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Sub-national government and pathways to sustainable energy

Richard Cowell¹, Geraint Ellis², Fionnguala Sherry-Brennan⁵, Peter A. Strachan³ and David Toke⁴

Richard Cowell is the corresponding author.

1 School of Planning and Geography
Cardiff University
Glamorgan Building
King Edward VII Avenue
Cardiff, CF10 3WA
United Kingdom
Email: cowellrj@cardiff.ac.uk

2 School of Planning, Architecture & Civil Engineering
Queen's University Belfast
David Keir Building
Stranmillis Road
Belfast, BT9 5AG
United Kingdom
Email: g.ellis@qub.ac.uk

3 Aberdeen Business School
Robert Gordon University
Garthdee Road
Aberdeen, AB10 7QE
United Kingdom
Email: p.a.strachan@rgu.ac.uk

4 Department of Politics and International Relations
University of Aberdeen,
Edward Wright Building
King's College Regents Walk
Aberdeen, AB24 3FX,
United Kingdom
Email: d.toke@abdn.ac.uk

5 Exeter University
Department of Geography
University of Exeter
Amory Building, Rennes Drive, Exeter,
Devon, EX4 4RJ
Email: F.Sherry-Brennan2@exeter.ac.uk

Abstract

In an effort to understand how to promote more sustainable forms of energy provision, researchers have begun addressing the scale of political and governance processes, yet the effects of sub-national government remain neglected. At the same time, analysts of political devolution, decentralisation and independence have rarely given attention to the energy sector. Papers in this special issue seek to better understand the relationship between sub-national government and pathways to sustainable energy: examining how city-regional and devolved governments have shaped agendas for building retrofit; elucidating the importance of reflexive, decentralised governance in knitting together electricity, heat and transport energy markets; mapping the complex, fuzzy spatial organisation of legal powers to direct energy policy across multi-level polities; and analysing conflicts over the allocation of energy infrastructure consenting powers between national and devolved governments. The papers highlight the interdependencies of action in different governmental arenas, and reinforce arguments for greater central-to-local reflexivity in governance styles. Analysing the interface between sub-national government and energy transition also raises new questions about the meaning of 'sovereignty', the fragmentary nature of democratic control over energy systems, and the effects of boundaries.

1.0 Introduction

Around the globe, from international institutions to local municipalities, there is a broad chorus of support for making our systems of energy provision more environmentally sustainable, secure and just. Listening more closely to this chorus reveals the immensity of the challenge. Rather than a single route towards more sustainable energy futures there are multiple possibilities: some entailing incremental adjustments of incumbent systems of provision, others involving radical change (Verbong and Loorbach 2012; Foxon 2013). All choices have distinct distributive effects and are likely to be contested. Given the stakes, the challenges of energy transition raise questions about politics and governance (Meadowcroft 2009): who should decide what to do, on what basis, for which political community and how can policies be effectively implemented?

Politics and governance are aspects of energy transition acknowledged to require more researcher attention (Cox et al 2016), and the scale at which political and governance processes are organised is an important dimension (Bridge et al 2013; Sovacool and Brown 2009). To adapt a geographical aphorism, the transition to more sustainable energy systems will not occur on the head of a pin, but across complex terrains of physical infrastructures, consumption behaviours and environmental and resource ecologies, and it will be driven by pressures from market interactions, government interventions and social practices that emanate from different places and operate at different scales. This creates a difficult setting for the deliberate orchestration of change and a challenging context for understanding the causal effects of governmental action.

This challenge is not simply one of understanding how energy transitions intersect with multiple levels of government: in numerous spheres the spatial arrangements of political and governance processes are *themselves* in flux. Familiar processes of localisation, Europeanisation or internationalisation face trends pushing change in other directions. Devolution within the UK is changing its constitutional structure, for which the 2014 Scottish independence referendum is just one of the more dramatic episodes. The UK's EU membership referendum of 2016 and ensuing moves for 'Brexit' have potentially profound implications *inter alia* for supra-national governing and market institutions, as well as unsettling the UK's 'internal' territorial constitution. It is timely therefore to examine how the shifting scalar structures of governance – their changing territorial reach, the distribution of power between tiers - intersect with the evolving spatiality of energy provision, and how together they shape future energy pathways.

To address these concerns, this themed issue of *Environment and Planning C: Politics and Space* focuses on sub-national government. This has been characterised by Marks et al (2008, 113) as a 'coherent territorial entity situated between local and national levels with a capacity for authoritative decision-making' and remains neglected in research on sustainability in general (Bruyninckx et al 2012; Raven et al 2012), and energy in particular. This is an unfortunate omission, as sub-national government has numerous potentially important roles in shaping energy transitions: as an originator of innovations, a vehicle for addressing and channelling social disaffections arising from specific localities, and a resister, mediator and/or implementer of wider national or corporate agendas.

