Creating A Greener Energy Future For the Commonwealth

DOER
Massachusetts Department of Energy Resources

Funding the Deep Energy Retrofit

NESEA BE 10

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Learning Objectives

- Understand how to achieve the widespread adoption of residential deep energy retrofits from a funding perspective.
- The funding perspective requires an understanding of the timeline, borrowing parameters, saving's target, and critical assumptions for achieving widespread adoption.
- Understand the existing funding options
- Present a funding mechanism that minimizes public funding and maximizes the property owner's investment to savings ratio.

Spirit of Presentation

- Ideas presented have been discussed at DOER and during the development of “Getting to Zero – Final Report of the Massachusetts Zero Net Energy Building Task Force Report”
- Facts speak for themselves
- Policy considerations do not necessarily represent planned state initiatives

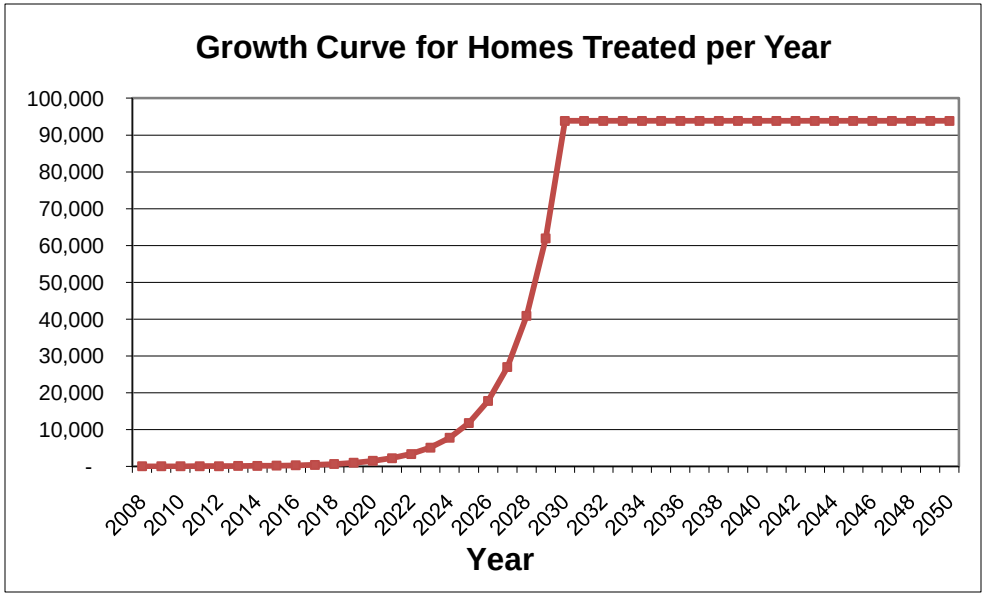
Funding the Deep Energy Retrofit
A Long View

- Thought Exercise
- Assumptions
- Market Transformation
- Financing Options
- PACE Bond and Zero-Net Energy Bond
- Consequences of Financial Options
- Long Term Consequences

Thought Exercise

- **Timeline**
  - **Global Warming Solutions Act**
    - **2050 - 80% reduction of 1990 CO_2**
    - **All existing buildings will move toward zero net energy**
- **Borrowing Parameters**
  - **At time of scheduled maintenance**
  - **Total incremental $50,000**
  - **Interest Rate 3%**
  - **Term 30 Years**
- **Benchmark *Heating Savings***
  - **National Energy Modeling Software 2009 projection for New England**
  - **Average House Size - 2,031 ft^2 and heat energy 96 MMBTU**
  - **47 kBtu/ft^2 with Target 10 kBtu/ft^2 = 76 MMBTU household savings**

Thought Exercise
Timeline for Massachusetts



Selected Years - Growth 52% per Year

Year	Units/year	Cumulative	Notes
2008	10	10	
2012	53	**136**	**Less Than DER Pilot Target**
2020	1,468	4,297	
2025	11,739	34,490	
2030	**93,855**	275,890	**Steady State**

Thought Exercise
Borrowing Parameters (Recap)

- **At time of scheduled maintenance**
- **Total Incremental $50,000**
- **Interest Rate 3%**
- **Term 30 years**

Thought Exercise
Benchmark Heating Savings

NEMS 2009 New England Projection		
Measurement	**Amount**	**Units**
Size	2,031	Ft^2
Heating Total	96	MMBTU
EUI Heat Now	47	$kBtu/Ft^2$
EUI Heat Target	10	$kBtu/Ft^2$
Heat Savings	76	MMBTU

Thought Exercise
Dollar Heating Savings

$-Saved from 76 MMBTU Reduction per Year				
Fuel	**Unit Price**	**$ per MMBTU**	**Annual Savings**	**Source**
Gas	$1.41 per Therm	$14	**$1,063**	My January Bill
Oil	$2.81 per Gallon	$20	**$1,518**	DOER Website - Recent Average
Electric	$0.17 per kWh	$51	**$3,835**	EIA MA Jan-Oct 2009

Assumptions

- ***Efficient Division of Labor***
  - **Audit**
    - **Diagnostic**
    - **Work Order Ready**
  - **Climate fortification specialists**
    - **Air Sealing**
    - **Interior Insulation**
    - **Exterior Insulation**
    - **Blower Door Testing**
  - **Performance Confidence**
    - **Measure & Report Savings**
    - **Marketing & Education**

