



# The political dynamics of green transformations: The roles of policy feedback and institutional context

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**Abstract:**

Green transformations, including in energy policy, are likely to take several decades and so need to be sustained politically over long periods of time. A key factor in whether this happens or not is the political impact of policies, i.e. 'policy feedback', which is likely to depend partly on the design of policies. Policy design itself will be heavily influenced by prevailing policy paradigms, and the articulation between policies and political effects may also be amplified or dampened by the institutional context. These ideas are applied to the contrasting cases of renewable energy policy in Germany and the UK, where the greater momentum of the former is linked to the political effects of the feed-in tariff policy design in a supportive institutional context.

**Keywords:** politics, renewable energy policy, institutions, Germany, UK

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## 1. Introduction

Why do green transformations in some countries appear to have more momentum than in others? For example, Table 1 shows recent growth in the share of renewables in total energy use for a number of different OECD countries in the second half of the last decade. There is wide variation, from virtually no change in Japan, through slow growth in the US and the UK, to rapid expansion in the Nordic countries and Austria.

The nature of transformations may be open to debate. But whatever form they take, whether merely technological substitution or deep changes in social structures, some basic features of their political dynamics will be common to all. There are some fairly obvious factors that help determine where transformations to sustainable economies are more likely to start – for example the absence of a powerful coal lobby (Steves and Teytelboym 2013), or a more green-minded population (Harrison and Sundstrom 2010). However, sustainable transformations are likely to take some time, for example at least two or three decades for decarbonising energy systems and economies.

A key corollary of this is that successful transformations not only require instigation, but also have to be politically sustained for long periods. Eventually, as the costs of more sustainable technologies and processes come down, green transformations should become economically self-sustaining, led effectively by a new green demand paradigm (Perez 2013). But until that stage is reached public policy is needed to lead the transformation. Such policy will tend to be highly political because it effectively involves a process of managing rents to pay for the development greener products and processes, financed from public sources (Schmitz et al 2013). It is not at all clear that policy makers and campaigners can rely on public support to do this. For example, returning to the issue of renewable energy, the relationship between growth in renewables and underlying concerns about climate change is weak. For 23 European countries, the proportion of people regarding climate change as the most serious problem facing the world in 2009 explains only 15% of the variation in renewables growth in the period 2004-10. If the outlier of Sweden is excluded, this falls to under 3%. Something else is going on.

Here, I argue that the sustainability of green transformations in any particular context will depend heavily on the *political effects of policies* aimed at bringing about transformation, which will in turn either strengthen or weaken support for such policies, causing positive or negative feedback effects and divergent policy paths. In the political science literature such effects are known as ‘policy feedback’. My focus here is on (largely national) public policy making, since this will inevitably be needed for large scale transformations of the economy, but I would argue

that the same set of issues also apply to campaigns and other actions by social movements or civil society organisations. Unless they create some form of positive feedback through their actions or ideas, such movements and organisations will not be able to lead significant transformations. For some green transformations, especially those relating to global sustainability problems (including most ‘planetary boundaries’), this dynamic is crucial, since the problems in themselves are not seen by the majority of people as sufficiently urgent to prioritise action, or pose severe collective action problems that prevent action.

**Table 1: Change in share of renewables in final energy consumption, 2004-2010 %**

Japan	0.40
The Netherlands	1.90
UK	2.10
US	2.20
Finland	3.10
Belgium	3.20
Ireland	3.30
France	3.60
Italy	4.80
Germany	5.90
Norway	6.40
Denmark	7.10
Austria	7.20
Sweden	9.20

