SP0014

UPTAKE OF A SHARED SOLAR STORAGE INNOVATION: DYNAMICS AND DIMENSIONS

THE TRANSITION TOWARDS AN ENERGY SYSTEM BASED ON RENEWABLES is characterized by technological advances and a changing pattern of involvement of social actors. Although the importance of social actors in this sociotechnical transition has been acknowledged, it has been insufficiently researched. If the energy transition is to be successful, and effectively managed, it is pivotal to establish an understanding of the effect of the dynamics of interactions between actors, and between actors and a sociotechnical innovation across scales and levels on the energy system, and the implications for its future. This research examines the process of moving a shared solar storage innovation to higher levels of the system in terms of the cross-dimensional interactions steering this process.

Research question

What impact(s) do different scales and levels, and their interplay, have on the uptake of a solar storage innovation?

Methodology Currently in stage 1, this research is based on the case study of the White Gum Valley (WGV) innovative residential housing precinct and focuses on the construction of an agent-based model (ABM) to study the emerging dynamics of interaction between various stakeholders around the shared solar storage innovation. ABM is a computational technique that simulates the interactions of autonomous decision-making entities – agents. The multilevel perspective and transition theory, as well as literature on cross- scale interactions will be used to guide this research.

Stage 1	*Stage 2*	*Stage 3*
Systematic Literature Review (SLR) of ABM in the context of energy transitions. Conceptualisation of ABM based on the WGV case study.	Collection of primary data at the WGV site (e.g. energy consumption, decision rules), selection of decision-making theories and integration into the ABM. Validation of the model.	Implications for adapting the multilevel perspective to more appropriately integrate cross-dimensional dynamics. Theory proposition. Adapting the model to simulate peer-to-peer energy trading and/or EV sharing.

Figure 2: Three stages of the research project.

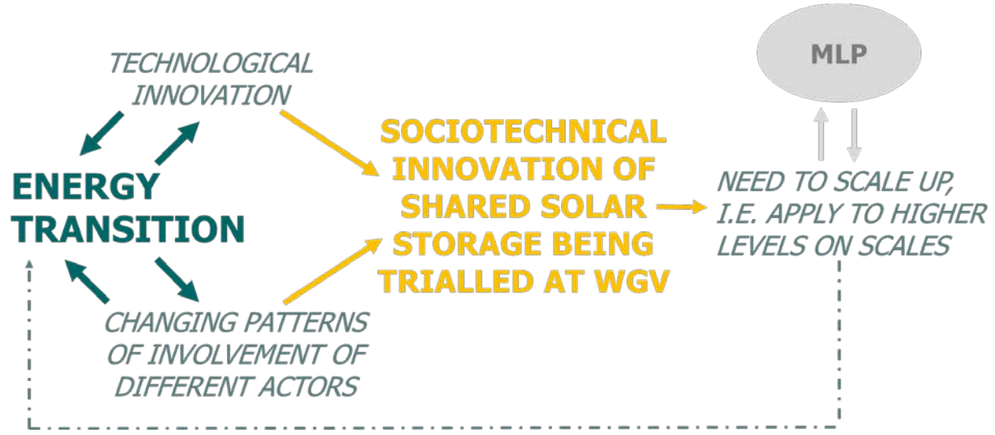

Figure 3: Conceptualisation of the research project.

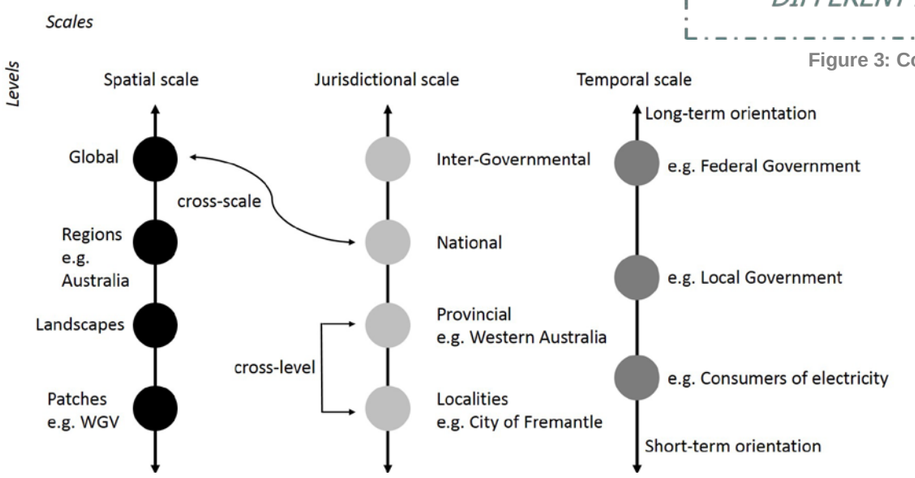

Figure 1: Conceptualisation of scales and levels, as applied to the WGV case study.

Influencing the energy transition requires an understanding of the cross-dimensional dynamics driving system disruptions.

Preliminary Results

The SLR will be submitted to an academic journal before the end of 2017. Results thus far indicate an increasing popularity of ABM in energy studies. The SLR has confirmed that there is insufficient research focusing specifically on the complexities associated with energy transitions, which underscores the merit of the proposed investigation.

Anticipated impacts

This research will contribute to an understanding and effective management of up-scaling in WGV; the literature on scales and agency (in the multilevel perspective); and ultimately to the efficiency of the Australian energy transition. Its impact relates to improved understanding in the areas of battery storage and peer-to-peer energy trading; scaling in theory and practice; energy governance dynamics.

Further information

http://www.lowcarbonlivingcrc.com.au/research/program-3-engaged-communities/rp2006-fredzed-mainstreaming-lc-housing-wa

Contact

Paula Hansen

Curtin University Sustainability Policy Institute

paula.hansen@postgrad.curtin.edu.au
LinkedIn.com/in/paulahansenprofile/