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Title: Policy, politics and materiality across scales: A framework for understanding local sustainable energy capacity applied in England

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1. Introduction

At a time of fast growing public and political awareness of the urgent need to mitigate for climate change we concern ourselves here with the question of local government sustainable energy capacity. In doing so we accept arguments that public policy has a central role to play in sustainable change (Rutherford & Jaglin 2015; Castán Broto, 2017; Johnstone & Newell 2018), that the local is a vital area of activity in relation to emissions reduction (Bulkeley 2010; UNEP 2018), and that action so far has been concentrated in sustainable energy as a policy area (Bulkeley & Kern 2006). It is worth being clear that our emphasis here is on local government, rather than on ‘city’ or ‘urban’ governance, networks and/or assemblages, which has been the more common focus for analysis since the multi-level governance turn (Bulkeley & Betsill 2005; Rutherford & Jaglin 2015; Haarstad 2016; Ehnert et al 2018). This is not because we do not recognise enabling forms of governance as a more or less accurate portrayal of local sustainable action, but because we are interested in local government as the democratically elected body, that often sits at the heart of assemblages, whose purpose it is to pursue public goals via policy.

The term capacity is used on a regular basis within scholarship on city climate change governance and urban sustainability transitions, with two main emphases. Much analysis has concluded that a *lack of* capacity is one of the main constraints on local sustainable action, and a central reason why results have not always matched ambition over the past decades (Bulkeley 2010; Hodson et al 2013; Webb et al 2016; Beveridge et al 2016). Others, however, identify new spaces opening up in the urban politics of climate change, enhancements of local political autonomy, and some return of municipal energy (McGuirk et al 2014; Gailing and Röhring 2016; Bulkeley et al 2016; Durrant et al 2018). For some the growing capacity for local action relates partly to technological change (Kuzemko 2019; Brisbois 2019). From this we learn that capacity is considered an important aspect of the ability of local actors to pursue sustainable energy, but what is capacity made up of, what makes it more or less available at points in time, and how does it relate to energy systems?

Given the emphasis here on local government, and its ability to make and enact sustainable energy policies, we define capacity, in Section 2, in relation to public policy. We take a broad view on sustainable energy policy – to include renewable energy, energy efficiency, demand side response, heat, transport and energy poverty reduction measures. Further, in order to provide a more nuanced and in-depth understanding, we identify six broad types of capacity relevant to sustainable energy, to include material energy capacity. Local government sustainable energy capacity is seen not as operating in a vacuum, but as context-sensitive (Rutherford & Coutard 2014). As such, we set out and explore inter-linkages between local government policy capacity and: national and global institutions; local institutions; national and/or international energy and climate policy; and material aspects of energy systems. These relationships are, importantly, considered to be dynamic, as opposed to taking local government as locked within contexts not of its own making. This allows for a recognition both of path dependencies, and constraints upon policy capacity, and of new possibilities and change.

The conceptual framework is then applied to the case study of eight local and combined authorities in England, a relatively centralised political economy that often compares less well in local sustainable activities to other European countries (Bulkeley & Kern 2006; Eckersley 2017; Ehnert et al 2018). We have chosen to concentrate our analysis on local authorities that are reasonably active as we are interested in the conditions under which they have managed to pursue sustainable energy policies, despite relatively challenging political institutions. Capacity emerges as a useful lens through

which to explore local governments as political actors, their sustainable energy policy strengths and limitations, during a particular period of reasonably rapid energy system change.

2. Conceptualising Local Government Sustainable Energy Policy Capacity

Local government is an important part of the broader assemblages and networks involved in sustainable governance, but government policy capacity rarely receives particular attention (Rutherford & Jaglin 2015; Haarstad 2016; Ehnert et al 2018). We turn here to public policy scholarship that defines government capacity. This scholarship is increasingly concerned with processes of policymaking and implementation at a time of growing complexity, and also of the move away from government to governance (John 2001; Wu et al 2015; Copus et al 2017). Government actors rely on a range of resources and skills, increasingly located outside state agencies, to perform policy functions (Wu et al 2015), whilst reliance on non-governmental actors has raised questions about government having sufficient control over policy processes such that public policy outcomes can be reached (Rhodes 1997; Copus et al 2017). We define government capacity, in relation to these debates, as having the ability to take political decisions in pursuit of agreed public policy goals, which may imply a greater or lesser reliance on non-government actors. Capacity is, essentially, about having access to, and using, the various resources and skills available, whilst recognising that they may change over time.

We want, however, to define in more detail what capacity local governments have to perform particular policy functions. Understanding *local* government capacity adds an extra layer of complexity in that some decisions relating to their ability to perform policy functions will have been taken elsewhere (John 2001; Copus et al 2017). At the same time, we view *sustainable energy* as a reasonably specific policy area, not least in that it is relatively new and infers a desire to change material aspects of energy systems (Kuzemko 2019). Through a reading of local government, city climate change, and urban transitions literatures we identify, see Table 1, and then explore six inter-related types of capacity that *local* governments can have in relation to *sustainable energy* specifically.

Insert Table 1 here

The first category, *responsibility*, refers to the duty of local governments to implement policies and/or deliver services in defined areas, the parameters of which have often been decided by a higher tier of government, often through national constitutions (John 2001; Copus et al 2017). Statutory duties allocate both responsibility and some degree of administrative authority, in specific policy areas, which then legitimates the allocation of local resources and skills to that area. Whilst in most countries local governments tend not to have energy policy responsibility (Rutherford & Coutard 2014; Cowell et al 2017), and only some, for example in Sweden and China, have specific climate mitigation responsibility this might infer limited local government capacity. Many do, however, have responsibility in policy areas, such as environment, transport, waste management, buildings, planning and air quality, that are relevant to pursuing sustainable energy transitions (OECD 2016).

It is important to distinguish between administrative responsibility and *political authority*, the second category. This is defined as having sufficient capacity to make discretionary policy choices that explicitly align to *local*, rather than national, political mandates (Copus et al 2017). Having political authority, similar to notions of autonomy (Bulkeley et al 2016), could infer that a local government can take discretionary policy decisions even in the absence of any defined energy or climate responsibilities. In situations where there are weak political commitments to sustainability in higher tiers of government, for instance in the USA currently, local government political authority can allow continued pursuit of sustainable energy transitions. Local polity authority is not enough on its own, however, as others have noted that local governments with significant autonomy can still be constrained, for example through reliance on unpredictable revenue streams (Eckersley 2018: 141).

This reminds us that sustainable energy capacity can also be closely tied to *finance*, the third category defined here. This category includes access to capital, via public or private channels, the ability to raise taxes locally, but also having land and property resources. Much emphasis has already been placed on limitations in local government finances, partly due to reliance on central government funding flows (OECD 2016: 42), in relation to the scale of climate mitigation response needed (Bulkeley & Kern 2006; Beveridge et al 2016; Davies & Blanco 2017). It is also worth remembering, however, that some sustainable energy policies result in positive financial outcomes, for example as a result of lower buildings maintenance costs or through revenues from municipal energy investments (Dowling et al 2014).

Another oft cited constraint upon local government capacity is a lack of *personnel* dedicated to analysis and decision-making in sustainable energy (Martins and Ferriera 2011; de Oliveira 2009; Bulkeley 2010). This can relate to difficulties of assigning staff in the absence of defined sustainable energy responsibility, or to a wider lack of finance capacity. We see personnel capacity as not just to do with quantity, however, as personnel qualities make a significant difference. For example, sustained individual leadership has been identified as being fundamentally important to opening up local spaces for policy action (Bulkeley 2010: 234). Others note, however, that local government leaders and managers who see their jobs as implementing responsibilities, decided elsewhere, can tend towards passivity and lack of agency (Ahmad & Broussine 2008).

