



## **Energy Efficiency in 2014: An Assessment and Discussion**

The Lyceum  
227 Lawrence Street, Hartford, CT  
April 10, 2014

### **AGENDA**

8:30 – 9:00 AM Check-in

9:00 – 9:20 AM **Welcome** – *Nicole E. Chevalier*, Interim Chief Executive Officer, Emily Hall  
Tremaine Foundation

**Opening Remarks** – *Rob Klee*, Commissioner, Connecticut Department of  
Energy and Environmental Protection

9:25 – 9:35 AM **Overview: Where do energy efficiency efforts stand in Connecticut and  
the region?**

The forum commences with a brief overview of trends in energy efficiency in Connecticut and the New England states to set the stage for the panel discussions. The presentation will review relevant performance data, such as energy savings, spending per capita, and economic and environmental benefits captured. Presenter: *Dan Sosland*, President and CEO, ENE.

9:35 – 11:00 AM **All cost-effective energy efficiency procurement: How is this critical  
policy performing in the region?**

This panel will examine the effects of all cost-effective energy efficiency procurement in the region – a policy approach adopted now in Connecticut and much of New England – that is driving increased investments and savings goals in state efficiency programs intended to capture energy efficiency as an economic energy resource. The discussion will focus on key issues around implementing this policy: energy efficiency program delivery and performance; program administration models, including utility and third party program administration; perspectives on how to measure consumer value from efficiency investments (including whether consumer benefits should be measured on the basis of rates, bills, or system or economic savings), and exploring whether and how to sustain all cost-effective procurement over time. Moderator: *Jamie Howland*, Director, ENE Climate and Energy Analysis Center and, Chair, Connecticut Energy Efficiency Board.

#### Panelists (confirmed):

*Scudder Parker*, Director, Policy, Vermont Energy Investment Corporation

*Penni McLean-Conner*, Chief Customer Officer & Senior Vice President,  
Customer Group, Northeast Utilities

*Elin Swanson Katz*, Consumer Counsel, Connecticut

*Tim Woolf*, Vice President, Synapse Energy Economics, Inc.



11:00 – 11:10 Break

11:10 – 12:40 PM **What is the future of energy efficiency as a modern grid resource in New England?**

Grid modernization and changes to the utility business model are increasingly urgent topics in the region and throughout the nation. This panel will focus on the role of energy efficiency and address issues including: how the states' energy efficiency programs can evolve to address system reliability needs; how grid modernization policies and investments can accelerate energy efficiency savings; ensuring that the benefits of grid modernization reach everyone, particularly low-income consumers; and, are utilities appropriately positioned to deploy energy efficiency and other demand-side resources instead of traditional solutions to grid reliability needs? Moderator: Abigail Anthony, Ph.D., ENE Director of Grid Modernization and Utility Reform, and, ENE Rhode Island Director.

Panelists (confirmed):

*Tim Roughan*, Director of Energy and Environmental Policy, National Grid

*Jeff Schlegel*, Schlegel and Associates

*Henry Yoshimura*, Director, Demand Resource Strategy, ISO New England

*Charlie Harak*, Senior Attorney, National Consumer Law Center

12:40 – 1:45 PM **Lunch and Speaker** – *Marion S. Gold*, Ph.D., Commissioner, Rhode Island Office of Energy Resources

1:45 – 3:10 PM **Moving beyond the low-hanging fruit: How to innovate to achieve greater weatherization in the residential sector?**

This panel will explore the complex challenges posed by public policies that task efficiency programs with moving beyond electric resource acquisition to achieve significant weatherization goals in the residential sector. The discussion will focus on issues unique to this challenge – such as overcoming barriers to efficiency gains in low-income and multi-family housing, the cost-effectiveness challenge of full weatherization, enabling savings of all fuels, and the role of PACE and other financing options. A fundamental theme will be examining program design and policy issues through the consumer lens and probing possible innovations to determine which are likely to provide the best value to consumers. Moderator: William E. Dornbos, ENE Connecticut Director.

Panelists (confirmed):

*Bryan Garcia*, President & CEO, Clean Energy Finance & Investment Authority

*Jane Lano*, Senior Program Manager, The United Illuminating Company

*Ian Finlayson*, Deputy Director, Energy Efficiency Division, Massachusetts  
Department of Energy Resources

*Shirley Bergert*, Member, Connecticut Energy Efficiency Board

*Jeremy McDiarmid*, Senior Director, Innovation and Industry Support,  
Massachusetts Clean Energy Center



3:15 – 3:45 PM

**Thank You & Closing Remarks** – Dan Sosland & Abigail Anthony

Thank you to the Emily Hall Tremaine Foundation for its support of this forum.



# Energy Efficiency in 2014: *An Assessment and Discussion*

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The Lyceum

Hartford, Connecticut

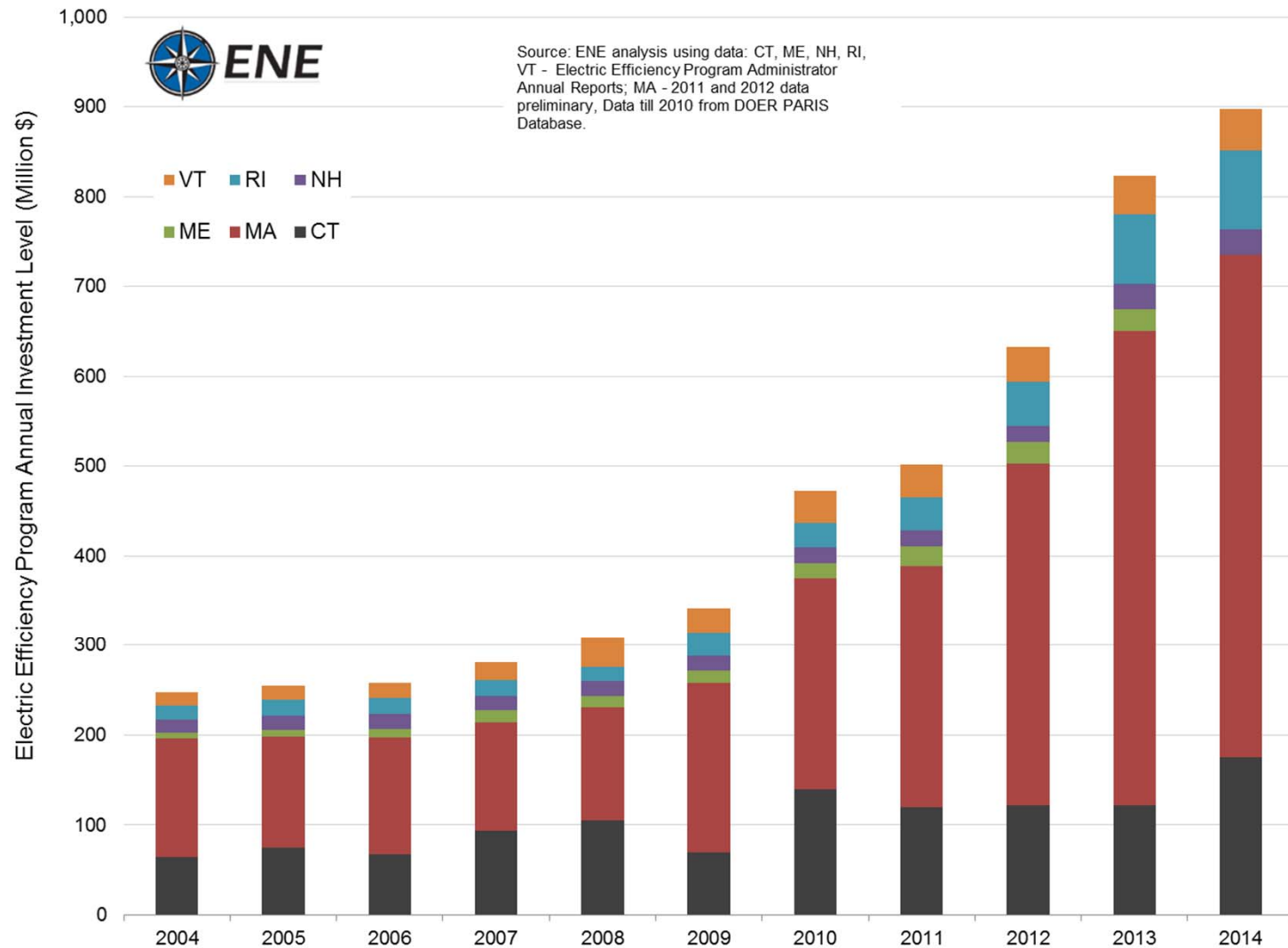
April 10, 2014

Daniel L. Sosland, President

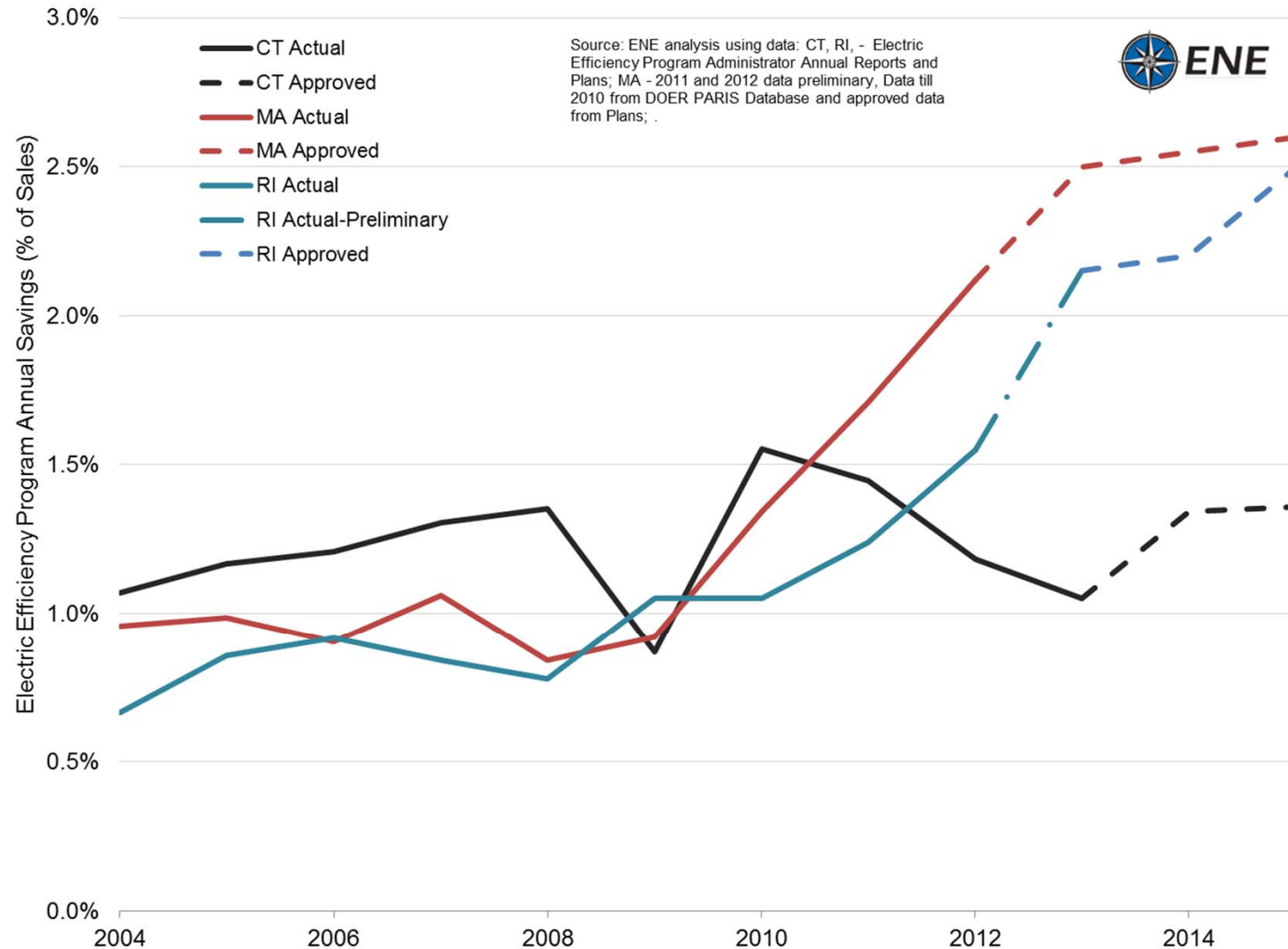




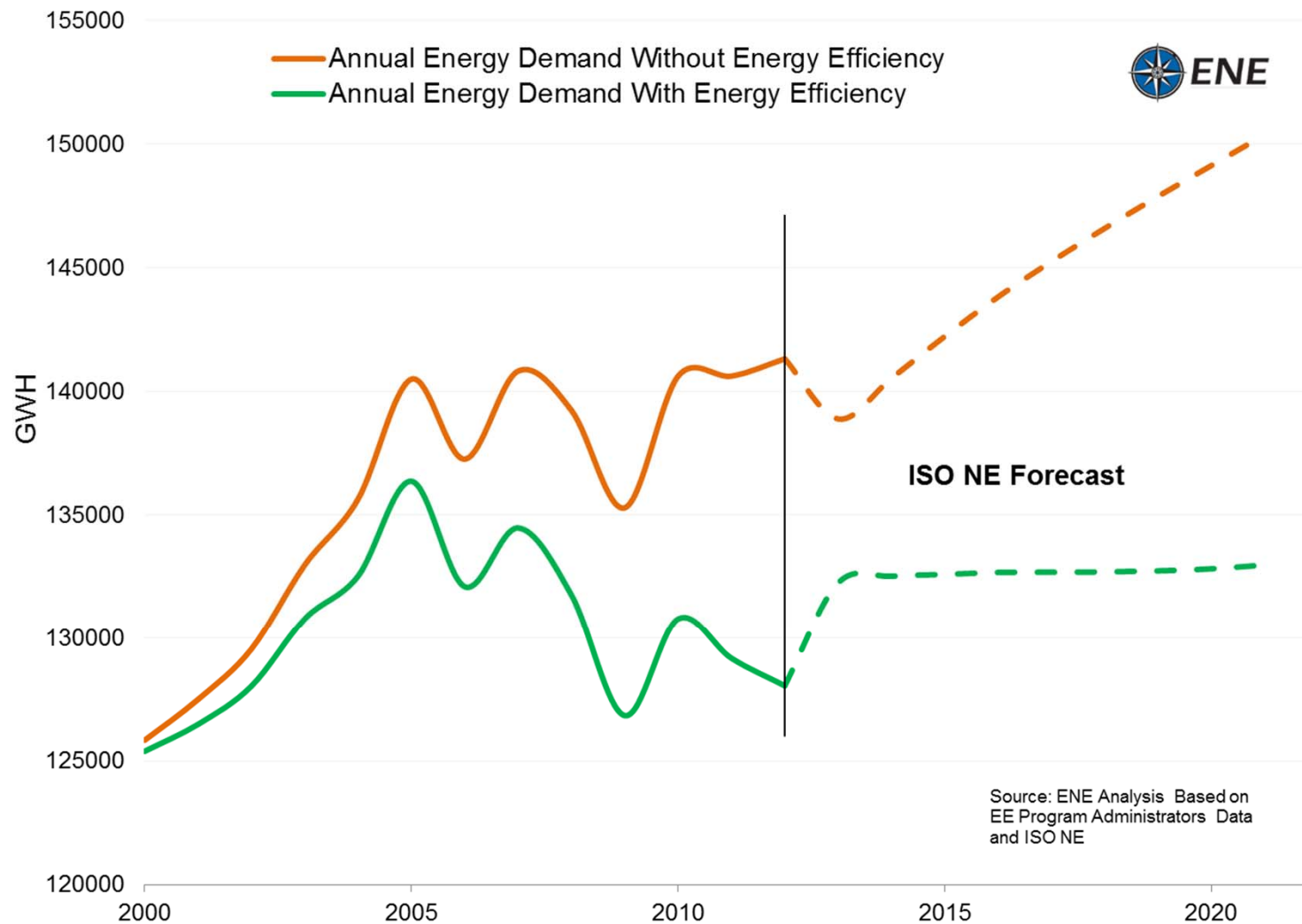
# Electric Efficiency Investments



# Electric Efficiency Savings Goals

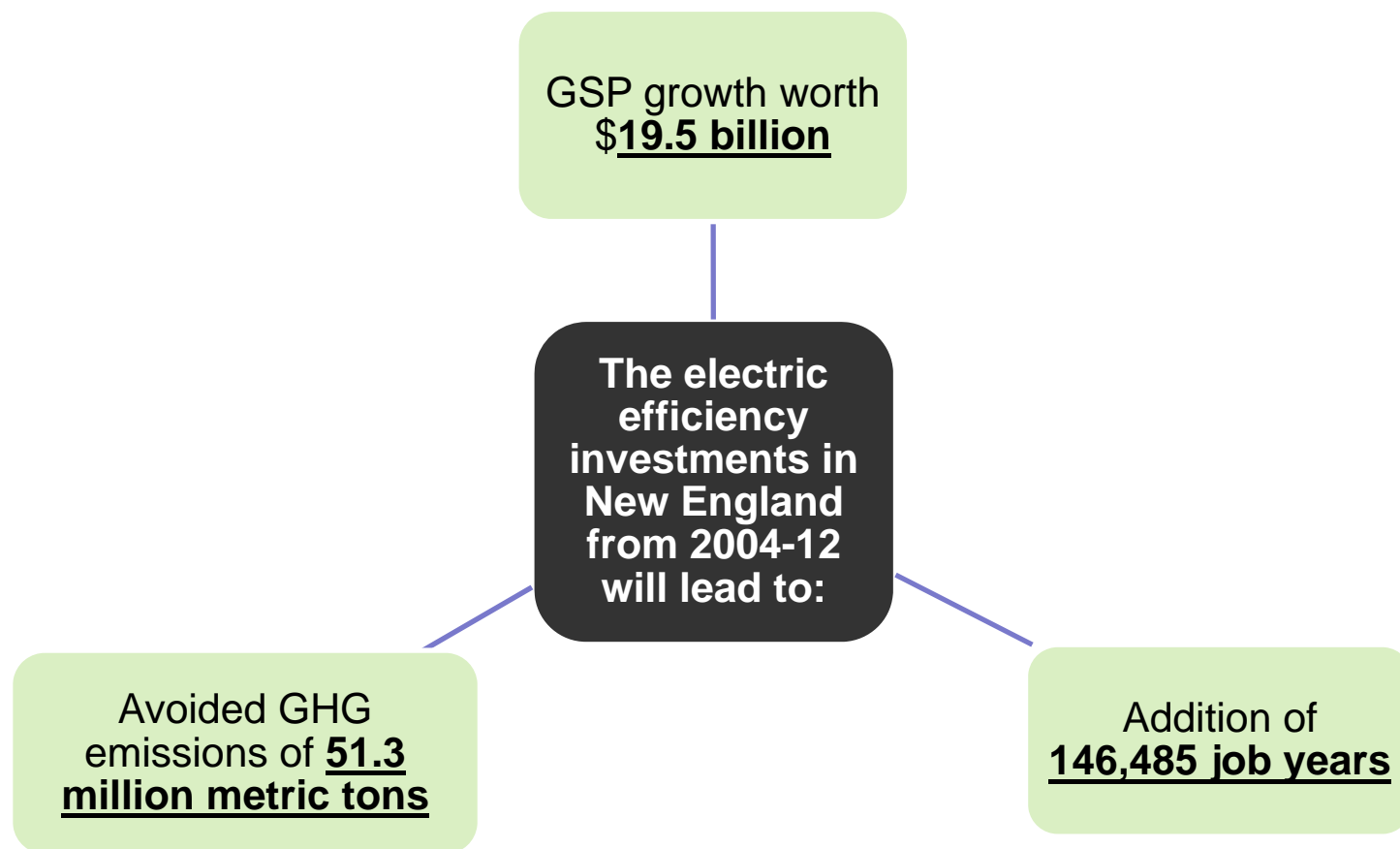


# Benefits of EE (ISO NE System Benefits)



# Efficiency's Economic and Climate Benefits

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# Overview of Topics For Today

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- Panels focus on 3 overarching issues for the future:
  - All Cost-Effective (or Least Cost) Procurement Mandate
  - Energy Efficiency as a Modern Power Grid Resource
  - Residential Efficiency, Weatherization, and Hard-to-Reach Markets
- Goals: spur information exchange, discuss points of view
  - What does it mean to capture all cost-effective efficiency resources in a utility service territory? Are we achieving the statutory mandates?
  - How do we best measure the benefits and costs of efficiency resource acquisition?
  - Efficiency is now included in the demand forecast and is impacting transmission and grid infrastructure: is there a greater and more defined role for efficiency resources in planning and managing the power grid?
  - How can two efficiency goals – utility resource acquisition and the need to invest in deep weatherization – intersect in terms of public policy, program design and implementation?



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Thank you to the Emily Hall Tremain  
Foundation for its support of this forum.



Tremain Foundation



# Contact Information

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Daniel L. Sosland, President

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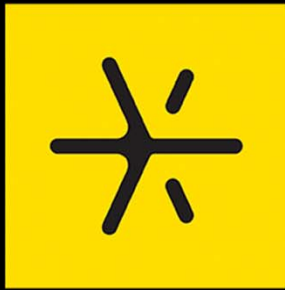
**ENE**

Rockport, ME / Hartford, CT / Boston, MA

Providence, RI / Ontario, ON, Canada

[www.env-ne.org](http://www.env-ne.org)





**Vermont  
Energy Investment  
Corporation**



Environment Northeast  
Energy Efficiency Forum

# All Cost-effective Energy Efficiency Procurement: Status in the Region

Scudder Parker, April 10, 2014

# Delivering Services with Important Results

- Nonprofit with 27 years' experience in reducing economic and environmental costs of energy use
- Comprehensive and results-driven
- Energy efficiency – renewable energy – transportation efficiency
- National and international consulting / implementation
- Program design, planning, and evaluation – policy and advocacy – research
- Clients: government agencies, regulators, utilities, foundations, advocates
- Operate 3 energy efficiency utilities





## RELATIVE COST RANKING OF NEW GENERATION RESOURCES

HIGHEST LEVELIZED COST  
OF ELECTRICITY (2010)

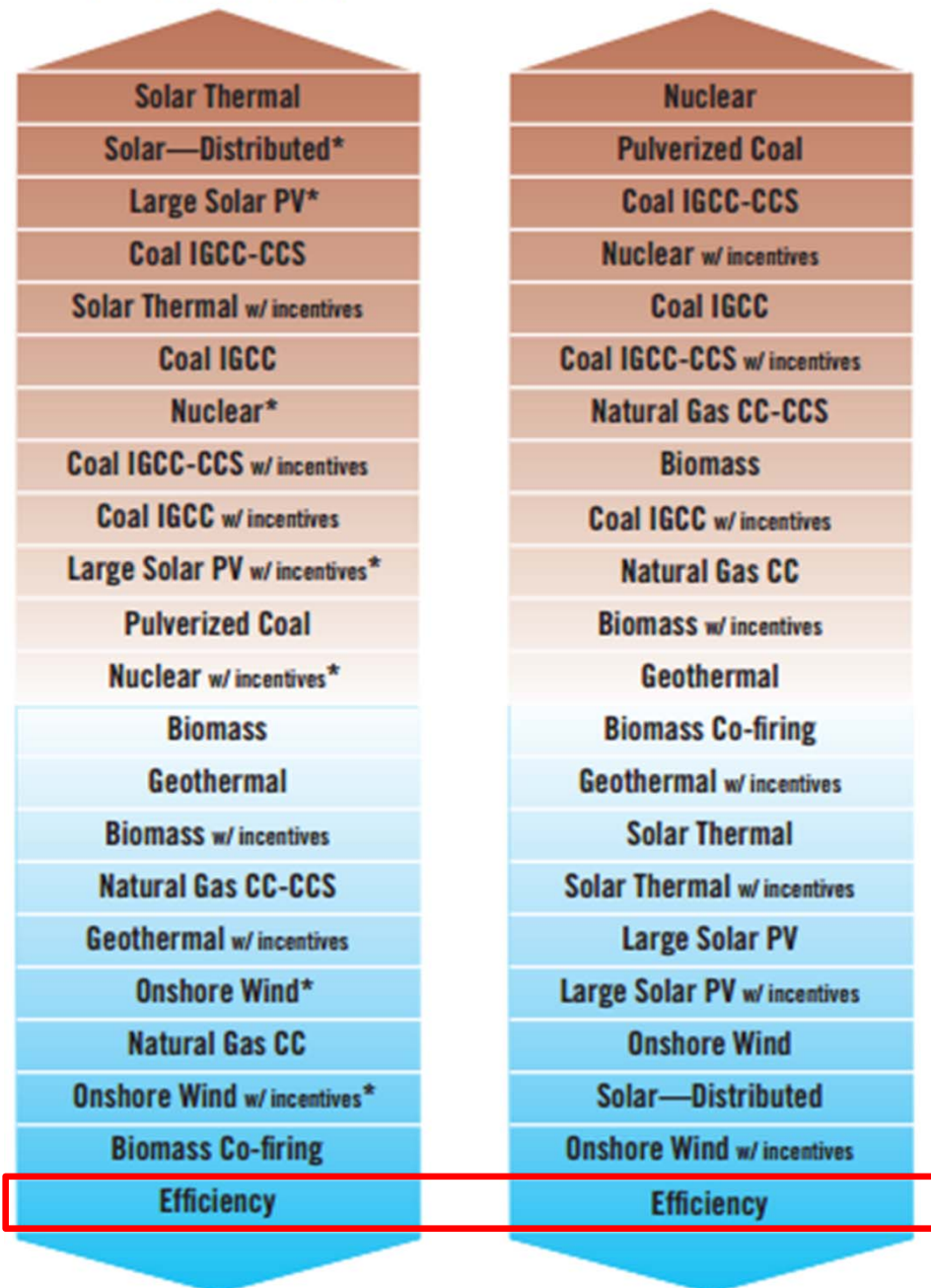
## RELATIVE RISK RANKING OF NEW GENERATION RESOURCES

