

MAINE STATE LEGISLATURE

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ECONOMICS

London Economics International LLC

Highlights from
MPUC RPS Report 2011:
Review of RPS Requirements and Compliance in Maine

prepared for the Maine Public Utilities Commission pursuant to
An Act To Reduce Energy Prices for Maine Consumers

February 23, 2012

What I Intend to Cover Today

1

Overview and Approach

2

Key Findings

3

Discussion of Each Study Item & Takeaways

4

Cost and Benefit Summary

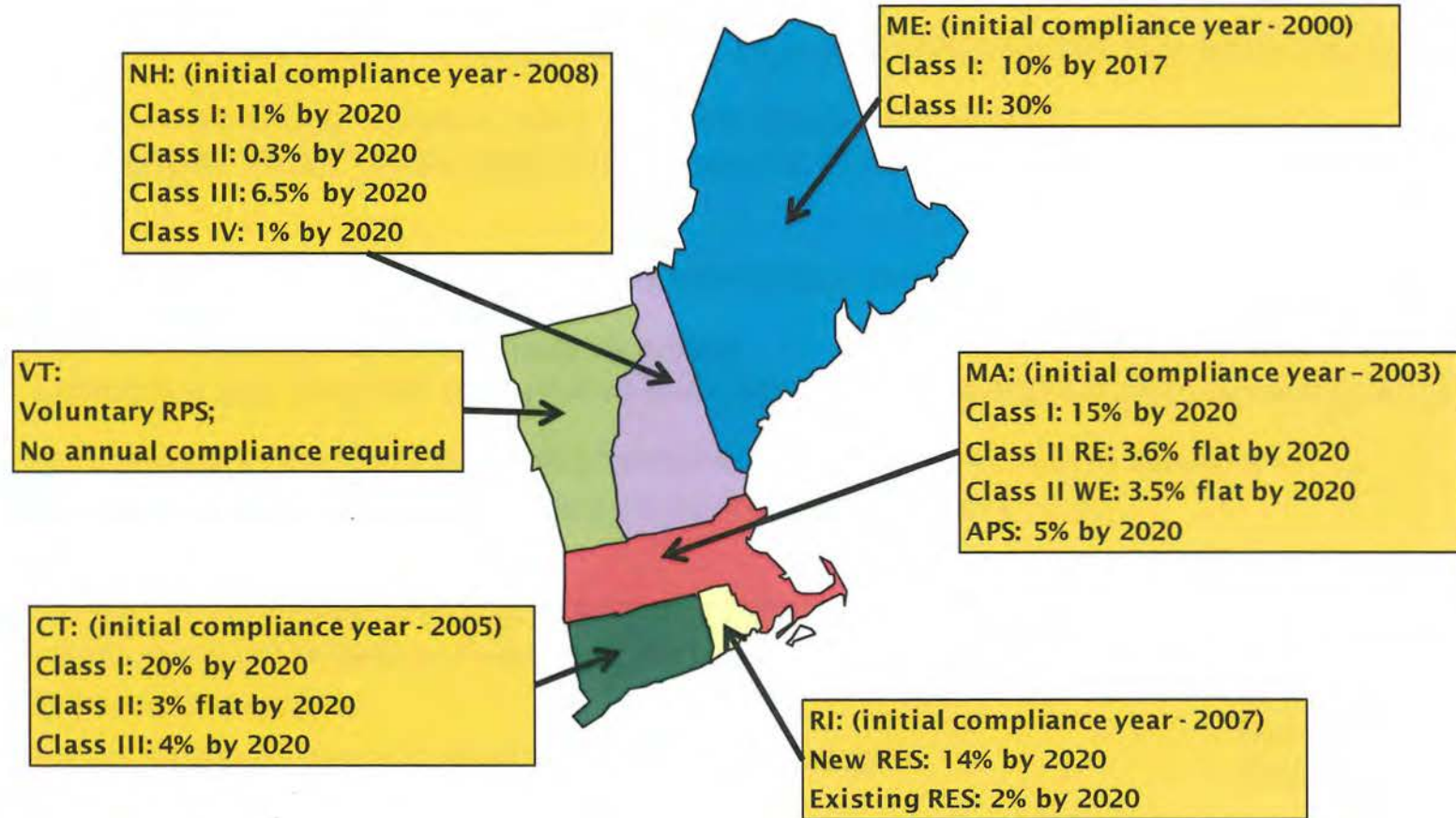
MPUC was directed by the Legislature to study Maine's renewable portfolio requirement established in 35-A M.R.S.A. § 3210 (3-A).

