Framing the sun: A discursive approach to understanding multi-dimensional interactions within socio-technical transitions through the case of solar electricity in Ontario, Canada

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ABSTRACT

In response to calls to develop more politically-informed transition studies, a burgeoning literature on discourse-transition complementarities and niche-regime interactions has recently emerged. This paper draws these strands of literature together in order to develop a discursive approach that investigates the process by which actors use language to build or erode the legitimacy of socio-technical innovations and their niches within transition episodes. Conceptualizing this process in terms of *multi-dimensional discursive interactions,* we adopt a discursive approach to further scrutinize: (1) the way in which actor groups depicted within the multi-level perspective struggle to frame innovations using narrative work and (2) how these narratives are formed through the ideational capacity of actors to link the content and context of an innovation. We demonstrate this approach by applying it to the case of PV diffusion in Ontario, Canada. Our findings contribute to the development of a more politically-sensitive view of transitions as well as recent work on incumbent-challenger interactions and discourse-transition crossovers. Beyond this, we corroborate and extend several observations in the transition literature, including the semi-coherent nature of the regime, the social construction of the landscape, and the prevalence of fit-and-conform orientations within niche empowerment strategies. However, findings also indicate that strategic orientations can be subtle and intermeshed, perhaps explaining why fit-and-conform orientations appear more prevalent.

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1. Introduction

Over the past decade, transition perspectives have attracted increasing attention as a useful way to contemplate the changes needed to shift societal systems such as energy and transport toward more sustainable configurations (Loorbach and Rotmans, 2010; Markard et al., 2012). The multi-level perspective (MLP), in particular, serves as the core theoretical framework underpinning most transition studies. The MLP conceptualizes socio-technical transition processes as involving the interplay of "developments at three analytical levels: niches (the locus of radical innovations), sociotechnical regimes (the locus of established practices and associated rules that enable and constrain incumbent actors in relation

to existing systems), and an exogenous socio-technical landscape" (Geels, 2014, p. 3).

Despite the MLP's utility in conceptualizing socio-technical change, this framework has been criticized for paying insufficient attention to the role of agency and political contestation within processes of regime transformation (Genus and Coles, 2008; Meadowcroft, 2011; Smith et al., 2010, 2005). While a robust literature reveals that agency is already accommodated within MLP formulations (Geels, 2011, 2010, 2004; Geels and Schot, 2007), it has nevertheless been acknowledged that some types of agency may be further developed. Indeed, Geels (2011) submits that power struggles and discursive activities may warrant greater attention, especially in empirically-focused transition accounts.

This has motivated a burgeoning literature on the political dimensions of transitions (e.g., Geels, 2014; Geels et al., 2016; Hoffman, 2013; Kern, 2012; Smith and Raven, 2012). Within this literature, there are two prominent strands of research that are particularly relevant for this paper. The first is concerned with elaborating niche-regime interactions within transition episodes (Berggren et al., 2015; Ingram et al., 2015; Smink et al., 2015),

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whereas the second seeks to develop more politically-sensitive accounts of transitions by drawing on the MLP and discursive traditions (Fuenfschilling and Truffer, 2014; Geels and Verhees, 2011; Munoz et al., 2014; Smith and Raven, 2012). With respect to the first strand, Smink et al. (2015) elucidate the defensive strategies adopted by incumbent firms to temporarily limit the diffusion of innovations. Berggren et al. (2015) expand understandings of incumbent strategies, demonstrating that they are operative at both regime and niche levels. While the authors echo the formidable resistive capabilities of the regime (as discussed by Smink et al., 2015 for instance), they also show how incumbents may leverage niche activities to impact the regime, highlighting the differentiated orientations and innovative potential of established actors. Similarly, Ingram et al. (2015) explore the diverse interactions between niche and regime, suggesting that while common ground between niche and regime can ease the diffusion of novelties, orientations are complex and should not be viewed as uniform across actor groups. In regards to the second strand of this research, Geels and Verhees (2011) develop a cultural performative approach to explicate the way in which actors build and maintain legitimacy around technologies and their associated pathways within innovation journeys. Bosman et al. (2014), on the other hand, draw on discourse to refine the regime concept through an investigation of the language used by incumbent actors in relation to energy pathways. In a similar fashion, Fuenfschilling and Truffer (2014) uncover tensions between institutional logics (i.e., arrangements of beliefs, norms, and practices that surround particular socio-technical systems) within the regime, reminding us that actor orientations are not uniform but semi-coherent (i.e., despite belonging to the regime, actor positions can be dynamic and conflicting). Shifting focus to niche strategies, Smith and Raven (2012) use discourse to elaborate the concept of protection, investigating the empowerment activities (e.g., outward-oriented narrative work) of niche actors to build legitimacy for their technologies. The authors suggest that these activities can be understood in terms of fit-and-conform and stretch-and-transform strategies. The former refers to strategies that position niche innovations as becoming competitive within unchanged selection environments, while the latter entails upsetting the rules of the game to allow niche innovations to reach competitiveness. Building on this approach, Smith et al. (2014) draw on discourse to demonstrate the way in which advocates undertake narrative work to link *the content of innovations* (e.g., performance and efficiency) with *the context of innovations* (e.g., broader developments in the regime or landscape) in order to build legitimacy. In the same vein, a recent meta-analysis of ongoing transitions indicates that fit-and-conform narratives are generally more common among the advocates of niche innovations and that, despite their positive resonance, stretch-and-transform strategies can sometimes be damaging to emerging technologies (Raven et al., 2015). Taken together, these studies prompt a greater appreciation of agency (strategic behavior, political struggles, and the dynamic positioning of agents) within MLP formulations.