HIGHEST COMPOSITE RISK

# How to Think About Energy Efficiency Investments:

## A low cost, low risk, *Energy Resource*

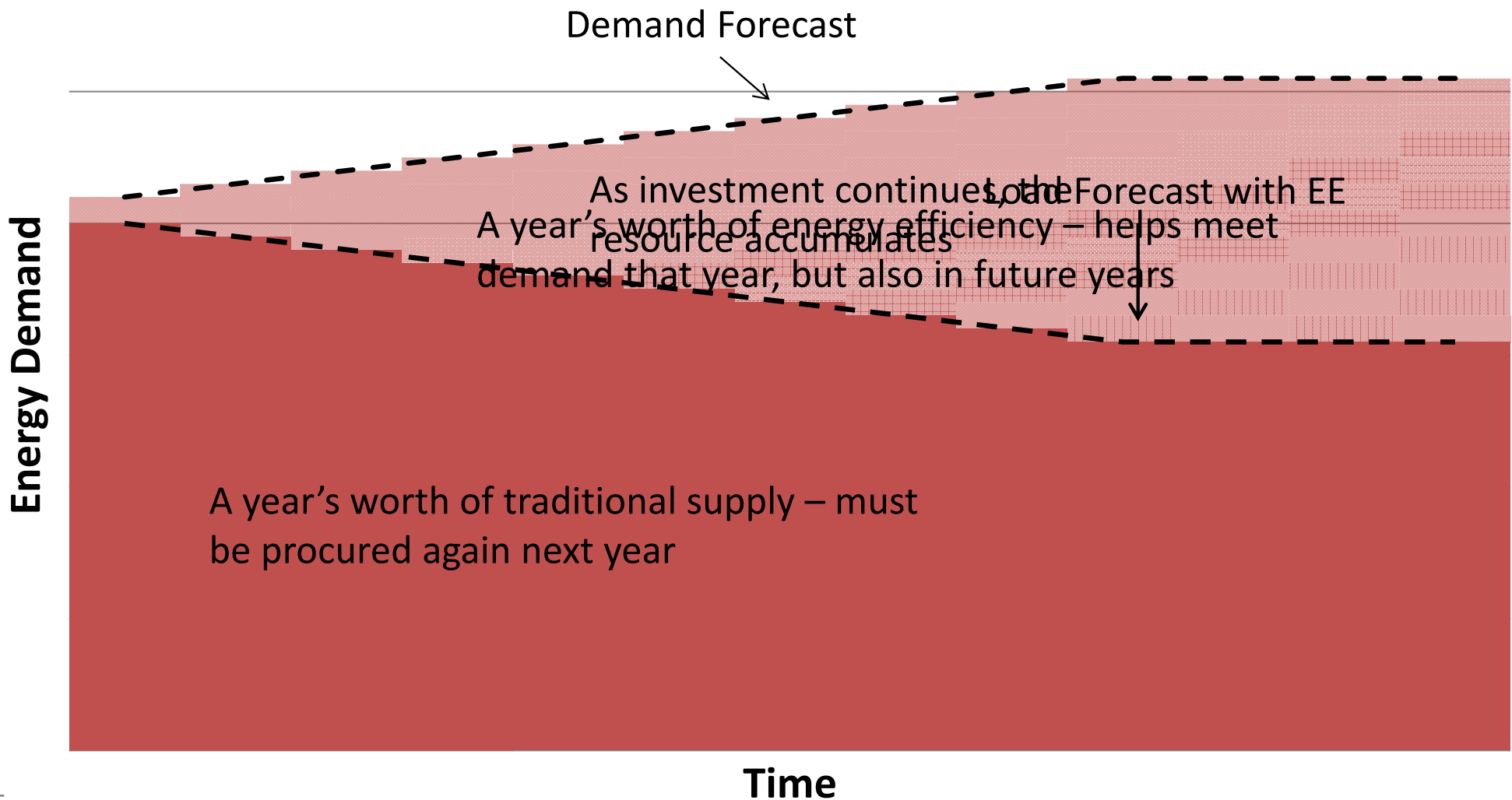
2012 report published by Ceres and  
authored by former utility regulators  
identified energy efficiency as the  
lowest-cost, lowest-risk resource for  
current utility planners



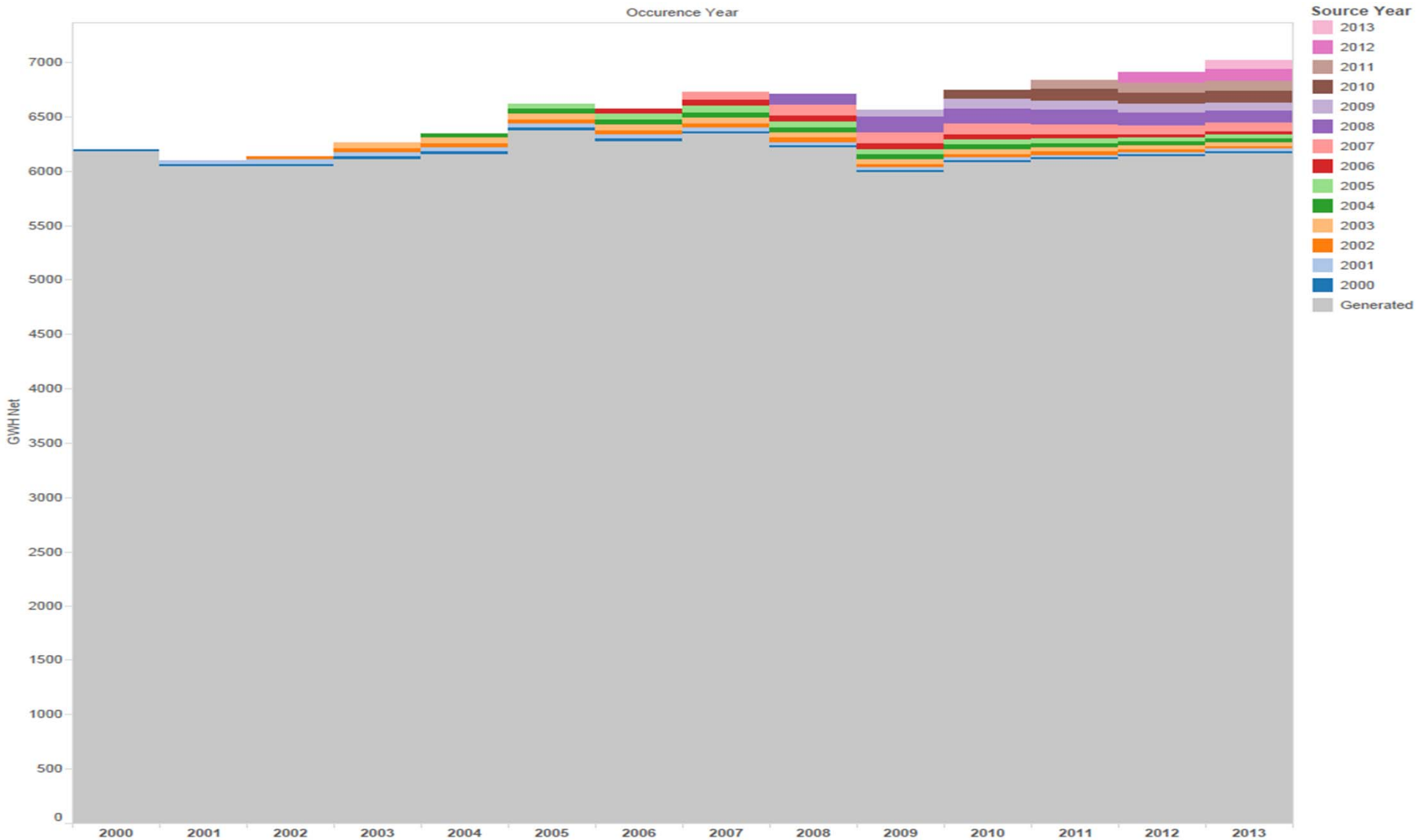
LOWEST LEVELIZED COST  
OF ELECTRICITY (2010)

LOWEST COMPOSITE RISK

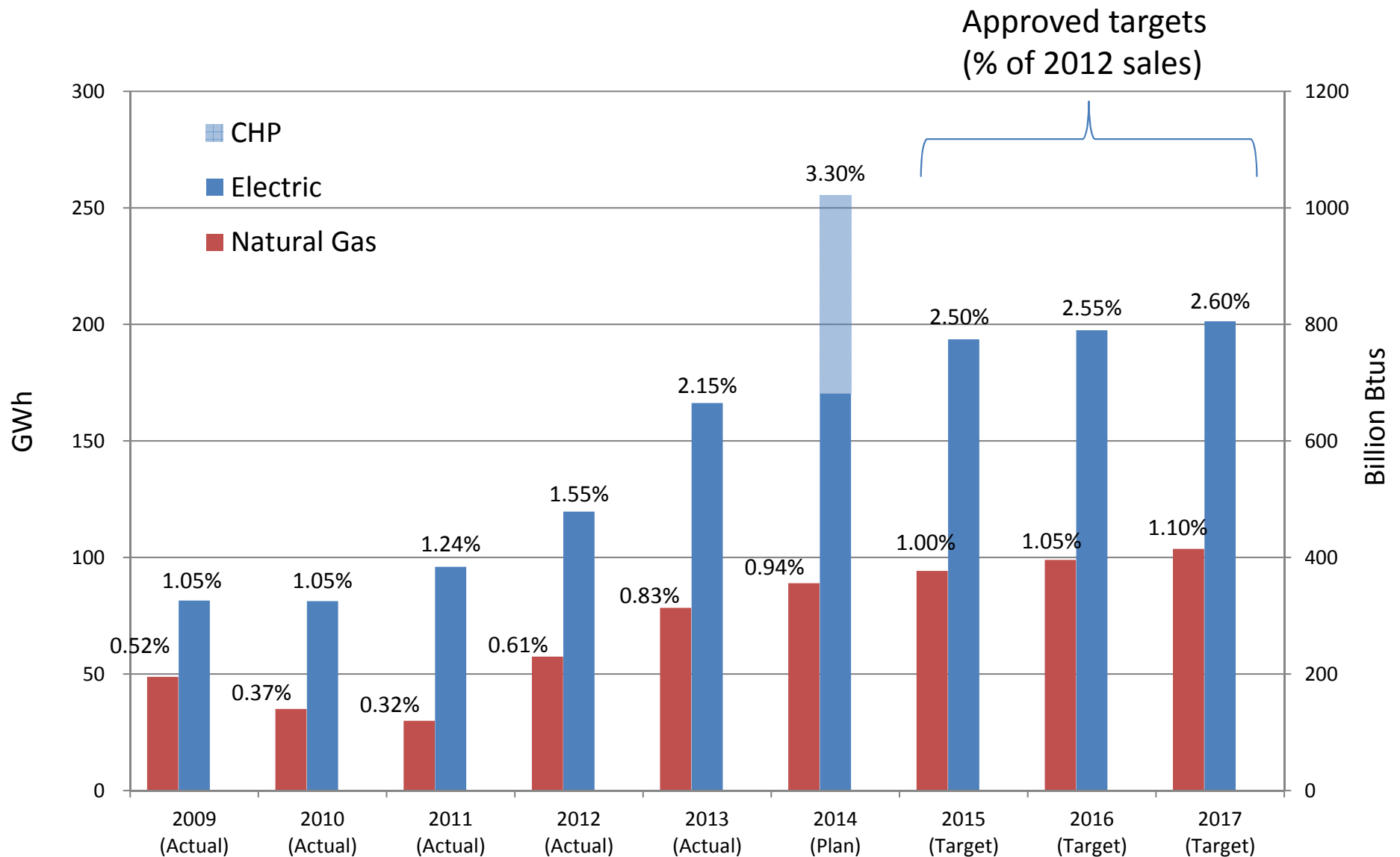
# Energy Efficiency as a Resource Acquisition Strategy – A Conceptual Example



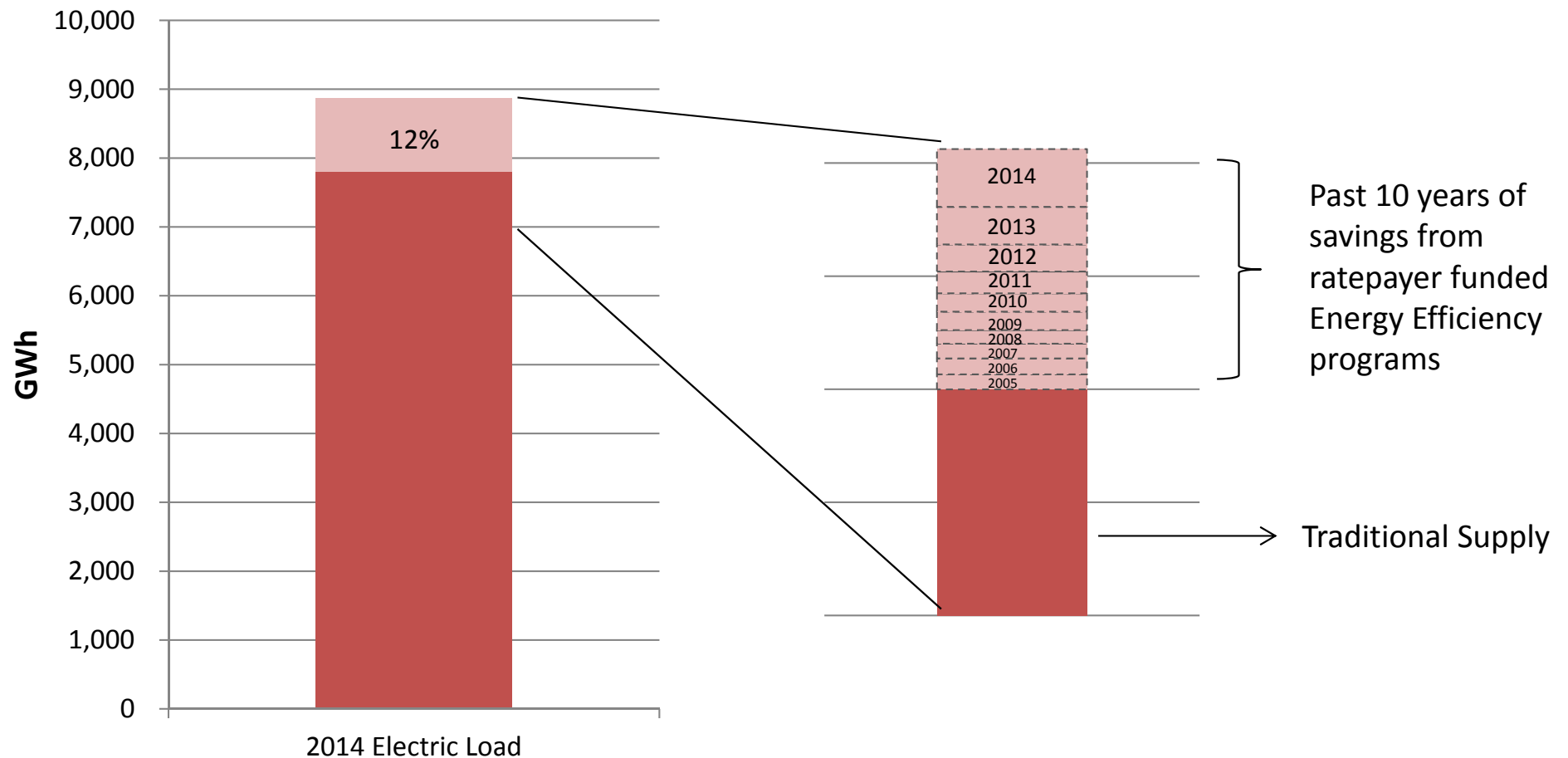
# Vermont Investment in Efficiency: Cumulative Impact



# Historical Context for Proposed Targets



# Cumulative Savings from EE ~12% of RI's 2014 Electric Demand





# Least-Cost Planning and Least-Cost Procurement: Can Fundamentally Change the Utility Industry



Cure for over-  
building?

- Alternatives compared on level playing field...
- Over lifetimes of options
- More complete accounting of costs and benefits



# Unrecognized Benefits of Energy Efficiency Programs

- Market Transformation
- Advancing Codes and Standards
- Changing design, building, and stocking practices
- Support for innovation
- Conservative assumptions about measure decay
- Unmonetized cost of carbon mitigation

Scudder Parker  
[Sparker@veic.org](mailto:Sparker@veic.org)

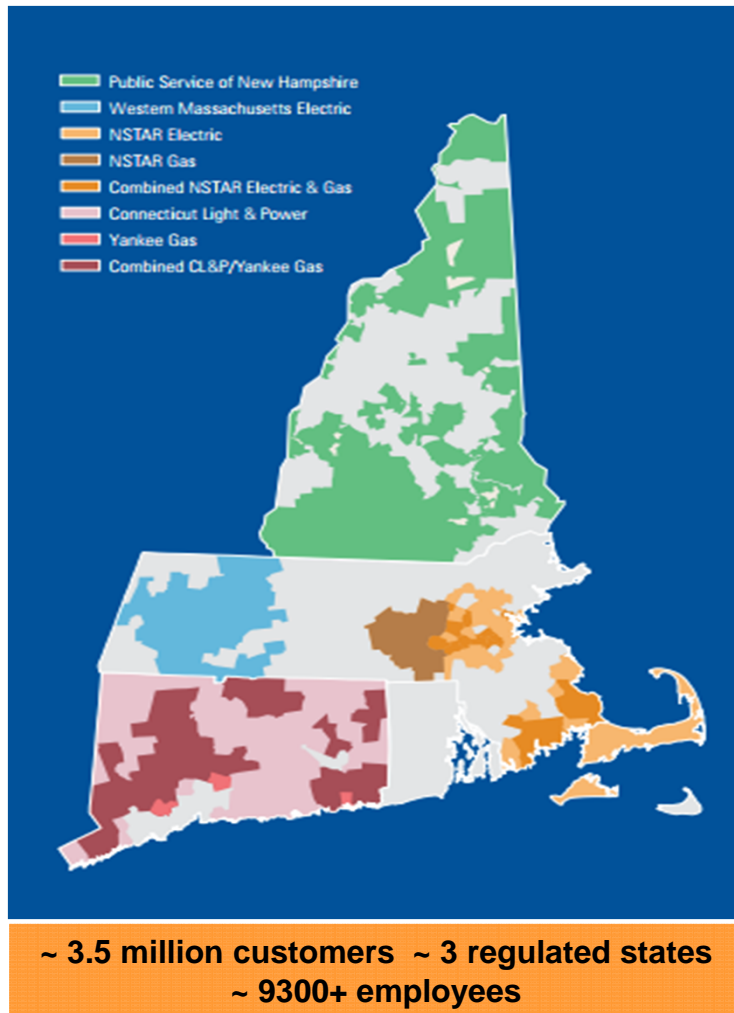
(802) 540-7623



## Northeast Utilities Service Company Overview

### *Over the last 3 years NU has delivered:*

- \$1B Energy Efficiency Portfolio
- \$4B in Customer Savings
- Substantial Environmental Stewardship
  - 320 MW Fossil fuel power plant
  - 175k cars off the road
  - 2000 MW solar

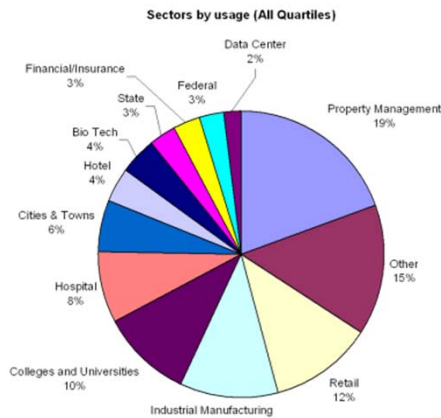




## Influencing energy profile of the region through deep understanding of our customers

### Deep Understanding of Customers & Markets

- Customer segmentation
- Targeted marketing
- Integrated energy solutions



### Innovation

- Sophisticated go-to-market approaches
- Community engagement
- Innovative financing



### Driving Value

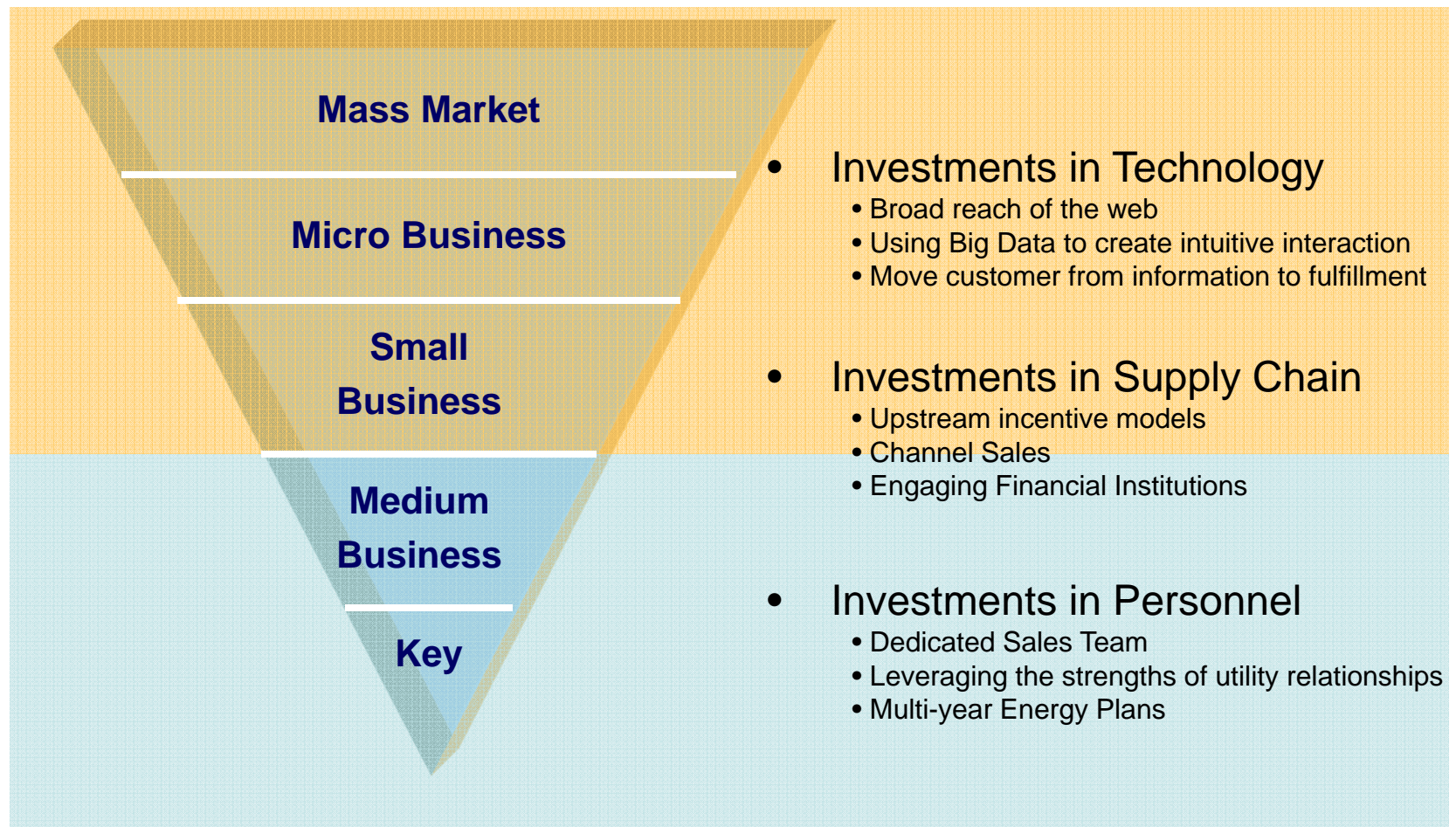
- Expertise
- Accountability
- Performance





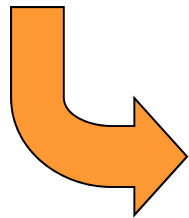
# Our market approach

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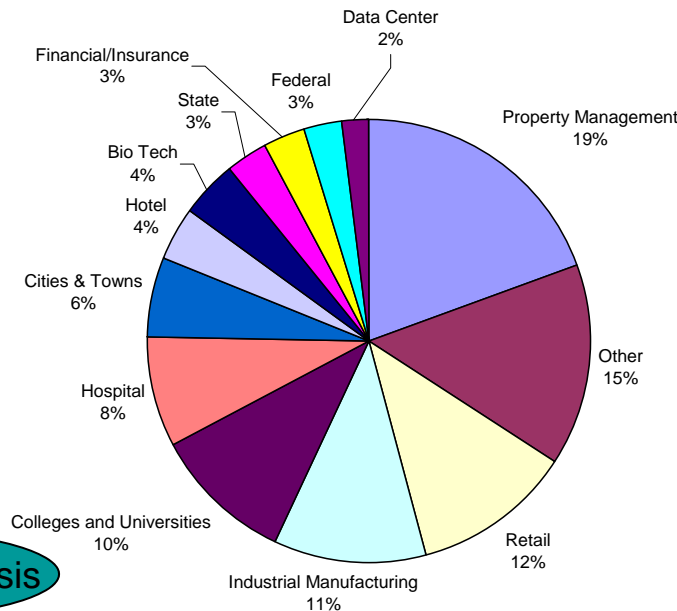




# It starts with segmentation of the customer base

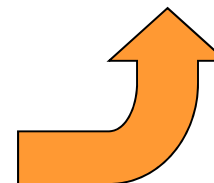


**Usage by Segment**  
Sectors by usage (All Quarters)



Segmentation & Analysis

Team	Market Segments	
1	Pharmaceuticals & Medicines Healthcare	Retail (Except Mall)
2	Colleges & Universities Research Laboratory	Pharmaceuticals & Medicines
3	Government Agency Public Schools (K-12)	Private Schools
4	Commercial Property Management Hotels & Motels Professional Service	Mall Residential Property Management
5	Commercial Property Management Data Center Professional Service Communication &	Entertainment Food & Beverage Software & Internet Financial Other Industrial Computers & Electronics



Segment-focused Teams





**Synapse**  
Energy Economics, Inc.

# Defining Cost-Effective

**Energy Efficiency in 2014 Conference  
Hartford Connecticut**

**April 10, 2014**

Tim Woolf

# How to Define What is Cost-Effective

- California Standard Practice Manual – three standard tests.
  - Utility Cost test
  - Total Resource Cost test
  - Societal Cost test
- Many states are currently debating which is the right test to use.
- Efficiency experts continue to debate which test is best.
- Why is this so difficult?



