Energy Efficiency:
An Engine of Economic Growth

Presentation for Efficiency Maine Trust

January 6, 2010

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Why This Study Was Needed

- Other assessments only look at the direct costs and savings of the program to participants and ratepayers

- Need to understand the positive impacts of EE to the broader economy

- Encourage and reinforce treatment of efficiency by state leaders as an economic development tool

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Why Efficiency Programs are Needed

- **Correct market failures**
  - Liquidity Constraints – inadequate access to capital
  - Split Incentives – EE investor does not receive savings benefits
  - Information Problems – uncertainty of future savings of today's investment
  - Behavioral Problems – complexity of decisions are beyond one's ability
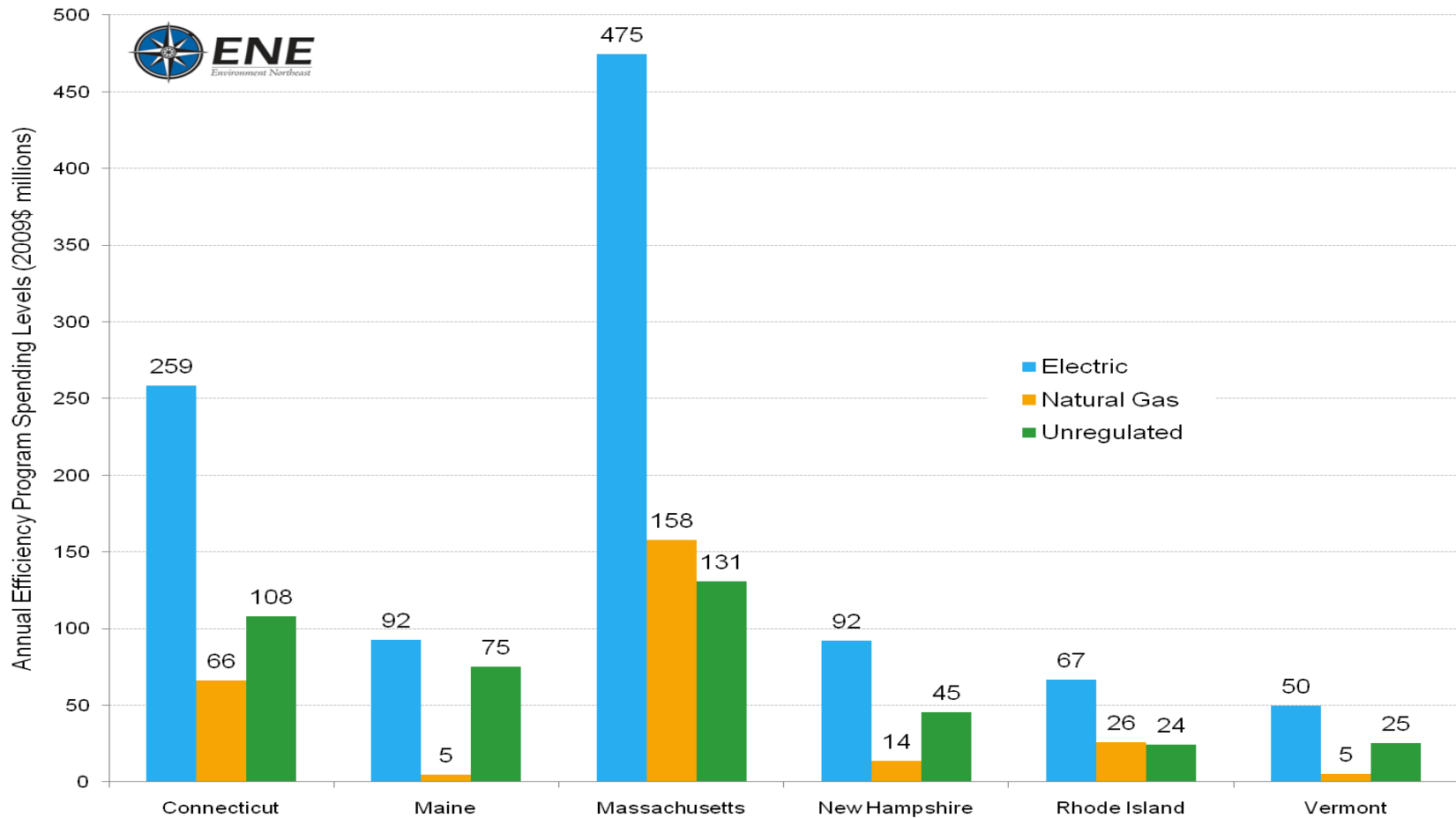
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Methodology

