
New Hampshire Independent Study of Energy Policy Issues

“SB 323 Study”





Presentation for the NH EESE Board

Preview of our Findings – Part 2

June 10, 2011

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Agenda

1. Study Purpose, Team, & Format Today - **Christine** (5 min)
 2. Study Context & Approach - **Christine** (10 min)
 3. EE Review & Assessment - **Jim** (25 min)
 4. SE Review & Assessment - **David** (25 min)
- Break**
5. Planning & Community Energy Assessment - **Jeff** (20 min)
 6. Funding Assessment - **Todd** (20 min)
 7. Policy & Regulatory Assessment - **Scudder** (20 min)
 8. Wrap Up & Next Steps - **Christine** (10 min)

1. Study Purpose, Team, & Format Today



Desired End Result

An effective approach to transforming EE and SE markets that

- ... reflects what is unique about NH

- ... builds upon the progress and successes to date

- ... applies learning from other states & jurisdiction

- ... when helpful for achieving NH's goals.

Study Team

- Vermont Energy Investment Corporation (VEIC) – Prime
 - Senior-level PM, 3 Senior Managers, and 8+ specialists with expertise in EE and SE program design & assessment, low income/WAP, demand response, smart grid, finance & investment, etc.

 - Jeffrey H. Taylor & Associates – Subcontractor
 - Jeff Taylor, NH Planning and Stakeholder Outreach Lead
 - Steve Whitman, NH Local Energy Committees Outreach Specialist

 - Optimal Energy, Inc. (OEI) – Subcontractor
 - Phil Mosenenthal, Performance Incentives Lead
 - Cliff MacDonald, Utility Analyst
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Format Today

- Summary of study team and approach
- A second, more detailed view into key findings and recommendations thus far
- Could spend a whole day on this
- Draft final report will provide specificity and detail

2. Study Context & Approach



Study Context

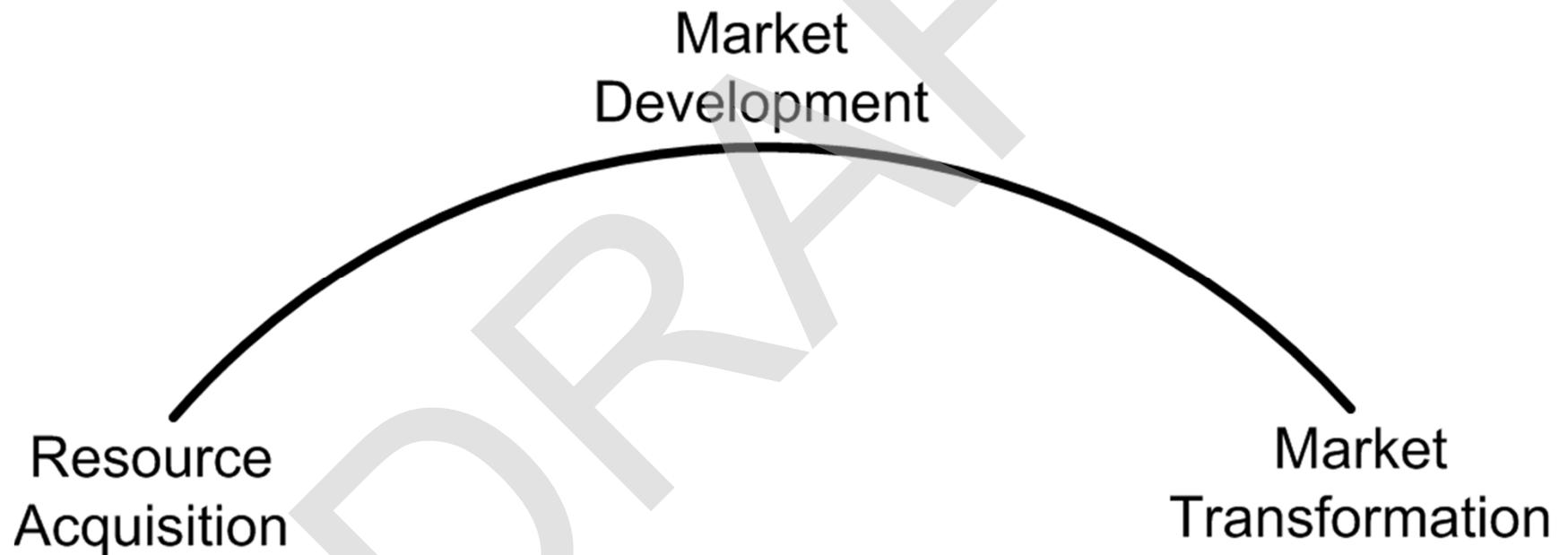
- NH 2008 Energy Bill - \$6 Billion (and rising)
- > \$1 Billion is heating oil, 78% leaves state immediately
- Economic drain = > \$800 M per year
- Efficient use of clean local, indigenous energy is:
 - Yankee independence and frugality at its best
 - Makes good economic and business sense for all!

Study Context

- Total estimated cost to retrofit NH housing to 20-30% efficiency = \$6 Billion
- SBC brings \$34.6M per year. Right now:
 - 45% allocated to EE
 - 55% allocated to low income assistance
- RPS / ACP / REF \$ declining over time < \$ 1M.
- Current RGGI allocation brings \$13.2M, future uncertain.
- ARRA brings \$60M EE & SE. Here today, gone tomorrow!
- Huge investment needed over many years.

EE and SE Markets

What is the desired outcome?



Sustained Orderly Market Development

- Results in EE & SE market penetration and growth in a way that:
 - Enhances market drivers that already exist
 - Engages market players
 - Ensures no dead ends – allows for & encourages:
 - future market growth
 - innovation
 - continuous improvement

Key Ingredients

- **Coherent policy & regulatory framework**
- **Clear, stable message to market players**
 - Ease of finding information and assistance
 - Contractors/installers, retailers, manufacturers, business and home owners all driving to one result
 - Consistent market presence
 - Optimized incentive structures
- **Ease of participation**
- **Sustainable public funding**
- **Stimulating & leveraging private investment**

EE & SE Assessment

- Are market barriers understood & addressed?
- Are offerings targeted to markets?
- Are markets underserved or not addressed?
- Are results in-line with leading programs?
- Are best-practice approaches used?
- Is public funding sustainable?
- Is private investment being leveraged?
- Is the process informed by continuous improvement (EM&V, etc)?

