FINAL

SUMMARY REPORT OF RECENTLY COMPLETED POTENTIAL STUDIES AND EXTRAPOLATION OF ACHIEVABLE POTENTIAL FOR MAINE (2010-2019)

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Agenda

- Introductions & General Overview
- Task 1: Summarize Electric and Fossil Fuel Potential Studies & Extrapolate Achievable Potential & Required Funding Levels
- Task 2: Benchmarking Maine's 2008 DSM Results
- Task 3: Assessment of Pros/Cons of Electric and Fossil Fuel Joint DSM Delivery
- Task 4: DSM Workforce Development & Job Creation



Summit Blue/ACEEE

Summit Blue Consulting

Established in 2000- Offices in CA, CO, IL, VT, WI

70 employees

Focus: Energy efficiency, Demand Response, Renewables

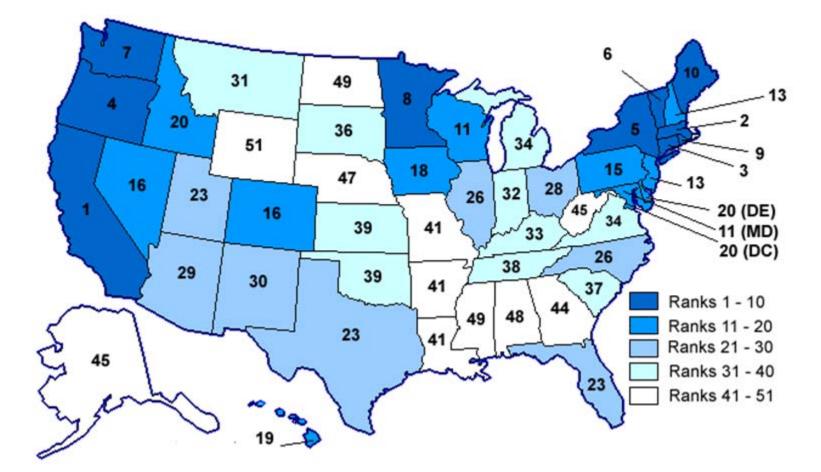
- Program Design & Implementation
- Potential Studies
- EM&V
- Resource Planning

ACEEE

- National non-profit energy efficiency organization
- 50 employees



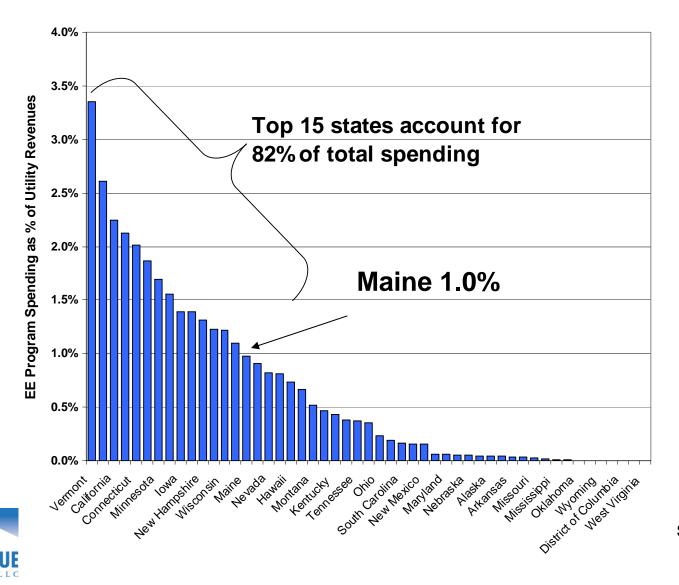
ACEEE's 2009 State Energy Efficiency Scorecard Results





Source: Eldridge et. al. 2009. http://aceee.org/pubs/e097.htm

2007 Spending on Ratepayer-Funded Electric Energy Efficiency Programs



Source: CEE

Task 1: Summarize Electric and Fossil Fuel Potential Studies & Extrapolate Achievable Potential & Required Funding Levels



Task 1: Summarize Potential Studies & Extrapolate Achievable Potential & Required Funding Levels

Objective:

- Summarize results from 10 other electric and fossil fuel potential studies completed in the northeast since 2004.
- Study Contents
 - > 7 studies for electricity
 - > 5 studies for natural gas
 - > 3 studies for propane
 - > 2 studies for fuel oil
- Primary authors: GDS Associates completed 60% of studies
- Prepared comparative tables and graphics with a focus on:
 - > Savings as % of sales
 - > First year costs
 - Detailed estimates by Sector for Electric, Natural Gas, Fuel Oil, Propane



Top 10 Studies

State	Study Year	Study Period	Study Title	Sector	Fuel Types	Author
			Connecticut Natural Gas Commercial and			
СТ	2009	2009-2018	Industrial Energy-Efficiency Potential Study	C, I	Natural Gas	Kema
			Natural Gas Energy Efficiency Potential in			
MA	2009	2009-2018	Massachusetts	R, C, I	Natural Gas	GDS
NH	2009	2008-2018	Additional Opportunities for Energy Efficiency in New Hampshire	R, C, I	Electricity, Natural Gas, Oil, Propane	GDS
PA	2009	2008-2025	Potential for Energy Efficiency, Demand Response, and Onsite Solar Energy in Pennsylvania	R, C, I	Electricity, Natural Gas, Oil, Propane	ACEEE
			Rhode Island Energy Efficiency and Resources Management Council (EERMC): Opportunity			
RI	2008	2009-2018	Report - Phase I	R, C, I	Electricity	Kema
ME	2008	2007-2017	Maine Power Reliability Program Electric Energy Efficiency and Demand Response Potential Study	R, C, I	Electricity	GDS
VT	2007	2007-2016	Vermont Energy Efficiency Potential Study for Oil, Propane, Kerosene, and Wood Fuels	R, C, I	Oil, Propane, Kerosene, Wood	GDS
VT	2007	2007-2016	Vermont Energy Efficiency Potential Study for Electricity	R, C, I	Electricity	GDS
СТ	2004	2003-2012	Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region	R, C, I	Electricity	GDS
New Eng.	2004	2004-2013	Economically Achievable Energy Efficiency Potential in New England	R, C, I	Electricity, Natural Gas	OEI

COD

The Four Stages of Energy Efficiency Potential

Not Technically Feasible		Technical Potential				
Not Technically Feasible	Not Cost Effective	Economic Potential				
Not Technically Feasible	Not Cost Effective	Market and Adoption Achievable Potential Barriers				
Not Technically Feasible	Not Cost Effective	Market and Adoption Barriers Program Design, Budget, Staffing, and Time Constraints		Program Potential		

From: "Guide to Resource Planning with Energy Efficiency November 2007" written by the US EPA.

- Studies define/calculate potential types slightly differently
- This analysis focused on "Achievable Potential"



Maine Potential Study Approach

- Step 1: Extrapolation of potential study findings & costs from other studies.
- Step 2: Apply these extrapolations to Maine forecasted sales and revenue
- Step 3: Report on median results and "best fit-high" results.
- Note: Savings from codes and standards or combined heat and power and renewables not included in this analysis.



Extrapolated Results

1) Median Values:

 Simple approach - apply across the board median averages of the results.

2) Best Fit High Values:

- Reviewed studies and selected "best fit high" results based on a number of factors:
 - geography,
 - retail price,
 - saturation of electric space and water heating,
 - role of fuel switching, and
 - sales by sector.



