed to be upheld by the CEGB's non-executive directors who would operate at arms-length from the government to reconcile economic efficiency with wider social concerns. However, the public interest was poorly defined in legislation and non-executive directors were political appointees who often acted to advance the short-term political objectives of the governments that appointed them (Helm, 2004, pp. 21–4). Successive governments in the 1950s and 1960s intervened in decisions about prices, investments, wage settlements and

closures, which undermined the long-term financial stability of the CEGB (Ezra, 1993, pp. 392–3). The decision over nuclear technology was also politicised, with both Labour and Conservative Governments intervening several times between 1964 and 1974 to ensure that the CEGB was ordering British-designed reactors (Wonder, 1976). This led to the adoption of the AGR design, which proved to be overly complex, difficult to construct and prone to technical failure (Collingridge, 1984, pp. 58–60; Helm, 2004, p. 35; Williams, 1980, pp. 320–1).

As the analysis in the previous chapter demonstrated, state institutions in France have greater autonomy from the government than those in the UK. This autonomy is aided by the deep technical expertise that exists amongst civil servants, a fact that was evident in the nuclear technology decision. EDF in particular had focussed on building its technical competence through the 1960s by attracting the best talent from the elite engineering schools. By the mid-1970s the company was operated by a "technocracy operated from the top by an insulated group of highly competent experts. Their credentials were beyond reproach, and they led EDF to the height of its glory" (Frost, 1991, p. 161). The tradition of engineering education was also evident within the Ministry of Industry, which possessed enough expertise within its own ranks to assess the competing claims of the CEA and EDF and make decisions that balanced technical and commercial imperatives (Grubler, 2010, pp. 5175–7; Hecht, 1994, pp. 559–60; Lucas and Papaconstantinou, 1985, p. 20).

As the first country to develop a civilian nuclear program, the UK also possessed considerable competence in nuclear power but it lacked the depth and breadth of expertise that was evident in France. The government recognised the potential skills shortage in the mid 1950s and established a number of programs to increase the number of qualified engineers in the civilian workforce, but the UK lacked the long-established educational institutions in engineering, and the deep technical expertise within the public service that France was able to call upon (Schneider, 2013, p. 31; Tomlinson, 1994, pp. 255–62).

The expertise that did exist in the UK was also concentrated in the AEA, giving it disproportionate influence over decision-making (Collingridge, 1984, p. 47). The Department of Trade and Industry (and later the Department of Energy, which was created in 1974) was dependent upon the AEA for advice. In the late 1970s, the Deputy Chairman of the AEA was simultaneously the Chief Scientist at the Department of Energy (Patterson, 1977, p. 44). As a consequence of the lack of independent expertise within government departments and the reliance on the AEA, the Department of Trade and Industry/Energy was unable to balance the competing claims of the AEA and CEGB (Williams, 1980, pp. 320–1; Wonder, 1976, pp. 244–5).

The UK also lacked a single reactor builder like France's Framatome, making industry coordination more difficult. Five separate consortia had been established in the 1950s with the objective of promoting competition, but the UK's nuclear program was never large enough to sustain all five. As a consequence, economies of scale were lost, and expertise dispersed (Rush et al., 1977, pp. 97–8; Wonder, 1976, pp. 264–5).

The choice of reactor design in France and the UK was typical of the strong state-weak state dichotomy that was examined in the previous chapter. In France, strong state institutions were able to coordinate the actions of a small number of actors, leveraging their technical expertise while largely avoiding political interference (Araújo, 2017, pp. 86–7; Hatch, 1986, pp. 152–4). Although British nuclear institutions appeared to mirror the structure in France, there were inherent differences in the administrative traditions of the two countries that produced a different outcome. The UK civil service lacked the autonomy from government and the depth of technical expertise that characterised its French counterpart. As a consequence, there was a lack of balance between the technically oriented AEA and the more commercially oriented CEGB. Direct government intervention also prioritised political considerations, resulting in an outcome that proved to be costly (Williams, 1980, pp. 320–1).

The energy transition in the UK: 2000 to the present

The UK has a diverse generation mix, with gas, nuclear and renewables all playing an important role. Gas has become the most important fuel, providing 42 per cent of electricity while nuclear provides 21 per cent and renewables 30 per cent. Gas was once a marginal source of generation, supplying just two per cent of the UK's electricity in 1990, but the 'dash for gas', facilitated by increased domestic production, price improvements relative to coal, and the effects of the Thatcher Government's undermining of the coal industry, saw its share increase to 40 per cent within 10 years. Coal's share of generation, on the other hand, fell from 64 per cent to 29 per cent over the same period (Carter, 2014, p. 424; European Commission, 2017b).

Coal has suffered a second rapid decline in recent years. As recently as 2013, it accounted for over a third of generation, but the closure of several coal-fired plants in 2015 and 2016 has seen its share plummet to below 10 per cent (European Commission, 2017b). The decline is terminal with the UK Government announcing that the remaining coal plants will be phased out by 2025 (Department for Business, Energy & Industrial Strategy, 2018c). There is pressure on the Government to bring that date forward, but existing regulations and market reality may ensure early closures regardless. Of the eight remaining plants, several have only been retained to provide back-up power for the winter months and only one currently complies with the EU's Industrial Emissions Directive (IED), which places emissions standards on large combustion plants. Those plants that do not meet the standard have a limit placed on their operational hours, meaning that they are likely to close before the UK's 2025 deadline (Utilitywise, 2016).

The most recent decline in coal capacity has provided an opportunity for renewables to fill the generation gap. Since 2005, the share of non-hydro renewables has grown faster in the UK than in Germany, France, Spain or Italy with a noticeable acceleration after 2011 (European Commission, 2017b). In 2005, renewables provided less than 6 per cent of the UKs electricity generation, nearly all of which came from hydro or biomass. There was no solar capacity and wind supplied less

than 1 per cent of power. However, generation from renewables grew by an annual average of 8 per cent between 2006 and 2010 and then by 24 per cent between 2011 and 2015. The biggest contributor to that growth was wind power, which had grown to 12 per cent of total generation by 2015. The development of solar generating capacity has taken much longer to materialise, but by 2016, it accounted for 3 per cent of total capacity (European Commission, 2017b).

The UK has is also beginning a period of transition in nuclear generation. Over the past 25 years, nuclear has provided between 20 and 25 per cent of the electricity generated but a number of the plants that became operational in the 1970s and 1980s have either been decommissioned in recent years, or are due to be decommissioned in the next decade. The only plant that is scheduled to close after 2030 is the Sizewell B plant, which is the only nuclear power facility completed after 1990 (National Audit Office, 2016, p. 31)

With the complete phase-out of coal announced, plans have been made to build new nuclear plants to guarantee base load power. It is expected that by 2035 an additional 14GW of nuclear capacity will be added to the grid, which would bring the share of nuclear to about one-third of the UK's generation mix (National Audit Office, 2016, p. 4). A new plant at Hinkley Point, which will be operated by a partnership between EDF and the state-owned China General Nuclear Power Group (CGN), is the first of the new nuclear plants. When completed in 2025, the plant is expected to provide 7 per cent of the UKs electricity (National Audit Office, 2017, p. 4). However, the project has suffered construction delays, cost overruns and a state-aid investigation by the European Commission, which was concerned about the price guarantees that the UK Government had made to the EDF-CGN consortium in order to make the project financially viable (European Commission, 2014c). The Commission exempted the project from state aid penalties following changes to the agreement between the Government and EDF-CGN, but the terms of that agreement demonstrate how difficult it is to build new nuclear plants in a liberalised market where investors cannot rely on regulated prices to guarantee a return on investment (Hultman, 2011, p. 404).

The Hinkley deal utilises a contract for difference (CfD) that guarantees that the operators will receive a wholesale price of £92.50 per MWh, index-linked to 2012 prices, for 35 years (National Audit Office, 2016, p. 5). This price was nearly double the wholesale market price at the time, and thus a form of subsidy. The Government has also offered to guarantee up to £2 billion of bonds that the EDF-CGN consortium may issue to finance its construction of the plant (National Audit Office, 2017, pp. 16–7).

The agreement represented a significant political reversal for the Conservative Party, which had pledged to offer no subsidies to support new nuclear generation when it governed in coalition with the Liberal Democrats between 2010 and 2015 (Huhne, 2010). Having won a majority in the 2015 election, however, it announced the agreement with EDF-CGN in October of that year. A footnote included in the official statement simply read: "The Government confirms that it is not continuing the 'no public subsidy policy' of the previous administration" (Department of Energy and Climate Change, 2015).

Despite the wholesale price and loan guarantees, EDF's financial director, Thomas Piquemal, resigned from his position ahead of the final board decision to proceed with the project in 2016, citing the risk that it posed to the company (De Clercq and Mallet, 2016). Although the project was approved, the move highlighted the financial risks associated with new nuclear generation, and called the UK's future nuclear strategy into question (CCC, 2018a, p. 67; National Audit Office, 2016, pp. 34–5). The effective subsidies that the Government is prepared to outlay for new nuclear plants is antithetical to the market-oriented approach that governments have taken toward the electricity sector since privatisation in the late 1980s, but in order to achieve its long-term energy and emissions objectives, such intervention has been necessary. The extent to which similar interventions have been necessary to meet the specific objectives of the RED, and whether state institutions that have been structured around market principles since the 1990s actually have the capacity to meet those objectives will be examined in Chapter 8.

The energy transition in France: 2000 to the present

Nuclear provided nearly 77 per cent of France's electricity in 2017, the highest proportion of nuclear generation of any country in the world (European Commission, 2017b; IEA, 2016, p. 188). Over the past two decades the generation mix has changed little with nuclear retaining a consistent share of between 77 and 78 per cent and hydro providing between 10 and 13 per cent over the same period (European Commission, 2017b).

France's high proportion of nuclear makes its electricity network one of the least emissions intensive in the EU. Only Sweden, which also has a high proportion of nuclear and hydro in its generation mix, has a lower emissions-to-GDP ratio (Eurostat, 2017c). France's shift to nuclear generation saw a 23 per cent decline in energy-related emissions between 1980 and 1990, but in the quarter of a century that followed, France often used this record to justify its weak ambition on climate and renewable energy policy (Giraud et al., 1997; Szarka, 2010, pp. 112–6). This is evident in the slower growth rates of renewables. Prior to 2000, hydro was the only form of renewable energy generating any more than 1 per cent of France's electricity. Wind capacity began to grow from the early 2000s with its share of generation increasing from 0.38 per cent to 3.74 per cent between 2006 and 2015. Solar PV has lagged behind wind and still made up less than 1.5 per cent of generation in 2015 (European Commission, 2017b).

The closure of nuclear plants could provide an opportunity for renewables to fill the generation gap, much as the closure of the UK's coal plants over the past decade has enabled rapid renewables growth. However, although France's nuclear plants were designed to operate for 40 years, there is no regulatory limit on their service lives as long as they continue to pass safety audits from the Nuclear Safety Authority (ASN) (OECD, 2012b, p. 69). In 2015, France legislated a nuclear drawdown to 50 per cent by 2025, but that date has already been pushed back by a decade and at the time of

publication only one plant has been identified for closure. This policy is examined further in Chapter 7.

The resistance to a reduction of the role of nuclear France's generation mix is a consequence of the deeply embedded economic, technological and institutional path dependencies inherent in the nuclear program. The institutional aspects that are the focus of this thesis will be examined in Chapter 7, but from an economic perspective, the current nuclear fleet represents a cumulative investment of 83 billion euro in construction and engineering costs alone (Cour de Comptes, 2012, p. 24; World Nuclear Association, 2018), and the sector accounts for about 2 per cent of France's GDP and nearly 7 per cent of its industrial employment (MTES, 2019, p. 126; PWC, 2011, p. 12). Nuclear plants also have a high ratio of capital costs to operating costs relative to coal or gas plants, therefore there is a strong incentive to operate reactors for as long as technically feasible (Hultman, 2011, p. 403; Malischek and Trüby, 2016, p. 909). The competence in nuclear technology is also seen as a significant export opportunity. In 2008, the Agence France Nucléaire International (AFNI) was created under the CEA to facilitate international cooperation (IEA, 2016, p. 168) and in the same year, the Government directed the CEA to cooperate with Chinese authorities on all aspects of civilian nuclear technology (World Nuclear Association, 2018).

From a technical perspective, overcapacity has minimised the incentive to invest in renewable energy (Hadjilambrinos, 2000, p. 1118). France's first investments in wind technology were made in the late 1950s and the Oil Crisis triggered further investments in non-hydro renewable technologies (Laali and Benard, 1999, p. 805). However, the investments came to an abrupt halt in 1986 as it became apparent that planning for the nuclear program had overestimated electricity demand, thus creating overcapacity in the market (Grotz, 2012, p. 135; IEA, 2016, p. 137; Szarka, 2007, p. 327). This overcapacity has persisted, allowing France to export more than 10 per cent of total electricity generated in 2016 (IEA, 2018, pp. 197–210). Additional renewable capacity would therefore have to displace existing capacity, most likely nuclear. Coal and gas accounted for less than 10 per cent of generation in 2010, and

with gas usage expected to increase slightly in the decade to 2020, some nuclear capacity will have to be closed to allow renewables to gain share (European Commission, 2017b)

As long as France's existing nuclear reactors are technically and financially viable, they will be an impediment to the growth of renewable capacity. The institutional aspects and their influence of the implementation of the RED are examined in Chapter 7, but it is first necessary to identify and analyse the key actors and institutions in the electricity sectors of the two countries in question.

Part II – The Institutions of the Electricity Sector

The analyses in the previous chapter and Part I of this chapter examined how France and the UK adopted similar institutional structures in the post-war period, albeit with important differences in the depth of state control and coordination. However, the proliferation of neoliberalism in the UK from the 1980s onwards saw the structure of the electricity sectors in the two countries diverge as the UK implemented a program of privatisation and liberalisation while France largely retained its statist approach, despite attempts by the EU to increase the competitiveness of member state electricity markets (Méritet, 2011; Pollitt, 2009).

Government departments and agencies

Energy policy in the UK is the responsibility of the Department of Business, Energy and Industrial Strategy (BEIS). Between and 2008 and 2016, a separate Department of Energy and Climate Change existed, but the department was disbanded and merged with the Department for Business, Innovation and Skills to form the new BEIS when Theresa May assumed the Prime Ministership in 2016. The change was subject to criticism from those who felt that separating climate and energy policy would diminish the climate imperative in energy policy (Rincon, 2016). However, in interviews with UK officials who either work in the department, or work with it,

there has been no discernible change in either outlook or resources (Interview 1 CCC, 2018; Interview 2 CCC, 2018; Interview 1 BEIS 2018).

In France, energy and environmental matters are the responsibility of the Ministry for an Ecological and Inclusive Transition (MTES). Within the department, the Directorate-General for Energy and Climate (DGEC) is responsible for the development and implementation of climate and energy policies. The Ministry of Economy and Finance also plays an important role as the ministry ultimately responsible for the state's ownership of EDF and its subsidiaries.

The French power sector has always been dominated by a small technocratic elite situated within the triumvirate of the ministry, the CEA and EDF (Delmas and Heiman, 2001, pp. 444–6; Hatch, 1986, pp. 156–62; Schneider, 2013, pp. 31–3). Amongst the three it was the civil service that Jasper (1992, p. 655) described as the "God", and its role was crucial in the nuclear transition that occurred in the 1970s. According to Hatch (1986, pp. 152–4):

> Policymaking was carried out by abdicating significant power to the bureaucracy. Policymaking among officials took place almost entirely among technocrats and the administration and managers of public enterprises. Parliament was hardly consulted except to approve plans...Throughout the 1970s, Parliament has remained far removed from the conduct of energy policy. The government's energy program wasn't even brought before the National Assembly until May 1975, where a perfunctory debate ensued...The regulatory arena is characterized by low visibility and the dominance of highly technical procedures, necessitating the involvement of experts and minimizing the role of lay citizens.

Within the bureaucracy, decisions were made by line departments, which liaised closely with EDF (Feigenbaum et al., 1993, p. 76). As a consequence, policymaking in the power sector has been de-politicised, a practice that is justified on the basis of

the tradition of the bureaucracy serving the public interest (Brouard and Guinaudeau, 2015, pp. 156–62). In the case of the power sector, the public interest was codified in the Electricity Act of 2000, which states that "Electricity is defined as a product of absolute necessity", that "is to be organised by the government, the communes or their public co-operation organisations" and that in delivering this service, security of supply, economic competitiveness, climate change mitigation and social cohesion will be considered (IEA, 2000, pp. 32–3)

There have been claims that the era of the technocratic elite within the French civil service is over (Dubois and Dulong, 1999), but as Genieys (2010, p. 6) notes, although the power of the technocratic elite has declined in certain sectors, autonomous power has been sustained, and even strengthened, by "new or reinvigorated elite groups within the state who have mobilized around programs intend to restore and enhance the state's capacity for autonomous decision making". The power sector is one such program, a point that is explored in further detail when the implementation of the RED is examined in Chapter 8.

Both countries have independent advisory bodies focussing on energy and the environment, although they differ in structure and function. In the UK, BEIS receives advice on climate change and energy related matters from the Committee on Climate Change (CCC). The CCC is an independent statutory body that comprises eight members, with expertise across a range of disciplines related to climate change, and a secretariat of permanent employees.

The CCC's main function is to develop five-yearly carbon budgets, based on the UK's 2050 emissions reduction target of 80 per cent on 1990 levels. It also produces regular reports on the government's progress toward that goal. A more detailed analysis of the CCC's role and influence is provided in chapter 8, but its establishment was a critical development and established the UK as a leader in climate policy (Rayner and Jordan, 2010, p. 108). The initial idea behind the establishment of the CCC was to create a body that was able to make difficult, long-term decisions, free from the pressures of short-term political cycles. In this respect,

it would have been similar to the state delegating monetary policy to an independent central bank (Helm et al., 2003). However, climate and energy policy was deemed to be too politically sensitive to delegate, therefore the CCC was given an independent advisory role with its recommendations being non-binding (Lockwood, 2013, p. 1343). However, the CCC was still an innovation and at the very least would provide credible policy recommendations and require governments to account for any shortfalls in emissions reductions.

France established an equivalent body, known as the High Council on Climate Change, in late 2018 with the chair, Corinne Le Quéré, also being a member of the CCC. The High Council comprises 13 experts on climate change and is tasked with producing reports on France's progress towards its Paris Agreement targets every five years (Macron, 2018). A more established body is the Environmental and Energy Management Agency (ADEME), which provides policy advice amongst other tasks that include the allocation of research funds and managing public education programs. ADEME was created in 1990 through the merger of three separate agencies that dealt with air quality, energy efficiency and waste (Giraud et al., 1997, p. 132; IEA, 2000, p. 51). However, its program has since expanded to include climate change and renewable energy with its climate and energy programs absorbing nearly half of its 760 million euro budget (ADEME, 2018).

France has also broadened the remit of the nuclear research agency, CEA, to include renewable energy with a specific focus on solar thermal and photovoltaic technologies. The agency is now known as the Alternative Energies and Atomic Energy Commission and hosts a specific body for solar thermal research, the National Institute of Solar Energy (INES) (CEA, 2018). This is what Streek and Thelen (2005b, pp. 8–9) label 'layering', where new rules are applied to existing institutions.

Market regulators

Both countries have independent market regulators, which was a stipulation of the EU's three energy packages of 1996-1998, 2003 and 2009 (De Somer, 2012, pp. 102–

3). The packages were designed to harmonise rules, promote competition, and ultimately create a single market for electricity (European Parliament, 2018). Independent regulators that act to protect the interests of consumers are a necessary precursor to competitive electricity markets and were therefore a key component of the packages (Bergara et al., 1998; Jamasb and Pollitt, 2005, p. 13). The UK established the Office of Electricity Regulation (OER) ahead of full privatisation in 1989 and then merged the OER with the gas regulator in 1999 to create the Office of Gas and Electricity Markets (Ofgem). The UK successfully uploaded its regulatory model to the EU level, ensuring that there was no adjustment required when the EU's energy packages were implemented (Thatcher, 2007, p. 148)

With the French state retaining full control over the electricity sector until well into the 2000s, there was no market imperative to establish an independent regulator in France and it was only after the implementation of the EU's first energy package that the Regulatory Commission of Energy (CRE) was established in 2000 (Thomson Reuters, 2018). Although the provisions for independent regulators in the EU's energy packages were modelled on Ofgem, the CRE is a weaker institution in measures of regulatory power, independence and transparency (Green et al., 2009, pp. 189–97; Larsen et al., 2006). The CRE also works more closely with EDF and its subsidiaries than Ofgem does with firms in the UK power sector (Interview 14, 2019).

The establishment of independent regulators encapsulates the positions of the UK and France in relation to liberalisation. Amongst member states, the UK has been at the forefront of liberalisation and has been very successful in efforts to upload its policy preferences at the EU-level (Ciambra and Solorio, 2015, pp. 155–7; McGowan, 2011, pp. 199–202). France initially supported the Commission's efforts to harmonise rules and promote cross-border trade in electricity as a way of easing constraints on the export of its excess capacity. However, that support ceased when it became apparent that liberalisation would also entail the breakup of vertically integrated state monopolies (S. Schmidt, 1996, p. 247). France was one of only two countries without an exemption that failed to transpose the EU's first energy

directive on time (Bergman et al., 1999, p. 182). In terms of electricity liberalisation, therefore, the UK became a policy-maker and France and policy-taker. How this has influenced the states control over electricity firms and markets in discussed in the following section.

Electricity firms and the impact of liberalisation

The EU's energy packages have had some success in reducing direct state involvement in the industry and forcing the unbundling of generation and distribution functions (Buchan 2015, p. 345). However, a report from the EU's Competition Directorate released following the second of the EU's energy packages in 2007 found that "The high level of concentration which existed in most national markets at liberalisation largely remains" (European Commission, 2007, p. 37). The introductory chapter analysed statistics relating to state ownership and market concentration, demonstrating that there has been considerable resistance to liberalisation in certain market segments, particularly generation, and in certain member states, particularly France.

The French electricity market is dominated by EDF, which owns the bulk of generation, transmission and distribution infrastructure in the country. EDF was established through the nationalisation of the sector in 1946 and remained as a fully owned state enterprise until the limited public offering was made in 2005. The company was once described as a "state within a state" due to its size and influence (Hayward, 1986, p. 35), and in the 1970s, it was able to negotiate a more independent role for itself relative to other state-owned enterprises. The company was granted permission to enter new markets and set salaries and prices that reflected its costs, rather than the social objectives of the state (Lucas and Papaconstantinou, 1985, pp. 21–4). However, the French state still exercises considerable control over the company. By law, the state must hold at least a 70 per cent stake, and has retained nearly 85 per cent of shares through the State Shareholding Agency (APE), a national department controlled by the Minister of Economy and Finance. The APE effectively acts as the state's representative and

closely monitors major strategic and financial decisions made by EDF with state approval required for any decision related to financials, investments, acquisitions and disposals, or related to the compensation of corporate officers. In addition, Article 13 of the French Constitution stipulates that the appointment of the chairman and CEO are subject to the opinions of the relevant permanent committees of the French National Assembly and Senate, and are ultimately approved by Presidential decree (EDF, 2017, pp. 31–2).

Strict foreign investment laws further protect EDF and other companies deemed by the state to be of strategic importance. An attempted takeover of Alstom's power and transmission equipment business by General Electric in 2014 was initially thwarted by a government-issued decree which extended the power of the state to block foreign investment in 'strategic' activities. Existing laws already provided the Minister of the economy with considerable powers to scrutinise foreign investment, but the 'Alstom' decree, as it became known, extended the areas where investments required approval to include the "integrity, security and continuity of the supply of electricity, gas, oil or other source of energy". The sale was eventually made, but only after concessions had been made by GE, including the sale of their locomotive business to Alstom and the establishment of a joint-venture for electricity grid services (Herbert Smith Freehills, 2015, p. 80).

EDF's control of the electricity system extends to the transmission and distribution networks through its ownership of Réseau de Transport d'Électricité (RTE) and Enedis. RTE operates the French transmission network, while Enedis controls about 95 per cent of the distribution network (IEA, 2016, pp. 122–4). The two companies were split from EDF in order to comply with the EU's first energy package, which required member states to dismantle vertically integrated monopolies by unbundling generation and transmission activities (Directive 96/92/EC). RTE first became an independent function attached to EDF with separate administrative, accounting and management structures. Following the strengthening of the unbundling requirement through the second energy package in 2003 (Directive 2003/54/EC), RTE became a limited company and subsidiary of EDF in 2005.

However, the French Energy Code dictates that only the state, EDF or other public companies can own shares in RTE (Thomson Reuters, 2018).

The second package also required an unbundling of transmission and distribution, leading to the creation of Enedis (then known as Électricité Réseau Distribution France or ERDF) in 2008 (Enedis, 2018). EDF also owns 75 per cent of the nuclear reactor manufacturer, Framatome. The reactor business was formerly part of another state-owned firm, Areva, which went bankrupt in 2015 and was sold to EDF as part of a rescue plan devised by the state. The state's involvement was subject to a Commission investigation, but approved in 2017 (European Commission, 2017c).

State control of EDF has ensured that it has always been both a "national champion and a social instrument" (Bergman et al., 1999, p. 191). The company employs over 100,000 people in France and electricity tariffs are also regulated, ensuring that French households pay the lowest prices amongst the five largest EU member states (Cour de Comptes, 2013; Eurostat, 2017a).

The structure of the French electricity market stands in contrast to the UK market, where privatisation and liberalisation were policy priorities throughout the 1980s and 1990s. The privatisation program was motivated by a desire to minimise the role of the state in the economy, which, it was argued, would promote competition, increase efficiency, and broaden the base of shareholders amongst the population. Even in markets where a natural monopoly existed, the Government argued that the withdrawal of the state would improve performance (Foreman-Peck, 1994, p. 324). As Hall (1986, p. 110) notes "The (Conservative) Party's basic approach to industry seemed to herald a return to the policies of *laissez-faire* pursued in the latter half of the nineteenth century". The electricity sector was regarded as the most difficult to privatise due to the scale of the infrastructure, the fact that it was a monopoly industry, and the complexity of the nuclear component (Helm, 2004, p. 125). As a result, electricity privatisation only commenced after Thatcher's election win in 1987, and it was not until 1990 that most of the assets had been privatised, or the government share had been reduced dramatically. The exception was the nuclear

power plants that remained under state ownership until the mid-1990s, with their sale complicated by the opaque economics of the British nuclear industry, the liabilities that nuclear power brought with it via decommissioning, and the uncertain role of nuclear in the UK's generation mix into the future (Helm, 2004, pp. 128–30).

Privatisation extended to the UK's transmission and distribution systems with the mainland grid divided amongst three operators. National Grid owns the largest component of the grid covering England and Wales, Scottish and Southern Electricity (SSE) operates the grid in the south of Scotland and SP Energy Networks, a subsidiary of Spain's Iberdrola, operates the northern half of the Scottish grid. Northern Ireland has a separate grid, which has been part of the Single Electricity Market with the Republic Ireland since 2007. The electricity distribution network is divided into nine regions, which are controlled by seven operators. SSE and SP Energy Networks have control of one region each in addition the distribution networks in their respective regions of Scotland. Separate companies operate the remaining seven regions (Ofgem, 2018).

