

The Economics of Maine's Renewable Portfolio Standard

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Objectives

- To gain a better understanding of the potential benefits and costs of renewable portfolio standards (RPS); and
- To understand the ways in which Maine's RPS may affect our state economy and environment.
- Specifically, I will:
 - Focus on Class I RECs;
 - Briefly review two recent studies making various economic claims.

Introduction to Maine's RPS

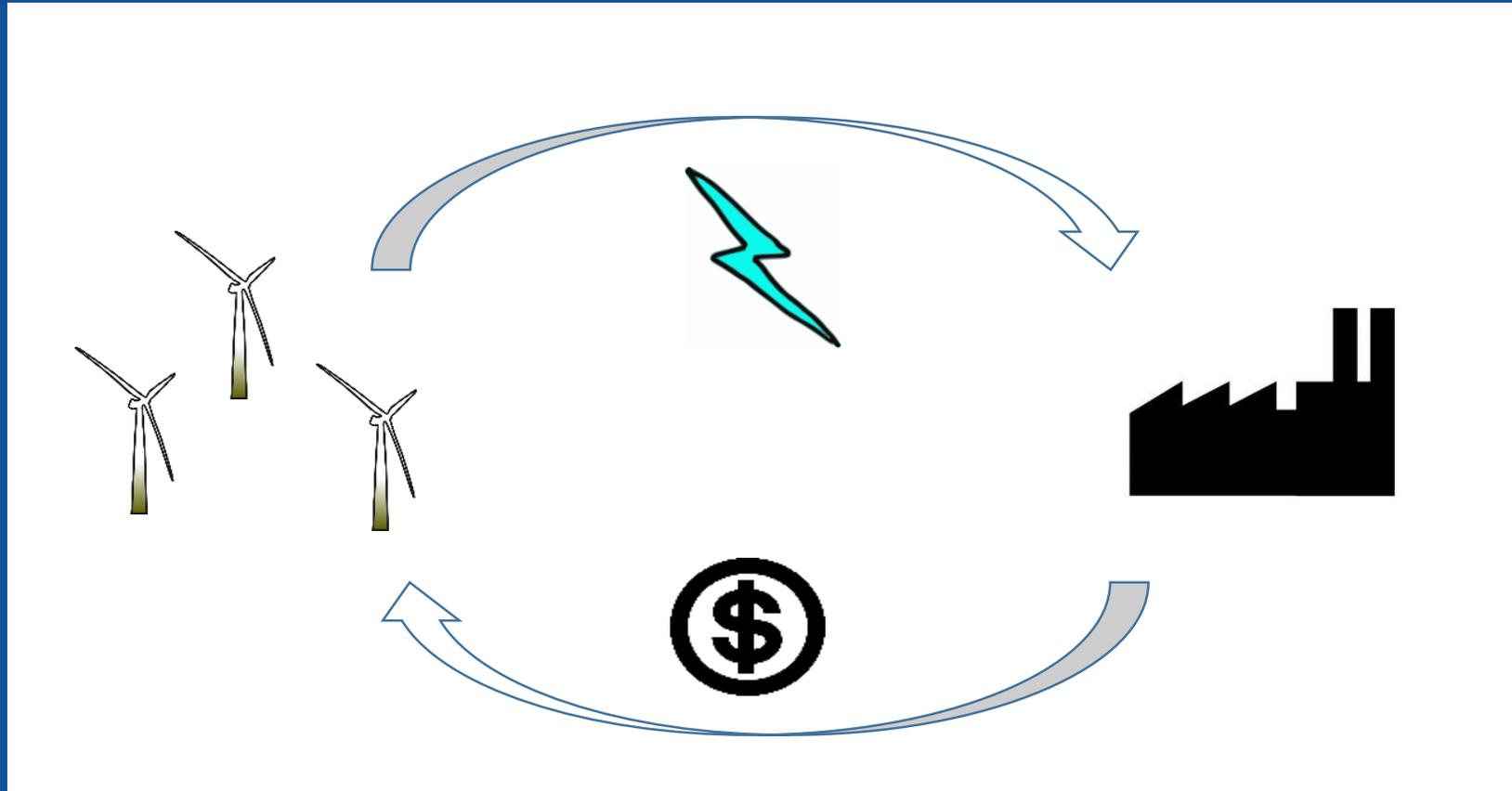
Class II Standard

- At least 30% of retail electricity sales by “eligible renewable and certain energy-efficiency resources.”
 - Not truly a “binding constraint.”
 - Item: Only “small” facilities with no greater than 100 MW*
- *(except for wind)

Class I Standard

- Goal: To increase new renewable energy capacity by 10% by 2017.
- Staggered implementation.
- One percent new renewable energy capacity in 2008, then increase 1 percent each year.
- Three additional goals for wind power.

The Market for Renewable Energy Certificates (simplified)



How the Market for RECs works (reality)

Demand and Supply Side

- All MWs are not created equal!
- Each state in the NE Pool has different standards as to what they can “accept” to satisfy the RPS (geography, technology, size, vintage).
- Each REC generated may only be sold in certain markets.