Sources: Eurostat, Statistics Norway, US Energy Information Administration

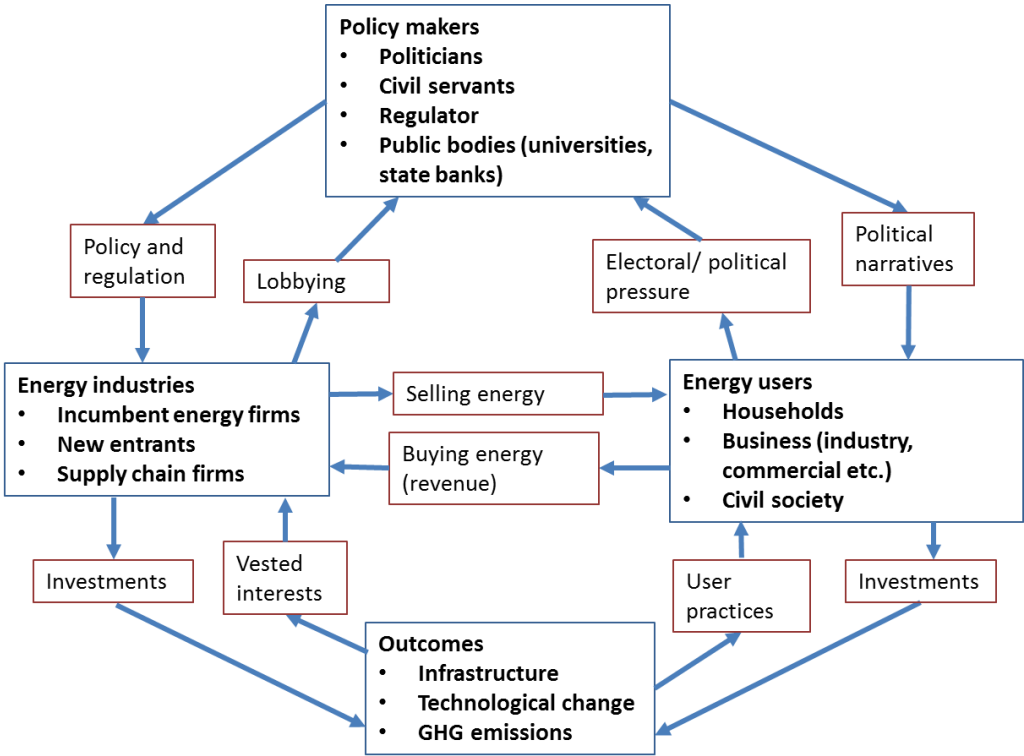
The political effects of policies depend in part on how policies are designed. However, both policy design and their political consequences will also be affected by the nature of *underlying institutions and dominant ideas*, which tend to vary between countries (Morgan et al 2010). The factors of policy feedback and underlying institutions are likely to play a major role in shaping the speed and likely success or failure of transformations, since they help determine the political dynamics of transformation. They also point to the possibility of trying to accelerate transformations, through maximising positive policy feedback through policy design and through institutional change aimed at supporting such feedback

Below, I explore how policy feedback and institutional context affect the political dynamics of renewable energy growth in a number of different cases. To appreciate how these factors work, it is useful to first briefly consider political forces and relationships at work in the energy sector, and these are considered in the following section. Section 3 then examines the concept of policy feedback, and how it can be a useful analytical tool for understanding the dynamics of renewable energy policy in Germany and the UK. Section 4 brings in the role of institutional context and revisits the case studies. The chapter concludes with some reflections on the approach, its relation to the issue of social justice, and implications for accelerating green transformations.

## 2. The politics of energy

In modern energy sectors there are broadly three groups of actors that are important for the political dynamics of energy; *energy providers*, *policy makers* and *users of energy* (e.g. Scrase and Smith 2009: 710). The relationships between these groups of actors ultimately determine investment, technological change and outcomes such as greenhouse gas emissions, all of which will have further feedback effects on actors (Figure 1; see also Hughes et al 2012).

**Figure 1: Political and economic dynamics in the energy system**



Source: Lockwood et al (2013)

Energy providers are often large incumbent companies, which may be privately owned or state owned. Their investment decisions, especially for new technologies, will be shaped heavily by incentives and regulations set by policy makers. Once made, these decisions create vested interests that shape the subsequent actions of incumbents in energy markets. This is particularly so in the energy sector because infrastructures are so long-lived, and so give a heavily path-dependent nature to regimes and transitions. However, large energy firms are rarely passive and usually seek to influence policy actively through a range of means, including direct lobbying, secondments to government, and sitting on technical committees that shape markets, all backed up with the threat of investment strikes (Jessop 1990) or divestment leading to the lights going out. In privatised and liberalised markets, a key objective for incumbents in influencing regulation and policy will often be to maintain high costs of and barriers to entry in markets (e.g. Stigler 1971), meaning that new and potentially innovative new companies will find it harder to enter the energy sector.

However, in addition to being influenced by energy providers, politicians will also pay attention to the relationships they have with energy users, which encompasses both the general public and businesses outside of the energy sector. Political elites may also be concerned about climate change and want to see change towards low-carbon energy, either because that is what the public want, or because of personal conviction. Amongst businesses, large energy-intensive users tend to lobby strongly against policies that increase energy costs, while other businesses may support transitions because they see opportunities for revenue in low-carbon products and services and in owning renewable energy assets. The resulting balance of views and interests in national business organisations determines the view of “business”.