Study Approach

- Conducted > 40 confidential interviews
- Obtained intel and input from > 50 additional EE & SE professionals with NH experience
- Initiated Survey Monkey >700 general public responses
- Presented at annual Local Energy Solutions Conference
- Reviewed 10+ years of NH policy, legislation, and PUC dockets
- Researched experience in other jurisdictions

3. EE Market Assessment



EE Findings – Portfolio Level

- Core programs are functioning and create a foundation for market development.
 - Some coordination underway between electric & gas programs.
 - Programs continuously exceed goals.
 - Goals are set by utilities and approved by PUC.
 - Customer satisfaction is high.
 - Participating contractors express core programs have helped their businesses.
 - Some programs are fully subscribed early in year.
-

Residential Findings

- Programs effectively capture savings in primary markets
 - Measure mix favors longer-lived measures over short term savings
 - Opportunities are still left on the table
 - A few examples:
 - Lighting
 - Appliances
 - Retrofit Market Development
-

Residential – Retail Lighting

Upstream Incentive Program:

- Dramatically increases volumes
- Decreases administrative costs
- Increases participation of retailers
- Increases lighting technologies and product selection and quality available in stores
- Requires a methodology to attribute individual utility kWh savings post-coupon.

Residential – Retail Appliance Program

- Energy Star is a low threshold
 - Transition to CEE Appliance Tiers
 - Consortium of Energy Efficiency (CEE) Super Efficient Home Appliance (SEHA) designation
 - <http://www.cee1.org/resid/seha/seha-main.php3>
 - Tiers leverage ENERGY STAR and are approx. 10-30% more efficient
 - Diversify technologies promoted
 - Consumer electronics and pool pumps
-

Residential - Home Performance with Energy Star

- Customer satisfaction is strong, but...
- Incentive levels are high
 - NH - 50% of the cost up to \$4,000
 - MA - up to \$2,000
 - VT - up to \$2,500
 - NY - 10% of cost up to \$3,000
- Utilities providing more incentive than necessary to drive participation

Residential - Home Performance with Energy Star

- **Market Development is limited**
 - High incentives
 - “Fixed” unit pricing
 - Limited # of contractors

Residential - Home Performance with Energy Star

- Recommend deliberate transition to “Open Market” structure
 - Enhance customer education
 - Centralized and open enrollment of qualified contractors
 - Market pricing
 - More uniformity statewide
 - Expand Fuel neutral pilot
 - Consistent software and savings calculations

EE Findings – C&I

- Effectively captures savings for largest customers, with high satisfaction levels
- Significant room to increase participation among smaller customers
- Program design that addresses market needs and reduces barriers to participation
- Need to examine incentive structure re:
1 year SPB

Large C&I

- Satisfaction and participation among large customers is high
- 50%+ of lifetime savings come from large C&I (pool of 1,200 customers out of 36,000 business accounts)

Large C&I

- Artificial Market Barriers
 - Increase participation and savings by redefining “large users of electricity”
 - NH state government is largest user of electricity in the state
 - But because they have 500 facilities, with only a few demanding over 100 kW, they are being underserved
-

Small C&I

- Streamline participation process for smaller customers
 - Remove pre-installation inspection/approval
 - Only inspect after installation
 - Promote additional technologies to draw in broader participant base (food service, compressed air, Ag, data centers, etc.)
-

C&I Market Approaches

- Develop outreach approaches that reflect specific market audiences (ski areas, hospitality, institutions, etc.)
 - Reduce transaction “management” where it creates barriers to participation- e.g. accommodate procurement requirements
 - Implement upstream programs for common small C&I
-

C&I Incentives

- Are incentives stimulating maximum private investment?
 - Incentives- 35%-75% of cost, bought down to 1 year SPB
 - Need to analyze data to determine SPB, ROI, relative to incentives provided
 - 1 Year SPB may be too low- 3 customers interviewed indicated business decisions are made based on 2-3 year SPB.

EE Conclusion

- Increased technical support during goal setting and program planning.
- Expanded use of common branding and single point of contact.
- Increased coordination among programs across utilities (e.g., offer the same incentives for measures across utilities).
- Third party verification of savings.

4. SE Market Assessment



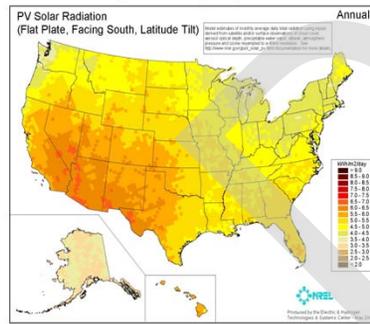
Sustainable Energy Landscape

- Economic
 - Diversity
- Security
 - Diversity
- Environmental
- Increase Electrification

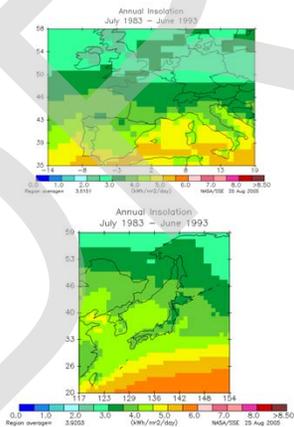
New Hampshire Energy Facts 2008: Overview Based on EIA Data for 2008

Overview of 2008 NH Energy Consumption by Source, Economy Sector and Electricity Generation, in Trillions of British Thermal Units (Tbtu)																														
Gross Non-Renewable Energy Inputs 376.9 Tbtu												Gross Renewable Energy Inputs 43.2 Tbtu						Grand Totals												
< Uses	Petroleum 164.5 Tbtu											Biomass 24.1 Tbtu																		
	Coal	Natural Gas	Asphalt and Road Oil	Aviation Gasoline	Distillate (electricity generation)	Distillate (heat)	Distillate (transp.)	Jet Fuel	Kerosene	LPG (propane)	Lubricants	Motor Gasoline and 10% ethanol by vol	Residual Fuel	Other	Petroleum Total	Nuclear	Muni./Other Solid Waste Nonbiogenic	Muni./Other Solid Waste Biogenic	Wood	Landfill Gas	Biodiesel/Bioheat	Ethanol in gasoline 10% by vol	Geothermal	Hydro	Solar PV/Thermal	Wind	Electr. Net Imports	Total Gross Energy Inputs (Primary Energy)	Total Gross Exports & Associated Losses	Total Net NH Energy Consumption
Totals >	40.2	73.4	0.5	0.1	0.1	33.4	14.6	0.9	1.0	13.9	0.4	87.0	5.9	0.4	164.5	97.7	1.2	1.6	17.5	1.3	0.0	3.8	0.02	16.1	0.1	0.1	2.8	420.3	-109.1	311.2
Sector:																														
commer.		9.3				5.8				4.1		0.3	2.3		12.7				0.3			0.0			0.02				22.2	22.2
industr.		5.7	0.5			3.8				0.9	0.1	0.8	2.3	0.4	14.7				1.5					0.1				22.1	22.1	
residen.		7.2				23.8				0.9	8.8				33.5				2.0			0.02		0.06			42.8	42.8		
transp.				0.1		14.8	0.9			0.1	0.3	85.9			102.1							3.8					106.0	106.0		
Elec.Gen.	40.2	51.2			0.1								1.3	1.5	97.7	1.2		1.6	13.7	1.3			16.0	0.1	2.8	227.2	-109.1	118.1		