- Energy cost and consumption model
    - EE spending levels near all cost-effective
    - Published forecasts of energy consumption and prices
    - Conservative estimates of future EE costs
    - Developed baseline and EE scenario projections
- Macroeconomic impacts modeled with REMI
    - REMI baseline forecast
    - Costs/savings from above used as input for EE scenario
    - EE jobs composition specified in model
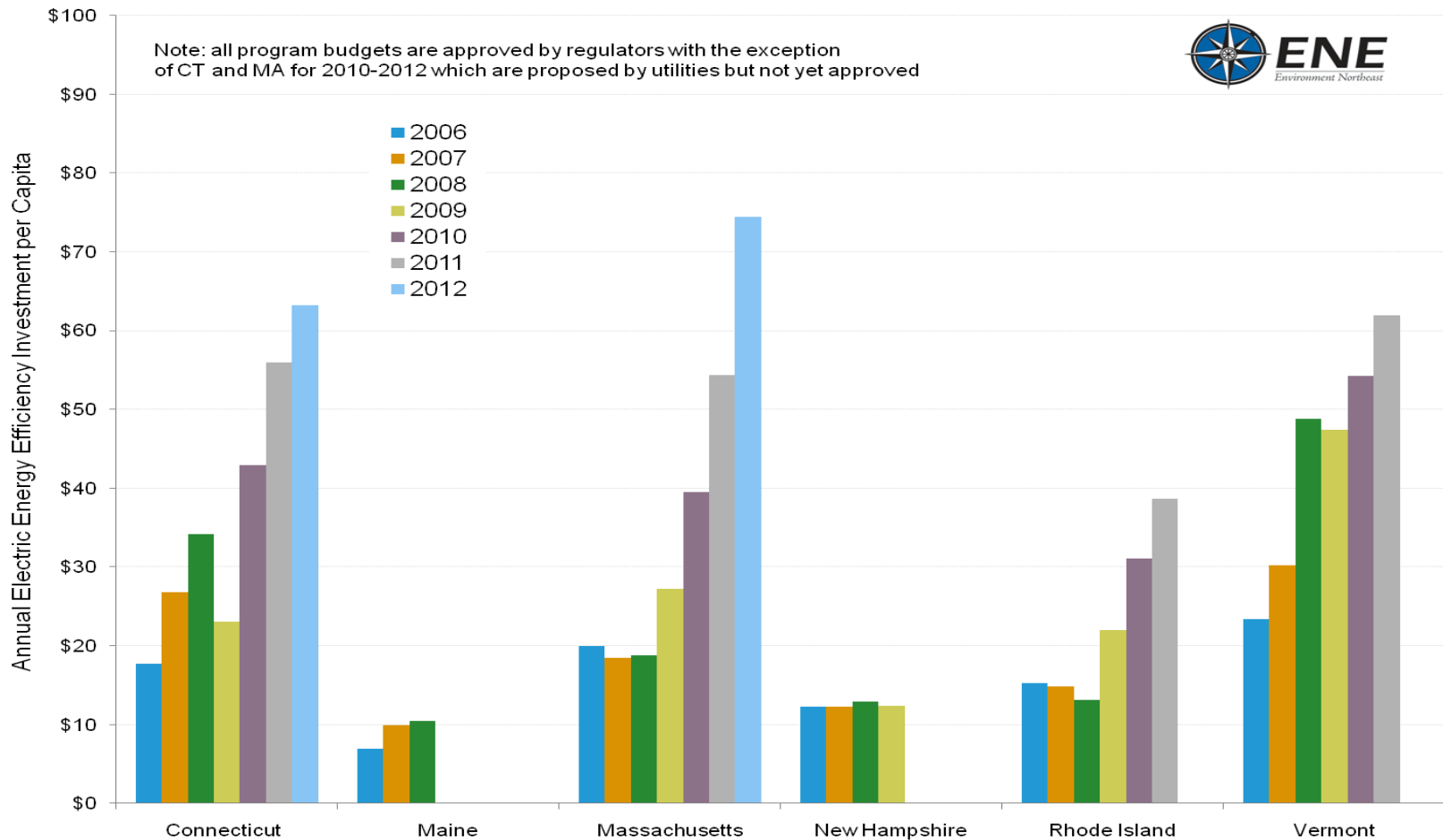
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REMI Model