Overall, much of the process by which policy makers shape the institutions that govern the energy system is effectively a balancing act between the perceived interests of energy users with those of energy provider incumbents (cf. Peltzman 1976). This is what makes a sustainable energy transition so challenging, because policy makers have to find some way of managing this balance through a process of profound change. As seen below, different countries have approach this problem in different ways, with varying degrees of success.

This framework is very general. The actors and relationships in any particular context will depend on the institutional context, an issue explored further below. For example, in many OECD countries, the energy sector has been liberalised, and incumbents are large (often multinational) private corporations. In countries like China and India, most energy companies remain state-owned, giving their relationship with policy makers a different quality. Such firms can still form a lobby, but cannot, for example, threaten to leave the sector by divesting. At the

same time, they typically enjoy soft budget constraints in a way that private sector firms do not, and are more able to absorb the costs of policy.

There will also be differences in the relationship between policy makers and energy users, determined especially by differences in the nature of politics between countries. This can apply even between countries with apparently very similar politics. For example, Germany and the UK are both mature European democracies. However, Germany's proportional representation electoral system means that environmentally-minded voters have enjoyed much stronger political representation through its Green Party, which was a partner in governing coalitions in the 1990s and 2000s. By contrast, in the UK's first-past-the-post system the Green Party has only one parliamentary member, and the route to influencing policy goes via environmental campaign organisations. These have undoubtedly played a significant role, but are not as effective as a parliamentary presence. In non-democratic systems, such as China's, the relationship between political elites and mass publics is obviously different, as political pressure comes not through voting but through different kinds of pressure from a range of actors, from urban communities protesting about pollution, to local governments seeking to maximise economic growth (e.g. Lampton 2014). However, even in China, a major concern of political elites will be to ensure that energy is available at an affordable cost (e.g. see Yuan and Zuo 2011).

### **3. Feedback effects and renewable energy policies**

#### **Policy feedback**

The idea that policies can have political effects is now a well-established idea in political science, with a large number of applications in areas such as welfare and pensions policy (e.g. Béland 2010). As Skocpol puts it, 'Policies not only flow from prior institutions and politics; they also reshape institutions and politics, making some future developments more likely, and hindering the possibilities for others' (quoted in Patashnik and Zelizer 2009: 1).

In a classic essay on such effects, Pierson (1993) distinguishes a number of ways in which policies can change politics. One effect is that policies often distribute resources and create material incentives, which can work to create or strengthen particular *social interest groups*: 'Public policies often create "spoils" that provide a strong motivation for beneficiaries to mobilize in favor of programmatic maintenance or expansion' (Pierson 1993: 599). Secondly, policies can also transform *state capacities and institutions*, changing the administrative possibilities for government initiatives in future and affecting later prospects for policy implementation. For example, policies that involve the collection or generation of new types of information then make possible other kinds of policies dependent on that information.

But most importantly policy feedback effects can work via what Pierson calls the ‘mass public’, transforming the interests, identity and political participation of large groups of people (see also Mettler and Soss 2004). For example, the introduction of social security in the US as a policy created the conditions for the invention of a new social category (‘retired people’) and the formation of the politically powerful American Association of Retired Persons (AARP). Another important mass public policy feedback effect can occur where a policy induces large numbers of people to make commitments or investments that it subsequently becomes ‘both expensive and politically perilous’ (Béland 2010: 575) to reverse, thereby ‘locking in’ the policy decision (see also Pierson 1993: 610). One example might be the Brazilian government’s decision to develop ethanol from sugar, creating not only a new industry but also widespread investments by households and businesses in vehicles that run on ethanol. However, commitments need not be physical investments, but can also be other types of investment, in skills, networks, organisations etc.

As well as the allocation of material or political resources, there are also what Pierson calls ‘interpretive effects’ (*ibid.*: 611), where policies may produce ‘cues’ for parts of the electorate that ‘help them develop political identities, goals, and strategies.’ (*ibid.*: 619). Particular policies can become iconic of particular political approaches, and help mobilise support for or opposition to that approach, above and beyond any material effect. Given the complexity of modern life, policies can generate ‘focusing events’ or cues for social actors, but in that process also ‘heighten the visibility of some social and political connections while obscuring others.’ For example, there are many cases where governments have tried to target a minority ethnic or religious group in order to mobilise majority political allegiance.