The UK has therefore embraced liberalisation in the electricity sector whereas France has only met the minimum requirements of EU's three energy packages. France's transposition of the third package (Directive 2009/72/EC), particularly as it related to unbundling, was deemed to be insufficient by the Commission and France was required to strengthen domestic laws in order to comply with the Directive. It was only in February 2016 that France enacted a new ordinance to meet the requirements of the Directive (Herbert Smith Freehills, 2017, p. 174). However, although generation, transmission and distribution function have been administratively separated, they are still owned by EDF, which in turn is controlled by the state.

The levels of market concentration also demonstrate that market liberalisation has had a limited impact on the structure of the French electricity sector, particularly when compared to the UK. In the generation segment of the market, EDF owns all 58 of France's nuclear reactors, about 80 per cent of its hydro capacity and a small, but

growing share of renewable energy, all of which amounts to a market share in power generation of over 80 per cent (EDF, 2017). Using the Herfindahl-Hirschman Index (HHI) of market concentration, the European Commission ranks France as the third most concentrated wholesale market in the EU, behind only Malta and Cyprus. The UK has the lowest levels of concentration (Energy UK, 2015, p. 2; European Commission, 2014a). In the UK, there are eight companies that hold a share of generation of at least 4 per cent, and only two of those hold a share greater than 10 per cent. Interestingly, EDF, which controls the UK's eight nuclear power plants, holds the largest share with 24 per cent (Ofgem, 2018b).

Liberalised markets provide opportunities for new entrants, including those focussed on renewable energy, whereas those with higher barriers of entry and favour the interests of incumbents (Reiche and Bechberger, 2004, p. 845). Incumbents are generally much slower to integrate non-hydro renewables into their generation portfolios. The largest utilities in each of the five largest EU markets (Germany, France, the UK, Italy and Spain) have a lower share of non-hydro renewable in their portfolios than the market as a whole.

The influence of the state-industry relationship on the implementation of the RED could either be a driver or impediment in both countries. The fact that state institutions in the UK are less entwined with the incumbent interests could mean that the state lacks the authority to dictate the terms of the energy transition. Alternatively, the lack of market concentration could mean that no single company is capable of acting as a veto point, thus providing policy flexibility. For France the state-EDF nexus could enable a rapid, top-down transition similar to the nuclear transition that occurred between 1973 and 2000. Alternatively, EDF could act as a powerful veto point, protecting its interests in nuclear power.

The actual influence of the state-industry relationship will be explored in detail in Chapters 7 and 8, but the outlines have become very clear throughout this chapter. After starting from a low base, the UK has been able to rapidly increase renewable capacity, particularly since 2011 and nearly all of this new capacity has replaced coal.

According to a senior energy advisor in the UK, this can be partly explained by the diversified ownership of the British electricity sector, which has enabled successive governments to implement their preferred policies without having to negotiate with a monolithic body with narrow interests. In fact, the various interests within the sector often cancel each other out as each seeks a competitive advantage (Interview 1, CCC, 2018). This claim is tested in the analysis of the implementation of the RED in Chapter 8.

France's generation mix has remained largely unchanged over the past two decades. Nuclear has retained its share of generation and long-standing hydro plants still account for nearly two-thirds of renewable generation. EDF has sought to maximise its investments and competence in nuclear technology, slowing the transition to renewable energy. The former member of the European Parliament and the rapporteur for the RED, Claude Turmes (2017, p. 245), summarises EDF's role in the energy transition as "forcing the government to join the race for renewable energy – with the handbrake on".

Conclusion

This chapter has shown that the structures of the electricity sectors in France and the UK have been tied closely to the dominant ideology that has shaped the state's role in the two countries. Like the role of the state, the structures of the electricity sectors in the UK and France are also deeply rooted in historical experience and resistant to change. The *laissez faire* development of the UK's electricity grid can be likened to the liberalised and privatised sector of today. In France, the state began controlling the development of the grid from the 1920s, with engineers from the *grand corps* tasked with managing the process of consolidation. Again, there are obvious parallels with the current technocracy that controls France's electricity sector.

This is not to suggest that the structure of electricity sectors has been static over the past century. The same critical junctures that altered the state's role have also

precipitated change to the structure of the electricity sectors, creating periods of convergence and divergence between the two countries. However, even during the period of convergence that followed the post-war nationalisation programs in both countries, the depth of state control in France was much greater, as the analysis of the nuclear programs in both countries highlighted. France was able to coordinate the activities of the civil service, the nuclear research agency (CEA) and EDF, drawing upon the engineering expertise within the three bodies to implement an unprecedented transition to nuclear over a 25-year period. The state lacked the same expertise and authority in the UK and the more limited nuclear program that developed was ultimately beset by technical and financial problems.

The period of relative convergence ended with the election of Margaret Thatcher in 1979 with the turn toward neoliberalism in the UK resulting in the break-up and privatisation of the state electricity monopoly, the CEGB. France has faced pressure to implement its own liberalisation program through the EU's three energy packages, but although those packages have resulted in some reforms, including the legal unbundling of the generation, transmission and distribution functions, and the creation of an independent market regulator (CRE), France has largely resisted this pressure and the fundamental characteristics have been retained. EDF remains as a state-controlled monopoly operator, which still owns the transmission and distribution businesses, even if they are managed separately.

France's rigid institutions stand in contrast to the UK where the dispersed and diversified generation market weakens any potential veto points from within the sector and provides policy-makers with greater scope to implement their preferred policies. Rapid increases in gas generation in the 1990s and then renewable generation from 2013 – both at the expense of coal – suggest that path dependencies are much weaker relative to France and that radical shifts in the energy mix are more likely. In both cases policy played a role in reinforcing existing market signals. The 'dash for gas' was primarily driven by lower prices relative to coal, but the breakup of state monopolies in the coal and electricity sectors had weakened entrenched interests. The more recent decline in coal was a consequence

of an ageing fleet of coal plants that were nearing the end of their service lives, although closures were hastened by the EU's Large Combustion Plant Directive, the UK's carbon price floor, and a number of policies implemented to support the deployment of renewable energy (Littlecot, 2016). The details of those policies are the subject of analysis in Chapter 8, but it is clear that a policy approach that simply reinforced existing market conditions was sufficient to produce positive outcomes in terms of emissions reductions and renewable deployment.

However, the challenges encountered in developing the Hinkley Point nuclear plant highlight the potential limitations of a market-based approach in achieving the country's climate and energy objectives. The plant was deemed to be a necessary component of the overall energy transition, but the market would not deliver the capacity without significant state intervention. Similar interventions are likely to be required as the energy transition moves into a more difficult phase. The phase-out of coal generation represents the low-hanging fruit of the energy transition. Coal plants were at, or near the end of their service life and the market needed little or no incentive to fill the gap with gas in the 1990s and renewables more recently. However, the next steps in the transition, particularly pushing gas out of the market, will be more difficult. More than half of the UK's gas generation capacity was commissioned after 2000 and much of it will have to be retired early if the UK is to meet its own objectives (Department for Business, Energy & Industrial Strategy, 2018d). It leaves UK energy policy in what Keay (2016, p. 247) describes as an "ideological limbo" between the market principles that have shaped the British electricity institutions since the 1990s and the need to decarbonise the generation system. Whether this has impeded the UK in implementing the RED will be explored in Chapter 8.

For France, the challenge of the renewable energy transition is to overcome the technological and institutional elements of France's nuclear program that have reinforced each other over nearly five decades (Finon and Staropoli, 2001, p. 180). The path dependencies embedded within the nuclear power sector mean that there has been significant resistance to the deployment of different technologies.

Attempts at 'layering' or adding renewable development to existing institutions has only proven to be mildly successful with growth rates in renewable capacity much lower than comparable EU member states, and below the targets France established under its NREAP (European Commission, 2017b, 2010).

Even if layering were possible and existing institutions could be recalibrated, there are questions about the compatibility of a highly centralised institutional structure with the requirements of the renewable transition. Although there are broad similarities between the nuclear program and the energy transition, particularly in relation to scale, there are also fundamental differences that make direct comparison very difficult. The nuclear program deployed a single, standardised technology across the electricity grid and what Hadjilambrinos (2000, p. 1114) describes as France's "techno corporatist ideology" was well suited to such a program. However, renewable energy has a more complex set of components. Not only is there an array of technologies available, but the scale at which they are deployed, and the business models that support them also vary widely. How France's state institutions have approached this challenge in the context of the RED is the subject of Chapter 7, but the following chapter will first examine the RED in detail.

Chapter 6

The Renewable Energy Directive

This chapter examines the evolution of the EU's renewable energy policies, and the specific development of the RED. It analyses the role that France and the UK played in the policy negotiation phase and the requirements that the final Directive imposed upon the two countries. The RED required both infrastructure changes that enabled an increase in renewable power generation and an associated realignment of member state political institutions and policy settings

One of the justifications for selecting France and the UK for the thesis was that these two states faced comparable increases in renewable energy generation to meet the RED targets. France had to increase the share of renewables in final electricity consumption from 15 per cent in 2010 to 27 per cent by 2020, while the UK had to increase its share from 8 per cent to 31 per cent over the same period. When existing hydro capacity is excluded from France's baseline renewables share of 15 per cent, its starting point was less than 3 per cent, thus making the actual percentage increase required in the two countries very similar (European Commission, 2017b, 2010).

Understanding the required change to each country's energy mix is therefore relatively straightforward, but the political-institutional adjustment is much more difficult to quantify. It requires a detailed analysis of the positions of France and the UK in the development of the Directive, but also a broader analysis of the Europeanization of climate and energy policy in the two countries since the two issues became intertwined in the mid-1980s.

The objective of this chapter is to establish whether policy settings in France and the UK were aligned with the requirements of the RED. This will provide a foundation for

the analysis of the implementation that will follow in Chapter 7 (France) and Chapter 8 (the UK).

The chapter is divided into two sections. The opening section begins by situating the RED within the context of the EU's broader climate and energy strategy. The Directive is just one component of a strategy that first emerged with the implementation of the Single European Act (SEA) in 1987 and the recognition of the scientific consensus around climate change by the European Commission in 1988. The Europeanization of this strategy in France and the UK, including the influence that these two states have had on the EU's strategy since the 1980s, is then examined. A specific analysis of the development of the RED follows, which begins with an examination of the 2001 Directive on Electricity Production from Renewable Energy Sources (RES), which first established the framework for EU renewable energy targets. It then studies the process of negotiation that took place between 2006 and 2009 with a particular focus on the positions of France and the UK. The combined analysis of the EU's climate and energy strategy and the more specific study of the development of the RED establish an understanding of the political adjustment required of France and the UK.

The chapter's second section examines the specific provisions of the RED and evaluates how they influence implementation at the member state level. Although the RED provides member states with considerable freedom to choose their own policies to achieve their targets, there are some specific requirements, restrictions, and omissions that influence member state responses. This section includes an analysis of other EU policies that may influence renewable energy deployment. It is impossible to accurately quantify the specific effects of individual policies, including the RED, but by cataloguing and analysing each, it is possible to reach a reasonable understanding of their effects. This exercise provides a clearer understanding of the impact of the RED at the member state level.

Part I: The evolution of the Renewable Energy Directive

Energy policy has been a crucial component of the EU's climate strategy from the time that a strategy was first articulated in 1988 (Oberthür and Pallemaerts, 2010, pp. 29–32). The Commission's first official communication on climate change recommended 10 actions for governments and industry, eight of which related to energy (European Commission, 1988, pp. 34–6). The Commission first proposed a specific EU renewable energy policy with the release of a Green Paper entitled *Energy for the Future* in 1996. The aim of the paper was to outline possible policies to promote renewable energy across the EU and to prompt debate amongst member states, the EU institutions and the various stakeholders, including industry bodies (European Commission, 1996). It was the first step in the development of the RES.

The 2001 Directive on Electricity Production from Renewable Energy Sources (RES)

Once input had been received on the RES Green Paper, a White Paper with the same title was released the following year with more explicit policy proposals. The central proposal of the Paper was an EU renewable energy target of 12 per cent by 2010, with separate targets for the electricity sector in each member state that amounted to 23 per cent. The 12 per cent target represented a doubling of renewable energy capacity across the EU. However, nearly all of the existing capacity at the time was hydro, which had limited potential for expansion. The proposal therefore projected significant increases in wind and solar capacity, which at the time represented less that 0.2 per cent of total electricity generation in the EU (European Commission, 2017b). There was also ambition in the timeline detailed in the White Paper with the Commission aiming to finalise a directive by the end of 1998.

Debate over specific aspects of the Directive meant that a draft did not emerge until May 2000 and the final Directive was not finalised until October 2001. Debate centred round three issues: the definition of 'renewable', whether targets should be binding and attempts to harmonise member state support schemes.

As the EU's potential to increase hydropower was limited, there were calls to exclude it from the definition of 'renewable', or to at least limit the definition to small-scale installations with less than 10MWh capacity. Attempts were also made to exclude some forms of biomass and waste from the definition. However, member states - particularly France and the UK - sought maximum flexibility in the definitions used and ultimately both large-scale hydro and a broad definition of biomass that included waste incineration were included (Rowlands, 2005, pp. 967–8).

The Council and the Parliament also disagreed on the matter of targets. The Parliament initially wanted a 15 per cent overall target for the EU and binding national targets for electricity, but the Council would only agree to a 12 per cent target and indicative national targets. The Council's position was ultimately accepted. Article 3 of the 2001 Directive did include a reporting requirement and a provision that potentially enabled the Commission to propose binding targets to the Council and Parliament if it concluded that a member state's actions were insufficient to meet its indicative target. However, the actual wording was weak, only allowing the Commission to submit a proposal in the event of an "unjustified" shortfall in a member state's activities and not binding either the Council or the Parliament to accepting the proposal.

The third of the significant issues under debate, policy harmonisation, saw the Commission, the Council and the Parliament each adopt a different position. Member states had generally applied one of three types of support: feed-in tariffs, tradeable certificates and tendering processes (Kitzing et al., 2012; Meyer, 2003). Feed-in tariffs were first introduced in Germany in 1991 and provide a guaranteed price, paid for by the utilities, for any electricity from renewable sources that is fed into the grid (Jacobs, 2012a, p. 224). Tradeable certificates are a market-based system that works by placing an obligation on electricity distribution companies to include a certain percentage of renewables in their supply to the market. As determining the source of electricity is impossible once it enters the grid, a certificate scheme is established to ensure that electricity distributors are meeting

their obligations. The certificates are allocated to the producers of renewable energy - typically one certificate for every MWh produced - who then pass the certificates onto the distributors when they sell the electricity to them. Distributors must then surrender the certificates to the energy authority at the end of a given period. If a distributor does not have enough certificates to fulfil its obligations, it must then purchase certificates on the open market.

Tendering processes are the simplest mechanism of the three. A government releases a tender for a certain amount of renewable capacity and awards the contract to the lowest bid.

The Commission's preference, supported by the UK, was to establish an EU-wide tradeable certificate system, arguing that a market-based system would provide the most flexibility (Busch and Jörgens, 2012, p. 79). The Parliament preferred feed-in tariffs, as they had proven to be the most effective in encouraging increases in renewable energy capacity, even if they were not considered to be the most cost effective policy. Ultimately, the Council quashed any real attempt at harmonisation, preferring to maintain the status quo, which gave member states the power to decide how they would support renewable energy (Solorio and Fairbrass, 2017, p. 109). The Commission was charged with the task of reporting on different policy support measures in place at the member state level and the possibility of harmonisation five years after the implementation of the Directive, but again the wording was vague and did not include any criteria that would trigger a concrete harmonisation procedure (Rowlands, 2005, p. 972).

Outcomes of the 2001 Directive

The 2001 RES established renewable energy targets for the electricity sector in each member state, but although it included reporting requirements, the targets were not binding and growth in renewables was slower than expected. Ultimately, the EU failed to achieve its objective of having a 21 per cent share of renewables in the electricity sector by 2001, reaching a final figure of 19.7 per cent (Eurostat, 2018a).

Only Denmark, Germany, Hungary, Ireland, Lithuania, Poland and Portugal met their indicative targets for electricity. The UK had a modest target of 10 per cent, but fell well short, reaching just 7.5 per cent by 2010. France also failed to achieve its 21 per cent target, finishing with 14.8 per cent in 2010 (European Commission, 2011c, p. 3).

However, the Directive did establish a framework that was built upon for the post-2010 period and failure to reach the targets gave the Commission some leverage in its efforts to strengthen that framework (Howes, 2010, pp. 122–3).

The development of the 2010 RED

Following a similar strategy to the one adopted in the lead up to the 2001 RES, the Commission released a Green Paper in 2006 that signalled its intention to formulate a more ambitious and comprehensive directive (European Commission, 2006). The Green Paper was followed by the release of the *Renewables Roadmap* (European Commission, 2007a), and *An Energy Policy for Europe* in 2007 (European Commission, 2007b). The two documents articulated the Commission's ambition to develop an integrated climate and energy package that would extend into the heating and cooling, and transport sectors with the aims of reducing emissions, increasing energy security and promoting the development of new, sustainable technologies. The resulting policy package became known as the '20-20-20 by 20' package due to its three headline targets of a 20 per cent reduction in emissions from 1990 levels, a 20 per cent improvement in energy efficiency, and a 20 per cent share of renewable energy by 2020 (European Commission, 2008).

With the Commission's proposal published, debate amongst the member states focussed on the same three issues that had been at the core of the 2001 RES debate: the definition of renewable energy, binding national targets and the harmonisation of renewable energy support schemes. France played a prominent role in the first, while the UK was at the forefront of the other two.

The role of France in the development of the RED

France's position towards the EU renewable energy policy has been shaped by its commitment to nuclear power (Bocquillon and Evrard, 2017, p. 165). France made its first investments in non-hydro renewable technologies at the same time it announced that it would rapidly expand its nuclear capacity in response the Oil Crisis in 1973. However, those investments came to an abrupt end in 1986 as it became apparent that the new nuclear plants had created over capacity in the electricity market (Grotz, 2012, p. 135).

The 2001 RES required France to increase its share of renewable energy in electricity from 15 per cent in 2001 to 21 per cent in 2010. Given that over 95 per cent of France's existing renewable capacity was derived from hydro, this represented a significant increase and prompted the Government to create a new electricity law that included an investment program for renewables (*2001/77/EC*, 2001; European Commission, 2017b; Grotz, 2012, p. 127)

In 2003, a national debate was held around France, with key stakeholders contributing to seven public events in different cities. The resulting *White Book on Energy* (*Livre blanc sur les énergies*) was to then form the basis of a new national energy law. The White Book reaffirmed France's commitment to the 2001 RES targets and called for a diversification of electricity generation, but it failed to articulate any targets for renewable energy beyond 2015, and called for nuclear to continue to play a central role in the long-term ("Livre blanc sur les énergies," 2003, pp. 37–8)

Despite the commitments made in the White Book and the subsequent energy law, France fell well short of its 2001 RES targets. Although there were significant developments in the wind power sector, these were offset by declines in hydro output (European Commission, 2017b). This was a demonstration of what an industry official sees as a constant in French renewable energy policy: "There is a gap between rhetoric and ambition in France" and that gap is due to the central role that

EDF continues to play in policy making: “EDF still has nuclear at its core, even if it has a renewables division” (Interview 2, 2018)

Having failed to meet its targets, France sought to change the wording of the follow up directive from ‘renewable’ to ‘low-carbon technologies’, which would enable nuclear power to be included in any targets. The change actually appeared in the 2006 Green Paper and French President Jacques Chirac then argued strongly in favour of the changed wording ahead of a European Council meeting in March 2007. However, German Chancellor Angela Merkel, who held the rotating Presidency of the Council at the time, strongly opposed the change, and the Council ultimately instructed the Commission to draft a directive based on renewable energy rather than low-carbon technologies (Turmes, 2017, pp. 29–30).

The draft Directive was approved by the Council of Ministers in April 2009. Although energy matters were still subject to national vetos (as they were not included in the Treaty establishing the European Communities - a specific article was included in the Lisbon Treaty, which only came into effect in December 2009), the RED, was adopted under Articles 95 and 175(1) of the EC Treaty, which related to the functioning of the internal market and environmental protection respectively. These articles only required a qualified majority in the Council of Ministers (van Schaik, 2010, p. 263). However, as the RED was part of a broader climate and energy package, it was subject to the unanimous approval of the heads of state at a European Council meeting in December 2008. As France held the rotating Presidency of the Council at the time, President Sarkozy was to play a crucial role.

Sarkozy recognised that concluding the package ahead of the 2009 Copenhagen COP was essential to EU leadership claims in relation to climate policy (Parker and Karlsson, 2010, p. 935). According the Claude Turmes (2017, p. 25), the Parliament’s rapporteur for the RED, Sarkozy also sensed an opportunity to build a legacy for himself by being the leader who steered the climate and energy package through the Council. Turmes’ observation is supported by the account of Pierre Sellal (in Nay, 2012), France’s Permanent Representative to the EU. According to Sellal, Sarkozy

personally negotiated with the leaders of several reticent member states prior to the meeting, and then as chair of the actual meeting, he refused to engage in any substantive debate about the provisions of the package and sought a vote on the 30-page document after just 90 minutes. The tactic worked and all heads of government signed the package.

Sarkozy had been supported throughout the negotiations by France's Ecology Minister, Jean Louis Borloo who saw the 20-20-20 package as an opportunity to bypass domestic, pro-nuclear opposition to implement stronger renewable energy targets (Turmes, 2017, p. 29). This is an example of a phenomenon described by Featherstone and Radaeli (2003, p. 9) whereby the "complex interpenetration between the 'domestic' and the 'European' level creates a variety of opportunities for actors to exploit" including national governments identifying "strategic advantages in being bound by EU commitments". EU decision-making procedures favour member state executives over national parliaments, domestic pressure groups and institutions, giving the executive greater capacity to implement policy priorities at the EU-level than they may have at the domestic level (Moravcsik, 1994, pp. 10–1). In the case of the RED, implementation is dependent upon domestic actors and institutions, but the targets themselves were negotiated by the relevant ministries in the Council of Ministers, and then finalised by the heads-of-state in the European Council.

The strategic use of EU procedures by Sarkozy and Borloo certainly had some bearing on the final outcome, but it should not be overstated in this case. Despite the important role that it played in finalising the RED, France was one of least ambitious countries over the course of the negotiations, particularly in relation to electricity (Bocquillon and Evrard, 2017, p. 165). A Commission official working on renewable energy matters states: "France is not ambitious. They want decarbonisation, but don't want anything specific relating to electricity. They want to do more in heating, cooling and transport" (Interview 1, 2018).

The role of the UK in the development of the RED

The UK's relationship with the EU presents a number of paradoxes. It has always been an outsider in EU politics generally, but has been highly influential in energy policy, particularly since the mid-1990s when the Blair Government made a strategic decision to upload its liberalisation agenda to the EU level (Ciambra and Solorio, 2015). It has also been a proponent of stronger EU climate action at the international level, but has often been resistant to specific renewable energy policies (Carter, 2014, pp. 423–5; Interview 10, 2018; Rayner and Jordan, 2010). These paradoxes were evident in its position toward the RED.

Much as it had done during the negotiations over the 2001 RES, the UK opposed individual targets in principle and its own internal targets were modest relative to those proposed by the Commission. The UK's 2006 Energy Review stated that 20 per cent of electricity could come from renewable sources by 2020 (Department of Trade and Industry, 2006, p. 98). This was not a firm commitment, merely a statement of potential. The 20 per cent target was repeated in the Energy White Paper that followed in 2007, although its forecasts were less optimistic than the 2006 Review due to the rising costs of raw materials for renewables (Department of Trade and Industry, 2007, p. 159).

However, by 2006 the UK was beginning to radically alter its position in relation to climate change and renewable energy. In 2005, the UK hosted the G8 Summit, and Tony Blair wanted to make an impact by focussing on two items that went beyond the traditional economic discussions: African development and climate change. In addition to the leaders of the eight largest economies of the world, Blair invited China, India, Brazil, South Africa and Mexico and aimed to further talks about an international climate agreement to succeed the Kyoto Protocol. After the United States had failed to ratify the Kyoto Protocol, Blair understood that any future agreement would require the involvement of both the United States and China, and believed that the UK could play a critical role in facilitating an agreement (Blair, 2010, p. 627). A senior energy advisor to the Government at the time attributes this sudden focus on climate change to Blair's desire to "leave a legacy" (Interview 8,

2018), much as Nicolas Sarkozy has sought to do at the European Council meeting in 2008.

Following the G8 Summit, the Blair Government commissioned economist Nicholas Stern to write a report on climate change and its economic impacts and opportunities. The Stern Review remains one of the most influential reports on climate change published - in part because it reframed economic understanding of the issue, and inverted the narrative about deferred mitigation and adaptation costs being less than present ones. Stern famously described climate change as the "greatest market failure the world has ever seen" (2007, p. viii) and estimated that the costs of climate change would be equivalent to at least 5 per cent of global GDP each year unless action was taken. However, these costs were not directly factored into the practices that cause the problem. Stern made three broad policy recommendations to overcome the failure: price carbon, promote energy efficiency measures and support innovation in low-carbon technologies. The review was strongly endorsed by Blair and the Chancellor of the Exchequer, Gordon Brown, and they set about creating an ambitious policy framework in response

The increased level of government activity coincided with a growing awareness of climate change amongst the public, with polls showing that an increasing number of UK citizens saw it as a national priority (Carter, 2014, p. 425). This awareness was aided by a concerted campaign by environmental NGOs, and a shift amongst some business leaders who began to publicly acknowledge the threat that climate change posed (Carter and Childs, 2018). Perhaps most crucially, the Conservative opposition was also advocating strongly in favour of climate mitigation policies. In fact, once David Cameron assumed the leadership of the Conservative Party in 2005 he placed climate change amongst the Party's highest priorities (Bale, 2016, pp. 285–88; Carter, 2009, p. 233; Carter and Jacobs, 2014, pp. 137–9). The Chancellor, Gordon Brown, underwent his own conversion around the same time, and like Blair, his motives related to personal ambition. According to Carter (2008, p. 198), Brown envisaged a future electoral battle with Cameron for the Prime Ministership and felt that he had to match the ambition of the Conservative leader on climate policy.

With the Greens Party also polling well at the time, particularly in Labour-held seats, the Government faced the unusual situation of being outflanked on climate policy by both left and right wing parties. This confluence of factors jolted the Blair Government from its complacency and was a decisive factor in generating significant policy activity (Carter, 2014, pp. 427–8). According to the senior energy researcher, the Labour Government would only have accepted about 80 per cent of what was proposed if not for pressure from the Conservative opposition (Interview 8, 2018).

