

The geography of energy transitions: a network approach for post-Fukushima Japan

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Abstract

Given the increasing threat of climate change, energy transitions from traditional sources to greener and renewable ones has become a major need and goal worldwide. However, energy transitions are costly and usually slow. In this paper, we empirically study the adoption and spatial spread of energy transitions from nuclear to wind triggered by the Fukushima incident in Japan in 2011. We build a novel panel dataset for 1741 municipalities combining detailed gridded data on the location of wind farms and nuclear plants, merged with data on lights, population, vegetation greenness, and pollution, from 2001 to 2020. Using panel-data econometric techniques, we explore the connection between the proximity to nuclear power plants and the adoption of Wind Energy Technology (WET). We then rely on a network diffusion model to analyze the direction, speed, and order in which municipalities adopted WET. Finally, we perform a counterfactual analysis by targeting key spreaders to alter the diffusion process, allowing us to propose policies to overcome "bottlenecks" in the network.

Keywords: Energy Transition, Networks, Technology Diffusion

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