Pricing

- Pricing varies widely from state to state, even within the same pool.
- Pricing is so complex that the final prices are determined by brokers, and sometimes not until the sale is final.

Do the Benefits Outweigh the Costs?

Four Categories of Benefits:

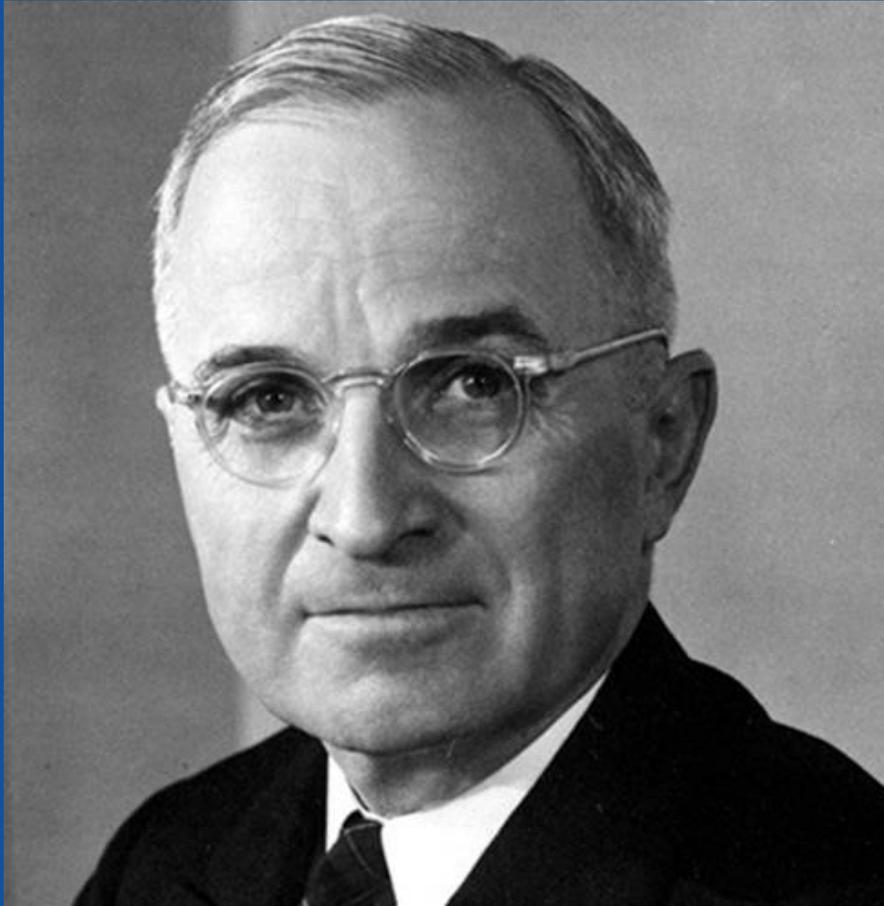
- “Homegrown” energy
- Investment and increased employment
- Revenue for generators
- Avoided Emissions and Improved Air Quality

Three categories of costs:

- Increased Residential, Commercial, and Industrial Costs
- Ripple Effect
- “Deterrence Effect”

	Beacon Hill Institute / Maine Heritage Policy ¹ (amounts for 2017 only)	London Economics ² (amounts over time unless otherwise specified)
Effect on Jobs	Lower employment by 995 jobs (820 – 1,165)	Reduce 129 jobs as a result of increased electricity prices. Create 11,700 jobs in construction (wind only; staggered over time)
Effect on Disposable Income	Reduce disposable income by \$85 million (<i>note: translates to 0.1 percent</i>)	Reduce disposable income by \$12 million to residential customers
Effect on Investment	Decrease investment by \$11 million	Increase by \$560 million (wind only; staggered over time)
Effect on Average Electricity Bill	Households: + by \$80/year (8%) Commercial: + by \$615/ yr (10%) Industrial: + by \$14,300/yr (16%)	Retail rates increase by 1.9% in 2017 (1.07 – 2.62, depending upon assumptions)
Effect on GSP	Not calculated	Reduce by 0.06 percent (impact on consumers); increase by 2% (increase in investment)
Effect on Emissions	Reduction of 145,600 metric tons of CO2 annually, but an increase of SOx and NOx (with backup).	Reduction of 1.1 million tons of CO2, 1,629 NOx and 96 tons of SO2 annually, valued at \$13 million (wind only)

“What the world needs...



... is a one-handed economist.”

-My dad, misquoting Harry Truman.

Potential Ratepayer Costs of Maine's RPS

- Idea here is that power generators are going to have to pay a higher price for electricity, and the higher prices will “pass through” to consumers.
- Cost of compliance is ultimately determined by price of the RECs that electricity producers had to buy (in turn determined by demand, supply, cost of generation).
- In 2013, total cost of compliance (Class I and II) was about 0.17 cents per KWh, between 1.2 and 1.4 percent of the typical price per kilowatt hour. ³
- Estimated that as RPS ramps up, cost of compliance will be about 1.9% of the typical consumer's bill. ⁴

“Ripple Effects” of Higher Electricity Costs

- Higher price will “pass through” to consumers, reducing disposable income. This, in turn, could ripple through the economy to decrease demand for consumer goods.
- Ultimate effect depends on several things:
 - Sensitivity of current Maine consumer to higher electricity rates;
 - Elasticity of electricity consumption in each sector.
- Electricity bills are a small component of household income (~0.1%),⁵ but may affect some households more than others.