Market Transformation

- Ratepayer-funded Utility Programs are an interim solution
- Efficiency improvements overtime become
  - Accepted in the market place
  - Mandated through building codes and equipment standards

Financing Options - Grants

- Ratepayer Funds
  - $25,000 - Deep Energy Retrofit Pilot Program
  - $2,000 - Standard Retrofit Incentive
  - $5,884 - $/MMBTU
- Tax Credits
  - $1,500 – Current Maximum

Financing Options - Borrowing

- Obligation Resolved at Time of Sale
  - Standard Loan: Principal and Interest
  - 0% Interest Loan
    - Offered through IOU electric companies
    - Interest small relative to DER investment
- Obligation Continues at Time of Sale
  - Property Assessed Clean Energy & Standard Loan
- Obligation Modified at Time of Sale
  - Property Assessed Clean Energy & Zero Net Energy Bond

PACE and Zero-Net Energy Bond

- PACE Bond
  - Municipality issues a bond
  - Bond provides capital for property owners
- Standard Loan
  - Property owner borrows from municipality
  - Loan obligation stays with property after sold
- Zero-Net Energy Bond (ZNEB)
  - Property owner issues bond to municipality
  - Property owner pays interest only
  - Property seller pays percent of principle at sale
  - New owner pays same interest

Financial Contributions

- Greatest Ratepayer Funds AND Lowest Participant Cost

Financing Option	Ratepayer Funds	Participant
DER Pilot Grant | Loan	$25,000	$25,000
$MMBTU Grant | 0% Loan	$22,814	$44,116
$2,000 Grant | 0% Loan	$20,421	$48,000
$MMBTU Grant | Loan	$5,884	$44,116
$2,000 Grant | Loan	$2,000	$48,000
PACE | Loan	$0	$50,000
PACE | ZNEB	$0	$50,000

Financial Cost Impact

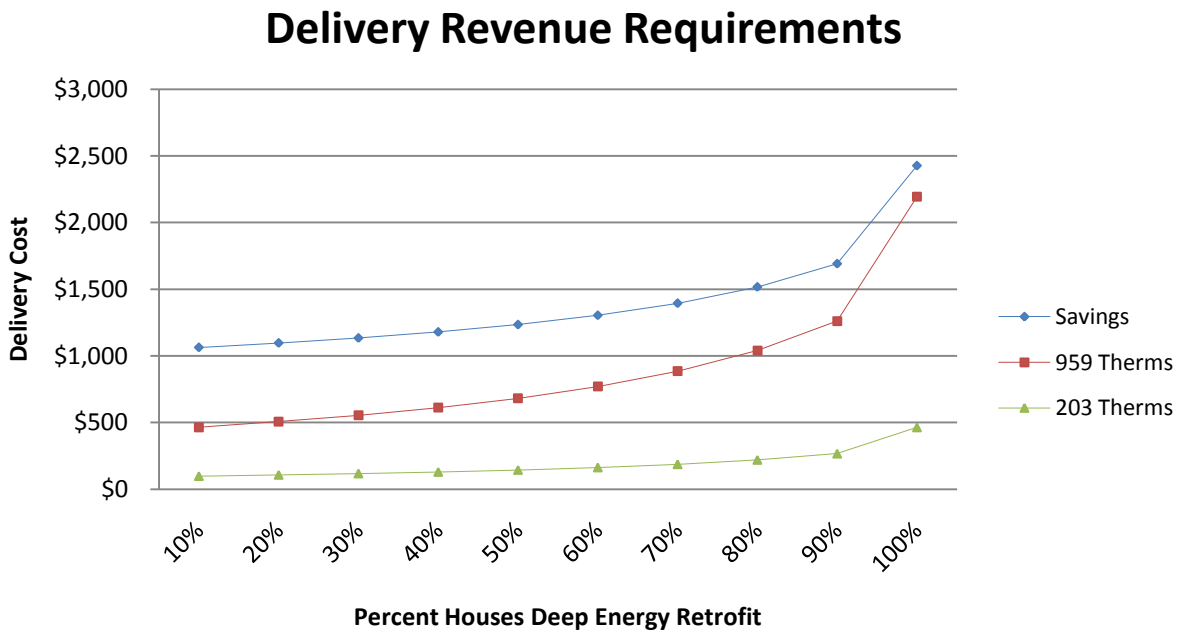
- Lowest Bill Impact AND Highest Savings to Investment Ratio

Financing Option	Annual Impact		Savings to Investment Ratio		
	Utility Bill	Participant	Gas	Oil	Electric
PACE | ZNEB	$0	$1,500	**0.71**	1.01	2.56
PACE | Loan	$0	$2,530	0.42	0.60	1.52
$2,000 Grant | Loan	$83	$2,428	0.44	0.63	1.58
$MMBTU Grant | Loan	$245	$2,232	0.48	0.68	1.72
$2,000 Grant | 0% Loan	$851	$1,600	0.66	0.95	2.40
$MMBTU Grant | 0% Loan	$951	$1,471	0.72	1.03	2.61
DER Pilot Grant | Loan	$1,042	$1,265	0.84	1.20	3.03

PACE – ZNEB Gas: **$50 a month more than saved; tax credit covers for 2+ years**

Long Term Consequences

- Increasing gas delivery charges



- DER Retrofit Supple Bubble

Thank you for your time!

QUESTIONS??

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