- Utilized Regional Economic Models Inc (REMI), a multi-state *Policy Insight* forecasting tool

- This is the same system that was used to evaluate the economic impacts from the Regional Greenhouse Gas Initiative (RGGI)

- REMI allows the analyst to enter state-specific *annual* changes and then generate an economic forecast

- The model used forecasts for 70 different industries through the year 2038

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Modeled Efficiency Spending Levels

Current/Proposed Efficiency Spending Levels

Note: all program budgets are approved by regulators with the exception of CT and MA for 2010-2012 which are proposed by utilities but not yet approved

EE Modeled Characteristics

| Electricity	Residential	C&I	Units
First-Year Program Costs per Annual Savings- Energy	425	375	$/MWh
Lifetime Program Cost per KWh	0.035	0.027	$/KWh
First-Year Program Costs - Capacity	3300	2500	$/KW
Average Participant Copay	12%	32%	%
Average Measure Life	12	14	Years
Natural Gas and Non-Regulated Fuels			
First-Year Program Costs per Annual Savings	80	30	$/MMBTU
Lifetime Program Cost per MMBTU - Energy	4.00	2.00	$/MMBTU
Average Participant Copay	20%	45%	%
Average Measure Life	20	15	Years

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Results - Energy Savings
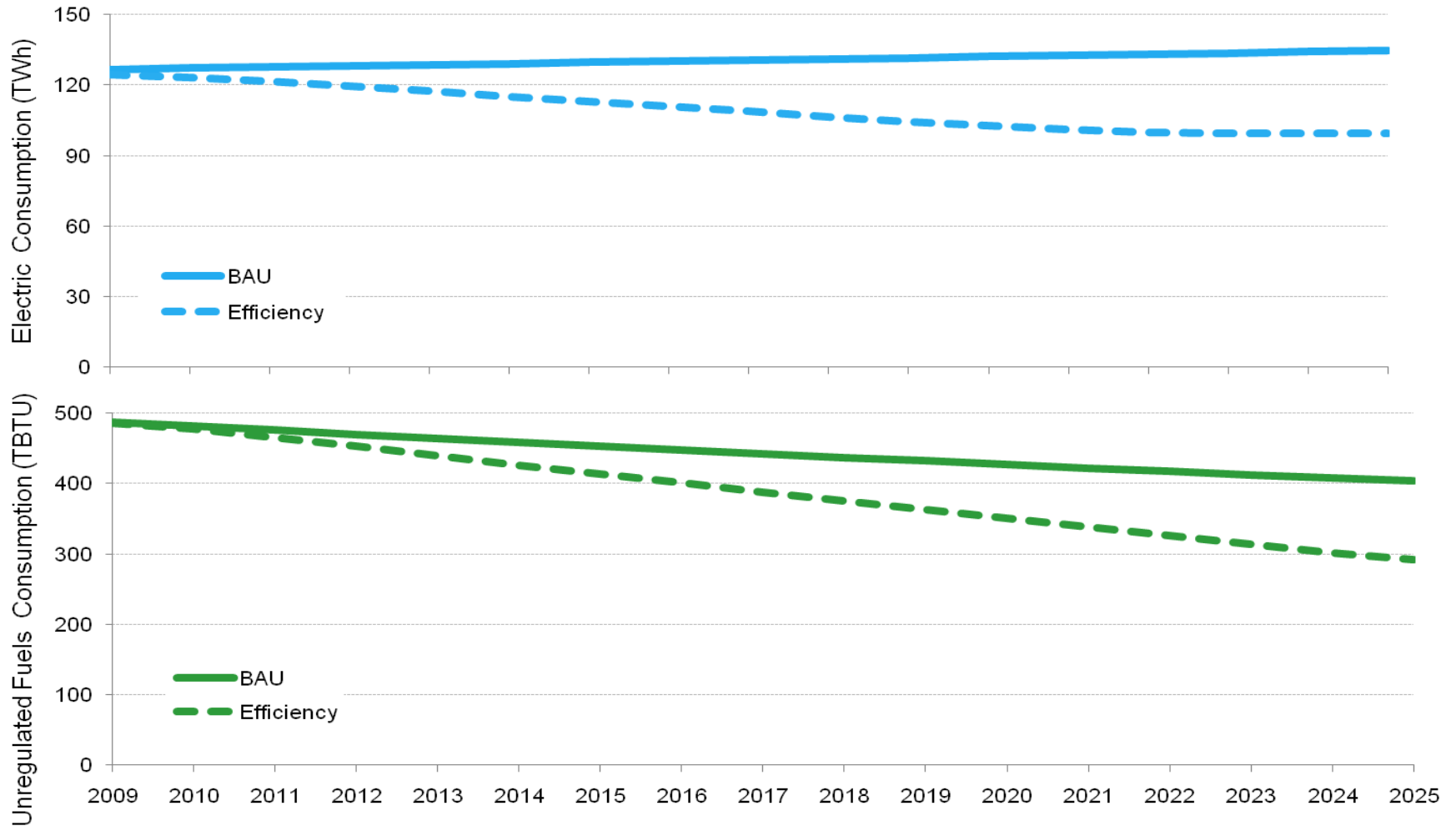
Results - Energy Cost Savings
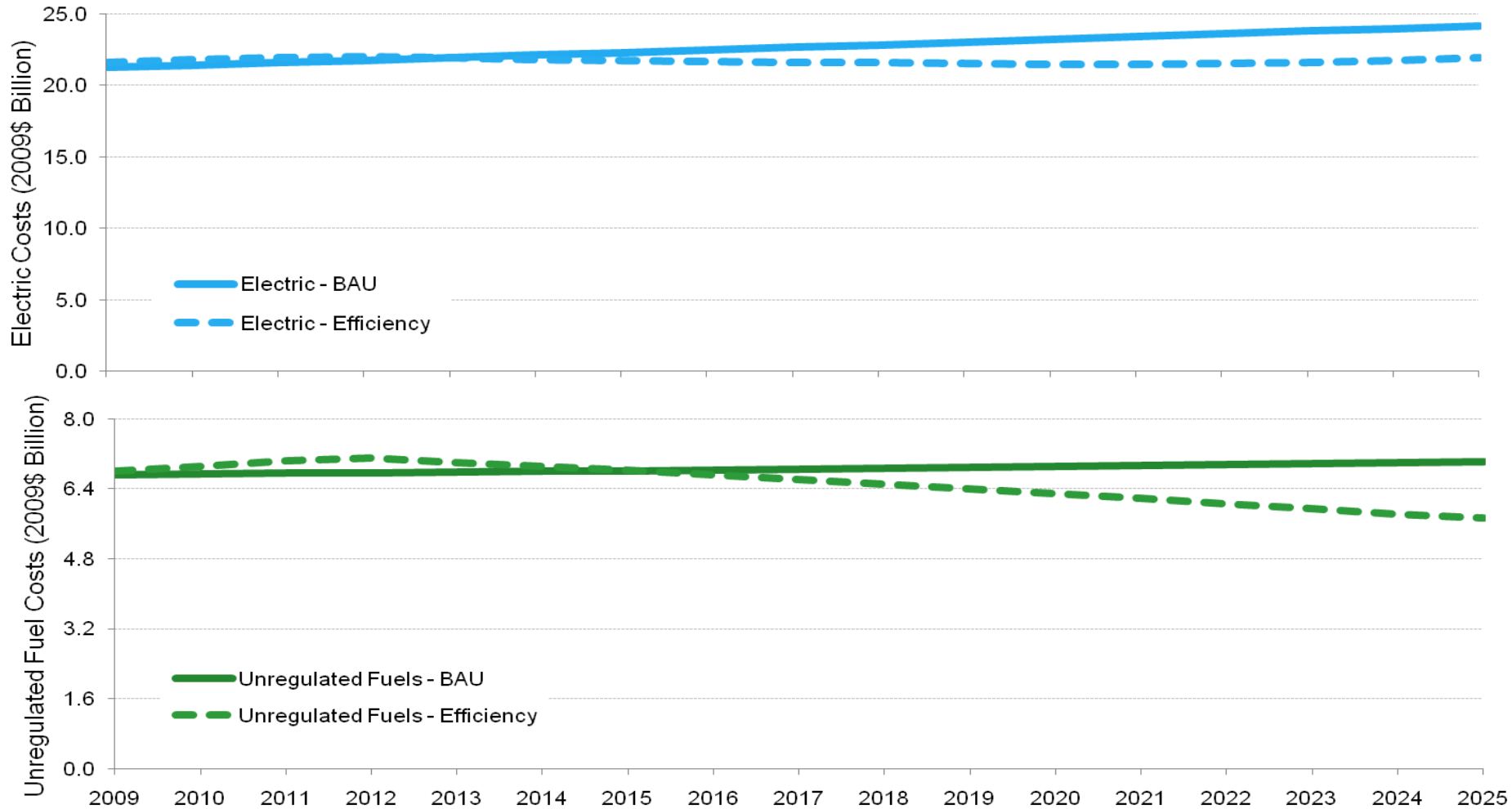
Results - Emissions Reductions
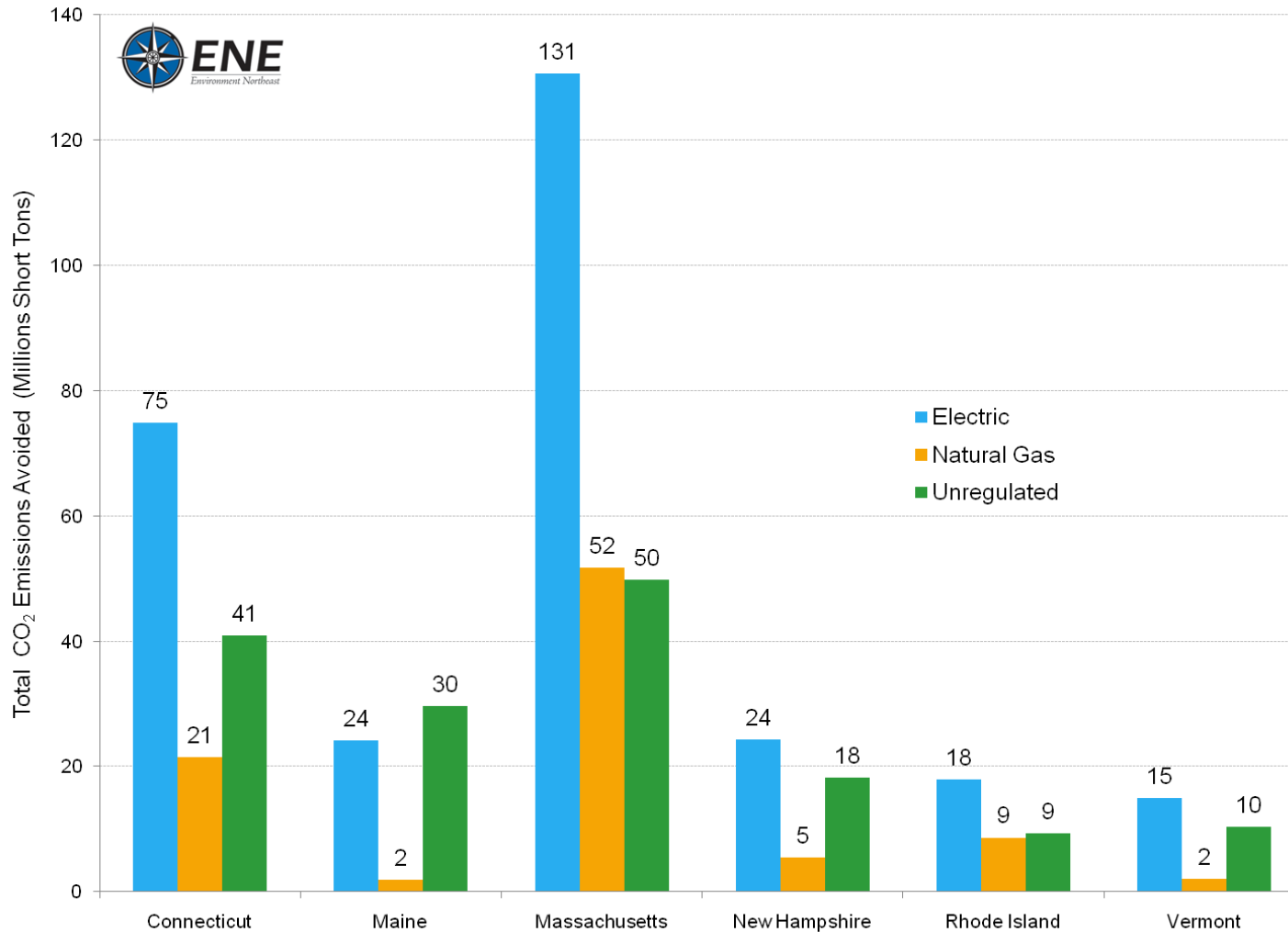
EE Scenario Economic Modeling Results

