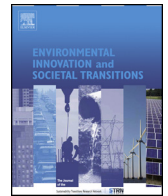


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A practice approach to study the spatial dimensions of the energy transition

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ABSTRACT

The spatial dimension of the energy transition has received increasing interest over the last years. This paper discusses the potentials of a practice approach to better understand the role of space, place and scale in transition processes and applies it to a case study in Beckerich, Luxembourg. The practice approach focuses transition practices as main conceptual and empirical object. It enables us to explore processes, contexts, and spaces of the energy transition. An in-depth case study illustrates transition practices and their implications for the 'renewable energy arena'. The findings highlight the importance of analysing developments on the ground and how local actors (re)produce contexts. They illustrate how a practice-sensitive analysis helps to better understand the processes of niche formation and the spatial dimension of underlying mechanisms of transitions.

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1. Introduction

The energy transition is one of the most debated challenges of our time. The production of renewable energy (RE) is a core building block of this transition. Therefore, the underlying processes and practices of RE production are fundamental aspects of the energy transition. These processes and practices vary spatially because various actors are involved in the operation of RE facilities, such as operators, engineers, planners, politicians, or local residents (Brücher, 2009, 38). Their interplay, their changing practices over time, and, consequently, the shifting processes of the energy transition are main foci of the paper at hand. I develop an analytical framework that allows examining these processes and practices as well as relevant contexts. A case study from Beckerich in Luxembourg illustrates the value of this approach.

The present paper contributes to the field of transition studies (TS), especially to two currently debated dimensions of the energy transition. First, I focus on processes and dynamics of niche formation. The current literature highlights the role of "protected spaces" (Geels, 2002), supporting framework conditions, such as institutional and socio-cultural frameworks (Essletzbichler, 2012), the parallel development of technologies (Foxon, 2011), or the creation of social networks between actors on different scales (Binz et al., 2014). But how are niches formed? I argue that a thorough examination of the underlying actors' practices further illuminates processes of niche formation.

Second, I am interested in the spatial dimension of transitions. Research in geography criticises the "aspatial" perspective of transition research approaches (Coenen et al., 2012; Markard et al., 2012). According to literature they "suffer from a

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missing or naïve conceptualization of space" (Coenen and Truffer 2012: 369) and "fail to specify the spatial ranges over which relevant institutions operate" (Coenen et al., 2012: 973). Bridge et al. illustrate that the energy transition mainly relies on the "interaction of natural, technical and cultural phenomena in a geographical setting" (Bridge et al., 2013, 336; emphasis added). They show that "these particular assemblages vary over space and time" (ibid.). This implies that "different places can do things differently" (ibid.) and that different scales of transition unfold meaning for the specific processes (Essletzbichler, 2012; Jørgensen, 2012). Consequently, the existing energy situations and potentials lead to a wide range of practices that reflect on the existing local and regional opportunities (Nadaï and v. d. Horst, 2010). Therefore, as various authors claim, additional analytical and conceptual attention should be given to actors and their capacities for action, competences, responsibilities, and strategies (Bridge et al., 2013; Jørgensen, 2012; Markard et al., 2012). The paper at hand conceptually and empirically addresses this.

First conceptual contributions discussing these aspects focus on the implementation and stabilisation of alternative urban visions (Rohracher and Späth, 2014), on the role of informal institutions and actor networks (O'Neill and Gibbs, 2014; Seiwald, 2014; Wirth et al., 2013), or on local or regional frameworks and their relevance for the energy transition (Mattes et al., 2015; Martin and Coenen, 2014; Negro and Hekkert, 2008). A thorough focus on actors and their practices is still missing in this strand of transition literature, though.

The present empirical study is a response to Musiolik and Markard (2011) observation that more in-depth studies are needed to understand roles of actors for the constitution and transformation of socio-technical systems, such as the energy system. Furthermore, most TS focus on national settings, whereas local, regional or urban analyses are less frequent (cf. Markard et al., 2012; first examples mentioned above). Additionally, the paper contributes to the often demanded spatial perspective on transitions (Coenen et al., 2012; Schulz and Bailey, 2014; Truffer, 2008) by combining thoughts from TS with place- and actor-sensitive practice approaches.

In the location under examination, the Luxembourgish municipality of Beckerich, nearly 30 years ago some actors decided to take a path towards the energy transition. Said to be the greatest example of a "green municipality" (Le Monde 11.08.2008) in the cross-border area of Luxembourg, France, Belgium and Germany, Beckerich was one of the first members of the "Climate Alliance" in 1995 and has developed a number of RE projects. As Doerr and Carr (2014) showed, various processes within the commune initiated a transition from an Agenda 21 to a *Transition Town*, but a deeper understanding of the processes and practices is still pending. A crucial project for the energy transition in Beckerich is a co-operatively operated biogas co-fermentation plant. Its evolution is the empirical case under examination that illustrates wider transition processes and practices in the village.

The paper unfolds as follows: it starts with discussing the potentials of a practice approach to TS in the energy sector. I outline my understanding of practices and how this helps to understand transitions as processes and contexts in space. Afterwards, I present the operationalisation of different transition processes as practice phenomena and the methodology of the case study. Section 4 presents the case study, focussing on transition practices of key actors. Section 5 discusses the time-space dimension of transition practices, of niche formation and the spatial dimension of energy transitions. Finally, the conclusion summarises main insights from this paper, highlights policy implications, and poses questions for future transition research.

2. Transitions in the energy sector – a practice approach

Questions of energy generation and distribution have received increasing interest in TS over the last years (e.g. Bridge et al., 2013; Essletzbichler, 2012; Foxon, 2011; Seiwald, 2014; Sengers et al., 2010; Verbong and Geels, 2010, 2007; Wirth et al., 2013). The fundamental goal of this study area is to analyse long-lasting transformation processes of socio-technical systems, such as the transition from conventional to RE, based on "relationships between the technical network, the user, the environment, the institutions responsible, and society at large" (Furlong, 2010: 461). Hence, the analysis includes "changes in user practices and institutional (e.g., regulatory and cultural) structures, in addition to the technological dimension [and...] a series of complementary technological and non-technical innovations" (Markard et al., 2012: 956).

As outlined in the introduction, processes of niche formation and the spatial dimension of transitions are currently strongly debated and still to be combined in one analytical framework. My suggestion is to focus on practices as main conceptual and empirical object. Following Schatzki, each practice is "an open-ended set of actions linked by pools of understandings (pertaining to action), a collection of rules (explicit formulations), and a 'teleoaffective structure' (a range of normativized, hierarchically ordered ends, projects, and tasks, to varying degrees allied with normativized emotions)" (Schatzki, 2003, 191 f.). Analysing practice highlights commonalities of single actions that scale up to routinized ways of "doings and sayings" (Schatzki, 2002, 73). This helps us to explore the ways in which groups of actors arrange their capacities for actions, competences and responsibilities and how individual actors develop strategies for practicing within teleoaffective structures.

A practice-oriented research approach is specific to context and can demonstrate the ways in which (economic) meaning is enclosed in different practices, in a variety of social situations and spaces. Therefore, it enables us to understand, how energy transitions are spatially constituted via their implications, contextuality, spatial specificity, and sensitivity towards scale—if empirically applied. Emphasis is put on, first, distinctive local conditions shaping evolutionary change. Second, we can expose non-routinised, contingent and improvisational or even accidental activities. And third, we can focus on how local practices change and co-evolve. Hence, it enables us to explore ongoing processes of niche formation, relevant contexts

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