Examining the connections between energy, transition and sub-national government enables insights to be drawn in a number of directions. Firstly, because of the location of sub-national government 'between' other arenas (local, national, and supra-national) in multi-level

government systems, it provides a useful vantage point for de-centred accounts of energy transitions, looking beyond central government. It offers great potential for understanding the conditions under which change emerges (Murphy and Smith 2013) but also – and equally important – identifying how dominant energy systems (incumbent actors, technologies, markets, social practices and other institution norms) come to persist, despite the need to navigate changes in the scalar structure of the state. Secondly, studying energy regimes can inform analyses of the re-scaling of government more widely. The UK and ongoing processes of political devolution offer an object lesson in this regard. Political commentators may observe the ‘break up of Britain’ (Nairn 1977), but with energy any scope for greater regional autonomy confronts governance and infrastructural arrangements geared towards system- and market integration.

In making claims for the practical and analytical importance of sub-national government, one must acknowledge its diversity. Structures of sub-national government vary within and between nation states, embracing regional government (including the assemblages of city regions), state-level government in federal systems, and other arrangements of devolved or decentralised political power. Moreover, the extent to which sub-national governments represent a ‘*coherent* territorial entity’ in relation to the governance of energy is itself one of the issues at stake. Similarly, despite adopting the transitions theory terminology of ‘pathways’ in the title of this themed issue, there is no attempt to corral the contributors into a single theoretical perspective. Use of this term serves simply to capture the multiplicity of routes that energy transition may take, entailing a diversity of roles for sub-national government.

Thus, the aim of this themed issue is to advance our understanding of the role of sub-national government in shaping pathways towards sustainable energy, and thereby improve our understanding of the dynamics of energy transitions and state re-scaling processes. To do this, the next section of this Introduction briefly reviews existing literature in this field, examining the relative neglect of governance scale and re-scaling issues within energy research and the neglect of energy within sub-national government and devolution research before expanding in more detail on the guiding questions for this issue. The five substantive papers included in this issue are summarised, pointing to how they address the questions identified in the literature review. These submissions started life as contributions to a symposium on ‘Sub-national government and paths to sustainable energy’ held in Cardiff University, 15th-16th May 2014 and have been developed significantly for publication here. Summary of the papers is followed by a wider reflection on the broader intellectual and policy issues raised by all the papers, before finally we highlight questions for further research.

2.0 Themed issue: context and questions

2.1 Energy transition and re-scaling the state

There has been significant research on scalar issues in environmental governance, much of it seeking to identify governance arrangements that better ‘fit’ the scale of the socio-ecological processes at work (Adger et al 2005; Benson and Jordan 2010), to understand the causes and effects of re-scaling (Moss and Newig 2010) and the way in which scale-framing can shape the outcomes of policy debates (Van Lieshout et al 2014). Various researchers have also articulated the sub-national region as a key strategic space for managing the tensions between

economy and environment (see De Laurentis et al, this issue; Gibbs and Lintz 2016) and the potential of this level of governance to influence geo-political environmental disputes (Setzer, 2014).

Yet researchers have been slower to engage with the scalar dimensions of *energy* governance, especially in relation to efforts to construct more sustainable pathways. Späth and Rohrer (2014) identified a pervasive ‘methodological nationalism’ in studies of socio-technical transitions and analyses of energy policy have a similar national emphasis (e.g. Helm 2003). Yet if the prospect of change in systems of energy provision is to be fully understood, then it is vital to understand how ‘energy systems are constituted spatially’ (Bridge et al 2013; Hodson and Marvin 2009; Murphy and Smith 2013; Truffer and Coenen 2012) for which governance arrangements are an important ingredient. There are analytical advantages to seeing energy regimes less monolithically, as constituted by interests, institutions and infrastructures that vary in their spatial reach and effect, which are beginning to be exploited by researchers (Späth and Rohrer 2014; Coenen et al 2012).

Some angles are covered better than others. For example, there is burgeoning research examining sustainable energy initiatives at the scale of local communities (for example, Walker et al 2006), or cities (Marvin and Guy 1997; Bulkeley and CastanBroto 2013; Turcu and Rydin 2012), though much less at regional level (Gibbs and Lintz 2016; Smith 2007). Fewer researchers have considered how wider infrastructural, hierarchical or market systems frame the scope for sub-national action, and the extent to which sub-national action serves to maintain or challenge those framing conditions. As Hodson and Marvin report (this issue), our understanding of the role of ‘multi-scalarity’ in transitions remains poorly developed (for exceptions see Bomberg and McEwen 2012; Hodson and Marvin 2013; Murphy and Smith 2013; Warren 2014). Moreover, the multiplicity of scales is often seen as part of a complex reality to be navigated by those pursuing sustainability objectives, or perhaps a set of opportunities for intervention and agency, but usually as a static backdrop for energy policy. There is much less research looking at the relationship between systems of energy provision and the shifting scale of governance processes, arising either from deliberate state and business action within the energy sector, or wider spatial shifts in the architecture of the state (Moss 2014).

