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Electric (dis) connections: Comparative review of smart grid news coverage in the United States and Canada

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ABSTRACT

The term smart grid (SG) has been widely used in both the United States (U.S.) and Canada to represent multiple visions and configurations of electricity system change. In both countries policies, programs, and initiatives have emerged to promote technological and social changes associated with SG, and different patterns of SG implementation and governance are apparent at local, regional, and national levels. This paper reports on a comparative analysis of SG media content in nationally-circulating newspapers in the U.S. and Canada to explore patterns of SG conversations in the two countries. Media reporting about SG provides a valuable lens that reflects public discourse and also contributes to setting the public agenda by shaping public opinion and framing key issues. Despite similarities in terms of policy, program design, and SG deployment strategies, several prominent differences between the two countries emerge in public conversations. Firstly, Canadian SG newspaper content focuses more on implementation and describing people's experiences with smart meters, while the U.S. content focuses more on commercial opportunities with more reference to private sector actors and various technological components beyond smart meters. Secondly, although media coverage in both countries frequently highlights technological and economic benefits of SG, positive SG framing is more frequent in the U.S. newspapers than in the Canadian ones. Negative SG portrayals, including cultural, political and health and safety risks, are more frequently mentioned in the Canadian newspapers. These differing SG framings could be due to national level cultural differences. In the U.S., considered to be more of an individualistic society, there is more emphasis on business opportunities, being entrepreneurial, and more private sector involvement in the electricity sector. By contrast, in Canada, public authorities, more prominent in the electricity market than in the U.S., play a key role in smart grid deployment. Furthermore, in Canada, considered to have more social support structures for individuals and communities, there was more emphasis on the experiences of people. This suggests that cultural differences at the national level be a further contextual lens helpful to policy makers and technology proponents as they embark upon energy system change initiatives.

1. Introduction

The term smart grid (SG) has been widely used throughout the world to represent multiple visions and configurations of technological and social changes in the management and development of electricity systems [1,2]. SG innovations are often presented as critical for reducing carbon dioxide emissions, scaling up renewable energy, enabling new technologies like electric vehicles, and making electricity systems more resilient and reliable in the face of new climate risks. The

appeal of SG upgrades and improvements is broad, yet SG also presents new challenges for consumers and utilities in managing privacy, cybersecurity, interoperability, as well as perceptions of health and safety (e.g. concerns about electromagnetic fields or fires from faulty meters). Implementation of SG is further complicated by a broad spectrum of perspectives on how the current electricity system should be transformed [12].

Smart meters are the most tangible component of SG that the general public has experienced. Smart meters, or Advanced Metering

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Infrastructure (AMI), enable real-time electricity use monitoring at the individual household level enhancing management capabilities of both utilities and consumers [3]. Smart meter deployment has been controversial in some places [4–6] expanding public discourse about the implementation of SG innovations. The research presented in this paper analyzes newspaper coverage of SG as a lens to compare national-level discourse in the United States and Canada, neighboring countries with global influence in energy system change. Comparing jurisdictions is a recognized approach to improve understanding about the interactions between people, technologies, policies, and programs in energy system change. A growing body of literature on SG focuses on context as a means to help understand noted diversification on SG experiences in different jurisdictions and different levels [7,8]. Contextual factors include heterogeneity of geography, historical trajectories, political landscape, and institutional peculiarities. This comparative review explores national-scale cultural differences and how SG is framed in public discourse in two different jurisdictions: Canada and the United States.

Energy is a critical part of the U.S.-Canada-bilateral relationship. In 2013, energy trading between the two countries exceeded \$140 billion Cdn (\$105 billion USD) [9]. The U.S. and Canadian energy systems are linked in multiple ways including the sale of Canadian shale oil and natural gas to the United States and cross-border sales of electricity [10]. In both countries, electricity systems are evolving to upgrade grid infrastructure, integrate more renewable generation and deploy other SG technologies including smart meters.

Investments in SG implementation are influenced heavily by state and provincial political priorities, which exhibit a high degree of heterogeneity in both the United States and Canada [11]. In both countries, SG implementation investments and decisions are influenced by both national-level energy policy and decentralized state, provincial and local policies. Other articles in this special issue explore sub-national variation in SG implementation (e.g. [12–14]). The research presented here compares national-level SG discourse through content analysis of nationally-circulating newspapers in the United States and Canada. Media coverage of SG provides a valuable lens to compare and assess public discourse. Comparative characterization of how the media portrays SG provides insights on public discourse on energy system changes in the two countries.