At the same time, personnel assigned with analysing, designing and implementing sustainable energy policies need to have, or have access to, specialist *knowledge* and energy literacy (Bulkeley 2010; Brown et al 2015; Beveridge et al 2016). This ties in with public policy notions that knowledge capacity is a core element of policy capacity (Wu et al 2015). Some claim that it is at the local scale that much new sustainable energy knowledge, in the form of learning and innovation, is starting to emerge (Goldthau 2014), which is significant given that sustainable energy, as a developing policy area, is so reliant upon accumulated learning (Meadowcroft 2011). Intermediaries, such as transnational networks and/or local universities, are often important in enabling local government knowledge capacity (Moss et al 2011; Hodson & Marvin 2013).

The last category, *energy materialities*, is an important addition to how we might think about capacity not least given claims that policy and material systems, the social and the technical, shape one another (Cox 1987; Bridge et al 2013). It also builds on observations that different local, material characteristics will suggest variety in local sustainable energy transitions (Haarstad 2016; Dowling et al 2018; Roelich et al 2018). Energy materialities might include historical legacies, such as local energy infrastructures, or proximity to geographically fixed resources, such as tidal or geothermal energy, that give some local governments the option to offer municipal services based upon those material energy assets. By allowing us to be more specific about energy materialities it provides us with a more nuanced view of capacity, whilst doing so allows us to consider that new forms of decentralised energy can make a difference to the capacity of local governments to pursue sustainable energy policies (Brisbois 2019; Kuzemko 2019).

3. Understanding Policy Capacity: Context, Contingency & Change

Local governments are seen here as having their own complex internal politics, as well as being interrelated, politically, economically and culturally, with other organisations at a range of different scales (Hodson & Marvin 2010; McKinnon 2011; Rutherford & Coutard 2014; Bulkeley et al 2016). It follows that local sustainable energy policy capacity does not exist apart from contextual factors but is, instead, contingent and context sensitive (Rutherford & Coutard 2014). This is one of the core observations that has motivated approaches that focus on the multiple, co-existent, overlapping sites involved in local sustainability governance (Bulkeley & Betsill 2005 and 2013). In this section we build up understandings of local government capacity by exploring these inter-relationships in more detail, with an added emphasis on how energy and climate policy, at different scales, and material aspects of energy systems, might shape capacity.

3.1 National and Global Institutions

We understand institutions in broad terms here to refer to formal and informal sets of established ideas, rules, practices and norms (Hall 1993). Scholarship on national level sustainable energy politics has observed that global neoliberal institutions have reduced government political capacity in energy, whilst boosting the powers of large-scale market actors (Kuzemko 2016; Johnstone & Newell 2018). Local governments have often, although not exclusively, been portrayed as active and/or passive ‘takers’ of neoliberal norms (Brenner & Theodore 2002; Jessop 2002), whilst gas and electricity market liberalisation is seen as having contributed to the de-municipalisation of energy and centralisation of energy systems (Moss et al 2015; Webb et al 2016). These institutions have together engendered conditions under which local governments are seen more as ‘enablers’ of local sustainable energy transitions, with heavy reliance on corporations and other actors to increase their capacity to act (Britton 2018; Eckersley 2018). This, in turn, has implications for the nature of local sustainable policy, and who benefits, if the emphasis on public policy goals is diluted (Copus et al 2017).

At the same time, it has been convincingly argued that the *nature* of national political institutions, centralised or federal for example, has considerable bearing on how local sustainable energy transitions are governed (Bulkeley & Kern 2006; Beveridge & Kern 2016; Ehnert et al 2018). Devolution, an overall trend globally (Brown et al 2015), suggests ongoing attempts to increase local government capacity through processes of decentralisation. These, highly varied, processes sometimes allocate new responsibilities to local government but without necessarily assigning greater financial capacity (Copus et al 2017). Interestingly, the OECD have observed a general trend of mismatches between responsibilities and access to revenues at the subnational government level (2016: 21). Local governments tend to need to secure any devolution deal from the centre, and this process can also be shaped by national institutions, unequal power relations, and the ability of local governments to negotiate (MacKinnon 2015; Bailey & Wood 2017). For example, the ongoing process of English devolution has mixed implications for local government capacity. Deals have been varied, but most have devolved powers in housing, transport, planning and policing, with only four attempting to devolve sustainable energy responsibilities (London, Cornwall, Manchester and West Midlands Combined Authority). Some public policy scholarship has been critical of the extent to which English devolution represents any real decentralisation of political authority (Ayres, Flinders and Sandford, 2018).

Although there is great merit in understanding local government, and capacity, in relation to national and global institutions, we find these approaches somewhat static, and too ‘top down’. We draw on the politics of scale, MacKinnon (2011: 22-23), in order to leave room for a more fluid and bi-directional understanding of the relationship between local and national and/or global institutions. This acknowledges that the shape and nature of inter-relations is open to change as a result of new rules, ideas and/or learning over time and of local political activity, sometimes in direct contestation of global or national institutions (Beveridge & Naumann 2014; Kuzemko 2019). What becomes important to consider is “...how individual scales inter-relate with each other and are constituted by each other” over time (Brown et al 2015: 16). Thinking about global-national-local inter-relations as fluid should also allow us to take better account of the significance of recent claims about political re-scaling for local government capacity (Moss et al 2011). For example, energy (re-)municipalisations and investments in renewable energy generation, when they result in new public revenue streams, can contribute towards local government financial capacity. In that specific innovation and learning around providing new energy services emerges within local government, and wider governance networks, it can contribute to knowledge capacity building which, if shared, can also inform national government.

3.2 Local Institutions

We take local governments to be sites of internal political struggle over time, whilst struggles are informed by different sets of place specificities and local characteristics (Rutherford & Jaglin 2015;

Roelich *et al.*, 2018). Political capacity, as having the ability to make discretionary decisions that benefit the locality, goes hand-in-hand with being able to build up and maintain local political support for sustainable energy. Indeed, local political buy-in to sustainability, the perceived relevance of energy to local residents and businesses, and the quality of local sustainability knowledge networks (Blanchet 2015), can all have considerable bearing on whether local governments can pursue sustainable energy. Support can be closely related to local, practical demonstrations of innovations (Goldthau 2014), and the articulation of the *local benefits* of sustainable energy policies (Roelich et al 2018). Local benefits include co-benefits for other policy areas, such as energy efficiency and links to improved health and/or poverty reduction (Webb 2015), and these need to be articulated clearly.

Internal politics and relations between local government departments have significant influence over whether sustainable energy projects, once identified as needed, actually proceed. For example, new projects require financial approval and here inter-relations between sustainability teams and finance departments are crucial and sometimes difficult, especially under conditions of austerity. Questions about knowledge capacity come into play if finance teams have little or no relevant understanding, or experience, of sustainable energy projects and their particular risk/reward profiles. These types of capacity can build over time if and when finance teams become more regularly exposed to, and familiar with, sustainable energy projects, and if local governments manage to embed such experiences in institutional memory.

Another important contextual factor influencing local government capacity is the presence, and just as importantly type, of energy organisations within the locality. In particular, distribution network operators (DNOs), and how ready they are to accommodate innovation and sustainable energy projects. Their ability to connect up new generation, and the price at which agree to do so, will have considerable bearing on local government capacity to make money from renewable energy generation. The view that local governments cede a degree of political control through reliance on third parties, to the extent that social objectives can be marginalised (Copus et al 2017), may be relevant here. However, it is important to distinguish between types of third parties, as networked relations with local organisations focused on similar social goals, for example sustainable learning and innovation, can be seen as an essential part of building local government personnel and knowledge capacity.

3.3 International and National Energy & Climate Change Policy

Beyond a consideration of national rules and norms, this section highlights national, and international, energy and climate change policies as having had a range of important implications for local sustainable policy capacity. This has partly to do with the nature of sustainable energy as a policy area. It is emerging, technical, and much learning needs still to take place, whilst high degrees of change and uncertainty must be faced. Pursuing sustainable energy policy, at any scale, is not just about making decisions and implementing them, but also about driving profound changes in how energy is produced and used in material and socio-economic terms (Roelich et al 2018; Goodspeed 2015). This means that new ideas, innovation and learning, in technologies, business models and policy, are central to the progression of sustainable energy policy, and this places a premium on knowledge capacity. For those local governments that have developed these kinds of knowledge bases this can infer an ability to inform wider change through national and/or transnational interactions (Kuzemko 2019).