New Hampshire's Solar Resource Is Better than Germany and Japan's

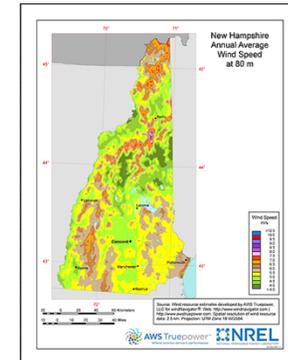
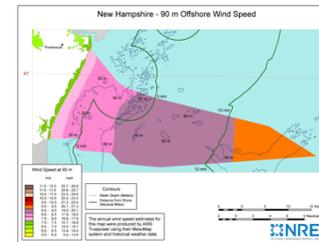


New Hampshire 4.0-4.5 kWh/m²/day



Germany & Japan <4.0 kWh/m²/day

New Hampshire's Wind Resource is Significant On Shore & Off Shore



Source: NREL Wind Powering America

Sustainable Energy Landscape

- Whether driven by economic, environmental, or other concerns – a common theme of combined EE and SE resources has emerged

Figure 2.2 - Projected Emission Reductions from Implementation of All Recommended Actions

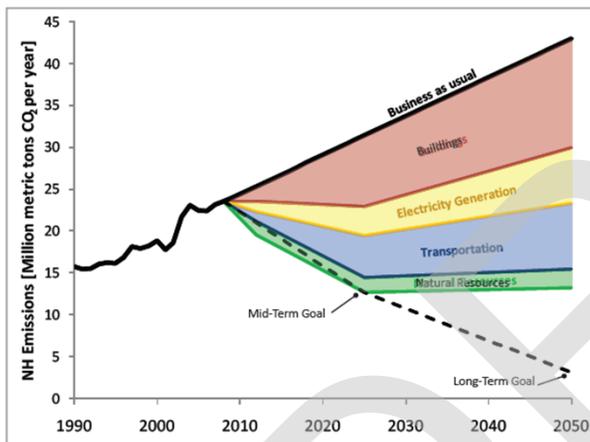
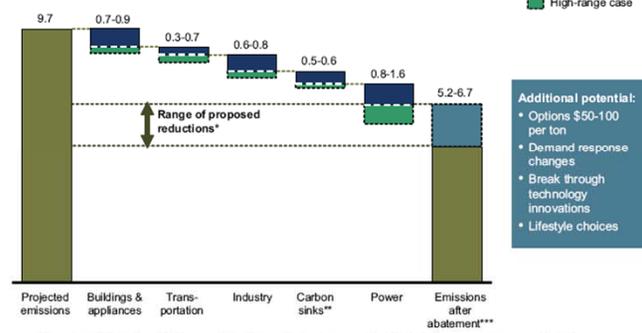


Exhibit B
CLUSTERS OF ABATEMENT POTENTIAL – 2030
Gigatons CO₂e, options less than \$50 per ton CO₂e



* Based on bills introduced in Congress that address climate change and/or GHG emissions on an economy-wide basis and have quantifiable targets; targets calculated off the 2030 U.S. GHG emissions of 9.7 gigatons CO₂e/year (reference case)
** Including abatement in the agriculture sector beyond expanding carbon sinks
*** Adjusted for cumulative rounding errors
Source: U.S. EIA; EPA; USDA; McKinsey analysis

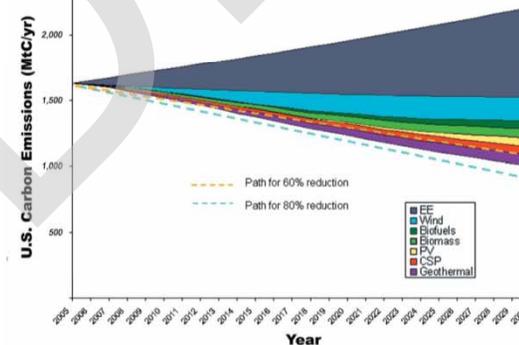
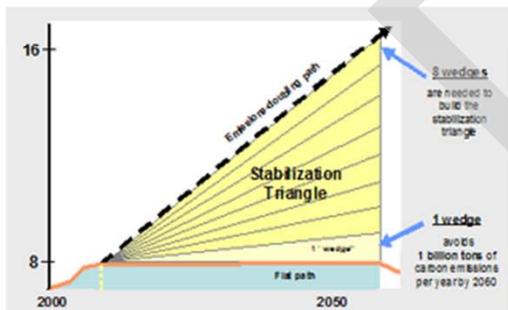
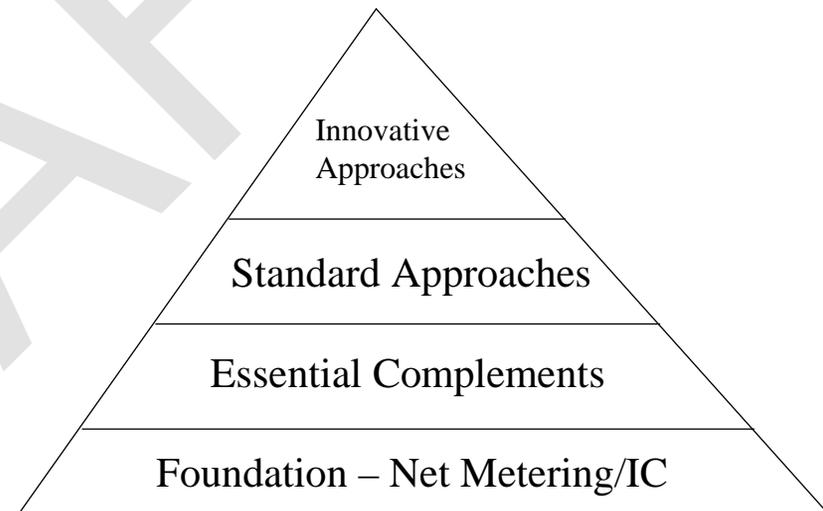