In a kind of symmetry, research into the re-scaling of governance – notably analysis of political devolution and decentralisation – has shown a general inattention to energy. The voluminous literature sparked by the post-1998 programme of devolution in the British state said little about energy (Adams and Robinson 2002; Bradbury and Mawson 1997; Keating 2005; Osmond 1998) a reflection perhaps of the limited attention given to energy in devolution debates and wider political beliefs prevailing in the 1990s that electricity and gas had become unproblematic commodities that markets could allocate (Kuzemko 2014). As the 21st century wore on, energy issues moved back to political centre stage, and research into the intersection between energy, climate change, devolution and other scalar shifts began to emerge. However, most analysis tended to focus on specific energy-related policy interventions such as planning (Stevenson 2008; Cowell 2007, 2010), market support (Winskel 2007) or moves towards community renewables (Murphy and Smith 2013; Strachan et al 2015).

Research is similarly partial in other countries where transitions towards more sustainable energy systems seem more advanced than the UK. Kuzemko et al (2016) analyse governance norms to compare the divergent energy transition pathway choices of the UK and Germany;

in the latter, political institutions have been more coordinative, and structures for energy provision are less centralised, granting regional and local municipal levels more capacity and leverage to work towards system change (Beveridge and Kern 2013). Indeed, analysts have long observed that the more decentralised ownership structure of the energy utilities in Scandinavia and Germany has facilitated more diverse patterns of ownership and alternative energy pathways – often focused on renewable energy – to be driven further (Moss 2014; Collier and Löfstedt 1997).

2.2 Guiding questions

Numerous questions arise from this existing literature about the role of sub-national government in energy transitions, prime among them being the issue of impact: ***How have sub-national governments acted on systems of energy provision and with what effects?***

By studying sub-national government one can begin to understand how and why governance and policy-making arrangements vary and how, in turn, this may shape energy pathways (Kuzemko et al 2016; Cox et al 2016). To date there is only a modest body of work that compares different sub-national governments in order to examine theoretical propositions about how particular governance ‘inputs’ generate particular energy outcomes, such as for the delivery of renewable energy (e.g. Ngar-yin Mah and Hills 2014; Cowell et al 2017; ESPON 2017). Kuzemko et al (2016) suggest there is a need to explain better why patterns of energy governance differ, and to link this to broader domestic political institutions, available energy sources and other potential sub-national influencing factors.

In considering the effects of sub-national government on energy transitions, one also needs to be alert to the array of potential energy outcomes and forms of agency. Is sub-national government a force for radically different energy system trajectories? Does it resist moves towards sustainability? Does it serve primarily to refine the delivery of national programmes but without changing anything fundamental (see discussion in Stirling 2014)? Analysts of the UK situation have tended to the latter conclusion, in that sub-national government has done relatively little in the pursuit of low carbon energy to challenge the dominant emphasis on competitive markets, facilitating large-scale energy investments, and the exploitation of those arrangements by major international utilities (Hodson and Marvin 2013; Strachan et al 2015; Cowell et al 2017). This points to a wider research issue. Verbong and Loorbach (2012) advise that to understand transition, we also need to understand how dominant systems of provision adapt and stabilise in the face of shifting social and political contexts. Given that political devolution can represent a significant re-territorialisation of government and political processes, one might expect such re-scaling to have disruptive effects on prevailing energy systems. If dominant systems of provision can accommodate such disruptions, then examining how this occurs and the extent to which sub-national governments facilitate it, can provide insights into the wider prospects for change.

Of course, sub-national governments may seek to promote ambitious sustainable energy objectives but there may be gaps between rhetoric and outcomes, a point that brings us to a second question: ***What agency in the energy sphere do sub-national governments possess?*** Sub-national government typically combines some claims to democratic legitimacy with a suite of formal competences over various activities (Bruyninckx et al 2012). Rarely however do sub-national governments possess full autonomy from national government over energy issues, and they vary significantly within and between nation states in terms of the competences they possess and their capacity to exercise influence, both within their borders

and in other arenas (Royles and McEwen 2015). The capacity of sub-national government regimes to influence subsidy schemes for renewable energy, or electricity grid regulation, is especially important (Toke et al 2013).