It is worth highlighting that the nature of national energy policy, and degree to which it (explicitly or implicitly) supports local government efforts, can shape local government capacity. Just as national political systems infer different degrees of local political authority, and different sets of responsibilities, so too can national energy policy enable and constrain local capacity in different ways. Arguably, an absence of sustainable energy policies and/or climate change mitigation goals at the national level will tend to place limits on domestic actors seeking to pursue sustainability. If sustainable energy has become established as a policy area, however, this does not always mean that the kinds of policies and regulations that explicitly support local governments will be in place. Sustainable energy policy will have set in motion different conditions under which local governments,

and a range of other actors, can make sustainable decisions, and that frame what is more and less possible (Kuzemko et al 2016; OECD 2016). Many national, and EU, policy documents set out a role for local government, but not all follow this through with policies and regulations that support local capacity or give them a voice in central policymaking processes. For example, some German and Danish national policies have explicitly supported the ability of smaller and medium sized actors, such as local governments, to engage in local sustainable energy policies whilst others, such as the UK, relatively favour centralised systems and large-scale system actors (Kuzemko et al 2016).

3.4 Material Aspects of Energy Systems

This section expands upon the notion that the social and material are inter-related in a variety of ways by arguing that material aspects of energy systems shape local government capacity, and vice versa. Energy materiality is sometimes referred to as a constraint upon social actions (Balmaceda et al 2019). For example, scholarship on the politics of energy transitions suggests that large scale energy systems have conditioned and/or limited political choices regarding sustainable energy (Goldthau 2014; Haarstad 2016; Cowell 2017; Johnstone & Newell 2017; Dowling et al 2018), with clear implications for smaller, sustainability actors seeking to swim against this tide. Roelich et al (2018: 731) note a preference for some local governments to build on existing energy infrastructures when pursuing sustainable strategies, inferring that pre-existing material capacity can define local government energy choices.

Whilst these material path dependencies form an integral part of understanding local government sustainable energy capacity, we also need to consider that the “present location of any (energy) activity is not natural but the outcome of past political struggle and has to be continually reasserted” (Brown et al 2015: 16). The two-way relationship between policy and material systems is important to consider here, including the notion that each influences and remakes the other over time (Cox 1987; Bridge et al 2013; Kuzemko 2019). For example, a range of policy decisions resulted in the centralisation of energy systems in OECD countries in the second half of the last century, whilst we are familiar with the argument that centralised energy systems have shaped later policy. More recently sustainable energy policies have contributed to the growth in renewable electricity generation (REN21, 2018), whilst some argue that rapid growth in renewable energy technologies then made the Paris Agreement, and associated policies, possible (Schmidt & Sewerin 2018).

Within the context of this two-way inter-relationship we can consider the implications of technical changes for local government material capacity, and the policy choices that can now be made. Decentralised renewables have already altered *who* can generate electricity and at *what scale* (Brisbois 2019; Kuzemko 2019). This has been visible in changing patterns of ownership of generation assets to include more municipal, community and individual actors (Becker et al 2016). Other socio-technical advancements, such as in storage, information and communication technology (ICT), and new business models, are understood to further underpin a broader range of opportunities for local governments to become sustainable energy actors (Hall & Roelich 2016).

4.0 Local Government and Sustainable Energy in England

In this section we apply our framework to a study of eight local authorities in England: Bristol City Council, Sheffield City Council, Birmingham City Council, Nottingham City Council, Swindon City Council, Cornwall Council, the Greater London Authority (GLA), and the West Midlands Combined Authority (WMCA). Comparative studies suggest that United Kingdom (UK) local governments have relatively limited capacity in climate change (Bulkeley & Kern 2006; Eckersley 2017), and sustainable energy transitions (Beveridge & Kern 2016; Ehnert et al 2018). This aligns with OECD statistics which show that UK local government revenues, as a percentage of general government revenues, sit below the global average, and well below the average for upper-and-middle income countries (OECD 2019). The most comprehensive review of the involvement of UK local authorities in sustainable energy suggests that:

... local authorities have very limited capacity for strategic energy management, in line with their limited statutory powers or duties, and limited budgets for energy provision or services (Tingey et al 2017: 16)

We have chosen English, as opposed to UK, local authorities for consistency in national political institutions and as there are some slightly different sets of institutions and policies that influence local sustainable energy in Scotland and Northern Ireland, and to a much lesser extent Wales. Our unit of analysis is the local, or combined, authority itself, and we concentrate on authorities considered either to be leaders or up-and-coming in the field of sustainable energy. These were identified through analysis of central government, local government association and industry literatures relating to local energy transitions, with authorities regularly identified as particularly active in sustainable energy selected. This reflects our interest in local government capacity to pursue sustainable energy policies. The case studies represent a geographically and demographically diverse set, incorporating five urban authorities, one rural authority (Cornwall) and two mixed areas (Swindon, West Midlands). We do not aim to suggest that this selection of eight is representative of local authority administrative types in England, indeed the selection does not contain any non-unitary district authorities, however they represent a diverse selection of authorities active in sustainable energy. In our framework, the selection of eight cases with the same national jurisdiction aids analysis of the interaction between capacity types and contexts.

There is little primary literature on English local government sustainable energy. We draw here mainly on secondary literature: think tank consultation documents, NGO reports, and the most comprehensive survey of UK local authorities and their involvement in energy that is available (Tingey et al 2017). Mainly, however, we rely on sixty-six in-depth, semi-structured interviews which took place – in person or over the phone - between 2015 and 2018 with local authority officers, councillors, advisors and municipal company staff.¹ Interviews are a widely used method to access elite practitioner discourses and explore tricky issues of power and politics (Burnham *et al.*, 2008). Our focus on interviews is also an attempt to give some voice to, often beleaguered, local government sustainability practitioners (Rutherford & Courtard 2014). *Semi-structured* interviews in particular can be effective in exploring complex phenomenon, and emerging, fast-moving areas of policy such as sustainable energy (Flick et al 2004; Denscombe 2010). The interviews were conducted in the course of two separate research projects however both projects focussed on exploring the drivers, challenges, barriers and dynamics of local authority sustainable energy activity.

In terms of analysis, following the development of our conceptual framework the interview transcripts were analysed in relation to the identified six types of capacity and the four categories of contextual factors. Our insights are also subsequently underpinned by two workshops and one conference organised by the authors between September 2018 and February 2019 and attended by a total of approximately 120 local government officers and other organisations working in the field of local sustainable energy. Detailed discussion notes were compiled for each of these events and reviewed against the conceptual framework outlined in sections 2 and 3.

In the following four subsections (4.1 – 4.4) we apply our conceptual framework to the eight cases and illustrate how policy capacity and contextual factors are interlinked in complex, recursive ways.

4.1 Local Government Capacity: Global and National Institutions

One dominant explanation for limited local government capacity in the UK has been the high degree of influence of neoliberal ideas over policy and political structures (Bulkeley & Kern 2006; Webb et al 2016), and examples abound. The department of Business, Energy and Industrial Strategy's (BEIS) approach to local energy is governed by globally relevant norms which prioritise economic rationality, reducing investment costs and attracting commercial finance, making it more difficult to pursue

¹ See Appendix 1 for a numbered interview list.

projects with priorities such as sustainability goals, some of which may be difficult to value (Interviews 52, 62, 66; see also Hall and Roelich, 2016). Local authorities have been encouraged to compete with one another for limited resources and/or to act entrepreneurially (Webb et al 2016). Strong traditions of competition for private capital and economic rationality have become increasingly embedded in some local policy discourses, and this acts to constrain the space for alternative, sustainable narratives to flourish (Interview 65).