"Best Fit-High" Sectors & Studies

Electricity

- Residential Sector: VT
- Commercial: ME CMP study
- Industrial: ME CMP study

Natural Gas

- Residential Sector: MA
- Commercial: MA
- Industrial: MA

Fuel Oil

- Residential Sector: VT
- Commercial: VT
- Industrial: VT

Propane

- Residential Sector: VT
- •Commercial: VT
- Industrial: VT



Electricity: Achievable Potential as % of Sales & Cost

Fuel Type: Electricity					vings Pote Forecast		Annual Achievable Energy Savings (% of Total Forecast Sales)		Cost of Achievable Potential Savings				
		Tech.	Econ.	Achie	vable	Res	Com	Ind	Annual	Total	Total \$/kWh		
State	Study Year	Study Period	Analysis Period (years)	TOTAL	TOTAL	TOTAL	ANNUAL				(\$M, 2009)	(\$M, 2009)	(\$M, 2009)
PA	2009	2008-2025			27.3%	7.9%	0.8%	0.3%	0.3%	0.2%	\$203	\$3,663	\$0.14
RI	2008	2009-2018	10	28.0%	24.0%	9.8%	1.0%	0.4%	0.5%	0.2%	\$20	\$201	\$0.26
NH	2009	2009-2018	10	27.6%	20.5%	10.8%	1.1%	0.5%	0.4%	0.2%	\$56	\$565	\$0.40
СТ	2004	2003-2012	10	24.0%		13.4%	1.3%	0.5%	0.6%	0.2%	\$70	\$702	\$0.16
ME	2008	2008-2017	10			15.9%	1.6%	0.5%	0.8%	0.3%	\$30	\$305	\$0.20
VT	2007	2006-2015	10	34.6%		19.4%	1.9%	0.9%	0.7%	0.4%	\$27	\$267	\$0.21
New Eng.	New Eng. 2004 2004-2013 10				22.9%	2.3%	0.8%	1.4	1%	\$1,205	\$12 <i>,</i> 050	\$0.36	
Median	Median		27.8%	24.0%	13.4%	1.3%	0.5%	0.6%	0.2%	\$56	\$565	\$0.21	
Mean				28.5%	23.9%	14.3%	1.4%	0.6%	0.7%	0.2%	\$230	\$2,536	\$0.25



Electricity: Maine Achievable Potential as % of Sales and First Year Cost

Result	Annual Savings as % of Sales	First Year Cost/ kWh
Median	1.3%	\$0.21
Best Fit-High	2.0%	\$0.20
Maine 2009 Actual	0.7%	\$0.16



Natural Gas: Maine Achievable Potential as % of Sales and First Year Cost

Result	Annual Savings as % of Sales	First Year Cost/MMBtu
Median	1.2%	\$30.1
Best Fit-High	2.5%	\$30.1
Maine 2008 Actual	0.5%	\$40.0



Fuel Oil: Maine Achievable Potential as % of Sales and First Year Cost

	Annual Savings as	First Year Cost/
Result	% of Sales	MMBtu
Median	1.1%	\$29.0
Best Fit-High	1.4%	\$29.0
Maine 2008 Actual	n/a	n/a



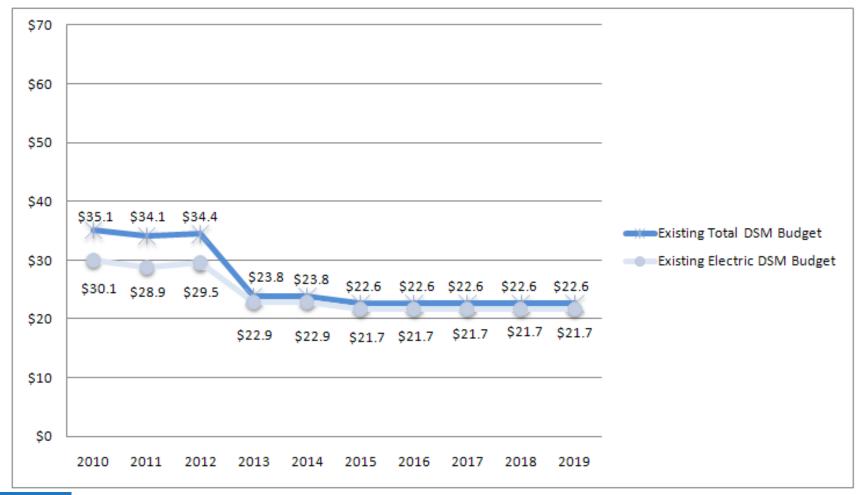
Propane:

Achievable Potential as % of Sales and First Year Cost

Result	Annual Savings as % of Sales	First Year Cost/ MMBtu
Median	0.8%	\$45.4
Best Fit-High	0.8%	\$45.4
Maine 2008 Actual	n/a	n/a