In 2006, the UK Government released the Energy Review, which then formed the basis for an Energy White Paper in 2007. The White Paper recognised that current policy settings were insufficient and argued for a strengthening of policy support mechanisms, a streamlining of planning processes and investments in grid infrastructure to ensure that 20 per cent of electricity would be sourced from renewables by 2020 (Department of Trade and Industry, 2007, pp. 143–67). The 20 per cent figure was well short of the 31 per cent that was eventually included in the UK's NREAP, but according to a senior policy advisor in the European Parliament, the White Paper was a "game changer" which "put the UK almost at the forefront of ambition amongst member states" (Interview 4, 2018, p. 4)

In 2008 the Government passed one of the world's most ambitious pieces of climate legislation, the *Climate Change Act*. The Act established a legally binding emissions reduction target of 80 per cent on 1990 levels by 2050. Given that the Government had endorsed a 60 per cent target just eight years earlier, the new target was a clear demonstration of just how quickly, and how far, climate politics had moved in the UK. The target would be achieved by setting out five-yearly carbon budgets that were to be based on recommendations from the Committee on Climate Change (CCC), which had also been established under the Act.

One senior member of the European Commission working on renewable energy policy in 2008 described the political atmosphere in the UK as a "fervour", and it was within this context that the UK went from "being against everything" to accepting a

binding national target of 15 per cent, with an implied target for the electricity sector of about 30 per cent (later formalised at 31 per cent in the UK's NREAP that was released in 2010) (Interview 7, 2018). There were some concerns about the ambition of the UK's target with a report from the House of Lords European Sub Committee on Internal Markets noting that both Ofgem and National Grid had expressed concerns that the target would favour wind power at the expense of other technologies, given that it was the most mature renewable technology available. There were also concerns that the targets under the RED were purely political and would focus attention on renewables, rather than emissions reductions as a whole. However, the committee did not recommend that the targets or timelines be altered (Parliament, House of Lords, 2008, pp. 11–2).

The only concession granted to the UK by the Commission was that a large-scale tidal power project that would be completed after 2020 would be included in the UK's target (Turmes, 2017, p. 29). Given that the UK had considered a 20 per cent target reasonable in 2006, the acceptance of the RED target was a significant increase in ambition.

The UK did lose a debate about the harmonisation of renewable energy support schemes, although it also played a key role in reaching a compromise agreement that enabled the RED to be finalised. The UK had initially argued strongly in favour of an EU-wide tradeable certificate scheme for electricity generated from renewable sources. The scheme would mirror the UK's own national certificate scheme and would eliminate the need for other support mechanisms such as the feed-in tariffs (Nilsson et al., 2009, pp. 4454–5). The UK believed that the ability to purchase certificates from other member states would be a cheaper method of attaining its targets rather than developing the renewable energy capacity domestically (Solorio and Fairbrass, 2017, p. 110). Despite the fact that a majority of member states opposed harmonisation, the UK had initial success in uploading its market-based policy preferences, with the proposal included in the draft RED of January 2008 (Toke, 2008, p. 3003). However, the scheme was opposed by Germany and Spain, in particular, due to their preference for feed-in tariffs.

An eventual compromise was orchestrated by the UK, Germany and Poland in June 2008, which allowed for the inclusion of cooperation mechanisms in the final Directive but ultimately provided member states with the freedom to implement their own national policies to achieve the RED targets (Boasson and Wettestad, 2013, p. 92). The cooperation mechanisms are analysed in Part II of this chapter.

Final outcome of the RED negotiations

The final Directive allocated an overall target for each member state, which ranged from 10 per cent for Malta to 49 per cent for Sweden. In addition to the 20 per cent renewable energy target, there was also a 10 per cent target for transport that was applied to all member states evenly.

The RED was published in April 2009, a little over three years after the first proposal was outlined in the Commission's Green Paper. By comparison, more than five years passed between the 1996 Green Paper proposing the original RES, and the finalisation of the Directive in 2001. This is despite the 2009 RED having the added complexities of binding national targets, and being tied to the broader 20-20-20 package. The greater urgency can be attributed to the fact that climate and energy had been pushed to the top of the EU's policy agenda by a heightened awareness of climate change and its impact on energy systems; record energy prices; the publication of the Stern Review; and the need to begin discussions about a global agreement to replace the Kyoto Protocol (Howes, 2010, p. 118).

This atmosphere also drove greater ambition in France and the UK, leading them to play more constructive roles in the final year of negotiations than they had in the previous two. This points to the need to include the role of ideas and political leaders in any analytical framework that seeks to explain Europeanization. This certainly does not nullify historical institutionalism as an explanatory framework, as those ideas are still interpreted through the lens of institutions. The RED may have been finalised in something akin to a political fervour, but existing institutions

operating within their own constraints will determine the more mundane process of implementation over a 10-year period. The analysis of that process in France and the UK will be made in the following chapter, but it is first necessary to examine some key provisions of the RED that have influenced its interpretation and implementation at the member state level.

Part II – The content of the RED

The second section of the chapter focuses on the specific provisions of the RED that influence how it is implemented at the member state level. It then analyses the outcomes of the Directive and considers how other policies, specifically the EU's emissions trading system (ETS) and Large Combustion Plant Directive (LCPD), influenced the deployment of renewable energy in France and the UK.

Implementation and reporting requirements

Article 4 of the Directive required member states to submit a National Renewable Energy Action Plan (NREAP) to the Commission by 20 June 2010. The report followed a standard template and included sectoral targets for electricity, transport, and heating and cooling with annual interim targets from 2010 to 2020. A list of actions (policies, joint projects or statistical transfers) that would be implemented in each sector to meet the targets was also included. If the Commission believed that the measures outlined in the NREAP were insufficient, it would issue recommendations to the member state.

The deadline for transposition was 5 December 2010. Member states were required to formally notify the Commission of all policies that had been implemented to achieve the targets by that date. If the Commission felt that those policies would not be sufficient to meet a member state's targets, infringement proceedings could be initiated. Details of those proceedings are in the following section.

Article 22 of the Directive requires each member state to submit bi-annual progress reports, with the first being submitted at the end of 2011. If the progress report

shows that a member states has fallen behind their trajectories by any significant margin, they are required to submit a revised NREAP to the Commission. The Commission collates the information contained in the member state reports and submits its own summary report to the European Parliament and Council, also on a bi-annual basis.

Penalties

The Directive does not specify the penalties that can be imposed upon member states for failing to meet the targets, but under Article 258 of the Treaty of the Functioning of the European Union (TFEU), the Commission can initiate infringement proceedings against a member state for failing to transpose the Directive fully into national law, or for failing to meet the targets at the end of the RED period. Any proceedings based on failure to transpose the law fully are likely to take place in the first few years following a Directive coming into force. Under the procedure, the member state is first likely to be given an opportunity to explain its position, but if this explanation fails to satisfy the Commission, a letter of formal notice will be issued, which requires the member state to formally respond, normally within two months. Following an assessment by the Commission, the proceedings will either cease in the case of a positive assessment, or result in a 'reasoned opinion' being sent to the member state, which is essentially a final warning. Again, the member state is given two months to respond, although the deadline is often extended if a request is made. If the Commission believes that the member state response is still unsatisfactory, the matter is referred to the European Court of Justice (ECJ). Article 260 of the TFEU grants the Commission the power request a second ruling from the ECJ, this time in relation to the penalty, which normally takes the form of a fine. Financial penalties are determined by the seriousness of the infringement, the length of the infringement and the ability of the member state to pay.

The various steps in the penalty process take several years, and member states are given several opportunities to comply before fines are imposed. In reality, failures to transpose directives are usually resolved following the issuance of the letter of formal notice, and before the Commission sends a reasoned opinion. In 2010, there

were 792 cases closed by the Commission, of which 70 per cent were closed at the first stage of proceedings (European Commission, 2011d, p. 6).

According to an advisor working in the UK parliament, the threat of fines from the Commission "drove action on environmental law time and time again. The name and shame also carries some weight. If you are one of three countries that haven't met its target, you can't go around to world saying that you are leader." (Interview 11, 2018). This view was echoed by a report from the UK's House of Commons Energy and Climate Committee (2016, p. 9), which stated that the UK's failure to achieve its 2020 renewable energy target "would be an unacceptable outcome given the UK's reputation for climate-change leadership".

Statistical transfers

Member states that fail to achieve their binding national targets can utilise the 'statistical transfer' provision outlined under Article 6 of the RED. Under this provision, member states can come to an arrangement whereby one state that has overachieved can trade part of its surplus to another state that has not met its target. As the name implies, there is no trade in actual energy, only a statistical transfer.

In October 2017, Luxembourg became the first member state to utilise the statistical transfer mechanism, reaching an agreement with Lithuania, which had already exceeded its 2020 target. Under the agreement, Lithuania will make a statistical transfer of 700GWh of renewable energy produced in their country, in exchange for €10 million (European Commission, 2017d).

Cooperation mechanisms

The statistical transfer provision is one of three cooperation mechanisms included in the RED, with the other two being joint projects between member states or between member states and third countries, and joint support schemes. Joint projects involve the cooperation between two countries to develop renewable energy capacity. In the case of intra-EU cooperation, the member states involved in the project notify

the Commission as to how the energy produced is to be allocated. There is no requirement for actual energy transfers only a statistical allocation to avoid double counting. Joint projects between member states and third countries do require energy transfers. The energy can be produced in the third country, but must be consumed within the member state.

The cooperation mechanisms are supposed to promote the concept of the single energy market by encouraging cooperation on the development of renewable capacity and the trade of energy produced by renewable sources. However, the mechanisms outlined in the Directive are entirely voluntary and there are a lack of incentives for member states to engage in them. The objective of promoting cooperation was also undermined by a provision that allowed considerable scope for national support schemes. This has led to what Buchan (2013, p. 8) argues is "increasing doses of random national intervention in the energy market, exactly what liberalisation was supposed to remove".

Outcomes of the 2009 RED

The EU is on track to meet its overall target. By the end of 2017 – the most recent available data are from October 2019 – show that about 17.5 per cent of the EU's energy consumption came from renewable sources. However, the figures also show considerable variance between member states. Eleven had already reached their targets with a further two within a percentage point. The Netherlands and France were the furthest from their targets with Ireland and France also well behind (Eurostat, 2019). The progress toward the national electricity targets shows similar trends. Seven had met their targets by the end of 2017, but again the Netherlands, France and Ireland were well behind their NREAP targets. However, the UK's performance in the electricity sector is better than its overall performance and it is likely to meet its 31 per cent target before 2020 (Eurostat, 2018a).

The EU's renewable energy policies have also had a positive impact on the development of new technologies. Although the EU's own *Innovation Scoreboard*

shows that the bloc's overall innovation performance is poor (European Commission, 2017e), it has established a clear leadership position in clean energy. The EU leads the world in renewable energy deployment (REN21, 2017, p. 34), R&D expenditure (Frankfurt School-UNEP Centre, 2017, p. 78) and the number of patents held for climate change mitigation technologies (CCMT). The EU is particularly strong in high-value CCMT patents - defined as those where protection is sought in more than one jurisdiction - holding 40 per cent of those granted in 2011 (European Patent Office-UNEP, 2015, p. 9).

Whether these achievements are consistent with the EU's longer-term emission reduction commitments, will be considered in the concluding chapter, but based on the EU's own 2020 targets, the RED has largely been a success. The individual performance of France and the UK will be examined in the following chapters, but the final section of this chapter will examine two EU policies that may also have influenced the deployment of the renewable energy.

Although the RED is the primary policy tool for promoting renewable energy in the EU, there are a multitude of factors that influence the deployment of renewable technologies, including policy settings, the availability of technology, renewable energy potential and market design amongst others (Abdmouleh et al., 2015; Aguirre and Ibikunle, 2014; Polzin et al., 2015). Many of these are country specific and are included in the analysis that follows in Chapters 7 and 8, but two key EU environmental policies warrant particular attention: The ETS and the Large Combustion Plants Directive (LCPD). An analysis of the impact that these two key policies have had on renewable energy deployment allows the influence of the RED to be better understood.

The impact of the Emissions Trading System

The EU ETS was launched in 2005, becoming the world's first international carbon trading system. The first phase of the system ran as a pilot between 2005 and 2007 and covered only emissions from power generators and energy intensive industries.

In its current, third, phase, which runs until 2020, the 'cap and trade' system is applied to sectors that are responsible for 45 per cent of the EU's emissions, including power and heat generation, domestic aviation and energy intensive manufacturing (European Commission, 2016). The third phase includes a single EU-wide cap and the auctioning of permits rather than free allocations (European Commission, 2016b).

The end of phase 1 of the ETS coincided with the negotiations around the RED in 2007. There was an argument within the Commission about the necessity of both the RED and an ETS. If electricity generation was already covered by the ETS, and emissions reductions were the primary goal of a renewable energy policy, then the latter was theoretically redundant. However, as Newbery (2012) correctly notes, the objective of the RED was not to reduce emissions, rather it was designed as a demand-pull instrument that would encourage investment, encourage new knowledge, reduce the cost of renewables and allow the EU to export its knowledge and hardware to the rest of the world. By the end of the first phase of the ETS, it had also become apparent that the system would not be sufficient to drive renewable energy deployment, thus confirming the need for a specific renewables target (Jones, 2010, p. 236).

Phase two of the ETS ran from 2008 to 2012. More reliable emissions data allowed for a cap that better reflected reality and the number of free allowances issued was reduced. However, the onset of the economic crisis in 2008 again led to a surplus and the carbon price fell from a peak of nearly €30 to €10 within twelve months. The price per tonne of carbon continued to fall after 2012, and remained below €5 until mid-2017. The announcement that significant reforms would be implemented in the fourth phase of the ETS, beginning in 2020, triggered a steady increase with the price passing the €20 mark for the first time in nearly a decade in August 2018 (European Council, 2017; Sandbag, 2019).

Both France and the UK have implemented a carbon price floor (CPF) to support the ETS, which has had an impact on the closure of coal plants in the UK in particular

(Interview 9, 2018), but the ETS itself has largely been ineffectual on renewable energy deployment.

The impact of the Large Combustion Plant Directive

The Large Combustion Plant Directive (LCPD, 2001/80/EC) came into effect in October 2001, replacing an earlier directive from 1988 (88/609/EEC), which had been developed in response to concerns about air quality (Eames, 2001, pp. 59–60). The LCPD placed a limit on the flue gas emissions from combustion plants with a thermal capacity of 50MW or greater. Thermal plants, including fossil-fuel power stations, petroleum refineries and steelworks, were all included under the Directive, with specific emission limits set for sulphur dioxide, nitrogen oxides, and dust.

Under the terms of the Directive, combustion plants built after 1987 had to comply with specific emissions limits. Plants built prior to 1997 could either retro-fit emissions technology or opt-out of the scheme. Operators that chose to opt-out were limited to a maximum of 20,000 hours of further operation, and had to close completely by the end of 2015. Across the EU, 205 plants 'opted out' with the directive being particularly effective in the UK where eight coal-fired plants totalling 8GW of capacity, or one-quarter of the UK's total coal capacity, decided to opt-out. All eight plants closed between 2012 and 2015 (European Commission, 2016c).

The Industrial Emissions Directive (IED) superseded the LCPD in 2016. The IED extended its coverage to include non-combustion industrial plants. Of the eight remaining coal plants in the UK only one currently complies with the IED. Those plants that do not meet the standard have a limit placed on their operational hours, meaning that they are likely to close before 2025 (Utilitywise, 2016).

The LCPD and IED have therefore had a considerable impact in the UK and are considered in the analysis of the UK's implementation of the RED in Chapter 8.

However, the two directives had little impact on the French electricity sector due to the small role that coal has played in the generation mix (less 2 per cent) since 2010

Conclusion

There are two main conclusions to be drawn from this analysis of the RED. The first relates to the Europeanization of the Directive and the adjustment required of France and the UK.

At the beginning of the RED period, France and the UK faced a similar challenge in terms of the rate of renewable energy deployment required to meet their targets. Both states had been amongst the worst performing of EU member states in terms of renewable energy through the 1990s and the first half of the 2000s. Both the French and UK Governments were also what Bocquillon and Evrard (2017, p. 169) describe as a "foot-draggers" in the early phases of the RED negotiations. However, the Blair Government began to significantly increase its ambition in relation to climate change and renewable energy from 2005 onwards. It was during the period from 2005 to 2009 that the Government accepted a national target under the RED of 31 per cent, having proposed a 20 per cent target just two years earlier. It also implemented a series of domestic policies – most importantly the *Climate Change Act* in 2008 - which created a durable legal and institutional foundation that would go some way to minimising the political adjustment of the RED (Carter and Jacobs, 2014; Howes, 2010, p. 118). The UK had therefore begun the political-institutional adjustment toward meeting the requirements of the RED before 2009.

Notwithstanding the efforts of Nicolas Sarkozy in the final negotiations over the 20-20-20 package, his ambition was not supported by domestic policy programs, nor did it have the backing of his administration (Bocquillon and Evrard, 2017, p. 179). France's political adjustment was therefore more challenging than the UK's, given that the Blair Government had already commenced a domestic policy program that would support the implementation of the RED. Chapter 7 (France) and Chapter 8 (the UK), will examine the adjustment required of the two states further.

The second conclusion relates to the benefits of an analytical framework that can account for the role of actors and new ideas. By Turmes' (2017, p. 25) account, if not for Sarkozy's desire to build a personal legacy during the crucial Council meeting in December 2008, the 20-20-20 package would have been delayed by a long list of amendments and weakened by compromise. Sarkozy's own administration did not regard France's target as being favourable, but the strong stance of the President led to its domestic acceptance (Bocquillon and Evrard, 2017, p. 179). It was a similar story with Tony Blair's own desire to forge a political legacy at the G8 meeting in 2005, which marked the beginning of a more ambitious approach to climate change mitigation.

The role of France's ecology minister, Jean-Louis Borloo is also important to note. Using the authority provided by the EU's decision-making procedures to establish targets that would have been opposed at the domestic level is an example of what Dyson and Featherstone (1996) term a *vincolo esterno* (external constraint). The term was first used to describe Italy's commitment to the European Monetary Union as a way of forcing economic reforms that would not have been possible through domestic action alone. Rational choice institutionalism can potentially explain such a tactic. Member states accept the constraints of the EU, but see opportunities to leverage those constraints to implement domestic reforms that would otherwise be more difficult. However, Woll and Jacquot (2010) argue that any analysis of the 'strategic usage' cannot ignore the role of individual actors and sociological elements.

Bocquillon and Evrard (2017, pp. 163–4) argue that the Europeanization literature tends to "overemphasise structural aspects – economic structures, institutions, ideas – at the risk of losing sight of the actors' role" going on to note that "Domestic actors implement, resist and sometimes subvert European constraints. They are not only passive receivers of European norms; they can also use them as resources for their own purposes". Sarkozy and Borloo held influential positions at a crucial juncture in the development of the 20-20-20 package, and their ambition during the

negotiations did not comply with the expectations of purely institutionalist accounts, namely the maintenance of the nexus between the French state and the nuclear sector. The analytical framework must therefore account for agency, even if that agency is bound by the institutions in which actors operate.

The political atmosphere also influenced the key actors at the time. For a brief period between 2005 and 2009, climate change became a global political priority influenced by a range of factors exogenous to the institutions of the EU member states. The Stern Review, Al Gore's film, *An Inconvenient Truth*, and the upcoming Copenhagen climate talks all contributed to record levels of public awareness and political urgency (Carter and Jacobs, 2014, p. 423; Gavin, 2009; Schmidt et al., 2013). Again, historical institutionalism cannot provide a framework for understanding the influence of ideas.

By incorporating sociological and discursive institutionalism into the analytical framework, these elements can be accounted for. This is not to dispense with the historical aspects, only to recognise the need for nuance. Bocquillon and Evrard (2017, p. 170) note that "[i]f the climate and energy package negotiations were largely considered a French success, implementation has proven difficult and controversial". This is a reflection of the fact that although personalities and ideas may have influenced the RED at crucial stages, once the Directive had been finalised and the more mundane, 10-year process of implementation had begun, it would be the state institutions with their deep historical roots that would be responsible for this task. Moravcsik (1994, pp. 10–1) argues that the EU gives primacy to member state executives in decision-making procedures, giving greater autonomy to a small number of actors, but implementation is dependent upon domestic actors and institutions meaning that opposition becomes easier to mount. Chapter 4 already noted France's dual policy style, and whether Sarkozy's ambition could be aligned with the powerful technocracy within the civil service and EDF is a crucial question for the following chapter.

Chapter 7

The Implementation of the Renewable Energy Directive in France

This chapter examines the drivers of, and impediments to the implementation of the RED in the French electricity sector. It assesses the role of French statist ideology, political parties, the French parliament, the civil service and the French state's relationship with the electricity regulator, policy advisory bodies and power sector firms. In doing so, it draws upon the analyses of the role of the state in Chapter 4, the institutions of the electricity sector in Chapter 5 and the development of the RED in Chapter 6.

Following a brief overview of the challenge posed by the transition to renewable energy in France, the chapter analyses the history of climate and energy policy in France since the late 1980s. It divides this history into six periods, beginning with early efforts to push climate change onto the political agenda in the 1990s and then examining France's record under the five presidential mandates since 1995. There is a particular emphasis on the implementation of the RED under the three most recent presidents.

The energy transition and state control in France

As Szarka (2010, p. 113) notes "France has consistently adopted a front-runner stance on climate policy, but has largely failed to persuade major partners of the credibility of its climate leadership bids". This lack of credibility stems from the fact that much of the emissions reductions in France are the result of the transition to nuclear energy in the 1970s and 1980s, which was driven by concerns about energy security rather than climate change mitigation (Giraud et al., 1997; Szarka, 2006, p. 629).

France's nuclear power program has ensured that it has not been subject to the same political pressures relating to climate that other EU member states have experienced, particularly in relation to the energy transition. France ranks behind only Sweden – another country with a high share of nuclear and hydro in its power sector - in terms of the emissions intensity of its economy (Eurostat, 2017d, 2015). However, by explicitly focusing on renewable energy, rather than 'low-carbon' energy, as Jacques Chirac had advocated during the RED negotiations in 2006, the RED obliged the French Government to consider transitioning a portion of its power sector to renewable forms of generation.

To meet the RED target, France had to increase the share of renewable energy in the power sector from 15.5 per cent in 2010 to 27 per cent, which would require a near doubling of output from renewables (MEEDM, 2009, p. 12). Coal and gas already played a minor role in electricity generation, accounting for less than 10 per cent of the total in 2010, and gas use was expected to increase slightly up until 2020 (European Commission, 2017b). As the RED targets were based on final consumption, and not total generation, France could not rely on building additional capacity for export to achieve its target. Renewables would therefore have to displace some nuclear generation in order to meet the RED target.

However, France's nuclear power program has created multiple path dependencies that have hindered the deployment of renewable energy. As the analysis in Chapter 5 showed, nuclear power has been deeply embedded within the French state since the 1970s. It also represents a cumulative investment of over 80 billion euro, directly employs 125,000 and provides export revenue from both the supply of electricity to neighbouring countries and the sale of nuclear technology (Cour de Comptes, 2012, p. 24; OECD, 2018c, p. 12; World Nuclear Association, 2018).

The nuclear power program has also been responsible for the bulk of France's emissions reductions since the 1980s, allowing the country to claim a position of leadership on climate change, albeit one that has been questioned by Germany and the UK at various times (Szarka, 2009, p. 117). It has also eased pressure on other

sectors of the economy to decarbonise. However, the RED may in fact conflict with France's emissions reduction commitments as renewables displace an already low-carbon source of electricity in nuclear. The debate about the financial and technical compatibility of renewables with a high share of nuclear was outlined in Chapter 5 (Buchan, 2014; Morris, 2018; Nuclear Energy Agency, 2012) but the transmission operator, RTE, argues that increased gas capacity is required to accommodate a higher share of intermittent renewables (RTE, 2017, p. 15). As a consequence, emissions from electricity generation will increase. One interviewee (Interview 14, 2019) who has advised EDF and the market regulator (CRE), urged caution in assessing RTE's modelling given that the company is a subsidiary of EDF and noted that the interests of the two companies are normally aligned. It should also be noted that increasing gas-fired capacity is only one possible way to support a growing share of renewable generation with increased interconnections and increased storage capacity other viable options (Becker et al., 2014; Krakowski et al., 2016). However, RTEs perspective only points to the inherent path dependency in the relationship between EDF and the state, so regardless of the technical validity of the argument, it is likely to be accepted by the administration.

The path dependencies inherent in France's nuclear program therefore present two paradoxes. First, the transition to nuclear energy in the 1970s and 1980s demonstrated that France was capable of managing a large-scale energy transition within a short timeframe. Some of that competence may have atrophied since the completion of the last plant currently in service in 2000, but the essential elements of the model remain (Schneider, 2013, p. 31). There is a high degree of research and engineering competence within the civil service, the energy research body (CEA), and the dominant utility (EDF), all of which remain under the state's control. It is possible that the transition occurs within a different framework, with smaller, community-owned, de-centralised renewable generation displacing large-scale, centralised generation, as it has in Germany for example. However, given that the sector has a state-owned, vertically integrated monopoly at its core, the transition to renewables will likely take place within the existing framework (Interview 13, 2019).

This point is discussed further in the analysis of the implementation of the RED below, but the competence and capacity for coordination could conceivably enable the rapid transition to renewable energy. However, the fact that the state institutions are geared so heavily to supporting nuclear technology makes it extremely difficult to recalibrate toward renewable technologies (Schreurs and Tiberghien, 2007, p. 39).

The second paradox is the fact that increased renewable capacity may conflict with France's climate commitments by increasing emissions. This further impedes any possible recalibration toward a renewable energy transition as it negates the climate benefits of the RED.

These two paradoxes ensure that French policy makers now face unique challenges in balancing climate and energy policy. The following sections analyse how successive governments have sought to meet those challenges since the 1980s, arguing that the paradoxes have not been resolved, leading to a failure to meet the requirements of the RED.

Early French climate policy

In the late 1980s and early 1990s, initial efforts to develop a coordinated response to climate change at both the EU level via the European Commission, and the international level via the UNFCCC, were met by a muted response from France (Schreurs and Tiberghien, 2007, p. 39). The nuclear power program had driven emissions down from a peak of 710Mt CO2e in 1979, to 550Mt by 1990 (Climate Watch, 2019), allowing France to claim a leadership position by default (Jean-Baptiste and Ducroux, 2003, p. 164; Szarka, 2006, p. 629). As Giraud et al. (1997, p. 132) describe it, "It was generally held that, if anything needed to be done, it was that other countries, in particular France's main competitors Germany and the UK, should cut their emissions to French levels".

In the lead up to the Kyoto climate negotiations, the Government made it clear that it would use its record on emissions reduction to avoid ambitious reduction targets under any agreement. In its First National Communication under the UNFCCC, the French Government (1995, p. 6) summarised its position as thus:

> Owing to the extent of the efforts already made and the results obtained, the cost of new measures liable to be taken in France will often be higher than in the other countries of the European Union or the OECD. For this reason France believes it is essential that the cost - per tonne of carbon emission avoided - of actions to reduce emissions adopted in national programs should be of a comparable level for the various countries shown in Annex I so as to abide by the principle of economic efficiency and with the Polluter-Pays principle.