The research question guiding this analysis is *how does media portrayal of SG compare in the U.S. and Canada?* This paper integrates data and prior analysis of media coverage of SG in the United States [15] and Canada [16]. This research question is tackled through content analysis of nationally circulating newspapers using the SPEED (Socio-Political Evaluation of Energy Deployment) framework, which facilitates comparisons of social and political dimensions of energy technology deployment in different places [17,18].

The background (Section 2) reviews analytical frameworks used to assess socio-political aspects of energy system change, with a focus on SG. The next section justifies the comparative media analysis approach and describes the methods (Section 3), which is followed by a description of the results (Section 4). The discussion section reviews the salient differences between the media portrayal of SG in the two countries and concludes with some integrative reflections (Section 5).

2. A review of socio-political dimensions of SG and energy system change

This research contributes to a growing body of social science literature on SG and energy system change [19–22]. Growing attention to the socio-political dimensions of emerging energy technologies and the evolution of energy systems represents acknowledgement of the socio-technical complexity of energy transitions. Moving beyond the more prevalent research on technical and economic aspects of energy system change [23–25], recent research on socio-political dimensions enables comparison of the context for energy technology development

in different geographic settings [1,26].

Multiple different conceptual frameworks have been developed to examine energy system change. At a macro level, the analytical lens of sociotechnical transitions is particularly relevant to assess SG with respect to energy system change, because SG involves simultaneous changes in policies, politics, regulations, routines, as well as technologies [27]. However, sociotechnical systems have been critiqued as downplaying the importance of agency in these transitions and neglecting the role of geographic settings [28] – to determine the extent to which there may be contextual particularities to help explain where transitions have occurred or not. Other recent research points out that the distinct and prominent role of certain settings, such as urban areas in energy system transitions, has not been adequately integrated into existing literature [29] and a surprising separation exists between literature on climate governance and research on so-called ‘smart cities’ [35]. A further critique of sociotechnical transitions analytical frameworks is that they look back through time and assume a transition has occurred or not.

Another set of research that examines socio-political dimensions of energy system changes at a more micro level emphasizes the actions and agency of people and social groups [30,31]. Research examining discrepancy between attitudes and behavior of people [32], suggests that analytical lenses seeking to understand these differences link psychological and societal/ institutional aspects [33] that influence people. For instance, when examining energy system change, people are concerned with subjective norms, including perceptions of risk and privacy concerns that influenced people’s use of smart meters in Portugal [34]. A different study examining new energy options in Australia (wind turbines) suggested that community members were concerned about procedural justice [35].

However, some scholars suggest that agency-based frameworks such as those emphasizing individual behavior focus too much on individualistic efforts [36] and fail to acknowledge systemic complexity and heterogeneity [37]. Systemic level issues include an inherent bias in energy research toward sustaining centralized systems in which currently powerful actors continue to profit from large scale investments [38]. An additional critique of existing literature on the role of individuals, purports that the public is often viewed as being amenable to change mainly through manipulations from others such as ‘nudging’ efforts by experts in the public and/or private sector or by the provisioning of infrastructure (e.g. charging stations for electric vehicles) [36]. Within this lens, individuals are often considered to be passive actors possessing little knowledge and/or concern about their energy use who may respond in predictable ways to specific interventions. In contrast, participants involved in a study regarding smart meters in France (that included both urban and rural areas) were cognizant of the wastefulness of their contemporary lifestyles; they were aware and concerned that comfort typically trumped other concerns regarding energy. In this study from France, participants proposed options such as a communal space for meals (preparation and consumption) in apartment buildings where people could save electricity (and also decrease social isolation) [8].

Some purport that focusing research efforts on SG experiences neglects pre-existing relationships and other influences that shape people’s perceptions of SG, and other sustainable energy technologies (see [36] for an overview). Recognizing influential actors in shaping perceptions and discourse is important. For instance, a Norwegian study about SG highlights the predominance of techno-epistemic networks in advancing a particular vision. These experts tend to view the public as rational agents, which is often disconnected from actual public actions which occur due to desires for more autonomy and privacy [7]. Opposition to sustainable energy technologies is often characterized as Not In My Backyard (NIMBY), however research has found those views to be inadequate explanations for opposition; researchers advancing the NIMBY thesis can frame those people opposed to energy system change pejoratively [33]. This set of critiques

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