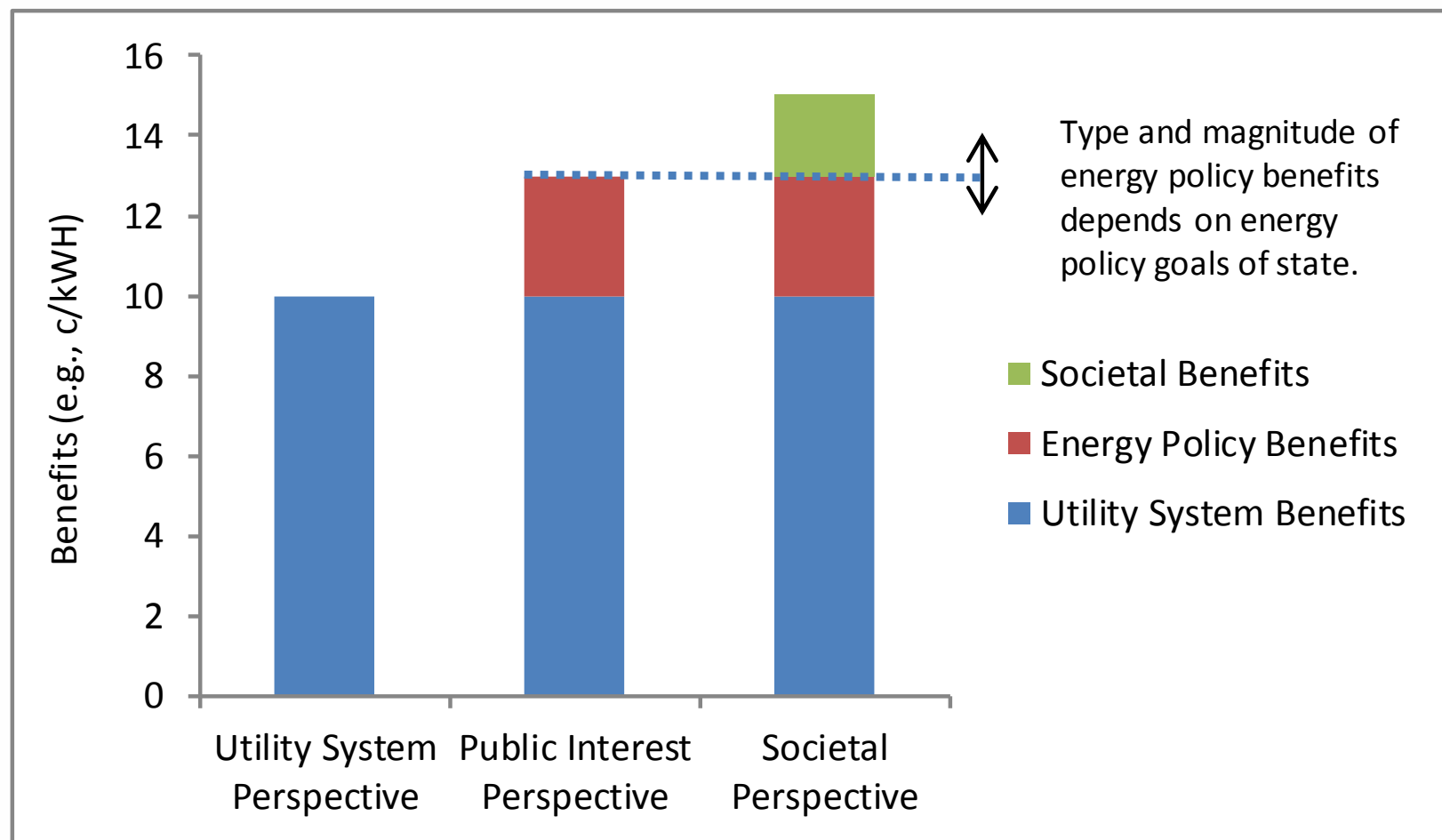
# The California Standard Practice Manual

- The CA Standard Practice Manual is used in almost every state.
- However, the Manual is woefully inadequate for today's needs.
- Approach to energy policy goals is not well addressed.
- Non-energy benefits are barely addressed.
- The difference between the TRC and Societal tests is not well defined.
- The RIM test should never have been invented.
- States should not be confined to the CA tests.

# The National Efficiency Screening Project


- Developed the Resource Value Framework.
- A framework of principles and recommendations that allows each state to identify a test that meets its own needs.
  - Clarifies that the goal of energy efficiency screening is to identify those resources that are in the public interest.
  - Accounts for the energy policy goals of each state.
  - Requires that costs and benefits be applied symmetrically.
  - Requires consideration of relevant hard-to-quantify benefits.
  - Provides an explicit, transparent process to identify the appropriate screening test and methodologies for each state.
- Still a work-in-progress.
  - See [nhpci.org/caimcampaigns.html](http://nhpci.org/caimcampaigns.html) for more information.

# The Public Interest Perspective



# Applying the Resource Value Framework to Connecticut

- CT Currently uses the Utility Cost test as the primary screening test, including:
  - Avoided capacity.
  - Avoided energy.
  - Avoided T&D.
  - Environmental compliance costs with current regulations.
  - Price suppression.
  - Avoided line losses.
  - Non-Energy Benefits: Low-Income programs that do not pass the UCT are still approved due to additional benefits that accrue to low-income customers



# CT Policies that should be included in Cost-Effectiveness Screening Practices

- Least Cost Procurement Statute:
  - Maximize consumer benefits consistent with the state's environmental goals and standards
  - Assess impact of current and projected environmental standards
  - Assess energy security and economic risks associated with potential energy resources
  - Ensure equity in benefits and cost reduction to all classes and subclasses of consumers
  - Stabilize the costs of electricity to each class and subclass of consumers

Other statutes?

Commission Orders?



## Contact Information

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[www.synapse.energy.com](http://www.synapse.energy.com)

# Appendix:

## Components of the Three Primary Tests

	Utility Test	TRC Test	Societal Cost Test
<b>Energy Efficiency Program Benefits:</b>			
Avoided Energy Costs	Yes	Yes	Yes
Avoided Capacity Costs	Yes	Yes	Yes
Avoided Transmission and Distribution Costs	Yes	Yes	Yes
Wholesale Market Price Suppression Effects	Yes	Yes	Yes
Avoided Cost of Environmental Compliance	Yes	Yes	Yes
Non-Energy Benefits (utility perspective)	Yes	Yes	Yes
Non-Energy Benefits (participant perspective)	---	Yes	Yes
Non-Energy Benefits (societal perspective)	---	---	Yes
<b>Energy Efficiency Program Costs:</b>			
Program Administrator Costs	Yes	Yes	Yes
EE Measure Cost: Program Financial Incentive	Yes	Yes	Yes
EE Measure Cost: Participant Contribution	---	Yes	Yes



# Energy Efficiency as a Modern Grid Resource

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*Environment Northeast*

*Energy Efficiency in 2014: An Assessment and Discussion*

Henry Yoshimura

DIRECTOR, DEMAND RESOURCE STRATEGY





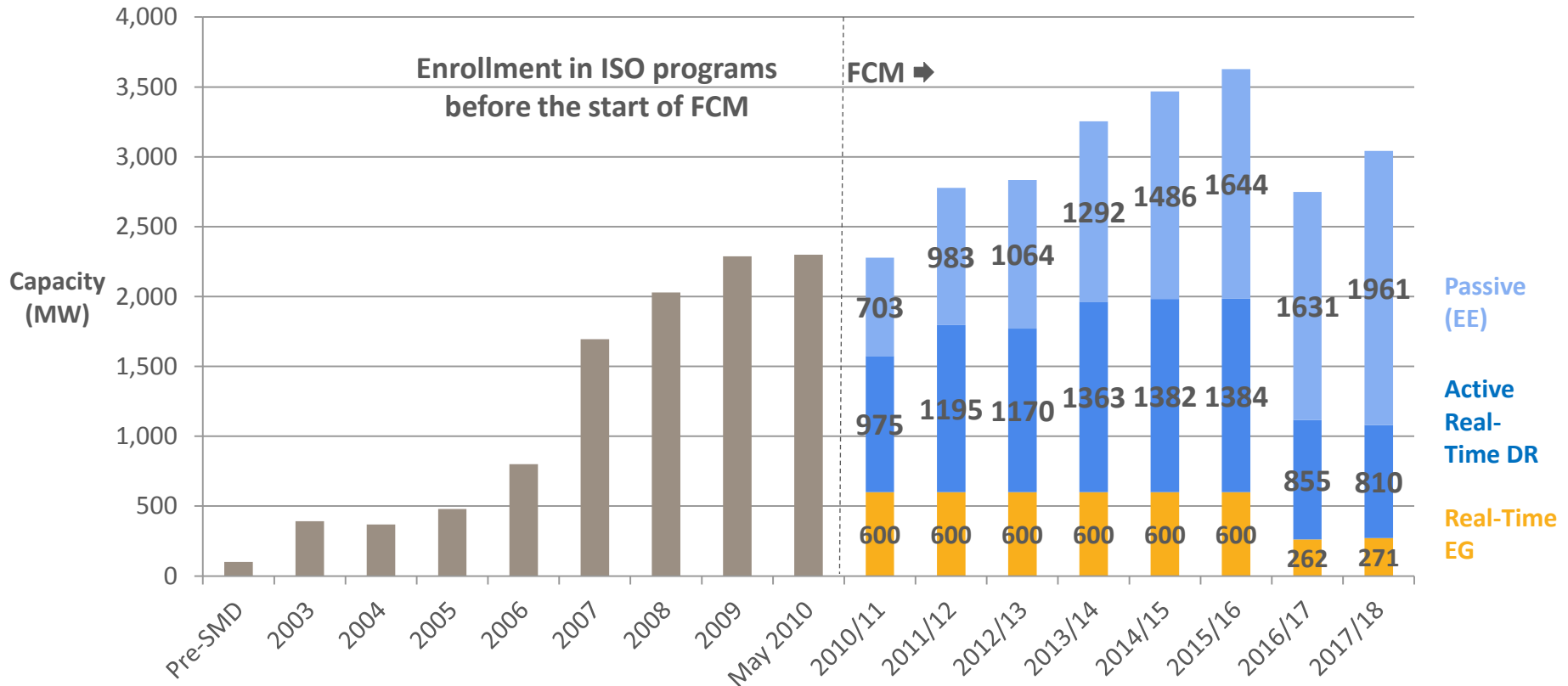
# Energy Efficiency is a Priority in New England

- States are making significant investments in Energy Efficiency (EE)
  - 2009 to 2012 = \$2.3B
  - 2017 to 2023 states are projected to spend \$6.3B
    - Connecticut projected to spend \$542.5 million
- Like generators, EE participates in the ISO markets
  - Forward Capacity Auction results tell ISO-NE exactly how much EE savings can be counted on for three years into the future
- EE is incorporated into ISO's long-term system planning
  - States encouraged ISO-NE to forecast incremental growth in energy savings beyond three-year Forward Capacity Market horizon
  - ISO developed an EE forecast that is now integrated into ISO's long-term planning processes
  - [www.iso-ne.com/eefwg](http://www.iso-ne.com/eefwg)

# Energy Efficiency is Growing in New England

*Capacity Market has stimulated Demand Resource growth*

## Demand Resource Participation in Region

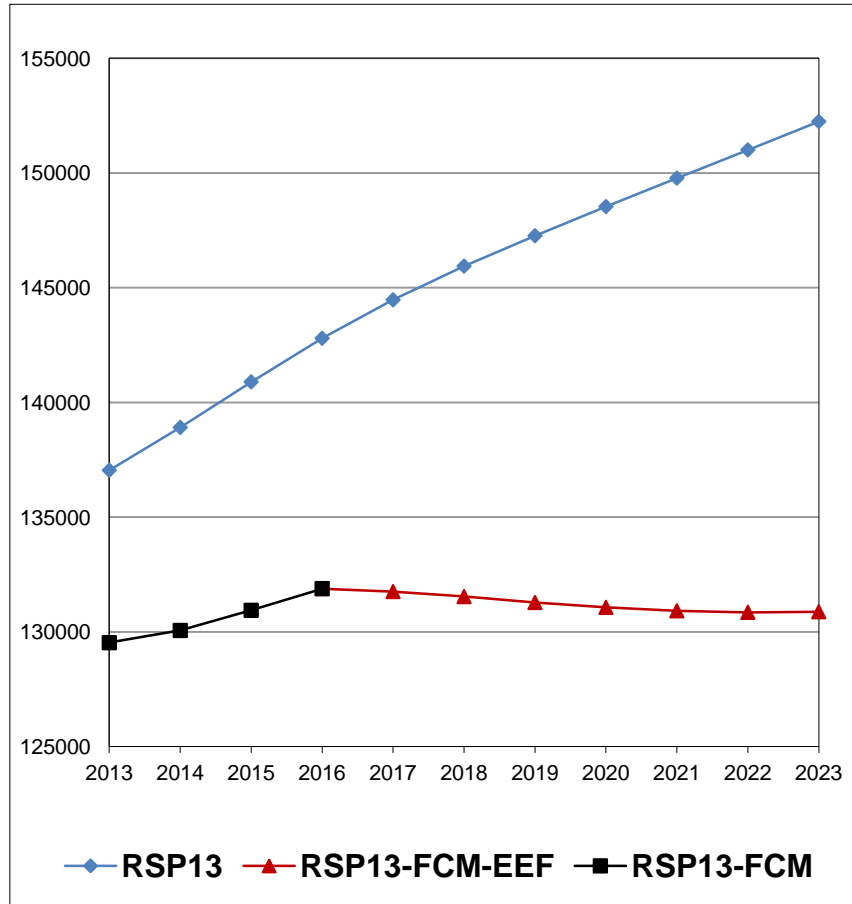


Note : Total real-time emergency generation (EG) capped at 600 MW:  
Cap reached for FCAs #1 – #6 (2010/11–2014/16); RTEG cleared below cap over last two auctions

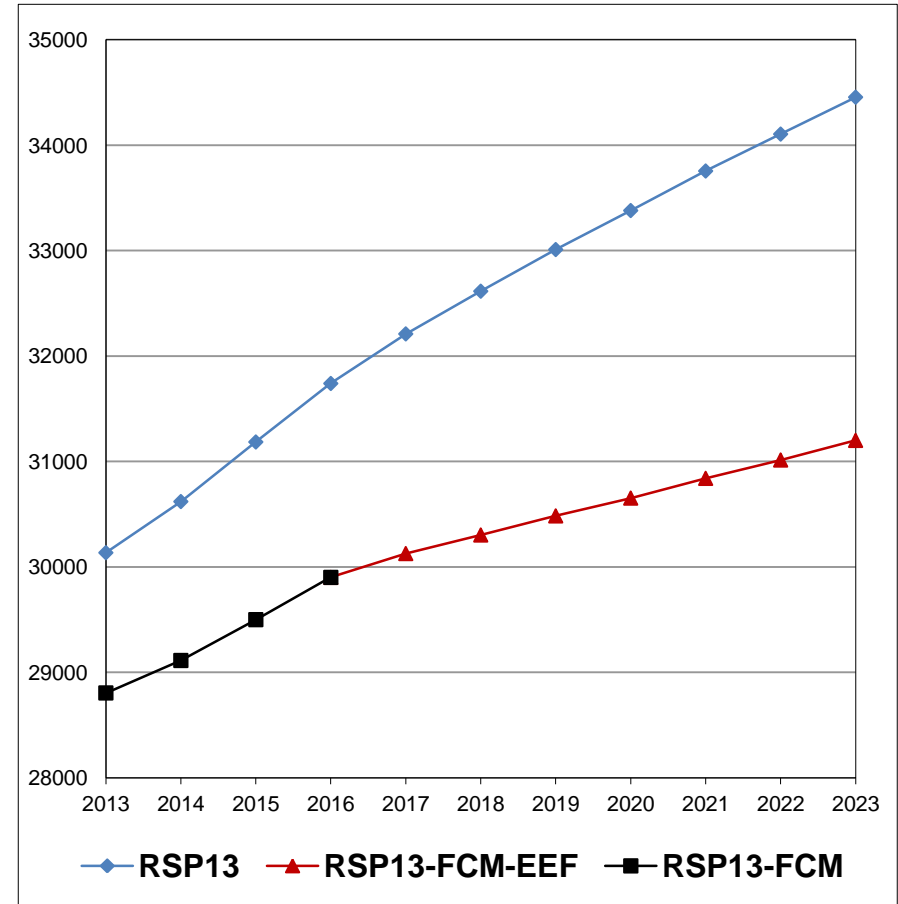
# EE Forecast Shows Drop in Demand

*Level Energy Demand, Lower Peak Demand Growth*

Annual Energy (GWh)

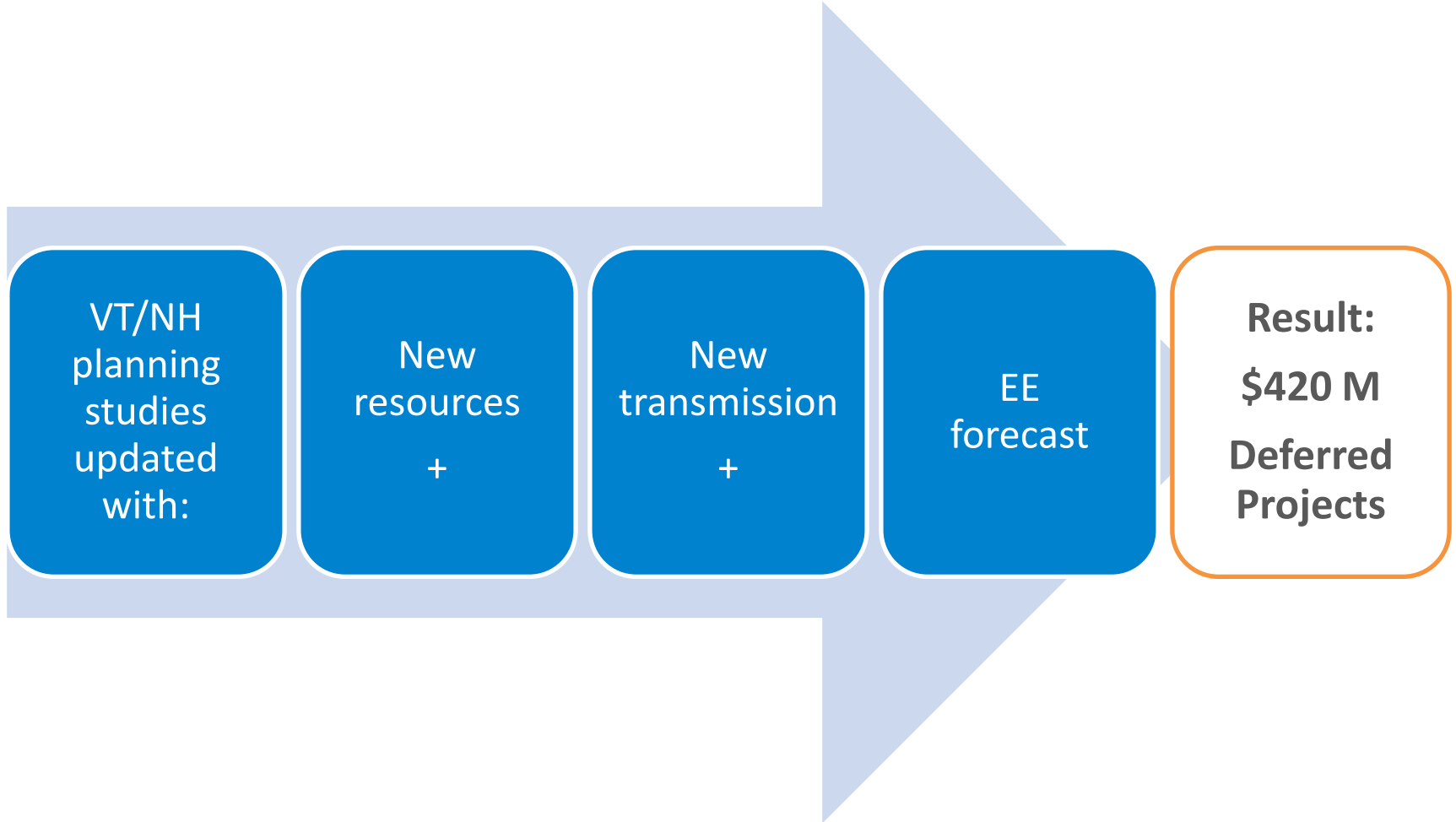


Peak (MW)

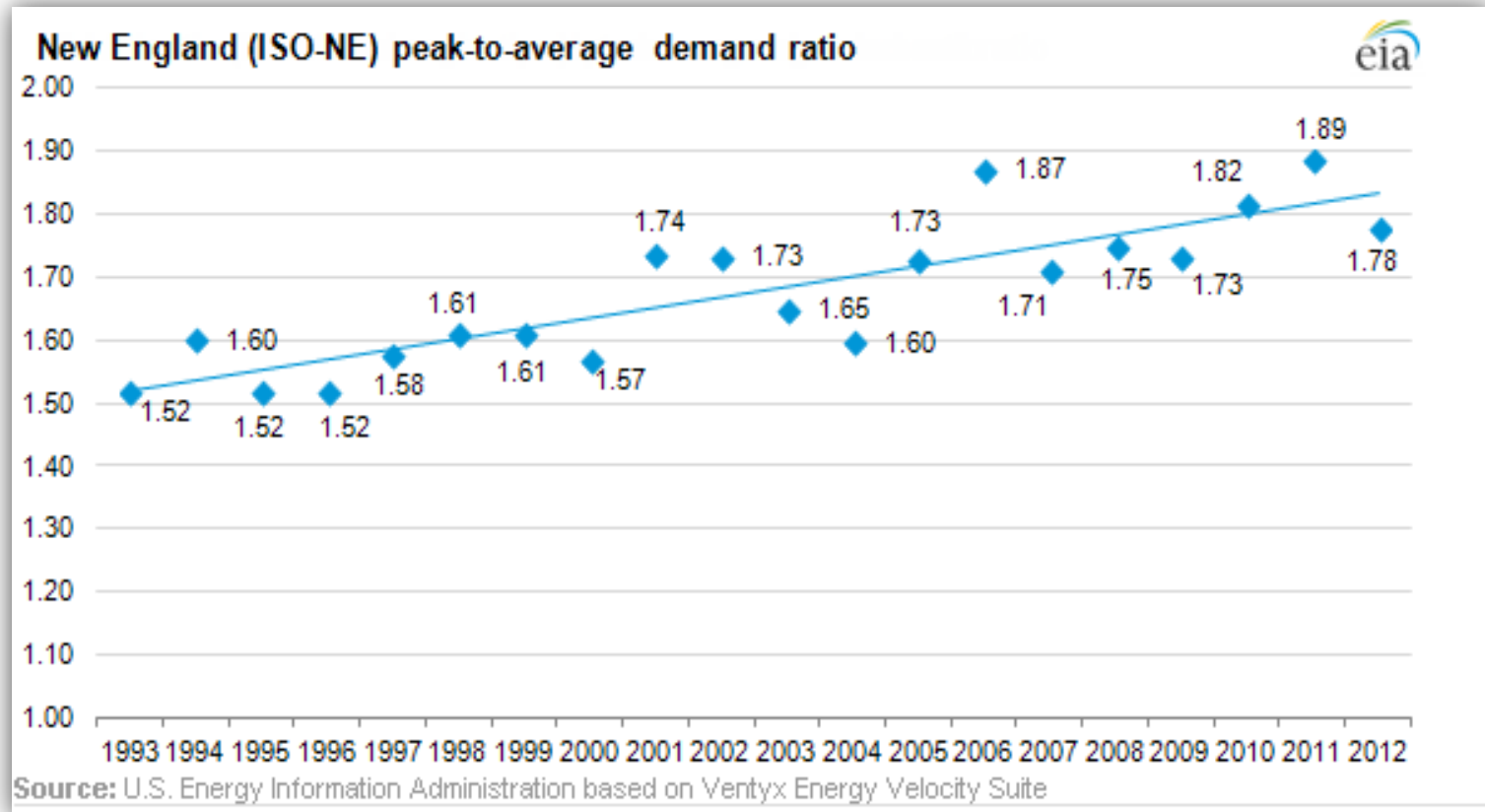


# EE Forecast is Affecting Grid Planning

*Previously Identified Transmission in Vermont & New Hampshire Deferred*



# Ratio of Peak-to-Average Demand is Growing



1993 peak use 52% above the hourly average level

2012 peak use 78% above the hourly average level

***The current design of EE programs appear to be a contributing factor as energy use is leveling out but peak continues to grow***

# Growth in Peak Demand Remains a Concern; Time-Varying Retail Rates Would Help Address It

- Additional capacity is needed to meet higher peak demand, which will raise costs
  - To increase efficiency and reduce costs, peaks need to be reduced
- Time-varying retail pricing and enabling technology would help
  - Increase system efficiency/productivity by encouraging customers to:
    - Decrease peak usage or shift usage from peak to off-peak periods
    - Increase distributed generation output when prices are high
    - Store energy (including electric vehicle charging) when prices are low
  - Reduce customer energy bills
    - Reduce wholesale electricity costs and average rates
    - Reduce risk premiums in retail rates
    - Eliminate cross-subsidies



# Conclusions

- States continue to make large investments in EE
- EE resources have opportunities to participate in ISO markets
- ISO worked with stakeholders to successfully integrate EE data into ISO's long-term planning processes
- EE forecast is affecting regional planning decisions
- Continued growth in peak demand remains a concern
- Time-varying retail pricing and enabling technology would help address this concern



# **EE as a Modern Grid Resource in New England**

Jeff Schlegel  
Independent Consultant

ENE Forum; April 10, 2014

Thank you to ISO-NE for data and the EE chart, and to MA DOER for the energy prices chart.  
Disclaimer: All comments are mine and not necessarily those of my clients.



