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Building physics into the social: Enhancing the policy impact of energy studies and energy social science research

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ABSTRACT

A diagnosis for why the social sciences have limited impact on energy policy-making is proposed, and the outline of a remedy presented. The diagnosis identifies the limited use physical science in social studies of energy as a major cause of this lack of impact. This is illustrated by a qualitative review of studies in psychological and sociological approaches and by a quantitative content analysis of all the articles published in Energy Research and Social Science to July 2016. Only around one in ten papers make any meaningful reference to common physical units for energy analysis, with nearly three-quarters making no reference at all to any of these units, in contrast to the pattern observed in the journal Energy Policy. This is important because while it is possible to make realistic but problematic energy policy with only physical and technical data it is not possible to make realistic energy policy with only social data. To bring more physics into social science of energy without the latter simply serving the framework of the former demands a new socio-technical approach to the study of energy. A potential vision for this approach is set out in order to stimulate wider debate in the academy.

1. Introduction

Social scientists from beyond economics (here, the phrase 'broader social science' is used from this point on) have for years made calls for more involvement in energy policy [1–6]. The principle concern has been that energy policy has been dominated by a technical/physical approach which means energy policy-making has missed out and misunderstood the human and social context of energy demand. Commonly this argument is made largely on the basis of broader social science being important for making changes to society, so if they are not involved then we are less able "to achieve a future energy system that enhances human well-being" [1]. While it is hard to argue against this claim as a social scientist, this author suspects it is not persuasive to public policy teams that comprise the main target audience for impact. As the one-time Head of Social Science Engagement at the then UK government Department for Energy and Climate Change (DECC, from 2011 to 2013) the author has direct experience in this area. While policy officials might agree with such claims, they rarely turn to the social sciences for energy policy analysis because such studies regularly fail to provide the sort of answers energy policy demands. At its simplest this relates to the goals of energy policy being implicitly set out in physical science units. For instance, energy security is based on the installed capacity, fuel poverty on costs of energy and implicitly, a lack of thermal resistance in building infrastructure, and climate targets defined in terms of weight of greenhouse gas emissions. To answer questions framed in these terms, answers *with* these terms are needed, or they can have no traction. One might question whether such policy goals are framed in a way that most benefits society. This is an important question which underpins the definition 'most impact' that the social sciences might have. It is addressed here by first recognising that physical units are necessary but not sufficient for effective energy policy: energy is a real, physical substance that needs to be generated, moved, transformed and managed by other physical process and substances. But the point (construction, management and use) of the energy system is entirely social. Consequently, the lack of broader social science approaches in the description and analysis of energy policy reflects an absence of deep impact by the broader social sciences. The remedy suggested here is not simply to do more social science disconnected from the physical context, or to do more 'end of pipe' social science in a physical context [7] but to do more interdisciplinary, integrated socio-technical research that reflects the integrated nature of the physics and the social in these systems.

First, though, the relative success of broader social sciences in energy policy is reviewed, before a diagnosis for the lack of impact that many claim is presented. It is important to note that the anal-

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ysis presented here is focused principally on the UK experience – though the underpinning arguments (and evidence) go beyond this. As a consequence, one goal of this paper is to prompt wider debate on the impact of social science approaches for energy policy in different jurisdictions.

2. Where has broader social science been successful in influencing energy policy?

Only recently has broader social science had any success with calls for integration into energy policy-making circles. In the UK that success is mainly from what has come to be known as 'behavioural science' and in particular behavioural economics. In the UK, this began with the recent (2010–2015) Coalition government's interest in 'Nudges' [8] and then developed into the support for a Behavioural Insights Team (BIT) at the UK Cabinet Office on the back of the then Director's authorship of document called 'MINDSPACE' [9]. The BIT went on to conduct a range of 'behavioural' studies with DECC in order to demonstrate the benefit of this approach [10–12]. At around the same time DECC grew its internal social research capacity (mainly as a 'Customer Insight team') from near zero staff to a partially dispersed group of around 15 (in contrast to the around 90 economists and 40–50 engineers and physical scientists in a total staff headcount of about 800). From there, and with my appointment, the broader social sciences started to take greater prominence with the creation of a 'Social Science Expert Panel' for DECC and sister department Defra (Department for the Environment, Food and Rural Affairs). The panel comprised 13 social science experts across energy and environment and drawn from psychology, sociology, politics and evolutionary economics. In addition, the UK Committee on Climate Change (an independent advisory body to DECC) appointed in 2015 its first ever social scientist, Nick Chater, Professor of Behavioural Science.[1] Finally, in 2014, the UK's Research Councils (led by the Engineering and Physical Sciences Research Council) funded 6 energy demand research centres, one of which is grounded in the sociology of energy demand.[2]