Figure 2

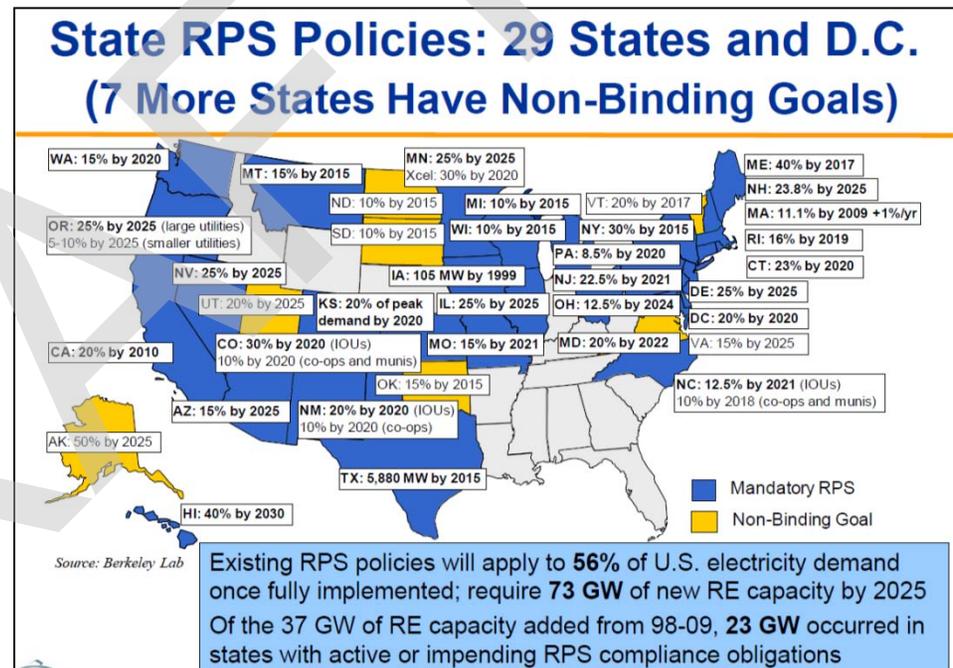
Sustainable Energy Policy and Market Development Strategies

- Aligned with objectives
- Realistic assessment of goals
- Market based
- Provide “safety valves”
- Adaptive
- Complementary to EE



Sustainable Energy Strategy

- NH has joined many other states in pursuing RPS driven development
- RPS under current review
- Report compares NH to “peers” and neighbors



CESA, LBNL

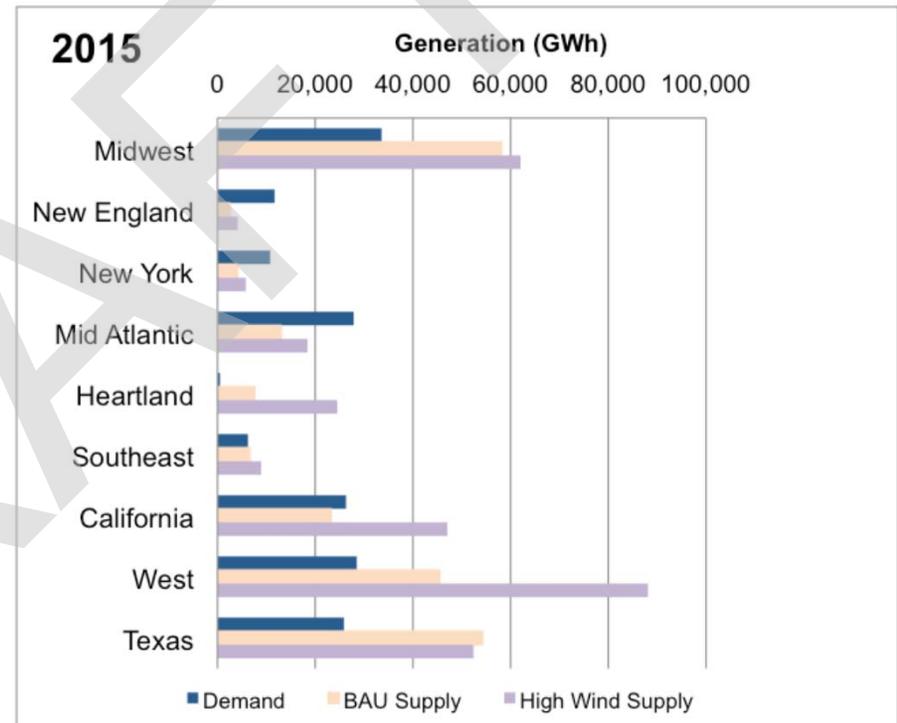
Enhancing NH's RPS Framework

■ Objectives of RPS Legislation

- ❖ Promote resources that serve to displace and thereby lower regional dependence on fossil fuels
- ❖ Support New Hampshire's economy
- ❖ Improve air quality and public health
- ❖ Mitigate against the risks of climate change

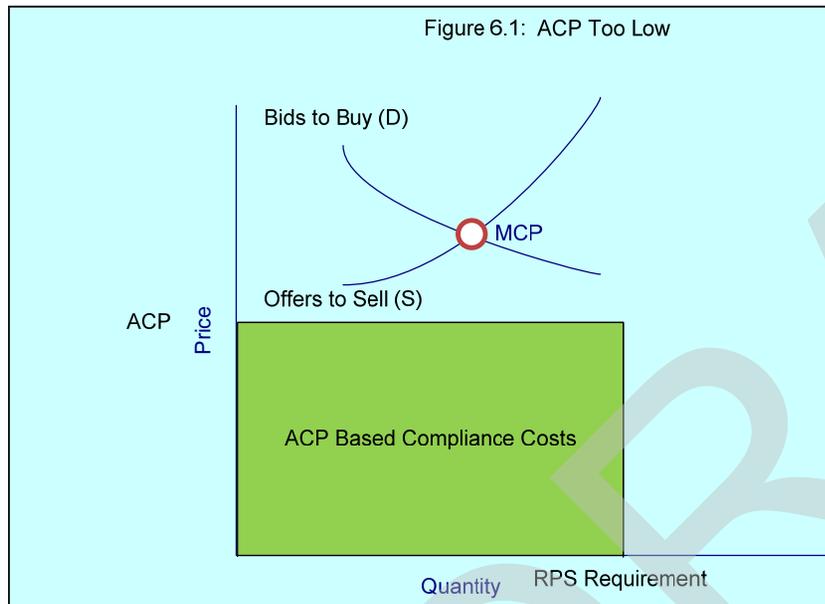
Enhancing NH's RPS Framework

- Regional RPS requirements grow rapidly
- Tendency to use only ACP will increase
- If ACP is too low, market activity will be suppressed
- Establish rate impact safety valves