# Five challenging regional energy issues:

1. Much higher winter energy prices and reliability concerns (higher gas use by generation plants and end-use customers; pipeline constraints)
2. Need for capacity resources, and higher capacity prices, as evidenced in recent FCA 8 (driven partly by retirements)
3. New transmission, higher transmission costs
4. Peak demand continues to grow while energy growth is flat or declining (lower load factors)
5. Locational pressures/constraints are resurfacing

*Increased pressures on addressing the issues sooner.*

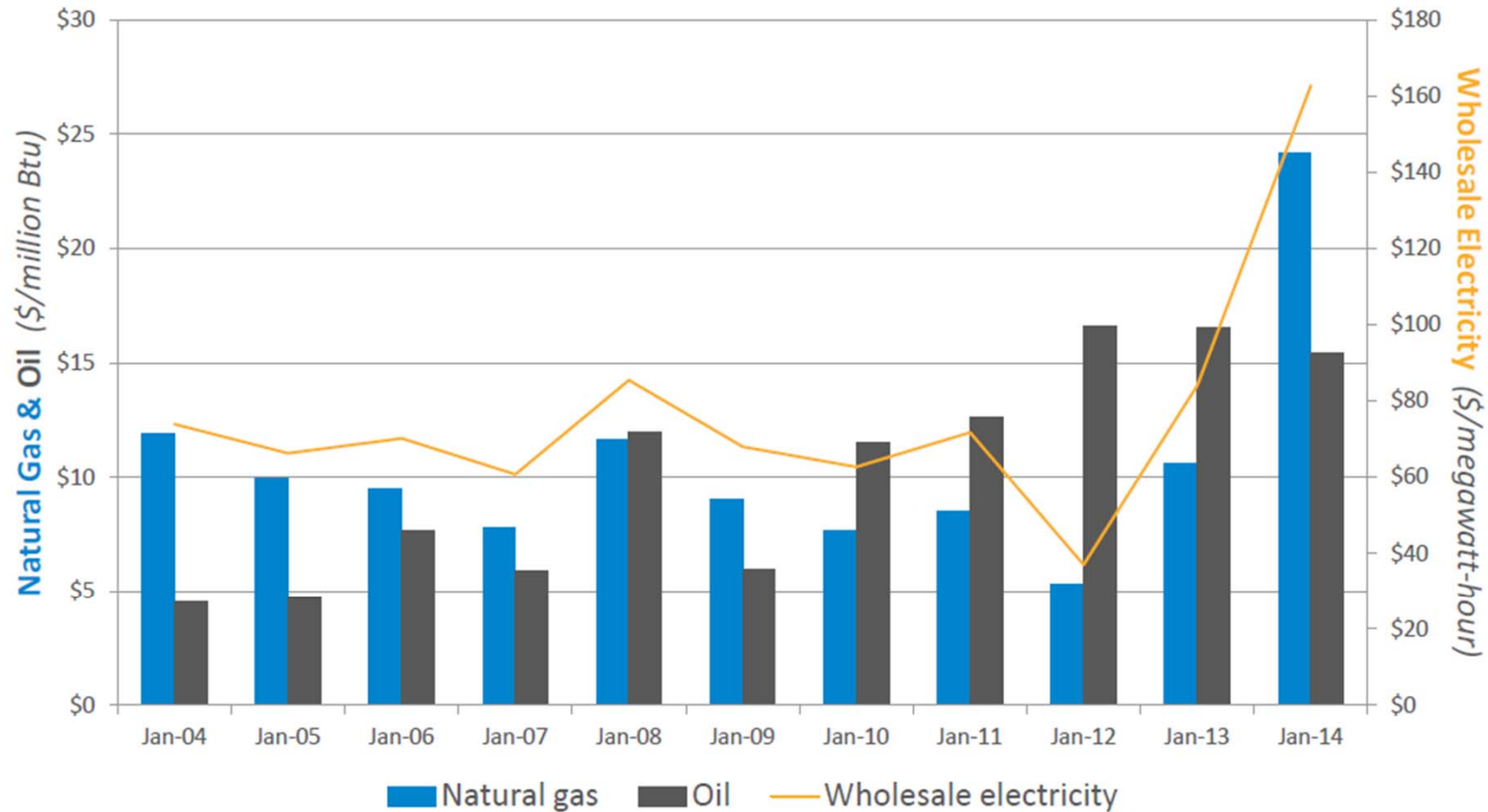
*Decide what EE to do, for which time periods, and where.*

*(Choosing to highlight just the first issue:)*

## Energy prices are increasing dramatically

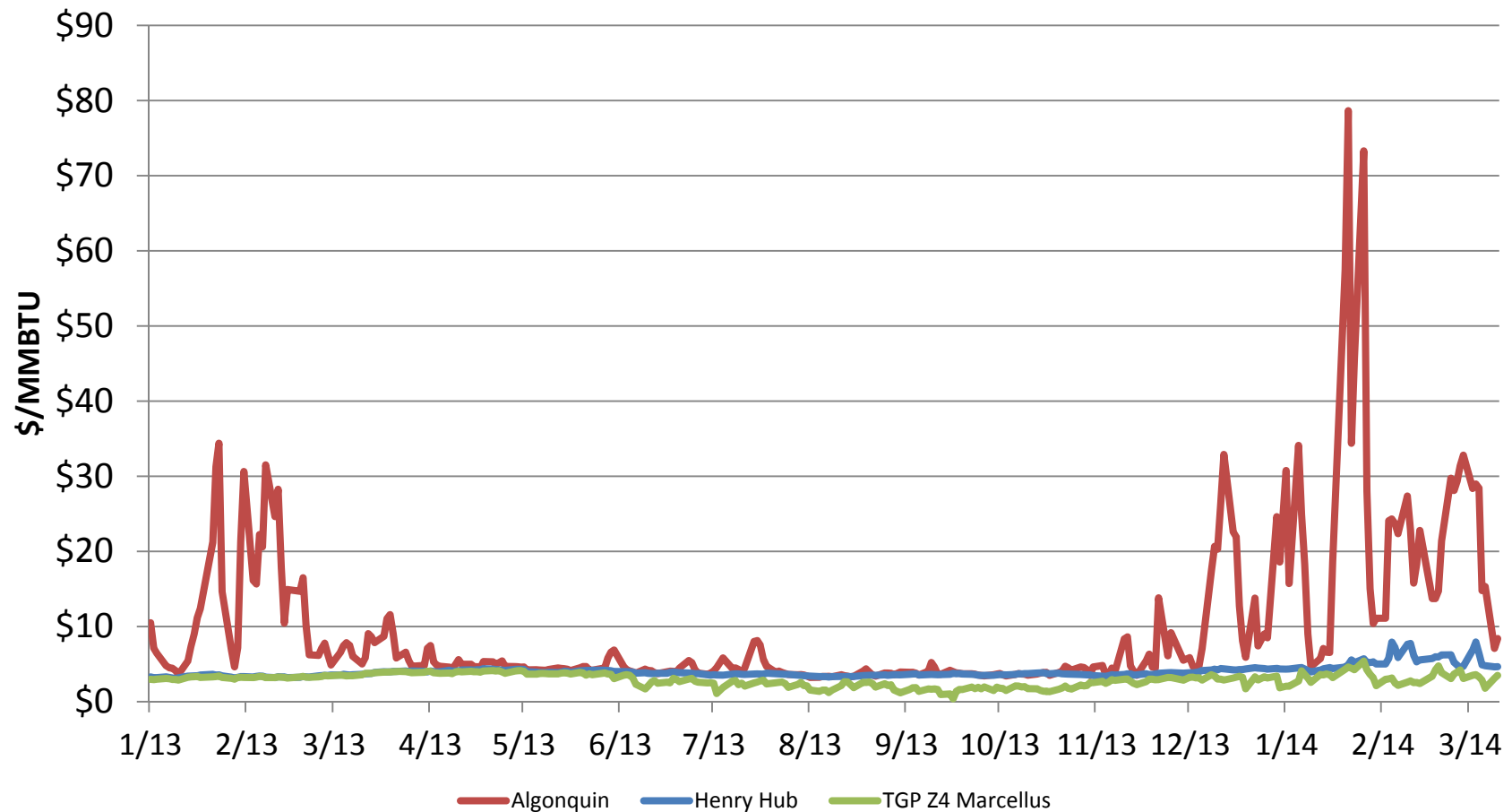
- Wholesale energy prices rose 55% in 2013
- Very large price spikes in the winter of 2013-2014
  - ISO: “The total value of the electric *energy* market alone in New England in December, January, and February was \$5.1 billion; that compares to \$8.0 billion for the full year of 2013 and \$5.2 billion for the full year of 2012...”
- Are we heading towards a world in which all-in electric energy prices are 15 cents per kWh or higher, rather than the 7-8 cents per kWh experienced recently?
- What can EE programs do to help mitigate the winter energy price increases and winter reliability issues?

# Winter gas and electricity prices surge



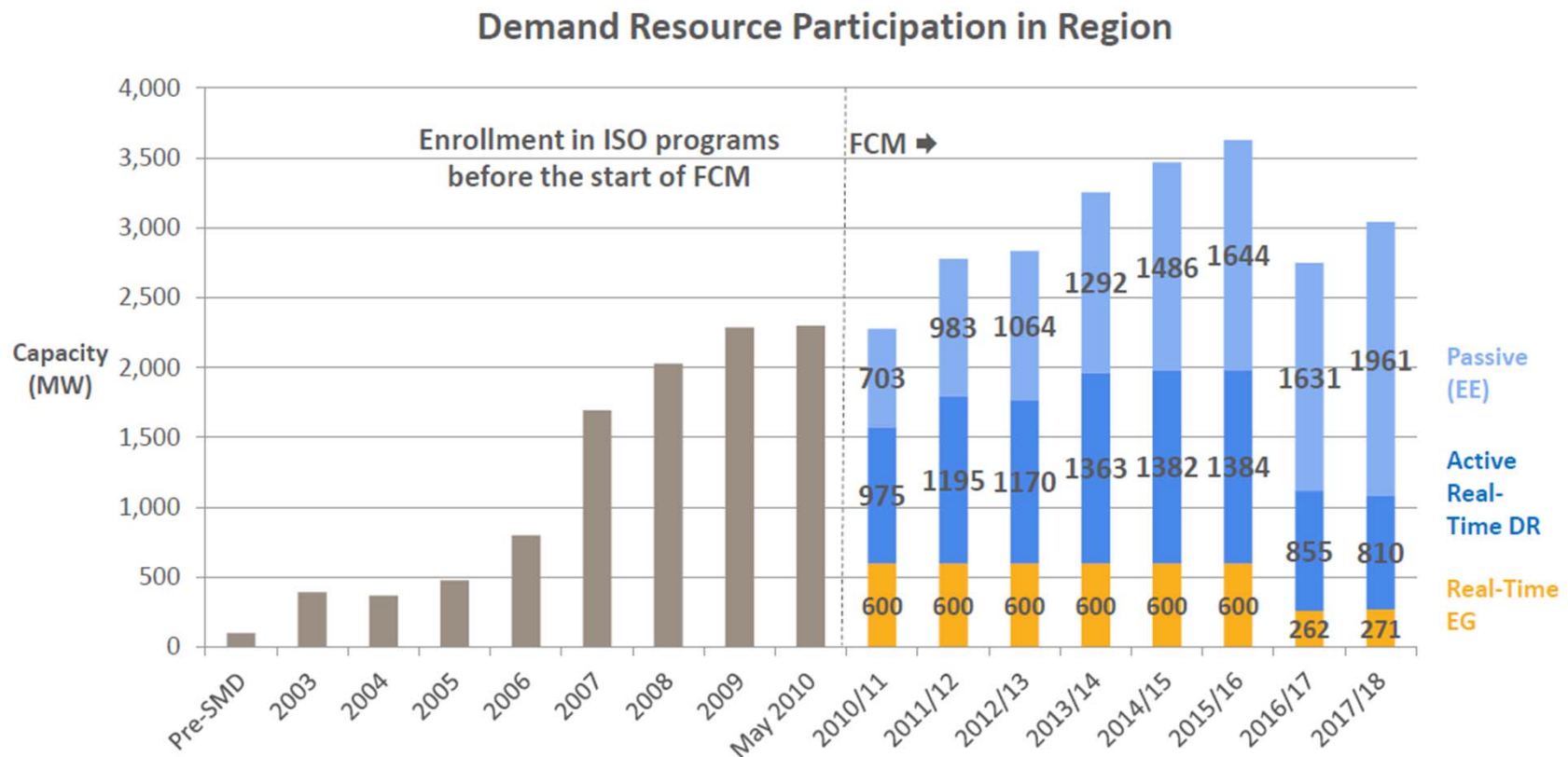
Source: ISO-NE data, MA DOER chart.

# Very high gas prices in New England (red line) driven by gas pipeline constraints



Source: World Energy

# Energy efficiency is a valuable resource



Note: : Total real-time emergency generation (EG) capped at 600 MW:  
Cap reached for FCAs #1 – #6 (2010/11–2014/16); RTEG cleared below cap over last two auctions

Source: ISO-NE

# EE to help mitigate winter price increases and help address winter reliability issues

- Both natural gas and electric EE strategies
- Natural Gas: reduce peak gas use, coincident with the timing of gas pipeline constraints
  - Examples: gas heating, gas boilers
- Electric: reduce electric use at times coincident with the timing of gas pipeline constraints (winter), to relieve some pressure on gas prices, because gas is used as a fuel for electric generators
- Opportunities for targeting of electric and gas EE in advance of upcoming winters (doing something to reduce gas and electric demand is the critical path)
- How best to value and fund targeted EE (also need to value targeted EE, but figure this out in parallel)

# Challenges Ahead: Bringing Efficiency to Scale

Marion Gold, Commissioner  
RI Office of Energy Resources  
April 10, 2014

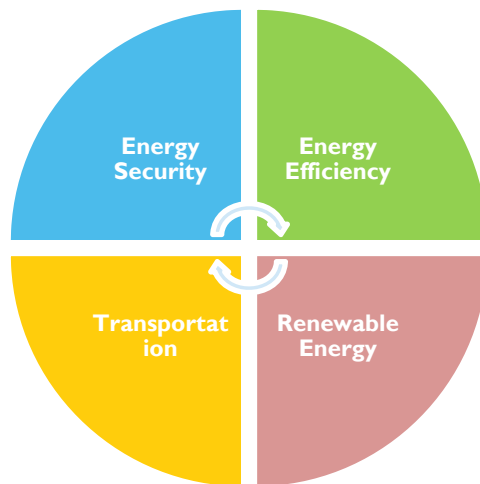


STATE OF RHODE ISLAND

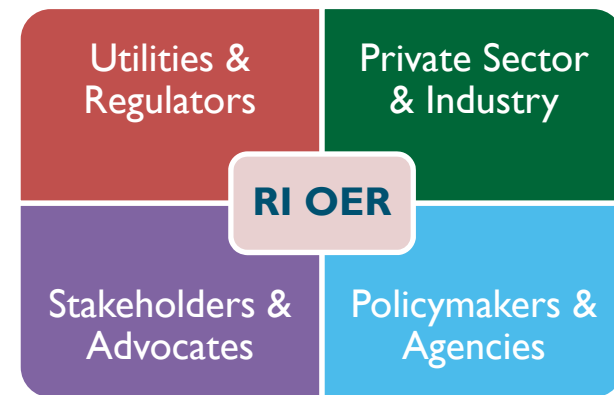
**OFFICE OF  
ENERGY RESOURCES**

# Rhode Island Office of Energy Resources

**“Leading Rhode Island to a secure, cost-effective,  
and sustainable energy future”**



*The OER is the lead state agency on  
energy policy and programmatic matters*



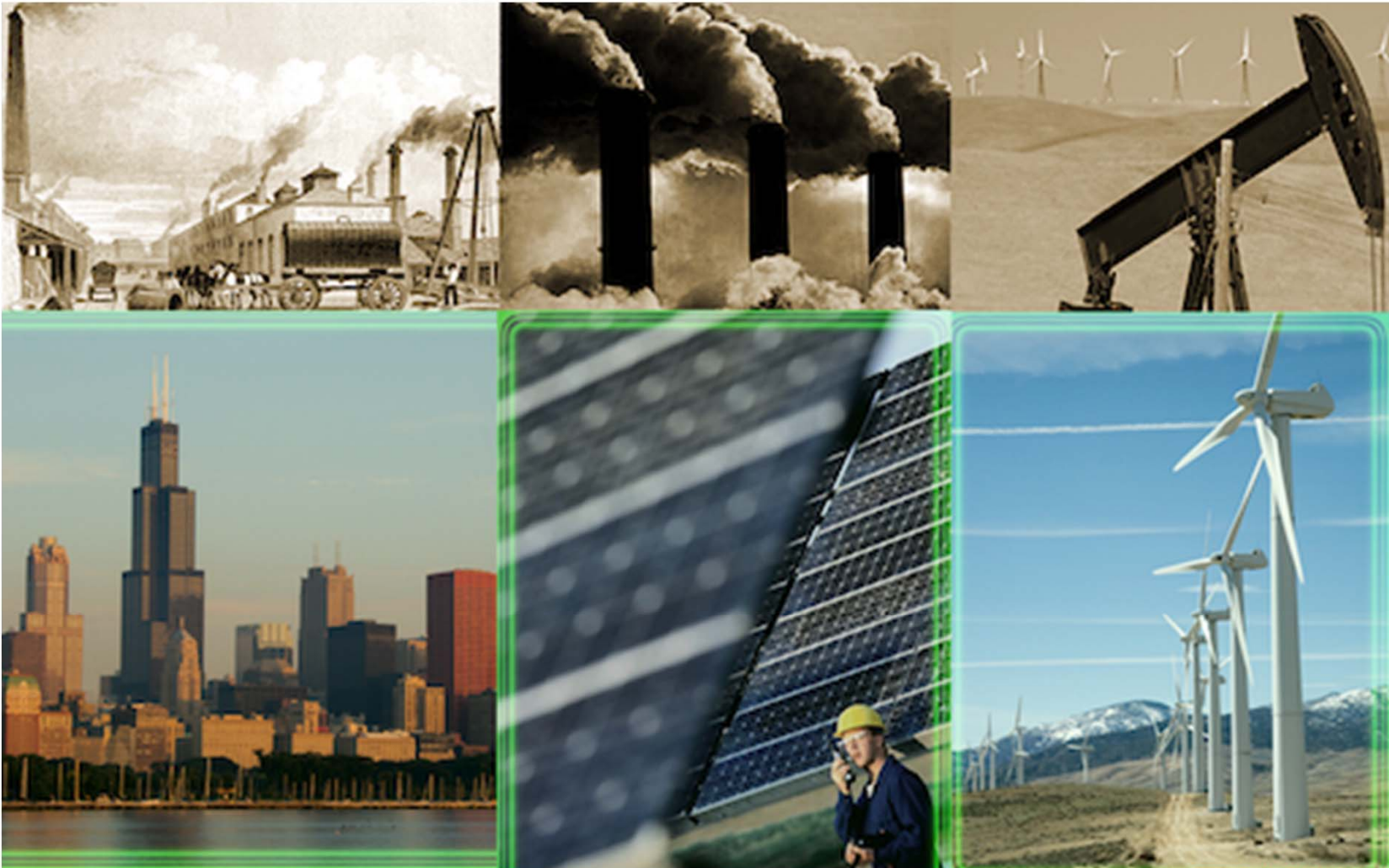
*The OER works closely with diverse  
partners to advance Rhode Island as a  
national leader in the new clean energy  
economy*



# Today

- **The Case for Energy Efficiency**
  - Global/National Perspective
  - State Perspective: Data in Support of Efficiency
- **Regulatory Challenges & Opportunities**
  - High and Volatile Rates
  - Piecemeal Ratemaking/Uneven Incentives for Utilities
  - Buy-In from Consumer Advocates
  - Education and Dialogue
- **The Path Forward**

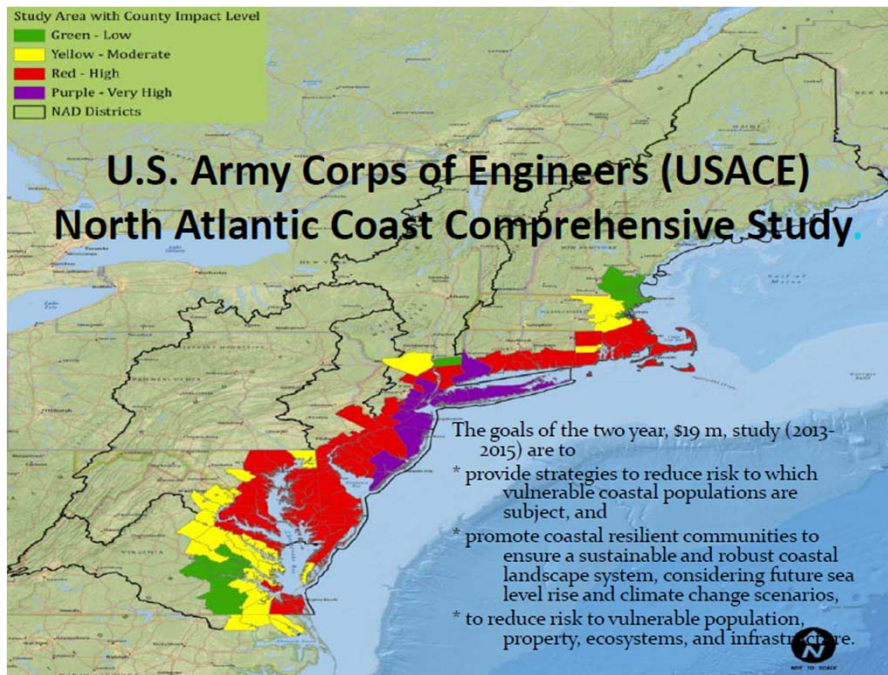
# Reinventing Fire







# Climate Change



- The entire eastern seaboard is vulnerable to hurricanes and other coastal weather events
- Energy efficiency is widely accepted as the most cost-effective way to lower carbon emissions



# Global & Nationally: Value of Efficiency is Acknowledged

- Number one policy in China's energy portfolio “Save Energy! Cut Emissions”
- European Union has target of 20% reductions by 2020
- In Washington - efficiency is a rare topic on which democrats/republicans agree

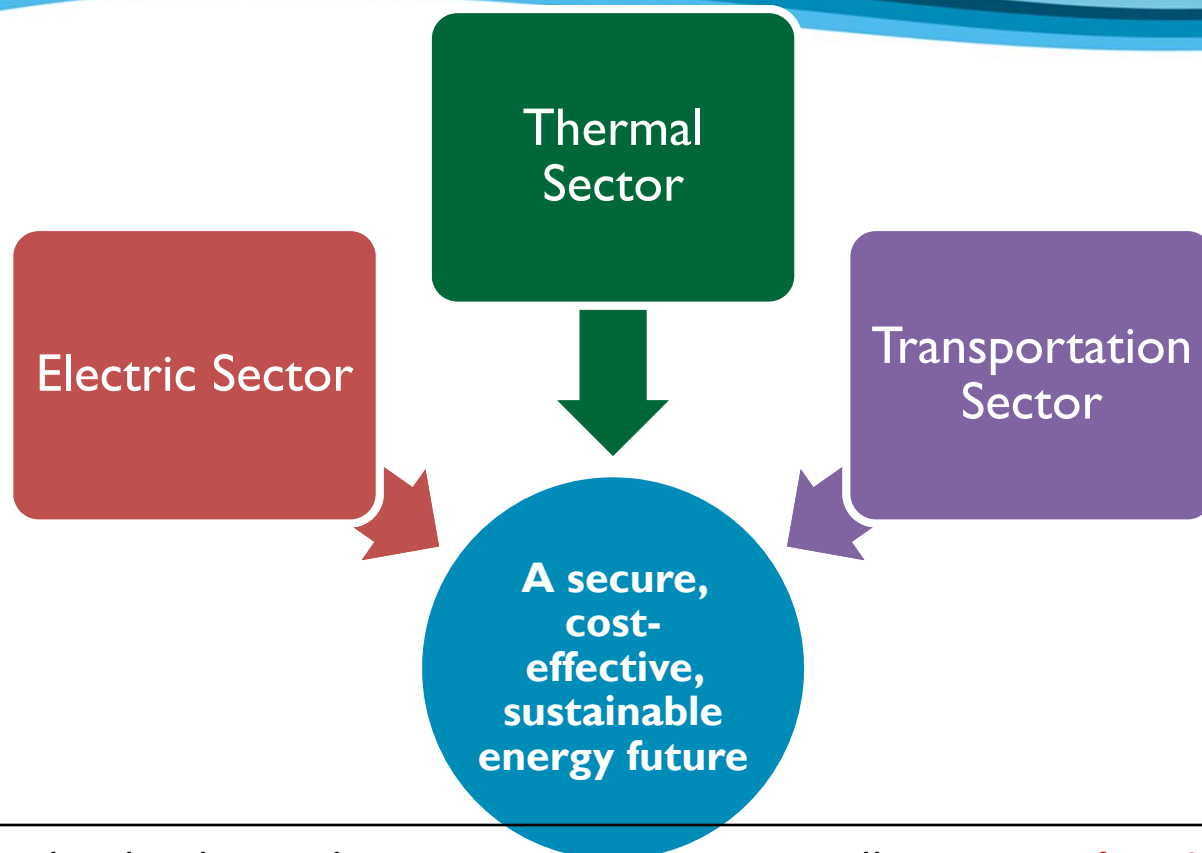
# State Perspective

- Commonly said that the action is at the local/state/regional level
- True for climate change and efficiency: the Northeast is a leader - RGGI and efficiency
- But, rumblings that ‘budgets are ‘too high’ are getting louder
- What are our challenges? What are the opportunities?