- ▶ **Maine's RPS requirement is composed of two classes:**
 - Class I (new renewables)
 - includes qualifying renewables on-line after September 1, 2005
 - increases by 1% annually (from 1% of retail sales in 2008 to 10% of retail sales by 2017)
 - Class II (existing renewables)
 - sets 30% of electric sales as the required renewable percentage to qualify for RPS
 - allows a broad pool of generation types (including existing projects) to qualify as renewable
- ▶ **New England's RPS policies and large renewable resource potential in Maine have led to significant renewable development in Maine**
- ▶ **Quasi-regional market for the supply of renewable energy credits ("RECs") exists in New England**
- ▶ **Maine's RPS has much lower MWh requirements over time than some other New England states due to its relative lower level of retail electricity sales**
- ▶ **LEI's report provides fact-based foundation to inform legislature and does not make any specific policy recommendations**
- ▶ **Report focuses on 8 key items identified by the Legislature in Bill SP0501 Item 2**

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To date, five New England states have established mandatory RPS regulations and they share several commonalities



Source: Database of State Incentives for Renewables & Efficiency (DSIRE)

LEI reviewed Maine's RPS and provide fact-based foundation to inform legislature

Item 1

- the source and cost of renewable energy credits ("RECs") used to satisfy the renewable portfolio standard ("RPS") requirements

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Item 2

- the impact of RECs generated in Maine on the regional REC market

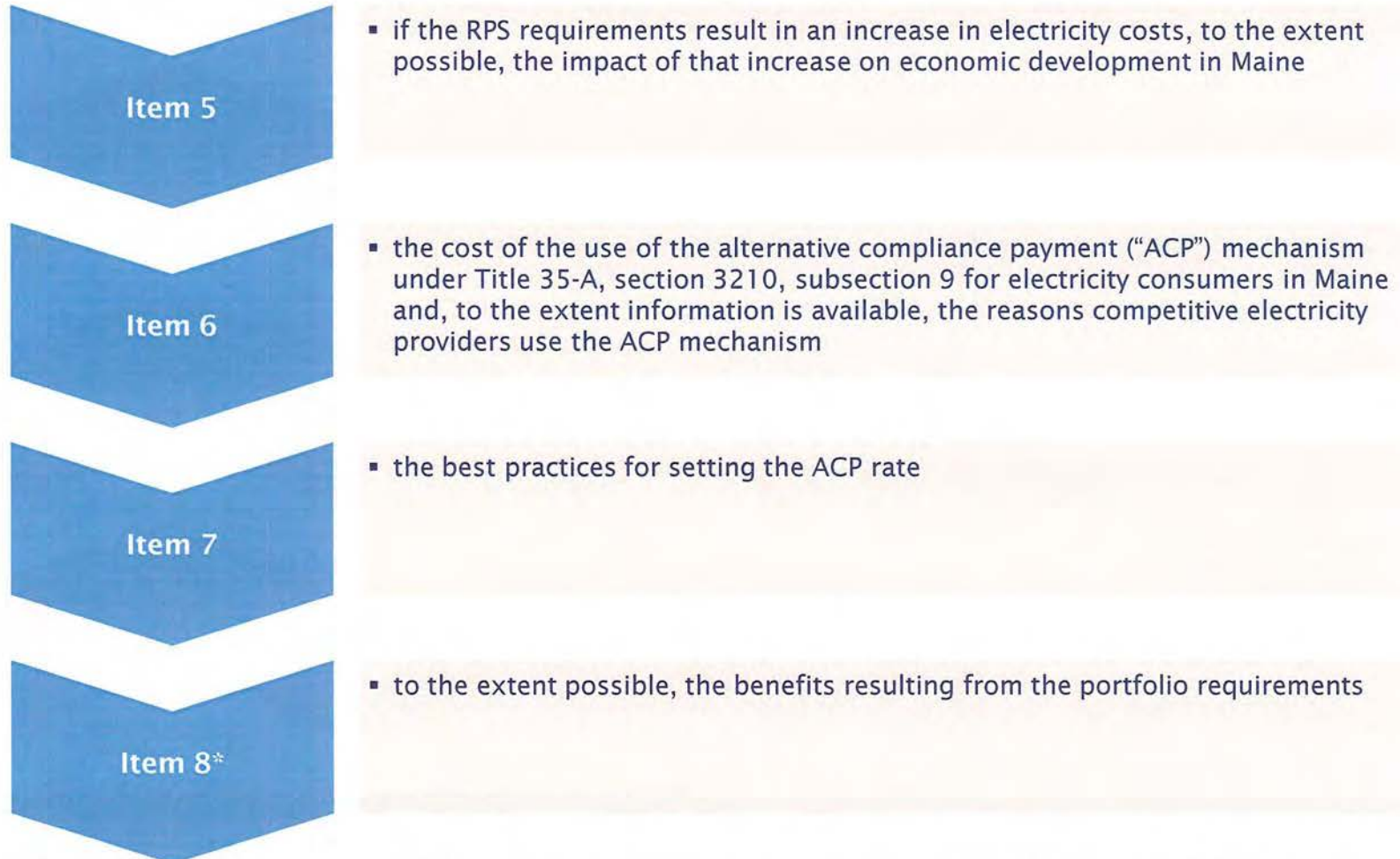
Item 3

- the impact of the RPS requirements on the viability of electricity generating facilities in Maine that are eligible to meet the RPS requirement