Limited local policy capacity is also often explained in relation to the particularly centralised nature of national political institutions (Wilson and Game, 2011; Bulkeley & Kern, 2006; Le Gales & Scott 2010; Ehnert et al 2018; Eckersley 2018). Indeed, until 2011, English local authorities could *only* undertake functions expressly permitted in statute. In relation to climate change and sustainable energy more specifically, local authorities have very few responsibilities (Tingey et al 2017). They do have duties to improve energy efficiency in their own estates and there has been some, related, tendency to focus sustainability efforts here (Interviews 36 and 37). Under fiscal austerity, since 2010, there have been severe budget cuts for English local authorities, and this has led some to scale back sustainability teams (Interviews 1, 3, 9, 13, 40, 42, 44). Interviewees in all eight case studies confirmed that the lack of formal sustainable energy, or climate change, responsibilities has meant that it has been more vulnerable as a policy area to financial cutbacks. This would tend to confirm links between being able to mobilise financial capacity and the policy licence that formal responsibilities confer.

It is worth highlighting, however, some variation in local authority responses to austerity (Interviews 13, 14, 25 and 36; see also Lowndes & Gardner 2016). Although many have cut back on non-essentials, others have interpreted austerity as a strong signal to start securing *local* financial assets in order to increase financial autonomy from central government (Interviews 28, 36, 37, 39). Sustainable energy projects, such as municipal energy, have been pursued partly for these reasons (Interviews 28, 39). In these instances, any sustainable energy profits made tend to go into maintaining capacity to provide public services in areas of formal responsibility, such as social care. A consultant working with several of the case study authorities summed this up as a “much more commercially focussed approach” to energy projects within local authorities. They suggested that the most active authorities were developing considerable knowledge capacity in business plan development “to deliver something which is going to generate some revenue” (Interview 52).

Indeed, as a response to lower revenues from national government, some authorities have built up specific personnel and knowledge capacity to enable them to diversify revenue sources (Interview 2, 3, 18, 19, 30, 39, 52). Over the past decade or so the amount of, particularly public, funding earmarked for sustainability has grown but sources have been quite varied, including European Reconstruction and Development Funds, EU Horizon 2020, sustainable crowd funding, and UK Industrial Strategy innovation funds. Many interviewees had been involved in writing, often successful, bids for EU funding and have, in this way, built up useful knowledge and networked relations over time (Interviews 13, 15, 18, 36, 62, 66).

Ongoing processes of English Devolution, as already mentioned, to some small degree represents a shift in local-national relations. However, a range of interviewees also emphasised the veto power of central government in negotiating deals and the number of compromises made by individual local authorities in order to secure deals (Interviews 1, 9, 13, 14, 25). Nevertheless, in the realm of sustainable energy some described devolution, and specifically the relaxation of borrowing rules, as “unleashing them [local authorities] a little bit” (Interview 52), and creating much needed new channels of two-way energy policy communication with central government departments (Interviews 13, 14, 25, 40). The ongoing nature of devolution deals was also seen as providing scope for improving local knowledge about how to make the next round of deals more advantageous to localities (Interviews 13 and 40).

When considering local-national inter-relations in a more contested and fluid sense, it is also notable that increasing numbers of local governments are willing to act outside the boundaries of national institutions. For example, in the absence of specific energy or climate responsibilities, all

those that have already taken the decision to pursue sustainable energy policies can be seen as showing quite well-developed political authority in this emerging policy area. Some have taken this further: all local authorities in the UK100 network have renewable energy targets that explicitly exceed those of national government, and authorities such as Bristol are aiming to be carbon neutral by 2030.² Additionally, Bristol and Nottingham have both established municipally owned energy supply companies that provide not just local but nation-wide energy services, with several other authorities now exploring the potential for similar undertakings. Together these infer some reshaping of local-centre energy relations to the extent that more sustainable energy decisions are being made in some English local authorities – a theme to which we return in the following subsections. Furthermore, municipal energy companies infer some contestation, and reversal, of national and global energy privatisation norms.

4.2 Local Government Capacity: Local Institutions

Given that local governments are democratically elected bodies the growth in discretionary sustainable energy decisions tends to emphasise the importance of local politics to maintaining policy capacity in this area over time. In a centralised political system, and in the absence of formal responsibilities, persistent local leadership and action to initiate internal debate about the need to act sustainably has been vital to establishing sustainable policy capacity across our cases (Interviews 1, 3, 9, 28, 61, 66; see also Bulkeley 2010). For some local authorities such debates were further underpinned by local ideas about the positive role of local government in sustainable transitions (Interviews 36, 39). For example, Swindon’s new sustainable energy consultancy company emphasises the importance of *public* power solutions (PPS 2018). Similarly, Bristol and Nottingham municipal companies focus on their role in delivering on public “social good” objectives, also by characterising the incumbent energy system as ‘broken and unfair to loyal customers’ (Bristol Energy 2017).

Our research confirmed the importance of being able to firstly understand, and then communicate, the local costs and benefits of sustainability. Those local authorities that acted early tended to be able to build-up more detailed knowledge capacity (Interviews 13, 36, 37, 56, 65), as well as demonstrate local implications of each sustainable energy policy (Interviews 50, 66). For example, Sheffield and Birmingham were able to re-evaluate their approach to heat networks due to: established evidence of the success of such ambitious, risky projects; and, conversely, growing awareness that commercially led governance models limit opportunities to address fuel poverty goals or to allow for future network growth (Interviews 52, 65, 66; see also (Bale et al 2014). Similarly, the long history of engagement in energy projects in Bristol, often through European funding programmes, allowed the development of a knowledgeable energy services team with strong links to other departments (Interview 59, 62). All of the cases confirmed the importance of positioning local sustainable energy activity in relation to other local priorities such as local economic growth or fuel poverty reduction, and highlighted importance of established personnel and knowledge capacity in order to successfully embed sustainable energy into wider local authority priorities (Interviews 13, 14, 15, 36, 40, 44). Indeed, several emphasised the unique role of local authorities in integrating multiple priorities, with one Interviewee suggesting that “councils have to really take a leadership role because they’re the only organisations that really have got that wider view whether that’s regeneration, economic development, fuel poverty” (Interview 62). Additionally, much policy learning is taking place at the local level about the co-benefits of sustainability, for example about the positive links between energy efficiency policy and improved health (Interviews 15, 16, 28, 36).

Our research also underpins the importance of working relationships between energy teams and finance departments. Many Interviewees noted that a lack of knowledge about sustainable energy business models in finance teams meant that projects were automatically flagged as ‘risky’, limiting

² UK100 is a network of over 90 UK local government leaders committed to shifting to 100% clean energy by 2050. For information see here: <https://www.uk100.org/>

their ability to proceed (Interviews 13, 14, 28, 33, 34, 36, 38). There were references to occasions when finance teams were approached with sustainable energy projects, designed to provide a steady income stream, only to be told that energy is simply not something that local authorities do (Interviews 33, 49, 50, 52). This view was underpinned by the fact that energy, sustainable or otherwise, was not a core responsibility and by limited knowledge capacity. However, experience is also important, as once finance staff became more familiar with energy, and once sustainable energy projects were seen to be contributing financially (either through income or cost savings) the perceived risk profile started to drop (Interviews 13, 36, 44). This ‘momentum’ in sustainable energy projects, as energy knowledge capacity became more embedded internally, was seen particularly in Nottingham, Bristol, and the West Midlands.

These relationships between knowledge capacity and having sufficient authority to take local sustainable decisions is a new observation and worth further exploration, in particular as sustainable energy policy is relatively new and learning is of particular importance. Working with third parties, to the extent that it boosts local government personnel and knowledge capacity, can be seen as a contribution to political authority, rather than merely as a symptom of neoliberal conditions where local governments are forced to rely upon others. For example, in some instances ongoing work with universities has lent extra knowledge capacity, often at little or no financial cost to the local authority (Interviews 6, 12, 13, 14, 15, 40, 44), and without the need to downplay public policy goals. Such networked modes of working may also support local authorities to be more experimental in their approach to sustainable energy. Whilst there has been much conceptual attention paid to the role of cities as sites of experimentation or ‘living labs’ (Bulkeley and Castán Broto, 2013; Hodson, Evans and Schliwa, 2018), the ability to develop, test and learn from sustainable energy innovations is often reliant on input from organisations outside of the local authority.