# RI State Energy Plan

- **The Rhode Island State Energy Plan (RISEP) is a long-range energy planning and policy document**
  - Statute requires five-year revisions; last update was in 2002
  - In 2013, OER worked with a twenty-member Advisory Council, stakeholder groups, and a consultant team to complete a 10-year update, with a planning horizon out to 2035
- **The RISEP is an element of the centralized and integrated State Guide Plan (SGP), which:**
  - Sets long-range state policy positions (generally twenty years)
  - Provides a means to evaluate and coordinate projects of state importance
  - Assures consistency of local plans
  - Provides a general background information source

# RI State Energy Plan: A Vision for RI's Energy Future



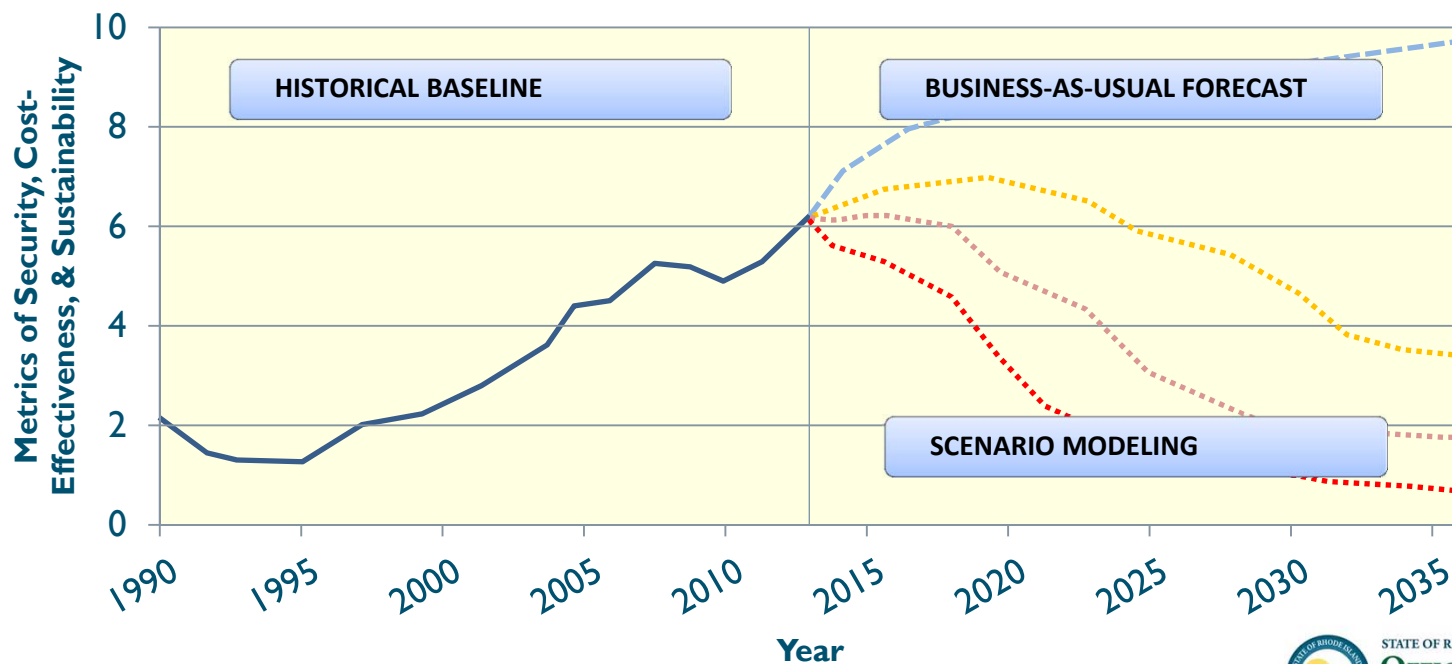
*"In 2035, Rhode Island provides energy services across all sectors—**electricity, thermal, and transportation**—using a **secure, cost-effective, and sustainable energy system.**"*



# Gathering Data

## Gather Data

*Analyze and quantify the amount, cost, supply, and environmental effects of all forms of energy resources—currently used, and potentially available to use—within all sectors in Rhode Island.*



STATE OF RHODE ISLAND  
**OFFICE OF  
ENERGY RESOURCES**

# What's in store for the future?

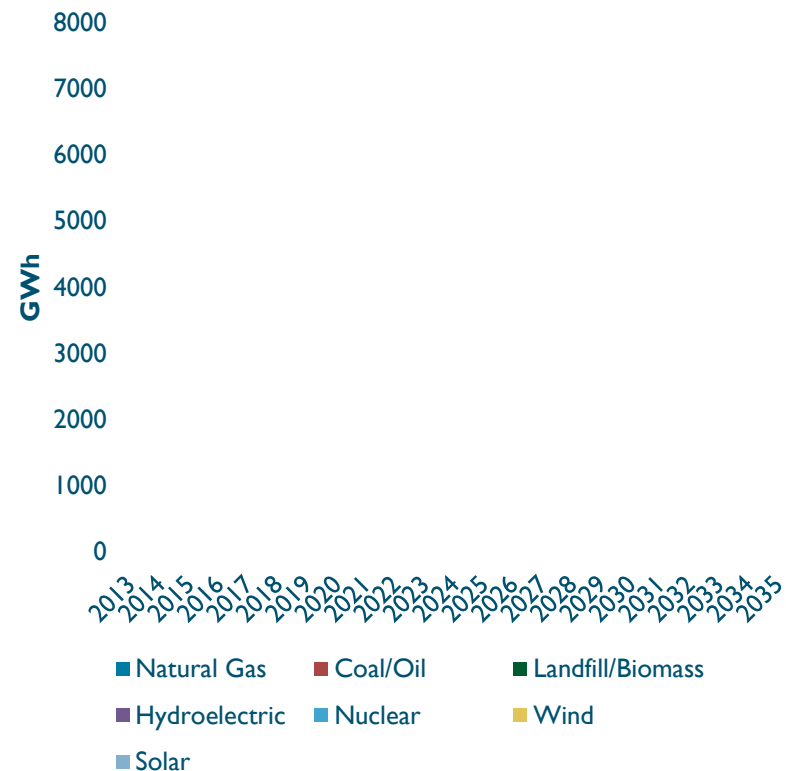
- **Electric Demand Decreasing**

- Least-Cost Procurement of all cost-effective electric energy efficiency
  - ~20% projected energy reductions
- Regional Greenhouse Gas Initiative (RGGI)
  - ~20% projected electric GHG reductions

- **Renewable Energy Increasing**

- Renewable Energy Procurement
  - 16% Renewable Energy Standard
  - >200 MW of wind & solar

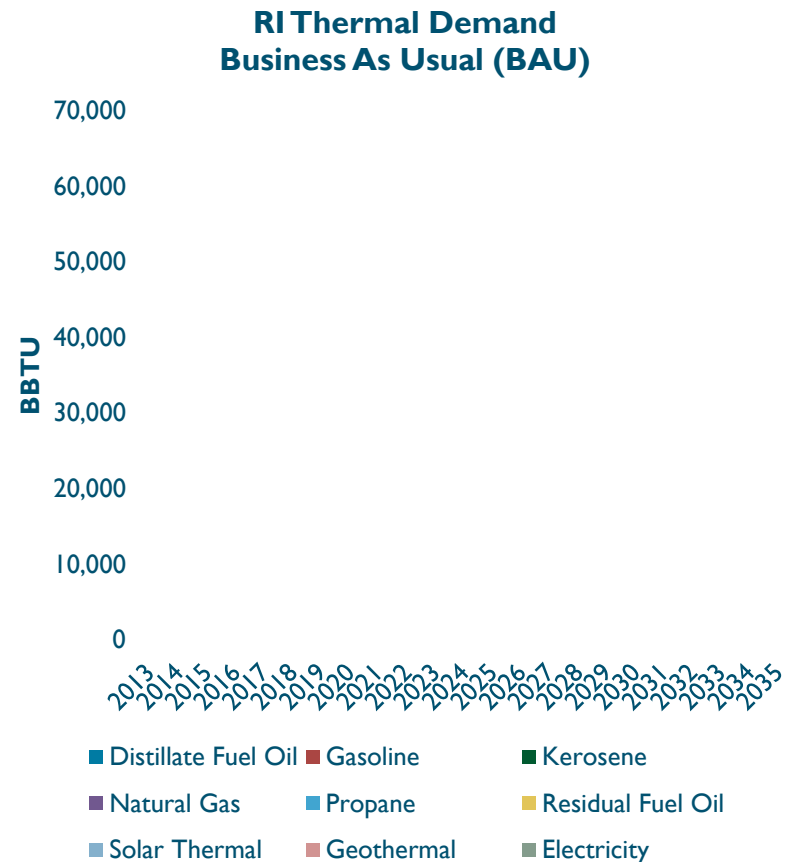
**RI Electric Demand  
Business As Usual (BAU)**



# What's in store for the future?

- **Thermal Demand Decreasing**

- Least-Cost Procurement of all cost-effective natural gas energy efficiency
  - ~20% projected energy reductions
- Biofuel Blends
  - 5% biofuel blend mandate



# What does this mean?

Rhode Island is already poised to make significant progress towards **a secure, cost-effective, and sustainable energy future**

...but can we do better?

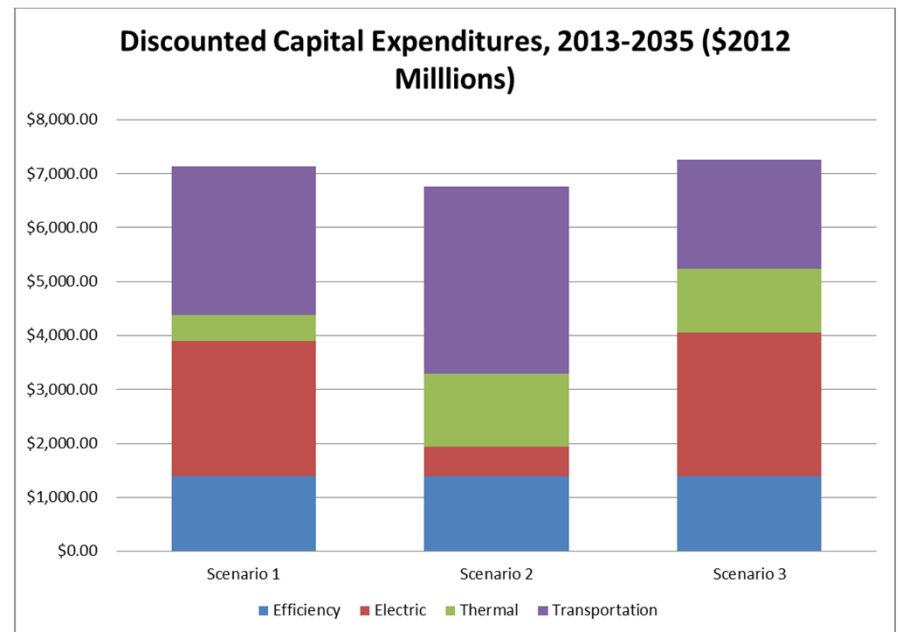
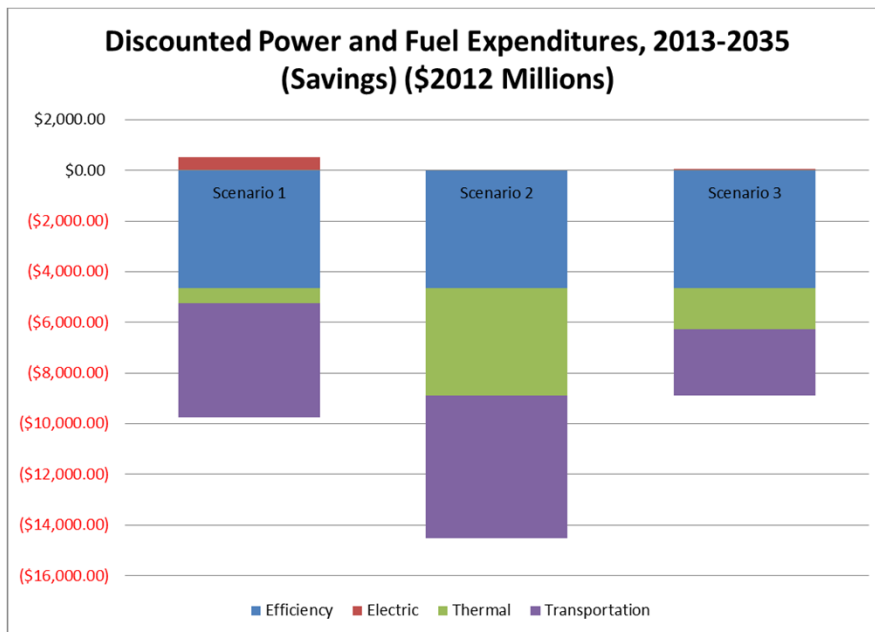
# RISEP Targets

- Scenario modeling shows Rhode Island can:



# Cost-Effectiveness: Net Benefits

- **Business As Usual is the most expensive path for RI**
  - Potential for \$8.8 to \$14.5 billion in NPV savings
  - Requires approximately \$7 billion of NPV investment



# RISEP Recommendations (1/2)

- An “all of the above” clean energy strategy:
  - Maximize energy efficiency in all sectors
    - Continue electric and natural gas least-cost procurement
    - Innovate with efficiency codes and standards
    - Develop an LCP strategy for delivered fuels and transportation sector
    - Continue rapid deployment of combined heat and power (400 MW)
    - Potential total of 1/3 economy-wide energy reductions
  - Promote renewable energy in-state and regionally
    - Expand RES to 40%
    - Develop over 350 MW of local RE generation
    - Successfully develop the state offshore projects (180 MW)
    - Facilitate 1,200 MW of new imported Canadian hydropower



# RISEP Recommendations (2/2)

- An “all of the above” clean energy strategy (cont):
  - Significantly expand alternative energy in thermal and transportation sectors
    - Develop the renewable thermal fuel market (15% by 2035)
    - Increase the use of alternative transportation fuels (25-40% by 2035)
  - Invest in energy infrastructure
    - Modernize the electric grid
    - Address leaks in the natural gas distribution system
    - Target power resiliency investments at critical infrastructure
  - Mobilize capital and reduce costs
    - Expand financing and investment tools (\$7 billion!)
    - Reduce the soft costs of renewable energy





# 2015-2017 Saving Targets Recommendations

Proposed by:



STATE OF RHODE ISLAND

**ENERGY EFFICIENCY &  
RESOURCE MANAGEMENT COUNCIL**

**With support from the Council's Consultant Team**



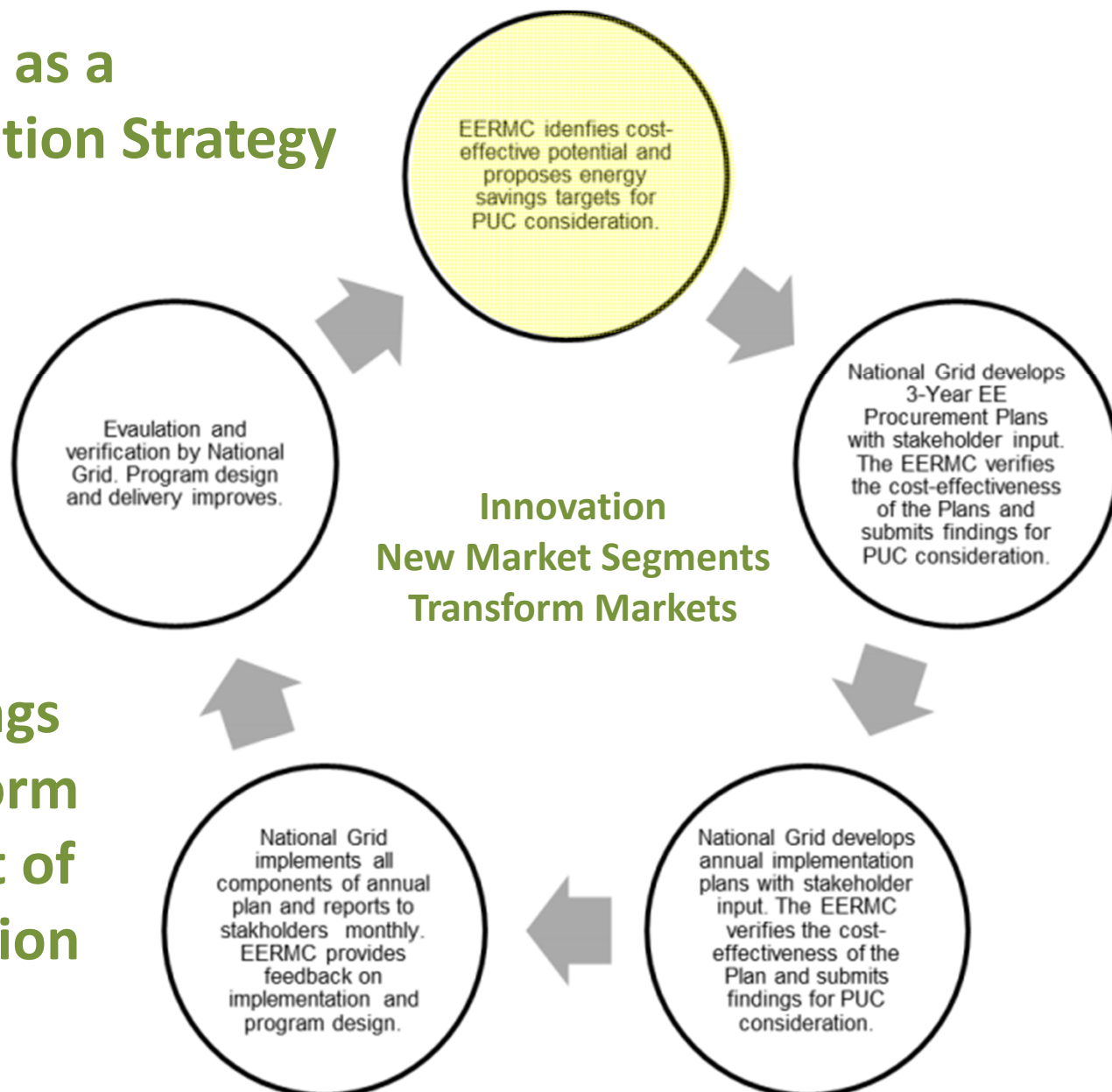
Vermont  
Energy Investment  
Corporation



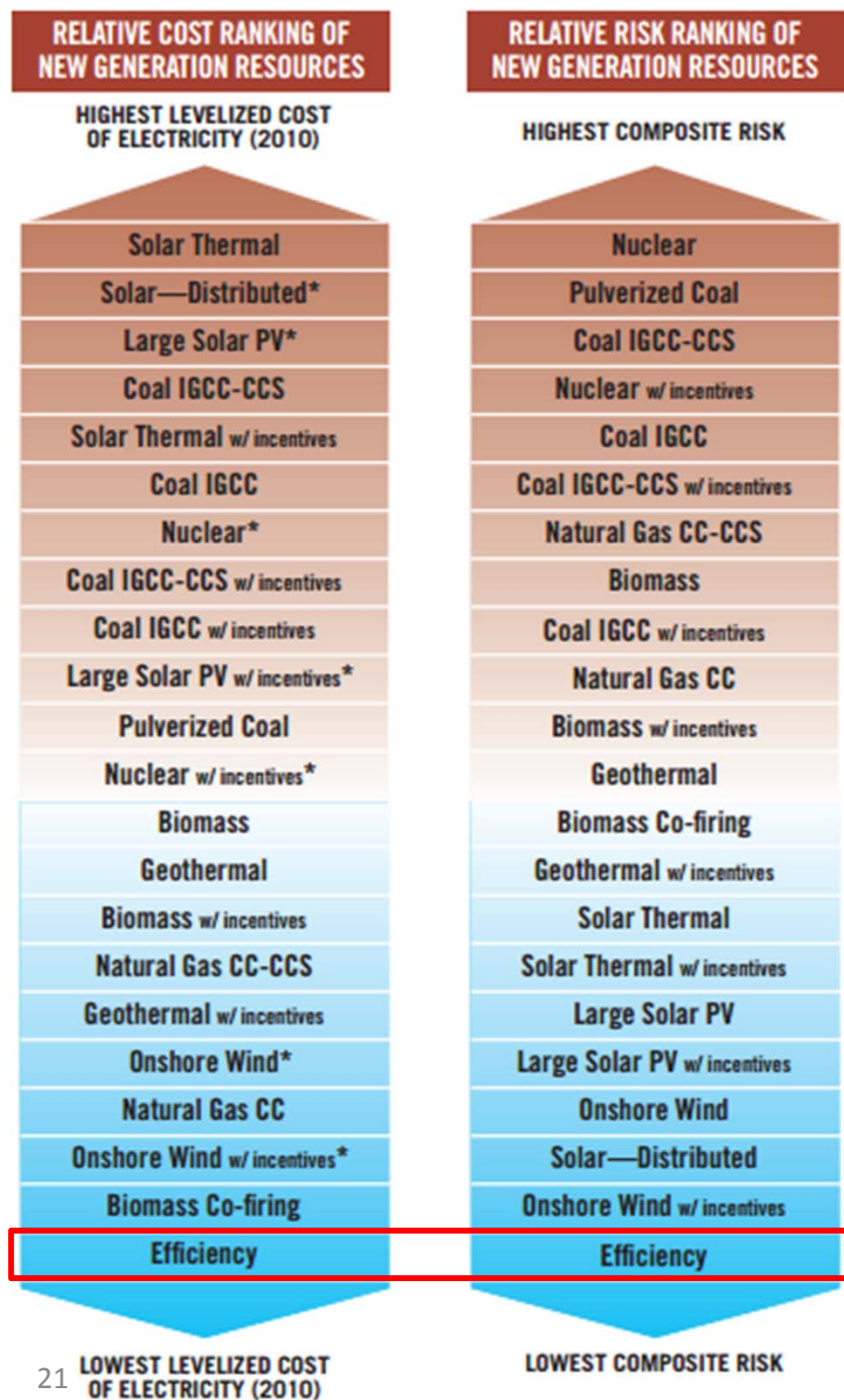
 **Optimal**  
ENERGY  
Integrated Energy Resources

**RI PUC Technical Session  
February 25<sup>th</sup> 2014**

## Energy Efficiency as a Resource Acquisition Strategy



**The Role of Savings  
Targets → to inform  
the development of  
the implementation  
plan**

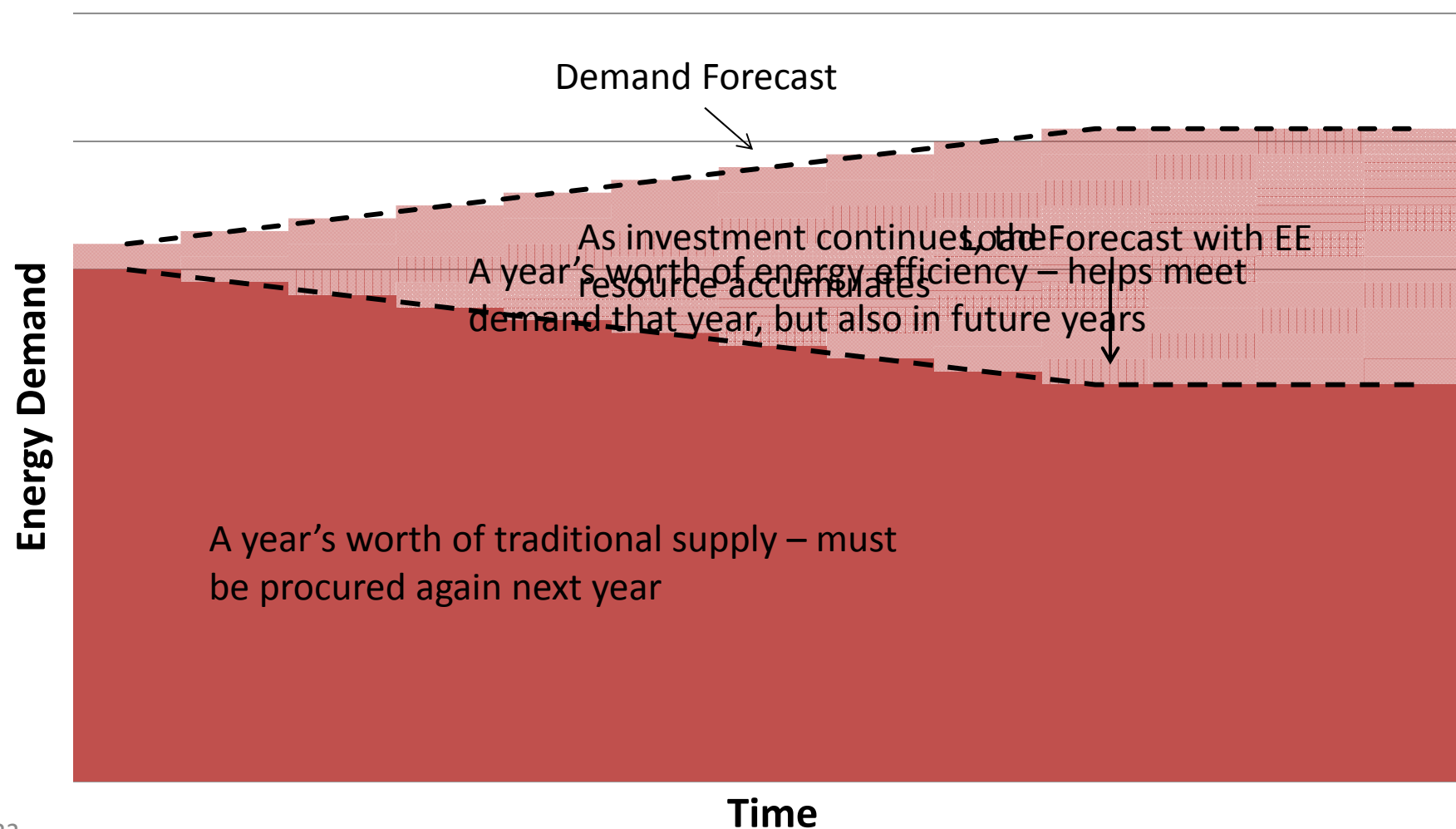


## How to Think About Energy Efficiency Investments:

*A low cost, low risk, Energy Resource*

2012 report authored by former utility regulators identified energy efficiency as the lowest-cost, lowest-risk resource for current utility planners

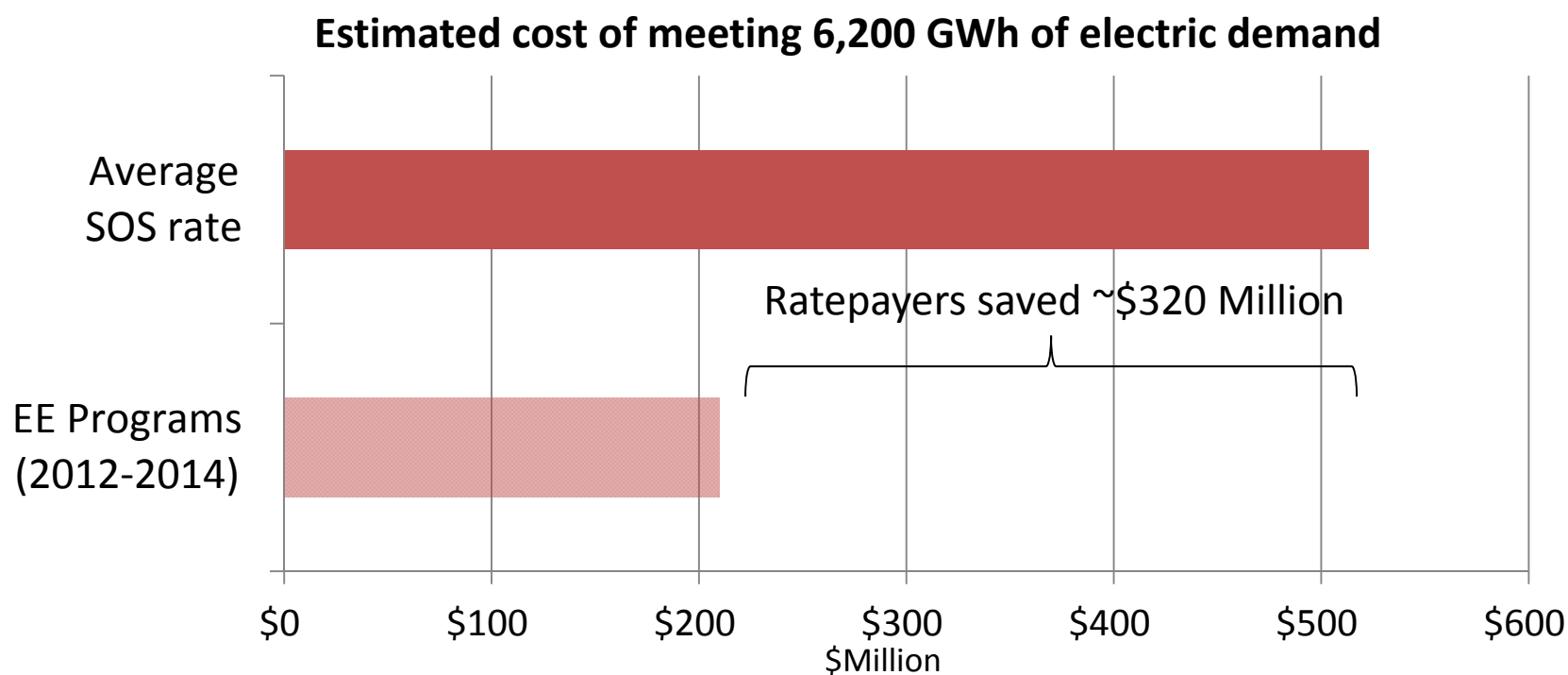
## Energy Efficiency as a Resource Acquisition Strategy – A Conceptual Example



## Comparing Costs - A look back at the previous 3 year plan

Energy efficiency measures installed from 2012-2014 will save almost 6,200 GWh over their lifetime, at a total cost of around **\$200 million**

Delivering the same amount of electricity at today's Standard Offer rates would cost approximately **\$520 million**



# Despite the Good Data, Questions Remain

- Do regulators/ratepayers accept energy efficiency as a resource acquisition strategy?
- If they don't, what more can be done to demonstrate its benefits?
- How do we change the mindset of energy efficiency as a 'program' to a 'resource acquisition strategy with all of the benefits recognized by regulators and key decision-makers in our states?

