STATE OF RHODE ISLAND
ENERGY EFFICIENCY & RESOURCE MANAGEMENT COUNCIL

MEETING MINUTES: EERMC Retreat

Thursday, June 15th 2017 | 12:00 - 5:00 PM
400 Smith Street, Providence, RI 02908

Attendees: Abigail Anthony, Mike Guerard, Mark Kravatz, Roberta Fagan, Tom Magliocchetti, Diane Williamson, Joe Garlick, Carol Grant, Bob Bacon, Joe Cirillo, Michael McAteer, Betsy Stubblefield Loucks, Shigeru Osada, Anthony Hubbard, Emily Levin, Kate Desrochers, Scudder Parker, Savannah Harik, Carrie Gill, Becca Trietch, Robert Beadle, Jeff Loiter, Rachel Henschel, Kaya Salem, Erika Niedowski, Maya Sosland

Minutes:

No council business was conducted during this informational meeting. However, education was provided on the following topics as described. Please see the PowerPoint presentation at the end of these minutes for further details.

Least-Cost Procurement

Abigail Anthony gave an overview of Least Cost Procurement and the oversight responsibilities of the Council. She explained that the EERMC was established to help Rhode Islanders maximize the benefits of energy efficiency. She also provided a brief history of energy efficiency in Rhode Island, focusing primarily on Rhode Island's Comprehensive Energy Conservation, Efficiency & Affordability Act.

The EERMC Consultant Team then explained the meaning of the phrase: "Invest in all cost-effective energy efficiency less than the cost of supply."

From there, the EERMC members participated in a breakout session where they practiced describing least-cost procurement to non-technical audiences.

Next, the councilors watched a short video from National Grid that described what is involved in a residential energy assessment.

Planning Cycle

The EERMC consultant team described the energy efficiency program planning cycle. They noted that the Least Cost Procurement Standards provide the deadlines and process for the utility. This Standards document is reviewed, and when appropriate, updated every three years at the same time when the Targets are filed. The process currently consists of the following documents being filed at the Public Utilities Commission (PUC) at the time intervals indicated:

- Targets & Standards: filed every three years by the EERMC (the Targets are not legally binding, but they act as guideposts for the energy efficiency program plans regarding the achievable energy savings potential)
- Three-Year Energy Efficiency Program Plans: filed every three years by National Grid (the first Three-Year Plan was filed in 2012)

- Annual Energy Efficiency Program Plans: filed every year by National Grid (due on Oct 15th to the PUC except years when a three-year plan is due. The due date is extended to Nov 1st during Three-Year Plan years)
- System Reliability Plans (SRPs): Both annual and three-year plans are filed by National Grid. (These filings follow the same schedule as the energy efficiency program plans)

In addition, the EERMC is required to write a cost-effectiveness memo to the PUC after every annual and three-year energy efficiency program plan. Each memo is due 14 days past a plan's filing.

Lastly, the consultant team described how the Collaborative participates in the development of National Grid's filings, how the System Benefit Charge (SBC) rate is set on annual basis based on the Annual Energy Efficiency Program Plans and how overall portfolios are required to be cost-effective.

Energy Efficiency Analytical Framework

Mark Kravatz from the EERMC consultant team, gave an overview of the analyses used to verify the cost-effectiveness of energy efficiency procurement in Rhode Island. He discussed the Rhode Island Test, custom versus deemed approaches for determining measure savings, the three large categories of evaluation studies (impact evaluations, process evaluations and market evaluations), and the avoided cost study, co-funded by a group of New England states. This part of the retreat showcased the science-based, highly analytical processes in place to verify Rhode Island's energy efficiency savings and their cost-effectiveness.

SRP was also touched upon. However, council members were encouraged to read more about SRP by reading the Standards document provided on flash drives.

Beyond EE: Special Considerations

Emily Levin from the EERMC consultant team presented on the topic of cost-efficiency. She highlighted the different options for program design including upstream incentives, financing options and direct customer incentives. She also discussed the overall goal of market transformation via codes and standards enhancements, program pilots, and research and development. Lastly, she described how utility performance incentive structures and on-going comparisons with peer programs can help sustain Rhode Island's national leadership in energy efficiency.

Scudder Parker, also with the EERMC consultant team, then presented the topic of equity. He described how program design, market transformation goals, and performance incentive structures can help energy efficiency programs to better support hard-to-reach sectors.

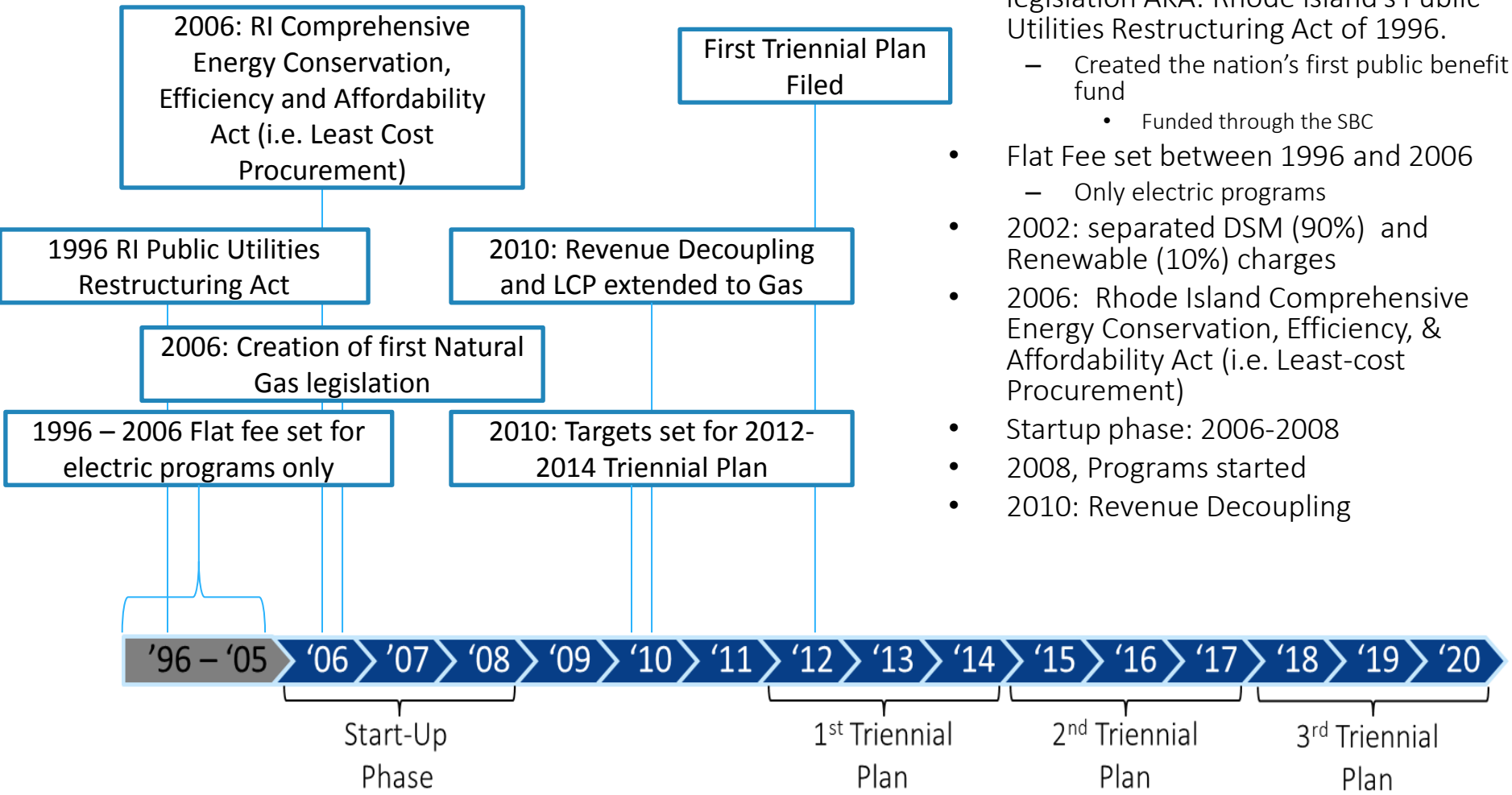
Lastly, Nicholas Ucci from the Rhode Island Office of Energy Resources (OER), provided an overview of current state energy policies related to energy efficiency. He specifically discussed the lens through which OER views energy efficiency programs. This lens focuses on clean energy (specifically carbon reductions), affordability (specifically the impacts on consumers), and system reliability. He also described broader economic, energy and environmental goals described in Executive Orders 15-17 and 17-06, the Resilient RI Act, Least-Cost Procurement legislation and on-going Power Sector Transformation efforts.

STATE OF RHODE ISLAND
ENERGY EFFICIENCY & RESOURCE MANAGEMENT COUNCIL

Rhode Island Least-Cost Procurement

Presented By: Abigail Anthony, Ph.D.; Acadia Center

Timeline & Key Milestones: Least-Cost Procurement



- 1996 RI enacted electric restructuring legislation AKA: Rhode island's Public Utilities Restructuring Act of 1996.
  - Created the nation's first public benefit fund
    - Funded through the SBC
- Flat Fee set between 1996 and 2006
  - Only electric programs
- 2002: separated DSM (90%) and Renewable (10%) charges
- 2006: Rhode Island Comprehensive Energy Conservation, Efficiency, & Affordability Act (i.e. Least-cost Procurement)
- Startup phase: 2006-2008
- 2008, Programs started
- 2010: Revenue Decoupling

2006 Rhode Island Comprehensive Energy Conservation, Efficiency, & Affordability Act

- Primary Goals
  - Establish a new economic model for efficiency investment
  - Establish a stakeholder oversight council
  - Distribution utility to submit successive annual 3-year EE procurement plans

- Key Amendments
  - Utility's financial incentives are aligned with customer interests (decoupling)
  - Providing clear directions to regulators to approve funding for cost-effective energy efficiency
  - Including natural gas in the state's LCP mandate
  - Regulatory review and approval of energy savings targets for cost-effective energy efficiency

Definition: Least-Cost Procurement (LCP)

- Definition: Invest in all cost-effective energy efficiency less than the cost of supply.
- Highlights:
  - Replaced a system that invested in set statutorily-mandated amount of energy efficiency
  - Least Cost Procurement is based on economics, flexible to changing market conditions, and designed to maximize consumer benefit.

Definition: Least-Cost Procurement

- Invest in **all** cost-effective energy efficiency less than the cost of supply.

- <u>Definition of "all"</u>:
  - Achievable cost-effective energy efficiency savings potential that is 'prudent and reliable.'
    - initially based on the 2010 KEMA Potential Study.
      - » Study covers 2011-2020

Definition: Least-Cost Procurement

- Invest in all **cost-effective energy efficiency** less than the cost of supply.

- Definition of "cost-effective energy efficiency":
  - A set of energy efficiency measures and programs that delivers measurable cost-effective savings that create quantifiable benefits that surpass costs.

Least-Cost Procurement

- Invest in all cost-effective energy efficiency less than the **cost of supply**.

- <u>Definition of "cost of supply":</u>
  - Based on the Residential Standard Offer Charge.

Value Proposition: Least-Cost Procurement

Benefits of the Rhode Island Energy Efficiency Programs

Acadia Center

Since 2008, Rhode Island has invested $569 million in energy efficiency and consumers have realized $2.3 billion in economic benefits.

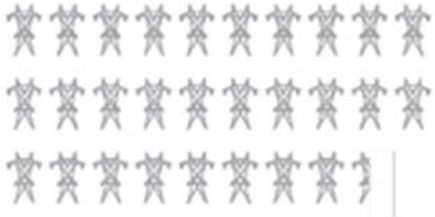
Efficiency Policies and Programs.

GHG Reduction
Will avoid 7 million metric tons from investments since 2006.

In 2016, 923 firms were involved in delivering Rhode Island's energy efficiency programs, with 82% of those companies located in Rhode Island.

The state's energy efficiency investment since 2008 will create over 23,000 job-years of employment economy-wide and add $2.3 billion to Gross State Product.

