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Energy in low carbon cities and social learning: A process for defining priority research questions with UK stakeholders

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ABSTRACT

City-level decision-making requires timely access to a wide range of relevant and comprehensible data and information. Although a wide range of research on energy and cities is on-going across the social, engineering and natural sciences, it cannot be taken for granted that the questions being asked and the way questions are structured reflect practitioner perspectives and requirements. This paper discusses the ways in which research questions are formed and interpreted by actors in academic research and research user communities. We also report a set of research questions produced via an initial trial of a two stage, participative process consisting of (a) a survey targeted at city-focussed practitioners in the United Kingdom (UK) with an interest in lower carbon energy futures; and (b) a workshop integrating practitioner and academic perspectives. Comparing the set of research questions identified with themes in the academic literature, we find that research and practitioner communities concur on the importance of reducing energy demand and also on a number of cross-cutting issues. However, we also find that academic research places a greater emphasis on the interfaces between the energy system and other urban systems. We conclude that the two stage, participative process followed can serve to generate and legitimate city-related research questions through collaboration between stakeholders and academic researchers.

1. Introduction

The quantity of scientific information produced annually on cities is immense, in recent years averaging over 20,000 publications per year.[1] Perhaps surprisingly however, there seems relatively little work on the extent to which this scientific information meets the needs of practitioners. In contrast, social learning theory suggests that meeting such needs and implementing integrated urban transitions of society and technology are important factors to consider. As van de Kerkhof and Wieczorek (2005) observe, learning in the context of interconnected social and technological change needs to include processes intended to foster social learning, particularly the development of shared understandings of problems (in terms of their nature, scope and impact). This in turn requires the participation of a wide range of actors, and indeed there is a growing, supportive literature that argues for societal engagement in the production of scientific knowledge. Often grouped together under the concept of post-normal science (Funtowicz & Ravetz, 1990; Ravetz, 1987) this literature emphasises through a variety of rationales that it is legitimate (and in some cases essential) to view the world in more than one way (Frame & Brown, 2008). One such rationale is that including a range of points of view when science is used to inform policy is likely to lead to better decisions with wider political support and legitimacy, particularly when problems are resistant to resolution, i.e. are 'wicked'

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[1] Calculated as the mean of articles returned in a search of the Scopus database for the years 2009–12 inclusive, with the terms 'city' or 'cities' in the abstract, title or keywords. At the time of writing, the annual mean for this four-year period is 21,069 publications.

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(Rittel & Webber, 1973). Indeed, when Rittel and Webber (1973), both urban planners, defined what it means for a problem to be 'wicked', one of their ten defining characteristics of such problems is that we can't even be sure when a problem is solved, not least because there are differing perspectives on any given problem of this type.

For these and other reasons, it is increasingly common, even commonplace, to involve stakeholders in collaborative work with scientists, particularly where there is a significant governance-related element to phenomena under investigation – e.g. Pahl-Wostl et al. (2007). Still, though, we would judge it somewhat less common within the research community to collaboratively generate scientific research questions with practitioners and other stakeholders, such that stakeholder views on what is important are considered from the beginning of the scientific process. In the UK, examples include Brown et al. (2010) in the case of fresh water resources and Sutherland et al. (2006) in the case of ecology.

Moreover, disjunctions in approach between the research and policy and practitioner communities have been identified across a range of fields e.g. (Boaz & Gough, 2010; Pohl, 2008). Remedying this might either focus on researchers acquiring the understanding of practice required to frame questions; or practitioners and policy makers gaining access to the process by which research questions are shaped. This in turn requires time and resources, to identify needs and perspectives of the diverse community of potential knowledge users (Holmes & Harris, 2010); and an ability on the part of users to "evolve more effective mechanisms for identifying gaps in the evidence base for policy development" (House of Commons Science and Technology Committee, 2006). Of course, it also requires more than this: a willingness to collaborate, based in part, as identified above, on a shared view of a problem.