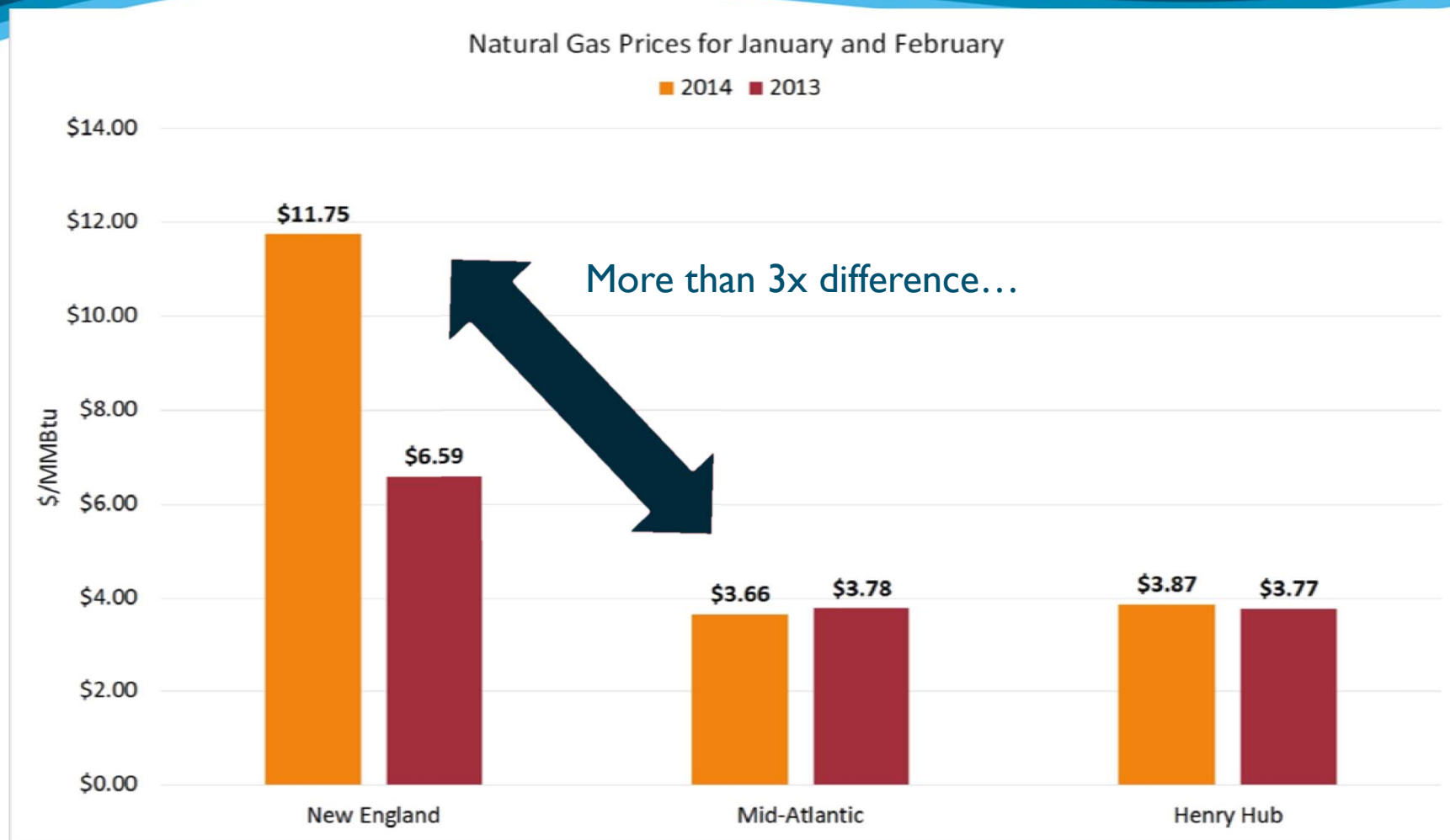


# Challenge: High & Volatile Energy Costs

- High and volatile regional energy costs colors public perception and impact decision-makers including legislators and regulatory community
- In New England, we paid \$1 billion more for wholesale electricity in January 2014 than we did in January 2013
- Over time, these prices work their way into retail rates



# New England's Economic Disadvantage





# What people are reading....



“We have a constraint on how much gas we can get into New England,” said Michael D. LaFlamme, National Grid’s New England vice president for regulation and pricing. “We don’t have [sufficient] gas transmission lines – the pipes – to get the gas from our sources.”

**“Utilities panel approves 12.1 percent rate hike for National Grid electricity”**

-G.Wayne Miller,  
December 20, 2013

Full article available at: <http://www.providencejournal.com/breaking-news/content/20131220-utilities-panel-approves-12.1-percent-rate-hike-for-national-grid-electricity.ece>

# What people are hearing...

**“RI electric bills  
to rise by nearly  
\$10 in January”**

-Kim Kalunian  
December 20, 2013



**““Unfortunately this increase is driven  
by market forces we cannot control,”  
said Timothy Horan, president of  
National Grid in Rhode Island...”**

# What people are seeing...

**“The rate increase means that customers will see a rise of about \$9.53 in their monthly bill. The average Rhode Island home, which typically has about a \$79 bill, will go up to around \$89.”**

-Nicole Gerber

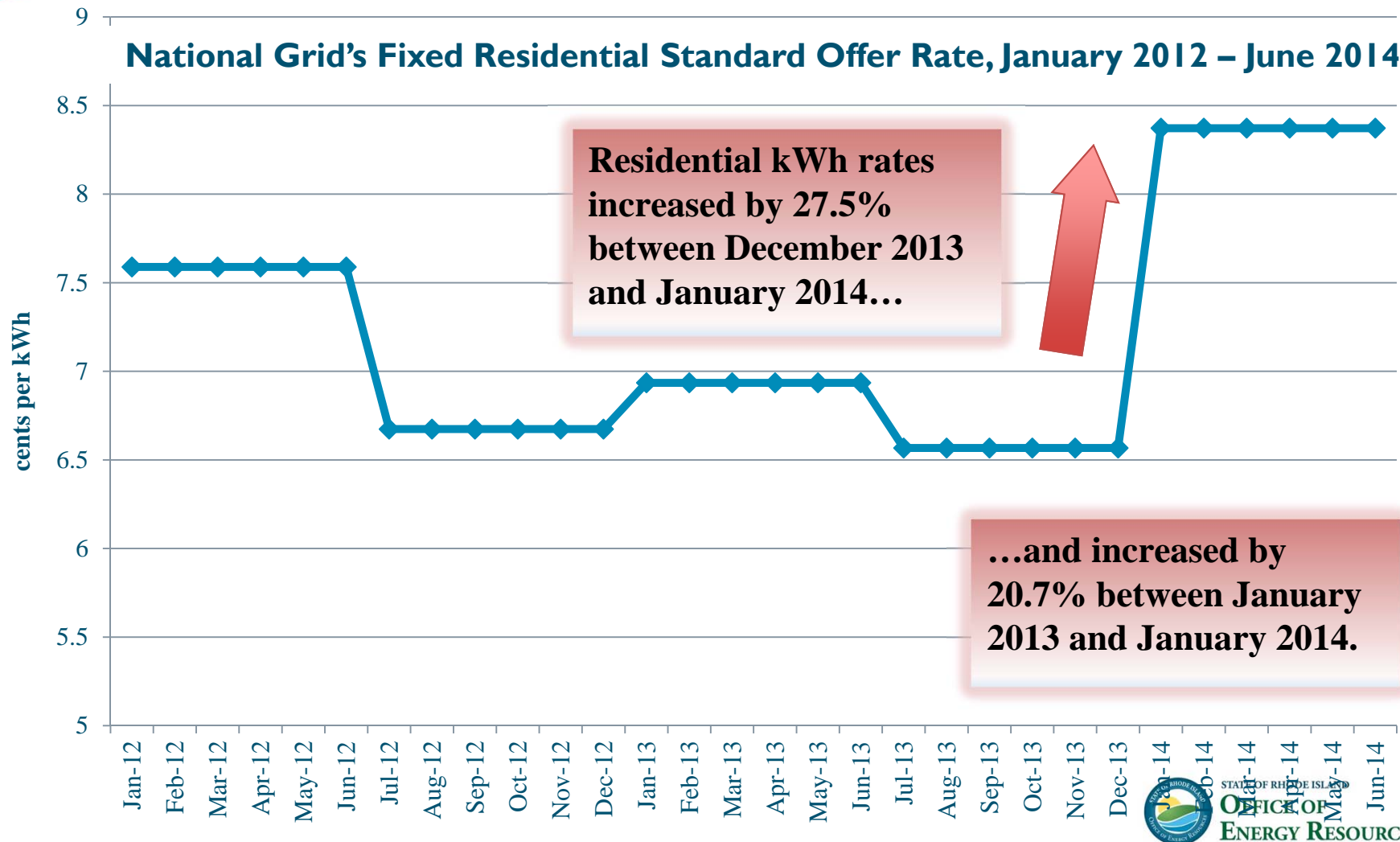
December 20, 2013 (updated 12/26/13)

"I think people on a fixed income are going to be most affected by it. Especially people now with this economy. They can't really afford any type of raises," said Marie from Glocester.



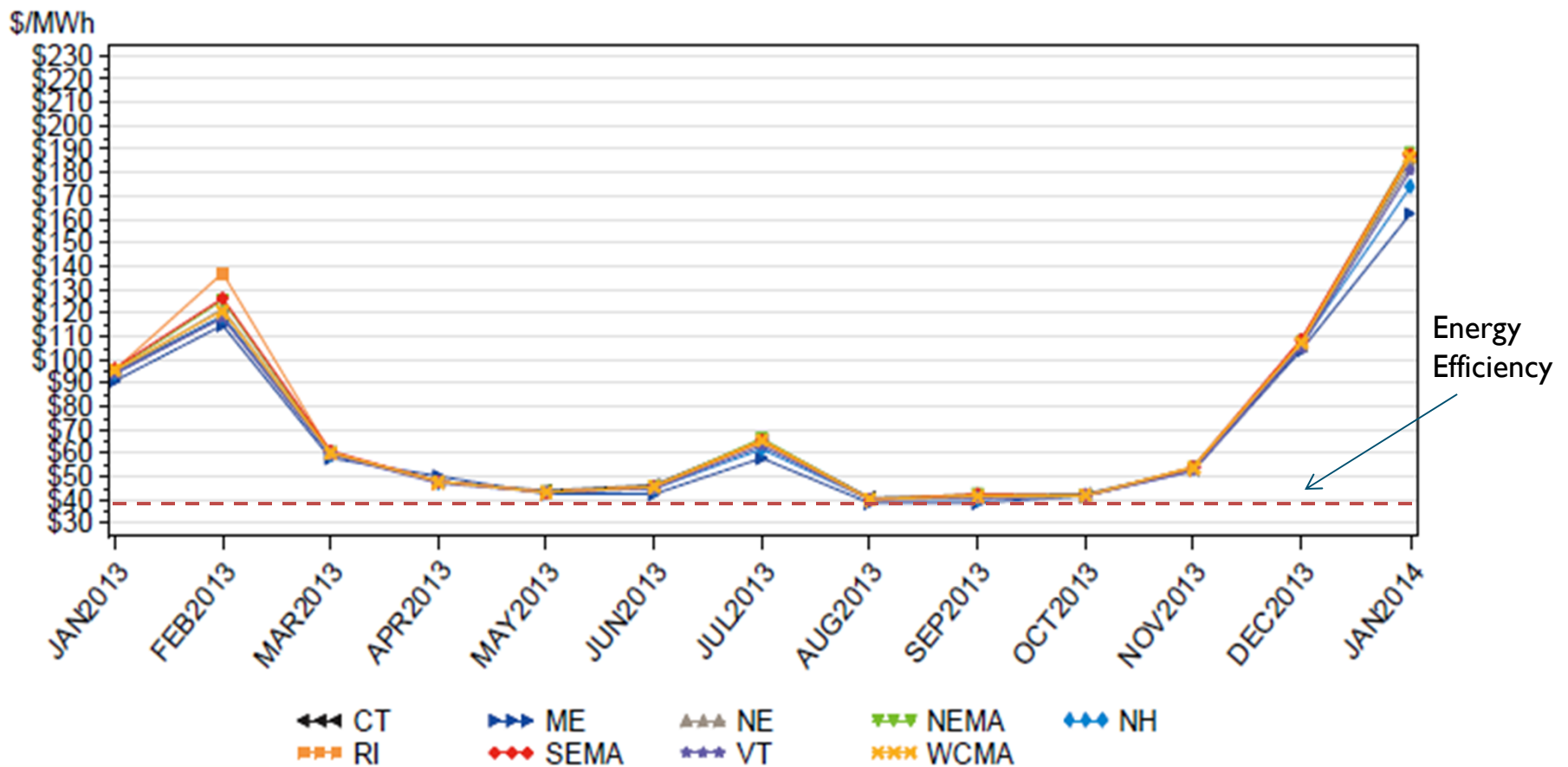
# What people are paying...

**National Grid's Fixed Residential Standard Offer Rate, January 2012 – June 2014**



# Low Risk - The long term nature of efficiency resources locks in low-cost energy, protecting ratepayers from price volatility

Average Total Wholesale Load Cost- All Hours  
13 Months Ending 31JAN14



# **Challenge: Cumulative Impact of Piecemeal Ratemaking**

**Regulators see a vast number of dockets, each of which appear to increase rates:**

- Electric Infrastructure Reliability Plan
- Gas Infrastructure Reliability Plan
- Energy Efficiency Program
- Distributed Generation Program
- Low Income Financial Assistance Programs

**Who is watching out for the overall impact on bills?**

# Rate Impact $\neq$ Bill Impact

- For EE, participants realize significant bill savings while non-participants see minor increases due to higher rates
- Long term rate impacts -- small (though better data needed)
- Challenging to communicate this message



# Connecting Consumer Advocates with Efficiency (RI)

- Consumer advocates are VERY active politically & with PUC
- Not engaged in advocating for EE as the long-term solution to high energy costs
- There's an opportunity for partnership



STATE OF RHODE ISLAND  
**OFFICE OF  
ENERGY RESOURCES**



# Tie Efficiency to Jobs and Economic Growth



STATE OF RHODE ISLAND  
**OFFICE OF  
ENERGY RESOURCES**

# Education & Marketing

**LEARN**

Energy  
Saving Tips

**energy**  
expo



The more  
**energy** you save,  
the more  
**money** you save.



**nationalgrid**  
HERE WITH YOU. HERE FOR YOU.



STATE OF RHODE ISLAND  
**OFFICE OF  
ENERGY RESOURCES**

# The Path Forward

- Better data and reporting from efficiency program administrators
- Evaluating the ability of financing to deliver deeper/broader savings- crafting better financing options
- Promoting dialogue with the regulatory community & with utilities, ratepayers, businesses
- Adjusting/aligning utility incentives as we move towards the utility of the future (utility 2.0)



# Questions?

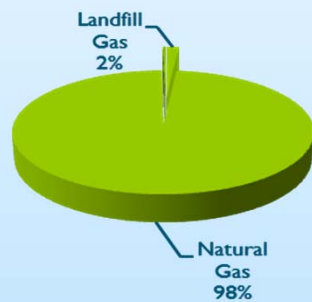
Marion Gold  
RI Office of Energy Resources  
401-574-9119  
Marion.Gold@energy.ri.gov  
[www.energy.ri.gov](http://www.energy.ri.gov)



STATE OF RHODE ISLAND

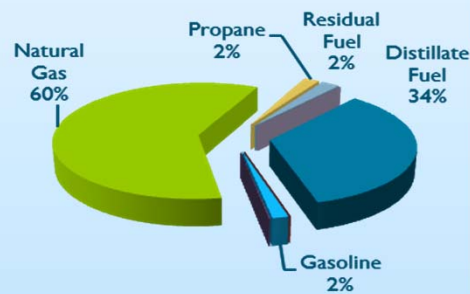
**OFFICE OF  
ENERGY RESOURCES**

# Rhode Island Energy Use Today



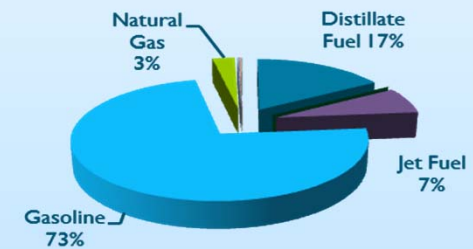
**Electric**

63 Trillion BTU  
\$1.1 Billion/Year  
2.9 Million Tons CO<sub>2</sub>



**Thermal**

63 Trillion BTU  
\$1.1 Billion/Year  
3.9 Million Tons CO<sub>2</sub>



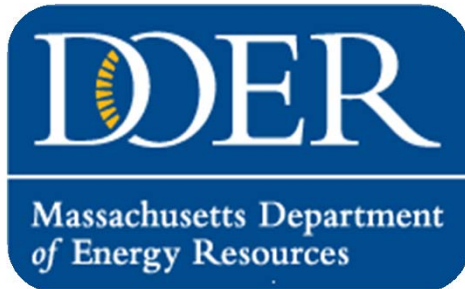
**Transportation**

64 Trillion BTU  
\$1.4 Billion/Year  
4.5 Million Tons CO<sub>2</sub>

**RI spends \$3.6 billion annually on 190 trillion BTU of energy, emitting 11 million tons of CO<sub>2</sub>**



*Creating A Cleaner Energy Future For the Commonwealth*



# **Residential Energy Efficiency in MA: trials and tribulations**

**Ian Finlayson  
Deputy Director – Energy Efficiency Division**

# MA 2013 preliminary results

- Over 100% of goal in Residential electric and gas savings
- Over \$80m in HEAT loan financing
- Residential LED lighting sales – dramatic increase
- Record year for PA program implementation

# Parmenides vs. Heraclitus

- 500 BC – Pre-Socratic Greek Philosophers



# Clear need for solutions that drive deeper savings

- Residential lighting – still the major driver of savings - Low cost, low risk investment
- Lots of potential customers face market barriers
- Many customers receive no audit recommendations
- Plenty of room for innovation in implementation

# Market Barriers – a non exhaustive list

1. Market awareness
2. Tenant- Landlord (renters)
3. Pre-weatherization
4. Incremental investments
  - Free lighting only
5. Financing
  - Time horizon
  - Credit score

# Building Blocks of Success



# Robust Financing - MA HEAT loan

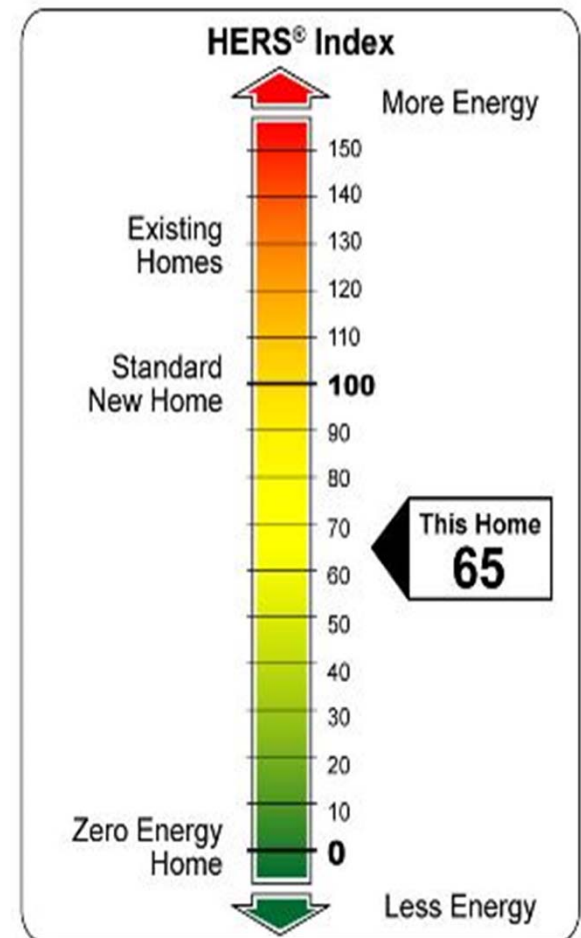
- Part of HEAT legislation
- 0% interest up to \$25,000
- Over 40 in-state lenders
- Over \$80m in loans in 2013
  - Cost of \$15m
- No secondary market
  - Local lenders offer lower cost of capital
  - Prime + 1% (5% - 6.25% floor)

# MA HEAT loan - expansion

- Pre-weatherization incentives
  - Up to \$2k for knob & tube wiring
  - Up to \$3k for asbestos HVAC mitigation
- Clean Biomass boilers – up to \$25k
- Landlord renovation loan – up to \$50k
- Deep Energy Retrofit loan – up to \$50k
  
- What next? – Solar PV loan

# New Construction & Stretch code

- HERS ratings required in 136 towns/cities
- 2013: 6,320 HERS ratings
  - Average HERS score 59
- High spillover rate in PA New Construction program – 1.8
- Next – ZNEB incentives



# MA Home MPG Pilot

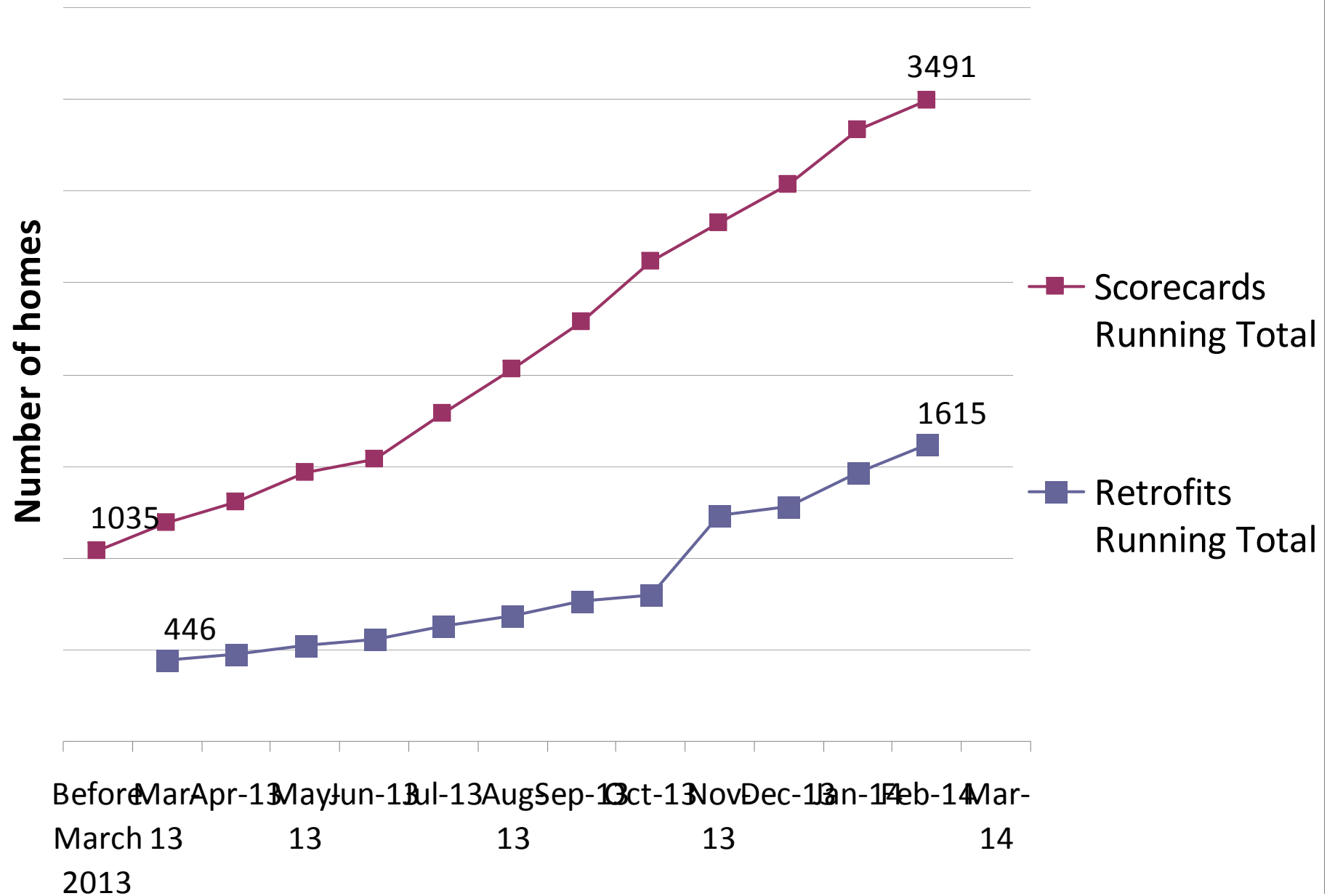
- 8 Towns and Cities – 50,000 homes
- 3 Utilities: NGrid, WMECO (NU), Columbia Gas
- 2 Lead Vendors: CSG and Honeywell
- 3 Approved EPS Scorecards – EAI, CSG & Honeywell