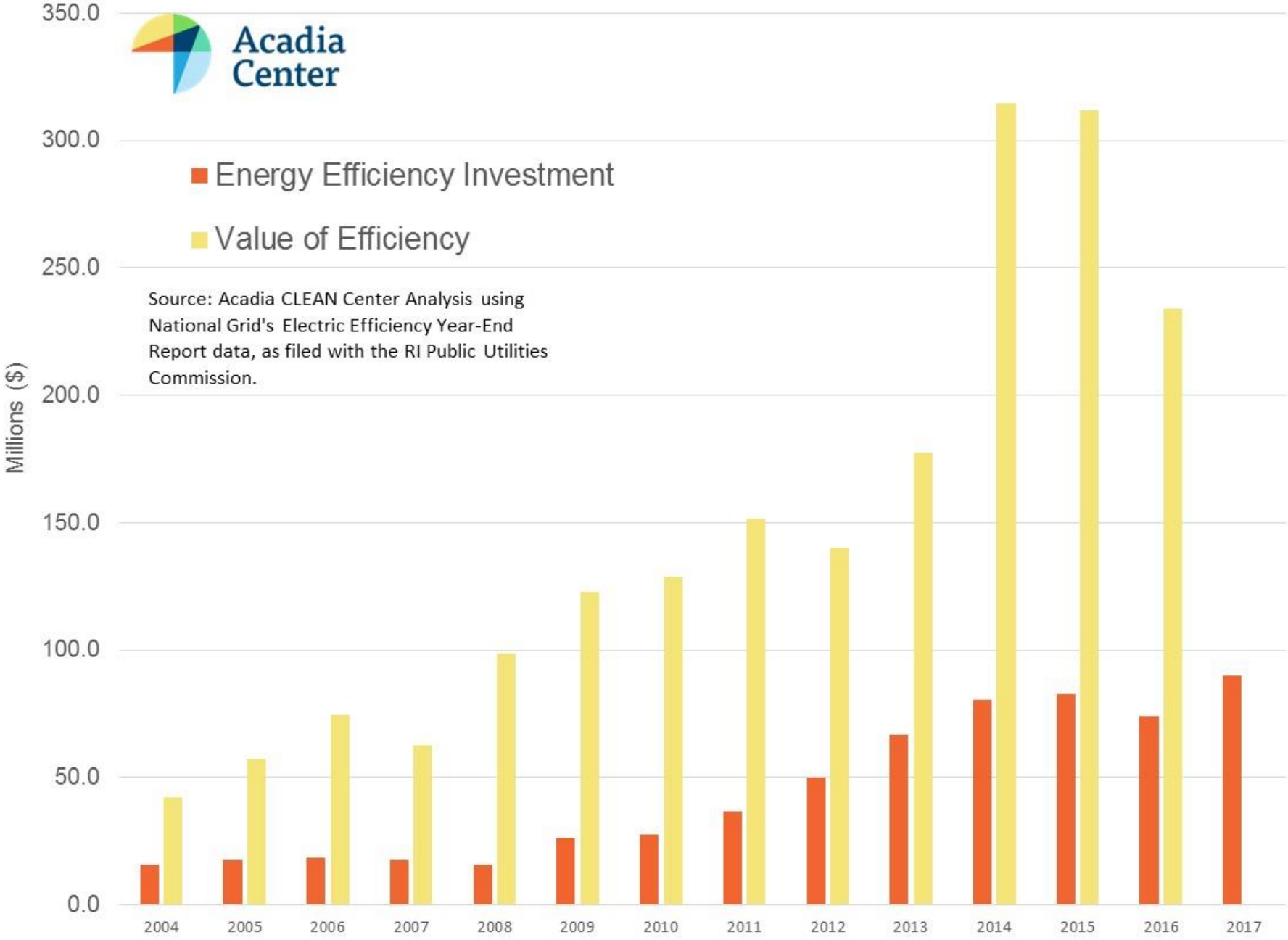
ENERGY SAVINGS

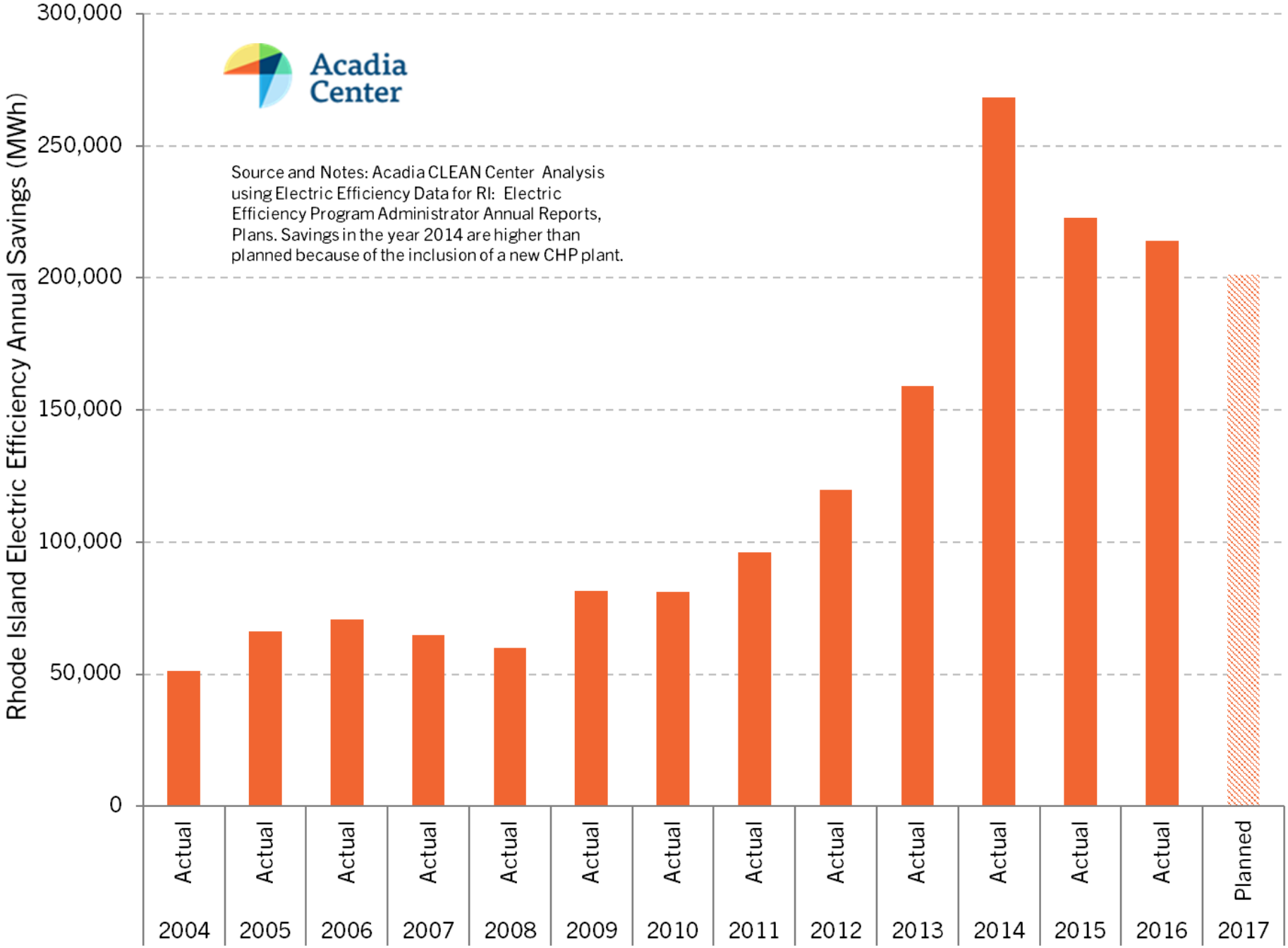


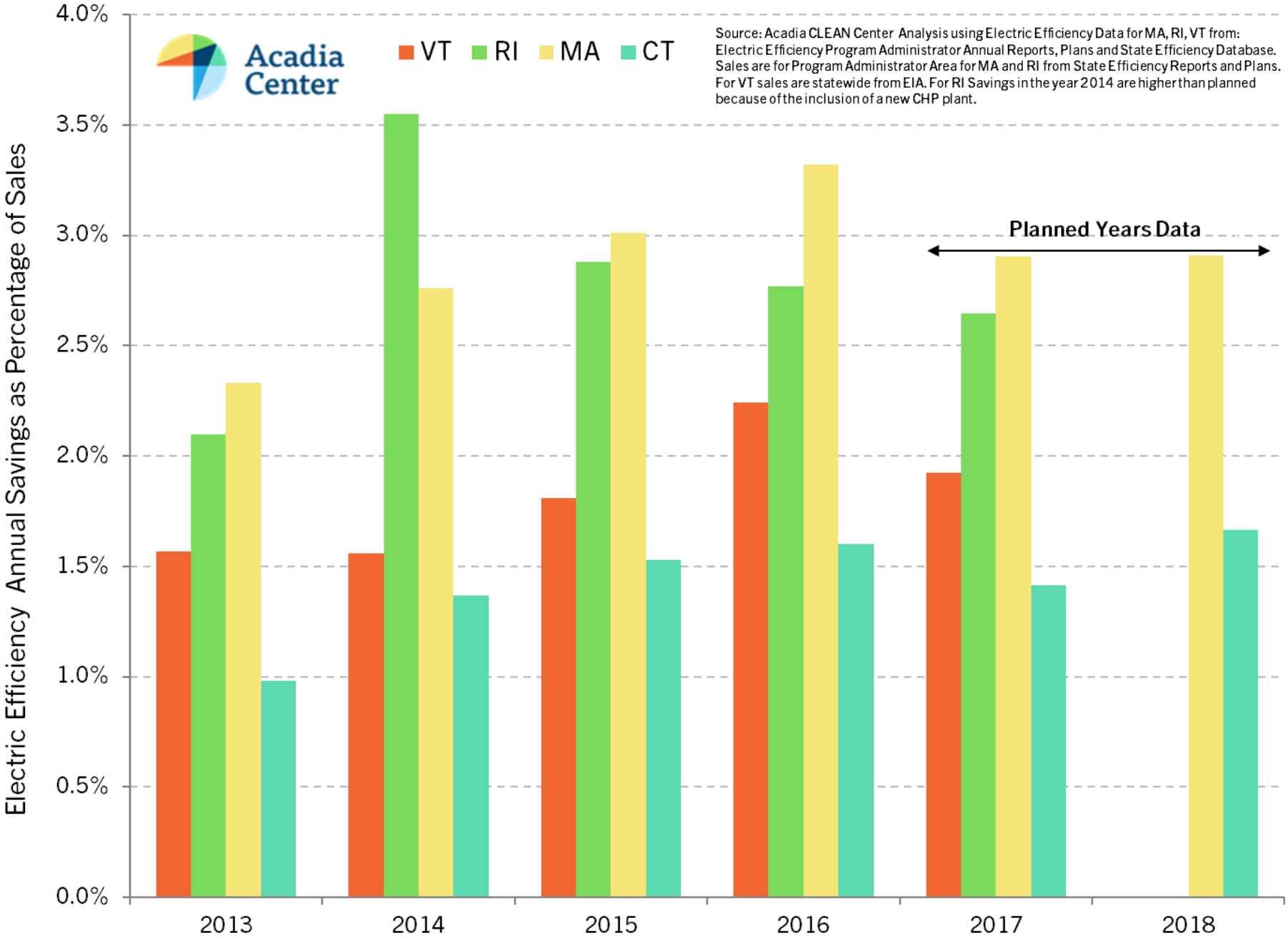
1,301,132 MWh of total electricity savings.

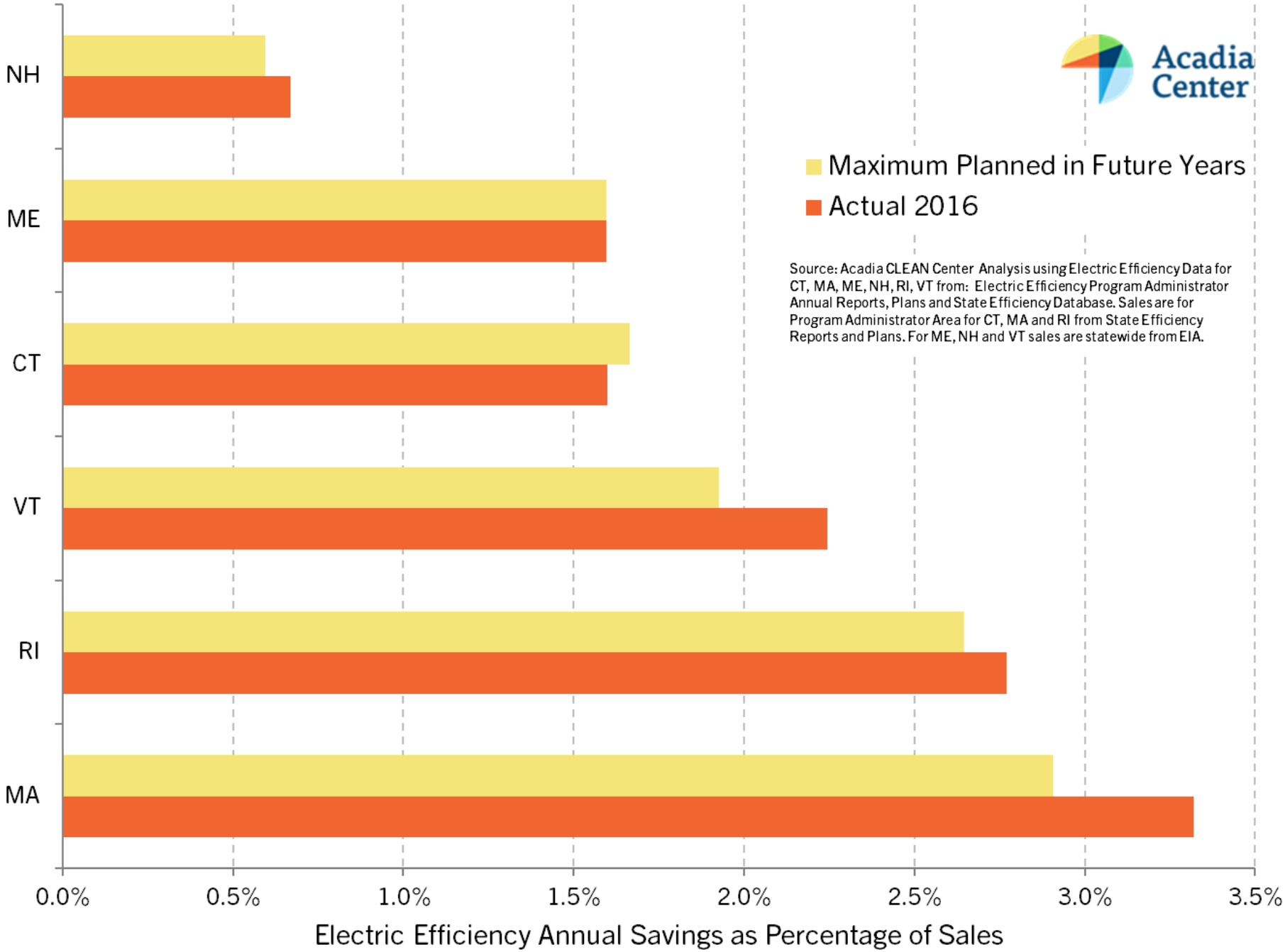
2,465,998 MMBTU of total natural gas savings.