In 1997, nine months prior to the signing of the Kyoto Protocol, President Jacques Chirac sought to re-set the political agenda by dissolving the National Assembly and triggering an election. The strategy failed with Chirac's political allies suffering a heavy defeat to a coalition of five leftist parties in the subsequent elections. The Socialists dominated the coalition and Chirac was obliged to appoint Lionel Jospin as Prime Minister. The Green Party also won seven seats and entered government for the first time with leader, Dominique Voynet, appointed to head the Environment ministry. However, at Kyoto, the new Government maintained the position of the previous administration under Alain Juppé, which had argued that previous emissions reductions should be taken into account and only agreed to stabilise emissions at 1990 levels (Oberthür and Ott, 1999, p. 68).

By 2000 - the mid-point of the Jospin Government's term - it was apparent that France could no longer rely on its previous record on emissions reduction to claim a position of leadership in either climate mitigation or renewable energy. In 2000, Jospin requested that Yves Cochet, a Greens representative in the National Assembly, produce a report on the promotion of renewable energy in France, incorporating the targets contained within the draft of the European Commission's

first RED. The report noted the poor deployment rates of newer technologies such as wind and solar, and recommended tax exemptions and priority grid access for renewable technologies, and incentives for small, community owned renewable generation (Cochet, 2000, pp. 16–23). It also compared France's performance to that of other EU member states, arguing that although the relative share of renewable energy was high at over 10 per cent, there was no justification for self-satisfaction as it was only due to the output of the country's hydro capacity (Cochet, 2000, p. 136).

Cochet's report echoed the conclusions of an earlier report to government (Brosse, 1992, p. 44) , which had noted that in relation to renewable energy: "France is falling behind. Our country should not stay away from this general movement. The EEC itself intends to develop an active policy in this matter. One does not see how France could stay isolated in Europe and why it would do so." According to Bocquillon and Evrard (2017, pp. 165–6), a desire to catch-up to other EU member states represented a horizontal form of Europeanization, with France seeking to apply policy lessons from those states perceived as leaders.

By the mid-1990s, France's non-hydro renewable generation was virtually zero (0.004 per cent of the total in 1995), whereas Germany, the UK, Spain and Denmark were all developing new capacity, particularly in wind technologies. France drew upon the policy-experiences of these countries in an attempt to generate new investment in the sector (Aykut et al., 2012, pp. 160–1; Brossard et al., 2004, p. 371; Szarka, 2010, pp. 112–5).

In 1996, the Government implemented a major renewable energy promotion scheme, based upon the UK's Non Fossil Fuel Obligation (NFFO) (Benard, 1998, p. 266). The program, known as Eole 2005, had an objective of installing between 250 and 500MW of new wind capacity by 2005 and utilised a similar tripartite structure to the one that had developed France's nuclear program in the 1980s and 1990s. The Ministry of Industry acted in a coordinating role with the Environmental and Energy Management Agency (ADEME) and EDF sharing responsibility for research, implementation and monitoring. France was starting from a low base with just 3MW

of installed capacity at the beginning of 1996 and even if the full 500MW had been installed by 2005, it would still represent just 0.45 per cent of total capacity (European Commission, 2017b). However, the primary objective was to establish a supply chain for renewable technologies and assess the performance of different wind turbines (European Commission, 2017b; Laali and Benard, 1999, p. 806).

Despite the limited objectives of Eole 2005, there were a number of shortcomings in the design and implementation of the program, which limited its effectiveness. By 2000, 361MW of new capacity had been contracted under the program, but less than one-third of that capacity had actually been installed (Cochet, 2000, pp. 96–7). Administrative complexity, a tendering system that encouraged the understatement of costs by bidding companies, and a lack of penalties for companies that won tenders but failed to complete projects all contributed to shortfall in completed projects (Nadaï, 2007, p. 2718; Szarka, 2007, pp. 322–3). When projects were completed, they often faced opposition from local communities where they were situated. France's top-down decision-making processes meant that there had been little or no community consultation, creating resentment amongst those living near wind farms (Dupuis et al., 2007, pp. 24–5; Enevoldsen and Sovacool, 2016, pp. 182–3; Nadaï, 2007, p. 2716).

Policy support for renewable energy was strengthened through the Electricity Act of 2000. The primary purpose of the Act was to implement the EU's first energy package which related to liberalisation and the creation of a single electricity market, but it also provided an opportunity to assess renewable energy support programs (Bocquillon and Evrard, 2017, p. 167). The French Government drew upon the experiences of Germany and Spain and included a feed-in tariff program in the Act, with the expectation that it would yield similar increases in renewable capacity (Debourdeau, 2011, pp. 110–1; Jacobs, 2012b, p. 54; Reiche and Bechberger, 2004, p. 847; Szarka, 2007, p. 331).

The FiT had an immediate impact on the deployment of onshore wind technologies in particular with installed capacity doubling in each of the first three years of the

program (European Commission, 2017b). However, in comparison to Germany and Spain, the increase in non-hydro capacity was much lower despite France having the best potential for onshore wind in Europe and offering a higher return on investment through its program than the German or Spanish equivalents (European Environment Agency, 2009, p. 19; Jones, 2006, p. 36; Nadaï, 2007, p. 2725). Whereas France added 652MW of capacity between 2000 and 2005, Germany added 12,203MW and Spain 7,712MW (European Commission, 2017b; Szarka, 2007, p. 324). The performance of solar PV was even poorer with France adding just 6MW of new capacity between 2000 and 2005, compared with 1,942MW in Germany and 48MW in Spain.

The FiT was also criticised in report from the French Regulatory Commission of Energy (CRE) (2001). Despite the inclusion of a provision that allowed the tariff to be reduced or removed if technology-specific targets were met, the CRE argued that the rate was too high, burdening electricity users with higher prices and creating windfall profits for operators (Jacobs, 2012b, p. 70; Szarka, 2007, p. 323). The report also noted that the FiT would provide zero benefit in terms of emissions reductions.

The question that arises from the analysis of France's FiT is why it was unsuccessful relative to similar policies in Germany and Spain. Szarka (2007, p. 321) argues that "the impact of a policy instrument is heavily influenced not just by its settings (in this context, the level of economic incentive offered to market actors) but also by the institutional and industrial contexts of usage and by the relevance of mobilising discourses". Although the policy-settings were very similar in France and Germany, different institutional settings ensured that the outcomes were also very different, a point that is examined in the following section.

National identity and the energy transition

As the analysis of France's electricity sector in Chapter 5 demonstrated, there are deep political and technical path dependencies inherent in France's nuclear program that have retarded the growth of renewables. In relation to the FiT, Debourdeau

(2011, pp. 111–3) notes that the "omnipotent" nuclear sector resisted the policy on both technical and political grounds. EDF was particularly sceptical about the technical and financial viability of solar PV in anything other than remote areas of the country where grid connections were poor (Benard, 1998, pp. 267–8).

Germany has faced its own entrenched interests in the form of the coal and nuclear industries, and large incumbent utilities resistant to change, but the differences between France and Germany go beyond their respective energy mixes and the existence of EDF (Hake et al., 2015; Jacobs, 2012a). Evrard (2007, p. 19) identifies important differences between the two countries at three levels in order to explain why similar renewable energy policies produced different outcomes. First, the two countries differ on "general principles" primarily relating to the role of the state and the symbolic role of energy. The German state is a mediator between various groups and environmental protection is a component of the country's collective identity. France applies a top-down form of governance and energy independence and technological progress are seen as expressions of national power and prestige. In a separate analysis, Hecht (2001) notes that this projection of power and prestige is an important component of France's national identity, and technology has often been the vehicle through which it is expressed. Nuclear power is an obvious example, but French investments in railways, aircraft, automobiles and telecommunications can also be cited. Various proponents of renewable energy, including Brosse and Cochet in the reports cited above, have sought to leverage France's national identity in their attempts to establish the country as a leader in renewable energy, and in many respects renewables fulfil the criteria for a *grand projet* much as nuclear did in the 1970s. It requires large-scale coordination and engineering expertise, it fulfils an urgent need (at least outside of France), and provides export opportunities. However, until France's nuclear plants reach the end of their service lives, any plans for the mass deployment of renewables will come into conflict with the nuclear sector, and given how deeply entwined the sector is with France's national identity, attempts to link renewables to this identity will likely fail.

The “general principles” to which Evrard refers flow through to the second level, “specific principles”, which relate to the priorities of energy policy in the two countries. For Germany it was economic efficiency and minimising risk from both nuclear and climate change, whereas France prioritised energy security. The third level is “modes of action”, which refer to energy policies. Although the two countries may have implemented similar policies, the objective was always different with Germany seeking to replace nuclear with renewables while France sought only to utilise renewables to complement nuclear.

Nuclear power and climate policy: 2002-2007

The commitment to the nuclear power program was deeply embedded in France’s policies, politics and national image, and also been central to the country’s climate policy through the 1990s. However, the effect on emissions of transitioning to nuclear power had peaked by 2000 when the last of France’s 58 reactors were completed and the Jospin Government published its first Climate Plan. The Plan re-affirmed France’s commitment to the Kyoto agreement but also projected a 25 per cent overshoot of the target based on existing trends (MIES, 2000, p. 29). To avoid exceeding the Kyoto target, four measures were identified: emissions trading; voluntary industry agreements; a carbon tax; and the promotion of energy efficiency measures and renewable energy deployment (Szarka, 2006, p. 630). The proposed carbon tax on industrial energy consumption was central to the plan, but a series of compromises weakened its implementation and it was ultimately ruled to be unconstitutional on the basis that it discriminated between different types of energy users (Deroubaix and Lévèque, 2006). At the end of the Jospin Government’s term in 2002, emissions were at an almost identical level to five years previously and nearly 3 per cent higher than 1990 levels.

Climate change became a prominent issue during the 2002 Presidential and parliamentary campaigns. In his bid for a second term as President, Jacques Chirac promised a national energy debate, and argued for a constitutional amendment that would enshrine the precautionary principle and the principle of the ‘polluter pays’ at

the highest level of French law (Schneider, 2013, p. 28; Schreurs and Tiberghien, 2007, p. 39). Chirac won a second term as President and his newly formed centre-right party, *Union pour un mouvement populaire* (UMP), won a parliamentary majority with Jean-Pierre Raffarin appointed as Prime Minister. Raffarin had been critical of its predecessor's record on climate change and vowed to formulate a new Climate Plan to meet France's commitments under the Kyoto Protocol.

The energy debate promised by President Chirac was launched in 2003 with the subsequent publication of an Energy White Paper in the same year. The White Paper, which was analysed in Chapter 6, did include a commitment to meet the renewable energy targets set under the 2001 RED, but it also reaffirmed the central role of nuclear in France's energy system. The key recommendations were to extend the service life of existing nuclear power plants and to develop a new, 'third generation' nuclear reactor by 2010 (Szarka, 2006, p. 633).

The Climate Plan took longer to materialise, only being released in 2004, but by that time there was growing momentum behind climate policy in France. The summer of 2003 had been the hottest on record in France, killing an estimated 15,000 people and providing a clear demonstration of the dangers of climate change. The lack of government preparedness for the heatwave became a significant political issue which influenced the development of the Climate Plan (MEDD, 2004, p. 16; Poumadère et al., 2005). The Plan again reaffirmed France's commitment to the Kyoto target, and the estimated overshoot had been reduced from 25 per cent in the 2000 Plan to 10 per cent in the 2004 version (MEDD, 2004, p. 4). The Plan also incorporated the longer-term goal of limiting global to warming to below 2°C and established a national 2050 emissions reduction target of between 75 and 80 per cent below 1990 levels (MEDD, 2004, p. 68). However, while the Government acknowledged that existing policy settings were inadequate, the Plan lacked detailed measures to meet the long-term targets, and the Government maintained its official position that it was necessary to convince, rather than force, businesses to take action on climate change, lest it effect France's economic competitiveness (Baulinet, 2002, p. 40; Szarka, 2004, p. 24).

In relation to energy, the Plan focussed heavily on energy efficiency with less emphasis on renewable energy development. Much like the Energy White Paper, the Climate Plan re-affirmed France's commitment to meeting the RED target of 21 per cent for the electricity sector by 2010, but also noted that achieving the Kyoto target would be unlikely unless the service lives of existing nuclear plants were extended beyond 2020 (MEDD, 2004, p. 49). Despite pledging to honour both the emissions reduction and renewable energy commitments, there was an inherent conflict between the two. Nuclear provided nearly 80 per cent of France's generation in 2004, renewables (including hydro) 12.1 per cent, and fossil fuels 9.5 per cent. If nuclear output was maintained, renewables would have to replace nearly all of the fossil fuel generation by 2010, and cover any additional demand (annual electricity consumption grew by an average of 2.1 per cent between 2000 and 2010) to meet the 21 per cent target under the 2001 RES (Berghmans, 2017, p. 5; European Commission, 2017b).

France's dual renewable energy and emissions targets were seemingly contradictory. France's electricity system was subject to large variations in demand due to the fact that most heating in France was electric rather than gas - a feature of the system since the 1980s when the French Government encouraged the adoption of electric space heating in order to utilise the overcapacity created by the nuclear program (Andriosopoulos and Silvestre, 2017, p. 378). Although gas only provided 5 per cent of electricity generation in 2004, its ability to load follow ensured that it would remain part of the generation mix. Therefore, if both nuclear and gas retained their shares of generation, it would be impossible for renewables to reach 21 per cent by 2010. The alternative was to replace a portion of nuclear generation with renewables, but under scenarios developed by the transmission system operator, RTE (2017), any increase in intermittent renewables would have to be supported by an increase in gas, which would therefore lead to an increase in electricity sector emissions. It is possible that such an increase could be offset by reductions in other sectors of the economy, but given that a 10 per cent overshoot was projected in the Climate Plan, and that existing nuclear plants were financially viable, this was an

unlikely prospect. By committing to both the Kyoto and RED targets without resolving the conflict between the two, the Government placed itself in a near impossible position. The fact that the Energy White Paper failed to articulate renewable energy targets beyond 2015 was an implicit acknowledgement of this reality.

Following the Energy White Paper and the Climate Plan, an Energy Policy Framework Law (POPE) was implemented in 2005. The law formalised France's commitment to reduce emissions by 75 per cent by 2050, established a High Council on Energy to provide advice to the Government, and required the Government to update the Climate Plan every two years (LSE, 2019a). The law again committed France to the RES target of 21 per cent, even though attaining the target was becoming increasingly unlikely. Between 2001 and 2005, the share of renewables declined as output from hydro fell by over a quarter and other forms of renewables increased only slightly (European Commission, 2017b).

France had been slow to integrate climate change into national policy in the early 1990s, but through the Kyoto Protocol and the 2000 and 2004 Climate Plans, the political salience of the issue grew and France sought to replicate the policies of other member states, particularly in relation to renewable energy. However, the ambition of successive governments did not translate into positive outcomes, creating a gap between France's emissions and renewable energy commitments, and actual performance. By the end of Jacques Chirac's second term as President in 2007, emissions were still 2.5 per cent higher than they were in 1990 and renewables had a lower share of electricity generation than they did when the RES was implemented in 2001 (European Commission, 2017b; Eurostat, 2015). Establishing the 2050 emissions reduction target was significant, and the Eole 2005 and FiT programs spurred increased investment in renewables, but overall outcomes were constrained by France's meso-corporatist policy approach, which favours entrenched industrial interests, and the conflict between the country's emission reduction and renewable energy commitments. France's meso-corporatism was examined in Chapter 4, but it can be summarised as a system of policy-making that

involves coordination between a small elite within relevant government departments and industry, resulting in a bias toward incumbents (Cawson, 1986). The meso-corporatist approach was evident in the reliance upon voluntary agreements with individual sectors to reduce emissions, the central role played by EDF and ADEME in the Eole 2005 program, and the windfall profits that accrued to incumbents as part of the FiT (Boemare, 2003, pp. 113–4; CRE, 2001, p. 14; Szarka, 2006, pp. 631–2).

From promise to politics-as-usual: 2007-2012

Nicolas Sarkozy was elected President in May 2007 with his party, UMP, gaining a majority in the legislative elections two months later. François Fillon, a close ally of Sarkozy, was appointed as Prime Minister, but Sarkozy also appointed a number of leftists to cabinet. Malière (2009, p. 375) describes Sarkozy's politics as an "ideological theme park" and in his attempt to bridge ideological divides, he was likened to Tony Blair (Knapp, 2013, p. 33). Sarkozy also sought to break from the indecisiveness of his two predecessors by involving himself in day-to-day domestic politics to a much greater extent than was customary under the Fifth Republic (Cole, 2012, p. 311; Musso, 2009, pp. 395–6).

Much like Blair, Sarkozy also sought a legacy by establishing a leadership position on climate change (Knapp, 2013, p. 44), and much like Blair he used a G8 Summit to communicate climate change as a priority (Thornhill, 2007). At the 2007 G8 Summit, Sarkozy argued for a binding international agreement to reduce CO_2 emissions by 50 per cent by 2050, and although the idea was rejected by the United States under President George Bush, it provided clear signal that climate change mitigation was a foreign policy priority for France (Dagorn, 2016). On the domestic front, Sarkozy launched a grand debate on environmental issues, known as the *Grenelle de l'environement*, in July 2007. 'Grenelle' was a reference to a grand debate that was held in response to the social upheaval that took place in 1968 and, like that debate, the *Grenelle de l'environement* was conceived as a bottom-up policy formation process, involving input from government, local authorities, industry, trade unions

and environmental NGOs with the objective of producing policy via consensus (Boy, 2010, pp. 314–5; Cole, 2012, p. 316). Six working groups were established, including separate groups for climate change and energy, with proposals submitted to the Government for consideration by September 2007. Legislation based on the Grenelle recommendations was passed in two phases with the first (Grenelle I) establishing broad targets and principles and being passed with a clear majority in 2009. Much of the focus was on energy efficiency, particularly in the building and transport sectors with the most substantive measure in relation to energy being the commitment to the RED target of 23 per cent renewables by 2020 (LSE, 2019b). The second phase of legislation (Grenelle II) provided more detailed implementation measures to meet the targets established in the Grenelle I law.

The commitment to the RED target led to the creation of a working group that was tasked with creating a reference scenario for growing the share of renewables to 23 per cent. The work of that group then formed the basis of France's National Renewable Energy Action Plan (NREAP), which was submitted to the Commission in 2010 (MEEDM, 2010, p. 4).

Boy (2010) argues that through the bottom-up, consensus-driven approach, the Grenelle appeared to be an innovative form of policy-making, but in reality the process conformed to French administrative traditions. Although grand debates have taken different forms, the concept has been used to discuss politically sensitive issues in France since the 19th century. Second, representatives from the state dominated the process, accounting for two-thirds of the participants; and third, as the process unfolded between 2007 and 2010, the outcomes increasingly reflected 'politics as usual'. In this respect, the process also conforms to the dual policy style identified by Hayward (1982) and examined in Chapter 4. Although the summit was not entirely innovative in its approach, it did demonstrate a significant degree of ambition in environmental policy that had been lacking in France. That ambition was driven by two policy entrepreneurs in President Sarkozy and Environment Minister, Jean-Louis Borloo, who sought to formalise long-term targets. In this regard, the Grenelle can be described as a 'heroic' form of policy-making (Hayward, 1982, p.

112) with the executive using its authority to establish a process that would discuss a comprehensive, long-term environment strategy. However, through the process of implementation, the 'humdrum' aspects of the dual system became evident as party politics, and then meso-corporatist compromises with French industry diluted the initial ambition of the process.

A large majority in the National Assembly had passed Grenelle I, but by 2010, the brief period of bi-partisanship had ended and the policy positions of the two major parties began to diverge. A cabinet re-shuffle in March 2010 also resulted in a more conventional conservative cabinet (Cole, 2012, p. 316; Knapp, 2013, p. 44). Amongst the departures was the environment minister, Jean-Louis Borloo, whose crucial role in securing the EU's 20-20-20 climate and energy package when France held the rotating presidency was examined in Chapter 6. Borloo had not only been personally invested in the RED, but he was also the architect of the Grenelle summit. He had therefore been an important advocate for ambitious climate and energy policy within the Government (Turmes, 2017, pp. 28–9).

Borloo's departure coincided with growing opposition to renewable energy within the ranks of Sarkozy's parliamentary party. A report commissioned by the conservative President of the National Assembly, Patrick Ollier (2010), examined the development of wind energy in the context of the EU's RED. The report was largely critical, focussing on costs of policy support measures and community opposition, ultimately recommending that greater focus be placed on research for offshore wind rather than the immediate deployment of onshore wind. Each of the report's recommendations were added as amendment to the Grenelle II law, tightening regulations and increasing the average development time for projects to 6-7 years (Feurtey et al., 2016, p. 1462)

The FiT was also suspended in 2010. The tariff had already been lowered in 2008 when it became apparent that the levy on electricity bills that was used to fund the FiT was not covering the costs of the program (Andriosopoulos and Silvestre, 2017, p. 380). The new minister, Nathalie Kosciusko-Morizet, cited the costs of the

program, but also the minimal impact that solar PV deployment was having on job creation given that the vast majority of panels were imported from China (Debourdeau, 2011, p. 104; Interview 14, 2019).

This pointed to another barrier that renewables faced in France. Chapter 4 demonstrated how industrial policy has influenced technology choice in a range of sectors in France, from transport to telecommunications with Chapter 5 finding a similar phenomenon in electricity sector. France had leveraged its expertise in nuclear power technology to enable the international expansion of EDF and Areva, providing both jobs and export revenue. However, France had been slow to develop renewable technologies and missed an opportunity to leverage its engineering competence to establish a leadership position in renewables. By 2010, there were no French companies amongst the top 10 manufacturers of wind turbines or solar PV panels, and although France performed better in terms of research output, it still lagged behind Germany - which had filed four times as many patents as France between 1995 and 2010 - the United States, Japan, and even Denmark, which had developed a specific competence in wind turbines (European Patent Office-UNEP, 2015, p. 43; Johnstone et al., 2010, p. 141).

The change in rhetoric and support measures toward renewables was reflected in France's performance relative to its NREAP. After comfortably surpassing its indicative electricity target for 2011, France fell behind its 2012 target by 0.3 per cent. However, given that the average development time of renewable energy projects is estimated to be 6-7 years (Feurtey et al., 2016, p. 1462), the real effects of policy changes between 2010 and 2012 would not manifest themselves until much later and by 2016 the gap between France's NREAP target and the actual share of renewables in electricity was 2.2 per cent (Eurostat, 2018a; MEEDM, 2010, p. 12).

Climate policy between 2007 and 2012 mirrored the meteoric trajectory of the Sarkozy presidency itself. It began with the rhetoric of a new approach to politics but ended with the compromises and party-political divisions that had typified climate policy since the early 1990s. The same trajectory was also evident in renewable energy policy. France agreed to a relatively ambitious RED target, in part because of

the initiative of Nicolas Sarkozy and Jean-Louis Borloo when France held the rotating presidency of the European Council in December 2008. This was another example of the 'heroic' style of policy-making described by Hayward, but much like the Grenelle, implementation it would be subject to 'humdrum' policy-making, political negotiations and meso-corporatist compromises. It is for this reason that Bocquillon and Evrard's (2017, p. 169) description of France as an "occasional climate leader but implementation laggard" is entirely valid.

The energy transition under President Hollande

François Hollande defeated Sarkozy in the 2012 presidential election. Prior to the 2012 elections, the Socialist and Green Parties agreed to a list of measures that would be adopted if the left-wing bloc won a majority. The most significant of those measures was a commitment to reduce the share of nuclear in power generation from 75 to 50 per cent by 2025. Although it was a controversial commitment, the Fukushima disaster in March 2011 had fuelled a sense that France was too dependent upon nuclear energy and for the first time, a majority of citizens indicated that the risks associated with nuclear power were 'high' (IRSN, 2012).

Following the victories of Hollande in the presidential elections and the Left bloc in the parliamentary elections, a national consultation on the energy transition was launched in November 2012 with the objective of consolidating the pre-election commitments in relation to climate and energy. The conclusions formed the basis of the Energy Transition for Green Growth Law (Energy Transition Law), which was passed in 2015. The most crucial elements of the law are as follows:

- A 40 per cent reduction in GHG emissions on 1990 levels by 2030 and a 75 per cent reduction by 2050;
- A reduction in national energy usage of at least 50 per cent by 2050;
- A reduction in the share of fossil fuels in energy production by 30 per cent compared to 2012;
- A cap on the total output from nuclear power of 63.2 GW

- A reduction in the share of nuclear energy in electricity generation from 75 per cent to 50% by 2025;
- An increase in the share of renewables to 32 per cent of the energy mix by 2030.
- An increase in the carbon tax from the 2015 rate of €14.5 to €56 per ton in 2020, and €100 in 2030

The law also included a number of 'bottom-up' measures to empower local authorities and encourage decentralised electricity generation.

In Germany, nearly 50 per cent of all renewable capacity is classified as distributed energy, whereas just 3 per cent of wind power and 0.7 per cent of solar installations in France are classified as such (Devisse et al., 2016, p. 5; REN21, 2016, p. 136). High barriers to entry, particularly centralised control of distribution infrastructure, and financial incentives that favoured EDF have prevented decentralised energy from playing a greater role (Andriosopoulos and Silvestre, 2017, p. 378; Feurtey et al., 2016, p. 1458; Meyer et al., 2006; Reiche and Bechberger, 2004, p. 846; Wokuri et al., 2019, p. 266).

EDF also has a long history of reinforcing its control over the electricity market and promoting centralisation (Feurtey et al., 2016, p. 1460). In the early years of its existence it fought against legislation that would have allowed cogeneration plants to be built, and later, when legislation was passed, it adopted a strategy of co-opting new technology (Frost, 1991, p. 100). It adopted a similar position in relation to renewable energy, opposing decentralised renewable generation until the mid-1990s, and then arguing that it only had a role to play in remote areas of the country where grid connections were poor (Benard, 1998; Bocquillon and Evrard, 2017, p. 166).

Chapter 5 noted the barriers to decentralisation that had retarded growth in community-owned, small-scale renewable projects, but the Energy Transition Law included a number of provisions to reduce administrative burdens, increase

investment support and improve grid access for small-scale installations (Wokuri et al., 2019, pp. 252–63).

The Energy Transition Law was an extremely ambitious piece of legislation. The emissions reduction and renewable energy targets either matched or exceeded those being proposed as part of the EU's 2030 climate and energy package, and the nuclear drawdown and promotion of decentralisation represented a fundamental challenge to France's electricity sector. The Government was conscious of past failures in implementing ambitious climate and energy policies and moved quickly to draw up the necessary ordinances and decrees. Within 12 months, 85 per cent of the necessary measures had been finalised (Mathieu, 2016, p. 47). The Government also sought to overcome economic arguments against the nuclear drawdown by pitching the law as an economic stimulus package.