In the present paper, we describe the results of an investigation into the potential suitability of a process for identifying priority questions for research into city-focussed low-carbon energy supply and demand. This process enabled UK stakeholders and members of the research community to collaboratively identify priority research questions based on the perceptions of stakeholders. The research questions that we elicited were developed through an adapted form of the deliberative processes used in the water and ecology cases referred to earlier (Brown et al., 2010; Sutherland et al., 2006), essentially consisting of an online questionnaire survey and associated workshop. In the following sections, we first provide an overview of the problem domain, low-carbon energy supply and demand in cities; we then set out definitions and methods, followed by results consisting of: (a) key themes on low-carbon energy and cities evident in the academic literature; (b) the workshop output of 51 unordered questions, grouped by topic, and the top 10 priority questions; (c) a discussion of the nature of the questions and reflections on the process, and finally conclusions and proposals for further work. We would stress that our intent in this paper is to evaluate a process for gathering priority research questions for cities, not to assemble a definitive list of such questions at this stage. Thus, while the results will to some extent be applicable internationally, the work reported draws on data and insight provided by exemplar UK participants (based predominantly within the Yorkshire region).

2. Research scope: energy and a low carbon future for cities

A key priority for the UK Government is tackling climate change, through cutting greenhouse gas (GHG) emissions and decarbonising the economy (HM Government – The Coalition, 2010). In this regard the UK government has recognised explicitly the need for evidence-based policy-making in relation to energy and climate change. For instance, the first of the responsibilities listed for the Chief Scientist of the Department for Energy and Climate Change is "ensuring key policy and planning decisions in DECC are evidence-based" (DECC, 2012a). This commitment has been re-affirmed in a speech by the Secretary of State for Energy and Climate Change in which he stated that energy policy will be directed by and founded upon evidence (DECC, 2012b). Evidence-based policy making, although increasingly desired in the UK, is becoming increasingly difficult as evidence becomes more diverse and datasets more extensive. At issue here is what constitutes evidence, whose evidence should shape decisions, how that evidence is generated and what types of questions, both general and specific, are answered (Nutley & Webb, 2000; Pawson, 2006). Involving stakeholders in the development of research questions, as considered below, also involves many similarly contested issues.

The crucial role of cities in helping to tackle climate change is recognised widely (OECD, 2010; UN Habitat & UNEP, 2009). Around 80% of the UK population now lives in urban environments and this proportion is likely to grow over the coming decades. Thus, local action by cities will be vital if the UK is to meet its national target of an 80% reduction in GHG emissions, on 1990 levels, by 2050 (Dixon, 2012). The energy infrastructure on which every city depends needs to adapt and be renewed to meet the increasing demands for energy services from city residents, in the context of making the transition to a low-carbon economy. UK central government has stated that it cannot deliver on its energy and climate change policy without the support and action of local government. A recent report (The Committee on Climate Change, 2012) by the body tasked with advising the UK government on climate change has likewise concluded that local authorities have a crucial role in contributing to emissions reductions and helping the UK meet its carbon targets, given that local authorities have significant influence over key emitting sectors including residential and commercial buildings, surface transport and waste. The body representing local governments in the UK has also reached similar conclusions (Local Government Association, 2007).

Cities, local authorities and other organisations face a number of unprecedented challenges when seeking to create low-carbon urban energy systems across a spectrum of areas. Some of these challenges include:

- Reducing energy demand e.g. extensive retrofitting of the existing building stock, encouraging behavioural change and minimising any rebound effect;
- Decarbonising energy supply e.g. integrating distributed renewables and energy storage in to the network;
- Achieving societal and economic benefits e.g. alleviating fuel poverty and improving energy affordability, and promoting economic development;
- Managing interfaces between the energy system and other urban systems e.g. identifying synergies between managing demand for energy and demand for other utilities/services;
- Crosscutting issues e.g. massively scaling up the financing available for urban energy system improvements and streamlining decision-making and governance amongst a complex network of actors and infrastructure ownership.

Given these challenges, this paper aims to assess the extent of, and facilitate, the congruence of practitioner and academic research agendas. In Section 3, we describe the approach we used.