Much of the policy feedback literature has tended to focus on cases of *positive* feedback, not least because it is in these cases that policies become successfully entrenched. As Pierson (2000: 259) notes, positive policy feedback is one of the drivers of *increasing returns* in politics, which by analogy from economics (e.g. Arthur 1989) creates the lock-in noted above. Increasing returns also makes political processes path-dependent, in the sense that small details of policy design or institutional context will lead to rapidly diverging paths if one involves positive feedback and the other does not. By contrast, *negative* political feedback effects undermine policies and limit their transformative reach (Béland 2010: 575, Pierson 1993: 600). This is particularly important for understanding the political dynamics of attempted green transformations, since such transformations often involve additional financial costs and challenges to vested interests, which can quickly create opposition.



Overall, whether and how quickly transformation occurs depends on the balance of positive and negative effects, whether policies can be amended to improve that balance, or indeed whether new and more transformative policies are feasible. Both positive and negative feedback effects may change as a policy is implemented. Where policies have strongly positive feedback effects they become locked-in, but where there are both potential negative and positive feedbacks there can be a 'snakes and ladders' pattern whereby what appear to be similar policies can diverge according to which feedback effect dominates (Weaver 2010).

These considerations clearly apply to the example of renewable energy raised above. All the countries listed in Table 1 have some support policies for renewable energy, yet in some countries these have not gone very far whereas in others they have taken off. The question is then why this is the case. It might be argued that contrasts are simply due to the extent or generosity of subsidy, but this in itself begs the question of how higher degrees of subsidy (which are clearly seen in countries like Denmark and Germany) are politically sustained.

One factor which might be expected to have an influence on policy feedback effects is the *design of policies* (Pierson 1993, Patashnik and Zelizer 2009). Apparently small differences in policy design may lead to quite big differences in who can access the benefits from the policy, how those benefits are distributed, what the cost is and who bears that cost. Different policy approaches can also have varying interpretive effects, resonating strongly or falling flat with existing or new constituencies, and leading to large divergences in political sustainability. In the case of renewable energy policy design, a key issue is how different designs affect the political dynamics of the energy sector discussed above and in particular the balance between producers and users.

## **Germany and the UK**

Germany and the UK provide contrasting examples of how policy feedback has worked to produce different pathways in the growth of renewable energy. At the start of the 1990s, neither Germany nor the UK generated significant amounts of electricity from renewable sources. In Germany, policies adopted from 1990 onwards led to 70-fold growth in 'new' renewable electricity capacity (i.e. excluding hydro-power) by 2010. In the UK, renewable electricity was also eligible for support from around the same time, but growth has been much slower. By 2012, total renewable generation in the UK was around 11% of total demand, less than half the share in Germany.

The growth of renewables in Germany has undoubtedly benefitted from higher levels of environmental awareness and stronger opposition to nuclear power than in the UK. However, the nature of policies adopted in the two countries has been sharply different, with resulting



divergence in pathways and political sustainability. Germany's policies have offered stable, technology-specific prices to renewable generators (fixed prices from 2000), and a guaranteed market. By providing attractive returns with low risk and ensuring grid connection (Mitchell et al 2006), a key aspect of the feed-in tariff was that its benefits could be accessed by a range of groups, including farmers, households, cooperatives, schools, small businesses and municipalities, rather than large energy companies, which were in fact excluded from the policy. The policy supported a range of technologies, not only wind but also solar PV, biomass and anaerobic digestion. The fact that conservative farmers in areas such as Bavaria benefitted from the policy was particularly important for the keeping Germany's centre-right political party on board.

A coalition of political support for renewable energy rapidly grew through the 1990s (Jacobsson and Lauber 2000: 266), created partly by the creation of vested interests, with 340,000 Germans having invested around €12 billion in renewable energy projects by the early 2000s (Sawin 2004: 25). There were also interest group effects, with an increasing professionalization of renewable energy associations off the back of growing deployment, with strong support from the Green Party and the Ministry of the Environment (Laird and Stefes 2009). In addition, because renewables policy was linked to industrial policy, especially from the late 1990s onwards, employment in factories producing wind turbines and solar PV panels created a new constituency in favour of a strong renewables policy, especially in the former East Germany.

