

**Policy Paradigms as part of the landscape:
How do policy paradigms influence attempts to govern transitions?**

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Abstract

Over the last years a fast growing literature developed around the notion of socio-technical systems and the possibilities for governing such systems towards sustainability (Rotmans, Kemp et al. 2001b; Loorbach 2007; Rotmans and Loorbach 2008). Such large scale, structural changes in socio-technical systems have been described as multi-level transitions (Geels 2002). The government is assumed to play an important role in helping these necessary changes to happen. In this paper we argue that the transitions literature so far has underestimated political obstacles to governing transitions. In particular the transitions literature has under-conceptualised landscape level factors. We argue that the work on policy paradigms within political science (Hall 1993) is extremely useful to understand some of the macro-political constraints. The main point we are making is that policy paradigms shape what kinds of interventions are seen as politically acceptable and thereby influence the governance of transitions. The empirical case discussed in this paper to illustrate this argument is the transition towards a more sustainable energy system in the UK.

1. Introduction

Recent thinking on system-level change presents an alluring potential solution to problems of sustainability. Scholars interested in sustainable development have

fundamentally questioned whether incremental change along established technological trajectories will be sufficient to meet such goals or whether ‘system innovations’ will be needed (Kemp 1994; Berkhout 2002; Unruh 2002; Elzen, Geels et al. 2004; Jänicke 2004; Smith, Stirling et al. 2005; Tukker and Butter 2007; Scrase, Stirling et al. 2009; Loorbach 2010). A variety of scholars have convincingly argued that structural change is necessary. Scholars interested in transitions towards more sustainable systems have developed a multi-level perspective (MLP) to analyse how such change occurs (Rip and Kemp 1998; Geels 2002). They distinguish between a niche, regime and landscape level. Macro-political developments are seen as an important part of the socio-technical landscape in the MLP (Geels and Schot 2007: 400) but have received little attention in the transitions literature compared to the niche or the regime level.

This paper will explore the idea of understanding policy paradigms as an important part of the landscape level. It will be suggested that policy paradigms can usefully be seen as macro-political factors. The next section will discuss the multi-level perspective and the neglect of the landscape factors in more depth. The third section will define what policy paradigms are and why they matter for attempts at governing transitions. The fourth section discusses the role of policy paradigms in the energy transition in the UK. The final section concludes and points to a potential future research agenda.

2. The multi-level perspective on transitions and the neglect of the landscape

Scholars interested in transitions towards more sustainable systems have developed a multi-level perspective (MLP) to analyse how long-term, structural change in socio-technical systems occurs (Rip and Kemp 1998; Geels 2002). Based on historical case studies Geels distinguishes a niche, regime and landscape level. The landscape level comprises slowly changing external macro-economic and macro-political factors, which influence the development of the regime. Regimes are characterised by a dominant, relatively stable configuration of certain technological artefacts, institutions, networks, user practices, market structures, regulatory frameworks, cultural meanings and scientific knowledge (Rip and Kemp 1998) which fulfill a certain societal need such as the provision of energy services. On the niche level new practices and technological

innovations emerge in protected spaces or market niches, evolve over time and may possibly start to compete with the dominant regime and eventually ‘overturn’ it.

‘System innovations’ occur through interactions between developments on all three levels. The MLP assumes that a system innovation only comes about if there is pressure from the landscape level on the regime which destabilises current practices and creates opportunities for niches to break through. Important factors on the landscape level are macro-economic and socio-economic trends, macro-political developments as well as deep cultural patterns (Geels and Schot 2007; Shackley and Green 2007). Individual actors thus cannot directly influence developments on the landscape level.

We argue that the transition literature so far has under-conceptualised and under-researched landscape level factors. Macro-political developments are seen as an important part of the landscape (Geels and Schot 2007; Shackley and Green 2007), but have so far received little attention in the transitions literature compared to the niche or the regime level. For example Hofman argues that “the landscape level has been conceptualised rather weak as a set of diverse external factors, such as oil shocks, wars, but also cultural values and broad political coalitions” (Hofman 2005: 61); also see (Geels 2004b). Already early on Rotmans, Kemp et al. vaguely referred to paradigms as part of the landscape amongst many other factors (2001a: 21) but failed to specify what exactly they mean by paradigms and in which ways paradigms matter for transitions. Shackley and Green describe the landscape as encapsulating “the key ‘philosophy’ behind policy-making trends and in that sense can be said to reflect the dominant perception of ‘problems’ and the ways to resolve those problems (what Sabatier [11] terms the ‘policy paradigm’ and Hajer [12] the ‘discourse coalition’)” (2007: 221-222). Transitions have been argued to require changes in paradigms, infrastructure, institutions, behaviour, networks, etc (Loorbach, van der Brugge et al. 2008).