Seeking to ‘map’ the powers of sub-national governments over energy can reveal more foundational questions about law and governance, by exposing the sheer complexity of governance arrangements but also gaps, uncertainties and blurring in the allocation of competences (see Muinzer and Ellis, this issue). There are ontological implications here. ‘Multi-level government’ cannot be conceived as a simple, neat hierarchy of pre-given, nested spatial containers in which each ‘level’ possesses neatly demarcated powers. Rather, ‘governments’ at all levels are increasingly interdependent and actively negotiating with other levels of government and actors across a range of policy fields (De Laurentis et al, this issue). For many analysts of energy policy, ‘it is clear that governance scale is therefore relationally constructed’ (Hodson and Marvin, this issue, p.xx).

Concern with power *in actu* (after Latour 1986) leads to more precise concerns about cause and effect: ***By what mechanisms have sub-national governments been most effective in shaping systems of energy provision?*** This issue interfaces formal powers with the capacity and willingness of sub-national governments to use them (Cowell et al 2015), and the other factors shaping governance processes and outcomes. Questions arise about how the governmental actors at sub-national level work with other actors in public, private and voluntary sectors to address energy issues, the form of networks that are constructed, and how they work to realise particular energy pathways (Cowell et al 2017; Meadowcroft 2009). Sub-national government may create rather different opportunity structures (after Kitschelt 1986) for accessing policy processes compared to the national level, privileging some actors while marginalising others.

Understanding modalities of change also means confronting some of the biases in transition thinking research, which has tended to view technological innovation as the prime motor of change (Kern and Smith 2008). Equal attention should be given to how alternative energy technologies or practices are deployed at scale, across heterogeneous territory. Large-scale energy infrastructure can cause societal conflict, much of it centred on land use planning arenas, which is often a policy sphere where sub-national governments have major responsibilities. Nevertheless, the voluminous research on facilities siting is often disconnected from wider questions of energy transition, governance and polity (Cowell, this issue).

Analysis of network formation within transition thinking, and the governmentalities with which states act across their territory, risks missing one of the distinctive features of sub-national government: their political nature. An important question therefore is: ***Do sub-national governments serve to politicise energy, in the sense of bringing energy policy into contingency and debate, or to depoliticise it*** (Flinders and Wood 2014; Barry 2002, 2012; Stirling 2014)? Politicisation matters insofar as it may bring a wider array of value concerns into the energy policy arena, beyond those embodied in the mechanics of governance. It also matters because fostering more sustainable systems of energy provision entails making dominant, unsustainable energy provision systems more vulnerable (Shove and Walker 2007; Owens and Cowell 2010), or invoking ‘politically inspired regime destabilization’ (Kuzemko et al 2016, 98). Limitations on formal powers and resources mean that sub-national governments may be better at problematising business-as-usual than single-handedly delivering alternatives, making their political role rather significant. As an example of how

sub-national politics help destabilise energy policy, the electoral defeat of the long-ruling CDU party to a Green Party-led coalition in Baden-Württemberg's state election, Germany, is an important constitutive ingredient in *national* German decisions to phase out nuclear energy (Beveridge and Kern 2013). Sometimes energy issues can de-stabilise sub-national government; for example, the case of how the financial mismanagement of Northern Ireland's Renewable Heat Incentive scheme precipitated collapse of the power-sharing government in early 2017 (Muinzer 2017).

Thus far, our questions have presumed static encounters between systems of energy provision, agendas of sustainability, and given scalar structures of governance. But it is also important to ask: ***How does the scalar structure of energy governance (who does what, at what level, with what territorial reach) come to change? How have controversies around energy affected wider debates about the distribution of powers?*** Given that energy infrastructures and systems of provision often co-evolved with the wider sedimentation of state power, one might expect energy issues to be factors in ongoing debates about de- (or re-)centralisation within the state, or secessionist movements. By looking at energy one can gain further insights into governance 'scale in the making'; whether that be tracing new leverage points for innovation, or potential vulnerabilities for prevailing systems whose reach may be thrown into question. The fate of efforts to extend energy networks is important here, too. A succession of national and EU initiatives have sought to tighten the connections – infrastructural and economic – between national electricity markets, in turn affecting the scope for sub-national 'autonomy'. The UK Brexit vote throws these moves into question, though how far the UK or sub-national governments will be able or seek to 'take back control' over energy markets is highly uncertain (Pye et al 2017). Regulatory fields that intertwine with energy provision, such as around climate change, may also affect sub-national governments' capacity for action. A subsidiary question therefore is: ***How does energy-related action by sub-national government intersect with the shifting territorial reach of systems of energy provision and environmental and market regulation?***

3.0 Key findings from the papers

The papers brought together for this themed issue provide a distinctive and insightful set of responses to the questions above. They embrace a diversity of sub-national government settings, including moves towards city-regional governance, devolved governments in the UK, and the multi-scalar nature of energy transitions in Denmark. Different aspects of future sustainable energy pathways are examined, including the promotion of renewable energy, retrofitting the built environment to improve its energy performance, creating the mechanisms to integrate electricity, heat and transport energy markets and the spatial organisation of legal powers to direct energy policy. Not only is there a diversity of disciplines and conceptual approaches on display (from geography, planning, political science, law, innovation studies), but many of the papers explicitly advance the case for combining different disciplines: legal studies and geography (Muinzer and Ellis); institutional economics, governance and energy engineering (Hvelplund and Djørup), and transitions theories and multi-level governance (De Laurentis et al).