Item 4

- the impact of the RPS requirements on electricity costs of Maine ratepayers

LEI reviewed Maine's RPS and provide fact-based foundation to inform legislature



*including, but not limited to: tangible benefits and community benefits pursuant to Title 35-A, section 3454, economic benefits due to the creation of jobs or investments in this state including multiplier effects, research and development investment in this state, the impact on electricity rates and benefits due to diversifying this state's energy generation portfolio

LEI approach included review of relevant documentation, scenario development, and application of economic multipliers

- ▶ **RPS assessment included review of available compliance documents from New England states to determine compliance process and costs, review of RPS program attributes and historical review of REC markets (Items 1, 2 and 5)**
- ▶ **LEI used its New Entry Trigger Price (“NETP”) model to estimate the required all-in levelized costs for different eligible renewable technologies (Item 3)**
 - LEI estimated available energy and capacity market and applicable subsidies (such as investment grants and the PTC) to calculate break-even shortfalls for a renewable generator
 - LEI then compared the break-even shortfalls against the REC prices (from Bloomberg)
- ▶ **LEI developed customized “what if” cases to test the potential rate impact of a higher RPS requirement and different REC prices based on reported procurement costs and current Maine RPS program details (Item 4)**
- ▶ **LEI developed case studies to assess best practices related to use of the ACP (Item 7)**
- ▶ **LEI employed BEA RIMS II model multipliers to estimate the impact on GSP and employment levels in Maine from potential renewable power development in the state (Items 5 and 8)**
- ▶ **LEI further supplemented responses from Notice of Inquiry (NOI)**

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There are several key findings from LEI's Analysis

- ▶ RECs generated in Maine will continue to be a critical source of supply for the regional REC market across New England (Item 2)
- ▶ Current Class I REC prices do not fund the gap between all-in levelized costs for a new eligible renewable resource and its expected revenue, although they do provide meaningful revenues for already operating renewable generators (Item 3)
- ▶ Maine's qualified renewable resources produced more than enough RECs to meet the RPS requirement in 2010 at a cost to Maine ratepayers of \$0.07/KWh (Item 1)
- ▶ Retail rates increase from current levels by 1.9% in 2017, when Maine's RPS requirement reaches 10% of retail sales, assuming a REC price of \$24/MWh (Item 4)
- ▶ If the RPS compliance requirement increases to 10% and, assuming REC prices increase to \$33/MWh from the 2010 compliance year cost level of \$24/MWh, retail rates would rise by 2.6%; a lower REC price (\$13.5/MWh) coupled with a 10% requirement would result in approximately 1 % higher retail rates from 2010 levels (Item 4)
- ▶ Additional costs to residential customers associated with higher costs of RPS compliance would contract economy activity in Maine by about 0.06% in both GSP and employment terms. (Item 5)
- ▶ The ACP is not a meaningful cost contributor to the RPS program, and is unlikely to be in the future, even if ACP usage increases. ACP is generally perceived to be working as an effective cap on prices for Class I RECs. (Items 6 and 7)
- ▶ Investment in Maine renewable generation has the potential to be a meaningful contributor to the state's gross state product ("GSP"). Over time it could generate \$1,140 million or a 2% increase over current GSP, and the creation of 11,700 jobs during construction as well as additional jobs associated with operations and maintenance (Item 8)

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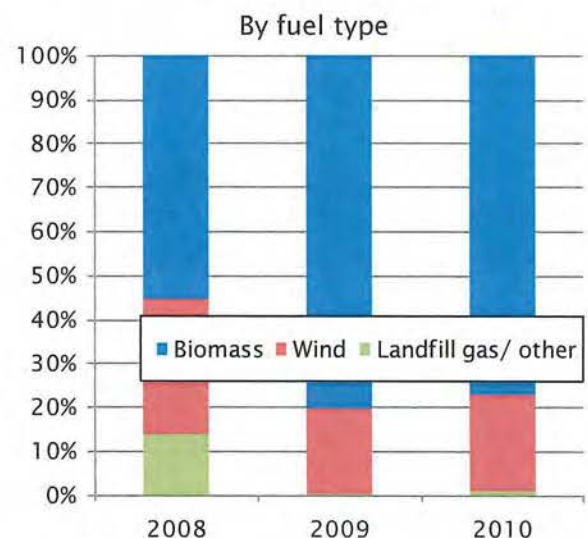
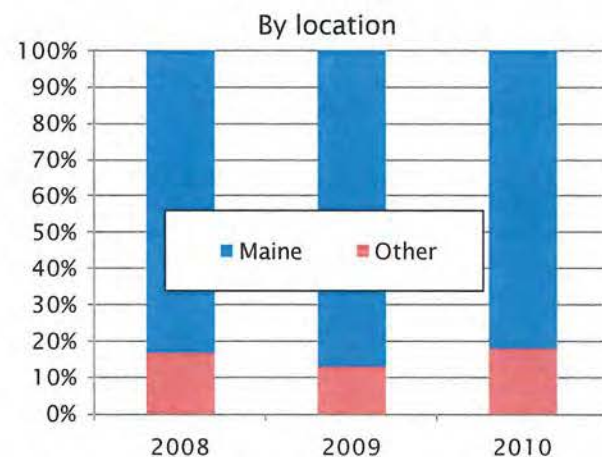
Item 1: Source and cost of RECs used to satisfy Maine RPS requirements

