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Renewable Portfolio Standards: Costs and Benefits

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ABSTRACT

This report summarizes state-level RPS costs to date, and considers how those costs may evolve going forward given scheduled increases in RPS targets and cost containment mechanisms. The report also summarizes RPS benefits estimates, based on published studies for individual states and discusses key methodological considerations.

STUDY METHODOLOGY

Historical Cost Data Analysis: Basic Approach

- Our analysis focuses specifically on the *incremental* cost of meeting RPS targets.
- The report relies largely upon data or results reported directly by electric utilities and state regulators.
- Key metrics include $/MWh of renewable energy procured and % of average retail rates.

Basic Methodology

- Restructured Markets: Calculated costs based on renewable energy certificate (REC) and alternative compliance payment (ACP) prices and volumes for each resource tier.
- Regulated States: Synthesized cost estimates published by utilities and PUCs, based on the varying methods.

RPS BENEFITS

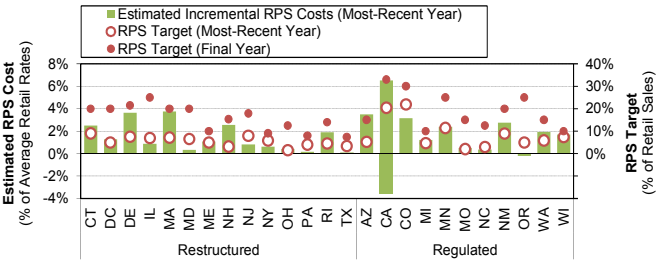
We identified studies for eight states that assessed the societal benefits or broader impacts of RPS policies.

Type of Benefit	Estimated Values	Estimation Method	Range Estimate $/MWh of RE	States with Estimates
Emissions & Human Health	• Avoided emissions • Human health impact of improved air quality	• Electric sector modeling (CT, OH, DE, IL, NY) • Displaced marginal generator emissions (ME)	$4-23	CT, OH, ME, DE, IL, NY
Economic Development Benefits	• Job creation • Direct facility Investment • Tax revenues • Induced spending	• Input-output models and case studies (IL, ME, MI, OR) • Economic modeling (CT, NY)	$22-30	CT, IL, ME, MI, NY, OR
Wholesale Market Price Suppression	• Depressed wholesale market prices from displaced dispatch stack generators	• Dispatch modeling scenarios with and without Renewable Energy	$2-50	ME, MA, IL, MI, NY, OH

- A relatively small number of RPS benefits estimates have been developed and methodologies vary considerably.
- Comparing costs and benefits is challenging, given costs may already include specific benefits, analysis time periods may differ, benefits assessments may address only particular types of benefits are assessed.

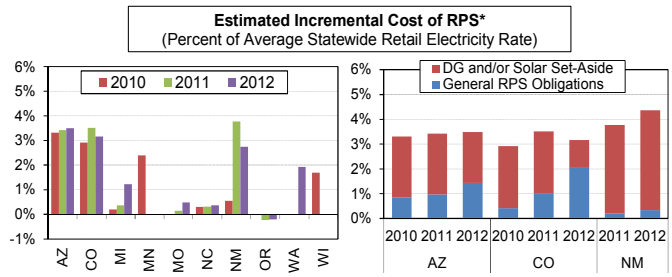
ESTIMATED RPS COSTS *RESEARCH SUMMARY AND KEY FINDINGS*

Estimated Incremental RPS Costs (% of Retail Rates)



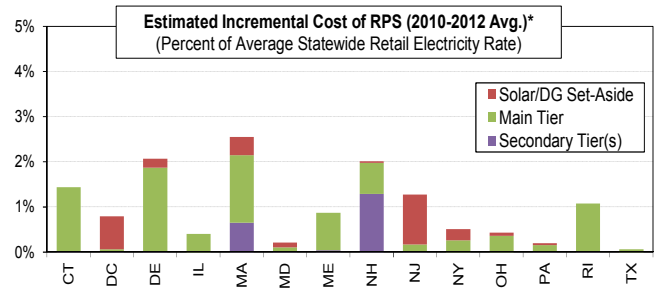
Costs were generally <2% of retail rates (10 out of 14 states in 2012), with an average of 1.4% in 2012, but also varied significantly among states. Trends reflect REC pricing and mix of resource tiers along with differences in RPS target level, which explains the rising cost in most states, parallel to rising RPS targets.

Regulated States: % of Retail Rates



Higher costs in Arizona, Colorado, and New Mexico due partly to solar/DG set-aside costs (right-hand chart) with front-loaded costs associated with rebates and performance based incentives.

Solar Set-Aside Contribution to Costs



- Main tier requirements are the bulk of RPS compliance costs in most states.
- Exceptions in D.C. and New Jersey (high solar requirements and SREC prices) and Massachusetts and New Hampshire (high secondary tier REC prices).
- ACP costs generally minimal (reflecting adequate REC supply).

CONCLUSIONS

- Incremental RPS compliance costs ('10-12) average 1% retail electricity rates; Restructured markets estimates were $10 to $60/MWh and regulated markets estimates were ~$20/MWh or less.
- States commonly estimated RPS benefits associated with avoided emissions ($3-22/MWh renewable generation), economic development ($4-24/MWh), and wholesale electricity price suppression ($2-50/MWh).
- States with ongoing RPS cost assessment and standardization efforts might also be useful to other states (CA, DE, MN, OR, WA).

REPORT BY NREL & LBNL

Download report:
http://www.nrel.gov/docs/fy14osti/61042.pdf

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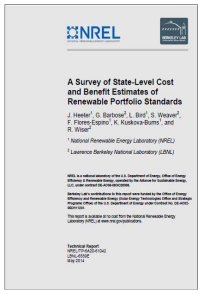

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