The question of how sub-national government and governance interpret wider social, economic and environmental pressures for their territory, and which energy pathways get prioritised, is a major concern for Carla De Laurentis, Malcolm Eames and Miriam Hunt (this issue), in their analysis of the emergence of a distinctive sustainability transition pathway in

Wales. They seek to understand how the Welsh Government developed an approach to domestic energy demand reduction through building ‘retrofitting’ founded on principles of need and justice, contrasting with the emphasis in England on market failure and incentivising private individuals. The effects of politics in sub-national government settings in mediating international and national decarbonisation agendas are visible here: a traditional, Labour-led administration dominates politics in Cardiff compared to the Conservatives in Westminster. De Laurentis et al detail how the Welsh Government pieced governance processes together and how these co-evolved with the retrofitting scheme itself. Similarities with transition management thinking are identified, including: creating a ‘shared’ normative vision that presents retrofit as a win-win solution for economic, social and environmental agendas; building, adjusting and repairing actor networks; and the dynamic nature of implementation, requiring experimentation and re-evaluation. If the agency of the Welsh Government is clear, so too is how drivers for retrofit in Wales reflect a broader landscape of carbon reduction targets, external funding streams (including national and EU funds) and capabilities distributed across other levels of government.

Debates about the powers available to sub-national government are placed centre stage by Thomas Muinzer and Geraint Ellis (this issue). They respond to the tendency of research on decarbonisation and energy to be ‘largely lawless’ – i.e. to ignore the ways in which constitutional legal arrangements define the scope for agency – by presenting a doctrinal legal analysis of the spatial and scalar distribution of powers related to energy in the devolved administrations of Northern Ireland, Scotland and Wales. Muinzer and Ellis chart how the UK’s ‘energy constitution’ creates agency and constraints for different governmental actors to control aspects of energy policy. They find a distribution of legal arrangements characterised by complexities (formal legal devolution of powers to Parliaments runs alongside executive devolution of specific responsibilities and more diffuse intergovernmental guidance), and contingencies (in that the ability of the UK to deliver on its responsibilities for energy or climate change is significantly dependent on the performance of the devolved administrations). Moreover, although the formal competencies of the devolved governments generally exclude directly energy-related powers, their ability to act on energy is still (p.20) ‘mediated by the deployment of modes of governance and engagement of other responsibilities that have been devolved’ e.g. through land use planning. Given the overlaps, interdependencies and different governance modes involved, they argue that it makes little sense to ask what is ‘*the* right scale’ (emphasis added) for energy and climate-related action, but to ask instead on what terms and within what parameters should different jurisdictions interact?

Viewing the issues in a co-evolutionary frame, the question of how sub-national government carves out a space for action on energy and with what effect is picked up by Mike Hodson and Simon Marvin (this issue). Here they explicitly consider how policy agendas of urban energy retrofit are co-constructed with the city region as a field for intervention. Their detailed qualitative analysis of the forms of governance at work in Greater Manchester find the city to be experiencing two ideal-type retrofit pathways, each making distinctive connections between retrofit and scale, but largely disconnected from the other. The dominant approach combines national and regional elite actors and seeks to translate national climate change targets into city regional action through mechanisms predicated on market-making and urban competitiveness (which they label ‘governing ON’ Greater Manchester). The other, alternative approach involves forms of ‘embedded localist action’ (p.15), grounded in a diversity of community, social justice and ecological concerns (‘governing IN’). The pathologies of this situation are that the former is big on strategy but built on a narrow

economic agenda, with limited capacity to realise change, while the latter consists of ad hoc, piecemeal and fragile initiatives. The solution, argue the authors, if retrofit is to be advanced more productively, democratically and with greater justice, is to find ways of developing relationships between these pathways ('governing WITH').