- ▶ **For Maine Class I (new renewables) RPS requirements:**
 - Nearly 80% of purchased RECs were produced within the State of Maine for the past three years
 - ACP only accounted for a small portion of the total compliance costs
 - Biomass to date has been the major compliance resource
 - The average REC procurement cost was \$24 per MWh in 2010

- ▶ **For Maine Class II (existing renewables)**
 - Hydro has been the major compliance resource
 - The large quantity of eligible supply results in much lower REC prices than for Maine Class I

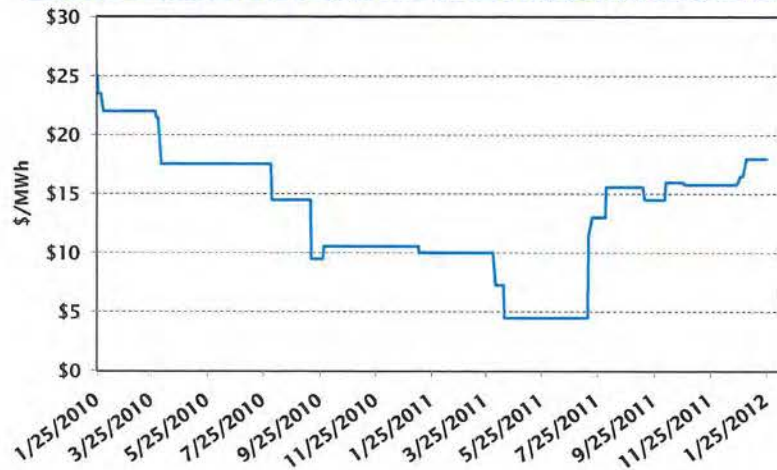
- ▶ **RPS compliance cost in 2010 for Class I and II was equal to \$0.074 per KWh or roughly 0.6% of a typical retail residential customer's monthly bill**

Distribution of compliance sources for Class I (new renewables) in Maine



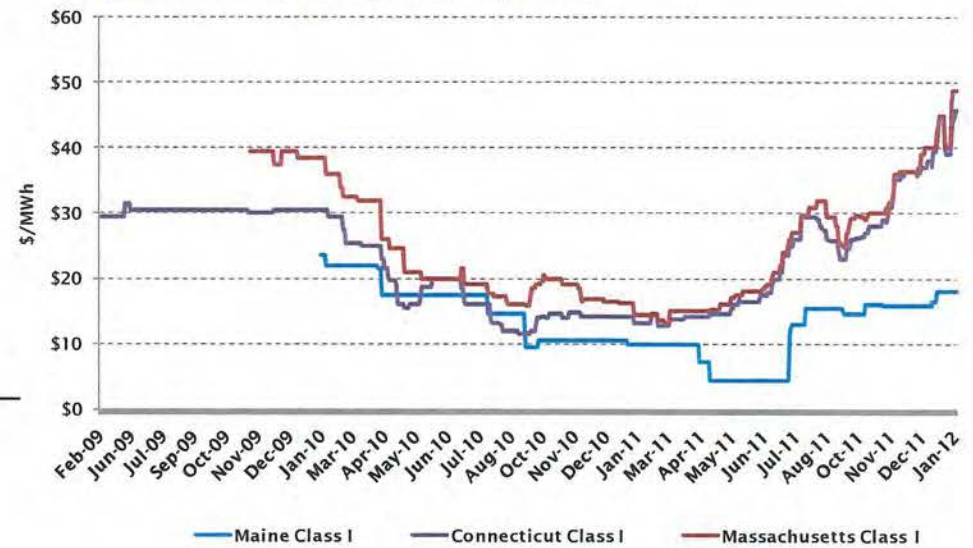
Current trading prices for 2011 vintage Class I RECs for Maine RPS are below 2010 levels