Promoting economic benefits as part of climate and energy policy is not uncommon – the preamble of the RED mentions economic benefits more times than climate change mitigation – but given that nuclear power was valued for its economic benefits as much as its contribution to energy security and low emissions intensity, it was a difficult case to make in France. Modelling from Marques et al. (2016), for example, shows that nuclear power has been a driver of economic growth whereas renewables are shown to exert a negative effect on GDP. Beyond including 'Green Growth' in the title of the law, the Government released its own modelling which projected an increase in GDP of 0.8 per cent by 2020 and 1.5 per cent by 2030 (MEEM, 2016a, p. 1).

At the EU level, Hollande had also reinforced France's commitment to the energy transition through negotiations over the EU's 2030 climate and energy package. Several member states, led by the UK and Poland were arguing that renewable energy and energy efficiency targets would be unnecessary if a single GHG emissions reduction target were in place. The UK energy minister, Ed Davey, reasoned that a single GHG target would provide member states with maximum flexibility in reducing emissions, and minimise costs (Neslen, 2014). It was a position that was supported

by economic analyses (Boeters and Koornneef, 2011; Böhringer et al., 2016; DECC, 2014; Flues et al., 2014) and the nuclear lobby in France, which argued that a single target would allow France to benefit from its already low emissions intensity (Bürgin, 2015, p. 699). Despite this, France was one of eight member states to write to the European Commission, urging it to support the inclusion of strong renewable energy targets in the final package (Neslen, 2014).

Despite the attempts to create political momentum behind the Energy Transition Law, doubts quickly emerged about the plan with contradictory positions being adopted by Government figures (Mathieu, 2016, p. 47). During the election campaign, Hollande only identified one nuclear plant for closure, which was the Fessenheim plant that was already approaching the end of its service life and would be offset by the completion of the new plant at Flamanville regardless. Following the election, the Industry Minister, Arnaud Montebourg, stated that Fessenheim would be the only plant to close and that nuclear would continue to provide at least 50 per cent of France's electricity into the future (Broomby, 2014). EDF was also said "to live in a different world" (Schneider et al., 2018, p. 54) with its planning for nuclear reactor shutdowns incompatible with the 2025 target. Delphine Batho, who served as the minister of ecology, sustainable development, and energy between 2012 and 2013, claimed that the CEO of EDF acted as a "phantom energy minister" who decides France's energy policy (Le Monde, 2014).

The official planning document that was released in 2016 (*Programmations pluriannuelles de l'énergie*, PPE) further undermined the 2025 reduction date. The PPE nominated between 10 and 65TWh of nuclear generation for closure by 2023 (MEEM, 2016b, p. 4), but even if the upper limit of that range was reached, nuclear would still be producing 60 per cent of France's electricity - well short of the 50 per cent target stipulated under the Energy Transition Law. Andriosopoulos and Silvestre (2017, p. 380) also note that the nuclear drawdown plan was devised without a corresponding plan to offset the loss of nuclear capacity, therefore the objective remained "theoretical". The PPE was further criticised by the Court of Auditors following the election of a new Government in 2017. The report (Cour de Comptes,

2018, pp. 7–12) recommended that new Government provide greater clarity around the transition plan.

The impact of the RED

Ultimately, Hollande finished his term as president in 2017 without any nuclear plants being closed, and renewables output falling behind France's interim targets set under the NREAP. France is now unlikely to meet its overall RED target, or the specific target of 27 per cent for electricity. As of the end of 2017 (the latest figures available prior to publication), the overall share of renewables was 3.2 per cent below the indicative target, with the share in electricity 3.1 per cent behind (Eurostat, 2018a). Only the transport sector is performing above the indicative trajectories – a consequence of the Government promoting biofuels in order to support the agriculture sector (Bocquillon and Evrard, 2017, pp. 172–5).

Much of the slow growth in renewable generation can be attributed to a decline in generation from hydro. Hydropower has long been an important component in France's electricity generation mix, consistently providing between 10 and 15 per cent of total generation over the past three decades. Hydro also provides about two-thirds of renewable generation. France's NREAP projected an increase in installed hydro capacity of nearly 3MW, or about 11 per cent, and a subsequent increase in output between 2010 and 2020. However, the increase in capacity never eventuated due to a number of political and legal issues that have dissuaded investment (Lubek and Wakeford, 2015, pp. 3–4). The output from the existing capacity has also declined. Hydro output varies from year to year depending on weather conditions, but average output has declined slightly in each of the past two decades, most likely as a consequence of climate change (Aanund Killingtveit and Byman Hamududu, 2012, p. 317; European Commission, 2017b; Schaefli et al., 2007).

Growth in solar capacity and output was much higher than projected under the NREAP, but wind, which was expected to play a much greater role, has performed well below expectations. The unfavourable political environment during the second half of Sarkozy's presidency retarded development in the wind sector and a large

gap opened between the projections for wind power and the actual output. Given the lag between investment and completion, the impact of that period continued to reverberate through Hollande's presidency and the gap has continued to grow each year. By the end of 2016, combined onshore and offshore wind generation was just two-thirds of the projection in the NREAP (European Commission, 2018, p. 6; MEEDM, 2010, p. 98).

The lagging performance of renewables is reflected in the relatively low levels of financial support provided by the state compared to other EU member states. In 2016, France offered €7.34 of financial support for every mega watt-hour of renewable energy generated. This was less than one-fifth of the support given in Germany, less than half of Spain and also less than 13 other member states (CEER, 2016, p. 25). However, France's updated energy plan (PPE), released in 2018 under the new Government and covering the period from 2019 to 2028, did commit to an annual increase in financial support from €5 billion to €8 billion by the end of that period.

A re-set under President Macron: 2018 to the present

The release of the 2018 PPE followed a major speech in November of that year by the new president, Emmanuel Macron, and represented a re-set for energy policy. The plan confirmed France's commitment to a partial transition to renewable energy but pushed the timeline back by a decade. Fourteen reactors were identified for closure by 2035 to ensure that nuclear was providing no more than 50 per cent of power generation by that date. Other commitments included the closure of remaining coal plants by 2022, an increase in onshore wind capacity by a factor of three, and an increase in solar PV by a factor of five (MTES, 2019).

Separately, France had continued to push for greater ambition at the EU level, arguing for a renewable energy target of 35 per cent by 2030, above the 27 per cent recommended by the European Council, and the final target of 32 per cent agreed upon in June 2018 (Vaughan, 2018). The 2030 EU target of 32 per cent does not

include binding national targets, but it was incorporated into the PPE and would require a renewable energy share in French power generation of about 40 per cent (MTES, 2019, p. 96). However, when the plans for the reduction of nuclear's share to 50 per cent and the 40 per cent renewable energy target are taken together, there is still an extremely narrow window for France to achieve both. As noted above, it would be very difficult to meet the 2020 RED targets without some displacement of nuclear and the 2030 renewable energy target is therefore even more dependent upon the closure of existing plans. The PPE identified that 14 reactors would have to close by 2035 in order to reach the drawdown target of 50 per cent, but only two of those reactors would be retired before 2029 (which would be almost entirely offset by the commissioning of the new reactor at Flamanville) (MTES, 2019, p. 144). On that basis, nuclear would maintain a share of over 70 per cent until at least 2029, making it impossible to reach a 40 per cent share for renewables. The PPE did include provisions for the possible early closure of between two and four reactors in addition to Fessenheim, but only if certain economic conditions were met. Given that the drawdown has already been delayed twice, and that EDF's position is to run all reactors with the exception of Fessenheim until at least 2029, it is unlikely that nuclear capacity will make way for renewables in the next decade (CNDP, 2018).

Conclusion

The implementation of the RED in France has been characterised by a gap between rhetoric and action, reflecting the dual policy style that is a feature of French politics. Presidents Sarkozy and Hollande both sought to establish France as an international leader on climate change, the former by driving agreement on the RED and accepting ambitious renewable targets on behalf of France, and the latter through leadership at the Paris COP and the implementation of the Energy Transition Law. These are examples of the 'heroic' form of French policy making, where executive authority is utilised to develop long-term policy objectives, often with an underlying objective of projecting French power and prestige.

However, executive authority has been constrained by the 'hum drum' processes of implementation that have slowed the deployment of new renewable capacity. This is in part reflective of the division of powers between the President, who negotiates international agreements, and the administration led by the Prime Minister, which implements those agreements. In the case of the RED, the processes of implementation are characterised by the numerous path dependencies inherent in the nuclear power program, including the cumulative investments in the program, its economic contribution (jobs and exports), and the influence of the technocratic elite within the key state institutions that has built its expertise around nuclear technology for over forty years.

The gap between rhetoric and action is therefore due to a misalignment between the two policy-making styles in France, with one that tends toward grand visions and the projection of national identity on the international stage, and the other that involves meso-corporatist negotiations with entrenched industrial interests. This reflects the historical development of state institutions that was examined in Chapter 4. The autonomous power of the civil service and its relationship with EDF has acted as a barrier to the objectives of the President.

The two forms of policy-making were aligned when the Messmer Nuclear Plan was implemented in 1974. President Georges Pomidou and Prime Minister Pierre Messmer (after whom the nuclear plan is named) sought to overcome an energy crisis by transitioning France's energy system on a scale and within a timeframe that was unprecedented. Successive governments were then able to utilise and develop the necessary expertise within a tightly controlled structure to ensure that the plan was implemented successfully. The question that this case study addresses is why a similar alignment has not occurred in the context of the renewable energy transition.

Söderholm's (1999) analysis of fuel choice in electricity generation of eight Western European countries demonstrates that since World War Two, energy policy has primarily been driven by economics (including prices) and energy security, with climate change also becoming increasingly influential since the 1990s. How those

drivers interact with national institutions and political priorities then determines the fuel choice. Chapter 5 examined these drivers and their influence on fuel choice in France and the UK from a historical perspective, demonstrating that the Oil Crisis and France's lack of natural resources, combined with a highly centralised decision-making structures and deep engineering competence lent itself to the development of a large-scale civilian nuclear program. What this chapter has demonstrated is that the interaction of the drivers identified by Söderholm with the institutions in France's power sector is not currently favourable to renewable energy deployment.

Although the institutions that enabled the nuclear transition have atrophied since the commissioning of the last plant in 2000, the more significant barrier is that the transition to renewables is not currently being driven by economic, energy security or climate change mitigation imperatives. Apart from the Fessenheim plant that will be closed in 2022, France's nuclear power plants will remain technically viable until at least the end of the next decade (MTES, 2019, p. 140). As such it fulfils both the economic and energy security needs of France, and as a low-carbon source of power, it also enables France to meet its emissions commitments. As Mignon and Rüdinger (2016, p. 482) note:

> French policies are overshadowed by the general lack of legitimacy of renewables in the field of electricity, given that most politicians argue that France already has a competitive and low-carbon power system, thanks to the historical development of nuclear energy.

The implementation of the RED has not, therefore, become a *grand projet* because the existence of the nuclear program has largely obviated the need for new renewable capacity. However, this situation is not permanent, and there are already signs that the two forms of policy making will eventually align. Extending the service lives of the existing nuclear plants to 2035 will likely deliver benefits in terms of electricity prices and emissions relative to scenarios involving the building of new nuclear plants or a progressive move to renewables, but only in the medium-term (Percebois and Mandil, 2012, p. 58). The economic position of renewables continues

to improve whereas the economics of nuclear have worsened as the new plant in Flamanville has experienced cost overruns and EDF has failed to secure contracts for new builds beyond those currently under construction in Taishan (China) and Hinkley Point (UK) (Feurtey et al., 2016, p. 1461).

The disaster at Fukushima also highlighted the potential vulnerability of France's electricity system with its dependence upon a single generation technology. Japan shut down its entire nuclear power capacity following the Fukushima disaster, which amounted to about 30 per cent of the country's generation. A similar shutdown in France where nuclear provides 75 per cent of power would cause enormous economic damage to the country (Jaczko, 2019; Suzuki, 2017, p. 14). France is not as vulnerable to seismic activity as Japan, and therefore such a scenario is unlikely, but France has faced smaller scale safety issues that point to possible future threats to the security of supply. For example, four reactors were forced to shut during a heat wave in 2018 due to regulations that ensure that the water used to cool reactors remains below a certain temperature (Schneider et al., 2018, p. 23). It is possible to envisage a scenario in the near future where a climate-change induced heatwave forces a wider shutdown.

EDF, which has always sought to control the transition, is also changing in response the less favourable economics of nuclear, albeit slowly (Interview 2, 2018; Interview 14, 2019; Turmes, 2017, p. 245). Renewables account for 14 per cent of EDF's total net generation around the world and the company has plans to double production from renewables by 2030 (EDF, 2018a, p. 9, 2018b, p. 18). Much of this is driven by EDF's international operations where the transition to renewables is occurring much more rapidly. International operations represent 28 per cent of EDF's net generation (EDF, 2018b, p. 18) and the company has stated its intention to triple its international business by 2030 (EDF, 2018a, p. 10).

The drivers of the RED have therefore been limited. Presidents Sarkozy and Hollande were driven by a desire to establish France as a leader in climate and energy policy, a position that can be linked to a national identity that seeks to project power and

prestige. However, the implementation of the RED has been impeded by the economic and technical path dependencies inherent in the dominant nuclear sector, the resistance of EDF and the technocratic civil service that sees no reason to retire nuclear reactors to satisfy EU renewable energy targets. This situation is unlikely to change over the next decade, but the situation is not permanent and when the two forms of policy style in France align, the transition is likely to progress rapidly. As one former employee of EDF (Interview 14, 2019) who has worked in both France and the UK notes, the technical competence within the French regulator (CRE) and the civil service mean that decisions about the energy mix and grid requirements are made very carefully, in contrast to the UK where they are more willing to "just try things". This has slowed the transition in the short-term and medium-term, but in the long-term it is likely to result in a smoother transition.

Chapter 8

The Implementation of the Renewable Energy Directive in the United Kingdom

This chapter examines the drivers of, and impediments to, the implementation of the RED in the British electricity sector. It assesses the role of the neoliberal ideology, political parties, the UK Parliament, the civil service and the state's relationship with the electricity regulator, policy advisory bodies and power sector firms. In doing so, it draws upon the analyses of the role of the state in Chapter 4, the institutions of the electricity sector in Chapter 5 and the development of the RED in Chapter 6.

Following a brief overview of the challenge posed by the transition to renewable energy in the UK, the chapter analyses the history of climate and energy policy in the country since the late 1980s. It divides this history into three periods, beginning with early efforts to push climate change onto the political agenda in the 1990s. It then examines the period between 2005 and 2010, which saw a significant increase in ambition toward emissions reductions and renewable energy. Finally, the period incorporating the implementation of the RED from 2010 onwards is analysed.

The energy transition in a neoliberal context

To a greater extent than other EU member states, the British electricity sector has been governed by neoliberal principles since the 1990s. Of the 20 EU member states for which the OECD collects data, the UK is the only one where the state does not own any assets in the electricity and gas sector (OECD, 2017). As was noted in Chapter 5, levels of market concentration in the British power sector are also amongst the lowest in the EU (European Commission, 2014a).

However, the implementation of the RED, and renewable energy policy more broadly, has been characterised by an awkward balance between neoliberal principles and the need for intervention to deliver the energy transition. Chapter 6 analysed the UK's RED targets, demonstrating that a considerable increase in the rate of renewable energy deployment would be required. Pollitt (2010, p. 253), argued that this would necessitate "radical changes to current policy", which, according to Lorenzoni et al. (2008, p. 105) had "been structurally constrained by the Government's allegiance to ecological modernization and reliance on market mechanisms that focus on producing incremental changes in business emissions".

The influence of ecological modernisation is examined in the policy analysis below, but in the context of UK renewable energy policy it has meant a commitment to market-based incentives rather than direct government investment or specific regulations. The inadequacy of this policy approach was acknowledged in the Government's 2009 Renewable Energy Strategy, which was published in response to the RED:

> Market forces on their own will not achieve the necessary change towards a low-carbon energy mix sufficiently quickly and radically. The core of our strategy to overcome these market failures involves putting a price on carbon emissions through the EU Emissions Trading Scheme. But, as the Stern Review emphasised, carbon pricing alone will not be sufficient to reduce emissions at the scale and pace required and more support is needed for renewable and innovative low-carbon technologies (Department of Energy and Climate Change, 2009, p. 13)

In financial terms, the UK's 2020 targets required investments of £12 billion per year, every year from 2010, which compared to the £5 billion invested in 2008. Such a significant increase in investment rates was deemed to be beyond the capacity of the UK's 'Big Six' electricity companies by market analysts (Newbery, 2012, p. 73).

The RED therefore posed an immediate challenge to the Government. As chapters 4 and 5 demonstrated, the institutions of both the state and the electricity sector have been shaped by the dominant neoliberal ideology since 1979. Full privatisation meant that the state had no direct control over the companies operating in the sector; the public sector lacked the capability to deliver large-scale infrastructure projects and the independent regulator (Ofgem) had a strong mandate to protect consumers but a weaker mandate to promote sustainability. Whether this institutional framework has been capable of meeting the requirements of the Directive, whether it has had to adjust, or whether it acted as an impediment is the the core question of this chapter.

Climate and energy policy in the UK

In 1988 – the same year that the European Commission formally recognised the scientific consensus around climate change - Prime Minister Margaret Thatcher (1988) gave a speech to the Royal Society in which she too acknowledged that:

> For generations, we have assumed that the efforts of mankind would leave the fundamental equilibrium of the world's systems and atmosphere stable. But it is possible that with all these enormous changes (population, agricultural, use of fossil fuels) concentrated into such a short period of time, we have unwittingly begun a massive experiment with the system of this planet itself.

The following year, Thatcher (1989) gave another noteworthy speech to the UN General Assembly, calling for international action to address climate change. The Government also commissioned a White Paper to provide policy recommendations relating to the environment and climate change (Lorenzoni et al., 2008, p. 104). Between the announcement of the White Paper and its release 12 months later, a slowing economy blunted some of the initial ambition and although the final document, entitled *This Common Inheritance: Britain's Environmental Strategy* (Department of the Environment, 1990), ran to nearly 300 pages, it was criticised for

a lack of a concrete policy proposals (Carter and Lowe, 2014, p. 32). It did highlight the potential of market mechanisms to mitigate environmental damage, but perhaps most crucially, it ruled out any form of carbon tax, which had been proposed by the European Commission in 1990 (Jordan et al., 2003, p. 179; Oberthür and Pallemaerts, 2010, pp. 29–32).

The White Paper included a proposal to stabilise GHG emissions at 1990 levels by 2005, although this was not as ambitious as a similar report commissioned by the German Government in the same year that called for a 30 per cent reduction in Germany's emissions over the same period (Jänicke, 2010, p. 132). The White Paper did establish a baseline for emissions reductions in the UK, and also included a proposal to have 1000MW of renewable energy capacity available by 2000. However, in a pattern that would be repeated throughout the period from 1990 to 2005, the UK fell well short of its own targets, with just 415MW of non-hydro renewable capacity installed by 2000, less than half of what was proposed in the White Paper (European Commission, 2017b).

Having replaced Thatcher as Prime Minister in 1990 and then having won the election in 1992, John Major took a number of steps at both the international and domestic levels to strengthen the UK's position on climate change. The Government ratified the UNFCCC in 1993, committed the UK to returning emissions to 1990 levels by 2000, and formulated the UK's first Climate Change Program (CCP) in 1994 (Lovell et al., 2009, p. 95). Most of the measures in the CCP relied on voluntary action from industry rather than direct government regulation (Rayner and Jordan, 2010, p. 98), but it did signal a shift away from the notion that climate protection and economic growth were a zero-sum trade-off, which had dominated environmental debates in the UK since the 1970s (Osborn, 1997, p. 6; Weale, 1992, p. 27).

When the Labour Party came to power in 1997, it pledged to "lead the fight against climate change", committing to reduce carbon dioxide emissions by 20 per cent on 1990 levels by 2010 and to work to reach an international climate agreement in Kyoto (Labour Party, 1997). The Party had also pledged to take a more direct

approach to climate mitigation, primarily through tax measures that would shift the burden from workers to activities that produced waste and pollution (Rayner and Jordan, 2010, p. 99). However, in keeping with its pro-business Third-Way politics, the new Government framed climate change mitigation using the language of ecological modernisation (EM) which emphasised economic opportunities rather than costs (Barry and Paterson, 2003; Curran, 2001; Revell, 2005). Ecological modernisation (EM) is a contested term with Christoff (1996) identifying 'weak' and 'strong' forms. Weak EM views environmental policy in terms of economic inputs and outputs and focuses on technological solutions. Strong EM considers a wider range of non-economic values, which are incorporated into political institutions. In the context of UK policy during the first term of the Blair Government, Curran (2001, pp. 45–6) argues that the "neoliberal political compromise with the market" represented a weak form of EM.

Tony Blair's (2003, p. 23) response to the Royal Commission on Environmental Pollution's recommendation for a 60 per cent reduction in GHG emissions on 1990 levels by 2050 typified this approach. He argued that it "would not involve huge shifts in the economy or enormous changes in lifestyles". This belief was coupled with a policy approach that prioritised market-based incentives over any form of direct state investment or regulation.

The priority given to market-based incentives was evident in the UK's second CCP, which was released in 2000 and detailed how it would meet its obligations under the Kyoto Protocol. The Program included the Climate Change Levy (the Levy), which taxed energy delivered to non-domestic users and aimed to encourage businesses to adopt energy efficiency measures. Nuclear power was included under the Levy, but renewables were exempt. The Levy was to be recycled through the Carbon Trust, an independent company established by the Government to mimic a venture capital firm (Mitchell and Connor, 2004, pp. 1940–2; Watson, 2009, p. 125). The CCP also included a domestic emissions trading scheme, which acted as a forerunner for the EU's ETS. The UK's ETS had been supported by the major business groups as they saw it as a better alternative to direct carbon taxes, but support was given on the

proviso that participation remained voluntary (Jordan et al., 2003, p. 183). There was also an obligation for electricity suppliers to increase the proportion of electricity they supplied from renewable sources to 10 per cent by 2010, which aligned with the national indicative target included in the original RES. However, this provision included the caveat that the target was "subject to the cost to consumers being acceptable" (Department of the Environment, Transport and the Regions, 2000, p. 6).

In terms of renewable energy, the most significant element was the introduction of the Renewables Obligation (RO), a renewable energy certificate scheme that replaced the Non-Fossil Fuel Obligation (NFFO). The NFFO had been introduced in 1990, but although renewables were included in the scheme, it was largely designed to support the nuclear sector, which had yet to be privatised (Mitchell and Connor, 2004, p. 1936). The NFFO also had a number of other flaws that prevented it from driving the development of renewable capacity. First, in trying to develop renewable capacity at least cost, the policy led to a lack of diversity in the types of projects that were developed. Biomass, especially landfill gas and waste-to-energy, and onshore wind, were heavily favoured ahead of less mature technologies that would benefit the energy transition in the long-term. The geographic concentration of the wind turbines also created considerable community opposition in those areas (Lipp, 2007, p. 5489). Second, the NFFO had a low cost cap and no penalties for not taking up contracts, which meant that many bids were too low to be financially viable. As there were no penalties for not taking up contracts, many were abandoned when it became apparent that the cost assumptions were too optimistic or that planning permits would not be granted (Mitchell and Connor, 2004, p. 1937). By 2003, 3270MW of renewable capacity had been commissioned under the NFFO but less than 1000MW had actually been developed (Butler and Neuhoff, 2008, p. 1859). The RO replaced the NFFO in 2002, changing the obligation from a contract for generation from specific projects to a certain percentage of electricity supplied. Nuclear was also removed from the scheme (Mitchell and Connor, 2004, p. 1939).

Despite strengthening the renewable energy certificate scheme by replacing the NFFO with the RO, the CCP was heavily criticised in the Royal Commission on Environmental Pollution's twenty-second report (2000), which focussed on climate and energy. The report noted the gap between the Government's stated ambition and the policy framework that it had proposed, concluding that:

> There is, then, something of a hole in the government's climate change programme. The hole is of uncertain size, but there are assumed reductions in annual emissions of several MtC for which either no policies are in place or it is quite possible the measures identified will not deliver (p.32).

The report also noted that emissions reductions to that point had been "fortuitous" and that further reductions over the two decades to follow would be much more difficult, particularly given that climate and energy policies were far from being integrated (Royal Commission on Environmental Pollution, 2000, p. 83).

While the Royal Commission had criticised the policy program for being incomplete, business groups opposed it on the basis that it imposed too many costs upon industry (Jordan et al., 2003, pp. 178–81). Although business groups supported the ETS, it remained voluntary and the Levy faced fierce opposition from the business lobby. The Labour Party had made much of its repositioning as a pro-business party in the lead up to the 1997 election and were sensitive to criticism from business groups (Carter, 2008, pp. 198–9). As a consequence the Levy was weakened prior to implementation with energy intensive industries offered an 80 per cent discount (Jordan et al., 2003, p. 182). The Government also ruled out a number of possible policy proposals, including a plan to limit transport emissions.

The first term of the Labour Government ultimately failed to deliver any meaningful reductions in GHG emissions or increase in renewable energy capacity. Although the UK's GHG emissions fell by 4.3 per cent between 1997 and 2001, continuing a downward trend that began in 1991, those reductions were due entirely to the shift

from gas to coal in the electricity sector (the 'dash for gas') and de-industrialisation (Eurostat, 2015; Helm et al., 2007, pp. 9–12; Lorenzoni et al., 2008, pp. 104–5; Lovell et al., 2009, p. 95). Neither the fuel substitution or the outsourcing of heavy industry to low-cost countries such as China were the result of deliberate government policy, rather they were the result of economic decisions by private companies (Carter, 2014, p. 424; Helm, 2010, p. 183; Newbery and Pollitt, 1997, pp. 270–1).

In relation to renewable energy, policies that emerged from the second CCP produced modest results. The RO spurred some investment, but much like the NFFO that it replaced, technologies that were closer to the market were favoured, particularly onshore wind (Watson, 2009, p. 141; Wood and Dow, 2011; Woodman and Mitchell, 2011). It also favoured the incumbent utilities that were able to fund large-scale projects off their own balance sheets. This encouraged each of the six largest generators to invest in wind capacity, but as the policy provided no incentive to overachieve, it effectively placed a cap on the amount of investment (Stenzel and Frenzel, 2008, pp. 2648–9)

Between 2002 and 2006, onshore wind capacity nearly quadrupled but other non-hydro renewable technologies remained underdeveloped, accounting for just 0.02 per cent of the UK's total capacity. Although emissions continued to fall, the rate of reductions slowed between 2001 and 2005 compared to the five years prior (Department for Business, Energy & Industrial Strategy, 2018e).

Despite evidence that the Government's policy approach was having a limited impact on emissions and renewable energy, the non-interventionist approach was maintained in Labour's second term. In relation to renewable energy, a House of Commons Science and Technology Committee report criticised the Government's reticence to back certain technologies arguing that "The Government has an important role in identifying those of Britain's strengths that are consistent with the industrial environment and the market. It should provide a clear and unambiguous focus". In response to the report, the Government argued, "it would be unwise to attempt a prescriptive forecast of 'winning' low-carbon options for the future and to

concentrate Government expenditure on those alone. There would be a grave risk of foreclosing other options which may turn out to be winners in time." (House of Commons Science and Technology Committee, 2003, pp. 7–8).