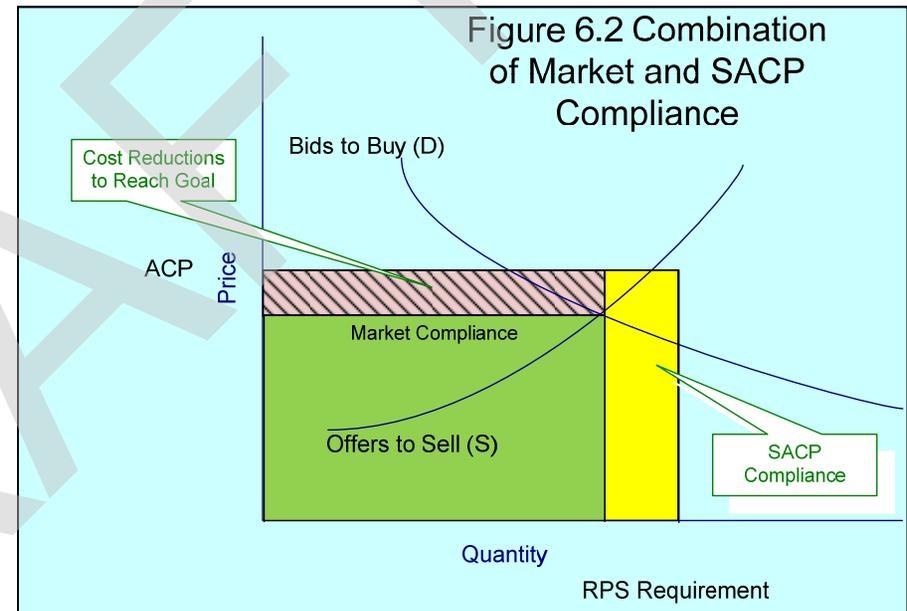


Bird et. al, NREL 2010, Technical Report 6A2-45041

Raising the ACP

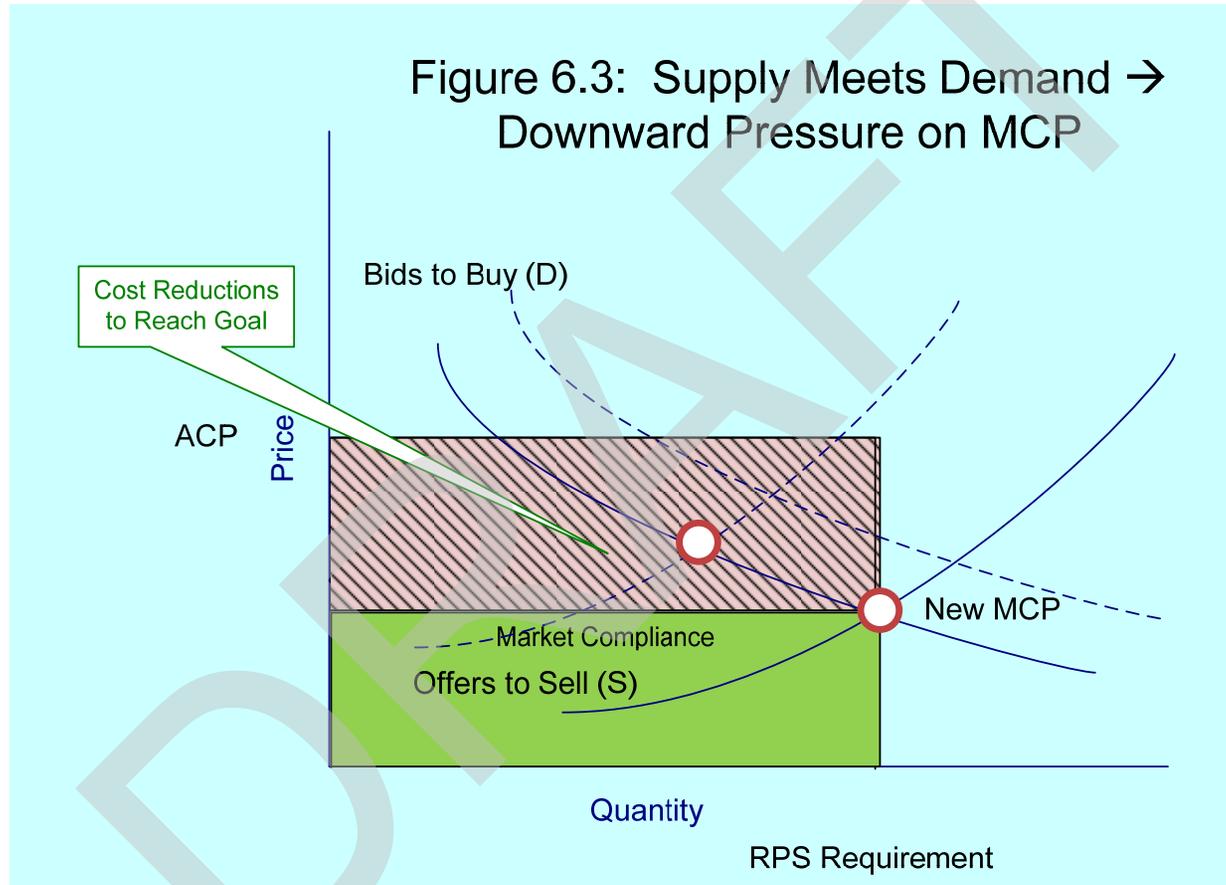


Result → ACP funds created, little/no Market compliance



Result → Mix of market and ACP Compliance

Raising the ACP



Result → All market compliance – reduced overall costs to meet goal

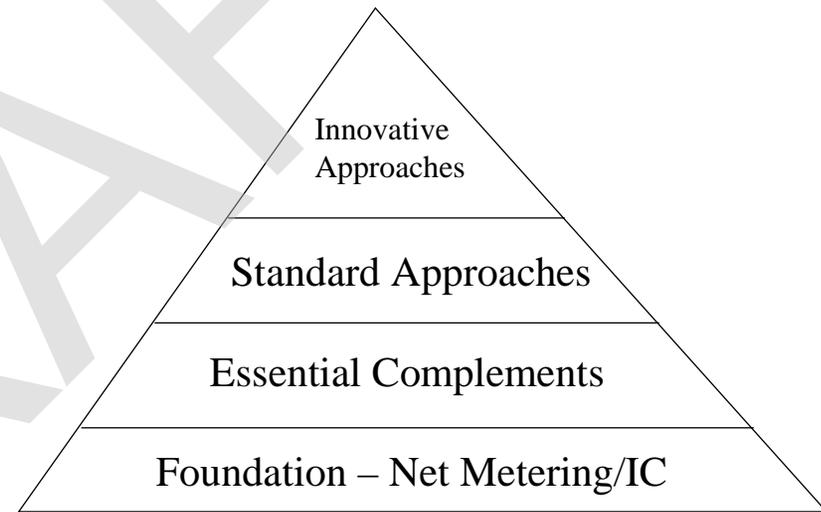
Raising the ACP – PV Example

- Increasing ACP from \$163 to \$250 provides positive NH customer economics
- Revenue requirement impact by 2014 → 0.33% to 0.51% if only ACP compliance is used

NH 2010 - No Limit on Fed Tax Credit Residential Cash Flow Forecast		Present Value	Year				
			1	2	3	4	5
Electricity savings	\$	6,886	\$ 660	\$ 673	\$ 687	\$ 700	\$ 714
REC revenue	\$	5,455	\$ 717	\$ 717	\$ 717	\$ 717	\$ 717
Initial Downpayment	\$	(18,000)					
Loan payments	\$	-	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Tax effect of loan	\$	-	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Federal Personal Income Tax Credit	\$	4,909	\$ 5,400				
State Tax Credit	\$	-	\$ -				
O&M - 10 Year Inverter replacement cycle @ \$0.80/Watt	\$	(1,234)	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00
Net Present Value		-\$1,983					
Incremental Cash Flow		-\$18,000	\$6,777	\$1,390	\$1,404	\$1,418	\$1,432
Cummulative cash flow			-\$11,223	-\$9,832	-\$8,429	-\$7,011	-\$5,579
<i>Inputs:</i>							
	Loan term years		20				
	Loan rate		8.00%				
	Installed Cost \$/Watt	\$	6.00				