Deterrence Effect of Higher Electricity Rates

- Maine does have high residential and commercial electricity rates, but relatively low residential and commercial monthly bills (compared to the rest of the nation).⁶
- Electricity and heating costs are important factors in location decisions, but heating costs swamp the costs of electricity in percentage of utility bills.
- Focus should be on decreasing heating costs (increasing energy efficiency) to a higher degree than decreasing electricity costs.
- Rest of New England also has RPS standards or goals!

Benefits: Increased Investment

- Difficult to pinpoint the exact driver behind increased investment.
- Investment in renewable energy sources has increased by \$900 million from 2009-2013 and is projected to grow by an additional \$1.9 billion from 2014 – 2023.⁷
- REC revenues alone are not enough to “single-handedly... fully remunerate an investor,” but they do cover a substantial portion of the gap between market revenues and levelized costs.⁸
- Dollars invested in Maine can generate a multiplier effect, by which increased income ripples through the economy.

Benefits: “Homegrown Energy”

- Increases the multiplier: money earned by locally-owned institutions is more likely to stay within the state.
- Increases in local tax revenue.
- Increases in local employment.
- Defer transmission expenses.
- Develop networks within the community (“cluster effects”).

Benefits: Avoided Emissions

- By displacing energy generation from more conventional sources, each MWh of generation by renewable sources has the potential to reduce emissions of carbon dioxide, nitrogen oxides, and sulfur dioxide.
- Complete analysis depends on type of renewable source, backup power used and capacity rates.
- Aside from greenhouse gas emissions, emissions from conventional energy generation have been associated with respiratory, cardio-vascular, and other health issues.

Conclusion

- Devil is in the assumptions (see appendix)!
- RPS will likely raise rates, but by how much depends on numerous factors. Need to protect those citizens most vulnerable to rate increases, and promote adoption of electricity-saving technologies.
- Deterrence effect (especially compared to rest of New England) likely overstated.
- New wind generation likely to hit “diminishing marginal returns” – but when?
- What will happen to price of RECs in the future?
- Benefits in terms of avoided emissions alone may be significant.

Addendum (added March 26, 2015)

- Recent data from the Maine PUC shows that the average price of Maine RECs has fallen to approximately \$5 / MWh (lowest in New England by far, and 20% of what the average prices were in the London Economics report).
- Possible implications:
 - To the extent that Maine retail suppliers use Maine-grown RECs to satisfy the RPS, the price of compliance will be low.
 - However, to the extent that Maine resource generators sell their RECs in Maine, their revenue will also be low. Others, who can sell their RECs in other states, will reap the rewards.
 - Need more information about percentage of Maine RECs sold in Maine.

Thank you!

References

1. Maine Heritage Policy Center and Beacon Hill Institute for Public Policy Research. 2012. "The Economic Impact of Maine's Renewable Portfolio Standard," *Path to Prosperity* 10(6).
2. London Economics International. 2012. "MPUC RPS Report 2011 - Review of RPS Requirements and Compliance in Maine." Boston, MA: London Economics.
3. Maine Public Utilities Commission. 2014. "2013 Average Price by Component." <http://www.maine.gov/mpuc/electricity/>.
4. London Economics International. 2012.
5. Presenter's calculations using data from MPUC website and Bureau of Economic Analysis.
6. Electricity Local. 2015. "Maine Electricity Rates and Consumption." <http://www.electricitylocal.com/states/maine/>.
7. Pew Charitable Trusts. 2014. Maine's Renewable Portfolio Standard Drives Clean Energy Economy. <http://www.pewtrusts.org/en/about/news-room/news/2014/12/08/maines-renewable-portfolio-standard-drives-clean-energy-economy>.
8. London Economics International. 2012.

Assumptions in the Beacon Report

- Used STAMP model (not used outside of Beacon Institute);
- Used estimates of costs that are in excess of EIA calculations;
- Modeled as a sales tax, not electricity cost increase;
- Used computable general equilibrium model, which assumes full employment;

- Forecasts of energy demand are unusually high;
- Model was actually for a national RPS, not Maine's specifically;
- Applied model to six states (none in New England) and averaged the effect of the prices changes to determine elasticity.
- Assumed renewable energy always needs (conventional) backup system in place, constantly idling.

Assumptions used in London Economics Report

- Tested three different scenarios: price of RECs stayed same as in 2010; increased; and decreased;
 - Used Maine-specific output multipliers in the Bureau of Economic Analysis RIMS model;
 - Assumes consumers do not react to higher prices by changing electricity consumption patterns;
- Assumes half the wind projects in the IQ are completed at estimated costs and 35% of investment stays in Maine.