Despite these initial attempts to characterise the landscape with reference to paradigms, we argue that so far the landscape level has been under-theorised in the literature on socio-technical transitions. However, the landscape level has an important role in fostering or blocking transitions. To look at the landscape level more systematically and in a conceptually well-founded manner is therefore essential if one is interested in governing transitions towards sustainability. The paper suggests that policy paradigms

can usefully be conceptualised as part of the macro-political landscape and that existing studies have failed to pay attention to the precise definition and impact of paradigms. This paper aims to address this particular weakness by drawing on conceptual insights from political science.

3. Policy Paradigms as part of the landscape

As argued above macro-political developments are seen as an important part of the socio-technical landscape in the MLP (Geels and Schot 2007: 400). We suggest that policy paradigms can usefully be seen as macro-political landscape factors which structure institutions and policies at the regime level and can hinder or enable transitions towards a more sustainable energy system. In line with Hall's seminal work (1993) policy paradigms are understood as interpretive frameworks through which policy makers see the world. In line with this thinking the challenge of 'transition management' (Rotmans, Kemp et al. 2001b; Loorbach 2007) can be interpreted as a challenge to shift the dominant paradigm.

3.1. What are policy paradigms?

A seminal contribution to studying policy paradigms in the political science literature has been made by Hall (1993). His work is situated within the growing literature on understanding policy-making as social learning processes. He argues that "the principal contribution of a social learning perspective is to draw our attention to the role of ideas in politics" (Hall 1993: 289). He states:

"Policy-makers customarily work within a framework of ideas and standards that specifies not only the goals of policy and the kind of instruments that can be used to attain them, but also the very nature of the problems they are meant to be addressing. Like a *Gestalt*, this framework is embedded in the very terminology through which policymakers communicate about their work, and it is influential precisely because so much of it is taken for granted and unamenable to scrutiny as a whole. I am going to call this *interpretative framework* a policy paradigm" (Hall 1993: 279; italics by FK).

Hall's work showed the importance of policy paradigms by analysing the change from a Keynesian macroeconomic paradigm to a monetarist macroeconomic paradigm in the UK between 1970 and 1989. To explain what a paradigm shift entails Hall distinguishes between three central variables in policy-making:

- Goals that guide a policy in a particular field (incl. how the problem at hand is understood)
- Instruments used to attain these goals
- Precise settings of these instruments (Hall 1993: 278).

UK energy policy can be used as an example to illustrate these distinctions: An important government *goal* in the context of making the energy system more sustainable is to deploy renewable energy technologies. Renewables so far account for only about 4% of the electricity generation but the UK government aims to achieve 10% by 2010 and aspires to achieve 20% by 2020 (DTI 2007). The main *instrument* in support of this goal is the Renewables Obligation (RO), requiring the suppliers of electricity to provide a certain minimum percentage of electricity from renewable sources. The precise *setting* of the instrument includes for example rules that define which technologies are eligible. The setting of the RO was changed as of April 2009 through ‘banding’ the RO to account for the different development stages of technologies as past experience showed that the RO had not sufficiently supported technologies far from market (Mitchell and Connor 2004; DECC 2009).

Such a change in the *setting* while the overall *goal* and the *instrument* of the policy remain unchanged would be termed a ‘first order change’ by Hall. A change in the policy *instrument* to support renewable energy deployment, such as a move to a feed-in tariff¹, would be a second order change; the *goals* of the policy remain the same but the *instrument* and the *settings* might be changed as a response to past experience. However, broader changes such as the radical change from Keynesian to monetarist modes of macroeconomic regulation entailed changes at all three levels of *goals*, *instruments* and *settings* (Hall 1993). Such changes are rare but can occur as a result of past experience and are termed ‘third order change’ by Hall. One example of such a paradigmatic change would be the move from a state-owned, planned energy sector to a liberalised energy market with privatisation and competition (Helm 2005). A similar example is the rise of the conservative supply-side economics paradigm in US macroeconomic policymaking (Campbell 2001).

¹ A feed-in tariff is a policy instrument which specifies the price per unit of electricity that a utility or supplier has to pay for renewable electricity from private generators. It is often differentiated according to the technologies used and decreases over time.