Maine Class I REC prices for compliance year 2011

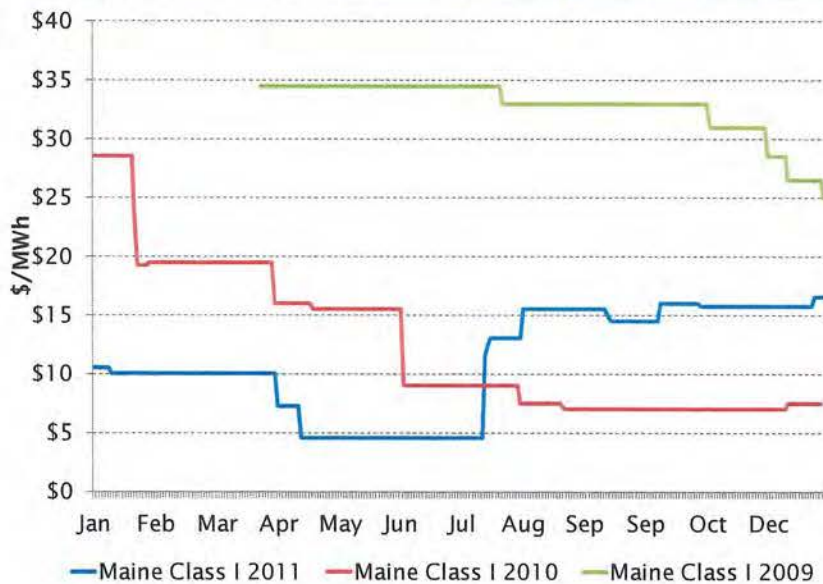


Historical REC prices for compliance year 2011

In contrast to Maine's REC price trends, Massachusetts and Connecticut Class I REC prices have more than doubled since December 1, 2010



Maine Class I (2009-2011) average annual prices



2011 REC average prices

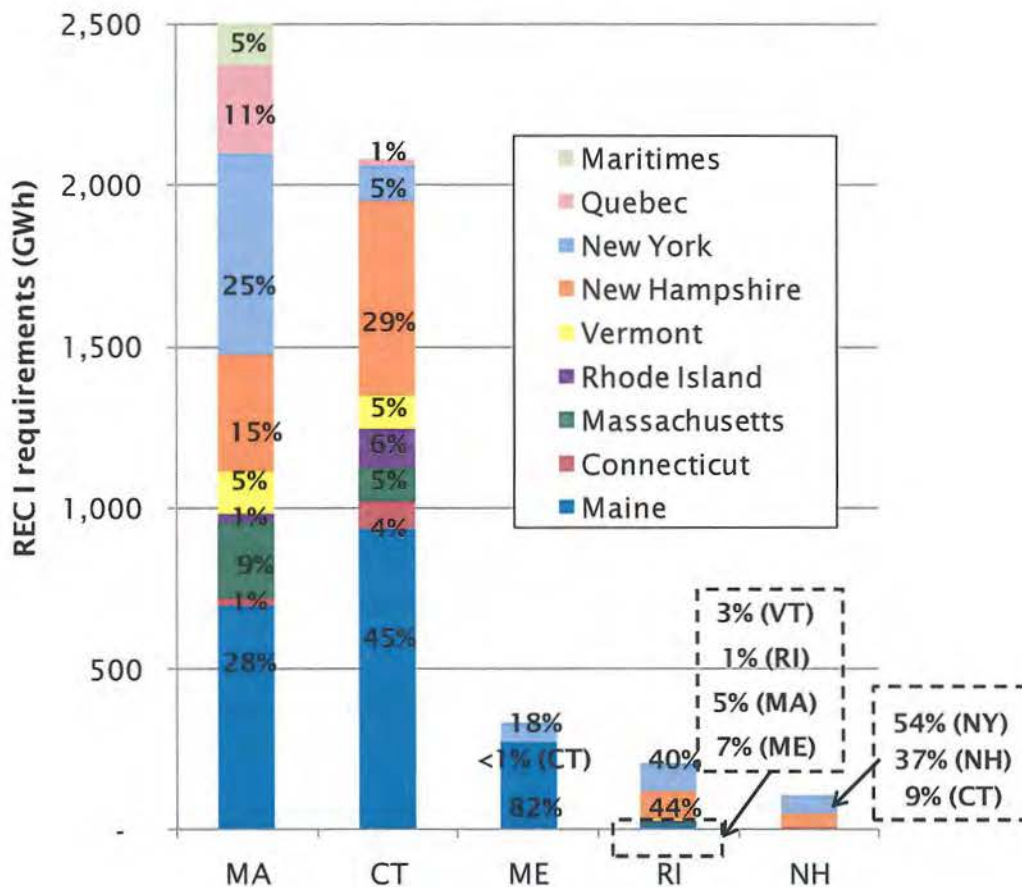
- ▶ Avg. ME REC Class I (From Jan. 2010 to Jan. 2012) = \$13.5/MWh
- ▶ Avg. MA REC Class I (From Nov. 2009 to Jan. 2012) = \$25.1/MWh
- ▶ Avg. CT REC Class I (From Feb. 2009 to Jan. 2012) = \$23.3/MWh