Maine 2010-2019 Existing Total DSM Budget and Existing Electric DSM Budget

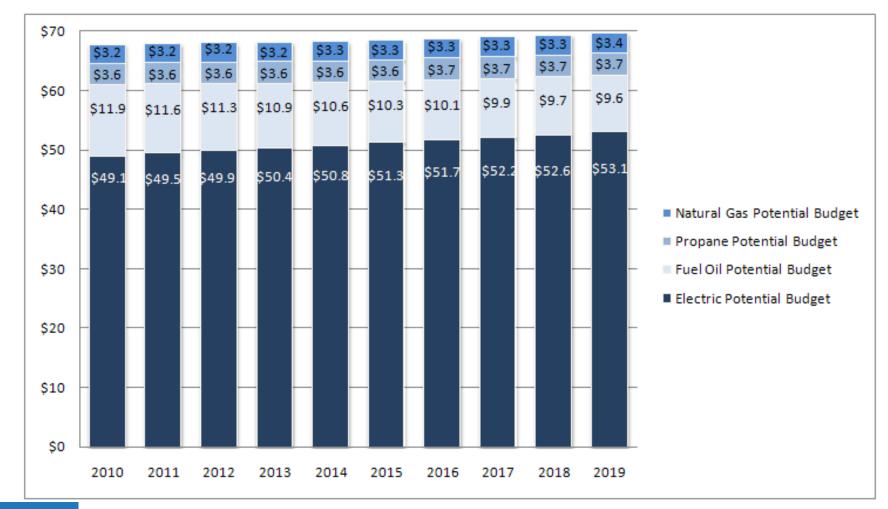


SUMMIT BLUE CONSULTING LLC a) EX

a) Existing budgets include funding from SBC, RGGI, FCM, and ARRA.

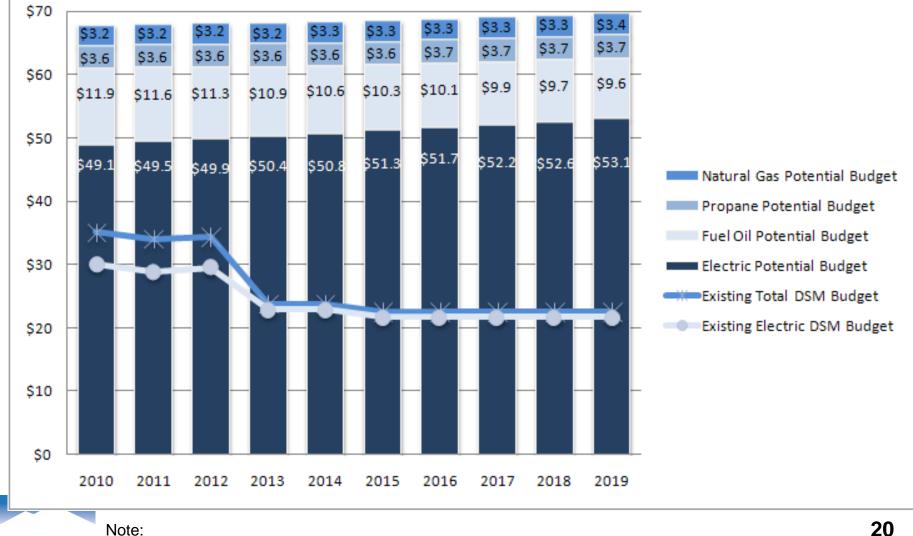
b) Existing total DSM budget includes funds allocated for electric and fossil fuels.

Budget Required to Achieve Maine BEST FIT High Potential 2010-2019 (\$686 Million)





Maine 2010-2019 Budget Required to Achieve BEST FIT High Potential v. Existing DSM Budget (\$686 Million)



a) Existing budgets includes funding from SBC, RGGI, FCM, ARRA b) Existing total DSM budget includes funds allocated for electric and fossil fuels.

Best Fit High Values: Savings & Cost to Achieve Maine Potential (2010-2019)

Fuel Type	Average Annual Savings	Average Annual Cost (\$ Millions)	10 Year Total Savings	10 Year Total Cost (\$ Millions)
Electricity (MWh)	250,778	\$51.0	2,507,882	\$510
Natural Gas (MCf)	109	\$3.3	1,090	\$33
Fuel oil/Propane			·	
(Gal)	1,350,411	\$14.3	13,504,105	\$143
TOTAL		\$68.6		\$686

DSM Budget by Fuel Type	Maine Existing 10- Yr Budget Forecast (\$ Millions)	Required 10-Yr Budget to Achieve Potential (\$ Millions)	Existing Budget as % of Achievable
Electricity	\$243.0	\$510	48%
Natural Gas	\$8.3	\$33	25%
Fuel oil/Propane	\$12.7	\$143	9%
TOTAL	\$264.0	\$686	39%



a) Existing budgets include funding from SBC, RGGI, FCM, and ARRA.

b) Existing total DSM budget includes funds allocated for electric and fossil fuels.

