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Ecologies of participation in socio-technical change: The case of energy system transitions

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ABSTRACT

Studies of societal engagement with socio-technical change are undergoing a systemic turn. Rather than simply viewing public engagement in science, policy and behavioural change in terms of discrete cases, key social theories in deliberative democracy, practice theory, socio-technical transitions and co-productionist scholarship in science and technology studies (STS) are moving to consider how diverse forms of participation interrelate in wider systems. In this paper we take stock of these advances to develop a conceptual framework for understanding ecologies of participation in socio-technical and democratic systems, grounded in relational co-productionist theory in STS. The framework is illustrated through empirical analysis of a systematic mapping of participation in UK energy system transitions between 2010 and 2015. This provides the first insights into system-wide patternings, diversities and inequalities of energy participation, the significant types of interrelation between practices of public engagement within wider ecologies of participation, and their mutual construction with political cultures and constitutions. The value and implications of adopting an ecologies of participation approach are considered with respect to the theoretical, empirical and practical challenges of understanding and building more inclusive, responsible and just socio-technical (energy) transitions.

1. Introduction

In this paper we develop a new perspective on 'participation' in socio-technical change with specific reference to energy system transitions. Notions of participation, inclusion and societal engagement have become central to realising socio-technical transitions that are more democratic [1], sustainable [2], socially shaped [3], responsible [4], just [5], and responsive to public values and human needs [6]. In addressing energy issues vis-à-vis climate change public engagement is variously viewed as crucial to communicating the problem [7], establishing public acceptability of policy and technological interventions [8], prompting behavioural change [9], mobilising grassroots citizen action [10], through to addressing aspirations for democratic steering and public accountability [11]. What publics think, know, say and do have become core concerns of energy research, policy and practice.

Even though there has been undoubted progress, our starting point is the contention that existing approaches to participation in socio-technical change have failed to address increasing complexities of public relations with energy systems and recent developments in social and political theory. Mainstream approaches to societal engagement with energy (or any other domain) most often adopt fixed, pre-given meanings of what it means to participate, and imagine involvement occurring in discrete events or cases in particular parts of wider socio-technical systems [12]. While energy research has developed 'whole system' approaches for technically modelling energy transitions (e.g. [13]), on questions of societal and democratic engagement social science and policy-practice remains compartmentalised in theory, modes of empirical study and models of engagement. For example, behaviour change studies tend to centre on the workplace, the home and efforts to reduce energy demand (e.g. [14,15]); public opinion research and deliberative democracy approaches focus on sites of invited public deliberation and questions of 'social acceptability' that most often feed in to government and industry decision-making (e.g. [16,17]); whereas social movement studies and transitions management approaches respectively hone in on sites of protest or activism and sites of social innovation (e.g. [18]).

Just as interest in the human and social dimensions of energy systems is being mainstreamed [19], this fragmentation is undermining the potential contribution of the social sciences. There is growing unease over the ability of existing approaches to account for the increasingly complex, diverse and interconnected roles of publics in energy systems on the cusp of a post-carbon era [20,21,12,22], linked to

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trends in globalisation, market liberalisation, distributed energy production, the digital revolution and the rise of the internet.

The impetus for radically rethinking existing approaches to energy participation also comes from two important developments in the social sciences (much of which lies outside of the energy field). First, relational and materially sensitive theories are challenging mainstream 'residual realist' understandings of 'the public', participation and public issues as pre-given and external, to rather conceive of them as being constructed through the performance of socio-material practices and social science methods [23–26]. Second, is a 'systemic turn' in social and democratic theory relevant to societal engagement with socio-technical systems. This includes recent developments in practice theory [27], deliberative democratic theory [28], and science, and technology studies (STS) [29], which are moving from a case or event-based imaginary of participation to conceive of how multiple practices of participation interrelate as part of wider systems and constitutions.

In what follows, we build on these developments to set out a systemic approach to participation in socio-technical change. We move beyond mainstream approaches that view energy participation as something particular, pre-given and discrete to introduce the notion of 'ecologies of participation' as a means to understand the dynamics of diverse interrelating collectives and spaces of participation and their interactions with wider systems and political cultures. In Section 2 we provide an overview of mainstream approaches to energy participation in comparison to emerging relational and systemic approaches. This provides the basis to present a new conceptual framework for understanding systems and ecologies of participation in Section 3, which is grounded in relational co-productionist theories in STS. In Section 4 we apply this framework to the case of energy transitions, drawing on empirical material from a systematic mapping of participation in UK energy system transitions. Here we present new insights into system-wide patternings, diversities and inequalities of public engagement with energy, how practices of engagement interrelate and interconnect within wider ecologies of participation, and their mutual construction with political cultures and constitutions.

