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Abstract

Climate change, depletion of fossil fuels, and economic concerns are among the main drivers of sustainable energy transition. Over the past decade, several regions with low population density have successfully transitioned towards renewable energy (for example Sienna, Italy). In the Netherlands and other countries, more densely populated regions have drawn up ambitious targets for energy transition. Most of these transition targets lack empirical evidence with regard to spatio-technological feasibility. This lack of evidence may compromise energy transition if constraints are discovered posteriori and short-term milestones missed. To address this shortcoming, we propose an integrated approach. Spatial Transition Analysis (STA) can assist in defining spatially explicit and evidence-based targets for energy transition. STA combines quantitative modelling of energy potentials, qualitative spatial considerations for the siting of renewable energy technologies and comparative scenario development. The application of STA in a case-study (Parkstad Limburg, the Netherlands) revealed that the region has the potential to become energy neutral between 2035 and 2045. Examining and illustrating the different types of constraints as well as the possible choices between renewable energy technologies enabled stakeholders to start planning for energy transition and implementing first interventions. This shows that STA provides a solid framework to foster sustainable energy transition initiated...