This wide coalition helped to maintain and strengthen renewables policy; for example, it was the involvement of municipalities in the 1990 that prevented the collapse of solar PV (Jacobsson and Labour 2006: 266). When the first renewable energy law was threatened by legal action by the large utilities in the late 1990s and the Government proposed a reduction in feed-in rates, the Green Party mobilised a wide coalition of environmental groups, solar industry associations and companies, trades unions and regional politicians to successfully oppose the changes (ibid: 265).

Germany's renewable policy has not been without negative feedback effects. It provoked strong opposition from the incumbent energy companies and over time the overall cost to energy consumers has grown, despite sharp falls in the prices of wind turbines and solar panels. At the same time, some of the employment benefits have evaporated as solar PV producers have been undercut by Chinese imports. Nevertheless, despite current debates about cost, the growth of renewable energy in Germany looks set to continue to enjoy broad support. The main political party opposed to further expansion lost all its seats in the 2013 Parliamentary elections, and the German government pressed strongly for a national renewables target to be part of the European 2030 package in early 2014.

In the UK, policy took a different course. From 1989, renewable energy was in theory eligible for support through an auctioning policy, although in practice very little capacity was built (Mitchell and Connor 2004). In 2003, a Renewables Obligation (RO) was introduced, which placed an obligation on large energy companies to source a certain proportion of generation each year from renewables. This created a market for renewables, but with a price that was not certain, and one which basically rewarded the cheapest technology (on-shore wind). As a result, almost all investment in new renewable energy under the RO was by large companies able to bear the price risk, and was concentrated in wind only (Mitchell et al 2006). A small and badly run grants programme supported a trickle of investment in solar PV by households, but this was at a tiny level compared with Germany. Eventually, in 2010, a feed-in tariff for small scale renewables was introduced, but following explosive growth in solar PV, tariff rates were quickly scaled back. Only in 2013 has the desire to reduce risk for larger investors led the UK to finally embrace a version of feed-in tariffs more widely.

The policy design of the Renewables Obligation has created weak positive feedback effects, and left the growth of renewables in the UK exposed to considerable negative feedback effects. Large energy companies have made the largest investment in renewables, but they also have existing high-carbon assets, and the companies have been half-hearted advocates for renewables at best. Their ambivalence has also affected the formation of a unified interest group, with one organisation (RenewableUK) representing larger companies and another (the Renewable Energy Association) the small-scale renewables lobby. During the debate about the introduction of a feed-in tariff in the UK, these two groups were unable to agree. The UK has also so far failed to develop a strong industrial policy and supply chain for renewable energy, meaning that employment effects are nowhere near as politically important as they have been in Germany, and that a narrative about the importance of 'green jobs' is not yet taken for granted.

At the same time, the dominance of large corporate interests in renewables has produced stronger negative feedback effects. One issue is planning. Whereas in Germany around half of onshore wind turbines were owned by farmers or local cooperatives in the late 1980s, in the UK 98% were owned by large energy companies or developers, which have no link to or stake in the local society and economy (Pollitt 2010: 36). Szarka (2006: 3046) argues that 'It is clear from fieldwork contacts with anti-wind protesters in Britain...that one cause of rejection is the feeling of injustice engendered by outside firms who exploit a local resource and impose burdens, but offer no community benefit or compensation'. Moreover, and again in contrast with Germany where tariffs were adjusted to help investors in less windy sites, the RO has incentivised developers to seek out the windiest sites, which often tend to be in ecologically and visually sensitive areas.

The fact that much of the financial benefit from renewables policy has been captured by large energy firms, which have become extremely unpopular since the mid-2000s due to price rises, suspected profiteering and high executive salaries, also leaves UK policy particularly exposed to the negative feedback effects of cost. Germany's renewable electricity support programme has so far cost about four times what the UK has spent, as a share of national income (OECD 2013: 48). Despite this, rifts on the future of renewable power in the political elite and the media are stronger in the UK, are creating considerable political uncertainty and are having a chilling effect on investment (Lockwood 2013).

Overall, in Germany, renewables policy appears to have maintained a dominance of positive over negative feedback effects through spreading the benefits of the policy widely through society. Policy makers, not without controversy, have tried to solve the problem of how to manage interests during transformation discussed above not so much by balancing them but by beginning to transform energy users into producers and challenging incumbents directly. It was not clear that this was intended at the start of the policy, but it has evolved in such a way as to produce this outcome. In the UK, by contrast, policy has benefitted incumbent producers, but the problem of balancing this approach with the interests of users has become increasingly fraught over time.