Task 2: Benchmarking Maine's 2007 Program Results



Task 2: Benchmarking

- Benchmarking study seeks to answer
 - > What are typical costs and impacts for DSM portfolios?
- Programming, evaluation, and reporting practices vary, as such results cannot be considered a strictly "apples-and-apples".
- Presentation of Results
 - > Savings as % of Sales
 - > First Year Costs
- First Year Costs =

Annual DSM Expenditures/ Annual Incremental DSM Energy Savings

- For example: DSM Program spends \$2,000,000, saves 10,000 MWh
 First Year Costs = \$0.20/ kWh for 1st year Savings
 - Analyzed 2007 DSM results from annual regulatory reports and 2007 sales and revenue data from EIA 861 Form 1.



Organizations Benchmarked: IOUs & State Agencies - Electric

	State Agency or	
Region	Investor-Owned Utility	State
Northeast	Efficiency Maine	ME
	Efficiency Vermont	VT
	Long Island Power Authority (LIPA)	NY
	National Grid	MA
	New Jersey Clean Energy Program (NJCEP)	NJ
	New York State Energy Research and Development Authority (NYSERDA)	NY
	NSTAR	MA
	Public Service of New Hampshire (PSNH)	NH
	Western Massachusetts Electric Co. (WMECO)	MA
Midwest	Interstate Power & Light	IA
	Interstate Power & Light	MN
	MidAmerican Energy	IA
	Minnesota Power	MN
	Otter Tail Power	MN
	Wisconsin Focus on Energy	WI
	Xcel Energy	MN
West	Arizona Public Service	AZ
	SWEPCO	ТХ
	Xcel Energy	со



Organizations Benchmarked: IOUs & State Agencies – Natural Gas

Region	State Agency or Investor-Owned Utility	State
Northeast	Berkshire Gas	VT
	Connecticut Energy Efficiency Fund (CEEF)	СТ
	National Grid	MA
	Northern Utilities	NH
	NSTAR	MA
	Unitil	ME
	Vermont Gas	VT
Midwest	Aquila	IA
	Center Point Energy	MN
	Interstate Power & Light	IA
	Interstate Power & Light	MN
	MidAmerican Energy	IA
	Wisconsin Focus on Energy	WI
	Xcel Energy	MN