Source: Bloomberg, accessed January 26, 2011

Item 2: Impacts of RECs generated in Maine on the regional REC market

- ▶ Maine’s renewable resources contributed significantly to RPS Class I compliance in other states (e.g., Massachusetts and Connecticut)
- ▶ Additional supply of renewable resources (e.g., wind sourced from Maine) will tend to lower REC prices
- ▶ Stricter biomass regulations for Massachusetts Class I RECs may lower Maine REC prices as long as biomass continues to qualify

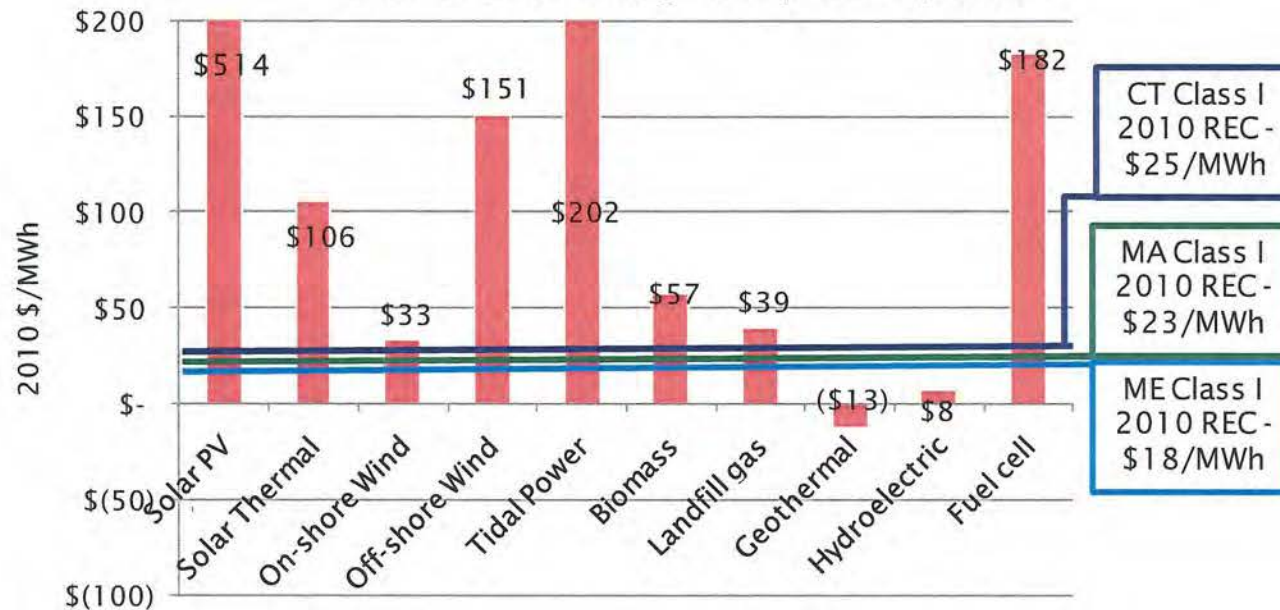
State REC sources by location in MWh



Item 3: Impacts of RPS requirements on the viability of electricity generating facilities in Maine eligible to meet the RPS requirement

- ▶ REC sales contributed 25% of the total revenues for a typical biomass plant, and 26% of total revenues for a typical run of river hydroelectric plant and a typical wind plant in 2010
- ▶ The break-even shortfalls for new renewables are below the over-the-counter 2010 vintage REC prices, except for geothermal and hydroelectric facilities

Comparison of “break-even” shortfalls for new renewables and over-the-counter 2010 vintage REC prices (\$/MWh)



Note:

- 1) These are over-the-counter RECT prices, not average procurement costs
- 2) The maximum of the Y-axis is fixed at \$200/MWh to show the relationship between breakeven shortfalls and Class I (new renewables) REC prices of Connecticut, Massachusetts, and Maine for 2010, which are calculated as an average based on historical data.
- 3) Source: Bloomberg, accessed September 2011

Item 4: Impact of higher RPS requirements and different REC prices on Maine ratepayers' electricity costs

- ▶ LEI has performed a hypothetical “what if” analysis to capture the impacts of different level of REC prices and RPS requirements in relation to 2010 costs and rates