## **4. The role of institutional context**

### **Diversity in social and economic institutional systems**

Above I argued that the design of policies in different countries have been more or less politically sustainable in part because of 'policy feedback' effects, i.e. the political impact of policies themselves. However, this account begs a number of questions. Why do some countries adopt one policy design and others a different design? Why do some countries find it much easier to adopt an active industrial policy? Why do local institutions, like municipalities and cooperatives, play such an active role in renewable energy in some countries? Why is cost such a heated argument in some countries and virtually absent in others? These questions indicate that, in addition to the nature of the policies themselves, we might also expect the wider discursive, institutional and political context in which policies are made and implemented to also have an influence (Pierson 1993: 602, Patashnik and Zelizer 2009: 3).

First, the range of options for policy design which are acceptable in any particular context will to a great extent be prescribed by what are sometime called 'policy paradigms', i.e. an interpretive framework of ideas and standards that is 'embedded in the very terminology through which policy makers communicate about their work...influential precisely because so much of it is

taken for granted and unamenable to scrutiny as a whole' (Hall 1993: 279). Particular policy paradigms are in turn often associated with particular institutional systems. For example, Schmidt (2002) argues that in Britain policy has been dominated by a neo-liberal paradigm, linked to a liberalised market institutional system and a politics deeply influenced by Thatcherism. By contrast, Germany's distinctive 'social market' paradigm complements a set of more deliberative economic institutions, while France's paradigm of *dirigisme* is a good fit for an institutional system in which the state plays a prominent role.

Beyond design, institutional systems are also likely to influence how far positive and negative feedback effects are likely to arise, and whether these effects are amplified or dampened, i.e. the articulation of policies and political effects. Many policies for green transformation are essentially economic policies, involving taxes, subsidies and other forms of state or institutional support, so economic institutions are particularly important. For example, a renewable energy support policy can offer a subsidy, but how far investment in renewables takes place depends on how far financial institutions complement that policy and provide credit on acceptable terms. Equally, a country with labour market and welfare systems that produce high levels of poverty and inequality may find it hard to place the costs of renewable energy support on energy bills, as it this amplifies the political effects of a negative policy feedback to the point of crisis.

The importance of context for policy feedback effects suggests that differences in speeds and paths of green transformation in different countries may be related to *institutional diversity* across countries. There are many approaches to understanding such institutional diversity (see e.g. Crouch and Streeck 1997, Berger and Dore 1996, Hall and Soskice 2001, Schmidt 2002, Morgan et al 2010), and considerable debate over whether it is possible to classify countries into particular 'varieties of capitalism' based on how far they are primarily characterised by liberal market or more coordinated non-market relations (Hancké et al. 2007, Crouch 2005a) or the relevance of those models for countries outside of Europe (Carney et al 2009, Schneider 2009). However, common to all these approaches is the idea that different countries do have distinctive systems of social and economic institutions that complement one another, and evolve over time (Crouch 2005b, Streeck and Thelen 2005). We can therefore expect such systems to have significant implications for the speed and path of a green transformation.

## **Germany and the UK**

Returning to the contrast between Germany and the UK, there are several contrasts in institutions and discourses that help explain why Germany adopted a policy which had the

potential to create stronger positive feedback effects, and also why that potential was realised more fully.<sup>1</sup>

The Renewables Obligation was explicitly chosen in the UK as a mechanism that attempted to mimic a market, i.e. not setting a fixed price, and avoided an explicit technology-specific focus (refs.) It was argued that the RO would be superior to the German feed-in tariff specifically for these reasons (a position initially taken up the European Commission as well). This approach was entirely consistent with a policy making environment in the UK dominated by neo-classical, and often neo-liberal, economic paradigm. In Germany, the neo-liberally minded finance ministry was also opposed to a technology-specific feed-in tariff. However, the wider German policy paradigm was more influenced by the concept of 'Ordoliberalism', a social market approach developed in Germany after the Second World War which lay much greater emphasis on active government intervention to ensure competition and prevent monopolistic or oligopolistic market power (Toke and Lauber 2007).

Ordoliberalism also turned out to be far more consistent with the idea of an active industrial policy than the UK's policy paradigm. More widely, many comparative analyses of economic institutions lay emphasis on the much greater degree of coordination amongst industrial companies and the state in Germany compared with the UK (e.g. Hall and Soskice 2001, Schmidt 2002). In the UK, governments since the 1970s have largely been sceptical of any directed form of industrial policy, with the Treasury in particular a major opponent.

