



A Comparison of State-Level Carbon Reduction Strategies: A Case Study of Hawai'i

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Highlights

- We develop a CGE model of the Hawai'i economy and GHG emissions.
- The RPS reduces Hawai'i GHG emissions and household welfare.
- GHG equivalent carbon taxes (without dividends) also reduce welfare.
- Equal share dividend payments yield progressive and often positive welfare impacts.
- Electric-sector-only policies result in lower electric vehicle adoption.

Abstract

State-level electricity standards are proliferating and becoming more ambitious, with numerous US states adopting a Renewable Portfolio Standard (RPS) and a small but increasing number of states participating in carbon pricing programs. The State of Hawai'i has an ambitious RPS that requires 100% electricity generation through renewable sources by 2045. This study uses a general equilibrium model to compare a range of state-level carbon reduction strategies that achieve the same level of GHG emissions reductions in Hawai'i as the RPS. We find that the RPS has regressive welfare outcomes. In contrast, an electric-sector-only carbon tax can be progressive if revenues are returned to households in equal-share dividends. Without dividends, there is little difference in welfare impacts between the RPS and electric-sector-only carbon tax. An economywide carbon tax has the lowest marginal cost of GHG abatement and highest level of electric vehicle adoption. When revenues are returned to households, the economywide carbon tax also has the most progressive welfare outcomes. Without revenue recycling to households, however, the economywide carbon tax yields the worst welfare impacts.

Keywords

Renewable Portfolio Standard; carbon tax; GHG emissions; electric-sector carbon policies; CGE model; distributional effects

JEL classification

C68; Q43; Q54; Q58

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Data Availability

Data will be made available on request.

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