The Labour Government's second term produced similar outcomes to the first. Emissions continued to decline, but the rate of decline slowed. The UK was on track to meet its commitment under the EU's Kyoto Protocol burden sharing agreement of reducing emissions by 12.5 per cent from 1990 levels by 2012, but as Eyre (2001, p. 309) notes, the target was "not challenging" and "Government policies designed to address climate change have not been important contributors". Renewable energy capacity also grew slowly and by the end of 2005, the UK had the second lowest share of renewable energy amongst member states, ahead of only Malta. The share of renewables in the electricity sector was slightly higher, but the UK was still one of the worst performers in the EU with its share of 4.1 per cent ranking it in the bottom third of member states (European Commission, 2017b).

Despite Labour's pledge to "lead the fight against climate change" ahead of its election in 1997, its policies had not induced emissions reductions or increases in renewable energy capacity that were beyond existing trends. As Helm (2010, p. 182) notes: "If climate change could be solved by political commitment, Britain would, indeed, lead the world. But the reality has been very different". However, a confluence of factors led to a remarkable change in the level of the Labour Government's policy ambition ahead of its third term in government.

The renewed focus on climate and energy 2005-2010

Chapter 6 analysed some of the factors that led to an increase in the Blair Government's policy ambition beginning in 2005 and culminating in the finalisation of the RED in 2009. The need to replace the Kyoto Protocol and the beginning of negotiations over the European Commission's 2020 climate and energy package; Tony Blair's desire to build a political legacy; and the party competition created by the opposition Conservative leader, David Cameron, vowing to lead the "greenest

government ever" if elected all created positive feedbacks that contributed to an increase of political salience around climate change during this period. The publication of key reports including the 2006 Energy Review, the Stern Review and the Energy White Paper in 2007 also contributed to the political momentum behind climate policy and provided a foundation for the *2008 Climate Change Act* (the Act).

Alongside the legislated 2050 emissions reduction target of 80 per cent, the Act established the Committee on Climate Change (CCC), which is an independent body tasked with making recommendations to Parliament and then holding the Government to account by assessing policy against the legislated five-yearly targets. As Lockwood (2013, p. 1339) notes, however, "while the Act might appear to lock in a commitment to reducing emissions through legal means, this does not guarantee political lock-in". Anderson et al. (2008) and Pielke (2009) have criticised the Act on a similar basis, arguing that although it establishes long-term targets, it does not provide a detailed pathway and is thus subject to changes in the salience of climate change as a political issue. Such a change did occur, with a decline in the salience of the climate change coinciding with the onset of the global financial crisis and the failure of the Copenhagen COP in 2009 (Gillard, 2016; Lockwood, 2013, p. 1342; Scruggs and Benegal, 2012).

The RED had therefore been finalised during a period of high political salience around climate change, which enabled an increase in the Government's ambition in relation to renewable energy. As Chapter 6 noted, the 2006 Energy Review had recommended a renewables target of 20 per cent in the electricity sector by 2020, but by 2009, the Government had established a target of 31 per cent. However, as the implementation period began in 2010 the political salience of climate change was falling and the political consensus that had existed between the major parties was fracturing (Boykoff et al., 2019; Carter, 2014, p. 429; Schmidt et al., 2013, p. 1242).

The implementation of the RED: Changing policy paradigms

Between the publication of the draft RED by the Commission in January 2008 and the final Directive in April 2009, there were three important reports from UK authorities that analysed the UK's proposed targets and recommended policies to achieve those targets.

The Renewables Advisory Board (RAB), an independent, non-departmental public body sponsored by the Department for Business, Enterprise and Regulatory Reform (BERR), published the first of the reports in June 2008. The report offered only broad policy recommendations, but it did note that existing policy settings would result in just 6 per cent of the UK's energy being sourced from renewables by 2020. It argued that the 15 per cent target under the RED could only be achieved with the "rapid development of a transformed energy framework with radically new economic, political and social drivers" (RAB, 2008, p. 9).

The European Committee of the House of Lords published the second report in October 2008. The report was significant as, according to the 'Scrutiny Reserve Resolution' of the UK Parliament, the Government cannot agree to any EU proposal until the committee has "cleared it from scrutiny" (House of Lords European Union Committee, n.d.). In assessing the RED, the committee questioned relevant witnesses from the Government, the European Commission, the European Parliament and industry (Parliament, House of Lords, 2008).

The Committee concluded that the 15 per cent renewables target would be "extremely challenging" (2008, p. 5) and noted the concerns of several witnesses, including Ofgem and National Grid that it was "too much, too soon" (2008, p. 11). As a consequence, there would likely be a reliance on a single technology (onshore wind), at the expense of other technologies that could be cost-competitive in the long-term. The report ultimately accepted the RED target, but recommended a number of policy changes including more research funding to support less mature technologies, replacing the RO with a feed-in tariff, upgrading the electricity grid to

enable the integration of intermittent renewables, and increasing the manufacturing capacity of the sector to minimise potential bottlenecks in the supply chain.

The CCC published the third report in December 2008. The CCC'S report was primarily concerned with the UK's first three carbon budgets, but it did incorporate the RED targets into its assumptions. The report noted that within the period of the first three carbon budgets (2008-2022), nearly all of the UK's coal generating capacity was due to be decommissioned. It was expected that most of that capacity would be replaced by renewables. Coal accounted for over 35 per cent of the UK's total generation in 2008, while the RED required the share of renewables to grow from less than 5 per cent to about 30 per cent by 2020 (later formalised at 31 per cent in the UK's NREAP) (CCC, 2008, pp. 173–8). However, the report noted that the required increase in renewable capacity would require a shift in the Government's policy approach, which had relied heavily on market mechanisms, particularly the carbon price under the EU ETS. The report stated that "The UK's existing and evolving policy for renewable energy, and in particular for renewable electricity, already therefore represents a major departure from the pure market principle of relying on a carbon price instrument alone. The Committee believes that this departure is justified" (CCC, 2008, p. 194). The report argued that the Government would need to provide financial support above the EU ETS to encourage the development of renewable technologies and drive costs down, particularly offshore wind which held significant long-term potential (CCC, 2008, p. 195).

According to Watson (2009, p. 139), there was also pressure from within the civil service to strengthen Government support for specific renewable technologies rather than applying a technology neutral approach. This was significant given the important role that the civil service has always played in the implementation of EU law, as the analysis in Chapter 4 demonstrated. In relation to the RED specifically, one interviewee noted that EU targets are taken very seriously within the civil service, even if the priorities of the Government change (Interview 12, 2019).

The three reports, combined with the pressure from within the civil service, made a strong case for a change in policy settings. Since the publication of the White Paper on climate change and the environment in 1990 both Conservative and Labour Governments had relied on market mechanisms to stimulate the development of renewable capacity (Mitchell, 2009). However, the efficacy of that approach had been limited with the UK having one of the lowest shares of renewable energy amongst member states at the beginning of 2010. To achieve the seven-fold increase in renewable energy share required to meet the RED target, the Government was under pressure to adopt a more interventionist approach. According to the recommendations in the three reports, this would include more direct funding for early-stage research, specific incentives for less developed technologies (offshore wind in particular) and more investment support for new renewable generation (both the House of Lords Committee and the CCC indicated their preference for feed-in tariffs over the existing RO). This would require the Government to compromise the neoliberal ideology that had governed the electricity sector since the early 1990s. Whether that ideology was a genuine constraint is a key question for the following section.

The official response to the RED

The Government's official response to the RED was published in the UK Renewable Energy Strategy in July 2009. The Strategy acknowledged, "that a radical increase in current rates of [renewable energy] deployment will be required" (p. 27) but the preference for "robust incentives for renewables to allow the market to respond" (p. 55) rather than direct state investment was maintained. There were, however, two significant changes to the policy framework. The first was the introduction of 'banding' in the RO, which meant that different technologies received different certificates depending on their costs. For example, onshore wind received one certificate for every 1MW generated whereas the less developed solar PV technology received two certificates for the same amount of generation (European Commission, 2009b, p. 114) The second change was the introduction of a feed-in tariff (FiT) for small-scale renewables (under 5MW). The objective was to encourage

more distributed or decentralised energy, where electricity is generated and consumed locally. Distributed energy was making significant contributions in countries such as Germany and Spain, but it had been underutilised in the UK up until that point.

The Renewable Energy Strategy formed the basis for the UK's NREAP, which was submitted to the Commission in 2010. The NREAP listed the policies that the UK had implemented to ensure that the national target was reached. The document also provided bi-annual sectoral targets for the electricity sector, heating and cooling, and transport.

The "greenest government ever"? The Cameron-Clegg Coalition 2010-2015

The Labour Party had little opportunity to implement its renewable energy plan after it lost the 2010 election. The Conservatives formed a government with the support of the Liberal Democrats and the new Prime Minister, David Cameron, claimed that his would be the "greenest government ever" (Randerson, 2010). The policies of the previous Government were retained, including the feed-in tariff (FiT) for small scale renewables, which was particularly successful in growing the capacity of solar PV – a technology that had was providing just 0.01 per cent of the UK's electricity in 2010 (European Commission, 2017b). However, a Policy Review from the Department of Energy and Climate Change (DECC) in 2012 concluded that "current market arrangements will not deliver" the necessary £110 billion of investment required to meet demand for electricity and the UK's renewable energy targets by 2020 (Department of Energy and Climate Change, 2012a, pp. 7–10).

The Government's response was the Electricity Market Reform (EMR) bill. The three major elements of the reform package were an emissions performance standard for new power plants, the establishment of Contracts for Difference (CfDs), and a Capacity Market, which was added through a separate bill in 2013. The emissions standard was designed to rule out the construction of any new unabated coal plants. The CfD mechanism was designed to replace the RO, which was officially closed to

new entrants in 2017. It works by offering a generator a 15-year contract that provides a set price, known as the strike price, for the electricity generated. If the market price is below the strike price, the generator is paid the difference, which is levied on consumers through their power bills. Conversely, if the market price is above the strike price, the generator pays back the difference. The purpose of the CfD is to provide generators with investment certainty by offering a guaranteed price over a 15-year period.

Capacity Markets act as an insurance policy against power disruptions by providing payments to electricity generators to guarantee supply during periods of peak demand. They are designed to overcome the issue of intermittency, which is a perceived weakness of renewable energy. If there is not enough wind or sun to meet demand, there is a possibility of power shortages, so a capacity market mechanism provides a subsidy to power generators to maintain a certain level of capacity, even if it is not utilised. Given that the capacity must be guaranteed, capacity markets favour existing fossil fuel plants and have been criticised for subsidising plants that would be otherwise uncompetitive (Grubb and Newbery, 2018, pp. 10–1). Four auctions have been held to date with the first in 2014. Nearly all of the payments awarded went to existing plants, with just 5 per cent of the first tranche of payments awarded to new capacity (National Grid, 2014, p. 7). However, the 2018 auction saw a shift away from diesel and coal, with gas, nuclear and new interconnectors winning the bulk of the contracts (National Grid, 2018).

The electricity market reforms retained the language of neoliberalism, but their implementation demonstrated a growing level of government intervention (Whitmill, 2012, p. 994). The CfD offers a guaranteed price, but is supposed to be technology neutral, as is the capacity market, which is designed to guarantee security of supply at the lowest possible cost. However, as an official from the CCC noted, the decisions about what is selected have become "very political" (Interview 9, 2018). Another senior energy policy advisor goes further, stating that: "People won't admit it, but they [the Government] are absolutely into picking winners",

likening the process to “the days of Harold Wilson in terms of industrial policy” (Interview 8, 2018).

First, the design of the CfD mechanism is not entirely technology neutral as the budget has been divided into three categories to provide incentives for technologies at different stages of maturity. The first category has an annual budget allocation of £65 million between 2016 and 2021 and is targeted at established technologies such as onshore wind, solar PV, energy from waste, hydro (up to 50MW), and landfill gas. The second category, with an annual budget of £235 million, is for less established technologies such as offshore wind, wave, tidal stream, and geothermal. The third category is for biomass conversions of existing power stations, although no budget was allocated for the period to 2021-22. Second, the CfD mechanism has also been used twice without an auction process. The first was through the Final Investment Decision Enabling for Renewables (FIDER) scheme, which granted CfD contracts to eight projects that included offshore wind and the conversion of a coal plant to biomass. The second use of a CfD without an auction was the deal with EDF-CGN to ensure that the Hinkley Point nuclear plant proceeded. It is clear that despite the actual policy instruments aligning with the market-oriented principles of the Government, there is still an element of ‘picking winners’ (Gillard and Lock, 2017, pp. 647–8; Helm, 2017, p. xii).

The Government implemented additional policies between 2012 and 2013. A household energy efficiency rebate scheme, known as the Green Deal, was launched in 2012; The Green Investment Bank was also created in 2012 to leverage private investment funds for renewable energy projects; and the carbon price floor (CPF) was implemented to buttress the EU ETS. The CPF was a particularly important policy. The UK had been one of the strongest advocates for the EU ETS in the early 2000s, having implemented its own voluntary national ETS in 2002. However both schemes were limited in their effectiveness due to an over allocation of permits, which resulted in persistently low prices (Grubb and Newbery, 2018, p. 7; Smith and Swierzbinski, 2007, pp. 38–9). The CPF was designed to address this problem by establishing a floor price on carbon emissions that would increase every year until it

reached £30 per tonne of CO2 by 2020. However, by 2012 there were signs that political momentum behind climate change mitigation and renewable energy was slowing and the Government implemented a number of policy compromises and reversals.

As the effects of the GFC continued to reverberate through the economy, dissenters within the Government became more vocal and the debate over climate change and the energy transition became more fraught. The Green Deal was cancelled, the Green Investment Bank was prevented from borrowing money until 2015 - and then only if national debt was falling - and the 2014 budget capped the carbon price at £18 per tonne until 2020 (Hirst, 2018, p. 3). The fourth carbon budget also became the subject of considerable debate (Carter and Clements, 2015, p. 212). Prominent members of the Government, including the Liberal Democrat Business Secretary, Vince Cable, and the Conservative Chancellor, George Osborne, issued warnings about the costs the carbon budget would impose on the economy. Osborne also argued that the UK should not be reducing emissions at a faster rate than other EU member states, essentially relinquishing the UK's leadership role (Bawden, 2012). The fourth carbon budget was eventually accepted, but only with a review clause in 2014 attached (Lockwood, 2013, pp. 1339–40).

The UK's growing ambivalence toward climate policy and the development of renewable energy capacity was also reflected in its position on the EU's 2030 climate and energy package. In December 2013, Prime Minister Cameron wrote to the European Commission, arguing that separate targets for emissions reductions, renewable energy and energy efficiency should be scrapped beyond 2020 and replaced with a single emissions reduction target, driven primarily by the ETS. Cameron argued that:

> This will reduce unnecessary costs that our embattled energy sector is currently bearing, lowering energy prices across Europe, with consequential benefits to the EU's growth and competitiveness.

The letter then went on to say:

> Our analysis in the UK indicates that a renewables target would add up to an additional 9 billion pounds per year to UK energy bills in 2030. (in Krukowska, 2014)

Having a single emissions target would allow nuclear and carbon capture and storage (CCS) to play a greater role in electricity generation and both technologies feature prominently in government modelling of the 2050 emissions reduction target.

The emphasis on electricity bills in Cameron's letter was also an indication that the costs imposed on consumers were becoming increasingly important in the debate over the energy transition. The issue became so politically sensitive that it led to some heavy-handed interventions that were completely at odds with the principles of a free market.

Overall, electricity prices for British consumers compare favourably with other large EU member states. UK households pay less than those in Germany, Italy and Spain with only the French paying lower prices (Eurostat, 2018c). However, despite the relative advantage that British consumers have over their fellow EU citizens, prices for households had increased by 14 per cent (adjusted for inflation) in the decade to 2017, and by 16 per cent for industrial customers. For households, this was nearly triple the EU average (Eurostat, 2018c, 2018d). When the opposition Labour leader, Ed Miliband, promised to freeze energy prices for consumers, David Cameron responded by removing environmental levies amounting to £50 per household per year (Carter and Clements, 2015, pp. 215–7). It was a clear shift in language from Cameron, who as opposition leader had argued in favour of stronger action on climate change on the basis of the economic opportunity that it offered.

Electricity prices became even more politically prominent in June 2016 with the publication of the UK Competition and Markets Authority's *Final Review Into the Supply and Acquisition of Energy* in the UK. The report noted that affordability had

become a major issue and would only worsen as climate and energy policies imposed additional costs. It proposed a number of adjustments to regulations, greater coordination between the various agencies overseeing the market and measures to increase price transparency. However, there was a dissenting view from the economist, Martin Cave, who argued that the measures would not be sufficient, therefore a short-term price cap should be imposed (CMA, 2016, p. 79). The Government accepted most of the recommendations, including this dissenting view (Department for Business, Energy & Industrial Strategy, 2018f).

In the lead up to the 2017 election, both major parties promised to place some form of price controls on electricity, and once elected the Conservative Government implemented the *Domestic Gas and Electricity (Tariff Cap) Bill*. The bill required Ofgem to cap energy tariffs until 2020, with the possibility of it being extended to 2023 if necessary. Price controls would seem to be an anathema to a Conservative Party that had long championed free-markets, and the liberalisation of the electricity sector in particular, but it highlighted how politically sensitive the issue had become. It was also another example of the clash between political imperatives and the integrity of a market-based system, which has led to a number of ad hoc government interventions. As Keay (2016, p. 249) notes "The Government's position seems to be that it wants market mechanisms - but only if they give the outcomes policy-makers want"

Policy reversals under the Conservative Government 2015-2017

The period between 2010 and 2015 was marked by ambiguity in climate and energy policy, but the election victory of the Conservatives in 2015 saw very clear reversals, particularly in the support for renewables. The Conservative Party's 2015 election manifesto had already promised to end new subsidies for onshore wind (2015, p. 56), but once elected there were further changes to policy that had a negative impact on investment in renewables. The UK Renewable Energy Association counted 13 negative changes to 'green' policies, including the removal of the renewables exemption under the Climate Change Levy, effectively making it a general tax on

electricity rather than a way to incentivise uptake of renewables; the lowering of the FiT for small scale solar and wind; and the closure of the RO in 2017 with new solar and on-shore wind being excluded a year earlier (Renewable Energy Association, 2016, pp. 9–11). The Energy Secretary, Amber Rudd, claimed that the UK had enough projects in the pipeline to meet its 2020 objectives but was later forced to admit that the UK would fall well short of its 15% renewables target following the publication of a leaked letter to fellow Cabinet colleagues (UK Parliament, 2015). As a result of these policy changes, investment in new renewable capacity fell by 65 per cent between 2016 and 2017 and the UK's reputation as a safe place for investment in renewable technologies was damaged (Frankfurt School-UNEP Centre, 2018, p. 25). In the annual Renewable Energy Attractiveness Index, the UK fell from eighth to eleventh place between 2014 and 2015 with the authors stating that the Government's policy changes had "sentenced the UK's renewables sector to a death by a thousand cuts" (Ernst &Young, 2015, pp. 35–7).

In November 2015, the CCC finalised its recommendation for the fifth climate budget, covering the period from 2028 to 2032, which was accepted by the Government in July of the following year. The UK met its first (2008-2012) and second (2013-2018) climate budgets, and is expected to meet the third budget ending in 2022. However, the early success can be largely attributed to the effect of accounting procedures in the UK's net carbon account, which were only applicable to the first two budgets, and the fact that most of the decline in emissions came from the power sector, which is the least costly to decarbonise. However, shortfalls of 3.3 per cent and 6.7 per cent are projected for the fourth (2023-2027) and fifth budgets (2028-2032) (Interview 8, 2018; Priestley et al., 2018). The CCC issued a progress report in June 2017 which recommended that stronger action be taken to meet the fourth and fifth budgets and noted worrying trends in all sectors, including a 56 per cent decline in renewables investment between 2016 and 2017 (CCC, 2018a, p. 61).

In October 2017, the Government published its *Clean Growth Strategy*, setting out policies and proposals for meeting future carbon budgets and illustrative pathways

for the 2050 target. The strategy was reviewed by the CCC which praised the Government's ambition and direction, but also classified a substantial portion of the projected emissions as a 'delivery risk' (CCC, 2018b, p. 9). In the power sector, it was projected that 85 per cent of generation would come from low-carbon sources by 2032, which would reduce emissions from the sector from about 80MtCO_2 per year to about 30MtCO_2 over the same period. However, about half of the projected emissions reductions were attributed to policies deemed to have a delivery risk, and another quarter included new nuclear capacity in addition to the new plant at Hinkley Point C (CCC, 2018c, p. 5). As the analysis in Chapter 5 demonstrated, the problems with the development of Hinkley have called the viability of the UK's nuclear strategy into doubt.

The impact of the RED

Despite the scaling back of policy support for renewables since 2015, the UK will meet the 31 per cent renewables target for 2020 that was outlined in the country's NREAP. In 2017, it had already reached 29.3 per cent, up from 24.5 per cent the previous year, and will likely pass the 31 per cent figure two years ahead of schedule (Department for Business, Energy & Industrial Strategy, 2018d; Interview 11, 2018, p. 11).

Growth in renewable capacity in the electricity sector during the period of the RED has been much faster than the previous decade. Between 2000 and 2009 generation in non-hydro renewable electricity had increased by 16TWh, but between 2010 and 2016 that growth was 55TWh (European Commission, 2017b). This represents an increase in the average annual growth rate from 16.8 per cent (2000-2009) to 22 per cent (2010-2016). On the basis of these figures, the RED can be seen as a success in the electricity sector. However, it is difficult to disentangle the impact of the RED from other factors that have contributed to the increase in renewable capacity since 2010. As Chapter 6 noted, other policies, particularly the LCPD/IED and the EU ETS (supported by the CPF) have played an important role, as have positive market conditions such as the closure of several coal plants and the falling costs of

renewables. This section addresses each of these factors to understand their influence relative to the RED.

Although the sectoral target for electricity will be met comfortably, this success has not been replicated in the other two sectors covered by the RED. At the end of 2017, the UK had surpassed its interim target for heating and cooling of 5 per cent, having reached 7.5 per cent. However, the target was heavily back loaded with a significant increase in capacity required to meet the 2020 target of 12 per cent.

The transport target will not be met with the latest figures available from the end of 2017 showing that just 5.1 per cent of transport fuels were from renewable sources, compared to the 2020 target of 10.3 per cent (Eurostat, 2018a). The overall target is also uncertain with the UK tracking slightly behind the projections outlined in the NREAP. As of the end of 2017, the share of renewables had reached 9.2 per cent, compared with the 2017 interim target of 9.4 per cent (European Commission, 2009b).

On the basis of emissions reductions, the electricity sector has also overachieved relative to other sectors. The 2017 CCC Progress Report to Parliament notes that since 2012, nearly all of the UK's emissions reductions came from the power sector while those from transport and building stock have actually risen. As a result, overall emissions reductions have stalled (CCC, 2017). This suggests that there are factors unique to the power sector that have contributed to the attainment of the NREAP target. Those factors can be divided into market conditions and the influence of other policies.

First, market conditions in the UK power sector necessitated investment in new generation capacity, which created an opportunity for renewables. Chapter 5 noted that much of the coal capacity that existed in 2010 was nearing the end of its service life and was due for closure before 2020. In fact, between 2010 and 2016 the share of coal in the UK's generation mix fell from nearly 30 per cent to less than 10 per

cent. Nearly 80 per cent of the coal generation that exited the market was replaced by renewable generation (European Commission, 2017b).

Until 2011, gas had replaced coal whenever the latter had exited the market. However, the falling costs of renewable technologies in the power sector made them a viable alternative to gas. Cost estimates for renewables have consistently underestimated the pace of technological development and the consequent rate of cost reductions (Creutzig et al., 2017, pp. 2–3; Frankfurt School-UNEP Centre, 2018, pp. 16–7; Mitchell, 2016, p. 8). For example, in 2013 DECC estimated the levelised-cost of electricity (LCOE) in 2016, 2020 and 2030 for large-scale solar, onshore wind and offshore wind projects. When the estimates were updated just three years later, they had already fallen by between 25 and 30 per cent due to "unanticipated cost reductions and technological improvements for these technologies, reduction in hurdle rates, and/or this progress occurring faster than previously estimated (for example due to accelerated global and domestic deployment)" (Department for Business, Energy & Industrial Strategy, 2016, pp. 29–30). BEIS creates forecasts for three scenarios for each technology based on 'high', 'central' and 'low' capital costs. Under 'low' and 'central' scenarios, the LOCE for large-scale solar PV and onshore wind generation is nearly equal to that of a new combined-cycle gas turbine (CCGT) (Department for Business, Energy & Industrial Strategy, 2016, p. 24).

The penetration and cost reduction of renewable technologies in the heating and cooling and transport sectors has been much slower. In heating and cooling, the primary focus of EU policy has been on energy efficiency rather than the development of new technologies, and where technology has been the focus, the objective has been to switch from gas to electricity, thus increasing the need for renewable technologies in the power sector (Cansino et al., 2011, p. 3804). In transport, there are a number of potential fuel sources that can be defined as renewable, including electricity generated from renewable sources and various biofuels that meet the sustainability criteria outlined in the Directive. Electric vehicles are the cheapest, and most advanced of the various types of renewable transport (Connolly et al., 2014, pp. 110–1), although they are still not cost

competitive with the cheaper internal combustion engine vehicles and make up just 0.2 per cent of the global car stock (IEA, 2017b, p. 225; Lévay et al., 2017; Wu et al., 2015)

The positive market conditions were reinforced by EU policies. The details of the EU's LCPD and the follow up IED were analysed in the previous chapter, but by setting emissions limits, the two Directives limited the service life of the UK's coal plants (CCC, 2015, p. 27). A total of nine coal plants 'opted out' under the LCPD, meaning that they could not meet the emissions limit and were therefore allowed a maximum number of operational hours before they had to close by 2015 (Department for Environment, Food, and Rural Affairs, 2012, pp. 41–3). Amongst EU member states, the UK de-commissioned the largest amount of coal capacity (11.5 GW) under the LCPD (European Environment Agency, 2015). There were a further five plant closures under the IED between 2016 and 2018 (Utilitywise, 2016).

The EU ETS and CPF also aided the cost competitiveness of renewables. The analysis in the previous chapter showed that the ETS alone had little effect on emissions or investment decisions in the power sector, but the implementation of CPF did have an impact. The LCOE estimates published by BEIS that showed large-scale solar PV and onshore wind competitive with CCGT (the lowest cost form of fossil fuel generation) include the CPF. Without the carbon price under the CPF, renewables would remain more costly in both the short (2020) and medium (2025) term (Department for Business, Energy & Industrial Strategy, 2016).