	System Size kW		4.00				
Residential Analysis	Gross Installed Cost	\$	24,000				
	kWh/DCKW/yr		1100				
	System Life Yrs		25				
	Incentive cap tier 1 (kW)		25				
	Incentive Tier 1 \$/Watt	\$	1.50				
	Incentive cap tier 2 (kW)		-				
	Incentive Tier 2 \$/Watt	\$	-				
	State Tax Credit limit	\$	1,000				
	Federal Tax Credit		yes				
	State Tax Credit		no				
	Fed tax credit limit	\$	24,000				
	Loan Interest Deduction		yes				
	Yr 10 maintenance	\$	(3,200)				
	"Simple Payback TL" (yrs)						19.1

Additional Enhancements for RPS as Cornerstone of NH's SE Strategy

- Encourage / require long term contracts
- Simplicity and transparency
- Geographic eligibility – at least for DG
- Supplement with SE Programs/Initiatives & essential complements

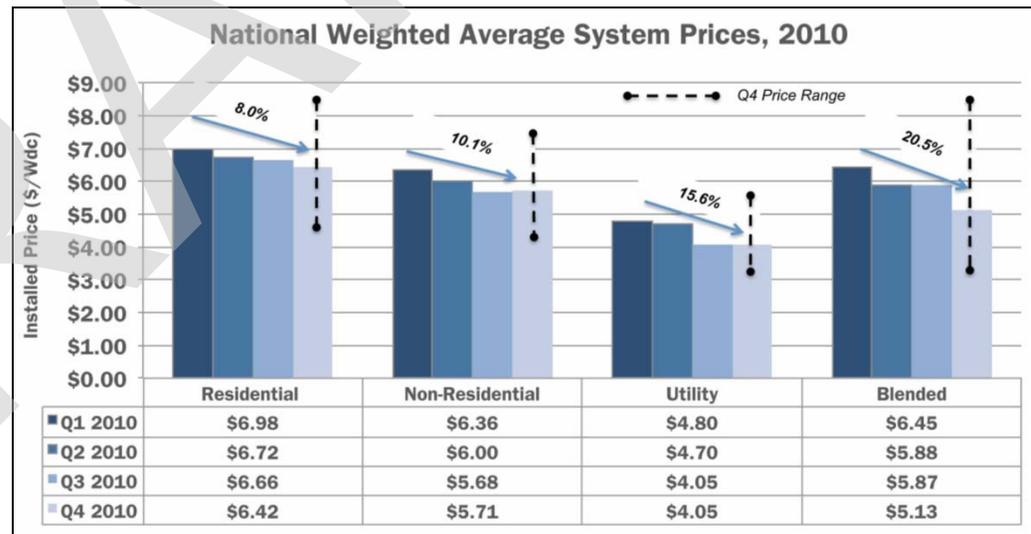
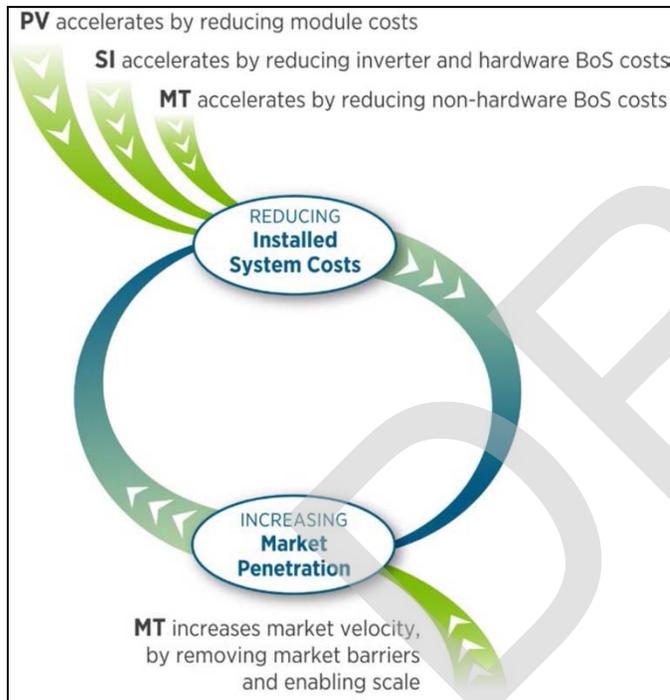


SE Programs & Initiatives as Complementary Strategies

- Sustainable funding for market dynamic initiatives
 - ❑ Main source for REF funding should be other than ACP
 - ❑ Establish declining incentive blocks and mechanisms to avoid over-subscription
 - Solar hot water and biomass thermal markets deserve continued support
 - Innovative strategies – can reach target markets and niche opportunities (e.g.):
 - ❑ Value based FIT
 - ❑ High value or Limited Income SE
 - ❑ Solarize
 - ❑ Community Solar
-

SE Programs & Initiatives as Complementary Strategies

- As investments these strategies help build the market and reduce the costs for RPS compliance.