Scenario	RPS requirements	REC prices	Impact
Status Quo*	Current RPS requirements for Class I in 2010 (3%)	\$24/MWh	REC compliance costs equal to 0.072 cent/KWh, or 0.57% of average current retail rates, or \$0.37 of the current residential monthly bill
1	10% of retail sales	\$24/MWh	REC compliance costs equal to 0.24 cent/KWh, or 1.90% of average current retail rates, or \$1.25 of the current residential monthly bill
2	10% of retail sales	\$33/MWh	REC compliance costs equal to 0.33 cent/KWh, or 2.62% of average current retail rates, or \$1.72 of the current residential monthly bill
3	10% of retail sales	\$13.5/MWh	REC compliance costs equal to 0.135 cent/KWh, or 1.07% of average current retail rates, or \$0.7 of the current residential monthly bill

* Assumes 12,000 GWh retail sales and a typical residential usage in Maine of 520 KWh/month

- ▶ **Over the longer term as RPS policies motivate new renewable investment to a significant scale, energy price reductions will also occur in the wholesale power market**
 - ISO-NE study found that the energy prices can decrease by \$0.6/MWh per 1 GW of new on-shore wind generation in the region in 2016

Item 5: Impacts of an increase in electricity costs due to RPS requirements on economic development in Maine

- ▶ **Electricity cost increases due to higher RPS compliance costs would reduce economic activity by cutting spending and investment**
- ▶ **LEI measured the direct, indirect and induced impact of an increase in costs of electricity for retail customers as a consequence of a higher RPS requirement and higher REC prices**
- ▶ **Analysis relied on BEA RIMS II multipliers and assumed a complete pass-through of the higher RPS compliance costs for typical households (residential customers)**
- ▶ **Additional costs to residential customers associated with RPS compliance will contract economy activity in Maine by about 0.06% in both GSP and employment terms**
 - Assumes Maine's Class I RPS increases from 3% to 10% of retail load
 - Assumes REC prices increase from the 2010 compliance year level of \$24/MWh to \$33/MWh
- ▶ **LEI also developed case studies for consideration of impact on non-residential customers (i.e., tourism sector and pulp and paper industries)**
- ▶ **Exposure exists for these industries to potential higher RPS compliance costs (electricity is typically under 5% of total operating costs)**
- ▶ **In the long run, RPS requirements may promote asset reconfiguration by some commercial and industrial customers**
 - some pulp and paper manufacturing facilities have re-configured existing assets to sell electricity on-grid and produce renewable energy to take advantage of associated REC revenues, e.g. Verso Paper Corporation ("VPC")

Item 6: The cost of and reasons for using the ACP mechanism for Maine RPS compliance

- ▶ **ACP usage as a percentage of the REC obligation has declined from 25% in 2008 to 3% in 2009, and to 0.5% in 2010 in Maine**

Compliance year	ME Class I requirement	ME Class I REC obligation (MWh)	% of using ACP	ACP rates (\$/MWh)	ACP costs (\$ million)
2008	1%	70,826	25%	\$ 58.58	\$ 0.69
2009	2%	174,557	3%	\$ 60.92	\$ 0.32
2010	3%	332,617	0.5%	\$ 60.93	\$ 0.02

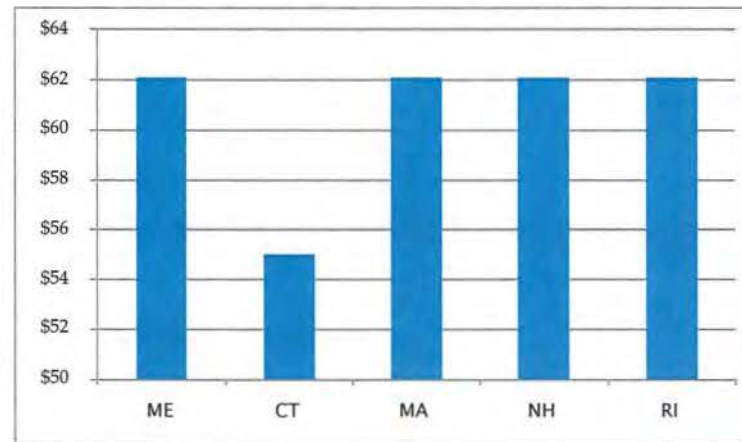
Source: Maine RPS compliance data 2008-2010

- ▶ **Competitive electricity providers may opt to use ACP for RPS compliance for a number of practical reasons, including:**
 - load forecasting error
 - transaction costs
 - insufficient supply of RECs
 - general hassle value or unfamiliarity with RPS compliance
- ▶ **The ACP is not a meaningful cost contributor to the Maine RPS program, and is unlikely to be in the future even if ACP usage increases**
 - ACP usage is unlikely to be anticipated ahead of time by standard offer service providers or competitive electricity providers, therefore would not directly result in higher rates to many Maine consumers