Frede Hvelplund and Søren Roth Djørupask (this issue) ask how we might better understand the governance processes that would foster the paradigmatic transition from energy systems based on stored fossil fuel and uranium technologies to fluctuating (intermittent) renewable energy-based systems. Their question is grounded in moves by the Danish government to transition to renewable energy sources, including a 50% share from wind power by 2050. Distinctive to their analysis is their approach, labelled 'concrete institutional economics and innovative democracy' (xx), and their focus on the transition between energy *systems*, especially developing an 'integration infrastructure' where electricity, heat and transport energy infrastructures and markets become connected. Bound up with such transitions are questions of scale, since: (i) the equipment involved (district heating plants, heat storage systems and heat pumps) are necessarily located closer to the consumer; (ii) in Denmark they are mainly locally owned by municipalities but also (iii) facilitating transition requires regulatory systems that are less sectoral and national, with more reflexive and collaborative relations between central authorities and sub-national actors (Sperling et al 2011). Hvelplund and Djørup demonstrate the value of their analytical approach by discussing the prospects and risks of two scenarios in which Denmark could accommodate more wind power: one based on expansion of high voltage, cross-border electricity grids; a second one that sells 'surplus' wind energy into the heat market, concluding that the latter better maintains economic sustainability and societal support.

Richard Cowell's paper (this issue) focuses on what can be learned about the scope for energy transitions by examining how government re-scaling is reconciled with prevailing regimes of energy provision. To guide his analysis, he uses the concept of 'technological zones' (Barry 2006) – spaces of rule which allow entities to circulate but which may not necessarily correspond with national political territory – to interpret how devolution within the British state (in this case to Wales), has affected the politicisation and organisation of electricity infrastructure decisions. Cowell charts how emerging political crises about the expansion of on-shore wind energy in Wales raised major questions about the appropriate distribution of project decision-making competences between the Welsh Government and Westminster, which were then a subject of discussion at two government inquiries. Parties to those inquiries asserted logics of democratic accountability to Wales, along with arguments about sensitivity to territorial conditions for Wales, but the dominant discourse emphasised swift and stable decision-making procedures to facilitate major investment and infrastructure delivery. In the end, the Welsh Government did receive more consenting powers, an example of how energy-related controversies can drive constitutional change, but the Welsh Government has chosen to use those powers to expedite infrastructure delivery rather than facilitate wider public engagement. Cowell's research shows that while intensifying place-based conflicts and pressures for governance re-scaling potentially disrupt the reproduction of infrastructural systems they do not automatically do so, which should direct our attention to the conditions that shape their politicisation. The influence of business actors is especially important here.

4.0 Common themes; emerging ideas

In their responses to the guiding questions of the themed issue, the papers throw up areas of commonality worth further discussion.

Interdependence, reflexivity, disaggregating 'energy'

Many of the papers show the interdependencies between national and sub-national government in constructing and delivering sustainable energy pathways. Muinzer and Ellis identify that the capacity of the UK to reach its climate change objectives will depend in part on actions undertaken by the devolved governments (see also Toke et al 2013). De Laurentis et al indicate how such interdependencies can unfold, as devolved governments combine national and European-level resources with processes of experimentation, learning and actor mobilisation within their territory. For Hodson and Marvin, the melding of nationally-driven and locally-embedded energy initiatives is part of the potential of city-regional governance. The limitations of 'methodological nationalism' in energy transitions research therefore becomes clear as we observe how 'national pathways' are constituted by pathways constructed at sub-national levels, their successes and failures.

Explicitly or implicitly, most of the papers make a case for greater reflexivity in governance relations between national, sub-national and other levels of government, as a response to situations where power is dispersed, knowledge is partial, and steering towards a goal is difficult to separate from reflecting on prospective, alternative goals (Meadowcroft 2009). However, any intergovernmental 'collaboration' needs considering in the light of what is open for discussion and the governing principles in play. For Hvelplund and Djørup (this issue) that principle should be subsidiarity, interpreted as meaning that energy market regulation should work to prioritise handling the integration of fluctuating renewable energy at local level before supporting further grid infrastructure for long distance transfers. However, others suggest existing sub-national governance arrangements may be inadequate venues for the kind of reflexivity required. Thus, for Hodson and Marvin (this issue, p.xx) reconfiguring the environmental performance of urban fabrics requires 'hybrid forms of governing that incorporate a wide range of city-regional standpoints and voices rather than the narrow governance frameworks of neoliberal urban governance'.

Looking across the papers, one can also discern how the objects under consideration affect how we perceive the agency of sub-national governments (Cowell et al 2015), suggesting that 'energy' needs disaggregation if one is to trace its interface with governance re-territorialisation. De Laurentis et al posit that the capacity for sub-national governments in the UK (such as Wales) to act on energy may be much greater around demand management than electricity generation. Electricity networks and the markets they facilitate require high levels of spatial integration, bringing with them national and (in the EU context) supra-national aspects of regulatory control, which often seems to overwhelm the prospects for significant re-localisation of power. Yet, in Hvelplund and Djørup's analysis, a 'need for downscaling regulation and policies' towards regional and municipal actors 'arises from the character of the technological change from stored to fluctuating energy sources' (this issue, p.xx). The potential for dispersion of power within electricity governance is thus a key issue for the future.