SEIA/GTM US Solar Market Insight 2010

5. Planning & Community Energy Assessment



Energy Implications of Growth

Growth in New Hampshire

A pattern of dispersed, agrarian development

Then concentration in/around mill economy

Then, since 1960s, dispersed, suburban development

Concord

1820 – 17% of region

1880 – 50% of region

1930 – 69% of region

1960 – 65% of region

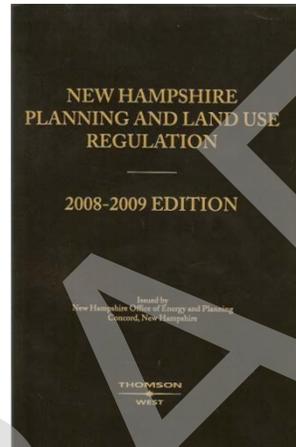
Today – 47% of region



Sound, Energy Efficient Planning: We have the infrastructure

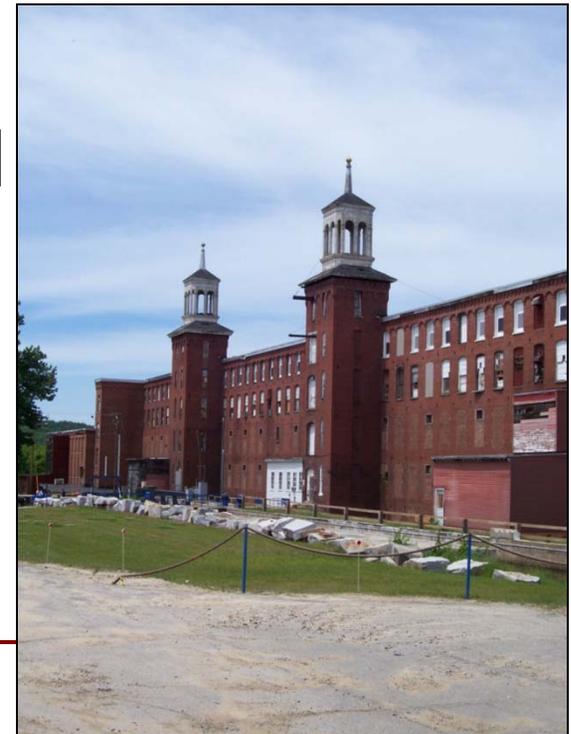
- State Level

- RSA 9-A, 9-B



- Community Level – Mixed Used

- Dover
- Pembroke
- Concord



Sound, Energy Efficient Planning:

We have the infrastructure

■ Community Level – Energy Efficiency

- ❑ Epping
- ❑ Keene
- ❑ Temple

■ Regional Level

- ❑ PAREI, TINREI, SEAREI, e
- ❑ Looking for ways to foster these
- ❑ T/A is helpful, Networking is critical
- ❑ Local energy committees a good start



Potential Actions

Translate RSAs 9-A,B from Smart Growth to Sustainability

Use RSAs 9-A,B: Dev. Plan, Grants, Rules, Real Estate, Capital Budget

Align NHHFA/CDBG to favor mixed use

Promote Form Based Zoning

Assist the PAREIs

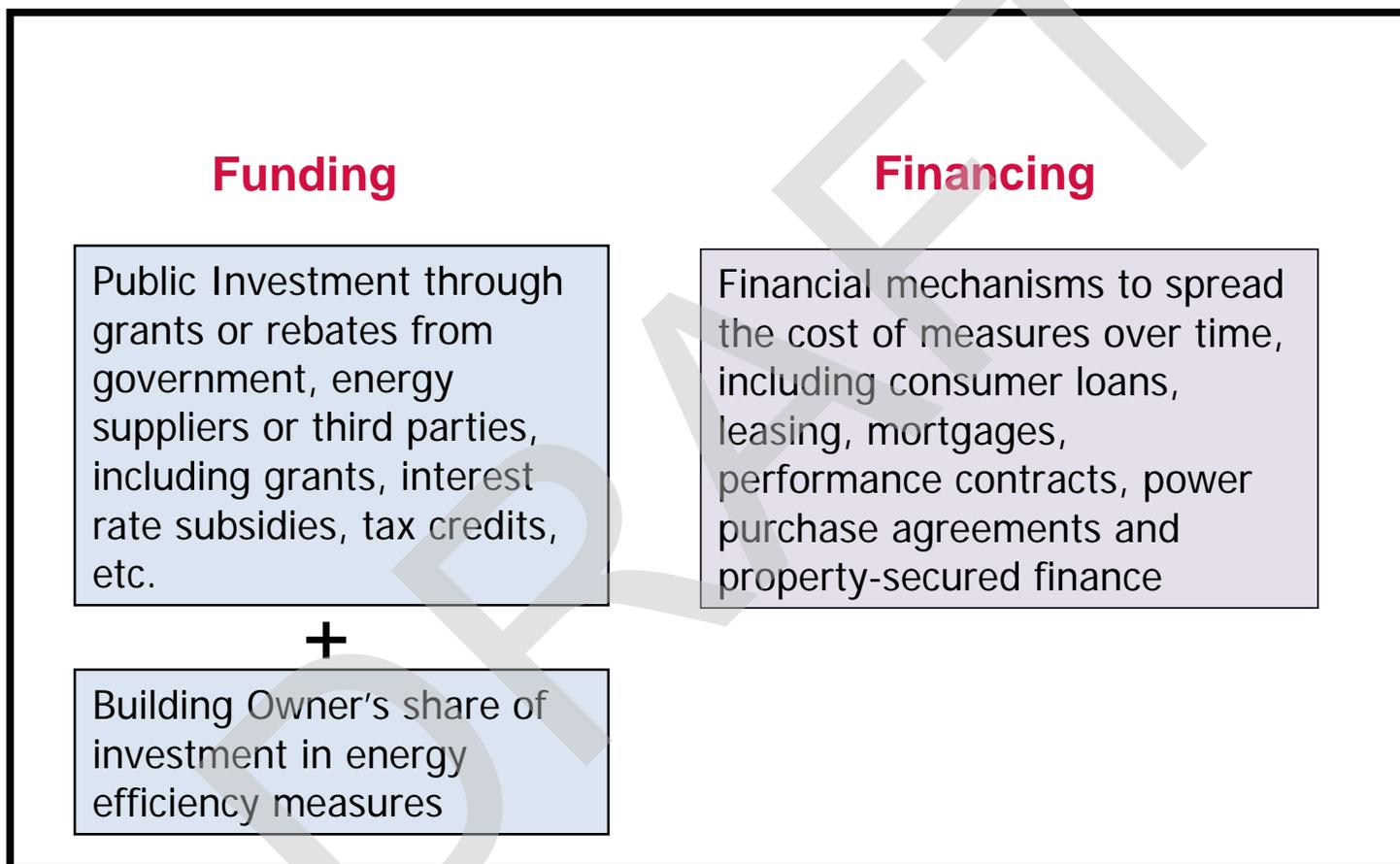
Tech. Assistance
Social Media for
networking