It is important to emphasise that policy paradigms are not exclusively constructed by policy makers alone. Wilson argues that

“Policy paradigms are constructed by researchers and intellectuals who contribute to academic discourse which shapes the definition of the policy problem; by professionals and practitioners who are directly engaged with the issue; by interest group leaders and organizations who are promoting a particular policy agenda; and by policy makers who interact with academics, professionals, practitioners, and interest group leaders” (Wilson 2001: 258).

Hall also points to the importance of the ‘broader public appeal’ of the monetarist paradigm in the change from the macroeconomic policy paradigm in the UK (Hall 1993: 286).

3.2. Why and how do paradigms matter?

Paradigms are influential in policy-making in a variety of ways. As Hall’s definition has already pointed out policy paradigms are important because they shape the way policy makers understand the problems they are faced with, and define the goals to be achieved by policy, and the policy instruments to be used and their settings (Hall 1993). In addition, a paradigm also filters information and focuses attention (Wilson 2001: 257). In the words of Campbell: “Paradigms constitute broad cognitive constraints on the range of solutions that actors perceive and deem useful for solving problems” (2001: 170). In short, one could argue that paradigms circumscribe and shape perceptions of what is feasible, possible and desirable (Hay 2001). Mitchell argues that political paradigms are like a band of iron holding together a certain framework and that policy action can be undertaken around or between this framework “but, in the end, this framework constrains certain actions or policies” (Mitchell 2008: 2).

If a policy paradigm is thus misaligned to the challenges of moving towards a sustainable energy system, it will obstruct progress. The ideas policy makers are influenced by are crucially important as

“[i]deas provide specific solutions to policy problems, constrain the cognitive and normative range of solutions that policy makers are likely to consider, and constitute symbols and concepts that enable actors to construct frames with which to legitimize their policy proposals” (Campbell 2001: 178).

Campbell sees paradigms as theoretical and ontological assumptions about the nature and operation of the world. New policy initiatives are then judged against these background assumptions. If the main ideas fit into the paradigm they are more likely to be considered by policy makers. As an example for an influential paradigm Campbell points to the dominance of the neoclassical economics discourse in the US which has limited the range of solutions to economic problems. He writes:

“Of particular importance were the core neoclassical assumptions that markets develop naturally; that a healthy economy depends on the ability of individual economic actors to pursue their self-interests; that competition among private actors is the source of economic innovation and growth; and that excessive government intervention undermines efficient market activity” (Campbell 2001: 171).

This economic paradigm also has a strong resonance in UK policy where the policy programs of privatisation and liberalisation were believed to deliver best on the goals of energy policy by introducing market competition. This paradigm was e.g. powerfully institutionalised in Ofgem and has also translated into a certain approach to innovation (see section 4).

Hay insightfully observes that “the ability to transform the institutional context of state, economy and society may reside less in access to governmental power and more in the ability to make the case for a shift in the dominant paradigm informing policy” (Hay 2002: 215). As the move to a low carbon economy has been argued to involve changes in technologies, infrastructure, behaviours as well as the institutions and policies that shape state, economy and society (Rotmans, Kemp et al. 2001a; Geels 2002), a paradigm shift will be needed to achieve this change if the paradigm is preventing such change.

4. Policy Paradigms and the transition to sustainable energy in the UK

Empirically, the paper will now focus on governing transitions towards more sustainable energy systems. It uses the UK as a case to illustrate the importance of policy paradigms in transition processes.

4.1. The ‘free market’ paradigm in the UK

Elsewhere, Mitchell has already argued that the framework principles of the current paradigm of the UK constrain the effectiveness of the move to a sustainable energy

system (Mitchell 2008). The nature of the paradigm can e.g. be exemplified by looking at the UK 2003 Energy White Paper. The strategy aims at a 60% cut in carbon emissions by 2050, at maintaining the reliability of energy supplies, at promoting competitive energy markets and at ensuring that every home is adequately and affordably heated (DTI 2003: 11). Curiously, also in other countries having similar ambitions for long-term sustainable energy systems (such as Germany and the Netherlands) markets are believed to play an important role in achieving energy policy goals to varying extents, but only in the UK promoting a competitive energy market is a goal in its own right. In the UK the market framework ('Open and competitive markets') and policy instruments are supposed to reinforce each other to achieve all four goals simultaneously (DTI 2003: 11). It is clearly stated that "liberalised and competitive markets will continue to be a cornerstone of energy policy" (DTI 2003: 11). It is also claimed that "vigorous competition in energy stimulates innovation and ensures the efficient allocation of resources, improving service quality and driving down price" (DTI 2003: 95). The government does not feel to be equipped to set targets for a desired fuel mix but prefers "to create a market framework, reinforced by long-term policy measures, which will give investors, business and consumers the right incentives to find the balance that will most effectively meet our overall goals" (DTI 2003: 11). A mix of measures it believed to be important including economic instruments to internalise externalities and regulation (DTI 2003: 28). Beyond that the government outlines its support for renewable technologies through the renewables obligation and the exemption of renewables from the climate change levy (DTI 2003: 12).