Item 7: the best practices for setting the ACP rate

- ▶ **Maine's ACP policy and rate is consistent with other surrounding states**

Class I/New RES ACPs in 2011, \$/MWh



- ▶ **The ACP has not been a significant cost contributor to retail rates, but it is generally perceived to be working as an effective cap on prices for Class I RECs**
- ▶ **Maine's ACP rate meets the key ratemaking principles of efficiency, fairness, stability, and practicality**
- ▶ **In the future, re-assessment of the ACP may make sense to ensure appropriate overall investment as well as investment in select renewables, as dictated by state policy**

Item 8: Benefits of RPS requirements on economic development in Maine

- ▶ **Although the investment decision is complex, RPS policies are one of the contributors motivating new renewable power plant construction**
- ▶ **Maine's RPS alone is too small to create large new renewable investments in Maine but is a contributor to the regional - New England market for renewable electricity supply**
- ▶ **Investment in new renewables in Maine - wind or other RPS-eligible renewables - has the potential to contribute to Maine's economy by creating jobs, increasing in-state spending, and increasing property tax revenues**
 - development of 625 MW of on-shore wind in Maine over time results in a \$1,140 million increase in GSP and 11,700 jobs created during construction, operation and maintenance (using BEA RIMS II multipliers)
 - this represents a 2% cumulative increase over current measures of economic activity
 - assumes half of the wind generation proposed in the Interconnection Queue for Maine is developed over time (625 MW installed capacity) at a total investment cost of more than \$2,000/KW
- ▶ **In addition to spurring economic activity, renewable investment in Maine would also provide additional benefits to Maine and New England as a whole**
 - property tax revenues and other local community benefits once renewable facilities are constructed
 - lower electricity prices, as wind displaces existing higher cost generation
 - a stronger industry knowledge base
 - improved air quality
 - fuel cost savings
 - diversification benefits

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Higher RPS costs can reduce disposable income for residential customers and lead to contraction of the economy

Status quo case: RPS at 3% of retail rate, REC price of \$24/MWh and 12,000 GWh retail sales	
2010 retail compliance cost	\$8.6 million
2010 retail compliance cost*	\$3.3 million
Retail rate impact	0.072 cents/KWh
Monthly bill impact*	\$0.37
Percentage of average retail rate of 12.6 cents/KWh	0.57%
2010 GSP	\$51,643 million
2010 non-farm employments	577,756

Case 1: RPS at 10% of retail rate and REC price of \$24/MWh	
Annual retail compliance cost Increase from 2010	\$20 million
Annual retail compliance cost Increase*	\$7.6 million
Retail rate impact	0.24 cents/KWh
Monthly bill impact (residential)	\$1.25
Percentage of average retail rate of 12.6 cents/KWh	1.90%
Decrease in GSP due to higher electricity rates*	\$8.7 million
Decrease in jobs*	84

Case 2: RPS at 10% of retail rate and REC price of \$33/MWh	
Annual retail compliance cost Increase from 2010	\$31 million
Annual retail compliance cost Increase*	\$12 million
Retail rate impact	0.33 cents/KWh
Monthly bill impact (residential)	\$1.72
Percentage of average retail rate of 12.6 cents/KWh	2.62%
Decrease in GSP due to higher electricity rates*	\$13.4 million
Decrease in jobs*	129

Case 3: RPS at 10% of retail rate and REC price of \$13.5/MWh	
Annual retail compliance cost increase from 2010	\$7.6 million
Annual retail compliance cost increase*	\$2.9 million
Retail rate impact	0.135 cents/KWh
Monthly bill impact (residential)	\$0.70
Percentage of average retail rate of 12.6 cents/KWh	1.07%
Decrease in GSP due to higher electricity rates*	\$3.3 million
Decrease in jobs*	32

Notes:

* refers to residential only

RPS policies can motivate new investment, which in turn can expand the economy and create other benefits

- ▶ All 625 MW is unlikely to be built at the same time and in a single year – therefore the economic benefits estimated below in terms of economic activity and new jobs would accrue over multiple years
- ▶ In addition, some benefits would accrue during construction (jobs and increase in GSP), while others would accrue after construction and as a result of production (such as tax revenues, reduced electricity prices, emissions reductions)

Benefits to Maine (Assumes 625 MW wind built with a capital cost of \$2,563/KW)	
Investment in Maine*	\$560 million
Increase in local Jobs (temporary or permanent)	11,700
Increase in GSP	1,140 million
Annual Tax Revenue	6.3 million
LMP Reduction**	\$0.375/MWh
Annual Savings to Maine ratepayers from reduced electricity prices***	\$4.5 million
Annual Emissions Reductions	\$13 million

* Assumes 35% of investment stays in Maine

** Based on ISO-NE 2011 Economic Study Update (adjusted for 625 MW). Wayne Coste, Principal Engineer. September, 2011

*** Assumes retail sales of roughly 12,000 GWh