Market conditions and the influence of the LCPD/IED and ETS/CPF have played a role in pushing coal out of the market, but their role in promoting the deployment of renewables should not be overstated. In relation to the LCPD and IED, the UK's coal fleet was nearing the end of its service life in 2010 - the average age of the nine plants closed under the LCPD was 40 years – therefore the LCPD and IED only brought forward their closure. The LCPD also pre-dated the RED and was therefore factored into the UK's NREAP.

The early closure of coal is significant, but if not for the RED, gas would have been the preferred replacement, as it has been since the 1990s. Although the cost of renewables fell much faster than BEIS had predicted, so too did the price of gas. Modelling and forecasts from DECC (2012b, p. 14) and the CCC (2008, pp. 400–4) had assumed that fossil fuel prices would continue to rise after 2008, but they in fact declined from 2014 onwards (Helm, 2017, p. xi). Even with the carbon price under the ETS/CPF, gas remains slightly cheaper than solar PV and onshore wind and between one-third and a half the cost of offshore wind, depending capital costs (Department for Business, Energy & Industrial Strategy, 2016, pp. 49–51). However, the RED target ensured that a minimum amount of electricity is generated from renewable sources by 2020 regardless of price movements.

Policies specifically implemented in response to the RED also improved the cost competitiveness of renewables and provided certainty to investors (Newbery, 2016, p. 1327). One senior UK energy advisor argues that the increase in renewable capacity in the electricity sector is "absolutely policy-driven" and that the costs only began to fall in the UK when the policy framework was put in place, beginning with the Climate Change Act and the RED (Interview 8, 2018). Between 2002 and 2009, the RO was the primary mechanism for promoting renewables, but it only achieved two-thirds of the target set by the Government and failed to drive investment in technologies other than onshore wind and biomass (Woodman and Mitchell, 2011, p. 3916). According to one official, the RED drove the introduction of banding to the RO, which led to the first mass deployment renewables in the UK (Interview 9, 2018). In the first three years following the introduction of banding, the UK added nearly 6,500GW of new non-hydro renewable capacity, more than double the amount added under the entire period of the non-banded RO between 2002 and 2009 (European Commission, 2017b). The gradual replacement of the RO with the CfD mechanism was to provide even greater certainty for investors by providing a guaranteed wholesale price (Bunn and Muñoz, 2016, p. 596).

The FiT for small-scale renewables also had an impact on solar PV capacity. Until 2010, solar PV made up just 0.03 per cent of installed capacity, but there was a four-

fold increase in 2010, followed by a ten-fold increase in 2011 (European Commission, 2017b).

Ultimately the RED contributed to a higher level of renewable energy deployment that would otherwise have been the case, an argument supported by all of the officials interviewed for this chapter. One interviewee noted that the UK's long-term targets under the *Climate Change Act* are actually more ambitious than EU legislation, but that the RED ensured that renewables play an important role in the UK's decarbonisation pathways (Interview 11, 2018). This point is supported by Newbery (2016, p. 1323) who notes that the UK's poor performance in renewable deployment "might not have mattered, given the *Climate Change Act 2008* with its ambitious carbon targets, the latest of which, the Fifth Carbon Budget for 2028-32 commits the UK to reduce emissions by 57% from 1990, except for the Renewables Directive". Modelling of the UK's emissions reduction target confirms this. One senior energy advisor notes that the CCC modelled scenarios with and without the RED, with renewables playing a much smaller role in the latter (Interview 8, 2018). Similar modelling was done by Anandarajah and Strachan (2010, p. 6729), which showed that in the absence of the RED, the UK's long-term emissions reduction target would only result in renewable energy reaching 7 per cent by 2020 rather than 15 per cent.

Conclusion

This chapter examined the implementation of the RED in the UK, which has been characterised by an awkward balance between the dominant neoliberal ideology and the requirement to rapidly expand renewable energy capacity between 2010 and 2020.

The neoliberal ideology that had dominated UK politics under Margaret Thatcher and John Major's Conservative Governments and then Tony Blair's 'New' Labour was influential in shaping British renewable energy policies until 2010. There were, of course, substantive differences between the Conservative and Labour Governments

on a range of issues, but in relation to the promotion of renewable energy, both governments were wary of 'picking winners'. Instead they relied on technology-neutral, market mechanisms such as the ETS and the Renewables Obligation.

However, with renewable capacity growing at much slower rates relative to other EU member states the Blair Government's market-based approach came under criticism from the Royal Commission on Environmental Pollution (2000), the House of Commons Science and Technology Committee (2003), the Renewables Advisory Board (2008) and the Committee of Climate Change (2008), all of which called for a more interventionist approach to develop a broad range of technologies. The ambitious RED targets prompted a policy review by the Labour Government that saw a move away from the technology-neutral approach with the introduction of banding under the RO and a feed-in tariff for small-scale renewables.

More substantial changes occurred under the Cameron Government with the implementation of the Electricity Market Reform (EMR). Nominally based on the principle of minimal state intervention, in practice the reform was implemented in ways that that ensured that the Government's favoured outcomes were achieved. The dominant neoliberal ideology was therefore sufficiently malleable to enable successive governments to identify specific technologies for development through measures such as the RO banding, and to guarantee power generators certain financial returns through measures such as CfDs and the FiT. One senior energy policy advisor suggested that in relation to these policies, "Margaret Thatcher would be turning in her grave at some of the things that the Conservative Party have done" (Interview 8, 2018).

Government interventions since 2009 should be viewed as part of the evolution of the UK's approach to climate and energy policy. In the 1990s, the UK began to utilise its large domestic gas reserves to displace coal. Helm (2004, p. 124) argues that this abundance of resources and the accompanying decline in emissions meant that "there was little or no energy policy to make in the 1990s". In the 2000s, with the imperative of climate change mitigation growing, the Government applied a more

active policy approach, but adhered to market principles through the use of technology neutral financial measures such as the ETS and the RO (Jordan et al., 2003, pp. 179–85; Reiche and Bechberger, 2004, p. 848). Those instruments were not sufficient to meet the ambitious targets of the RED, therefore the UK entered a third policy stage whereby the Blair Government identified specific technologies for development and offered direct payments to generators to overcome investment uncertainty. Neoliberal ideology was therefore only a weak impediment to the implementation of the RED.

The third stage of the UK's renewable energy evolution occurred within a favourable political context that was evident between 2005 and 2010. Both this chapter and Chapter 6 examined the increased salience of climate change as a political issue and the ensuing party competition between the Blair Labour Government and the Conservative opposition during this period. The fact that David Cameron made climate policy a central component of his election strategy drove the Labour Party to significantly increase its own ambition. It was during this period that the *Climate Change Act* was implemented and ambitious renewable energy targets established under the RED.

Blair and Cameron were aided by the fact that interests within the energy sector were dispersed and diverse – a consequence of the privatisation program of the 1990s and a diversified energy mix. It is often assumed that incumbent firms act as a restraint on energy transitions (Jacobsson and Lauber, 2006), but this leads to what Smith et al. (2005, p. 1492) describe as a "tendency to treat regime transformation as a monolithic process dominated by rational action and neglecting differences in context". In the context of the UK, there was little resistance from firms within the power sector. First, the uptake of renewables had been precipitated by the closure of ageing coal plants under the LCPD/IED, which had been planned before the implementation. Firms were therefore not defending sunk investments in infrastructure that was still financially and technically viable.

Second, each of the largest generators had investments in renewables and had benefited from the RO, which had favoured large-scale renewable projects. Third, although each of the large generators owned renewable capacity, the remainder of their portfolios differed widely. This coupled with the fact that there were low levels of market concentration in the wholesale market relative to other EU member states meant that there was no single perspective within the industry. The development of the CfD mechanism was instructive with the largest renewable generator in the UK, SSE, opposing the policy, as it believed that its competence in managing renewable projects would give it an advantage over its competitors. This is not to suggest that there was no industry opposition to the RED – National Grid expressed its concerns that the target was "too much, too soon" (House of Lords European Union Committee, 2008, p. 11) – but the fact that renewables were replacing a form of generation that was already closing, the self-interest of firms benefiting from the UK transition, and the diversity of interests within the industry meant that the Government did not face any concerted opposition from the industry as a whole.

The path dependencies in the UK were therefore weak. The neoliberal ideology that had dominated British politics since 1979 certainly shaped the early renewable energy policy frameworks from the early 1990s to the mid-2000s with market-based policy measures utilised to encourage private investment. However, when it became clear that those measures were insufficient, the Blair-Brown and Cameron Government's became increasingly interventionist to achieve desired outcomes.

The civil service was responsive to the Government's objectives, and the dispersed and diversified interests within the sector ensured that opposition was muted. There was some opposition to the increasing levels of ambition in relation to renewable energy, but neither the Labour nor Conservative Parties faced the sort of monolithic corporate opposition that the French Government faced in the form of EDF.

The 'weak' state institutions in the UK – defined by their authority and autonomy from the executive – also allowed for actors (individuals such as Blair and Cameron, and their political parties) to significantly shape the policy direction to a much

greater degree than their French counterparts. The sociological and discursive forms of institutionalism therefore have a greater explanatory role in the analytical framework when applied to the UK.

The RED was finalised within a favourable political environment and implementation occurred within favourable market and investment conditions in the electricity sector. Further decarbonisation of the sector is likely to become difficult overtime, as the phase out of coal was “the low hanging fruit” of the UK’s energy transition (Interview 10, 2018, p. 10). According to the CCC (2018c), the next phase of the transition from 2020 to 2030 will involve the more difficult tasks of pushing gas out of the market, developing carbon capture and storage (CCS) for the remaining fossil fuel generation and deploying offshore wind at a large scale. This will have to be achieved in a political environment that is likely to be less favourable than the period in which the RED was finalised and implementation began, and with greater resistance from the sector given that early retirements of gas generation may be required. This is to say nothing about Brexit, which will add another layer of complexity. These issued are discussed further in the concluding chapter, along with a comparison between the French and British responses to the RED.

Chapter 9

Conclusion

France and the UK have had markedly different experiences in implementing the RED. Both showed a lack of ambition in relation to renewable energy in the early phases of the RED negotiations, but eventually accepted ambitious targets under the final Directive. The leadership of President Sarkozy and Prime Minister Blair was a significant factor in both countries accepting those targets, but different state institutions then led to different outcomes in the implementation of the RED.

The UK has demonstrated policy flexibility, moving from a laggard in relation to renewable energy policy in the early 2000s, to a leader following the implementation of the RED. As part of that shift, successive UK governments became increasingly interventionist to ensure that policy objectives were achieved. In this regard, the dominant neoliberal ideology in the UK has been less influential that statism has in France, which has shown a lack of policy flexibility. Attempts at significantly increasing the share of renewables in France's power generation have repeatedly failed and the country will fail to meet its 2020 target for electricity as a consequence.

The key difference between the two countries was the responsiveness of the UK's state institutions to the priorities of governments. France's autonomous civil service and state-owned utility, EDF, often had interests that conflicted with the priorities of the executive, namely the continuation of the nuclear power sector. The UK civil service was less autonomous and the interests of the power sector were dispersed following privatisation in the 1990s. As a consequence, UK governments faced less resistance to the transition to renewable energy.

This chapter proceeds in three parts to expand upon these conclusions, beginning with a detailed summary of the thesis's findings. Part II summarises the thesis'

contribution to research on Europeanization, institutionalism and energy transitions, and Part III identifies future research pathways that have emerged from the thesis.

PART I – Summary of findings

The core objective of this thesis was to identify the drivers of, and impediments to, the implementation of the Renewable Energy Directive in the electricity sectors of France and the UK. The central proposition was that long historical processes have shaped the state institutions responsible for the implementation of the RED, creating path dependencies in policy making that have determined whether the two countries were able to meet the requirements of the Directive.

An overview of the analytical framework

The thesis drew upon the literature on Europeanization to describe the processes of EU policy development and implementation by the member states. However, given that Europeanization is not a theory in itself, the literature on institutionalism was utilised to understand those processes. It employed an analytical framework that drew primarily upon historical institutionalism in order to understand how the historical development of state institutions has shaped their form and function, how power is distributed amongst institutions, and whether path dependent policy-processes have formed. The analytical framework also drew upon the sociological and discursive variants of institutionalism to account for the different roles of actors and ideas.

In the layered conceptualisation of institutions the thesis employed, the historically dominant ideology was placed at the highest 'level', constraining and influencing the formal institutions of the state and the electricity sector beneath it. This aligns with the key precept of sociological institutionalism that formal institutions cannot be understood without understanding the culture in which they exist.

Sociological and discursive forms of institutionalism also formed part of the analytical framework to examine the different roles actors and ideas. In both France and the UK, political leaders and new ideas have shifted politics and policies at various times, particularly at critical junctures such as the periods following the Great Depression, World War Two, and the economic crisis of the 1970s. Specific examples are provided in the following section.

Sociological and discursive institutionalism therefore played an important role, but the historical variant remained at the core. The analytical framework of hybrid historical institutionalism was premised on the argument that a dominant ideology with deep historical roots has shaped the formal and informal institutions of the state and the electricity sector. Actors and ideas then operate within the bounds of those institutions. It is therefore necessary to understand the historical roots of the dominant ideology - statism in France and economic liberalism in the UK – in order to understand the form and function of the formal institutions of the state.

The following sections summarise the findings of the analysis of the institutions. It begins with the ideology that defines the role of the state and considers how ideas and actors interact with that ideology.

Ideology, ideas and actors

Chapter 4 provided a historical analysis of the dominant ideologies of the state in France and the UK. The analysis utilised Freeden's (1998, p. 16) definition of ideology, which encapsulates the role of beliefs and ideas as organising principles in political systems, tracing the dominant ideologies in both France and the UK to the Industrial Revolution. France's industrialisation was much slower than Britain's, which had sought to leverage its economic advantage by promoting the principles of economic liberalism, particularly open international markets and private investment. France employed statist principles to protect its industries and increase its economic competitiveness relative to the UK (Bairoch and Burke, 1989, p. 7; Shafaeddin, 1998, pp. 13–4).

However, ideology is not static and in both France and the UK there have been periods of convergence as different ideas penetrated the politics of each country. The influence of economic liberalism grew in France in the first half of the 20th century, which partly explained why the explicit principles of Keynesianism failed to take root in the years between the beginning of the Great Depression and the onset of World War Two. On the other hand, Keynesianism did become the dominant economic philosophy in the UK following World War Two, persisting under both Labour and Conservative Governments until Thatcher's election in 1979. The implementation of Keynesianism principles in a country where economic liberalism had been the dominant ideology since the Industrial Revolution demonstrated that ideas were not necessarily constrained by a dominant ideology. However, an analysis of the formal institutions of the state during this period revealed path dependencies in state institutions that reinforced the dominant ideology over time. The examination of the nuclear programs in the two countries was instructive in this respect.

In the UK, the Labour Party won its first majority government in 1945 and adopted a statist economic program, based on Keynesian principles (Foster, 1993). One of the key components of its program was the nationalisation of key industries, including the electricity sector. France also nationalised its electricity sector in the immediate aftermath of the War.

Both countries subsequently developed nuclear power programs with the UK opening its first plant in 1956, and France in 1962. The programs in both countries were characterised by a tripartite institutional structure with the relevant ministry working with a nuclear research agency and a monopoly utility, both of which were controlled by the state. Despite the similarities in the form of the institutions, however, there were important differences in their function that led to different outcomes in the choice of technologies in the 1970s.

In France, there was a high degree of coordination between a small group of elite decision-makers within the Ministry, the research agency, CEA, and the utility, EDF (Delmas and Heiman, 2001, pp. 444–6; Hatch, 1986, pp. 156–62; Schneider, 2013, pp. 31–3). There was also deep technical expertise within the Ministry, which allowed it to assess the competing claims of the CEA and EDF about technology choice (Grubler, 2010, pp. 5175–7; Hecht, 1994, pp. 559–60; Lucas and Papaconstantinou, 1985, p. 20). Finally, despite the fact that the state controlled the nuclear power sector, each of the three bodies operated with a high degree of autonomy from the government (Hatch, 1986, pp. 152–4). They also operated within the French public service tradition, which prioritised the public interest over the political interests of the government (Brouard and Guinaudeau, 2015, pp. 156–62).

The key nuclear power institutions in the UK did not possess these characteristics. In the UK, expertise was concentrated in the Atomic Energy Agency (AEA), upon which the civil servants from the Department of Trade and Industry were dependent for technical advice (Collingridge, 1984, p. 47). As a consequence, the department lacked the capacity to act as an arbiter between the AEA and the utility, the CEGB. The government departments and the CEGB also lacked autonomy from the Government (Williams, 1980, pp. 320–1). Between 1964 and 1974, both Labour and Conservative governments intervened directly to ensure that the CEGB purchased British-made nuclear reactors (Wonder, 1976). The independence of the utility was further undermined by political appointees to the board who often acted to advance the short-term political objectives of the governments that appointed them (Helm, 2004, pp. 21–4).

The historical analysis of the nuclear programs in each country has relevance for the current energy transition, particularly for France where nuclear remains the dominant power generation technology. However, the main point of the analysis is to demonstrate that even during periods of apparent ideological convergence – in this case a period where the state was the dominant actor in the electricity sectors of both countries - there are important differences in the functioning of institutions that reflect deeper administrative traditions.

Peters and Silberman (2008) trace the traditions of France's civil service, which feature an emphasis on engineering competence and the provision of public goods over the priorities of the government, to Napoleon's state-led modernisation program of the early 19th century. In the case of the UK, Lowe (2011), traces the origins of the British civil service traditions to the second half of the 19th Century – a period of British economic liberalism. The structure and traditions of the civil service were therefore deeply rooted and they retained many of their characteristics even when the politics of the country changed. This was particularly evident in the UK. Although the UK adopted statist principles in the post World War Two period, the UK remained what Katzenstein (1978), Krasner (1978), and Wilks and Dyson (1983) characterised as a 'weak state'.

The civil service in the UK was more generalist and more dependent upon outside expertise than the French bureaucracy, but also lacked autonomy from the government of the day (Hayward, 1986, p. xiii; Tomlinson, 1994, p. 163). State-owned enterprises, such as the CEGB, were also more likely to be politicised than France's EDF, which was able to maintain a much higher degree of independence and operated within the French tradition of protecting the public interest (Brouard and Guinaudeau, 2015, pp. 156–62; Hatch, 1986, pp. 152–4; Helm, 2004, pp. 21–4). The British state therefore lacked the capacity to implement a large-scale, centrally planned nuclear program.

The second, related, point highlighted by the historical study of institutions is that although there have been periods of ideological convergence, the historically dominant ideology has reasserted itself over time. France's statist principles waned in the first half of the 20th century, but returned in the aftermath of World War Two and have shaped economic policy since. The UK adopted Keynesian principles between 1945 and 1979, but the state had already began a gradual withdrawal from the economy in the 1950s, before the election of the Thatcher Government returned economic liberalism to the heart of the UK's political economy in 1979 (Tomlinson, 1994, pp. 221–4). Despite the election of a Labour Government in 1997, the main

tenets of Thatcher's economic liberalism – the predominance of the market, privatisation of state assets, a shrunken civil service, and de-regulation – were retained (Robinson, 2003, p. 42).

The institutions of the state in France and the UK

There are many similarities between the political systems of France and the UK, but also some important differences. They are both characterised by majoritarian, rather than consensual electoral systems, which normally results in one political party holding power at any given time. The UK has a more stable party system with either the Conservative or Labour Parties holding power since World War Two, although there is some evidence of party fragmentation since 2010, and Brexit is undermining traditional party allegiances (Prosser, 2018). In France, the collapse of political parties and the formation of new ones is common, although it is normally a single party that holds both the Presidency and Prime Ministership, particularly since electoral reforms in 2000 aligned presidential and legislative terms (Haegel, 2017, p. 379; Sauger, 2017, p. 316).

The state institutions of France and the UK have been shaped by different ideologies. These differences are evident in the analysis of the civil service and the level of state ownership and control over the economy.

As Chapter 4 indicated, despite a series of reforms since 2000, the French civil service remains much larger, has greater autonomy and has retained more specialist expertise than its counterpart in the UK (Baron, 2013, p. 108; Bezes, 2017, p. 256; Bezes and Lodge, 2007). It also works much more closely with large industrial interests, many of which remain under state control. The analysis of the relationship between the state and industry drew upon the varieties of capitalism literature, which classifies France as a meso-corporatist state, and the UK as a liberal market economy (Cawson et al., 1987; Hall and Soskice, 2001; Muller and Saez, 1985). The analysis indicated that these classifications remain broadly accurate.

In France, the state has retained a majority share in 51 firms, which account for 7 per cent of employment. This compares to 16 state-controlled firms in the UK, representing just 0.5 per cent of employment (OECD, 2018a, 2017). However, France's meso-corporatist structure goes beyond just ownership to incorporate coordination between a small number of elites in the firms, the civil service and the government. This is a phenomenon that has been observed in studies of multiple sectors, including vehicle manufacturing (Calef and Goble, 2007), banking (Jabko and Massoc, 2012) and the development of waste-to-energy technology (McCauley, 2016).

The institutions of the state therefore conform to the precepts of the historically dominant ideology, which aligns with the layered conceptualisation of institutions employed in this thesis. Ideology is an institution at the 'highest' level, which influences the formal institutions of the state and the electricity sector beneath it. This is not to discount the potential for change and the role of actors and ideas – particularly following critical junctures, which are discussed below in the section on institutionalism. However, actors and ideas are usually constrained by the institutions in which they operate, albeit to a different extent in France and the UK – a key point that is also discussed further in the sections below.

The institutions of the electricity sector in France and the UK

Chapter 5 indicated that the institutions of the electricity sector in France and the UK operate along the same principles as those of the state. In France, the electricity sector is an extension of the state as it controls the dominant utility, EDF. The EU's three energy market packages (1996-1998, 2003 and 2009) led to a degree of liberalisation in France, particularly at the retail end of the market, but the generation, transmission and distribution functions are still controlled by EDF. As a consequence, France has higher levels of market concentration in power generation than any other member state with the exception of Malta and Cyprus (European Commission, 2014a).

The UK's electricity sector sits at the opposite end of the liberalisation-state control spectrum. Amongst member states, it has the lowest levels of market concentration in the power generation sector, with only one company (EDF) responsible for more than 15 per cent of generation (Energy UK, 2015, p. 2; Ofgem, 2018a). The UK's generation mix is also diverse with gas (41 per cent), renewables (30 per cent) and nuclear (21 per cent), all accounting for significant shares (Ofgem, 2018b). This is unlike France where nuclear power accounts for over 75 per cent of total generation (European Commission, 2017b).

The coordination amongst policy elites is also evident in the French electricity sector (Genieys, 2010, p. 6). Several interviewees quoted in Chapter 5 noted the tight coordination between the civil service, EDF, and the market regulator, CRE. This compares to the UK where dispersed interests amongst energy firms and an independent regulator meant that coordination was limited (Interview 8, 2018; Interview 9, 2018; Interview 14, 2019).

The organising principles of the electricity sectors in France and the UK therefore conform to the dominant ideology in each state. Whether those institutions create path dependencies in policy-making processes that either drive or impede the implementation of the RED is discussed below.

Research findings from the French case study

France's established a renewable energy target for its electricity sector of 27 per cent by 2020 under its National Renewable Energy Action Plan (NREAP), which was submitted to the Commission as a requirement of the RED in 2010. It is likely that France will fall well short of its target. Renewables accounted for 19.9 per cent of electricity consumption in 2017 with the annual growth having stalled in the previous three years (European Commission, 2019b). At the beginning of the RED period in 2009, renewables had a share of 15 per cent, but nearly all of the existing renewable generation came from long-standing hydro facilities. Non-hydro renewables made up less than 1 per cent, but were expected to grow to about 13

per cent by 2020 (European Commission, 2016a). The target also implied a reduction in some of France's nuclear capacity. The NREAP target was therefore very ambitious. This raises the question of why France accepted such an ambitious target, particularly given that, as late as 2006, then President Jacques Chirac was arguing that the EU's target should include 'low-carbon' technologies rather than just renewables. Two factors were identified in this thesis.

The first was that leadership in the development and deployment of renewable energy technologies appealed to France's techno-nationalism, which Hecht (2001) identified as an important component of the country's self identity. A rapid deployment of renewables would demonstrate France's research, manufacturing and engineering capabilities in much the same way that the nuclear program had done in the 1970s and 1980s. Several parliamentary reports had made specific reference to France's poor performance relative to other EU member states as a way of arguing for stronger support policies for renewables (Brosse, 1992; Cochet, 2000).

The second, which was related to the first, was the roles played by President Sarkozy and Environment Minister Jean-Louis Borloo during the final European Council negotiations over the RED in 2008. France held the rotating presidency of the European Council during this period and Sarkozy wanted to ensure that the 2020 climate and energy package was finalised under his direction. As part of this demonstration of leadership, Sarkozy and Borloo accepted a national target of 23 per cent, over the objections of their administration (Bocquillon and Evrard, 2017, p. 179). Sarkozy's desire to create a political legacy undoubtedly played a role in his actions, and this highlights the need to allow for agency within any analytical framework. However the acceptance of the targets was also a demonstration of France's dual policy style, which was examined in Chapter 5.

The dual policy style distinguishes between 'heroic' and 'humdrum' forms of policy-making (Hayward, 1982). The former is characterised by long-term policy programs that normally involve transformative technologies and infrastructure – the manifestation of France's techno-nationalism. The nuclear program is the prime

example of this style; others include France's high-speed railway (TGV) and the Concorde. The 'humdrum' style refers to the more mundane application of policy that is usually carried out within France's meso-corporatist framework, which is characterised by cooperation between an elite group of technocrats within the civil service and large industrial interests (Cawson et al., 1987; Muller and Saez, 1985). However, the division of power between the executive, the civil service, and powerful industrial actors can create a misalignment between the two policy styles. This is precisely what happened in the case of the RED targets. Sarkozy used his authority to accept the targets, but lacked the support of the technocrats within the civil service and EDF, which resisted moves to reduce its nuclear power capacity, or allow new market entrants via decentralised forms of generation (Feurtey et al., 2016, p. 1460).

A further demonstration of the misalignment of policy styles occurred under Sarkozy's successor, François Hollande. The Energy Transition Law, implemented in 2015, included a provision to reduce the share of nuclear power in electricity generation from 75 per cent to 50 per cent with renewables replacing the bulk of the lost capacity. Chapter 7 analysed the technical, economic and political lock-in mechanisms inherent in France's nuclear power program, including the sunk investment of 83 billion euro in construction and engineering costs (Cour de Comptes, 2012, p. 24; World Nuclear Association, 2018); the contribution to France's GDP (2 per cent) and industrial employment (7 per cent of the total) (MTES, 2019, p. 126; PWC, 2011, p. 12); and the high ratio of capital costs to operating costs, which creates a strong incentive to operate reactors for as long as technically feasible (Hultman, 2011, p. 403; Malischek and Trüby, 2016, p. 909).

The difficulty of overcoming these lock-in mechanisms was evident in conflicting statements from members of Hollande's administration, and an official planning document that failed to outline how France would fully achieve the target (MEEM, 2016b, p. 4).