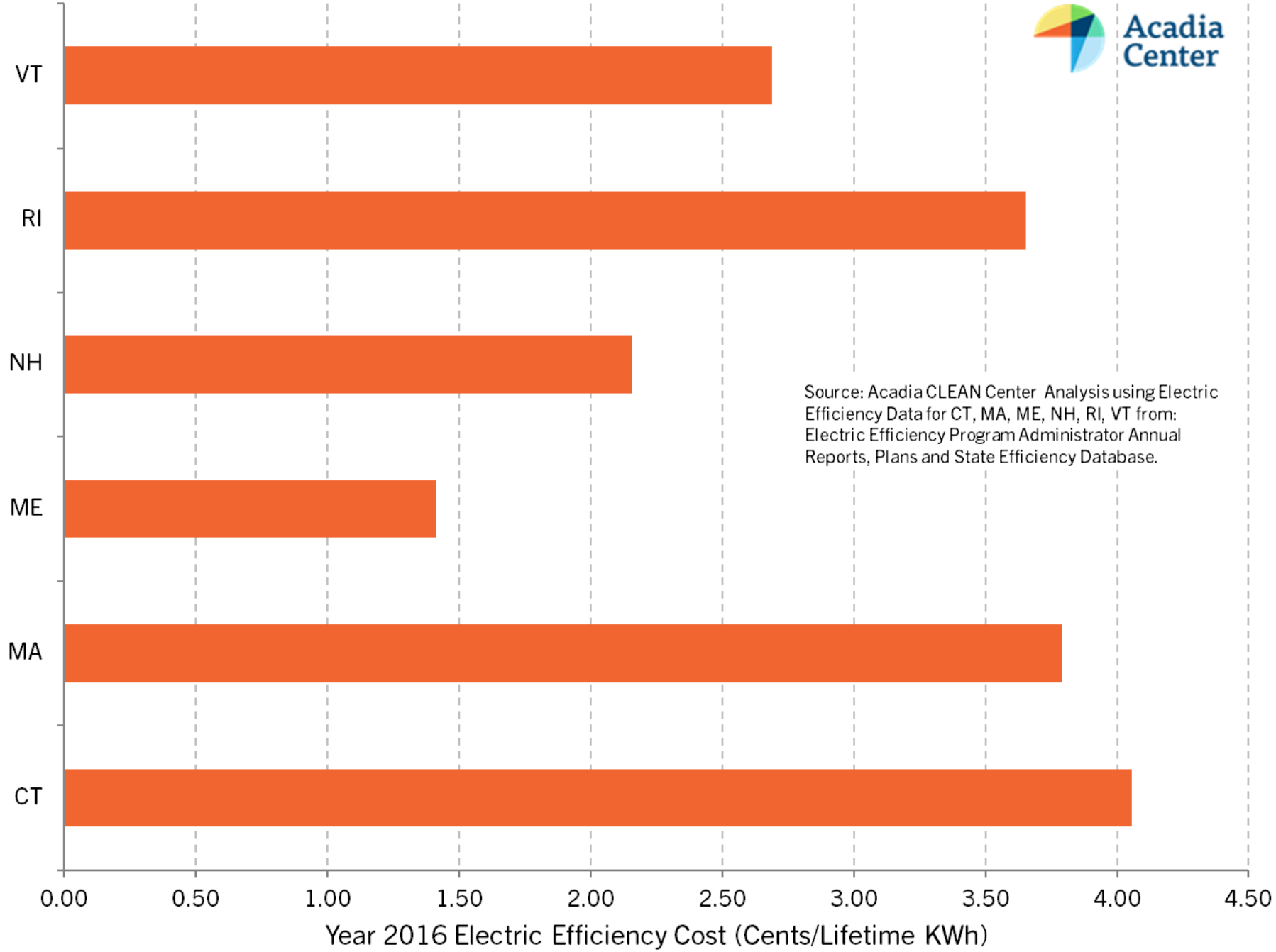
In 2016, 702 full-time equivalent jobs were directly related to the delivery of the state's energy efficiency programs.


Acadia Center
Energy Efficiency Investment
Value of Efficiency
Source: Acadia CLEAN Center Analysis using National Grid's Electric Efficiency Year-End Report data, as filed with the RI Public Utilities Commission.
Millions ($)
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

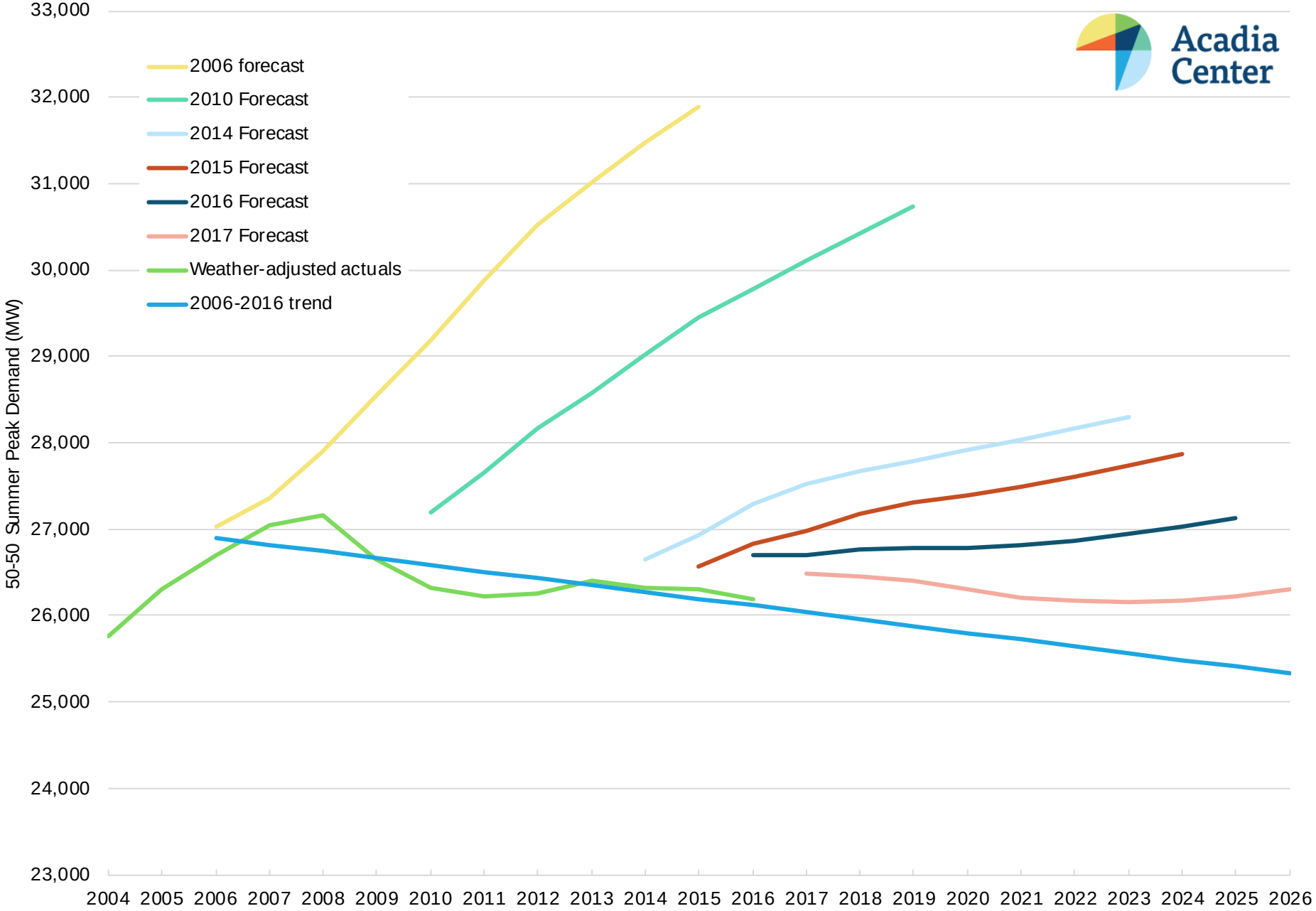

Acadia Center
Source and Notes: Acadia CLEAN Center Analysis using Electric Efficiency Data for RI: Electric Efficiency Program Administrator Annual Reports, Plans. Savings in the year 2014 are higher than planned because of the inclusion of a new CHP plant.
Rhode Island Electric Efficiency Annual Savings (MWh)
300,000
250,000
200,000
150,000
100,000
50,000
0
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Actual
Planned
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017

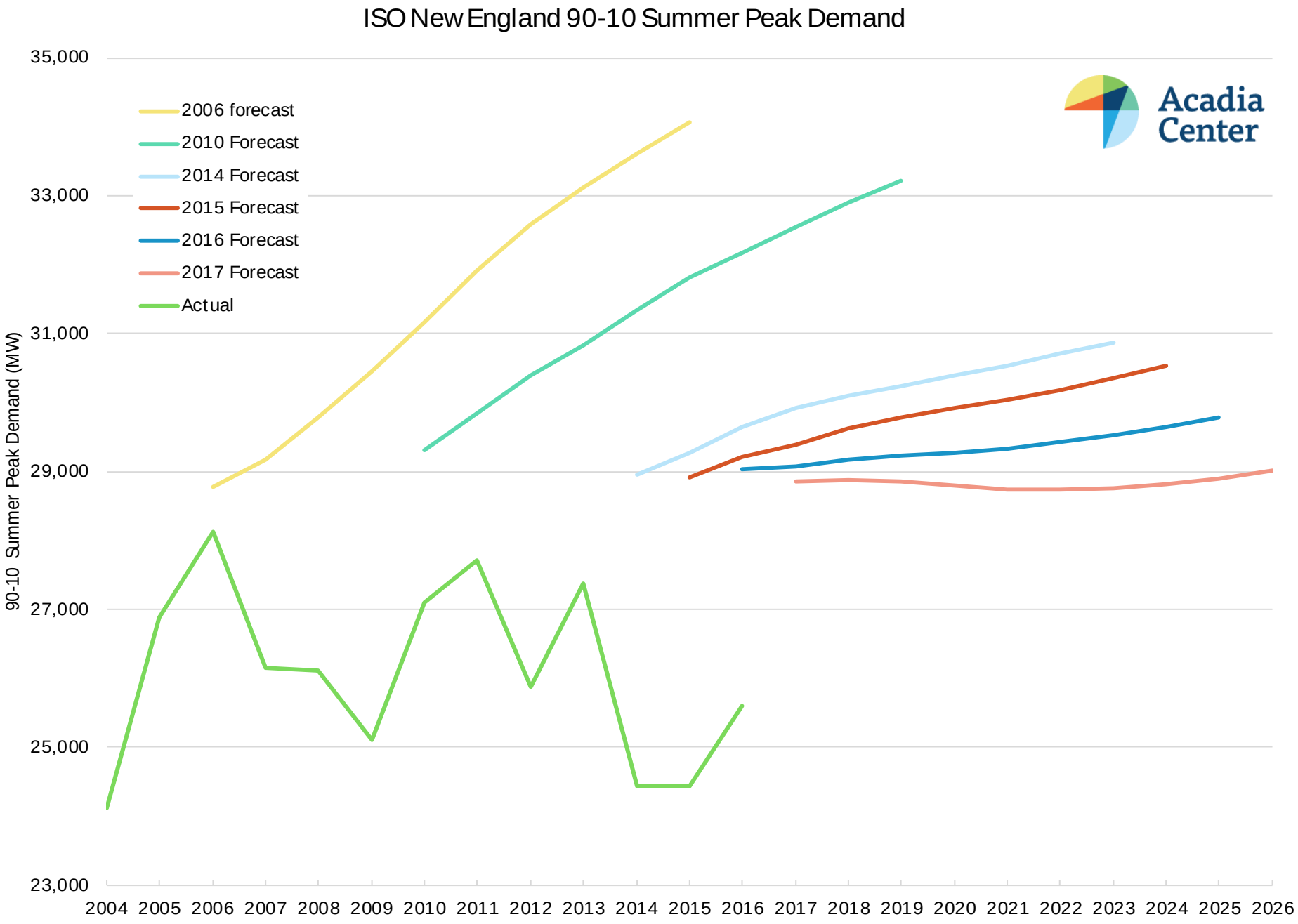

Acadia Center
VT
RI
MA
CT
Source: Acadia CLEAN Center Analysis using Electric Efficiency Data for MA, RI, VT from: Electric Efficiency Program Administrator Annual Reports, Plans and State Efficiency Database. Sales are for Program Administrator Area for MA and RI from State Efficiency Reports and Plans. For VT sales are statewide from EIA. For RI Savings in the year 2014 are higher than planned because of the inclusion of a new CHP plant.
Planned Years Data
Electric Efficiency Annual Savings as Percentage of Sales
4.0%
3.5%
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
2013
2014
2015
2016
2017
2018


Acadia Center
Maximum Planned in Future Years
Actual 2016
Source: Acadia CLEAN Center Analysis using Electric Efficiency Data for CT, MA, ME, NH, RI, VT from: Electric Efficiency Program Administrator Annual Reports, Plans and State Efficiency Database. Sales are for Program Administrator Area for CT, MA and RI from State Efficiency Reports and Plans. For ME, NH and VT sales are statewide from EIA.
NH
ME
CT
VT
RI
MA
0.0%
0.5%
1.0%
1.5%
2.0%
2.5%
3.0%
3.5%
Electric Efficiency Annual Savings as Percentage of Sales


Acadia Center
VT
RI
NH
ME
MA
CT
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
Year 2016 Electric Efficiency Cost (Cents/Lifetime KWh)
Source: Acadia CLEAN Center Analysis using Electric Efficiency Data for CT, MA, ME, NH, RI, VT from: Electric Efficiency Program Administrator Annual Reports, Plans and State Efficiency Database.