Commentators have argued that the UK government puts great emphasis on the maximal use of market based and/or voluntary measures (Sohre 2006). Foxon et al claim that the UK relies more on market-based, entrepreneurial approaches rather than significant interventionist approach, because of a greater faith in markets than in political processes (Foxon, Pearson et al. 2005: 23). Some have argued that although market-based systems such as the RO perform more poorly than e.g. the feed-in tariff system in Germany which is more effective by reducing risks for generators more effectively (Mitchell, Bauknecht et al. 2006), policy makers have failed to accept this (Toke and Lauber 2007). Toke and Lauber argue that the

“Anglo-Saxon neoliberals do not seem to be able to translate their stated ideological goals of cost reduction through neoliberal market governance into practice, at least in the case of renewable energy support systems, and, according to many arguments, also in emissions trading schemes in general. Long term innovation in clean energy technologies is neglected by such instruments when compared to other policy designs (2007: 685).

Although generally very much in favour of the UK’s commitment to non-intervention and use of market-based instruments, even the IEA criticised in their latest review of UK energy policy:

“the market-based policies have not ensured innovation and deployment of new energy technologies to address the long-term challenges facing the UK. Within existing frameworks, market actors have tended to pick mature cost-effective energy technologies like CCGT, landfill gas and wind. It is likely that both direct incentives for carbon reduction *and* incentives for innovation in lower carbon technology will be necessary. Government leadership will be needed” (IEA 2007: 176).

It is therefore argued that the current UK policy paradigm constrains the move to a sustainable energy system because the principles of the paradigm are incorporated into the institutions which are created or re-structured; and then those institutions deliver policies which fit with the principles. Mitchell speaks of ideological ‘lock-in’ as “a paradigm establishes its own institutions and those institutions initiate policies based on the principles of the paradigm” (Mitchell 2008: 1). This institutionalisation creates momentum in a particular direction rather than possible alternative trajectories. Over time this leads to the phenomenon of institutional path-dependency.

The regulator for gas and electricity markets in the UK (Ofgem) is a good example to illustrate this point. Established by the government in line with the dominant paradigm that competition breeds efficiency leading to lower consumer prices, Ofgem became a constituent vigorously defending any intervention in electricity retail markets. Protecting the consumer is Ofgem’s primary statutory duty and it believes competition is the best way to do so. Any policy change interfering with gas and electricity markets is thus usually opposed by Ofgem. It is assumed that consumers are mainly interested in low prices here and now. Protecting future consumers by preventing dangerous climate

change is only a secondary duty.² There are many other institutions and rules in which the paradigm is embedded, thereby contributing to its stability.

In terms of a potential energy transition, this means that the characteristics of the principles of any incumbent policy paradigm have to be able to enable an environment which is conducive to innovation and change. If this is not the case, it is inherently difficult for the paradigm to deliver change. Mitchell argued that the characteristics of the paradigm constrain the design of policies, and as a result policies are implemented which not only are unable to deliver the aims of the policies, but also are not able to tackle the key underlying challenges of moving to a sustainable energy system. Similarly, (Scrase and MacKerron 2009) have argued that the dominant UK policy paradigm based on the belief in the superiority of market-based policy approaches prevents progress towards a sustainable energy system. The ‘free market’ paradigm constrains new initiatives at governing the energy transition as the commitment to ‘open’, ‘efficient’, ‘transparent’ and ‘competitive’ markets is deeply embedded in how civil servants see the world and thus any new policy must pass the ‘market’ test (Scrase and MacKerron 2009). The conclusion is that if the UK is to make the transformation to a sustainable energy system it will have to change the character of its policy paradigm.

4.2. Recent policy developments: Change in paradigm?

This section will reflect on recent changes in energy policy in the UK and investigate whether there are signs that the ‘free market paradigm’ is currently changing and if so, why this is happening.