		Electric		Natural Gas		Unregulated Fuels	
		Individual	Simultaneous	Individual	Simultaneous	Individual	Simultaneous
Output	$millions	140,230	162,102	43,586	51,137	68,975	85,991
GSP	$millions	85,852	99,433	26,187	30,583	43,272	53,129
Income	$millions	60,765	72,842	17,950	21,806	30,398	37,170
Employment	Job Years	661,779	767,011	176,983	207,924	351,437	417,061

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Dollars of GSP per Program Dollar

	Electric		Natural Gas		Unregulated Fuels	
	Individual	Simultaneous	Individual	Simultaneous	Individual	Simultaneous
Connecticut	5.6	5.7	6.3	7.0	6.3	7.1
Massachusetts	5.5	6.4	6.7	7.5	8.0	10.9
Maine	4.3	4.9	8.4	12.4	6.6	7.0
New Hampshire	3.9	5.9	6.7	10.8	6.2	8.5
Rhode Island	4.0	5.4	4.4	5.7	6.2	7.6
Vermont	3.7	4.3	4.5	6.5	6.6	7.4
Six State Region	5.1*	5.9	6.4*	7.4	6.9*	8.5

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Job Years per Million Program Dollars

	Electric		Natural Gas		Unregulated Fuels	
	Individual	Simultaneous	Individual	Simultaneous	Individual	Simultaneous
Connecticut	40.4	41.2	40.7	44.9	43.1	47.9
Massachusetts	37.0	43.4	41.8	46.5	52.7	69.9
Maine	51.5	58.1	92.1	133.4	74.7	78.9
New Hampshire	35.7	52.7	55.6	88.7	53.7	72.0
Rhode Island	36.2	48.7	38.5	48.2	58.3	64.9
Vermont	43.4	49.6	48.4	66.3	73.7	81.8
Six State Region	39.3*	45.5	42.9*	50.4	56.0*	66.5

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Components of Economic Impacts