Lastly, in some local authorities emerging knowledge capacity, about how to design and implement new sustainable, and sometimes also municipal, business models are being shared with other local authorities via new council owned consultancy businesses (Interviews 28, 29, 36, 39). Take, for example, the work of Swindon Council owned ‘Public Power Solutions’, whose aim is to provide services that will boost local public provision of energy services in the UK (PPS 2018). Their argument is that knowledge capacity developed by more experienced local authorities can be communicated (for a fee) to support wider policy and material change beyond the boundaries of individual local authorities.

4.3 Local Government Capacity: National Climate & Energy Policy

Although international climate policy has had, often indirect, implications for local government sustainable energy capacity the focus here is on the more direct relationship with national climate and energy policy. As might be surmised from the lack of set local responsibilities, energy policy in the UK tends not to support specific roles for local actors. There is a strong discourse recognising the role of local authorities in decarbonisation and clean growth in national policy documents (Committee on Climate Change 2010; DECC 2011; HM Government 2017). However, there are few national policies designed to enable greater local action and national energy policy choices have tended to support large-scale, low carbon solutions, such as offshore wind or nuclear power (Kuzemko et al 2016).

There is a local energy team within BEIS, to cover community and local government, but the team is very small. Two-way policy dialogue between BEIS and local authorities has been limited (Interviews 13, 14, 17, 30, 33, 44), and institutional structures do not currently exist to engage local government in sustainable energy policy development (Interviews 59, 62, 63). To some degree this gap has been recognised. In 2017 BEIS set up a network of five regional ‘Energy Hubs’ to boost local personnel and knowledge capacity through making government funded, sustainable energy personnel available to advise and assist local authority energy officers (Allcorn 2018). Each hub is organised by a ‘lead’ local authority, Nottingham being one of them, inferring a sharing of knowledge between local authorities. The Energy Hubs are, however, very limited in scope: they are funded for two years only,

and each hub is relatively small in relation to the numbers of local authorities it needs to support. Furthermore, this approach tends to support the view that local authorities need to be reliant on decisions taken at the centre in order to have capacity to act, tending to ignore possibilities for local political authority.

To an extent this might explain why national sustainable energy policies have tended to have such complex outcomes, in that they hinder as well as support local sustainable energy policy capacity. Indeed, examples of both effects abound. Programmes, such as the Community Energy Programme, Low Carbon Infrastructure Fund and the Heat Network Delivery Unit, have provided financial incentives for local authorities to develop heat networks over the last fifteen years. These national heat policies have promoted local authorities as important enablers of new heat networks, but have also tended to marginalise them as municipal heat providers (Interviews 52, 57; see also Britton, 2018). Likewise, renewable energy support and subsidy policies, such as the electricity Feed-in-Tariff (FiT) (2009-2019), enabled a great many local authorities to invest in renewable energy generation (Interviews 5, 13, 14, 22, 26; see also Tingey et al 2017). However, regular changes in renewable policy have also negatively affected financial and knowledge capacity (Interviews 13, 14, 42, 44, 48). As one energy officer put it “(w)e just want some clarity about what this government wants going forward and not chopping and changing and cutting this, then that” (Interview 50).

One particularly high-profile example of negative implications of policy change is the demise of the ‘Energy Savers’ partnership between Birmingham City Council and Carillion. This was wound up in 2015 after the Government unexpectedly cancelled the Green Deal loans scheme that underpinned the programme (Localise West Midlands, 2014). Similarly, one interviewee characterised government sustainable energy policy as “non-comital, short-term or non-existent” (Interview 54), whilst others suggested that this resulted in difficulty in taking a strategic approach to area-wide decarbonisation (Interviews 62, 52).

Interestingly, on those occasions when national sustainable energy policies have supported local government sustainable energy capacity even when policies change, or come to an end, some of this capacity remains in place (Interviews: 13, 14, 19, 33, 44). Whilst some local authorities wait to see what opportunities the next national policies will have to offer them, others have put new knowledge and personnel capacity to the task of finding and pursuing sustainable energy projects that are more aligned with local financial and social benefits (Interviews: 14, 19, 30, 46). For example, the approach in the West Midlands of identifying Energy Innovation Zones has helped to situate action on energy system decarbonisation as central to economic growth. This latter approach tends more towards developing greater local political authority and discretion, and suggests a less passive stance.

4.4 Local Government Capacity: Material Aspects of Energy Systems

Up until very recently the UK has had a highly centralised energy system, dominated by large companies, and this has provided barriers to entry for a whole range of medium and small-scale actors, including local authorities (Ofgem 2015; Hall and Roelich 2016; Britton et al 2019). Local authorities have simply not been in a strong position to influence policy agendas, or to compete in privatised national markets dominated by large scale incumbents (see also Tingey et al 2017).

It is, however, in the relationship between energy systems, how they are changing, and local government sustainable energy capacity that we see most dynamism, but also tension. In England, as elsewhere, the current momentum is towards more distributed, decentralised and flexible systems across electricity, heat and transport. This is most striking in electricity where the amount of generation connected at the distribution level already makes up 30% of total GB installed capacity (ONS 2018). At the same time costs of renewable electricity, in particular onshore wind and solar PV, and other important technologies, including storage, have been falling. Many interviewees suggested that this fast-changing technological landscape increases possibilities for accessing local material capacity (Interviews 14, 17, 30, 33, 40, 44, 46, 47, 48). Local authorities, such as Nottingham, Swindon, Bristol, Cornwall, and the GLA, are now pursuing significant growth in ownership of renewable generation

(PPS 2019; Intelligent Energy Europe 2018). Specifically, it is recognised that falling technology costs coupled with the more accessible scale of distributed energy allow local authorities to make a business case for municipal energy, despite the demise of national FiT policy (Interviews 33, 39, 42, 48).

These changes, plus increasing recognition that locally based, whole system approaches to decarbonisation will be necessary, together feed into a policy context that is becoming more focussed on the local scale (Energy Systems Catapult 2018; Britton et al 2019). Technological change underpins the ability of local authorities to: balance intermittent renewable supply with local demand flexibility locally; make use of local energy generation, sometimes through private wires; and play a key role in the delivery of EV charging systems (Interviews 33, 39, 41). Indeed, it is predicted that the combination of car park ownership, the need for greater EV charging and system flexibility, and battery storage capabilities of parked vehicles will open up new revenue streams for local authorities (Interviews 36, 37, 40, 41). Although often capital intensive, such sustainable energy projects can offer long-term revenues, as well as other local co-benefits such as retaining energy spend locally, and jobs and skills development. Such positive local benefits can, in turn, be used to further support discretionary decisions taken to pursue sustainable energy.

Our analysis also supports the argument that energy materialities influence which types of sustainable project are developed (Interviews 13, 14, 17, 33, 36). For example, Cornwall County Council has more significant wind and solar power resources than many other English areas, as well as potential for geothermal and wave power. The extent and diversity of this material capacity has provided Cornwall, despite limited financial capacity, with an incentive to invest in renewable generation directly and to seek to incorporate sustainable energy into wider local economic planning (Cornwall Council 2016). Furthermore, lack of capacity on the local distribution network has further incentivised a greater emphasis on developing local energy independence from national systems (ibid).

Lastly, we consider the relationship between local energy infrastructures and local capacity. In Nottingham the district heating scheme was originally managed by British Coal but has been managed by Enviroenergy, a wholly owned subsidiary of Nottingham City Council, since 1995. The close relationship between Enviroenergy and the City Council has led to a significant build-up of personnel and knowledge capacity in managing energy infrastructure, in both organisations, over the last few decades (Interviews: 28, 35, 50). However, embedded energy materialities can limit institutional innovation and policy choices. For example, both Birmingham and Sheffield, who also have relatively long histories of involvement in heat networks, found that recent reviews of options for the delivery of future networks were somewhat constrained by existing models (Interviews 51, 58, 60, 65, 66). In comparison, Bristol has less established heat networks and this lack of precedent, and particular ambitions relation to climate leadership, appears to have enabled the city to have a more open debate about their involvement in local energy infrastructures.