The research in this thesis has revealed that although France's state institutions possess the capacity to manage a rapid, large-scale transition to renewable energy, that capacity has been constrained by the various lock-in mechanisms inherent in the French nuclear program. As long as those lock-in mechanisms remain, the meso-corporatist bargain between the French civil service and EDF will impede the transition to renewable energy, regardless of any ambition shown by the executive.

France's nuclear reactors were built with the expectation that they would operate for about 40 years, which most will reach between 2020 and 2025. EDF has proposed extending the life of all 58 reactors currently in operation to 60 years, which may deliver benefits in terms of electricity prices and emissions relative to scenarios involving the building of new nuclear plants or a progressive move to renewables (Percebois and Mandil, 2012, p. 58). Difficult decisions about new generation will still have to be made, but it is possible that an alignment between France's dual policy styles will occur at some point in the next two decades, thus enabling a transition that mirrors the transition to nuclear energy between 1973 and 2000.

Research findings from the UK case study

The UK, like France, had an ambitious target for the electricity sector under its NREAP. At the beginning of 2010, the UK had one of the lowest shares of renewables in electricity amongst EU member states with 6.7 per cent, yet it established a 31 per cent target for 2020. Unlike France, the UK will comfortably surpass that target. Only Ireland, Greece and the Netherlands expected a larger percentage increase under the RED, and none of those countries are expected to meet their 2020 targets (European Commission, 2017b).

The UK's achievement is remarkable when one considers its lack of ambition and progress in the two decades prior to the RED negotiations. It failed to meet its 2010 target of 10 per cent under the original renewable energy directive (RES) and at the beginning of the RED negotiation period in 2006, the UK Government proposed a target of just 20 per cent by 2020.

Chapter 8 examined the factors that drove this increase in ambition and subsequent performance. The period between 2005 and 2010 was of particular importance for the UK. It was during this period that the country moved from being a laggard on climate and energy policy within the EU to being one of its most ambitious member states. It was also the period that laid the foundation for the effective implementation of the RED in the period from 2010.

The increase in the UK's ambition was driven by a combination of increased political salience, party competition and personal initiative. The political salience of climate change was particularly high during the period from 2005 to 2009, driven by the need to negotiate a global agreement to replace the Kyoto Protocol, the release of the Stern Review and competition between the major political parties. Party competition was driven by the Conservative Party while in opposition, and led by David Cameron. The Conservatives adopted a strong position on climate change, in part to distance itself from its Thatcherite image. With the Greens party also gaining support, the Labour Government found itself being outflanked on both the left and right and responded by strengthening its own policies. Finally, the influence of political leaders played an important role. Much like Nicolas Sarkozy, Prime Minister Tony Blair sought to build a political legacy and chose climate change as a focus issue, while his eventual successor, Gordon Brown, envisaged a future electoral battle with David Cameron and reversed his earlier opposition to stronger climate policy in order to neutralise the issue (Blair, 2010, p. 627; Carter, 2008, p. 198; Interview 8, 2018).

The 2008 *Climate Change Act* in 2008 mandated a 2050 emissions reduction target and created the Committee on Climate Change (CCC). It was also during the period between 2005 and 2009 that the UK committed to the target set under the RED. Although there were a number of policy reversals in relation to renewables following the election of the Cameron Conservative Government in 2015 - due primarily to the global financial crisis and rising electricity prices - the foundation had already been established to ensure that the NREAP target would be met.

Chapter 4 illustrated that the state in the UK has traditionally played a weaker role in the economy relative to France, and that, in turn, led to the development of weaker state institutions. The civil service in the UK may be regarded as highly competent, particularly in its implementation of EU law, but it lacks the relative autonomy of its French counterpart. The British state also has a no direct control over firms operating in the electricity market and the liberalised structure has meant that there is no dominant player. In fact, the only company controlling more than 10 per cent of the UK's electricity generation is EDF.

The distribution of power amongst the government, the civil service and industrial interests in the UK ensures that the government has greater control over policy relative to France where power is divided between the three. The strength of the executive relative to the civil service and industrial interests also ensures that ideas and agency, as expressed through political parties, have greater influence in the UK than they do in France. A change of government in the UK is therefore more likely to lead to a change in policy direction.

Policy toward the electricity sector has been more stable in France than the UK. The British sector was broken up and privatised in the 1990s and there have been significant changes to the energy mix with coal being displaced, first by gas in the 1990s, and then by renewables since 2011. In France, the state has retained control over the vertically integrated monopoly, EDF, and nuclear has consistently provided over three-quarters of France's power generation since the 1980s. The dominant ideology has also proven to be less influential in the UK where governments have frequently compromised neoliberal principles by intervening in the market to achieve certain outcomes. Two examples are banding under the Renewables Obligation, which favours certain technologies, and the subsidies and loan guarantees offered to EDF to ensure that a new nuclear plant at Hinkley Point is built.

British governments have therefore been less encumbered by institutional path dependencies in the transition to renewables and this flexibility has contributed to the effective implementation of the RED. However, there are two important qualifications related to this finding. First, there have been other factors that have contributed to the UK meeting its renewable energy target that cannot be explained by hybrid historical institutionalism. First, the increase in renewable generation in the UK coincided with a decline in coal-fired generation, particularly after 2012. Between 2013 and the end of 2017 the share of coal-fired power generation declined from nearly 40 per cent to less than 10 per cent while the share of renewables increased from 10 per cent to nearly 30 per cent in the same period. The decrease in coal was driven largely by a combination of the EU's Large Combustion Plant Directive (LCPD) and the UK's carbon price floor (CPF), which brought forward the closure of plants that were already nearing the end of their service lives. The falling cost of renewable technologies - supported by government policies - then made renewables a more viable alternative than new gas generation.

Second, the UK has picked the low-hanging fruit. The more difficult phase of the energy transition lies ahead. The CCC (2015, p. 6) has identified the decade from 2020 as the crucial period in the decarbonisation strategy as a combination of renewables, nuclear and carbon capture and storage displace gas, which currently accounts for 40 per cent of electricity generation. Whether the state has the capacity to guide this phase of transition is uncertain and is one possible question for future research. Further questions for future research are discussed in Part III of this chapter, but it is first necessary to assess the thesis' contribution to existing research.

PART II – Contribution to research

This thesis makes contributions to research on Europeanization, institutionalism and energy transitions, each of which are outlined in the following sections.

Europeanization

This thesis drew upon Radaelli's (2003, p. 30) definition of Europeanization to examine the processes of policy construction, diffusion and institutionalisation. In relation to the 'construction' of the RED, Chapter 6 traced the development of the Directive with a particular focus on the roles of France and the UK. Both countries accepted ambitious targets, although for different reasons. For France, the EU negotiations gave President Sarkozy the authority to advance a position that was not supported by either the civil service or EDF. It is an example of a phenomenon identified by Featherstone and Radaeli (2003, p. 9) whereby actors utilise EU processes to bypass domestic opposition. However, this thesis examined that strategic use of the EU further to trace what happened when there was a misalignment between a position adopted at the EU level and the position of domestic institutions. In the case of France, the alignment was not achieved and the NREAP target for electricity will not be met.

The UK's acceptance of an ambitious policy was a continuation of a trend toward greater ambition on climate change and renewable energy that had begun in 2005. This meant that, although France and the UK required similar increases in the rate of renewable deployment, the adjustment required of the UK was much less as it had existing policy frameworks in place. When taken together, the two cases indicate the need to consider adjustment not just in terms of the difference between the baseline of a policy and its final objective, but also in the context of existing institutional and policy settings.

The case of the RED also extends an understanding of the role that institutional fit and veto points play in processes of Europeanization. The institutional fit and veto points theses seemingly contradict each other. The former posits that countries that mirror the institutional structure of the EU, with consensual political systems with dispersed authority, are more likely to adjust to the requirements of the EU. The latter argues that such dispersed authority creates more veto points, thus slowing the adjustment. However, as the analysis in Chapter 2 noted, the empirical evidence on the two perspectives is mixed and depends on the policy and the sector. This

suggests that studies of Europeanization that incorporate institutional fit and veto points should move from the macro-level of the state to the meso-level of individual sectors.

One of the criteria for selecting France and the UK was that they are both majoritarian systems of government, thus eliminating institutional fit and veto points as potential macro-level variables. However, the research does show the importance of these perspectives at the meso-level. The dispersed, private ownership in the UK's electricity sector meant that although energy firms are influential, there were no apparent veto points amongst industry players. In France, EDF was not only the dominant market player, but it was also deeply embedded within the state and therefore a very powerful constraint on ambitious renewable energy policy. This suggests that it is not the *number* of veto points that is an impediment to effective implementation of EU policy, but the *strength* of those potential vetos. This thesis has also argued that understanding the strength of veto points requires an understanding of the path dependencies inherent in institutions, and for that the hybrid historical institutionalist framework proved to be very useful.

Institutionalism

Institutionalism provides a framework for understanding how institutions shape behaviour and outcomes, and also the mechanisms that either perpetuate the structure of an institution or bring about change. This thesis has made a contribution to each of these elements.

First, in relation to the way that institutions shape behaviour, Chapters 4 and 5 drew upon the work of Simeon (1976), Scott (1994) and Williamson (2000) to identify and classify institutions. Each of these authors had developed frameworks that classified institutions in a hierarchical structure. Although each was different in the specific terms used and the number of levels applied, they were all similar in that they placed culture, meaning systems or ideology at the highest level and then formal institutions at lower levels of their hierarchies. This layered conceptualisation proved

to be a useful as it provided a framework for understanding how ideology has shaped the formal institutions of the state and the electricity sector.

The layered approach has been criticised for assuming that influence flows one way, with ideology - the focus of this thesis - determining the shape of formal institutions (Kingston and Caballero, 2009, pp. 167–8). However, this thesis has demonstrated that ideology leaves an imprint on institutions that is evident even after the dominant ideology of a state has changed. The examination of the state institutions in the three decades following World War Two showed that although there was a convergence toward Keynesianism, and institutions in the two states appeared to mirror each other, there were important differences that reflected France's statist history and the UK's history of economic liberalism. This is an important addition to the work of Simeon, Scott and Williamson.

There is a further consideration to be reflected upon. The thesis has shown the persistence of a historically dominant ideology in France and the UK. Although there have been shifts at different times, particularly following critical junctures, France has returned to some form of statism over time whereas the UK has returned to a form of economic liberalism. Even when new ideas emerge, the ideological imprint that persists within state institutions draws the state back toward the historically dominant ideology.

Institutional change: Critical junctures and incremental change

This thesis identified two types of institutional change from the literature: critical junctures and incremental change (Capoccia and Kelemen, 2007; Lipset and Rokkan, 1967; Streeck and Thelen, 2005a).

It is accepted that major shocks provide an opportunity for new ideas to penetrate political and social systems before the changes triggered by those ideas are bedded down and become permanent. This thesis' examination of state and electricity sector institutions confirmed this, with the successive impacts of the Great

Depression and World War Two, and then the economic crisis of the 1970s, triggering significant political and institutional change. Once changes are bedded down they can change through another critical juncture, or incrementally. Streeck and Thelen (2005a, pp. 8–9) identify four types of incremental institutional change: *displacement* (the replacement of existing institutions with new ones); *layering* (new rules being applied alongside existing ones); *drift* (no changes to rules, but their impact is altered by changes to the wider environment); and *conversion* (existing rules are interpreted or applied in new ways). However, the persistence of a historically dominant ideology and the lasting influence it has on institutions may work as another incremental mechanism that draws state back toward long-established organisational principles and practices.

The final point to make in relation to institutional persistence or change is that the potential for change varies according to whether a state can be classified as 'weak' or 'strong'. It is important to reiterate that the definition of 'weak' and 'strong' taken from Katzenstein (1978), Krasner (1978), and Wilks and Dyson (1983) does not refer to positive or negative outcomes, but to the authority and influence possessed by state institutions. The French state is classified as 'strong', owing to its powerful civil service and direct control over important sectors of the economy. The UK is a 'weak' state given its relatively smaller civil service and lack of direct state control of industry.

For example, the economic crisis of the 1970s contributed to the election of Margaret Thatcher in 1979, which marked the beginning of a period of significant political change in the UK. In France, however, the response occurred within existing institutional frameworks. Comparing the two states, it was the 'weak' state (the UK) that experienced deeper political and institutional change. Returning to the conclusions of the previous section, the fact that the government in the UK is proportionately much stronger than the civil service and than industrial interests means that political leaders and parties have greater opportunities to trigger change. The inverse is also true: the mechanisms for institutional stability (or stalemate),

namely path dependencies, are stronger where power is dispersed amongst different state institutions, as is the case in France.

Institutional stability: Path dependence and lock-in

This thesis has demonstrated that the influence of path dependencies varies between the two countries with the UK demonstrating far greater flexibility in implementing policies to meet the requirement of the RED than France. Again, it is important to note that other factors such as coal plants reaching the end of their service lives and the falling cost of renewables have been favourable toward the UK transition over the past five years, whereas the opposite is true in France where the nuclear plants have remained both technically and economically viable. However, it is clear that the UK has not faced the same institutional impediments as France. It has not been in the interests of EDF to replace nuclear with renewables to meet the country's NREAP target, and, given the relationship between the company and the civil service, the likelihood of France meetings those targets was low from the outset, regardless of any ambition that was held by the executive.

The Government in the UK did not face the same level of resistance to its ambition from incumbent energy firms. Privatisation severed the state's direct control over the sector and liberalisation dispersed interests across multiple firms. Even the commitment to economic liberalism in the UK has proven to be conditional upon governments achieving their objectives. As it became clear that market-based policies were not achieving their objectives, UK governments have been increasingly willing to intervene.

Although the weaker path dependencies in the UK have allowed it to implement the RED more effectively than France, the effect of those path dependencies may change when the RED is analysed in the context of the EU's 2050 climate strategy. The 2050 strategy outlines an emission reduction target of 80 per cent from 1990 levels (a net-zero target was being negotiated at the time of the thesis' completion), therefore the long-term emissions performance of the French and British electricity

sectors has to be considered. On this basis, the constraints that institutions have placed on France and the UK in the implementation of the RED may not lead to an ineffective outcome in the long-term.

Liebowitz and Margolis (1995) distinguish between three types of path dependence. *First-degree path dependence* occurs when there is some sensitivity to starting points, but no consequent inefficiency. *Second-degree path dependence* arises when a lack of information leads to an inefficient outcome, but the inefficiency is only recognised as inefficient in retrospect. *Third degree path dependence* is a situation where an inefficient path is pursued, even when remedial action can be taken to alter the outcome.

Although state institutions limit the types of policies France and the UK can implement, that does not necessarily affect the overall outcome. This is a particularly pertinent point for France, which will not meet its 2020 NREAP plan target for the electricity sector because of the inherent path dependencies of its nuclear power program, although it may meet the 2050 emission target precisely because of the use of nuclear power.

Energy transitions

This thesis has contributed to the small, but growing, body of research that examines the energy transition using institutionalism as a framework. As noted in Chapter 2, much of the literature relating to energy transitions has adopted a very broad perspective that has sought to identify general patterns. More recent work, such as that of Geels et al. (2016) has applied a comparative case study approach and describes differentiated transition pathways; however, it still seeks to identify general typologies. This literature has been very useful in identifying general principles; however, this thesis argues that the energy transition should be understood as multiple transitions occurring within different institutional contexts and to understand those contexts. Institutionalist literature provides a useful framework through which to understand those contexts.

A hybrid historical institutionalism is especially useful for understanding the transition currently occurring in electricity sectors. This thesis has demonstrated that the institutions of the electricity sector have been shaped by long historical processes that have created conditions that either drive or impede the transition. In this respect, the thesis builds upon the work of Lockwood et al. (2017) who utilise historical institutionalism in their examination of energy transitions. The authors are cautious not to definitively conclude that certain types of institutional structure are more suited to rapid transitions, although they do offer a list of potential drivers. They include a proportional electoral system that allows new ideas to enter the policy domain; the involvement of municipal or local institutions in energy supply; incumbents that do not have a narrow profit motive; expertise within the energy sector; dispersed interests and a wide distribution of benefits; and fewer or weaker veto points.

The research presented in this thesis does provide empirical evidence that supports some of the tentative conclusions of Lockwood et al. (2017), and contradicts others. The UK's success in implementing the RED may invalidate the findings of Lockwood et al. (2017) that proportional voting systems and the involvement of municipalities and local institutions are key drivers of the energy transition. The UK has successfully implemented the RED despite having a majoritarian electoral system and an electricity sector that is controlled by private companies at a national level. However, ownership is dispersed which does weaken potential veto points, thus validating the final factor on the list of drivers identified by Lockwood et al. (2017).

France's failure to meet the RED target may also invalidate some of the factors listed. As a state-owned company, EDF is not driven by a narrow profit motive - unlike the private interests of the UK market - and is still obliged to provide public goods. However, it has been the privatised UK sector that has increased renewable capacity to meet the requirements of the RED rather than the state-owned French sector. The French state also has greater control over the market regulator (CRE)

compared to the UK's independent regulator (Ofgem) and greater expertise within its institutions compared to the UK, yet it has failed to meet its stated targets.

The policy consequence of the institutional approach to the transition in the electricity sector is that policies should be designed with domestic institutions in mind. For example, France implemented a number of policies that had been applied previously in other member states. The Eole 2005 program mirrored the UK's Non Fossil Fuel Obligation (NFFO) scheme and the feed-in tariff (FiT) was based on the experiences of Germany and Spain. However, as Chapter 7 noted, the policies were much less successful in France in terms of encouraging renewable energy deployment than the countries where they had first been implemented. This failure could be traced back to an institutional structure that was heavily geared toward centralised, utility-scale generation (particularly nuclear), rather than the smaller-scale renewable installations that these policies were aiming to promote.

Finally, the thesis' conclusions demonstrate the value of the varieties of capitalism (VoC) literature to the study of energy transitions. The VoC literature describes the UK as a prime example of a liberal market economy (LME) with France being an example of a coordinated market economy (CME). Although the thesis argues that the CME label does not strictly apply to France with its meso-corporatist structure distinguishing it from true CME's such as Germany and Japan, the high level of state control still marks it as a 'coordinated' economy. Based on the research in this thesis, it has been the LME that has been more adept at transitioning its electricity sector to renewable energy than the coordinated economy. However, caution must again be applied due to the fact that the study was limited to two states and that the situation may reverse in the next decade.

Part III – Future Research

Any subject that intersects with two complex political phenomena - in this case the EU and the energy transition – offers abundant opportunities for ongoing research.

Some of these opportunities have already been noted throughout this chapter and this final section further outlines the ways in which the findings of this thesis could be useful for future research.

Future targets

The opening chapter defined the RED in the context of the EU's claims to climate leadership and it's stated objective of reducing emissions by at least 80 per cent by 2050 (negotiations for a net-zero target were ongoing at the time of writing). Continuing research on the EU's targets is required to assess progress toward this objective.

In relation to the contribution of renewable energy, an overall target of 32 per cent for 2030 was finalised in June 2018. Crucially, there are no binding national targets as part of the 2030 target (Knopf et al., 2015, p. 58). The 2001 RES only included indicative national targets and the 2010 target was ultimately missed. As the analysis of the RED in Chapter 6 made clear, the inclusion of binding national targets was a crucial element of the negotiations surrounding the Directive, and the consensus amongst interviewees was that the threat of sanction was a driving factor behind most states meeting their targets. Analyses of the 2001 RES and the RED suggest that binding national targets are an important driver of effective implementation (Howes, 2010, pp. 122–3), but the 2030 targets will enable further empirical evidence to be gathered on this question.

The negotiations themselves also offer an avenue for future research and are likely to provide valuable insights into the workings of the EU. There is a particular opportunity to examine the influence that the eastward expansion of the EU has had on the bloc's climate and energy policies. The RED was implemented a little over five years after the largest expansion of the EU in 2004 and the new member states were allocated relatively modest targets. However, since that time those states have become increasingly assertive in negotiations with Poland playing a particularly prominent role in arguing against both an ambitious EU renewable energy target and

binding national targets (Bürgin, 2015, p. 696; Knopf et al., 2015, p. 57). An analysis of the 2030 renewable energy target is likely to reveal interesting insights into impact that eastern and central states have had on the EU's claims to climate and renewable energy leadership.

Transport and heating and cooling sectors

A comprehensive understanding of the implementation of the RED would require an examination of the other two sectors included under the Directive, namely heating and cooling, and transport. The transition in those two sectors is less advanced than the electricity sector, yet their contribution to emissions and therefore their role in meeting the EU's 2050 targets are significant. EU emissions figures do not separate electricity and heat production, but transport is responsible for 20 per cent of total emissions (Eurostat, 2017d).

The UK is unlikely to meet its heating and cooling target and will fall well short of the transport target having achieved less than half of the 10.3 per cent at the end of 2016. France will meet its transport target, although its target for heating and cooling - which is tied to its electricity target given that much of the country's space heating is electric – appears unlikely. Understanding whether similar institutional drivers and impediments were at play would be one avenue for potential future research. A comparative approach between sectors could also yield particularly interesting insights. Calef and Goble's (2007) study of France's electric vehicle policies, which was discussed in Chapter 4, brought to the fore a number of similarities with the electricity sector in terms of the meso-corporatist approach. This provides an opportunity to understand why such an approach was effective in the transport sector (or at least the automotive segment), and not the electricity sector.

The role of nuclear

Although the thesis focused on renewable energy, both France and the UK envisage a prominent role for nuclear power in the energy transition. Although France is planning to reduce the share of nuclear from 75 per cent to 50 per cent by 2035,

investment in the technology continues. In the UK, nuclear's share is expected to increase from 20 per cent to as high as 30 per cent by 2030, with the new plant at Hinkley Point being the first of a series that are planned to be built in the next decade (Department for Business, Energy & Industrial Strategy, 2018a, p. 32). Elsewhere around the world, nuclear generation is in decline, and the average age of reactors in all developed countries is over 30 years (IEA, 2019, p. 11). As a consequence the share of low-emissions technologies (nuclear and renewables) has remained at 36 per cent for the past twenty years (IEA, 2019, p. 3). Replacing decommissioned capacity with new nuclear capacity has the potential to play an important role in the global energy transition, although as the analysis in Chapter 5 demonstrated there are particular questions that must be addressed if any potential is to be met.

France's nuclear transition between 1973 and 2000 was successful due to the high levels of coordination between state institutions (including EDF), the existing technical competence within the key institutions and the fact that the program was built at scale, which enabled France to build an effective supply chain, to leverage economies of scale and to apply lessons to each new plant constructed. The UK's program in the 1970s and 1980s was less successful, due to the fact that the decision about technology choice was politicised. The most recent program has begun under a privatised market, but the market would not deliver the necessary investment without significant government intervention. Hinkley Point was only started after the government offered EDF a guaranteed wholesale price that was double the market price, and loan guarantees. This points to the difficulty of incentivising new nuclear power capacity in a privatised market. It also suggests that a nuclear power program might only be successful if an institutional structure that mirrors that of France's program between 1973 and 2000 is in place. However, given that the thesis only included two states, and only took place in the context of the transition to renewable energy, it warrants further research before firm conclusions can be drawn.

Investment decisions of energy firms

The thesis focused specifically on the role of state institutions with electricity firms only examined to the extent that they influenced those institutions. France's EDF was the subject of a detailed analysis due to the fact that it is a state-owned firm and therefore very influential in the development and implementation of French energy policy. Individual firms in the UK received less attention although a key conclusion of the thesis was that the dispersed and privatised ownership of generation assets meant that the UK Government had greater freedom to implement its preferred policies.

An examination of private energy firms, their role in either opposing or supporting the energy transition and the factors that influence their investment decisions about renewable energy would complement this thesis' study of state institutions.

Implications of Brexit

Brexit has been a constant backdrop throughout this research project, despite the fact that the thesis covers a period that ends before the UK is due to the leave the EU. The nature of the UK's future relationship with the EU was unclear at the time of completion and the period of uncertainty is likely to continue beyond any formal exit. However, there is already a growing body of work on the subject, including specific research that focuses on the potential implications for climate and energy policy (Burns et al., 2019; Hepburn and Teytelboym, 2017; Ifelebuegu et al., 2017; Pollitt, 2017).

As noted in Chapter 6, the UK has played a prominent role in the development of EU climate and energy policies since the late 1990s, and the absence of its leadership could reduce the EU's policy ambition. For the UK, the direction of climate and energy policy is uncertain. Given its leadership role within the EU over the past two decades, it is possible that the UK's ambition will increase, as it is no longer subject to the constraints placed on the EU by less ambitious member states. The 2008 *Climate Change Act* and the commitment to a net-zero emissions target by 2050,

passed by the UK parliament in June 2019, both surpassed the EU's own targets at the time. However, it is also possible that the economic consequences of Brexit will trigger a decrease in ambition as the government seeks a competitive advantage through lower environmental standards.

Lessons for Australia

This research was conducted from Australia, and there are a number of lessons that can be drawn from the European experience. First, as noted in the opening chapter, the EU has been a leader in the climate and energy policy since the 1980s and has acted as a 'test laboratory' for a number of policies that have since been adopted in other parts of the world, including Australia. These include renewable energy targets, FiT's, certificate schemes, contracts for difference, and (briefly) a carbon price that was to transition to an ETS. Lessons from further EU policy innovations should be applied in the Australian context.

Second, Australian states largely followed the UK in privatising and liberalising their electricity sectors from the 1990s onwards. There are important differences between the two countries, not least the fact that Australia is one of the world's leading producers of coal and gas, whereas the UK is a net importer of both, but comparative research should yield important lessons on the type of policies and market reforms that have been successful (and unsuccessful) in the UK.

Third, Australia's electricity sector is governed by a federal structure that has some similarities to the division of policy competencies between the Commission and member states in the EU. Again, caution should apply and differences acknowledged - the fact that the EU is not a federal state is an obvious one – but there is likely to be some value in a comparative analysis that looks at the most effective policy mechanisms and where policy competence should reside to produce the most effective outcomes.

Appendences

Appendix A: List of interviewees

All interviewees are anonymous. In cases where identification could be derived from the institution, a generic title has been used. All interviews were conducted by the author.

Interview code	Institution	Date of interview
Interview 1, 2018.	European Commission Official.	26 June 2018
Interview 2, 2018.	European Energy Industry Representative.	26 June 2018
Interview 3, 2018.	European Parliament Advisor.	27 June 2018
Interview 4, 2018.	European Parliament Advisor.	28 June 2018
Interview 5, 2018.	European Parliament Advisor.	28 June 2018
Interview 6, 2018.	European Council Official.	29 June 2018
Interview 7, 2018.	European Commission Official.	25 July 2018
Interview 8, 2018.	UK Energy Advisor.	29 July 2018
Interview 9, 2018.	UK Energy Advisor.	25 July 2018
Interview 10, 2018.	UK Energy Advisor.	11 September 2018
Interview 11, 2018.	UK Official.	18 September 2018
Interview 12, 2019.	Member of the European Parliament.	7 March 2019
Interview 13, 2019.	French Energy Consultant.	1 May 2019
Interview 14, 2019.	French Energy Consultant.	22 May 2019

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