ISO New England 50-50 Summer Peak Demand




ISO New England 90-10 Summer Peak Demand
90-10 Summer Peak Demand (MW)
35,000
33,000
31,000
29,000
27,000
25,000
23,000
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2006 forecast
2010 Forecast
2014 Forecast
2015 Forecast
2016 Forecast
2017 Forecast
Actual
Acadia Center

ACEEE Ranking

- ACEEE State Energy Efficiency Scorecard
- Started in 2006
- Aims to provides an annual the progress of state energy efficiency policies
- Examines 6 Policy Areas:
  - Utility and public benefits programs and policies
  - Transportation policies
  - Building energy codes and compliance
  - Combined heat and power (CHP) policies
  - State government led initiatives around energy efficiency
  - Appliance and equipment standards

Leadership: Least Cost Procurement

- More than 25 states have adopted and fully funded an Energy Efficiency Resource Standard (EERS)
- All of the states require that programs are cost-effective

States with *All* Cost-effective Energy Efficiency Requirements

- California
- Connecticut
- Maine
- Massachusetts
- Rhode Island
- Vermont
- Washington

Figure 1. States with EERS policies in place as of April 2014. *Source*: ACEEE (2014).

ACTIVITY

Group Discussion

- Directions
  - Break up into groups
  - Assign a group facilitator and note taker
  - Choose one or more questions to discuss.
  - Take notes on large sticky notes.
  - Team reports out highlights of the discussion to the larger group

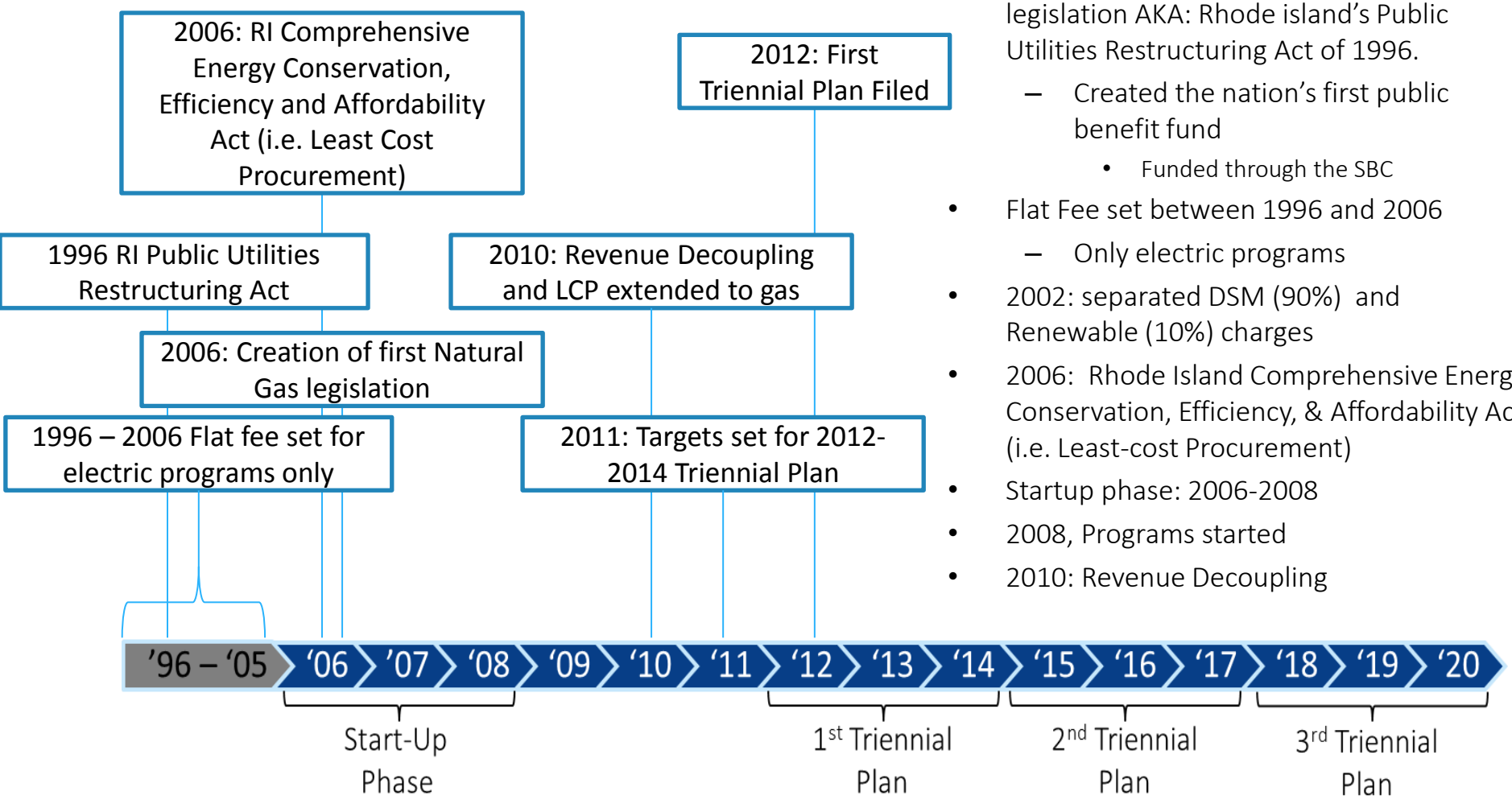
Questions

- How would you explain LCP?
- What contributions has LCP made to RI?
- What were the reasons for creating LCP legislation?
- What are the similarities and differences between RI EE legislation before LCP and after LCP (2006)?
- Explain ways in which LCP has impacted individual RI households and businesses.
- Explain ways in which LCP has made an impact on Rhode Island's energy savings.

STATE OF RHODE ISLAND
ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL

Energy Efficiency Program Planning & Cost-effectiveness Analytical Components

Least-Cost Procurement: Timeline & Key Milestones



- 1996 RI enacted electric restructuring legislation AKA: Rhode island's Public Utilities Restructuring Act of 1996.
  - Created the nation's first public benefit fund
    - Funded through the SBC
- Flat Fee set between 1996 and 2006
  - Only electric programs
- 2002: separated DSM (90%) and Renewable (10%) charges
- 2006: Rhode Island Comprehensive Energy Conservation, Efficiency, & Affordability Act (i.e. Least-cost Procurement)
- Startup phase: 2006-2008
- 2008, Programs started
- 2010: Revenue Decoupling

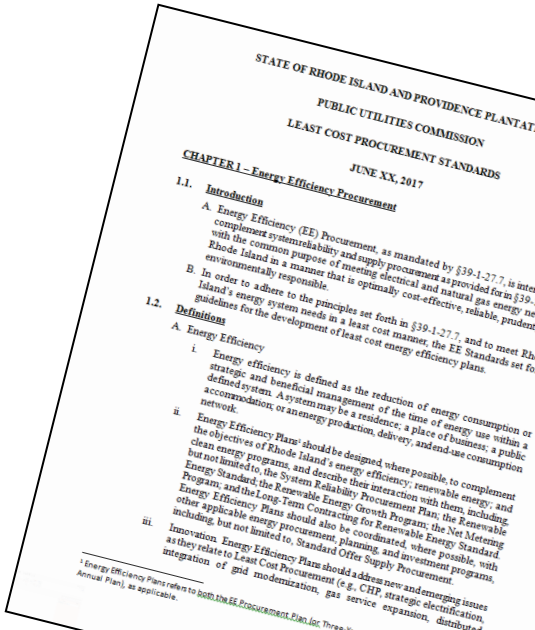
Least Cost Procurement Standards

- About: The Standards are guidelines for least cost energy efficiency plans.
- Last updated: June, 2017
- Prescribed guidelines for:

Three-Year Plans

Annual Plans

System Reliability Plans



STATE OF RHODE ISLAND AND PROVIDENCE PLANTAT

PUBLIC UTILITIES COMMISSION

LEAST COST PROCUREMENT STANDARDS

JUNE XX, 2017

CHAPTER 1 – Energy Efficiency Procurement

1.1. Introduction

A. Energy Efficiency (EE) Procurement, as mandated by §39-1-27.7, is inte
complement systemreliability and supply procurement as provided for in §39-
with the common purpose of meeting electrical and natural gas energy ne
Rhode Island in a manner that is optimally cost-effective, reliable, prudent
environmentally responsible.

B. In order to adhere to the principles set forth in §39-1-27.7, and to meet Rh
Island's energy system needs in a least cost manner, the EE Standards set fo
guidelines for the development of least cost energy efficiency plans.

1.2. Definitions

A. Energy Efficiency

i. Energy efficiency is defined as the reduction of energy consumption or
strategic and beneficial management of the time of energy use within a
defined system. A system may be a residence; a place of business; a public
accommodation; or an energy production, delivery, and end-use consumption
network.

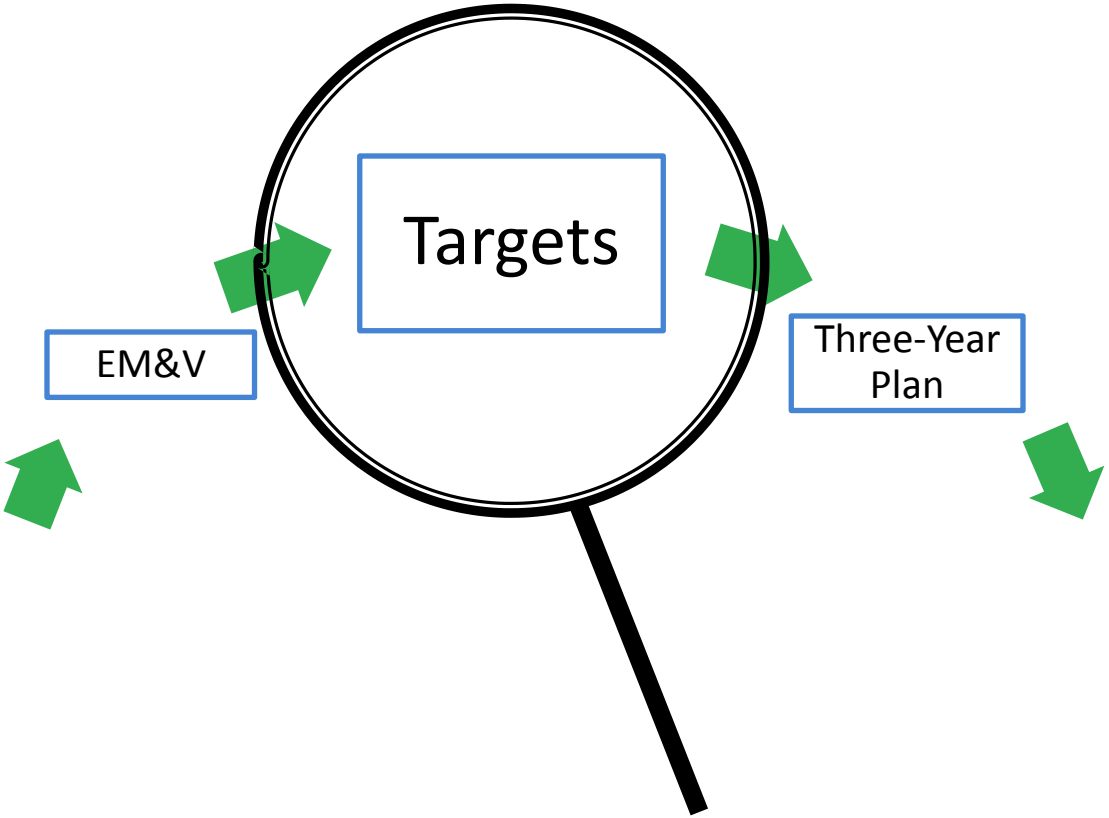
ii. Energy Efficiency Plans[1] should be designed where possible, to complement
the objectives of Rhode Island's energy efficiency; renewable energy; and
clean energy programs, and describe their interaction with them, including,
but not limited to, the System Reliability Procurement Plan; the Renewable
Energy Standard; the Renewable Energy Growth Program; the Net Metering
Program; and the Long-Term Contracting for Renewable Energy Standard.
Energy Efficiency Plans should also be coordinated, where possible, with
other applicable energy procurement, planning, and investment programs,
including, but not limited to, Standard Offer Supply Procurement.