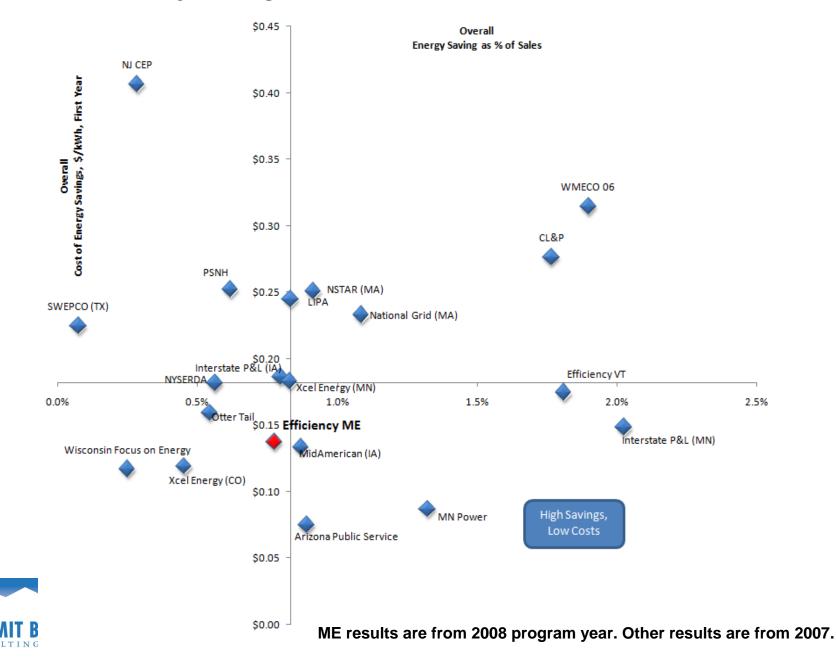


Medians of Energy Savings and First Year Costs of Savings

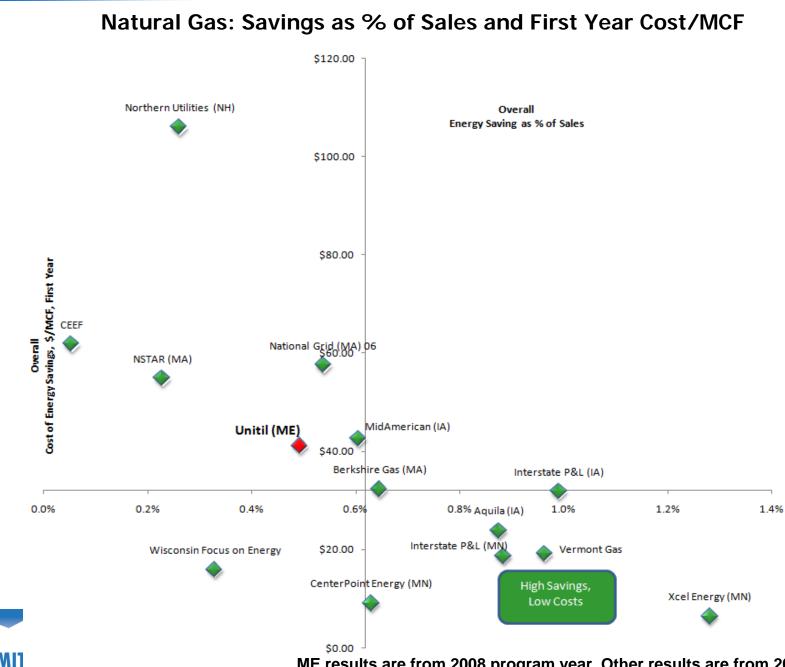
		nergy Savi as % of Sal		First Year Cost of Energy Savings \$/kWh or \$/MCF		
	Overall	Northeast	Eff Maine or Unitil 2008	Overall	Northeast	Eff Maine or Unitil 2008
Electric	0.8%	0.9%	0.7%	\$0.18	\$0.25	\$0.16
Natural Gas	0.6%	0.5%	0.5%	\$32	\$55	\$41



Electricity: Savings as % of Sales and First Year Cost/kWh



27



LTING, LLC

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ME results are from 2008 program year. Other results are from 2007.

Task 3: Assessment of Pros/Cons of Electric and Fossil Fuel Joint DSM Delivery



Delivery Approaches

- Efficiency programs fall into 3 general tiers
 - > 1) Programs administered jointly through a single entity
 - > 2) Collaboration and integration of separately administered programs
 - > 3) Isolated, separately administered programs
- Looked at case studies in 6 states looked for what seemed to be the most effective joint-fuel programs to date (only tiers 1 and 2), which programs were most applicable to ME
- Tier 1 case studies: VT, NJ, WI, OR
- Tier 2 case studies: MA, CT



Separate vs. combined fuel-electric efficiency programs: Highlighted Case studies

- Vermont
 - Efficiency VT took over state's electric EE programs in 2000 funded by SBC for electric IOU ratepayers
 - > Coordinates with VT Gas on combined EE programs
 - > Market penetration much higher in VT Gas territory
 - Last year, EVT mandate was expanded beyond electricity to include unregulated fuels
 - But limited RGGI and FCM revenue funding constrains services

Oregon

- > Energy Trust of OR uses funds from SBCs on electric and NG customers of state's largest IOUs
- > No separate NG and electric programs; ETO implements combined programs by economic sector and offers fuel-blind services



Separate vs. combined fuel-electric efficiency programs: Discussion & Conclusions

- Benefits of Combined Programs:
 - > Simplicity of having 1 number to call for all EE opportunities
 - > Certain economies of scale for technology procurement
 - > Consistency of program delivery
 - > Joint marketing and administration cut costs
 - > Potential for much greater combined savings
 - Seasonal marketing can further increase participation rates and savings
 - > Program administrator consensus: Tier 1 is ideal
- Challenges
 - > Adoption of DSM programs can be inherently delicate
 - > Electric & fuel together potential cost attribution concerns
 - > Funding
 - EE charges difficult to mandate
 - Lack of funds from fuel ratepayers may limit the success
 - Look at VT, MA, CT, NJ for fuel-blind services



Task 4: DSM Workforce Development and Job Creation



Workforce Development

- An overview of the workforce development needs including job certifications, workforce sectors and examples of successful training programs.
- Estimates of the job creation impacts of Maine's potential DSM initiatives.