(Post)sovereignty, democracy and sustainability

As well as these commonalities, the papers also point towards new areas of potential research and conceptual development.

There is scope for fruitful research at the interface between social science energy studies and traditional political science concerns with the changing nature of the state and, more specifically, debates about devolution, decentralisation and independence. Examination of the energy sector provides further evidence for Keating's conclusion that regions seeking 'independence' now rarely claim immediate statehood, but qualify their goals with significant sharing of institutions with the larger polity; agendas characterised as 'post-sovereignty' (Keating 2012). The governance of energy with all its interdependencies illustrates, *par excellence*, that sovereignty is not a thing to be held (Keating 2012, p. 12) 'but a relationship, which means that it always has to be negotiated with other sovereignty holders, and is usually embedded in wider transnational structures'; a view particularly supported by Muinzer and Ellis (this issue).

All five papers expose the fragmentary nature of democratic control over energy systems (Stirling 2014), highlighting to scholars of energy justice and democracy the need to relate their work to how the structure of states and apertures for engagement are actually changing. Hodson and Marvin (this issue, p.xx) see a deepening paradox between 'a discourse of transformation but a much more limited and conservative response that seeks to deliver these through less state intervention, the withdrawal of coordinating capacity and the development of increasingly marketised and local responses'. There are other challenges, too. As well as being interested in whether the re-scaling of government reallocates opportunity structures for extant actors, there is a need to consider whether it gives new recognition to interests that have been largely voiceless in decision-making about energy. Following Hvelplund and Djørup, we might ask whether sub-national government provides advocacy for the 'integration infrastructure' that knits together electricity, heat and transport energies, that otherwise lacks coherent representation.

The way these papers address the intersections between energy, sustainability and sub-national government can also inform wider, normative debates about how principles of democracy (as a procedural ethic) might be reconciled with the promotion of sustainability (as an outcome ethic; after Jacobs 1997; see also Dobson 2004). One element of this is to consider how the scale of territorialisation – the polity of concern - mediates tensions between democracy and delivery. The issue then is not simply what is or is not up for debate but what is up for debate at different levels of governance? Research in the energy field also warns against the easy elision between 'lowering the scale of governance' with 'greater opportunity to open up and pursue alternative policies'. Cowell (2017, this issue) and De Laurentis et al (this issue) offer different reflections on this, but again the objects of governance – major electricity generation for Cowell, retrofit for De Laurentis et al – may be important in mediating the scope for democratic steering.

Creation, erasure and negotiation of boundaries

Our understanding of the spatial constitution of energy systems and the structured scope for change might be enhanced by giving explicit attention to boundaries: their presence, effects and renegotiation. When energy infrastructures and systems of provision encounter boundaries, then efforts to transcend them to create unified and coherent systems are more likely to have to negotiate divergent values and priorities, entailing significant institutional work (Barry 2002). Equally, it can be very challenging to mobilise (or even conceive) the case for greater autonomy over energy for smaller scale political communities where this seems to entail 'slicing through' market and infrastructural systems that have been made

continuous (Boltanski 2009). As Meadowcroft (2009, 326) suggests, specifying boundaries ‘is necessarily a normative and in the final instance a politically charged, question’.

Theoretical frameworks with a post-foundational basis may be especially insightful where boundaries come under dispute. Drawing on Boltanski and Thévenot (2006), debates about boundaries are likely to create situations where arguments and efforts to create new forms of governance encounter plural and incommensurable ‘orders of worth’, some based on civic accountability to a particular community, some based on target-based delivery, some based on market freedoms and the pursuit of profit. Such orders may be drawn upon to defend the status quo or to justify change, but the resulting solutions are almost always compromises, embodying inconsistencies and omissions that thereby create the basis for further critique (as found by Muinzer and Ellis, this issue and Cowell, this issue). Herein lies a different perspective on ‘socio-technical regimes’ – deemed by transitions theorists to closely configure the scope for change – and how they actually hold together over space and time.

The potential explanatory power of such perspectives is becoming evident in the UK, as ongoing devolution and Brexit negotiations place the territorial governance of energy under pressure. Future developments in Ireland constitute a fascinating testing ground for post-foundational theories, as efforts to deepen energy system integration across the island of Ireland face the prospects of renegotiating boundaries between a Northern Ireland leaving the European Union and a Republic remaining a member (House of Commons Northern Ireland Affairs Committee 2017). Since 2010 especially, the Scottish Government has had clear reasons to wish to steer energy policy in a different direction to Westminster, given its opposition to nuclear power, greater desire to maintain financial support for renewable energy expansion, and concern that national regimes of regulation thwart the case for enhancing grid connections to the Scottish islands (e.g. McCall 2017). Following the 2014 independence referendum, further adjustments to Scotland’s energy-related powers have been made. The changes are modest, but show a distinct patterning.¹ When it comes to grid systems and markets that are integrated at a Great Britain level, the Scottish Government has simply had its rights to be consulted on regulatory and market support arrangements formalised (Little 2016) (i.e. a better seat at the table with central government and market regulators) but then the Scottish Nationalist Party has long tended to frame its independence agenda within the maintenance of GB-wide energy markets (Toke et al 2013). However, Scotland has acquired greater control over fracking within its territory and the energy exploitation of its coastal waters. The dynamic has been similar for Wales.