## Results thru Feb 2014:

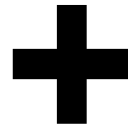
- **3,500** Scorecards
- **1,600** Insulation Retrofits
- **46%** Conversion rate



## Home MPG pilot results







## Additions to Mass Save Home Energy Services (HES):

- **Scorecard:** Before and after Home MPG scorecard
- **Bonus rebates:** for insulation & HVAC equipment
- **Local outreach and assistance:** marketing and concierge if considering a retrofit

# ENERGY PERFORMANCE SCORE

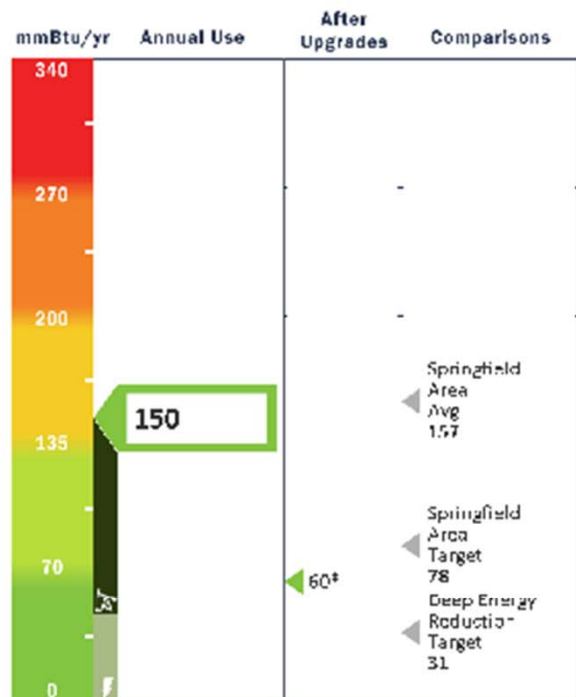


Address: 10-30 Oct  
Bend, MA 01101

Reference Number: 250000158

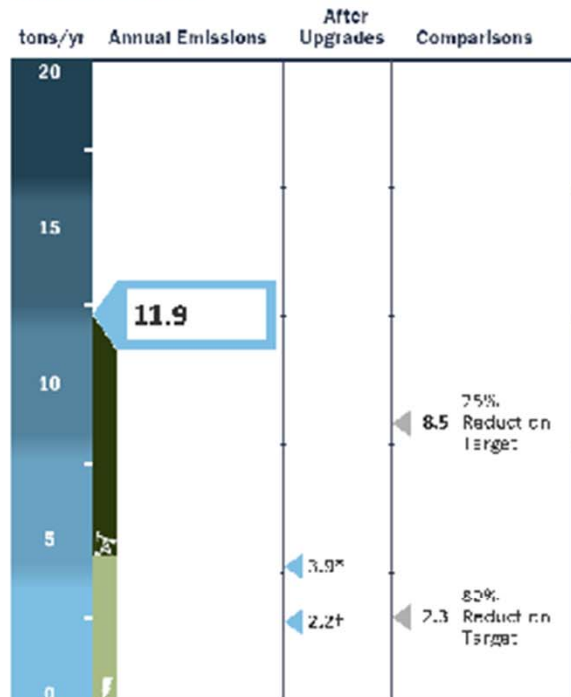
<b>Energy Score:</b> 150 mmBtu/yr	<b>\$4,608</b>	<b>Carbon Score:</b> 11.9 tons/yr
<b>Electric:</b> 13,700 kWh/yr	<b>\$1,918</b>	<b>Electric:</b> 4.5 tons/yr
<b>Natural Gas:</b> 0 therms/yr	<b>\$0</b>	<b>Natural Gas:</b> 0.0 tons/yr
<b>Oil:</b> 730 gal/yr	<b>\$2,690</b>	<b>Oil:</b> 7.4 tons/yr

## Energy Score



\*See Recommended Upgrades

## Carbon Score



\*See Recommended Upgrades  
†With energy from renewable sources

This score measures the estimated total energy use (electricity, natural gas, propane, heating oil) of this home for one year. The lower the score, the less energy required for normal use. Actual consumption and costs may vary.

Measured in million Btus per year (mmBtu/yr).

This score measures the total carbon emissions based on the annual amounts, types, and sources of fuels used in this home. The lower the score, the less carbon is released into the atmosphere to power this home.

Measured in metric tons per year (tons/yr).

Bedrooms: 2      Assessment Date: 10/30/2011  
Year Built: 1999      Energy Specialist: Coveo Test, Brandon

SIMPLE EPS Version 2.0 v20111011



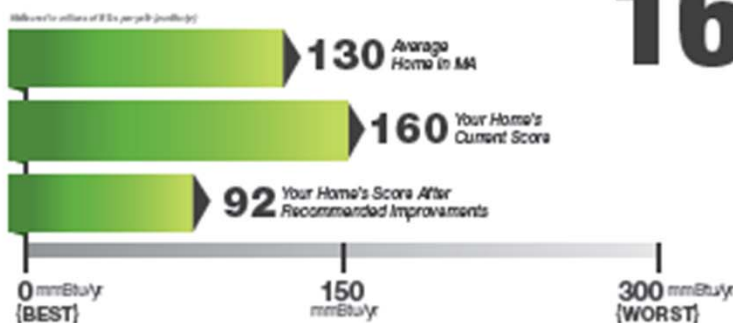


## YOUR HOME'S ENERGY PERFORMANCE SCORE

Home MPG, a program within Mass Save®, provides you with your home's "miles per gallon" energy performance rating, called an "energy performance score" or EPS. By helping you better understand your home's energy use, Home MPG helps you make smart decisions about implementing improvements that make your home more energy efficient and reduce your energy costs.

### Your Home's ENERGY PERFORMANCE SCORE

This score shows the estimated total energy use (electricity and heating fuel) of your home for one year. The lower the score, the better!

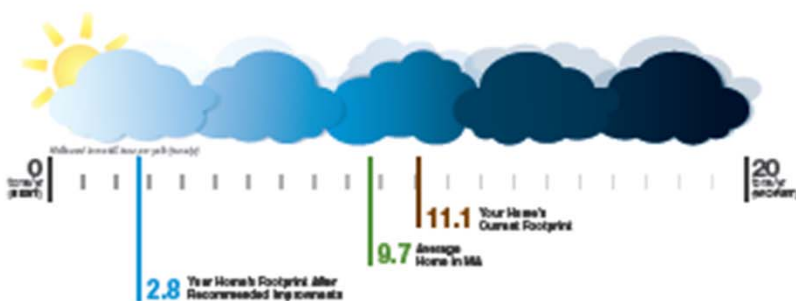


Estimated percentage of energy use by fuel type: Electric: <XXX%>, Natural Gas: <XXX%>

# 160

### Your Home's CARBON FOOTPRINT

This score shows the estimated carbon emissions based on the annual amounts, types, and sources of fuels used in your home. The lower the score, the less carbon is released into the atmosphere to power your home.



Estimated average carbon footprint (tons/yr): Electric: <XX%>, Natural Gas: <XX%>

# 11.1

#### PREPARED FOR

<Customer Name>  
<Customer Address>  
<City>, <State> <Zip>  
Ref #: <Site ID>

Year Built: <XXXX>  
Sq Footage: <XXXX>  
Bedrooms: <X>  
Primary Heating Fuel: <XXXX>

EPS Report Date: <XX/XX/XXXX>  
Energy Specialist: <Energy Specialist Name>

## DOLLARS & SENSE

Current Estimated Energy Costs: **\$2000** Per Year



## ESTIMATED ENERGY SAVINGS

**\$1150** Per Year

Based on implementing all of the recommended energy efficiency improvements



## YOUR HOME'S ENERGY PERFORMANCE SCORE

Home MPG, a program within Mass Save®, provides you with your home's "miles per gallon" energy performance rating, called an "energy performance score" or EPS. By helping you better understand your home's energy use, Home MPG helps you make smart decisions about implementing improvements that make your home more energy efficient and reduce your energy costs.

### PREPARED FOR

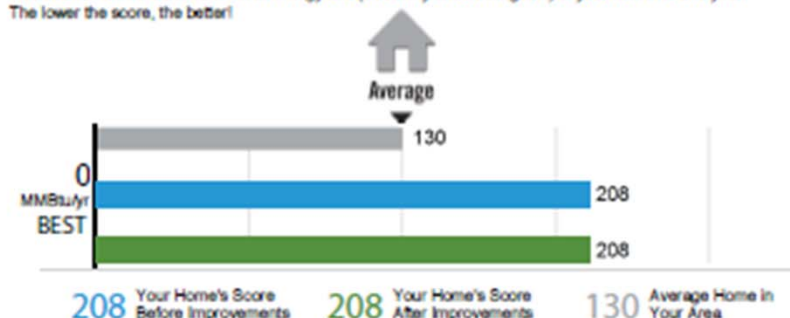
123 Test Street  
Testville, NY 14850  
Ref #: GSN637

**Year Built:** 1975  
**Sq Footage:** 1800  
**Bedrooms:** 3  
**Primary Heating Fuel:**  
Electricity

**Assessment Date:**  
9/12/2012  
**Energy Specialist:**  
Performance Manager

### 208 Your Home's ENERGY PERFORMANCE SCORE

This score shows the estimated total energy use (electricity and heating fuel) of your home for one year. The lower the score, the better!



### THE BOTTOM LINE

PER YEAR

\$0

**ESTIMATED  
ENERGY SAVINGS**  
Based on implementing all of the  
recommended energy efficiency  
improvements

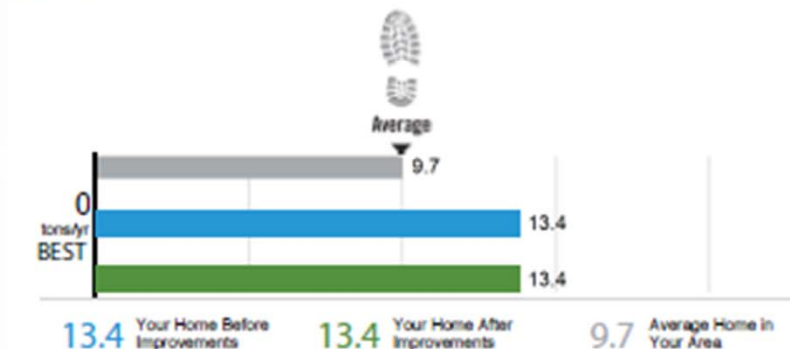
PER YEAR

\$9989

**CURRENT ESTIMATED  
ENERGY COSTS**

### 13.4 Your Home's CARBON FOOTPRINT

This score shows the estimated carbon emissions based on the annual amounts, types, and sources of fuels used in your home. The lower the score, the less carbon is released into the atmosphere to power your home.



For more information on Home MPG or to create an online account to manage your home's information, visit [masssave.energy-performance-score.com](http://masssave.energy-performance-score.com)

Actual energy costs may vary and are based on many factors such as occupant behavior, weather and utility rates. Please see reverse for more on the EPS calculation. Projections for ratings and energy savings are estimates based on implementing all of the recommended energy efficiency improvements.



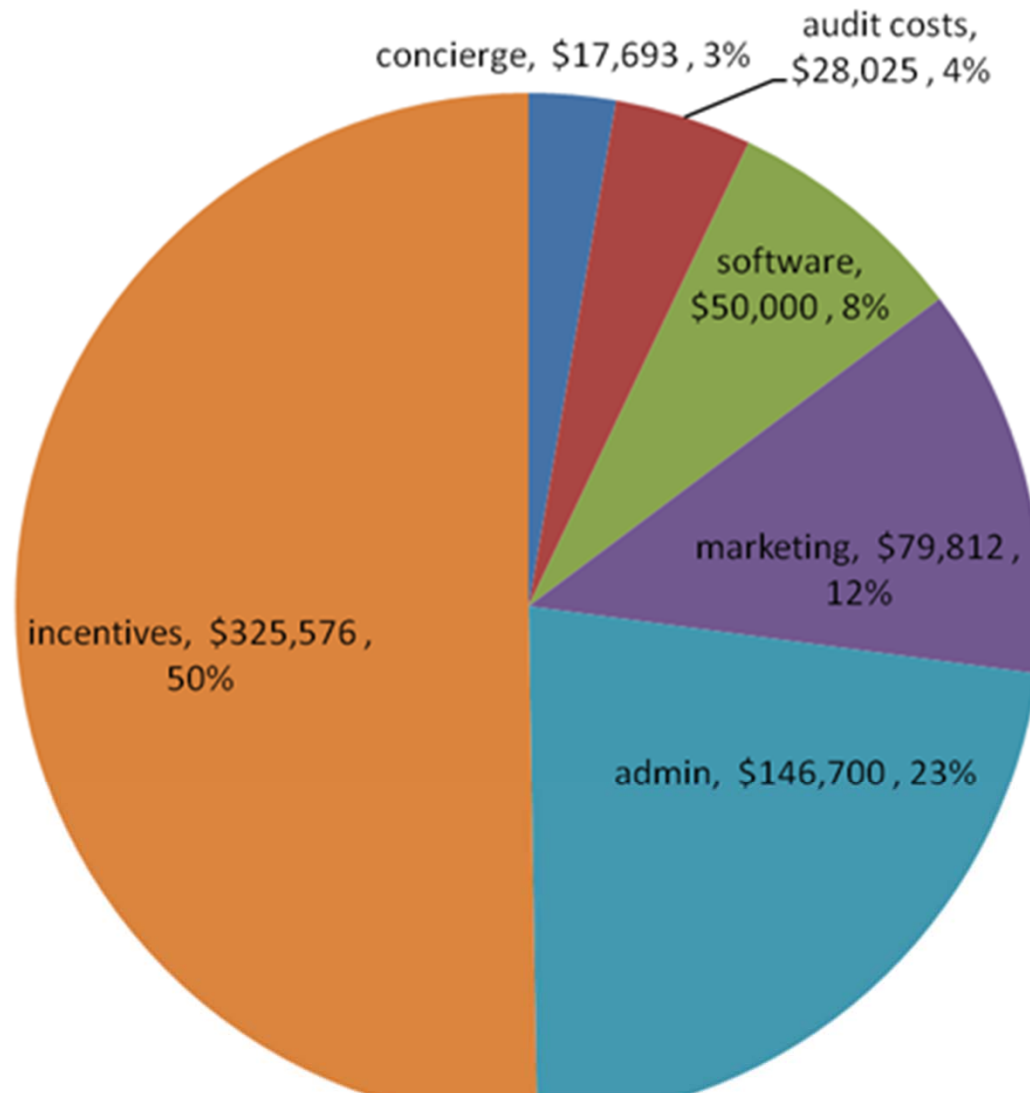
Western Massachusetts  
Electric  
A Northeast Utilities Company



# Scorecards are not expensive

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HomeMPG Lead Vendors  
through 12/2013



# Clean Energy Finance and Investment Authority

Providing easy access to affordable capital

Environment Northeast  
Energy Efficiency in 2014  
April 10, 2014



# Clean Energy Policy Goals

## Need for Finance and Private Capital

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- Enable energy efficiency improvements for at least 15% of single family homes in the state by 2020 – approximately 150,000 homes at \$10,000 to achieve 20% energy reduction would require an investment of \$1.5 billion
- Support the conversion from oil to natural gas for at least 200,000 households in the state in 8 years – at \$7,500 for an average cost of conversion with equipment for an estimated investment of \$1.5 billion
- Estimate potential market of over 150,000 households to install solar PV in the state – at an average cost of \$27,000,000 per system would require an investment of \$4.0 billion

# Connecticut Green Bank

## Visionary Leadership

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*...transitioning programs away from government-funded grants, rebates, and other subsidies, and towards deploying private capital*

...CEFIA was established in 2011 to develop programs that will *leverage private sector capital to create long-term, sustainable financing for energy efficiency and clean energy to support residential, commercial, and industrial sector implementation of energy efficiency and clean energy measures.*



# Connecticut Green Bank

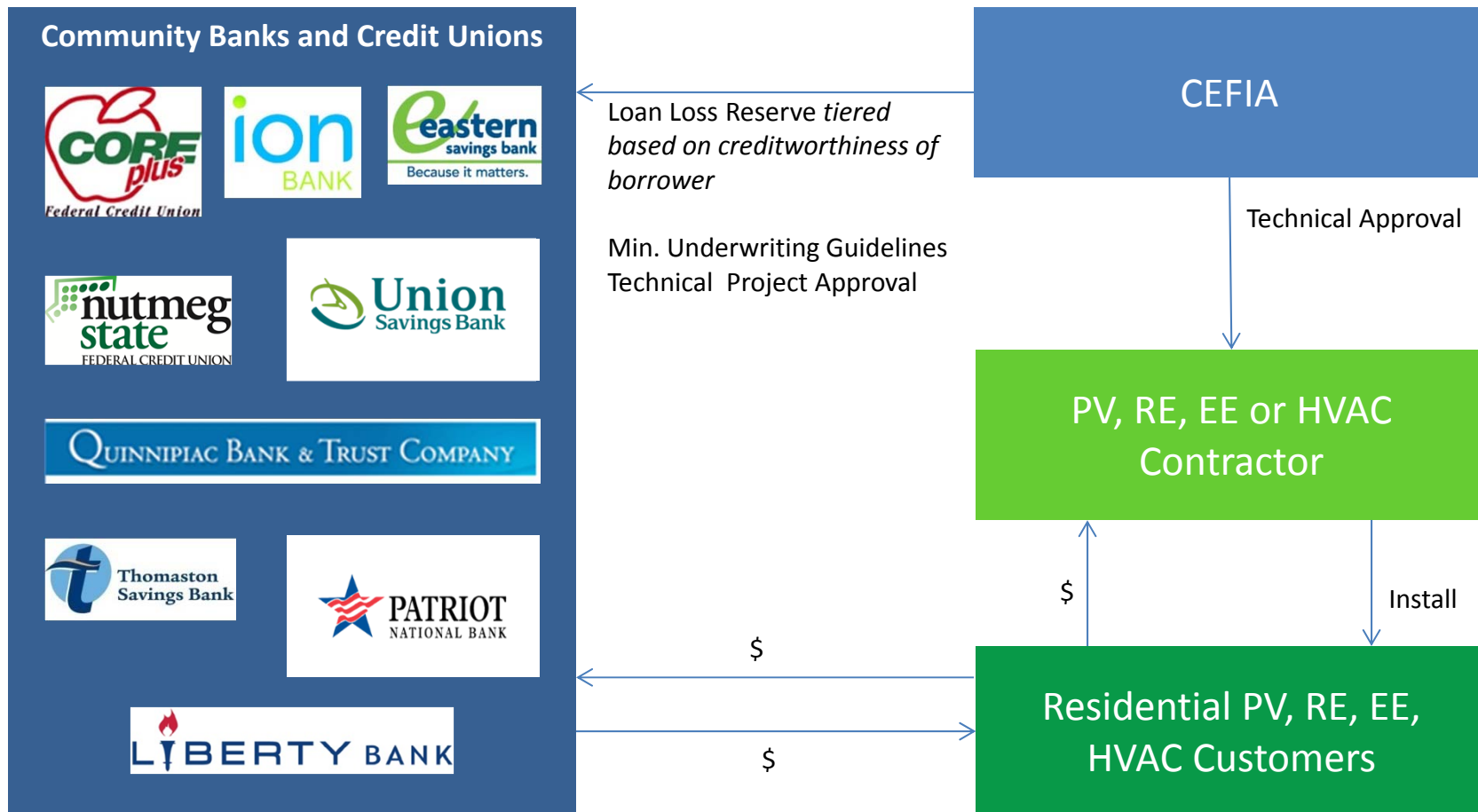
## Organization

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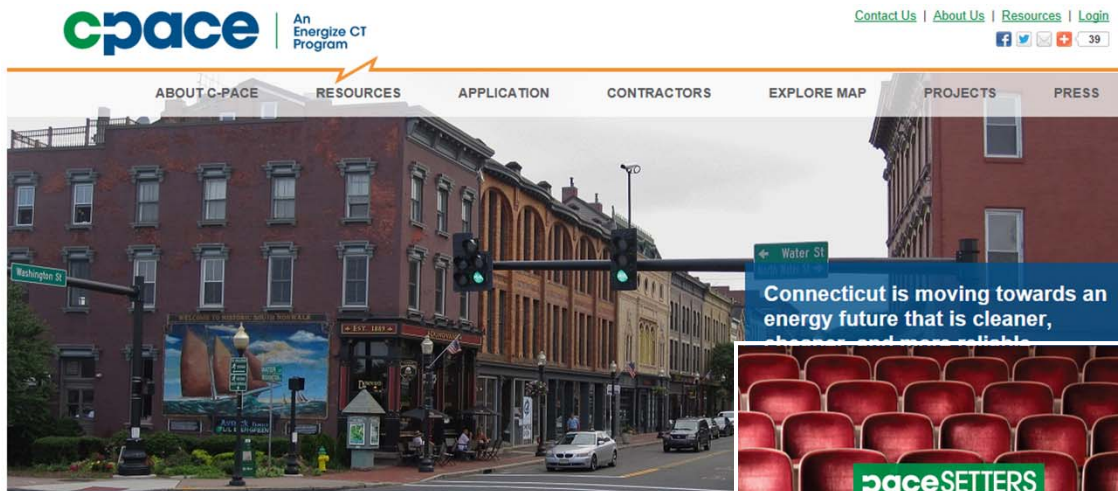
- **Quasi-public organization** – created by PA 11-80 and successor to the Connecticut Clean Energy Fund
- **Focus** – finance clean energy (i.e. renewable energy, energy efficiency, and alternative fuel vehicles and infrastructure)
- **Balance Sheet** – currently \$100 million in assets
- **Support** – supported by a \$0.001/kWh surcharge on electric ratepayer bills that provides approximately \$30 MM a year for investments, RGGI (EE and RE) about \$5-\$10 MM a year, federal competitive solicitations (i.e. SunShot Initiative) and non-competitive resources (i.e. ARRA-SEP), private capital, etc.

# Smart-E Loans

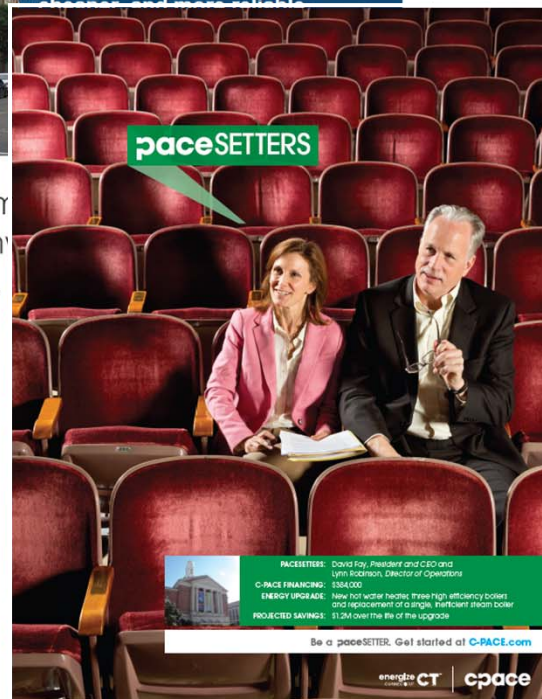
## Public-Private Partnership



# Commercial and Industrial PACE (C-PACE) Public-Private Partnership



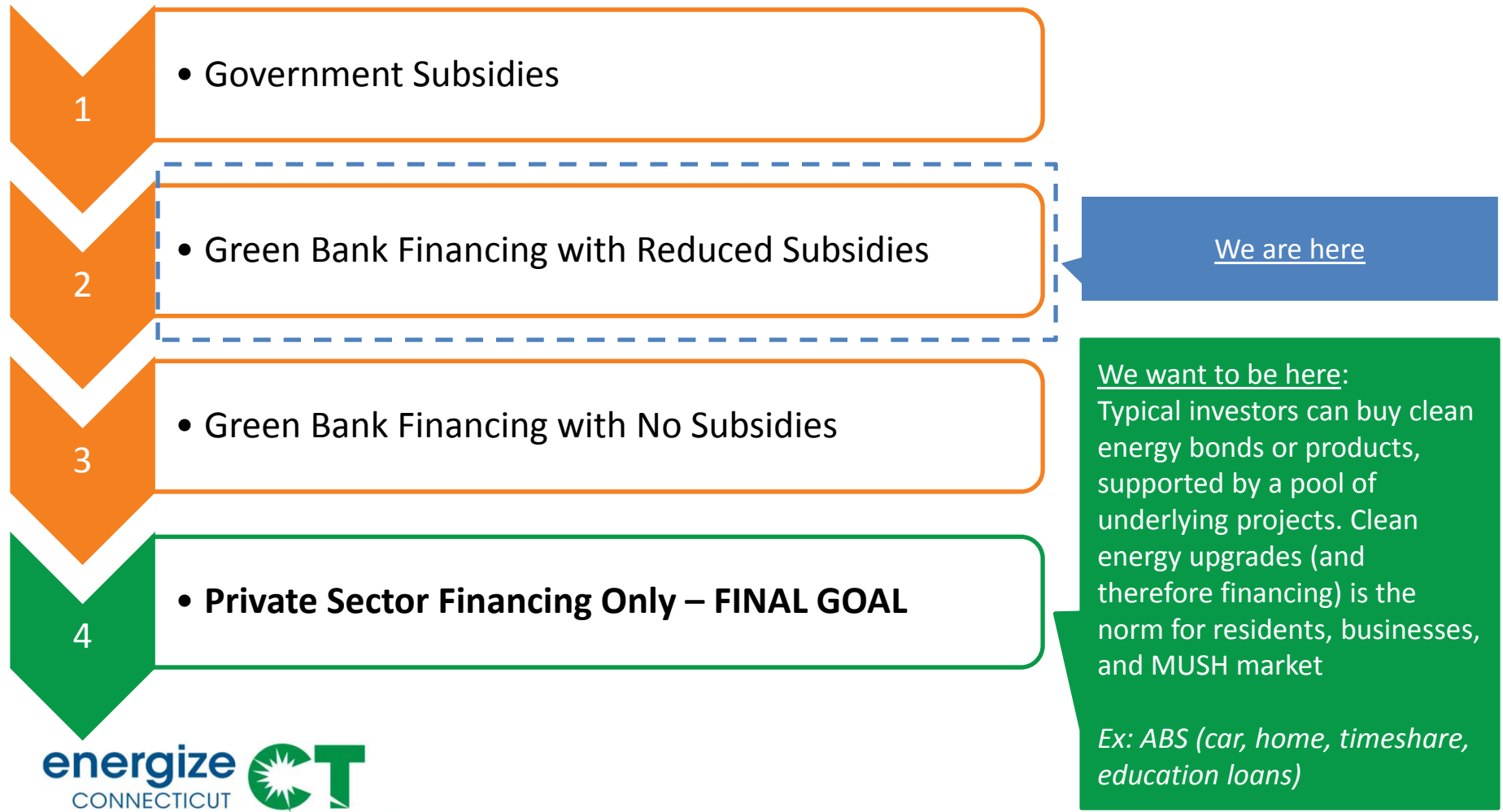
Whether you are a building owner, a contractor, project developer, or an investor, [get started on C-PACE now](#). It's easy.