New England (Simultaneous)	Electric	Natural Gas	Unregulated Fuels
Output			
Percent of Output Resulting from Efficiency Spending	12%	10%	9%
Percent of Output Resulting from Energy Savings	88%	90%	91%
GSP			
Percent of GSP Resulting from Efficiency Spending	12%	11%	9%
Percent of GSP Resulting from Energy Savings	88%	89%	91%
Income			
Percent of Income Resulting from Efficiency Spending	19%	18%	16%
Percent of Income Resulting from Energy Savings	81%	82%	84%
Employment			
Percent of Employment Resulting from Eff. Spending	16%	15%	12%
Percent of Employment Resulting from Energy Savings	84%	85%	88%

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Allocation of Employment Impacts

	New England Employment Impacts 2016			
	Electric	**Natural Gas**	**Unregulated Fuels**	
Total Increase in Jobs	18,971	2,056	5,150	**Average Annual Worker Compensation**
By Major Sector	Percent Allocation of Job Impact			
Forestry, Fishing, Related Activities, and Other	0.09%	-0.05%	0.09%	$27,360
Mining	0.02%	0.05%	0.02%	$55,616
Utilities	0.61%	1.10%	0.79%	$184,158
Construction	12.82%	15.25%	14.80%	$54,130
Manufacturing	4.34%	4.33%	4.45%	$121,088
Wholesale Trade	2.88%	3.07%	2.89%	$120,041
Retail Trade	14.40%	15.58%	15.31%	$43,154
Transportation & Warehousing	1.43%	1.37%	1.33%	$62,726

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Allocation of Employment Impacts (cont.)

Transportation & Warehousing	1.43%	1.37%	1.33%	$62,726
Information	1.52%	1.15%	1.41%	$117,052
Finance & Insurance	5.57%	1.81%	4.75%	$158,762
Real Estate & Rental & Leasing	4.20%	2.41%	3.73%	$22,939
Professional & Technical Services	11.41%	16.95%	11.22%	$92,003
Management of Companies and Enterprises	0.64%	0.38%	0.60%	$185,505
Administrative & Waste Services	5.92%	5.43%	5.48%	$46,433
Educational Services	1.70%	0.66%	1.43%	$55,686
Health Care & Social Assistance	14.46%	13.77%	14.11%	$69,193
Arts, Entertainment, & Recreation	2.66%	2.36%	2.55%	$27,723
Accommodation & Food Services	5.65%	4.33%	5.10%	$32,384
Other Services, except Public Administration	9.70%	10.04%	9.94%	$34,884

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Maine Results Summary

	Electric	Natural Gas	Unregulated Fuels
Energy Savings	(GWh)	(TBTU)	(TBTU)
Maximum annual savings	8,600	22	29
Maximum savings vs. Business as Usual	25%	20%	28%
Lifetime savings (15 years of programs)	125,900	272	368
Equivalent GHG Emissions Avoided	(Millions short tons)	(Millions short tons)	(Millions short tons)
Maximum annual avoided emissions	4.3	1.3	2.3
Maximum annual avoided emissions vs. 2005 total Maine Emissions	9.7%	2.9%	5.2%
Lifetime avoided emissions (15 years of programs)	127	52	49

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Maine Economic Impacts

	Electric	Natural Gas	Unregulated Fuels
Total Efficiency Program Costs ($Billions)	1.4	.07	1.1
Increase in GSP ($Billions)	7.0	.85	8.0
Maximum annual GSP Increase ($Millions)	435	50	450
Percent of GSP Increase Resulting from Efficiency Spending	11%	9%	8%
Percent of GSP Increase Resulting from Energy Savings	89%	91%	92%
Dollars of GSP Increase per $1 of Program Spending	4.9	12.4	7.0
Increase in Employment (Job Years)	82,000	9,200	91,000
Maximum annual Employment Increase (Jobs)	5,000	600	5,300
Percent of Employment Increase from Efficiency Spending	14%	13%	11%
Percent of Employment Increase from Energy Savings	86%	87%	89%
Job-Years per $Million of Program Spending	58	133	79

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Conclusions

- Experience shows that mandates and incentives are needed to overcome barriers to investing in efficiency

- This study shows that the economic benefits of EE investments are much greater than typically calculated

- Results should encourage states to expand programs to capture all cost-effective efficiency for all fuels

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