These UK examples indicate how arguments for decentralising power have been more thinkable and actionable for aspects of energy embedded in land and territory, but not for entities like electricity, gas and money, where few challenge their need to flow freely in systems that extend spatially without ‘unnecessary’ interruption. Strong system logics, founded in security of supply concerns entail that Westminster retains control over the ‘generation, transmission, distribution and supply of electricity’.² Within systems of market regulation, too, finer-grained concerns for geography and territory confront ‘standardized process of knowledge production’ (Barry 2012, 326), with economic knowledge readily

¹Provision is made for: statutory consultee status on guidance for energy market regulators and the right to call Ofgem before the Scottish Parliament; Westminster has a new, limited duty to consult Scottish Ministers on reviews of systems of market support for renewables; devolution of the Crown Estate in Scotland and licensing and mineral access rights over fracking (Little 2016).

²Being reserved under the Scotland Act 1998, Part II – Subsidiary Reservations and an Energy-Specific exception in the Government of Wales Act 2006, Schedule 7 Subject 4 (see Muinzer and Ellis, this issue).

prevailing as the dominant order of worth (Cowell 2004). Here we begin to expose the contours of tractability i.e. to understand what, politically, is open for change within energy systems and where critique struggles to emerge (Boltanski 2009; Cox et al 2016; Stirling 2014).

Developments in the UK also point to a need to open up conceptions of what the distribution of ‘powers’ and their rescaling might actually entail. Alongside the allocation of formal competences, one might also consider the presence and influence of sub-national governments in national and international venues for energy policy-making, like the design of market support or grid regulation. Here ‘independence’ (after Keating 2012, 15), means pushing for ‘the right to negotiate one’s position within the state and international order’, in which joint mechanisms of policy-making become increasingly important venues. Allowing sub-national actors better access to decision-making cores could be a demonstration of Hvelplund and Djørup’s call (this issue) for ‘innovative politics’. Little surprise, then, that it can be difficult to define ‘the line’ between national and sub-national government powers.

5.0 Conclusions

This themed issue has been driven by a concern to better understand the effects of sub-national government on moves towards more sustainable energy pathways, and better understand of how state and governance re-scaling are related to the form and direction of development trajectories. These are long-standing concerns of *Environment and Planning C: Politics and Space*. The centrality of energy to wider societal challenges, coupled with the uncertain ramifications of Brexit and moves towards nationalistic, populist politics in many countries, will keep these issues very much alive.

The papers presented here have added important new empirical evidence for how sub-national government is acting on energy and with what effects, both for energy outcomes and the spatial constitution of energy governance. The potential – some would argue necessity – for sub-national government to have a greater role in fostering a more decentralised and diversely owned energy system, is a point affirmed by many of the authors gathered here. So too is the need to consider what shifting powers towards sub-national governments means for the power of incumbent actors. Papers presented here have offered important new evidence on the role of business actors in influencing the distribution of powers between governmental levels and how they are ultimately used. More widely, the various contributions, through their cross-disciplinary analyses, have shown what can be revealed where traditionally separate bodies of work (on energy and transition on the one hand, and on governance, politics, law and inter-governmental relations on the other) are pulled into dialogue, generating new insights for each.

The papers originated in a symposium guided by questions around how sub-national governments have affected systems of energy provision, and through their analyses and reflections important issues for further research have emerged. To what extent can more reflexive intergovernmental arrangements for governing energy be created and, as a corollary, what are the consequences of sub-national government actor participation in the ‘policy cores’ of grid and market regulation? How do all governmental arenas, in an era of public austerity and job creation pressure, balance the desirability of systemic integration of different energy forms within more localised systems against facilitating major, new supply-based investments? How does energy governance affect our understanding of sovereignty and

independence movements and vice versa? What becomes of the ideals of energy justice and democracy across the multiple, fragmentary decision-making arenas in which energy decisions are made? How does conceiving of state re-scaling and energy governance in terms of boundaries – their creation, removal or negotiation – start to elucidate the scope and extent of agency over energy system change? Although the focus of this themed issue has been sub-national government, such questions are just as relevant to work on supra-national energy regimes and to the fate of energy localisms.

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