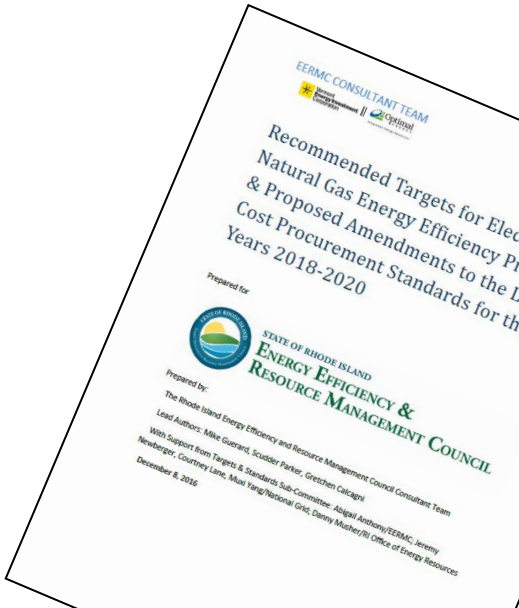
iii. Innovation. Energy Efficiency Plans should address new and emerging issues
as they relate to Least Cost Procurement (e.g., CHP, strategic electrification,
integration of grid modernization, gas service expansion, distribut

1 Energy Efficiency Plans refers to both the EE Procurement Plan (or Three-
Annual Plan), as applicable.

The Three-Year Planning Process At a Glance

Setting Energy Savings Targets




EERMC CONSULTANT TEAM

Recommended Targets for Elec
Natural Gas Energy Efficiency Pr
& Proposed Amendments to the L
Cost Procurement Standards for th
Years 2018-2020

Prepared for

STATE OF RHODE ISLAND
ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL

Prepared by:

The Rhode Island Energy Efficiency and Resource Management Council Consultant Team

Lead Authors: Mike Guerard, Scudder Parker, Gretchen Calcagni

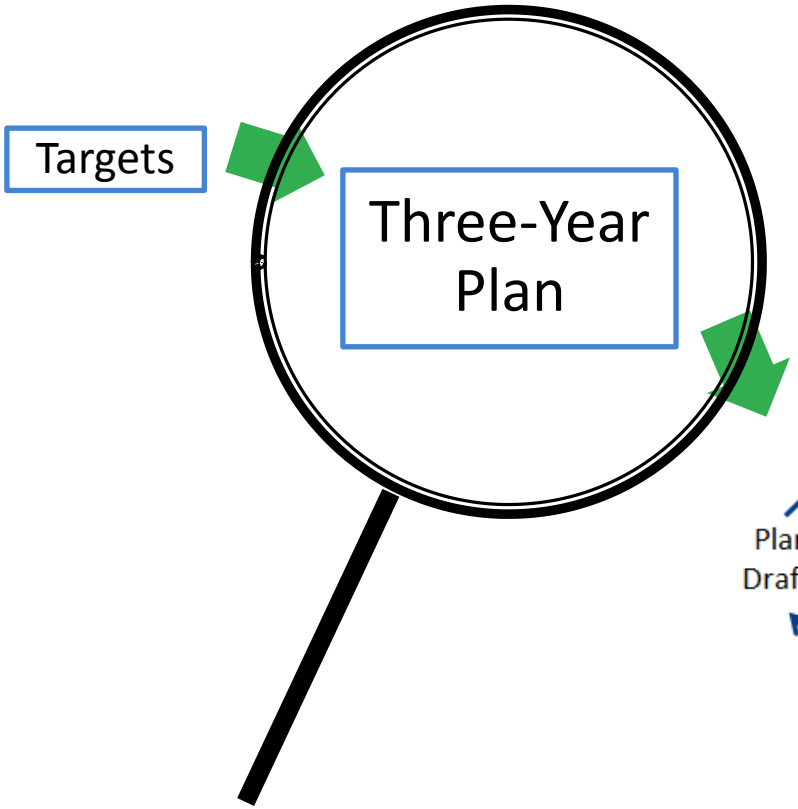
With Support from Targets & Standards Sub-Committee: Abigail Anthony/EERMC; Jeremy Newberger; Courtney Lamb; Muai Yang/National Grid; Danny Musher/RI Office of Energy Resources

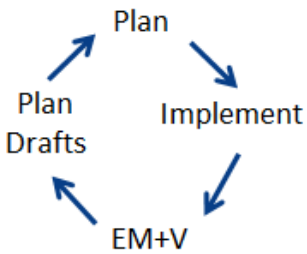
December 8, 2016

Setting Energy Savings Targets

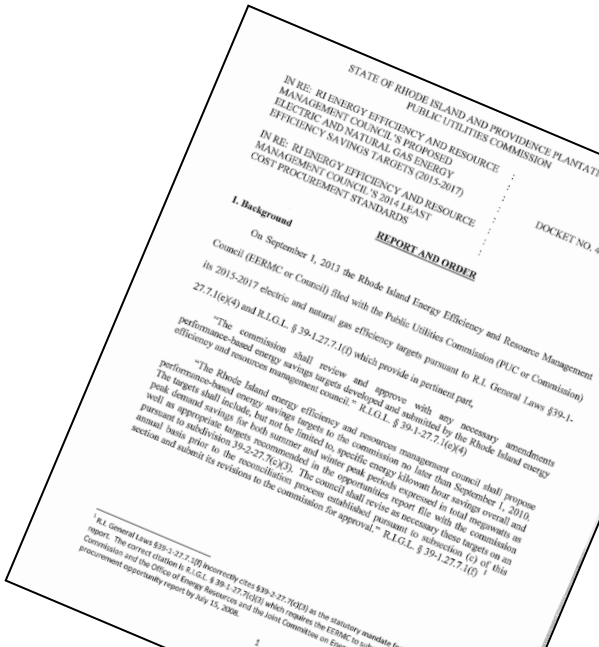
- First step of the 3-year planning process.
- EERMC responsible for drafting and filing with the PUC
  - Works closely with N-Grid, OER, and Collaborative.
- Targets are set on a triennial basis and are completed a year in advance of a completed 3-year plan.
- Targets cost-effective potential and proposes energy savings targets for PUC consideration.
- Targets are developed to serve as guideposts as the utility develops its 3-Year Plan and more detailed Annual Plans.

The Three-Year Plan





- **Three-Year Plans**
- Annual Plans
- System Reliability Plans



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATI

IN RE: RI ENERGY EFFICIENCY AND RESOURCE MANAGEMENT COUNCIL'S PROPOSED ELECTRIC AND NATURAL GAS ENERGY EFFICIENCY SAVINGS TARGETS (2015-2017)

IN RE: RI ENERGY EFFICIENCY AND RESOURCE MANAGEMENT COUNCIL'S 2014 LEAST COST PROCUREMENT STANDARDS

PUBLIC UTILITIES COMMISSION

DOCKET NO.

REPORT AND ORDER

I. Background

On September 1, 2013 the Rhode Island Energy Efficiency and Resource Management Council (EERMC or Council) filed with the Public Utilities Commission (PUC or Commission) its 2015-2017 electric and natural gas efficiency targets pursuant to R.I. General Laws §39-1-27.7.1(e)(4) and R.I.G.L. § 39-1-27.7.1(f) which provide in pertinent part,

"The commission shall review and approve with any necessary amendments performance-based energy savings targets developed and submitted by the Rhode Island energy efficiency and resources management council." R.I.G.L. § 39-1-27.7.1(e)(4)

"The Rhode Island energy efficiency and resources management council shall propose performance-based energy savings targets to the commission no later than September 1, 2010. The targets shall include, but not be limited to the specific energy kilowatt hour savings overall and peak demand savings for both summer and winter peak periods expressed as total megawatts as well as appropriate targets recommended in the opportunities report file with the commission pursuant to subdivision 39-2-27.7(c)(3). The council shall revise as necessary these targets on an annual basis prior to the reconciliation process established pursuant to subsection (e) of this section and submit its revisions to the commission for approval." R.I.G.L. § 39-1-27.7.1(f) [1]

[1] R.I. General Laws §39-1-27.7.1(f) incorrectly cites §39-2-27.7(c)(3) as the statutory mandate f
report. The correct citation is R.I.G.L. § 39-1-27.7(c)(3) which requires the EERMC to sub
Commission and the Office of Energy Resources and the Joint Committee on Ener
procurement opportunity report by July 15, 2008.

The Three-Year Plan

- Due Triennially on September 1st.
- N-Grid is responsible for drafting and filing.
  - N-Grid Works closely with EERMC, C-Team, OER, and the Collaborative to draft the Plan.
- Primary Sections of the Plan:

Strategies & Approaches to Planning

Cost-Effectiveness

Prudence & Reliability

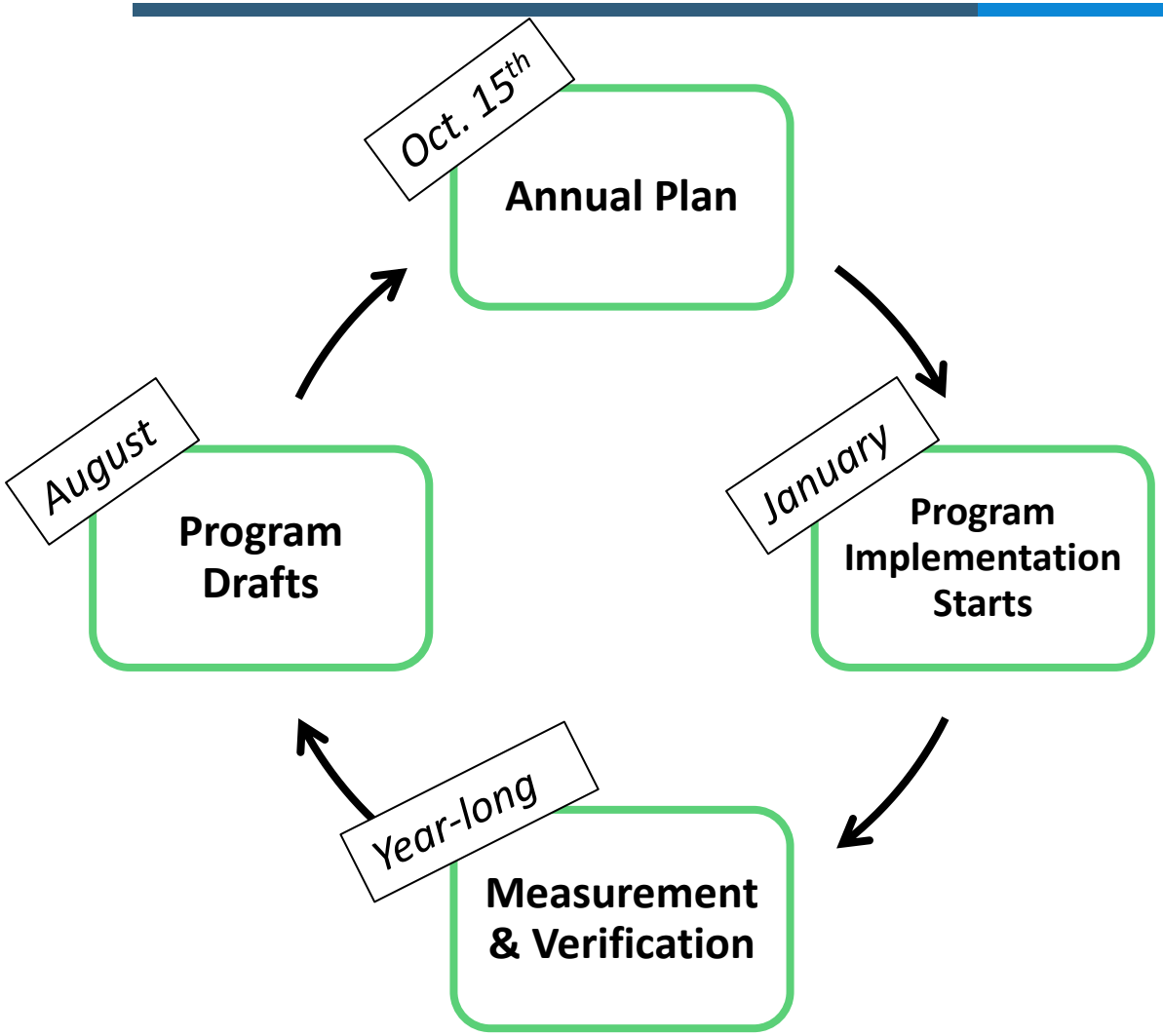
Funding Plan and Savings Targets

Performance Incentive Plan

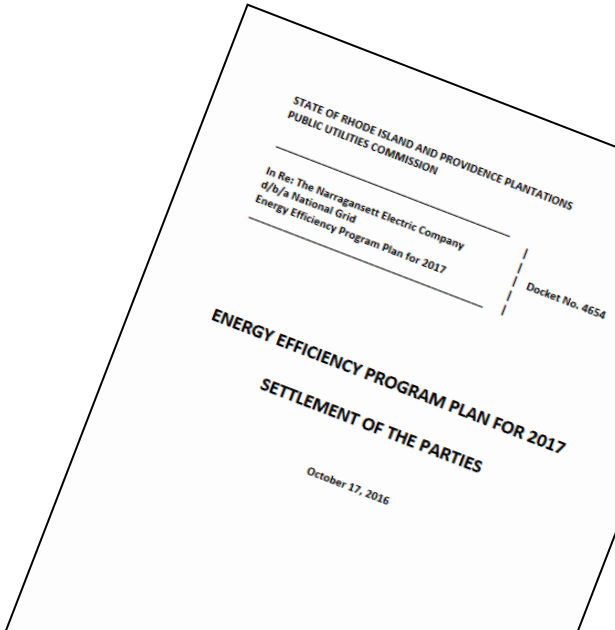
Factors that Inform the Three-Year Plan

- Targets
- The Rhode Island Benefit-Cost Test (aka: The RI Test) – at a higher level.
- Program evaluations and pilots
- Evolving markets
- New and/ or improved technologies
- State policy objectives

The Annual Planning Process At a Glance



- Three-Year Plans
- **Annual Plans**
- System Reliability Plans



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS
PUBLIC UTILITIES COMMISSION

In Re: The Narragansett Electric Company d/b/a National Grid Energy Efficiency Program Plan for 2017

Docket No. 4654

ENERGY EFFICIENCY PROGRAM PLAN FOR 2017

SETTLEMENT OF THE PARTIES

October 17, 2016

The Annual Plan

- Due on October 15th*
- National Grid responsible for drafting and filing.
  - Works closely with EERMC, C-Team, OER, and Collaborative.
- Primary Sections of the plan:

Final Funding Plan and Budget Amounts, Cost-Effectiveness, and Goals

Program Descriptions

Monitoring & Evaluation Plan

Reporting Requirements

Performance Incentive Plan

* Due Nov. 1st when falling on a Three-year planning year.