Workforce Development Job Creation Estimates

 Three Industry Models: Overall estimate 22 jobs/\$1million spent on DSM

Job Impact Model	Jobs / \$M
DOE RDEE Toolkit	16 (Residential)
	11 (Commercial & Industrial)
	27 Total
PERI Report: Green	9 (Direct)
Recovery	6 (Indirect)
	5 (Induced)
	20 Total
AESC New England	22.9 (Electric DSM)
	19.1 (Gas DSM)



Workforce Development Energy Efficiency Jobs With Certifications Available

BPI	Residential	Commercial
ACCREDITED	Home Energy Raters	Architects
Queren	Residential Building Analysts and Professionals	Engineers
ENERGY STAR	HVAC Technicians	HVAC Technicians
CCP	Home Builders	Commissioning Agents
CCC TH	Existing Home Performance Contractors	Building Operators

Workforce Development Examples of Training Opportunities

- Efficiency Vermont: Better Building by Design Conference
- Massachusetts Clean Energy Center: Energy Efficiency Skills Training Initiative
- Massachusetts Clean Energy Center: Online Workforce Development Resources
- State of Connecticut: 21st Century Green Jobs Training Initiative
- Northeast Sustainable Energy Association: Building Energy Conference



Conclusion

- Uncertainties are inherent in any potential study (primary or secondary).
- Extrapolation from other potential studies, by design, increases level of uncertainty <u>compared to an original Maine specific DSM potential</u> <u>study.</u>
- Extrapolation Re-Cap: Maine median achievable potential for electricity is 1.3% of sales per year and best fit <u>of high savings</u> <u>results</u> is 2.0% of sales per year
- Fuel Oil is second largest reservoir of achievable potential- at 1.1% of sales (median) and 1.4% high best-fit values.



Conclusion (Con'td)

- Overall, these results may be conservative as they exclude savings from codes & standards, combined heat and power, and renewables.
- Team believes electric results, while CFLs are still a major component of portfolios, are achievable, but will require significant and sustained financial investment and will require a ramp-up period.



Thank You

Contact Information

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- > Neal Elliot: rnelliott@aceee.org, 202-507-4009



Appendix



Electricity: Achievable Potential as % of Sales & Cost

Fuel Type: Electricity					vings Pote Forecast		En	ual Achie ergy Savi Total Fo Sales)	ngs		of Achiev ential Savi		
				Tech.	Tech. Econ. Achievable			Res Com Ind			Annual	Total	Total \$/kWh
			Analysis										
State	Study	Study	Period								(\$M,	(\$M,	(\$M,
	Year	Period	(years)	TOTAL	TOTAL	TOTAL	ANNUAL				2009)	2009)	2009)
PA	2009	2008-2025	10		27.3%	7.9%	0.8%	0.3%	0.3%	0.2%	\$203	\$3,663	\$0.14
RI	2008	2009-2018	10	28.0%	24.0%	9.8%	1.0%	0.4%	0.5%	0.2%	\$20	\$201	\$0.26
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New Eng.	New Eng. 2004 2004-2013 10					22.9%	2.3%	0.8%	1.4	1%	\$1,205	\$12,050	\$0.36
Median	Median			27.8%	24.0%	13.4%	1.3%	0.5%	0.6%	0.2%	\$56	\$565	\$0.21
Mean	Mean				23.9%	14.3%	1.4%	0.6%	0.7%	0.2%	\$230	\$2,536	\$0.25

Result	Annual Savings as % of Sales	First Year Cost/MMBtu
Median	1.2%	\$30.1
Best Fit	2.5%	\$30.1
Maine 2008 Actual	0.5%	\$49.0



