

Transitioning to Net-Zero Carbon Emissions in Taiwan: A Multi-Dimensional Analysis of Clean Energy Technology Development

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Abstract

Achieving the net-zero emissions target relies on the development and implementation of current and innovative abatement technologies. While discussing about pathways to achieving countries' net-zero emissions targets, governments usually take comparative advantages of manufacturing as well as abatement potentials into consideration. Our study conducted an in-depth analysis of 55 existing and innovative clean energy supply technologies through a series of expert panel review process. Marginal Abatement Cost Curve (MACC) method was used to examine abatement cost and potential for each technology. Quantitative scorings of Technology Readiness Level (TRL) and comparative advantages were also considered to categorize 55 technologies with different deployment strategies. Finally, our study applied the Taiwan TIMES model, an energy engineering model, to further shape Taiwan's pathway for net-zero electricity. Results of this study have shown that by integrating interdisciplinary collaboration and energy modeling, we could provide more solid policy suggestions for future development planning toward national net-zero emissions target.

Keywords: pathway to net-zero emissions, marginal abatement cost curve (MACC), TIMES model

• The views expressed are those of the individual authors and do not reflect those of Industrial Technology Research Institute and Bureau of Energy, Taiwan.

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