The Collaborative

- The Collaborative has been meeting regularly since 1991 to analyze and inform the National Grid's electric and gas energy efficiency program planning processes including the Annual and Three-year Plans.
- Members presently include National Grid, the Division, PP&L, TEC-RI, Acadia Center, and other stakeholders.
- In addition, the OER and several EERMC members and representatives from the EERMC's Consulting Team participate in the Collaborative group.

The Role of the EERMC

- The Role of the EERMC for the three year and annual planning process:
  - Review/ provide Input on Plan drafts
  - Work with C-team to understand key topics/ issues
  - Develop and submit cost-effectiveness memo to the PUC
  - Sign on to the “Settlement of the Parties” (i.e. The Plan)

Key Factors that Inform the Annual Plan

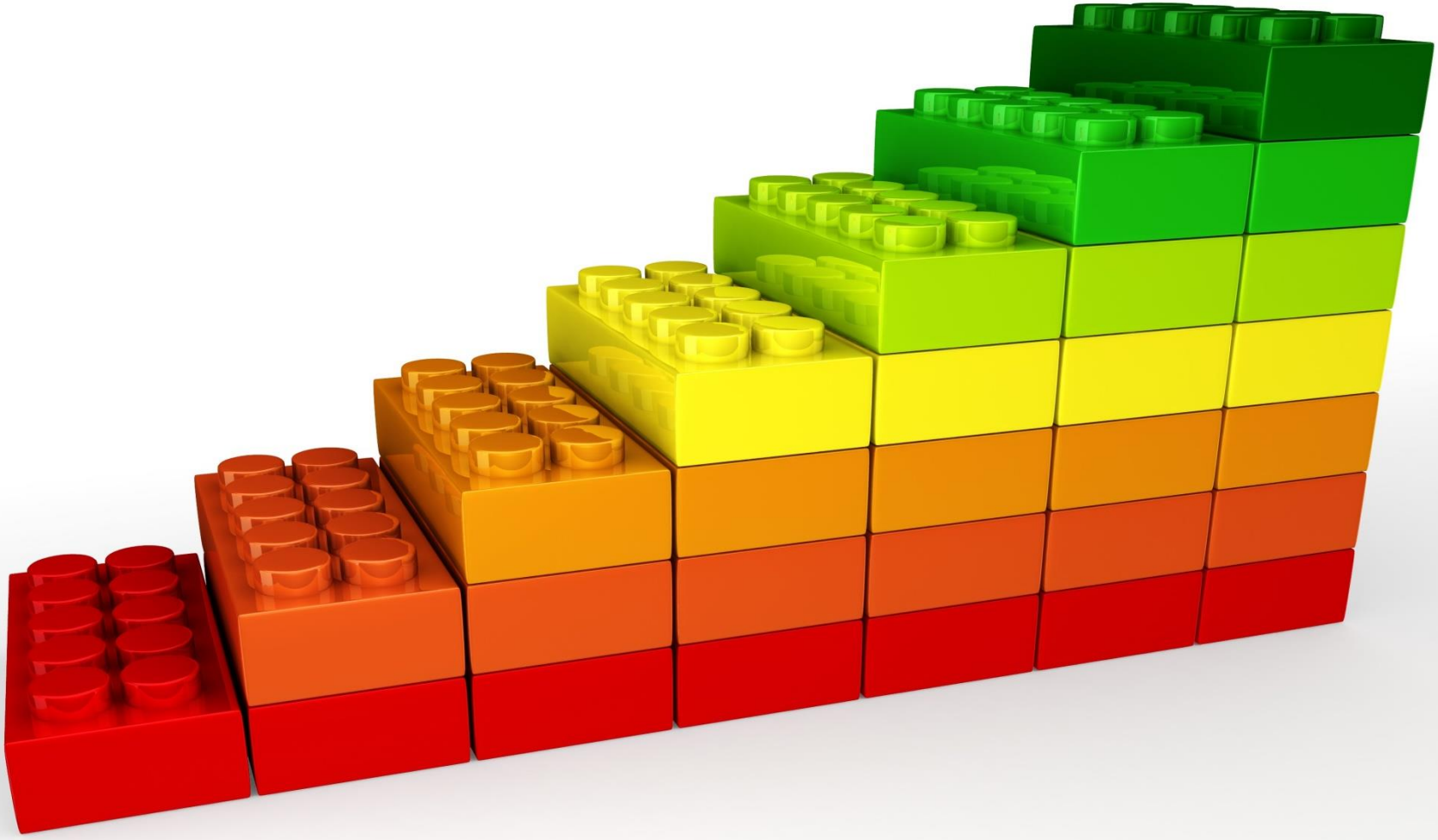
- Targets
- The Rhode Island Benefit-Cost Test (aka: The “Rhode Island Test”)
- Program evaluations and pilots
- Evolving markets
- New and/ or improved technologies
- State policy objectives

Highlights of the Annual Plan

- Portfolios are required to be cost-effective. Programs should be cost-effective.
- "Rough parity" should be maintained between Residential and C&I.
- Budget to show:
  - Projected costs,
  - Benefits and energy savings goals of each program,
  - Total Resource Cost of efficiency resources.
- Identify energy cost savings and bill impacts that Rhode Islanders will realize.
- The EERMC shall take a leadership role in ensuring that Rhode Island ratepayers receive excellent value from the Three-Year Plan being implemented on their behalf.

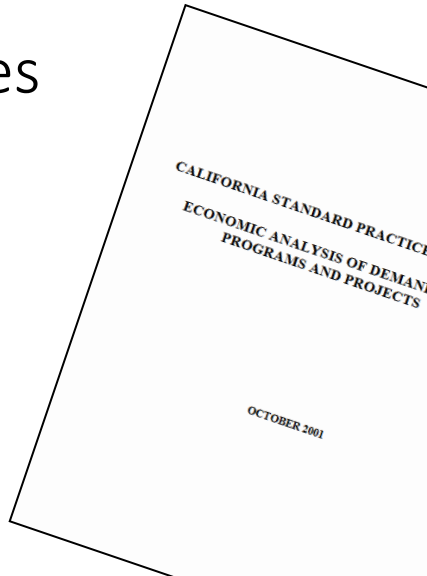
Source: Least Cost Procurement Standards

The Building Blocks of Energy Efficiency Planning



Measuring Cost-Effectiveness

- Cost-effectiveness screening is a critical part of the Energy Efficiency program planning process.
- The **California Standard Practice Manual** provides detailed guidance on the primary approaches used for evaluating the cost-effectiveness of energy efficiency activities.
  - Guidance for evaluating energy savings activities and uses
  - Creates consistent definitions of categories, programs, and program elements
  - Includes several "tests" tailored to individual jurisdictional needs

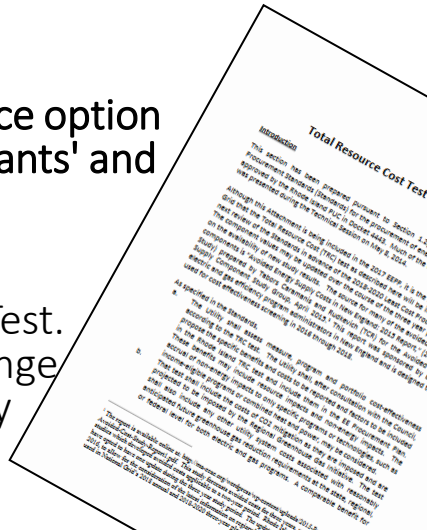


Cost-effectiveness Tests

- Key questions that cost-effectiveness tests answer may include: Is the program effective overall? Is it balanced? Are some costs or incentives too high or too low? What is the effect on rates? What adjustments are needed to improve the alignment?
- Each test contributes one of the aspects necessary to understanding these questions and answering them.
- Each of the tests provides a different kind of information about the impacts of energy efficiency programs from different vantage points in the energy system.
- On its own, each test provides a single stakeholder perspective. Together, multiple tests provide a comprehensive perspective.

Cost-effectiveness Tests

- There are 5 general types of Tests:
  - Program Administrator Cost Test (PAC)
    - Measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (including incentive costs) and excluding any net costs incurred by the participant. The benefits are similar to the TRC benefits. Costs are defined more narrowly.
  - Participant Cost Test (PCT)
    - Quantifies benefits and costs to the customer due to participation in a program
  - Rate Impact Measure Test (RIM)
    - Measures what happens to customer bills or rates due to changes in utility revenues and operating costs caused by the program.
  - **Total Resource Cost Test (TRC)**
    - **Measures the net costs of an energy efficiency program as a resource option based on the total costs of the program, including both the participants' and the utility's costs.**
  - Societal Test (SCT)
    - The Societal Test is structurally similar to the Total Resource Cost Test. It goes beyond the TRC test in that it attempts to quantify the change in the total resource costs to society as a whole rather than to only the service territory (the utility and its ratepayers


Total Resource Cost Test

The Rhode Island Benefit-Cost Test

- The Rhode Island Benefit-Cost Test (docket 4580)
  - TRC/ Societal Tests, but with some customized pieces that reflect RI specific policies
  - More fully reflect the policy objectives of the State with regard to energy, its costs, benefits, and environmental and societal impacts.
  - National Grid shall, after consultation with the EERMC, propose specific values.
  - These benefits include resource impacts, non-energy impacts, distribution system impacts, economic development impacts, and the value of greenhouse gas reductions

Rhode Island Benefit-Cost Test Highlights

- Efficiency as a Resource
  - EE can be compared with both supply-side and demand-side alternative energy resources in a consistent and comprehensive manner.
- Energy Policy Goals
  - Accounts for RI policy goals, as articulated in legislation, PUC orders, regulations, guidelines, and other policy directives.
- Hard-to-Quantify Impacts
  - Will account for all impacts, even those that are difficult to quantify and monetize.
- Symmetry
  - Efficiency assessment practices should be symmetrical, for example, by including both costs and benefits for each relevant type of impact.
- Forward Looking
  - Analysis of the impacts of efficiency investments should be forward-looking.
- Transparency
  - Efficiency assessment practices should be completely transparent, and should fully document and reveal all relevant inputs, assumptions, methodologies, and results.
- Includes the Costs of CO_2 mitigation
  - The RI Test shall include the costs of CO_2 mitigation as they are imposed and are projected to be imposed by the Regional Greenhouse Gas Initiative

Identifying Cost-effective Potential: Calculating Measure Savings

- An Energy Efficiency Measure: An energy efficiency technology installed through a program.

- Two ways that measure savings are calculated:

Custom Approach	Deemed Approach
➢ Low volume	➢ High volume
➢ High variability	➢ Low variability

Custom Savings Approach

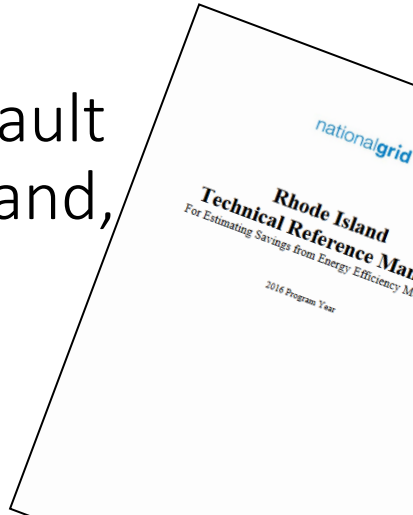
- Measures that are Low volume – high variability
  - Ex: Manufacturing process
- Involves gathering and analyzing site-specific information, both the pre- and post- condition, such as:
  - Fuel and energy usage bills
  - Sub-meter information (for disaggregation)
  - Equipment operating characteristics: e.g., run hrs.
- Only found in C&I sector

Deemed Savings Approach

- Measures that are high volume – low variability
- Usually based on regionally specific evaluations
- Energy efficiency programs often use a Technical Reference Manual (TRM) to organize deemed savings measures

Technical Reference Manual (TRM)

- Rhode Island's TRM is updated annually by N-Grid
  - Reflects annual changes in technology, baselines, and evaluation results.
  - Reviewed by EERMC, C-Team, OER and filed with the PUC
- The TRM documents for regulatory agencies, customers, and other stakeholders the methodologies and assumptions used by N-Grid to estimate measure savings.
- The TRM provides methods, formulas and default assumptions for estimating energy, peak demand, and other resource and non-energy impacts from efficiency measures.
  - This is called a measure characterization



Measure Characterization

Description of Measure

Name and Description

Eligibility Criteria

Definition of Baseline Case

Definition of Efficient Case

Measure ID

Effective Dates

Measure Characterization

Description of Measure

Name and Description

Eligibility Criteria

Definition of Baseline C

Measure ID

Savings Calculations

Electric Savings: kW, kWh

Gas Savings: Therms, peak therms

Algorithms

Assumptions

Examples / Supporting Documentation

Net to Gross Adj.

Measure Characterization

Description of Measure

Name and Description

Eligibility Criteria

Definition of Ba

Savings Calculations

Measur

Electric Savings:
kW, kWh

Gas Savings:
Therms, peak therms

Algorith

Examples / S
Document

Additional Input for Cost-effectiveness

- Measure Life
- Persistence
- Loadshape
- Measure cost
- Coincidence Factor
- Interactive Effects
- O&M Cost and Schedule
- Water and Other Non-Energy Benefits
- Retrofit Baseline Adj.