While the above contributions call our attention to the dynamic positioning of actors and begin to establish the promise of discourse and transition crossovers in developing politically-sensitive understandings of innovation journeys, more can still be done to integrate these perspectives in explicating the dynamic interaction between the different levels depicted within the MLP. Thus, we build on the above studies in order to develop an analytical approach that focuses on the use of language in innovation debates and conceptualizes these struggles in terms of multi-dimensional discursive interactions. We demonstrate the utility of the framework by applying it to the case of solar photovoltaic (PV) deployment in the electricity system in Ontario, Canada. We are specifically interested in how different constellations of actors depicted within the MLP attempt to align the content of innovations with the contextual con-

ditions in which these emerging technologies develop and diffuse. Our findings contribute to the development of a more politically-informed view of transitions and the burgeoning strand of research focused on elaborating niche-regime interactions. Beyond this, we corroborate and further clarify several observations in the transition literature: (1) the semi-coherent nature of the regime; (2) the social construction of the landscape; and, (3) the prevalence of fit-and-conform orientations within niche empowerment strategies.

The argument in this paper unfolds in the following steps. First, we build on previous work integrating discourse and transition perspectives to develop an approach attending to the discursive struggles in innovation journeys. The paper then moves to discuss methods. Following this, we briefly consider the multi-level developments occurring around the electricity sector in Ontario, Canada and apply the abovementioned discursive approach to examine the case of PV deployment in this province. This study concludes with a discussion of our findings and reflections for further research.

2. Theoretical framework

This study integrates the MLP and discourse theory to attend to the agential and political character of transitions. This work is premised on the notion that transitions are an inherently political enterprise. Like policy and planning, the choices between pathways involve the use of competing problem definitions and narratives by societal actors with diverging interests (Fischer and Forester, 1993; Hajer, 1995; Stone, 2001). By interrogating the use of language within innovation debates, discourse frameworks may provide the analytical tools needed to complement transition perspectives and elaborate the strategic use of ideas in directing change along particular socio-technical trajectories. We begin by outlining the MLP in greater detail and then draw on this discussion to develop a novel approach that conceptualizes discursive struggles in terms of multi-dimensional discursive interactions.

The MLP views socio-technical transitions in terms of interactions among three interconnected levels: the niche, regime, and landscape (Geels, 2002). The regime represents the dominant configuration of rules and institutions, practices and cognitive routines, technologies and infrastructures, meanings and logics, along with actor groups surrounding a particular socio-technical system (Geels, 2004). In this fashion, system configurations are made up of material, structural, and agential forces (Geels, 2010). The regime is characterized by stability as these forces constrain or enable actor behavior in such a fashion as to reproduce longstanding development trajectories. This poses an acute challenge for decarbonization as change tends to be incremental in nature, locking in carbon-intensive modes of production and consumption (Unruh, 2000). Similar to regimes, niches also consist of rules, technologies, and actor groups (Geels, 2004). However, niches are far less stable than regimes. Rather, they encompass protective spaces that shield novel innovations from harsh selection pressures, allowing for variation and experimentation (Smith and Raven, 2012). Innovation efforts within these spaces are often aimed at addressing issues in the regime, with the hope of eventually replacing it. While early strands of transition research viewed niches as the principal seeds of change (Geels, 2002; Kemp et al., 1998; Rotmans et al., 2001), more recent formulations suggest that niche-regime symbioses and even regimes themselves may play important roles in driving transformations (Geels and Schot, 2007; Verbong and Geels, 2010). The landscape, on the other hand, embodies the broad cultural, environmental, economic, and political context which impinges upon the niche and regime. That is, the "technical, physical and material backdrop that sustains society" (Geels and Schot, 2007, p. 403). According to Van Driel and Schot (2005), the landscape encompasses static or gradually changing features (e.g., geography