6. Funding Assessment



Differentiating “Funding” from “Financing”



Dollars Leveraged

Finance Program	Interest Rate	Capital	Leveraged Dollars	Leverage Ratio
Enterprise Energy Fund	2%	\$1,900,000 ¹	\$5,300,000 ¹	3:1
Business Energy Conservation Fund	P to P+3	\$2,050,000	\$3,300,000	1.6:1
Better Buildings	1% ²	\$3,000,000 ³	\$25,200,000 ³	8:1
People's United EE Loan	P-1 (>4%)	\$360,000	\$1,800,000	5:1
Giving Power Back	-	\$500,000	\$1,200,000	2:1
PSNH Energy Rewards	-	\$3,200,000	\$3,900,000	1.2:1
Actual Total			\$15,500,000	
Projected Total			\$40,700,000	

- **Leveraging applicant dollars vs. financial institution dollars**
 - \$3M at 50% = \$6M
 - 10% = \$30M
 - 5% = \$60M
 - 2% = \$150M
- **Energy program financing vs. bank financing**

¹ – Enterprise Energy Fund includes oversubscribed dollars; actual numbers will change upon project approval/completion

² – Introductory Rate

³ – Better Buildings capital contribution and leveraged dollars are based on VEIC estimates and ideal scenario projections

What are Highest and Best Uses of Public, Government or Energy Supplier Investment?

- Options for use of public funds to support retrofits:
 - ❑ Direct financial incentives to lower up-front costs
 - ❑ Start-up and operating costs for energy programs
 - ❑ Capitalizing and managing revolving loan funds
 - ❑ Buying-down interest rates for consumer financing
 - ❑ Loan guarantees, loan loss reserve funds, or other credit enhancements

- Assuming project cost of \$8k, \$1,000,000 could:
 - ❑ Provide capital for loans to 172 homes (20 year financing)
 - ❑ Provide 20% loan loss coverage for 625 homes
 - ❑ Provide 5% loan loss coverage for 1250 homes

7. Policy & Regulatory Assessment



We have numerous observations,

suggestions, and recommendations ...

7 are Foundational

1. **Lead by example -**

State government EE and SE commitment with “teeth”

Strong state energy & planning entity with leadership & consistency – in it for the long haul

Demonstrate coordination/mobilization of resources

2. **Efficiency first -**

Least cost procurement – If you don’t have a policy you still have a policy

3. **Motivate utilities to invest in EE and SE -**

Decoupling

Modified performance incentives in exchange for aggressive implementation

7 are Foundational (con't)

4. **Improve the regulatory environment -**

Clarity and consistency are essential – have your debates in the right setting

Planning & collaboration, not litigation

Strengthened EM&V, 3rd party review

5. **Coordinate programs & streamline administration**

Common branding with one stop shopping

Comprehensive fuel neutral services w/ single point of contact

If performance really matters these are logical steps

7 are Foundational (con't)

6. Use public funding and policy to stimulate & leverage private investment

Statewide, coordinated financing, targeted to markets

Fuel neutral fund, pooling SBC monies, RGGI monies,

new EE charge on wholesale oil and propane (for retrofits), etc.

Loan loss reserve fund to leverage private investment

Codes coordinated with EE programs.

7. Continued Multi-Disciplinary (resourced) Stakeholder Group

Advisory to the PUC and Legislature

For coordination & information sharing

With standing & independent expertise

8. Future EESE Board Engagement



Next Steps

- Draft Report - June 30
- EESE Board Draft Report “Orientation” - July 8 (or 15?)
- EESE Board Final Report “Orientation” - September 9
- 2 Public Presentation Days - Fall 2011 & Winter 2012

For More Information

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Survey Monkey

- On-line for about 6 weeks
 - 751 responses -
 - 589 (78%) Homeowners
 - 39 (5%) Renters
 - 82 (11%) Business Owners
 - 41 (6%) Other (LEC members, officials, etc.)
-

Motivated Group

- Invest how much to save \$250 annually?
 - \$1,500 – 31%
 - \$1,000 – 25%
 - \$ 500 – 17%
 - \$ 250 – 22%
 - Know how to ... “Very Knowledgeable”
 - Obtain an Energy Audit - 38%
 - What to do first – 35%
 - Where to go for EE \$\$\$ - 17%
 - Where to go for SE \$\$\$ - 15%
-

Findings

- What have you done? – **Homeowners**
 - Lighting – 82%
 - Building Envelope – 59%
 - Heating – 34%
 - Appliances – 35%
 - What have you done? – **Residential Renters**
 - Lighting – 63%
 - Building Envelope – 63%
 - Heating – 49%
 - Appliances – 26%
-

Findings (con't)

- What have you done? - **Business owners**

 - Process Upgrades – 15%

 - Property Upgrades – 20%

 - Both – 53%

 - Neither – 12%

- Property Upgrades? - **Business owners**

 - Lighting – 63%

 - Building Envelope – 63%

 - Heating – 49%

 - Appliances – 26%