Identifying Cost-effective Potential: Benefit-Cost Ratio Model (BC Model)

- Updated annually
- The BC Model is a table made up of Deemed and Customized Measure characterizations.
- The goal of the BC Model is to calculate the total benefits and the total costs in dollar terms from a certain vantage point to determine whether or not the overall benefits exceed the costs.
- A benefit-cost ratio above 1 means the program has positive net benefits. A benefit-cost ratio below 1 means the costs exceed the benefits.
- Results are reported either in net present value (NPV) dollars (method by difference) or as a ratio (i.e., benefits/costs).
- Basic Approach for calculating and representing cost-effectiveness:

Net Benefits (Difference)	Net Benefits$_a$ (dollars)	=	NPV $\sum$ benefits$_a$ (dollars) - NPV $\sum$ costs$_a$ (dollars)
Benefit-Cost Ratio	Benefit-Cost Ratio$_a$	=	$\dfrac{\text{NPV} \sum \text{benefits}_a \text{ (dollars)}}{\text{NPV} \sum \text{costs}_a \text{ (dollars)}}$

Source: Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects.

Program Implementation

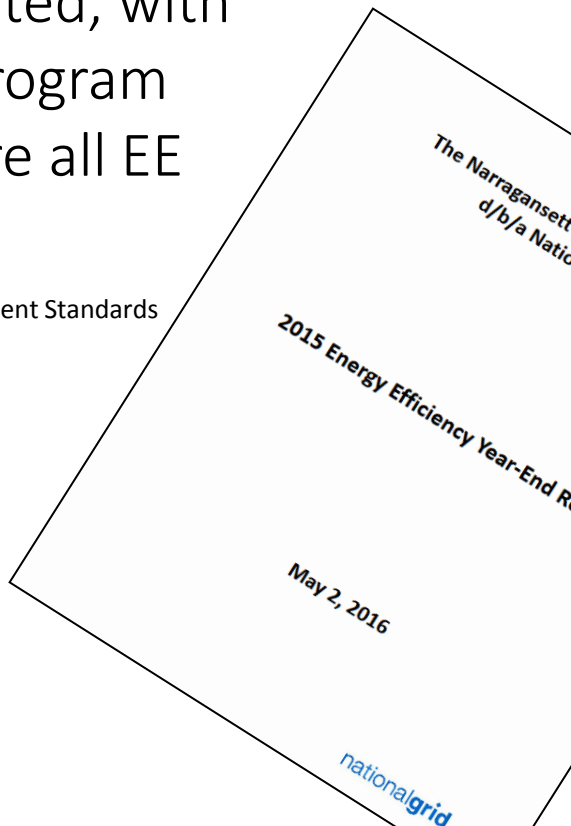
- Program implementation runs on a calendar year (Jan. – Dec.).
- National Grid, EERMC C-team, and OER meet monthly to:
  - Review program progress,
  - identify any types of program issues,
  - assure programs are moving along in a timely fashion, and
  - discuss strategies to continually improve programs.

Program Reporting

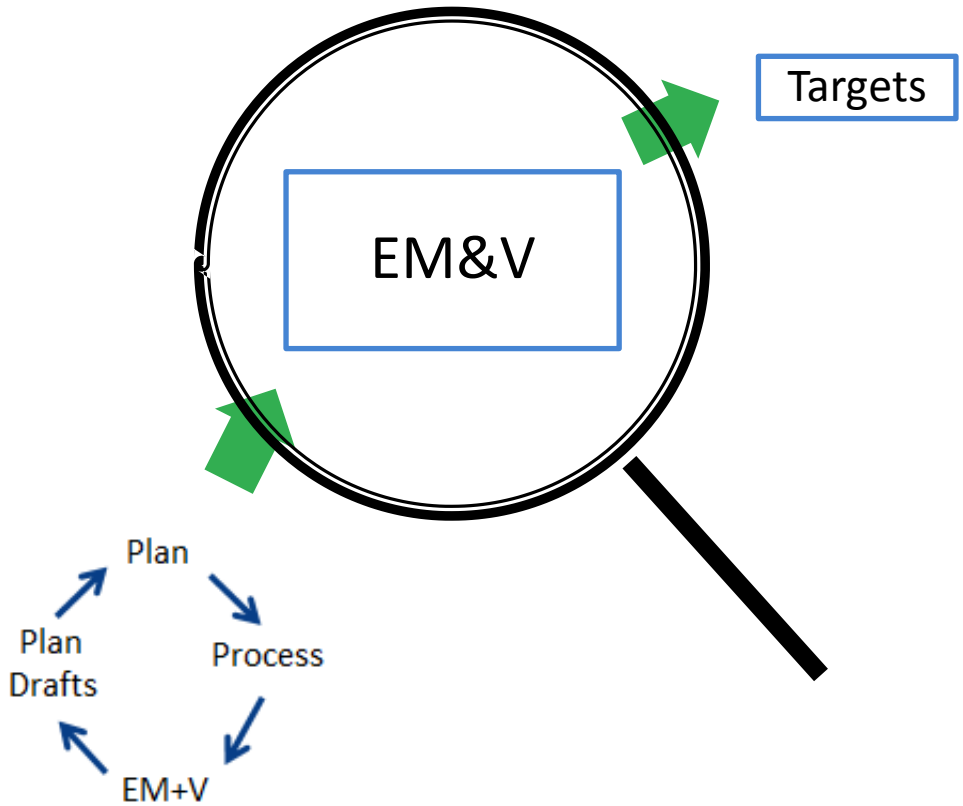
- "The distribution company, in consultation with the Council, will propose the content to be reported and a reporting format that is designed to communicate clearly and effectively the benefits of the efforts planned and implemented, with particular focus on energy cost savings and program participation levels across all sectors, to secure all EE resources that are lower cost than supply."

Source: Least Cost Procurement Standards

- Quarterly, and Annual Reporting



Evaluation, Measurement, & Verification (EM&V)

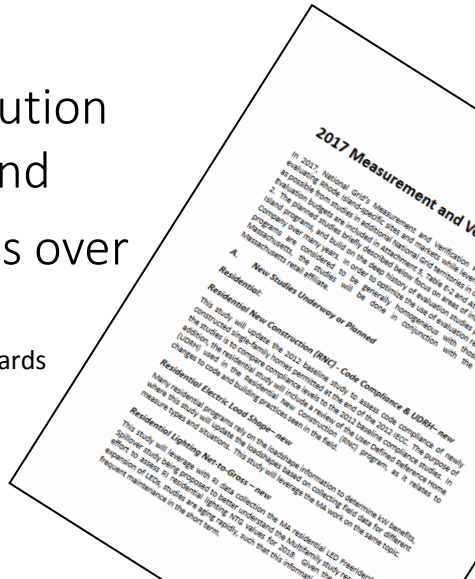


Rhode Island Measurement and Verfication Plan

This **Measurement and Verification (M&V) Plan** shall address:

- Savings verification, including where appropriate analysis of customer usage.
- Verification should also facilitate participation in ISO-NE's forward capacity market;
- Issues of ongoing program design and effectiveness;
- Efforts related to market assessment and methodologies to claim savings from market effects, among others;
- Regional and other cooperative M&E efforts the distribution company is participating in, or plans to participate in; and
- Longer-term studies, as appropriate, to assess programs over time.

Source: Least Cost Procurement Standards



Evaluation, Measurement, Verification (EM&V)

- **EM&V =** Commitment to providing accurate, transparent, and consistent metrics – based on good data – that assesses the performance and implementation of energy efficiency projects, programs, and portfolios of programs.
- Industry has 30+ years of EM&V experience

Why EM&V?

- Policy makers and legislation require that energy efficiency programs be proven cost-effective.
- EM&V serves three critical objectives:
  1. **Accountability of the impacts**
     - *Did the program deliver its estimated benefits?*
  2. **Risk management**
     - *How certain are these savings?*
  3. **Continuous improvement**
     - *What can be done to improve program performance in the future?*

Types of EM&V Assessments

- **Impact Evaluations** – Assesses outcomes attributable to an energy efficiency program.
  - Addresses questions related to the following objectives:
    - 1) Accountability of Programs
    - 2) Risk Management
- **Process Evaluations** – Assesses program operations to identify and recommend areas of improvement
  - Addresses questions related to the following objective:
    - 3) Continuous Improvement
- **Market Evaluations** – Assesses broad aspects of the marketplace with respect to energy efficiency.
  - Addresses questions to all three objectives

Steps in an EM&V Impact Evaluation Process

1. Define the evaluation objectives, scale and time frame in the context of policy objectives.
2. Determine approach for how savings will be evaluated and define “business as usual scenario (aka: baseline)
3. Design and conduct data collection and analysis
4. Determine energy and demand savings (i.e. gross and/or net savings)
5. Calculate co-benefits (according to policy objectives; examples include avoided emissions, NEIs, national security, etc.)
6. Report evaluation results and implement recommendations.

Rhode Island EM&V

- 28 Active studies (direct and leveraged)
- Budget
  - 2017 EM&V Budget = $2.4 million (1.9% of budget)
  - 2017 MA leveraged studies = $11.5 million
    - Note: Industry average spent on EM&V = 3-5% of annual portfolio budgets
    - Note: When including MA studies ($13.9 mil), an equivalent of 11.3% of annual portfolio budget is concentrated on EM&V.
- Applies evaluations prospectively to the Annual and Three year plans.
- National Grid is recognized as an EM&V industry leader

RI EM&V: Transparency and Accountability

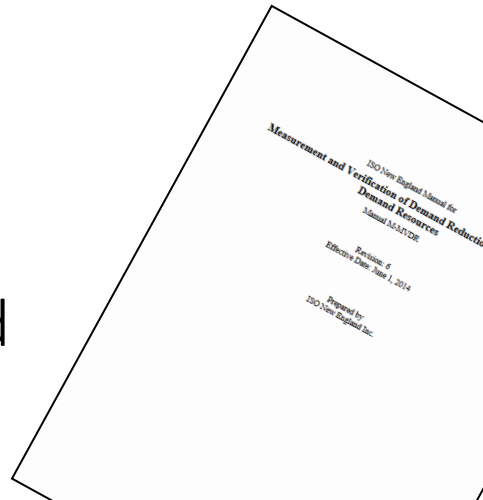
- Evaluations conducted by independent third-party evaluators, managed by National Grid with oversight from the EERMC.
- All evaluations are filed with the PUC and publicly accessible.
- EM&V C-team is led by Ralph Prahl to providing oversight.
- Meet with N-Grid twice per month to review all studies.

Who is Ralph Prahl?

- 30 Years of EM&V
- North American energy efficiency industry's leading specialist in the review and oversight of EM&V activities.
- In 2015 he received the International Energy Program Evaluation Conference's (IEPEC) Lifetime Achievement Award
- He is currently engaged in long-term EM&V review and oversight assignments on behalf of four of the top five energy efficiency states in the most recent ACEEE Scorecard (Massachusetts, California, Connecticut and Rhode Island).
- He pioneered the role of regulatory oversight of evaluation while at the Public Service Commission of Wisconsin (PSCW) from 1985-1997
- Ralph is the author or coauthor of some 75 refereed publications along and is a leading authority on the evaluation of market effects and market transformation.

Rhode Island EM&V: Meeting Industry Standards

- All methods consistent with:
- International Performance Measurement and Verification Protocol (IPMVP)
  - IPMVP is based out of Berkeley Lab
  - The Protocol has become the national measurement and verification standard in the United States and many other countries, and has been translated into 10 language.
- ISO-New England Standards
  - Manual for Measurement and Verification of Demand Reduction Value from Demand Resources (M-MVDR)

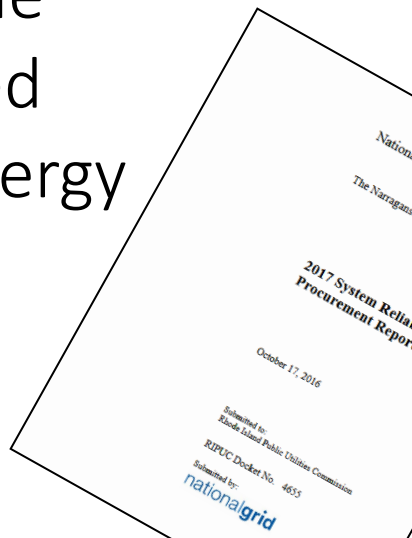


System Reliability Plan

- Three-Year Plans
- Annual Plans
- **System Reliability Plans**

System Reliability Procurement (SRP) Plan

- Due Annually and Triennially.
- National Grid responsible for drafting and filing
  - Works closely with EERMC, C-Team, OER, and Collaborative
- Described in Chapter 2 of the Least-Cost Procurement Standards.
- The SRP Standards set forth guidelines for the incorporation of energy efficiency, distributed generation, demand response, and other energy technologies (collectively referred to as "non-wires alternatives" or NWA) into N-Grid planning.



System Reliability Procurement Plan

- SRP is interpreted to mean an ongoing N-Grid practice to maximize the prudent, reliable, and environmentally responsible use of Non-wire Alternatives (NWA) to meet electric distribution system needs and optimize grid performance.