A set of other aspects of Germany's institutions have also turned out to play important roles in facilitating both the implementation of its renewable policy, and in increasing its net positive political feedback effects. Much of the investment by non-corporate actors in renewables has been supported by state finance in the form of the KfW bank, channelled through a network of local and regional banks, which know their clients personally. The UK has none of these financial institutions.

In Germany, higher energy costs for consumers have not produced quite the same political backlash as in the UK partly because higher levels of welfare and lower inequality in Germany make fuel poverty and squeezed incomes in the middle less acute problems (Iversen and Soskice 2006, Austen-Smith 2000 and Crepaz 1998).

Below the level of national political economy, German federalism and decentralisation has also meant that municipalism is strong, at least compared with the UK's currently highly centralised

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<sup>1</sup> See also Laird and Stefes (2009) for a similar analysis of Germany and the US

system. Both municipal and regional government in Germany have been highly supportive of various aspects of renewables growth, and many municipalities in Germany still own energy supply and generation businesses that have given them a vehicle for investment. In the UK such companies disappeared after the Second World War.

## 5. Concluding remarks

What constitutes a green transformation will be open to contestation, but for any kind of transformation actually to occur it must be politically sustainable. Alliances for transformations need not only to be formed but also maintained and expanded. In this sense, if policies (or actions or campaigns by social movements) are to be successful in bringing about green transformations, they must be self-reinforcing, creating constituencies for their own implementation and expansion.

In terms of the concepts explored here, this means that policies must have a preponderance of positive feedback effects over negative ones if they are to become 'locked in'. For many sustainability problems, including climate change, this represents a major challenge, since transformative policies fly in the face of existing high-carbon lock-in, and will challenge existing vested interests, norms and institutions. In that sense, policies for green transformations are always likely to encounter negative feedback.

Here I have argued that an important factor in the balance between positive and negative feedback effects can be the design of policies, illustrating how this can work in the contrast between renewable energy policy in Germany and the UK. Germany's policy approach has been to distribute subsidies from policy relatively widely, and use industrial policy to create employment, both of which have created important positive feedback effects to offset the inevitable negative feedback on the costs of the policy. The UK's renewable support mechanism has done neither of these things, leaving subsidy to be captured by large and highly unpopular energy incumbents and the policy exposed.

I have also argued that both policy design and political effects in turn will depend in part on institutional systems and dominant policy paradigms obtaining in a country. Again, taking the contrast between the UK and Germany as an example, a technology-neutral, market-mimicking policy was the natural fit for the liberal policy paradigm in the former case, whereas an industrial policy for renewables was very difficult to get going, in contrast to Germany's more managed, coordinated institutional system and discourse.

Many of our sustainability problems are unprecedented and extremely urgent. On the basis of this challenge, some take the view that the nature of politics will have to change completely if we are to solve these problems. In time, that may be so, but the problem that we currently have is precisely that our efforts to address the challenges are being hampered precisely because of business-as-usual politics. In this sense, I would argue that if we want to make progress, we need to start from an understanding of business-as-usual politics, and the approach I have taken here draws on two well-established conceptual frameworks in mainstream political science, rather than *sui generis* theorising about the politics of sustainability.

At the same time, the application of these frameworks can be found in different forms elsewhere. The idea of policy feedback, for example, is touched upon in existing accounts of German renewables policy (see especially Laird and Stefes 2009). The idea that subsidy can be strategically deployed to help the politics of a green transformation is also explored in work by Schmitz and Altenburg on 'rent management' in green industrial policy (Schmitz et al 2013). In this paper, my aim has simply been to draw out the concepts at the core of the political dynamics more explicitly.

Finally, what are the lessons from this approach, if any, for accelerating green transformations? One is simply that climate policy makers (whose framework in many countries is dominated by neo-classical economics) should start thinking more about the political implications of their policies. To some extent, they do this in a self-censoring way, avoiding politics that they think will be too controversial with some groups, but they rarely think about strategies for positive feedback. A second implication is that countries with institutions that are less supportive of positive feedback effects should seek to change their institutions or develop new ones. This is a controversial area, with some arguing that institutional systems cannot be changed and others that they can. The key thing seems to be that what matters for learning from others is institutional function rather than form.



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