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## Potential solar and wind power expansion in the New Zealand network

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Renewable generation, solar and wind, has constantly increased over the last decades. Increasing the share of renewable generation, it is well known that power price is likely to reduce in short-run due to the merit order effect. In long term, the effect also depends on changes in new capacity investments. Previous studies examine the effect of intermittent energies in different electricity markets. For a hydro-based system such as New Zealand, increasing the share of variable resources is more important as the main supply is changeable and depends on climatic conditions. Wind power expansion for this network is well studied by Browne et al. (2015); however, they do not consider solar power in their model. New Zealand seems to be rich enough to access adequate sun radiation for the purpose of power generation, particularly in the North Island. Therefore, the contribution of this study is introducing large solar power into the system. We extend the literature by simulating the power market, using an agent-based model, in order to answer the question of whether wind extension is the best solution in terms of the impacts on electricity price and dispatch or the solar aggregated wind power scenarios would better fits the existing network. We investigate this issue for the case of New Zealand as a small and pure hydro-based network yet the methodology is applicable for other power networks as well.

### Biography

Mina Bahrami Gholami is currently pursuing her PhD in Economics at the University of Auckland, New Zealand. With knowledge on both econometric and mathematical methods, she is passionate about environmental issues including topics on mitigating emissions and renewable energies. She has nearly completed her Doctoral research on evaluating the opportunities for solar PV generation, and the impacts of large solar and wind power on the New Zealand electricity market. Applying agent based model, using the solver SWEM that is developed by the Energy Center, she simulates power market to answer the open questions about the effects of intermittent power extension on nodal and national prices. For her Master's thesis, she conducted a comparative study on greenhouse gas emissions in OECD and OPEC countries using econometric approach, panel data.

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