# Purpose of a Green Bank

## Sustainable Clean Energy Marketplace

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Empowering you to make  
smart energy choices

# Thank You!

**Bryan Garcia**

President and CEO

845 Brook Street

Rocky Hill, CT 06067

[www.ctcleanenergy.com](http://www.ctcleanenergy.com)

[bryan.garcia@ctcleanenergy.com](mailto:bryan.garcia@ctcleanenergy.com)

(860) 257-2170

# Residential Financing Programs Available

## Multifamily and Affordable Housing



An  
Energize CT  
Program



### CDFI's



CL&P



### CHFA-CEFA Pilot



### WINN-HUD OME





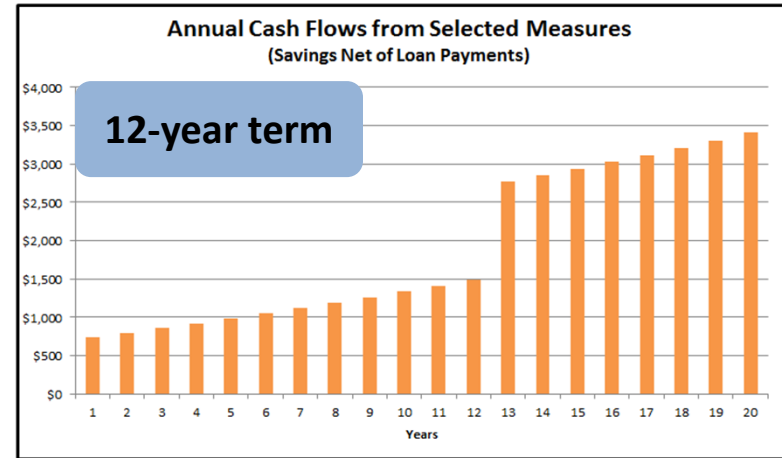
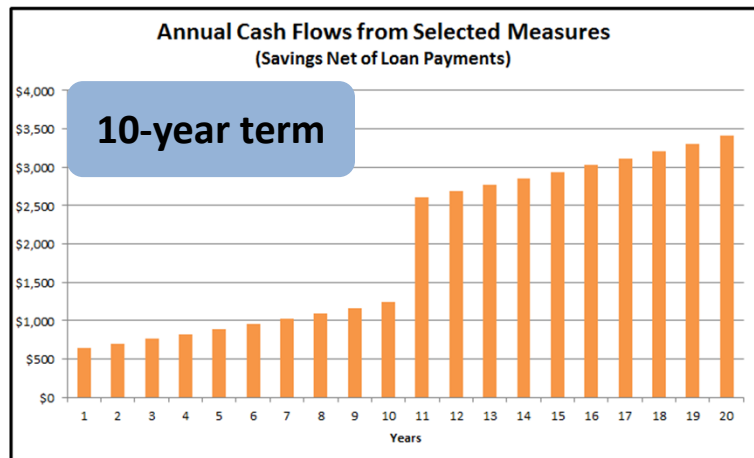
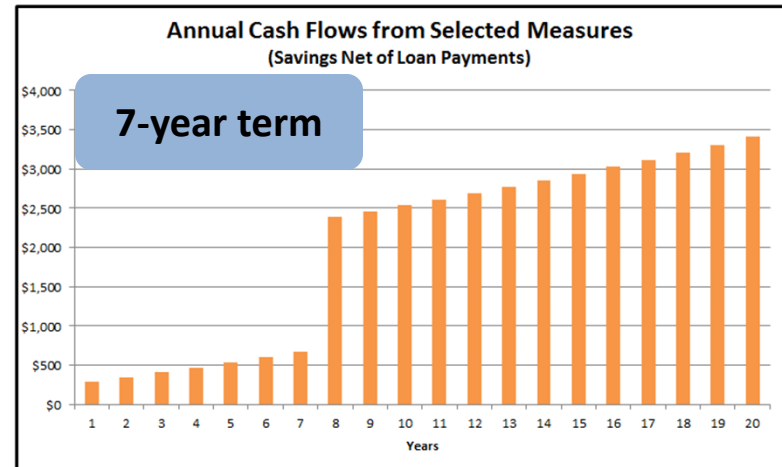
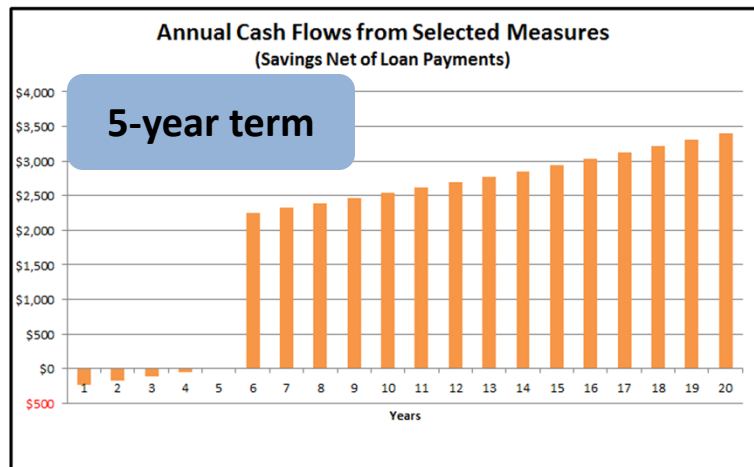
# Residential Financing Programs Available

## Single Family (1-4 Units)

Program	Administrator	Source of Capital	Interest Rate and Term	Loan Amount
Smart-E Loan	CEFIA	Private Capital	NTE 4.49%-6.99% 5-12 years	\$3,000-\$25,000
Micro Loan	CHIF	Public Capital (Ratepayers)	0% 3 years	\$1,000-\$3,000
Comprehensive Loan	CHIF	Public Capital (Ratepayers)	2.99% 10 years	\$3,000-\$25,000
Energy Conservation Loan	CHIF	Public Capital (Taxpayers)	0%-6% 10 years	\$400-\$25,000
Cozy Home Loan (Pilot)	HDF	Private Capital	5.99% 10 years	\$3,000-\$50,000
Heating Loan	EDC and GDC	Public Capital (Ratepayers)	2.99% Payback +2 or 10 years	\$15,000

# Smart-E Loan (Oil to Gas)

## Annual Homeowner Cash Flows



### REFERENCES

Net installed costs and average savings based on numbers provided by CL&P.

Calculation assumes gas rate of \$1.40/ccf and oil rate of \$4.00/gallon as well as an energy price escalator of 2.99%

Includes boiler fuel conversion, insulation in ceiling and walls, and window replacements



# Smart-E Loan

## Channel Marketing – Capital Provide



The advertisement features a bright orange background. On the left, there are three colorful alphabet blocks: a green block with the letter 'B', a yellow block with the letter 'C', and a red block with the letter 'A' stacked on top of the others. To the left of the blocks are two large, 3D purple quotation marks. The main headline in white, bold, sans-serif font reads: "WITH SMART-E, HOME ENERGY IMPROVEMENT IS CHILD'S PLAY." Below the headline, there is a bulleted list of three points in white text: "• No money down", "• Rates as low as 4.49% APR and terms up to 12 years\*", and "• See how easy it is to get started!". Underneath the list, a line of white text says: "For more information and Smart-E Loan details, visit [EnergizeCT.com/SmartE](http://EnergizeCT.com/SmartE) or call us at (888) 570-0773". At the bottom left of the orange area, the Energize Connecticut logo is shown above the text "SMART-E LOANS". In the center bottom, the Liberty Bank logo is displayed. On the bottom right, there is a white box with a diagonal line pattern containing the text "Make a Statement." followed by Twitter and Facebook social media icons. A small footnote at the very bottom left explains the loan details and eligibility criteria. At the bottom right, it states "MEMBER FDIC", "EQUAL HOUSING LENDER", and "NMLS #459028".

**WITH SMART-E, HOME ENERGY IMPROVEMENT IS CHILD'S PLAY.**

- No money down
- Rates as low as 4.49% APR and terms up to 12 years\*
- See how easy it is to get started!

For more information and Smart-E Loan details, visit [EnergizeCT.com/SmartE](http://EnergizeCT.com/SmartE) or call us at (888) 570-0773

**energize** **CT**  
CONNECTICUT  
**SMART-E LOANS**

**LIBERTY**  
BANK

**Make a Statement.**  
Twitter Facebook

\* Smart-E Loans are offered through our partnership with Energize Connecticut. Annual percentage rates (APR) are subject to change without notice. As of 3/12/14, a five year Smart-E Loan of \$6,000 at 4.49% APR results in 60 monthly payments of \$111.83. To be eligible, home must be: located in Connecticut, 1-4 unit owner occupied, primary residence, condominiums are eligible only if they are individually metered. Subject to Liberty Bank credit approval and project approved through Clean Energy Finance Investment Authority. Available to borrowers with a minimum FICO score of 680 and a maximum DTI of 43%.

MEMBER FDIC EQUAL HOUSING LENDER NMLS #459028



# Connecticut Residential Energy Efficiency

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- Goal:
  - PA 11-80: Weatherize 80% of homes by 2030
    - Increase customer awareness of home performance
    - Complete all cost-effective energy-efficiency improvements
- Challenges:
  - Customer Awareness
  - Upfront cost
  - Home performance spans multiple trades
  - Renters
- Tools:
  - Marketing
  - Rebates and Financing
  - Training
  - Energy Labeling



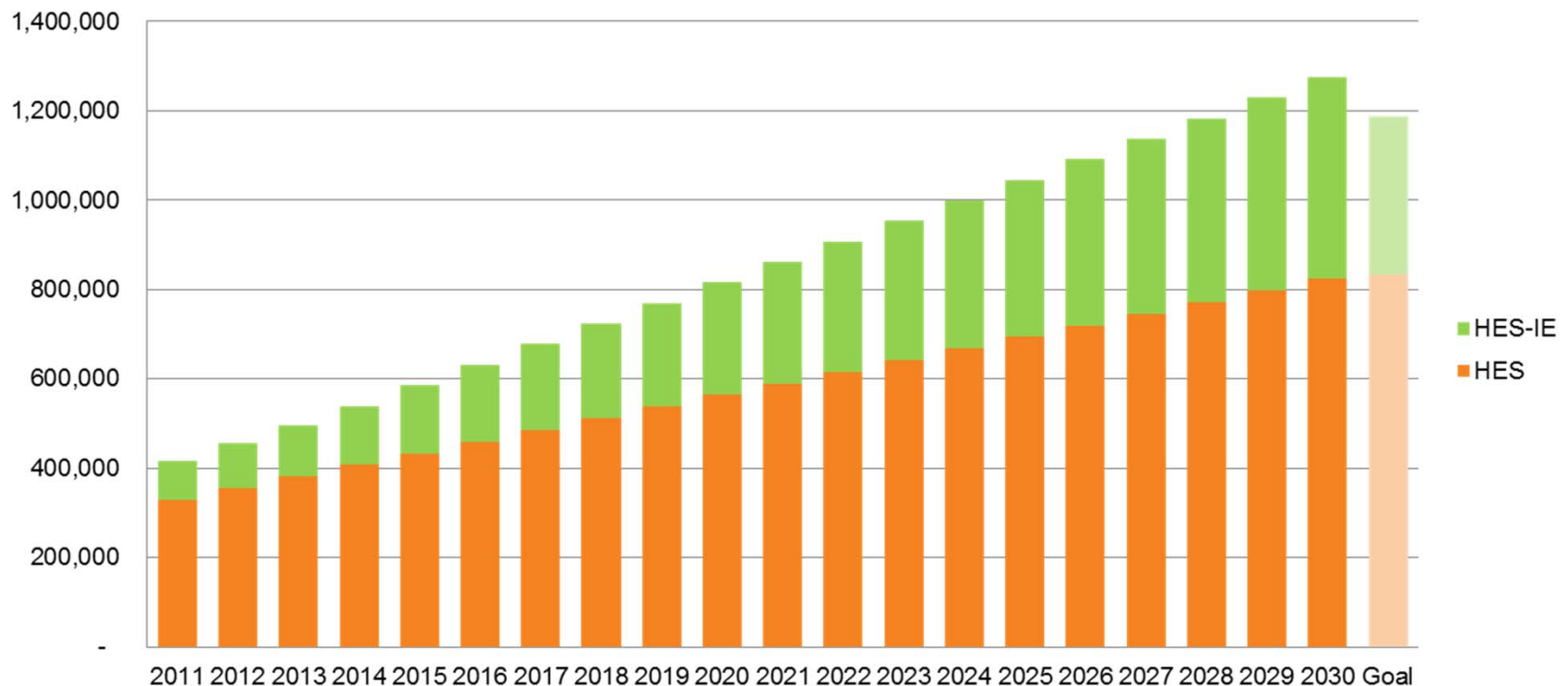
# Scope of the Weatherization Goal

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- 1,400,000 Housing Units
- 32% Renter Occupied
- 81% are 1-4 Units
- Opportunities\*
  - Air sealing - 39% at 9ACH<sub>50</sub> or lower
  - Insufficient insulation in:
    - Above grade walls – 47% are less than R-11
    - Flat Ceilings – 66% are less than R-30
    - Floors above basements – 85% are less than R-13
  - HVAC
    - Central AC average SEER = 11.3; Energy Star = 14.5
    - Average Boiler AFUE = 82%; Energy Star = 85%
    - Average Furnace AFUE = 84%; Energy Star = 95%

# Reaching the 80% Goal

## HES and HES-IE Dwelling Unit Penetration



\*Assuming 29% and 15% of existing non-low income and low-income homes are already weatherized per the draft Weatherization Baseline Assessment dated January 3, 2014

\*\*Using statewide data based on actual program results, unit goals and extrapolated projections from the Utility Companies' filed "2013 – 2015 Electric and Natural Gas Conservation and Load Management Plan"

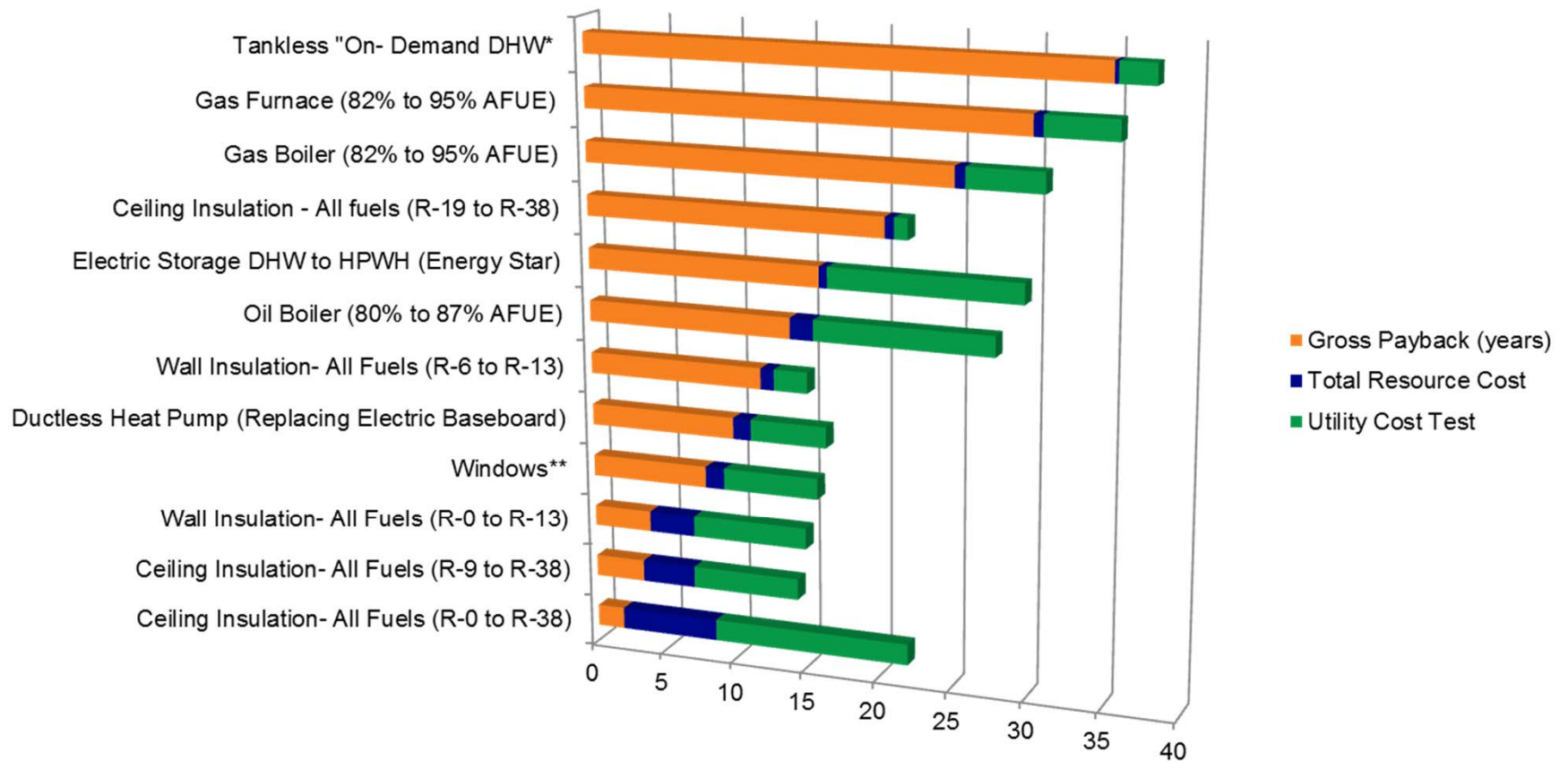
# Reaching Customers

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- Structure:
  - Comprehensive assessment
  - Custom report with payback information
  - Incentives
- Customer decisions are made based on:
  1. Comfort
  2. Health and Safety
  3. Durability & End of Useful Life
  4. Energy Efficiency
  5. Cost
- 2013:
  - \$3.1 million in program incentives leveraged \$15.6 million in customer spending
  - 5% of projects were financed

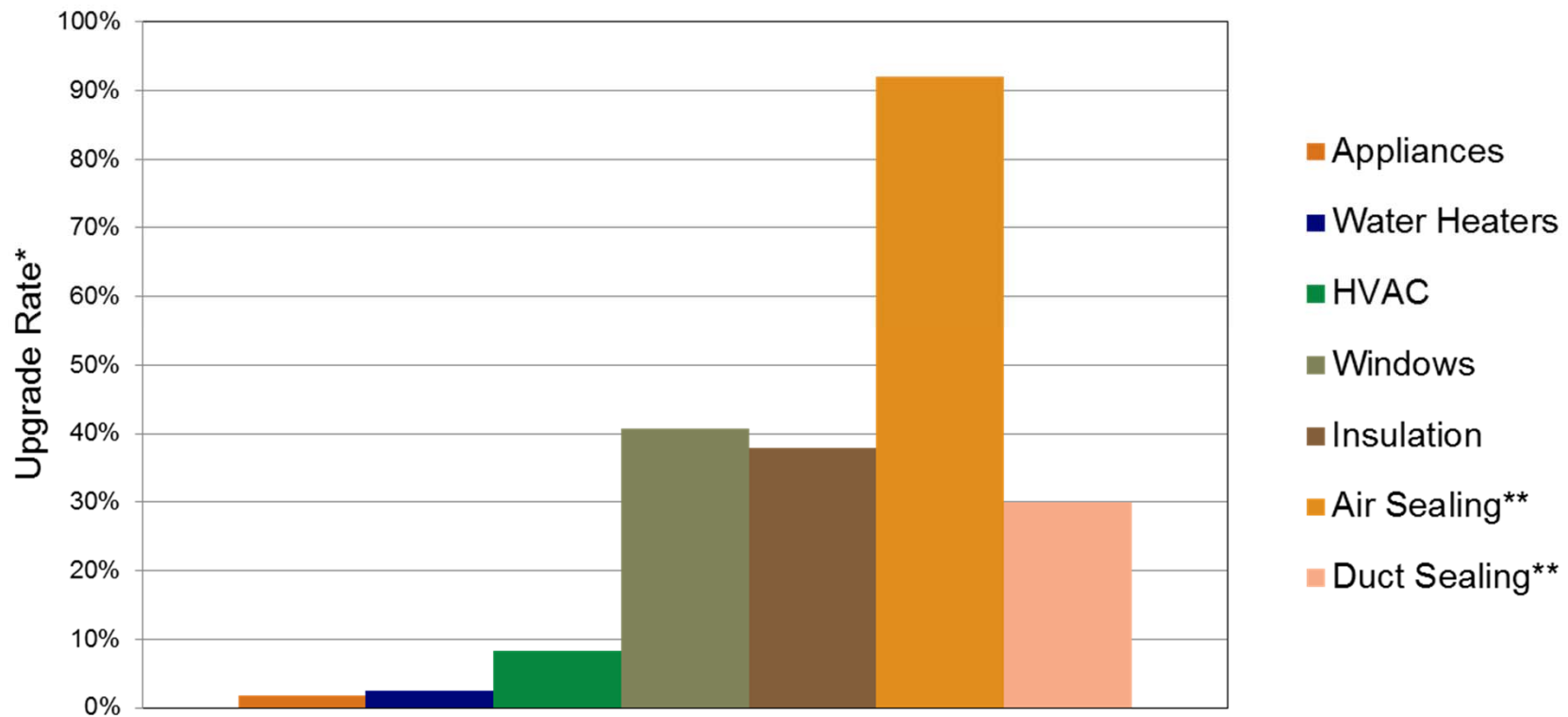


# Driving Deeper Measures



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Upgrade Rates by Measure



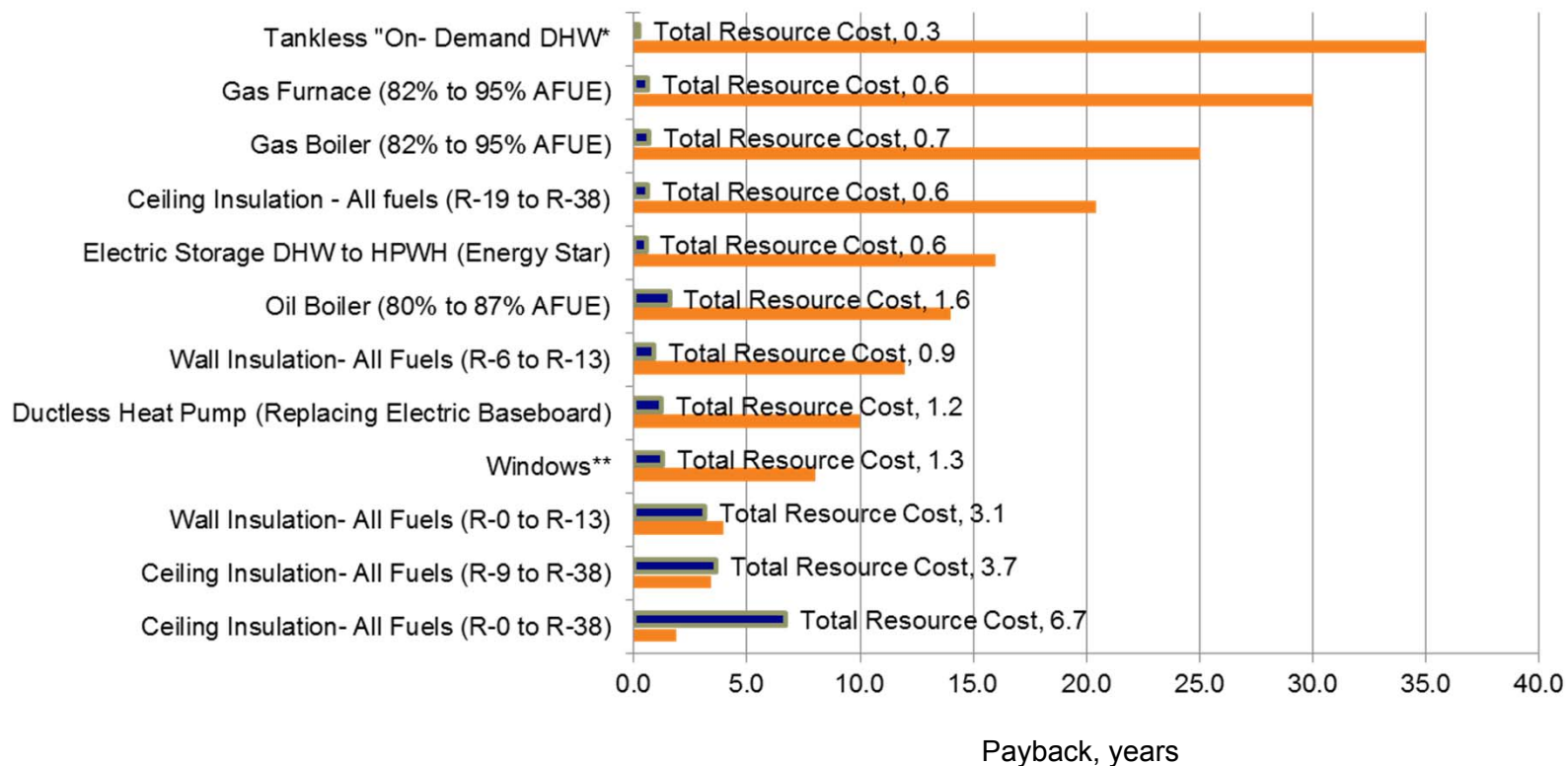
\*Upgrade rate is the number of unique homes redeeming a rebate over the number of unique homes recommended that rebate

\*\*Upgrade rate across all unique homes



# Driving Deeper Measures

Cost Effectiveness by Measure



\*Tankless "On-Demand" DHW (0.62 to 0.82 AFUE, Energy Star)

\*\*Windows (20 windows at 10 sq ft/ window, single pane to Energy Star)