In the final discussion and conclusions we consider the value and implications of adopting an ecologies of participation approach with respect to the theoretical, empirical and practical challenges of understanding and building more inclusive, responsible and just socio-technical transitions in energy. While the focus of this paper is on developing and illustrating a new conceptual framework, we suggest that its systemic and ecological perspective on the diversities, emergence and stabilities of energy participation can enhance energy research and policy understandings of: the dynamics of socio-technical system change; ambiguities and contestations over the framing of energy system transitions; and systemic inequalities of inclusion and exclusion. It also has potential to cultivate more robust forms of social intelligence for energy governance that can be more responsive and accountable to continually emerging societal values, knowings and doings.

2. Beyond 'residual realism': energy participation as relational and systemic

In this section we identify three broad ways in which societal engagement with energy and low-carbon transitions is and can be conceived, considering literature from energy research and across the social sciences. In doing this we contrast mainstream approaches to energy participation with emerging relational and systemic perspectives. An overview of the key features and differences between these three perspectives, in relation to their underlying assumptions about publics and participation, is provided in Table 1.

2.1. Mainstream 'residual realist' perspectives on energy participation

The first perspective is closely associated with mainstream approaches to energy participation, most of which are well-established in energy research, policy and practice. This includes commonly adopted approaches for engaging societal actors with energy, such as behaviour change techniques (often grounded in the fields of social psychology (e.g. [14]) and behavioural economics (e.g. [9,15]), public attitude surveys (e.g. [17]), deliberative processes (e.g. [16]), transitions management (e.g. [3]), and sometimes forms of engagement enacted in social movements (e.g. [18]). While the intentions of these engagement approaches diverge considerably – ranging from encouraging the public to adopt more sustainable energy behaviours through to eliciting opinions about energy policy and facilitating wider public debate – they are most often imbued with and *perform* a particular conception of participation and the public. This includes the dominant assumptions of (see also Table 1):

- publics engaging with socio-technical change as individuals or groups of individuals;
- participation in socio-technical change as occurring in discrete events and processes, which can be grown and 'scaled up';
- participation as being fixed or pre-given in terms of the *model* or format of engagement (e.g. deliberative citizens jury, behaviour change initiative, activist group), the *subjects* of engagement (e.g.representative publics, consumers, affected stakeholders) and the *objects* of engagement (e.g. the energy-related issue or technology); and
- participation as able to be technically improved or perfected through objective evaluation against 'best practice' criteria (like inclusion, representativeness, attitudinal change, impact on decision-making).

Following Chilvers and Kearnes [26], we term this a 'residual realist' perspective on participation and the public. This is because while many of the aforementioned mainstream approaches to energy participation are prompted by constructivist views on socio-technical change, 'the public', 'participation' and 'democracy' remain as naturally occurring, pre-given categories that can be evaluated against externally prescribed (normative) principles. The emphasis is on *doing* energy participation through refining techniques to more accurately and completely represent or mobilise energy publics in achieving desired socio-technical change.

2.2. Relational perspectives on 'energy' participation

The second perspective identified in our review has become firmly established across the interpretive social sciences over the past decade and has in some instances begun to cross over into the worlds of policy and engagement practice. It is a relational perspective underpinned by approaches which see participation in socio-technical change as always occurring through the performance of heterogeneous collective practices. Some of these approaches are mainly analytical, focusing on understanding the dynamics of (energy) participation. These include science and technology studies (STS) approaches to participation – growing out of developments in actor network theory, including object-oriented approaches [25], technologies of participation [30], and ethno-epistemic assemblages [31] – which have taken practices of public involvement in issues as their focus, each offering different explanations over what brings participatory collectives into being [12]. Social practice theory (SPT) offers another relational approach which has become quite well established in energy research, focusing for the most part on everyday social practices which use energy [32]. Some relational approaches are more interventionist in emphasis, bringing forward new ways of doing energy participation in more deliberately experimental and reflexive ways, including collective experimentation [1,33], speculative design [34], and Deliberative Mapping [35].

Relational practice-oriented approaches assume that even a single person never participates alone, but always through collective practices comprising networked relations with material elements, infrastructures,