Natural Gas: Achievable Potential as % of Sales

Fuel Type: Natural Gas					vings Pote Forecast		En	Annual Achievable Energy Savings (% of Total Forecast Sales)			Cost of Achievable Potential Savings		
				Tech.	Econ. Achievable		Res	Com	Ind	Annual	Total	Total \$/MM Btu	
			Analysis										
State	Study	Study	Period								(\$M,	(\$M,	(\$M,
	Year	Period	(years)	TOTAL	TOTAL	TOTAL	ANNUAL				2009)	2009)	2009)
PA	2009	2008-2025	10		27.2%	6.1%	0.6%	0.2%	0.2%	0.2%	\$85.2	\$1,534	\$21.9
NH	2009	2009-2018	10	29.2%	16.9%	8.3%	0.8%	0.4%	0.3%	0.1%	\$8.5	\$85	\$38.3
СТ	2009	2009-2018	10	28.8%	25.2%	16.6%	1.7%						
MA	2009	2009-2018	10	44.0%	6 36.3% 25.5% 2.5%		1.8%	0.6%	0.2%				
Median	-			29.2% 26.2% 12.5% 1.2%			0.4%	0.3%	0.2%	\$47	\$809	\$30.11	
Mean	Mean			34.0%	26.4%	14.1%	1.4%	0.8%	0.3%	0.2%	\$47	\$809	\$30.11

	Annual Savings as % of	
Result	Sales	First Year Cost/MMBtu
Median	1.2%	\$30.1
Best Fit	2.5%	\$30.1
Maine 2008 Actual	0.5%	\$40.0



Fuel Oil: Achievable Potential as % of Sales

Fuel Type: Fuel Oil				Energy Savings Potential (% of Total Forecast Sales)				Annual Achievable Energy Savings (% of Total Forecast Sales)			Cost of Achievable Potential Savings		
				Tech.	Econ.	Achie	vable	Res	Com	Ind	Annual	Total	Total \$/MM Btu
			Analysis										
State	Study	Study	Period								(\$M,	(\$M,	(\$M,
	Year	Period	(years)	TOTAL	TOTAL	TOTAL	ANNUAL				2009)	2009)	2009)
NH	2009	2009-2018	10	26.5%	16.1%	7.8%	0.8%	0.4%	0.3%	0.1%	\$16.7	\$166.8	\$42.3
VT	2007	2007-2016	10	29.7%	6 14.1% 1.4%		0.6%	0.7%	0.1%	\$11.2	\$112.1	\$15.7	
Median	Median			28.1%	16.1%	11.0%	1.1%	0.5%	0.5%	0.1%	\$13.95	\$139.45	\$29.02
Mean	Mean			28.1%	16.1%	11.0%	1.1%	0.5%	0.5%	0.1%	\$13.95	\$139.45	\$29.02

Result	Annual Savings as % of Sales	First Year Cost/ MMBtu
Median	1.1%	\$29.0
Best Fit	1.4%	\$29.0
Maine 2008 Actual	n/a	n/a



Propane: Achievable Potential as % of Sales

Fuel Type: Propane				Energy Savings Potential (% of Total Forecast Sales)			Annual Achievable Energy Savings (% of Total Forecast Sales)			Cost of Achievable Potential Savings			
				Tech.	Econ.	Achie	vable	Res	Com	Ind	Annual	Total	Total \$/MM Btu
			Analysis										
State	Study	Study	Period								(\$M,	(\$M,	(\$M,
	Year	Period	(years)	TOTAL	TOTAL	TOTAL	ANNUAL				2009)	2009)	2009)
NH	2009	2009-2018	10	26.5%	16.1%	7.8%	0.8%	0.4%	0.3%	0.1%	\$6.0	\$59.7	\$42.2
VT	2007	2007-2016	10	17.8%	17.8% 8.0% 0.8%		0.4%	0.3%	0.0%	\$3.7	\$37.4	\$48.6	
Median	Median			22.1%	16.1%	7.9%	0.8%	0.4%	0.3%	0.1%	\$4.85	\$48.53	\$45.4
Mean	Mean			22.1%	16.1%	7.9%	0.8%	0.4%	0.3%	0.1%	\$4.85	\$48.53	\$45.4

Result	Annual Savings as % of Sales	First Year Cost/ MMBtu
Median	0.8%	\$45.4
Best Fit	0.8%	\$45.4
Maine 2008 Actual	n/a	n/a



Budget Required to Achieve MEDIAN Potential v. Existing DSM Budget Maine 2010-2019 (\$557 Million)