Taken together material energy system changes infer quite considerable new opportunity for local authorities. Technological change has boosted local financial capacity to invest in energy, whilst doing so, in turn, has feed into greater local knowledge capacity. This has, in some cases, also be communicated to other local authorities, and city governance networks, inferring a broader contribution to sustainable change. They do not, necessarily alter other material and political capacity limiting factors, such as national policy uncertainty and limited access to distribution networks, but they do represent some possibility to act more independently of those constraints.

5.0 Discussion & Conclusions

Whilst all our cases relate to the English context, our conceptual framework has broader relevance. Capacity has, indeed, been a lens through which various aspects of local government sustainable energy have become more visible. We departed from approaches that frame local government as just one constrained actor in complex local sustainable energy governance networks by tightening the focus on government. By doing so we are able to evidence the development of more local government sustainable energy capacity, despite difficult national political conditions, inferring an ability to

maintain more control over the delivery of vital sustainable public policy goals. Indeed, that English local authorities have been able to build sustainable energy capacity at a time of austerity, given that overall funding for local authorities has been cut by 49.1% in real terms from 2010-11 to 2017-18 (Communities and Local Government 2019), infers that changes in other contextual factors were indeed important.

In order to deepen our understanding of how context and local government capacity inter-relate the cases explored here demonstrate a complex, multi-scalar web of, often dynamic, interactions. Changes in national political institutions, such as English devolution, were found to support the embedding of energy knowledge in leading local authorities as well as some increases in local political authority. To a great extent local sustainable energy policy, as pursued by these local authorities, has been discretionary and against the tide of national institutions, for example the notion of public ownership of energy contests the very English institution of privatisation in energy. In turn, through emphasising local political authority, we have made more visible important links between policy decisions aimed at local benefit and the ability to maintain discretionary policy over time. Refocusing on local institutions as a contextually significant factor has also allowed for a more detailed understanding of why some local governments have been able to interpret and experience issues, such as austerity and devolution, very differently in relation to sustainable energy.

By drawing out some of the inter-connections between energy policy and energy materialities, we were able to highlight the very real opportunities for local government that are being presented by material changes in energy systems, both in terms of building and mobilising capacity. This supports arguments that political space for sustainable action is opening up at sub-national scales (McGuirk et al 2014; Gailing and Röhring 2016; Bulkeley et al 2016; Durrant et al 2018), and that political re-scaling in energy is increasingly associated with material re-scaling in energy systems (Brisbois 2019; Kuzemko 2019). This is also in line with those who argue that multi-scalar changes to energy infrastructures both require, and are likely to create, further contestations of scalar politics (Meegan *et al.* 2014; Eadson, 2015). In this regard interactions between political and material re-scaling are seen to be complex and recursive. In some respects, the shift to more decentralised renewable energy technologies are starting to provide a route to make visible, at the local authority scale, previously less visible aspects of the material organisation of centralised energy systems (Balmaceda *et al.*, 2019).

By applying a frame that also identifies *types* of local government sustainable energy capacity our research has tended to suggest, perhaps unsurprisingly, that local governments need to be able to draw on and develop multiple capacity types. This insight might be useful in exploring the capacity of other actors, and actor networks, involved in sustainable energy governance. Furthermore, although tendencies might be to emphasise the importance of financial capacity to local sustainable energy (Davies & Blanco 2017), our analysis suggests that knowledge capacity is indeed becoming increasingly important. Evidence that local governments have been able to build knowledge capacity through the process of pursuing more sustainable energy policies supports arguments about the importance of practice-based embedding of transition innovations (Ehnert et al 2018). In turn, we note that learning from local authorities is increasingly being shared with other local authorities, as well as with central government thereby potentially contributing to policymaking capacity at other scales, with the potential to lower the political cost of sustainable energy. Applying our framework in country contexts beyond England's relatively centralised, Westminster-based system could provide a useful avenue for further testing and refining our findings regarding inter-relationships between types of capacity and contextual factors.

We suggest two policy implications in relation to England, but that might also have wider application. Firstly, through its emphasis on knowledge capacity this study points to the importance of establishing more channels of communication, that explicitly flow bi-directionally, between local and national government, as well as between local authorities. At a time when we remain on a steep learning curve with regard to how to make energy sustainable, both in environmental and wider social terms, it is fundamental that new knowledge coming from local governments is widely shared, debated,

and tested. In addition, easy access to comprehensive information about sustainable business models, funding opportunities and how to access them would also provide smaller and less experienced local authorities with much needed building blocks, whilst lowering their barriers to entry. It has also become clear that embedding specialist staff and knowledge in local governments has the potential to drive longer-term capacity in other local areas, particularly finance, political authority and understanding of local energy materialities.

Secondly, we have a slightly more mixed view on UK debates about the implications of setting local governments formal responsibilities in sustainable energy (Webb et al 2017). This is a current area of debate in relation to Scottish local authorities and significant learning could be gained for the English (and wider) context from the detailed work taking place here (see Wade et al 2019 for an overview). On the one hand, in the absence of set sustainable energy responsibility and/or local political support for sustainability, many local governments simply do not have sufficient incentives to act. However, if new responsibilities were to be conferred this should not be done without boosting local financial capacity, and access to the kinds of information sharing systems we mention above. On the other hand, there is also potential for the more innovative local governments, who are establishing local sustainable energy strategies more attuned to their particular localities, to be hamstrung by responsibilities set at the national level that are designed to fit all.

Bibliography:

Ahmad, Y; Broussine, M. (2009) 'Pedagogic implications of anxiety and loss of agency in public services managers and leaders' *International Journal of Public Sector Management*, 21:4, 340-352.

Allcorn, P. (2018) *A View from BEIS*. Available at: http://www.apse.org.uk/apse/assets/File/Day%201%20-%20Session%201_2%20-%20Patrick%20Allcorn.pdf (Accessed 7 May 2019)

Ayres, S., Flinders, M.; Sandford, M. (2018) 'Territory, power and statecraft: understanding English devolution', *Regional Studies*, 52:6, 853-864.

Bailey, D.; Wood, M. (2017) 'The metagovernance of English devolution', *Local Government Studies* 43:6, 966-991.

Bale, C. *et al.* (2014) 'Valuation of passive provision for heat network investments', in Brown, A. and Robertson, M. (eds) *Economic evaluation of systems of infrastructure provision: concepts, approaches, methods*. iBuild Project, University of Leeds.

Balmaceda, M. *et al.* (2019) 'Energy materiality: A conceptual review of multi-disciplinary approaches', *Energy Research & Social Science*. doi: 10.1016/j.erss.2019.101220.

Becker, S.; Beveridge, R.; Gailing, L. (2016) 'Energy transitions and institutional change: between structure and agency', in L. Gailing and T. Moss (eds.) *Conceptualising Germany's Energy Transition*. London & New York: Palgrave Macmillan.

Beveridge, R.; Naumann, M. (2014) 'Global norms, local contestation: Privatisation and de/politicisation in Berlin', *Policy & Politics* 42:2, 275-291.

Beveridge, R. and Kern, K. (2014) *The Energiewende in Germany: Background, Developments and Future Challenges*.

Blanchet, T. (2015) 'Struggle over energy transition in Berlin: How do grassroots initiatives affect local energy policy-making', *Energy Policy*, 78, 246-254.

Brenner, N.; Theodore, N. (2002) 'Cities and the geographies of "Actually Existing Neoliberalism"', *Antipode* 34:3, 349-379.

Bridge, G.; Bouzarovski, S.; Bradshaw, M.; Eyre, N. (2013) 'Geographies of energy transition: Space, place and the low carbon economy', *Energy Policy* 53 (2013), 331-340.

Brisbois, M. (2019) 'Powershifts: a framework for assessing the growing impact of decentralized ownership of energy transitions on political decision-making', *Energy Research & Social Science* 50 (2019), 151-161.

