Economic Impacts of Expanding Vermont's Renewable Energy Standards

INTRODUCTION

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Benefit-Cost Analysis Captures Direct Net Benefits



Benefit-Cost Model

Calculates the direct net benefits resulting from RES/CES policies:

- Costs of building and integrating RE resources
- Avoided electricity sector costs (e.g., reduced T&D costs, improved reliability)
- Rate payer bill impacts
- Societal benefits (environmental benefits)

Comprehensive Impact Assessment of RES/CES Expansion

Increased economic activity in input sectors that provide goods/services in procuring RE infrastructure (e.g., manufacturing, construction sectors):

- Sectors that provide inputs to building and integrating RE resources increase production, contributing to growth.
- Increased household income from wages and capital rent lead to more consumption.

Reduced economic activity in input sectors due to reduced input demand:

- Reduction in wholesale electricity prices
- Decreased production levels result in less use of production input factors
- Labor, capital, natural resources and other intermediate goods repurposed and redistributed to other sectors

BEYOND Model (Resulting Economic Impacts)

B-C Analysis (Source of Economic Impacts)

Costs of Renewable Energy:

- Incremental Cost of RE
- Grid Integration Costs

Electricity Sector Avoided Costs:

- Reduced T&D Costs
- More Efficient FCA Outcomes
 - Rate Payer Bill Impacts

Societal Benefits

Increased economic activity due to price effects (reflecting rate decreases):

- Increased disposable income for households lead to higher demand in non-electricity goods, inducing increased production of these goods
- Commercial and industrial customers also have more budget to spend on nonelectricity production inputs, inducing higher demand and production
- Increased production leads to increased use of labor and capital, which provides increased income for households – owners of labor and capital
- Increased production also leads to more government tax revenue and savings
- Increased production of goods and services are consumed in-state, exported out-of-state, or used as investment goods to increase VT's GDP

Economic Impact Assessment Captures Economy-wide Effects

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Brattle's Macroeconomic Model (BEYOND)

Calculates the indirect and induced economic impacts (state GDP) resulting from RES/CES policies:

- Incurred costs of RE increase economic activity in sectors that costs are paid to
- Decrease in electricity sector costs decrease spending in other input sectors, reducing economic activity
- Rate payers' bill savings translate into more consumption and more efficient production of goods/services

Two analyses should be used *together* in providing a comprehensive assessment of cost effectiveness. Macroeconomic impacts should be considered as economy-wide effects of VT's RES/CES policies that are consistent with the policies' direct costs and benefits.

BEYOND Model

- BEYOND is Brattle's proprietary recursive dynamic computable general equilibrium (CGE) model
- Representation
 - 50 states + Washington, D.C.
 - 71 sectors based on BEA national summary files
 - 5 household income levels
 - Annual time steps (2023-2035 for current study)
- Simulates Key interactions in US economy:
 - Interactions between industries, households and government
 - Model dynamics based on circular flow of economic activity
- Key model outputs:
 - GDP/GSP impacts
 - Price effects (wages, return on capital, prices of goods and services)
 - Economic output by sector and region
 - Consumption of goods and factors of production by sector and region



Clarity in the face of complexity