Compared to the late 1990s, a more active technology policy is now much more acceptable in the UK and more institutions designed to directly support low carbon technologies have been set up, such as the Environmental Transformation Fund, the Energy Technologies Institute and the Technology Strategy Board. The government is offering direct support to build four full-scale carbon capture and storage demonstration plant. The Low Carbon Buildings programme offers grants for the diffusion of low carbon micro-generation technologies. This greater support for stronger policy action to develop and deploy low carbon technologies (incl. nuclear) is partly due to the

² However, in 2008 Ofgem’s statutory objectives have been refined to give more prominence to the achievement of sustainable development (Tutton 2009).

disappointing policy outcomes so far. The objectives of the renewables obligation (10.4% share until 2010/11) looked increasingly unlikely to be met as until 2005 only 4% of renewables had been achieved. Rutledge speaks of “an extremely feeble expansion of renewables and CHP” (Rutledge 2007: 916).

Several high profile reports suggested to the UK government to play a more active role in developing and deploying low carbon technologies (Stern 2006a; IEA 2007). Also academics argued for more government leadership in research, development, demonstration and deployment of energy technologies (Anderson and Gross 2000; Foxon, Pearson et al. 2005; Sauter and Watson 2007). In addition, the credit crunch and the following economic crisis made public calls for a green industrial revolution, including the promotion of energy efficiency and low carbon technologies, much louder (see e.g. Monbiot 2008; Bowen, Fankhauser et al. 2009; Stern 2009).

The centrality of the market approach with regard to investment in new electricity generation has also been questioned by leading academics and influential experts who became increasingly worried about the financing of low carbon investment in electricity generation (see e.g. Gross, Heptonstall et al. 2007; Rhys 2009). Well known experts like Anthony White have questioned whether the current power market set up will deliver the required investment in low carbon generation and have instead argued in favour of a single buyer authority, purchasing green power through long term contracts (White 2009) which is a substantial departure from the ‘free market’ paradigm. Even Ofgem, the gas and electricity regulator, in which the market paradigm has been firmly institutionalized, recently published a report in which it voiced concerns about the current regulatory arrangement. Ofgem put forward a range of options including the ‘central energy buyer’ option to deliver secure and sustainable electricity and gas supplies (Ofgem 2010). Other observers have noted that it is likely that wholesale energy markets will be subject to a “substantial increase in government/regulatory intervention” and that there is a cross-party “trend to a more interventionist energy policy” (Tutton 2009: 5).

Also the government has shifted gear. Despite its previous aversion to technology-specific support and industrial policy (Watson 2009) in line with the ‘free market’ paradigm, the UK government recently published a *Low Carbon Industrial Strategy* which acknowledges that there is a strategic role for the government in making the shift

to a low carbon economy (BIS and DECC 2009). The document pledged £405 million of the stimulus package for encouraging low carbon industries. The government also recently produced a *UK Low Carbon Transition Plan* in which it explains its national climate and energy strategy and takes a more active role (HM Government 2009). Most recently, the government published an industrial strategy for the development of CCS as it sees the potential for the UK to be a leader this emerging industry (HM Government 2010).

These examples seem to suggest that the UK is moving away from the ‘free market paradigm’. But do these discussions and the emergence of new ideas in combination with the financial crisis really signal the end of the paradigm? Helm already argued in 2005 that a paradigm change has happened (Helm 2005). He claims that at the beginning of the new century new policy concerns emerged such as security of supply and climate change. He argues that these changes led to a paradigm shift around the year 2000 because the change was “of sufficient magnitude to require rethinking of the role of privatization, liberalisation, and competition in achieving the new priorities, and hence a recasting of energy policy itself” (Helm 2005: 3).

We would, however, argue that a paradigm change has not yet occurred as the framing of nature of the problem remains within the market logic and the goals to be achieved remain unchanged (clean, secure and affordable energy, only the hierarchy of the goals might have changed). While the suggestions cited above recommend radical new policy instruments (such as a single buyer or changing the setting of existing policy instruments such as the RO), this in itself does not amount to a third order change even if adopted by policy makers. The dominant framing of the problem e.g. sees the lack of private sector investment as a market failure which needs to be corrected through an intervention in markets (Kern 2010). As Tutton argues for the case of Ofgem:

“the extent to which the market fails for deliver the required carbon reduction and security of supply goals will not be seen as a question of the market not ‘working’ ...Rather, the problem will be a failure to respond to objectives which are not aligned with financial incentives” (Tutton 2009: 4).