Two points can be made from this success story, such as it is. The first is the focus on 'behavioural science' as the main way of bringing in broader social sciences. This success is a double-edged sword for the social sciences: on the one hand, finally there is some kind of social science involvement in policy making; but on the other, the focus on behavioural science is a *strengthening* of the standard (techno-economic) approach to energy policy [4,5]. The focus is clearly on addressing the obvious shortcomings of treating the energy system as a purely technical system, rather than widening horizons to take account of what energy is for and how patterns of use and deployment might be reconstituted to meet energy and climate policy goals.

The second (and perhaps more contentious) point is to note that energy policy in the UK has not noticeably improved since 2010. Major policy programmes have been cancelled, amended due to recognised failings or significantly delayed (including the UK Green Deal, the feed in tariff scheme for solar photovoltaics, carbon capture and storage innovation, fracking policy, new nuclear power, on and off shore wind turbine development and so on). For many of these, the failure to take on board broader social science input can be seen as one among a set of causes for these issues. Further, the failure of policies to work in intended ways misses either unintended benefits of supposedly 'failed' energy policy that a broader social science could recast as success (e.g. FITS scheme developing social energy enterprises), or unintended costs that are not detected by the standard policy analysis approach (e.g. communities mobilised against energy developers due in part to planning processes).

3. The real barrier facing social science for energy policy impact: physics

Here, my focus is on diagnosing why broader social science has had limited impact on energy policy making. Why it fails to gain any traction despite both longstanding calls for more involvement, several open doors and sympathetic ears from the institutions within which they must operate. The principle hypothesis offered here is that the lack of *real* consideration of the properties of physical 'stuff' within a significant body of social science studies of energy prevents deeper policy impact. This is, in effect, the mirror image of the problem social scientists diagnose with the technical-led studies of energy – the lack of *real* consideration of the properties of social 'stuff' [1]. It is worth noting that the choice of the term 'real' in this context is quite deliberate – as the underlying position here is that a (critical) realist perspective is needed to bring together epistemic communities from physical sciences with those from broader social sciences [13]. While there is no doubt that social science *has* provided important insights in this domain around risk analysis, public acceptance and attitudes [e.g. 14–16], the point here is that such input has so far failed to affect day to day policy analysis at the national level in the UK at least. And crucially such input often fails to widen the horizons of policy options, reinforcing the standard framing [6,7].

4. Does social science of energy give no real consideration to physics?

Perhaps one of the ironies of this whole debate is that the one part of the broader social sciences that has been embraced by energy policy, the so-called 'behavioural sciences' is the one part of the broader social sciences that is often critiqued for taking a 'physics-like' approach to studying the social (i.e. positivist/empiricist), but arguably does the *least* to acknowledge and promote the idea that physical stuff is an important consideration in shaping social (and therefore policy) outcomes. While the one area that is perhaps most distant from having a direct impact – social theory – is in many respects much better placed to address these issues. This irony is best demonstrated by reference to relevant studies from the different perspectives. But either way, the argument presented here is that the vast majority of mainstream social science of energy research pays little or no real attention to the physical property of stuff, and that lack of attention underpins a lack of policy impact.

4.1. Behavioural/psychological approaches to energy research

It is not possible to do proper justice to the range of approaches from this angle here, but it is probably uncontentious to state that (social and cognitive) psychological approaches in energy research regularly fail to recognise the significance of physics, privileging instead mental states and processes. Some examples can illustrate this. For instance, the document underpinning the BIT studies in the UK – MINDSPACE – focuses on issues of 'messenger' (who is telling you some information), 'incentives' (psychological states induced by proposed rewards), 'norms' (beliefs about what others would typically do), 'defaults' (implied standards in specific settings), 'salience' (how some information stands out), 'priming' (the automatic triggering of mental states), 'affect' (the emotions provoked by some context), 'commitment' (the sense of duty ensuring an action is undertaken) and 'ego' (doing things to appear bet-

[1] See: https://www.theccc.org.uk/about/structure-and-governance/committee-on-climate-change/ Accessed 27 October 2016.
[2] See: http://www.demand.ac.uk Accessed 27 October 2016.