Bristol Energy (2017) *Council Ownership*. Available at: <https://www.bristol-energy.co.uk/about-us/council-ownership> (Accessed April 2017).

Britton, J. *et al.* (2019) *Changing actor dynamics and emerging value propositions in the UK electricity retail market*. IGov report, Energy Policy Group, University of Exeter.

Britton, J. (2018) 'Localising energy: heat networks and municipal governance' in A. Goldthau; M. Keating and C. Kuzemko (eds.) *Handbook on the IPE of Energy and Natural Resources*. Cheltenham, UK: Edward Elgar.

Brown, E.; Cloke, J.; Harrison, J. (2015) 'Governance, decentralisation and energy: A critical review of the key issues', Working Paper 1, Project EP/L002469/1, April 2015.

- Bulkeley, H. and Betsill, M. (2005) 'Rethinking Sustainable Cities: Multilevel Governance and the "Urban" Politics of Climate Change', *Environmental Politics*, 14:1, 42–63.
- Bulkeley, H. and Castán Broto, V. (2013) 'Government by experiment? Global cities and the governing of climate change', *Transactions of the Institute of British Geographers*, 38:3, 361–375.
- Bulkeley, H. (2010) 'Cities and the governing of climate change', *Annual Review of Environmental Resources* 35:229-253.
- Bulkeley, H.; Luque-Ayala, A.; McFarlane, C.; MacLeod, G. (2016) 'Enhancing urban autonomy: Towards a new political project for cities', *Urban Studies* 55: 4, 702-719.
- Bulkeley, H.; Kern, K. (2006) 'Local government and the governing of climate change in Germany and the UK', *Urban Studies* 43:12, 2237-2259.
- Burnham, P.; Lutz, K. G.; Grant, W. (2008) *Research Methods in Politics*. Second Edi. Basingstoke, Hampshire: Palgrave Macmillan.
- Committee on Climate Change (2010) *The Fourth Carbon Budget Reducing emissions through the 2020s*. London, CCC.
- Communities and Local Government (2019) *Local Government Finance and the 2019 Spending Review*. London: Parliament. Available here: <https://publications.parliament.uk/pa/cm201719/cmselect/cmcomloc/2036/203605.htm>
- Copus, C., Roberts, M. and Wall, R. (2017) *Local government in England: centralisation, autonomy and control*. Basingstoke, Hampshire: Palgrave Macmillan.
- Cornwall Council (2016) *Cornwall Energy Storage Masterplan*. Truro: Cornwall Council.
- Cowell, R. (2017) 'Decentralising energy governance? Wales, devolution, and the politics of energy infrastructure decision-making', *Environment & Planning C* 35:7, 1242-1263.
- Cowell, R.; Ellis, G.; Sherry-Brennan, F.; Strachan, P.; Toke, D. (2017) 'Sub-national government and pathways to sustainable energy', *Environment & Planning C* 35:7, 1139-1155.
- Davies, J.; Blanco, I. (2017) 'Austerity urbanism: Patterns of neo-liberalism and resistance in six cities of Spain and the UK', *Environment & Planning A* 49:7, 1517-1536.
- DECC (2011) *The Carbon Plan: Delivering our low carbon future*. London: Crown Copyright.
- Denscombe, M. (2010) *The Good Research Guide: for small-scale social research projects*. Open University Press.
- de Oliveira, A. (2009) 'Implementation of climate change related policies at the subnational level: an analysis of three countries', *Habitat* 33, 253-259.
- DCLG (Department of Communities and Local Government) (2008) *Practical use of the Well-Being Power*. London: DCLG.
- Dowling, R.; McGuirk, P.; Maalsen, S. (2018) 'Multiscalar governance of urban energy transitions in Australia: The cases of Sydney and Melbourne', *Energy Research & Social Science* 44 (2018) 260-267.

- Dowling, R., McGuirk, P. and Bulkeley, H. (2014) 'Retrofitting cities: Local governance in Sydney, Australia', *Cities*, 38, 18–24.
- Durrant, R.; Barnes, J.; Kern, F.; Mackerron, G. (2018) 'The acceleration of transitions to urban sustainability: a case study of Brighton & Hove', *European Planning Studies*, DOI: 10.1080/09654313.2018.1489783
- Eadson, W. (2015) 'State enrolment and energy-carbon transitions: Syndromic experimentation and atomisation in England', *Environment and Planning C: Government and Policy*, 34:8, 1612–1631.
- Eckersley, P. (2018) 'Who shapes local climate policy? Unpicking governance arrangements in English and German cities', *Environmental Politics* 27:1, 139-160.
- Ehnert, F.; Kern, F.; Borgström, S.; Gorissen, L.; Maschmeyer, S.; Egermann, M. (2018) 'Urban sustainability transitions in a context of multi-level governance: A comparison of four European states', *Environmental Innovation and Societal Transitions* 26, 101-116.
- Emilianoff, C. (2014) 'Local energy transition and multilevel climate governance: The contrasted experiences of two pioneer cities (Hanover, Germany, and Växjö, Sweden)', *Urban Studies* 51:7, 1378-1393.
- Energy Systems Catapult (2018) *Local Area Energy Planning: Guidance for local authorities and energy providers*.
- Flick, U.; von Kardoff, E.; Stienke, I. (2004) *A companion to Qualitative Research*. London: Sage Publications.
- Fudge, S.; Peters, M.; Woodman, B. (2016) 'Local authorities as niche actors: the case of energy governance in the UK', *Environmental Innovations and Societal Transitions* 18 (2016), 1-17.
- Gailing, L. and Röhring, A. (2016) 'Germany's Energiewende and the Spatial Reconfiguration of an Energy System' in Gailing and Moss (eds) *Conceptualizing Germany's Energy Transition: Institutions, Materiality, Power, Space*. Basingstoke, Hampshire: Palgrave Macmillan
- Goldthau, A. (2014) 'Rethinking the governance of energy infrastructure: Scale, decentralization and polycentrism', *Energy Research & Social Science* 1, 134-140.
- Goodspeed, R. (2015) 'Smart cities: Moving beyond urban cybernetics to tackle wicked problems', *Cambridge Journal of Regions, Economy and Society*, 8:1, 79–92.
- Haarstad, H. (2016) 'Where are urban energy transitions governed? Conceptualizing the complex governance arrangements for low-carbon mobility in Europe', *Cities* 54, 4–10.
- Hall, P. A. (1993) 'Policy paradigms, social learning, and the state: The case of economic policymaking in Britain', *Comparative Politics* 25:3, 275-296.
- Hall, S. & Roelich, K. (2016) 'Business model innovation in electricity supply markets: The role of complex value in the United Kingdom', *Energy Policy* 92 (2016) 286-298.
- HM Government (2017) *The Clean Growth Strategy: Leading the way to a low carbon future*. London: Crown Copyright.
- HM Government (2011) *A plain English guide to the Localism Act*. London: Crown Copyright.
- Hodson, M., Evans, J.; Schliwa, G. (2018) 'Conditioning experimentation: The struggle for place-based discretion in shaping urban infrastructures', *Environment and Planning C*, 36:8, 1480-1498.