The single buyer model is a suggested fix within this interpretative framework ‘to get the incentives right’ as security of supply and environmental quality are seen as public goods.

Competitive cost tendering is (and thus competition) is still believed to be important. Technological change is seen as central to the transition.

However these new ideas gaining prominence in policy advice certainly stretch the intellectual consistency of the paradigm as the single buyer determines the investment need in new capacity and then provides long term contracts for building this capacity. It thus comes close to the predict and provide approach from transport policy often criticised as an example of the failure of state planning (Lehtonen and Kern 2009). The intellectual stretch to square this policy instrument with the ‘free market’ framework might be a precursor to more radical change in the (near) future. Hall has argued that the ad hoc adjustment of a paradigm can take into account anomalies (such as the lack of low carbon investment in this case) but this “gradually undermines the intellectual coherence and precision of the original paradigm” (Hall 1993: 280) which contributes to its demise. He also argues that when policy paradigms are openly contested the “the outcome depends on the ability of each side to mobilize a sufficient electoral coalition in the political arena” (Hall 1993: 287). Politics is thus central to paradigm changes. Also Mitchell emphasises the role of contestation by a variety of actors in paradigm changes. She uses the metaphor of a ‘band of iron’ to illustrate how paradigms change. She argues that Thatcher was elected because of the long build up of pressure on the previous ‘band of iron’ in place beforehand; that of large scale state control. Mitchell argues that paradigms evolve in response to pressure, that the pressure accumulates over time and then the final straw (e.g. a certain event) causes it to snap and give way, and then once everything settles down in its new place, a new paradigm emerges. Mitchell argues that individuals and voters matter in this process, as do politicians, civil servants, companies, NGOs, communities, regional and local authorities: “All actors...involved in the build up of pressure are therefore central to a paradigm shift” (Mitchell 2008: 204). While a paradigm shift might not yet have occurred, the evidence reviewed above certainly suggests that pressure on the ‘free market’ paradigm is increasing and that new policy ideas emerged which might open up new possibilities in terms of governing transitions.

5. Conclusion

This paper took its starting point in a critique of the MLP and pointed to the neglect of the macro-political factors in transition studies. It argued that, however, the landscape level has an important role in fostering or blocking transitions. To look at the landscape level is therefore essential if one is interested in fostering transitions towards sustainability. The paper then argued that policy paradigms can be usefully conceptualised as an important part of the socio-technical landscape. The analysis provided in this paper shows how (political) landscape factors constrain transition governance at the regime level. In particular, analysis shows how the ‘free market paradigm’ in the UK has so far slowed down the transition towards a sustainable energy system but is now in the process of changing.

The paper makes three contributions to the emerging literature on transitions. First, it pays explicit attention to the so far under-theorised landscape level of the MLP and argues that insights from political science on the nature of policy paradigms can be used to better conceptualise macro-political factors which are argued to be important for the governance of transitions. Second, the paper shows empirically for the case of the UK how policy paradigms influence attempts to govern transitions at the regime level by constraining which political interventions are acceptable. Third, the paper shows that the landscape is not immutable. While the socio-technical transitions literature so far has maintained that the landscape level cannot be influenced by any individual actor, it seems that in the case discussed above the cumulative behaviour of actors has contributed to a change on the landscape level which opens up new opportunities for governing the energy transition in the UK. It is therefore important not to take the landscape level as for granted and immutable and solely depend on external shocks for conceptualising change. Instead, understanding socially constructed policy paradigms as one of the important factors of the landscape level allows insights into the dynamics and agency involved in changes at the landscape level.

However, further research is needed to clarify the precise mechanisms and patterns through which paradigms change. This has indeed been criticised out as one of the weaknesses of the literature on policy paradigms (Blyth 1997). Campbell rightly pointed out that research so far mainly addressed this issue “by arguing that paradigm shifts occur

when policy makers suddenly find themselves faced with unusual political economic problems for which the current paradigm offers no clear-cut solutions” (Campbell 2002: 23). Often external political or economic shocks such as an oil price shock or a global economic crises are claimed to cause policy paradigms to change (see e.g. Challies and Murray 2008). The concrete mechanisms, through which such an adjustment of the paradigm as a response to crisis happens, and the role of key actors who contribute to such a change are often unclear in these accounts. Further research is needed in this area. Transitions researchers are well placed to contribute to this wider debate by building on the MLP and combining the more cognitive lens of policy paradigms with attention to physical infrastructures, artefacts and actor strategies.

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