- Hodson, M.; Marvin, S. (2013) 'Mediating Low-Carbon Urban Transitions? Forms of organization, knowledge and action', *European Planning Studies*, 20:3, 421–439.
- Hodson, M., Marvin, S.; Bulkeley, H. (2013) 'The Intermediary Organisation of Low Carbon Cities: A Comparative Analysis of Transitions in Greater London and Greater Manchester', *Urban Studies*, 50:7, 1403–1422.
- IEA (2016) *Re-transition: Transitioning to policy frameworks for competitive renewables*. Paris: IEA.
- Intelligent Energy Europe (2018) *Mobilising Local Energy Investments in Greater Cambridge and Greater Peterborough UK - Low Carbon Hub*, <https://ec.europa.eu/energy/intelligent/projects> (accessed May 2019).
- Jessop, B. (2002) 'Liberalism, Neoliberalism, and Urban Governance', *Antipode* 34:3, 452-472.
- John, P. (2001) *Local Governance in Western Europe*. London: Sage Publications.
- Johnstone, P.; Newell, P. (2018) 'Sustainability transitions and the state', *Environmental Innovation and Societal Transitions* 27, June 2018, 72-82.
- Kuzemko, C. (2019) 'Re-scaling IPE: Sustainable energy, local government and change', *Review of International Political Economy* 26:1, 80-104.
- Kuzemko, C. (2016) 'Energy Depoliticisation in the UK: Destroying Political Capacity', *British Journal of Politics and International Relations*, 18:1, 107-124
- Kuzemko, C.; Lockwood, M.; Mitchell, C.; Hoggett, R. (2016) 'Governing for Sustainable Energy System Change: Politics, Context and Contingency', *Energy Research and Social Sciences*, 12 (2016), 95-105
- Le Gales, P.; Scott, A. (2010) 'A British Bureaucratic Revolution? Autonomy Without Control, or "Freer Markets, More Rules"', *Revue Francaise De Sociologie*, 51, 117–143.
- Localise West Midlands (2014) *The Green Deal and energy efficiency supply chain development*. Birmingham.
- Lowndes, V. and Gardner, A. (2016) 'Local governance under the Conservatives: super-austerity, devolution and the "smarter state"', *Local Government Studies*. Routledge, 42:3, 357–375.
- Lowndes, V.; Pratchett, L. (2012) 'Local Governance under the Coalition Government: Austerity, Localism and the "Big Society"', *Local Government Studies*, 38:1, 21–40.
- MacKinnon, D. (2011) 'Reconstructing scale: Towards a new scalar politics', *Progress in Human Geography* 35:1, 21-36.
- Martins, R.; Ferreira, L. (2011) 'Opportunities and constraints for local and subnational climate change policy in urban areas: Insights from diverse contexts', *International Journal of Global Environmental Issues*, 11:1, 37–53.
- Mazzucato, M. (2013) *The entrepreneurial state*. London: Anthem Press.
- McGuirk, P.; Dowling, R.; Bulkeley, H. (2014) 'Repositioning urban government: Energy efficiency and Australia's changing climate and energy governance regimes', *Urban Studies* 51:13, 2717-2734.
- Meadowcroft, J. (2011) 'Engaging with the politics of sustainability transitions', *Environmental Innovation & Societal Transitions* 1 (2011) 70-75.

- Meegan, R. *et al.* (2014) 'Global economic crisis, austerity and neoliberal urban governance in England', *Cambridge Journal of Regions, Economy and Society*, 7:1, 137–153.
- Moss, T., Becker, S. and Naumann, M., (2015) 'Whose energy transition is it, anyway? Organisation and ownership of the Energiewende in villages, cities and regions', *Local Environment* 20 (12), 1547-1563.
- Moss, T. *et al.* (2011) 'Intermediaries and the Reconfiguration of Urban Infrastructures: An Introduction', in Guy, S. *et al.* (eds) *Shaping Urban Infrastructures Intermediaries and the Governance of Socio-technical Networks*. Abingdon, Oxon.: Earthscan.
- Mountfield, H. (2012) *The 'general power of competence' in the localism act 2011: devolving democracy or the end of accountability?* London: Public Law Project.
- OECD (2019) *Subnational government Structure and Finance*. Available online: <https://stats.oecd.org/Index.aspx?QueryId=72691> (Accessed May 2019).
- OECD (2016) *Subnational governments around the world: Structure and finance*. Paris: OECD.
- Ofgem (2015) *Non-traditional business models: Supporting transformative change in the energy market*. London: Ofgem.
- ONS (2018) *Digest of UK Energy Statistics (DUKES): Electricity*. London: Office for National Statistics.
- Painter, M.; Pierre, J. (eds) *Challenges to state policy capacity: Global trends and comparative perspectives*. London: Palgrave Macmillan.
- Polzin, F., von Flotow, P. and Nolden, C. (2016) 'Modes of governance for municipal energy efficiency services – The case of LED street lighting in Germany', *Journal of Cleaner Production*, 139, 133–145.
- PPS (Public Power Solutions) (2018) *Powering the Future, PPS website*. Available at: <https://www.publicpowersolutions.co.uk> (Accessed May 2018).
- REN21 (2018) *Renewables 2018: Global status report*. Paris, France.
- Rhodes, R.A.W. (1997) *Understanding Governance*. Buckingham: Open University Press.
- Roelich, K. *et al.* (2018) 'Institutional pathways to municipal energy companies in the UK: Realising co-benefits to mitigate climate change in cities', *Journal of Cleaner Production*. Elsevier Ltd, 182, 727–736.
- Rutherford, J.; Coutard, O. (2014) 'Urban energy transitions: Places, processes and politics of Socio-technical change', *Urban Studies* 51:7, 1353-1377.
- Rutherford, J. and Jaglin, S. (2015) 'Urban energy governance: Local actions, capacities and politics', *Energy Policy*, 78, 173–178.
- Smedby, N. (2015) 'Assessing local governance experiments for building energy efficiency' *Environment & Planning C* 34, 299-319.
- Tingey, M., Webb, J. and Hawkey, D. (2017) *Local Authority Engagement in Uk Energy Systems: Highlights From Early Findings*. UKERC, London and The ETI, Loughborough.
- Unruh, G. C. (2000) 'Understanding carbon lock-in.', *Energy Policy*, 28, 817–883.

Wade, F., Webb, J. and Creamer, E. (2019) *Local Heat and Energy Efficiency Strategies: Phase 1 Pilots. Social Evaluation Report*. Edinburgh, Scottish Government.

Webb, J. (2015) 'Improvising innovation in UK urban district heating: the convergence of social and environmental agendas', *Energy Policy* 78, 265-272.

Webb, J.; Hawkey, D.; Tingey, M. (2016) 'Governing cities for sustainable energy: The UK case', *Cities* 54 (2016), 28-35.

Webb, J., Tingey, M. and Hawkey, D. (2017) *What We Know about Local Authority Engagement in UK Energy Systems: Ambitions, Activities, Business Structures & Ways Forward*. London, UK Energy Research Centre and Loughborough, Energy Technologies Institute. Available at: <http://www.ukerc.ac.uk/publications/what-we-know-about-local-authority-engagement-in-uk-energy-systems.html>.

Wilson, D.; Game, C. (2011) *Local Government in the United Kingdom*. Fifth edition. London: Macmillan.

Wu, X.; Ramesh, M.; Howlett, M. (2015) 'Policy capacity: A conceptual framework for understanding policy competences and capabilities', *Policy & Society* 34 (2015) 165-171.

Appendix 1: Numbered List of Interviews

1. Think tank and NGO
2. Think tank and NGO
3. Local government network
4. Local government network
5. Government Advisor
6. Think tank
7. Think tank
8. Local energy network
9. NGO and government advisor
10. NGO
11. NGO and ex-local authority
12. Local authority
13. Local authority
14. Local authority
15. Local authority
16. Local authority
17. Think tank
18. Academic, ex-BEIS
19. Municipal Utility, ex-local authority
20. Ofgem
21. Ofgem
22. Local energy company
23. Local authority
24. Local authority
25. Local authority
26. BEIS
27. BEIS
28. Local authority
29. Local authority

30. Local authority
31. NGO
32. NGO, ex-local authority
33. Local authority
35. Local authority
36. Local authority
37. Local authority
38. Local authority
39. Municipal Utility, ex-local authority
40. Local authority
41. Local energy company
42. Local authority
43. Local authority
44. Local authority
45. Local authority
46. Local authority
47. BEIS
48. Local authority
49. NGO
50. Municipal Utility
51. NGO
52. Consultant to local government
53. BEIS
54. Consultant to local government
55. BEIS
56. NGO
57. Local authority
58. Consultant to local government
59. Trade Association
60. Consultant to local government
61. BEIS
62. Local authority
63. Utility
64. Local Authority
65. Local Authority
66. Local Authority