Types of Customer-side Non-Wire Alternatives

- Least Cost Procurement energy efficiency baseline services,
- Peak demand and geographically-focused supplemental energy efficiency strategies,
- Distributed generation generally, including combined heat and power and renewable energy resources,
- Demand response,
- Direct load control,
- Energy storage,
- Electric vehicles,
- Controllable or dispatchable electric heat or cooling,
- Alternative metering and tariff options, including time-varying rates;

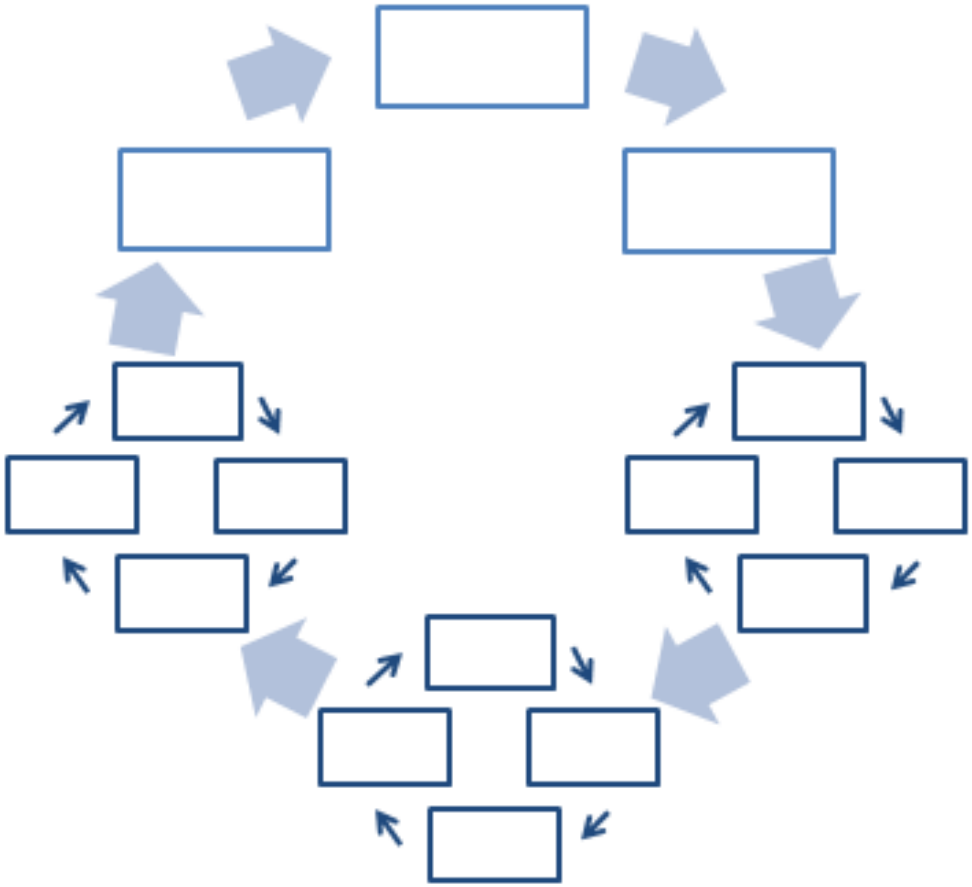
Types of N-Grid Investment of Non-Wire Alternatives

- energy storage,
- voltage management
- communications systems
- grid-optimization technologies

SRP Project to Date

- Load Curtailment Pilot called DemandLink™
- The purpose of the Pilot is to test the use of customer demand response (DR) and targeted energy efficiency as a means of managing local distribution capacity requirements during peak periods.
- The Pilot has taken place where customers are served by the Tiverton, RI substation.
- 2017 is the final of this six year Pilot

ACTIVITY



Terms

- The Planning Cycle
- Standard
- Targets
- Three Year Plan
- Annual Plan
- Three year EM&V
- Annual EM&V
- Draft Annual Plans
- Submit Annual Plan
- Annual Plans
- Rhode Island Benefit Cost Test (aka: RI Test)
- January
- October 15th
- August
- Year-Long
- The Collaborative
- EERMC
- OER
- California Standard Practice Manual
- Custom Measure calculation
- Deemed measure savings calculation
- Technical Reference Manual (TRM)
- Measure Characterization
- Benefit-Cost Model
- Residential Program Implementation
- Commercial Program Implementation
- Program Annual Report
- Impact Evaluations
- Process Evaluations
- Market Evaluations
- Third-party evaluation
- C-Team
- Ralph Prahl
- Performance Measure and Verification Protocol
- ISO-New England Measurement & Verification Standards
- System Reliability Procurement Plan
- Non-Wire Alternatives

STATE OF RHODE ISLAND
ENERGY EFFICIENCY &
RESOURCE MANAGEMENT COUNCIL

Considerations

Considerations for Planning

- Beyond cost-effectively achieving annual savings, other key objectives drive Program Planning. These include:
  - **Cost-efficiency** – How do we optimize program spending to meet savings targets at lowest cost?
  - **Equity** – How do we make sure as many homes, institutions and businesses get to participate?
  - **State policy** – How can energy efficiency best support State policy goals?

Considerations for Planning

The Process:

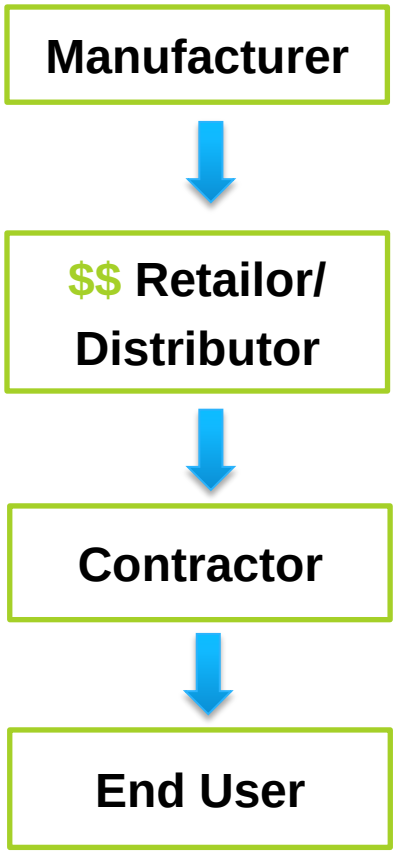
1. Stakeholders in the Collaborative **discuss and identify other key objectives** (e.g., policy goals, equity issues).
2. Stakeholders **consider ways to achieve these objectives** while maintaining focus on the primary objective – to achieve the Annual Targets for gas and electric savings.
3. National Grid **proposes a draft annual plan** with specific programs and tactics to achieve the savings Targets and address the Collaborative's policy goals.
4. **Stakeholders review and provide feedback** on draft plan.
5. **National Grid revises the plan and submits** the final version for approval by EERMC.

Considerations for Planning: Cost-Efficiency

- Hitting Targets at lowest cost possible
- Key approaches to control program budgets:
  - Program designs
  - Codes & standards
  - Pilots/R&D
  - Performance Incentive
  - Jurisdictional comps

Considerations for Planning: Cost-Efficiency

- Program Design
  - Upstream programs – instant discount at distributor or retail level instead of customer rebates
  - Financing options – helping customers overcome cost barriers and afford EE projects
    - In contrast to one-time rebates, loans are paid back over time and the funds can be used to help more customers pursue EE



Considerations for Planning: Cost-Efficiency

- Codes & Standards:
  - Locking in energy efficiency through building codes and appliance standards
  - Improving code compliance rates for residential and commercial buildings

Considerations for Planning: Cost-Efficiency

- Pilots / Research & Development:
  - Smaller scale proof-of-concept efforts before significant investment made
    - Wi-fi thermostats
    - Emerging lighting controls
    - Zero Net Energy Buildings

Considerations for Planning: Cost-Efficiency

- Comparisons to Peer Programs:
  - Review comparable program portfolios in neighboring and high-achieving jurisdictions to confirm reasonable “ballpark” ratio of spending to savings
  - Usually conducted by EERMC C-Team
  - At high level, by sector/portfolio – see Table E-5: “¢/Lifetime kWh”

Considerations for Planning: Cost-Efficiency

Table E-5
National Grid
Calculation of 2017 Program Year Cost-Effectiveness
All Dollar Values in ($000)

	TRC Benefit/ Cost[1]	Total Benefit	Program Implementation Expenses[2]	Customer Contribution	Shareholder Incentive	¢/Lifetime kWh
Non-Income Eligible Residential						
Residential New Construction	1.73	$ 1,852.2	$ 1,045.3	$ 25.0		6.6
ENERGY STAR® HVAC	1.37	$ 3,060.5	$ 1,669.5	$ 569.6		12.4
Energy*Wise*	1.09	$ 12,667.4	$ 9,630.0	$ 1,968.8		16.6
Energy*Wise* Multifamily	1.74	$ 6,913.1	$ 3,443.5	$ 538.8		11.1
Home Energy Reports	1.02	$ 2,504.3	$ 2,447.0	$ -		9.3
ENERGY STAR® Lighting	1.95	$ 29,224.5	$ 9,412.4	$ 5,608.8		3.8
Residential Consumer Products	1.26	$ 3,482.9	$ 2,125.0	$ 639.8		8.1
Energy Efficiency Education Programs		$ -	$ 40.0	$ -		
Residential Demonstration and R&D		$ -	$ 1,179.5	$ -		
Community Based Initiatives - Residential		$ -	$ 270.8	$ -		
Comprehensive Marketing - Residential		$ -	$ 535.4	$ -		
n-Income Eligible Residential SUBTOTAL	**1.40**	**$ 59,704.9**	**$ 31,798.4**	**$ 9,350.9**	**$ 1,589.9**	**7.0**
Income Eligible Residential						
Single Family - Income Eligible Services	3.80	$ 35,232.6	$ 9,268.1	$ -		20.0
Income Eligible Multifamily	2.69	$ 7,294.1	$ 2,708.4	$ -		9.7
Income Eligible Residential SUBTOTAL	**3.38**	**$ 42,526.7**	**$ 11,976.5**	**$ -**	**$ 598.8**	**16.1**
Commercial & Industrial						
Large Commercial New Construction	4.55	$ 23,281.0	$ 5,121.4	$ -		2.2
Large Commercial Retrofit	2.54	$ 105,858.8	$ 23,708.4	$ 18,010.9		4.1
Small Business Direct Install	1.50	$ 16,500.4	$ 8,831.4	$ 2,172.9		7.6
Commercial Demonstration and R&D		$ -	$ 874.4	$ -		
Finance Costs		$ -	1,300			
RI Infrastructure Bank			4,900			
C&I SUBTOTAL	**2.17**	**$ 145,640.2**	**$ 44,735.6**	**$ 20,183.7**	**$ 2,236.8**	**4.6**
Regulatory						
OER			$ 816.3			
EERMC			$ 816.3			
Regulatory SUBTOTAL			**$ 1,632.5**			
TOTAL	**2.00**	**$ 247,871.8**	**$ 90,143.1**	**$ 29,534.6**	**$ 4,425.5**	**5.8**

Cents/ Lifetime kWh = 5.8

Considerations for Planning: Cost-Efficiency

- Performance Incentive:
  - The Performance Incentive of 5% of program spending for hitting Targets is supplemented if National Grid achieves more than 100% of the Targets for 95% or less than budget.

Considerations for Planning Equity

- Equity: Everyone should have an opportunity to participate in savings opportunities and contribute to common benefit.
  - Program design (examples above)
  - Transform markets:
    - Making efficiency the Norm
    - Customer protection: shifting the economy
    - Driving innovation in products and services
- Reward Utility for Supporting Market Transformation…some but not too much

Considerations for Planning Equity

- Hard-to-Reach (HTR)
  - "Multifamily" – Adjusted program rules to allow multiple "triple-deckers" under common ownership to be treated as single MF project; created specialized approach for condominiums
  - Public buildings – Built in OER's RIPEP initiative and leveraged financing from RIIB to supplement Revolving Loan Fund allocations to support more school and municipality projects
  - Addressing Moderate Income: 61% - ~100% Area Median Income:
    - Capital Good Fund option for HEAT Loan targeted at affordable housing added in 2014
    - Other ideas being explored for 2018, i.e. tiered incentives

Considerations for Planning Equity

- C&I – Market segmentation
  - Grocery focus – *EnergySmart Grocer*
  - Industrial Initiative - broad support on specialized process enhancements, management and technologies
  - Agriculture sector (levaraging OER RGGI funding)
  - Assisted Living Facilities (C-PACE focused offering)

Considerations for Planning State Policy

Clean

Reduce carbon-intensity of supply portfolio

Affordable

Consumer cost as a lens for all policies, from procurement to investment

Reliable

Invest in a diverse resource portfolio through infrastructure, supply, and system redesign

Principles for Policy and Programmatic Decision-Making

Considerations for Planning State Policy

Most, if not all, existing State energy policies and directives are cross-cutting, and contribute to economic (i.e. jobs, reduction of energy costs), environmental (i.e. carbon reduction), and energy system (i.e. enhancing system resiliency and reliability) goals.

- Clean
  - Resilient RI Act §42-6.2
    - Develop strategies to reduce GHG by 10% by 2020; 45% by 2035; and 80% by 2050
  - Governor Raimondo's EO 17-06 (June 12, 2017)
    - Affirms that RI shall remain dedicated to principles of Paris Climate Agreement
    - Directs State agencies/ EC4 to take all necessary actions to reduce GHG in line with Resilient Rhode Island Act

- Affordable
  - Least Cost Procurement
  - Governor Raimondo's EO 15-17 (December 8, 2015)
    - State agencies to reduce energy consumption by at least 10% (below FY14) by end of FY19
    - State entered into a Strategic Energy Management Plan (SEMP) with National Grid
  - Rhode Island Infrastructure Bank

- Reliable
  - Power Sector Transformation
    - Support underlying objectives of System Reliability Plan
    - Timing of energy use becomes increasingly important -- SIRI revealed importance of managing to summer peak
    - Efficiency, load management, solar, storage tactics being explored in Plans
    - Increased value of strategic integration of EE and renewables
    - Explore utility business models and effective near-term incentives for utility to deliver integrated approaches

Considerations for Planning State Policy

As energy policy and technologies become more dynamic and integrated, how can we advance Rhode Island's understanding and accounting of the full range of costs *and benefits (economic, energy, environmental)* of our clean energy investments, such as energy efficiency?

i.e. **"RI Test":** quantify and account for Environmental (Carbon/Air Quality), Economic (Jobs) & Health (Medical costs) benefits

ACTIVITY

The Equity Challenge

- Break up into 4 Groups, two sectors
  - 2 Residential
  - 2 C&I
- Define a hard to reach demographic in your sector
- Tools: Large Post-It; Markers
- Step 1: Draw the challenge (No Words allowed)
- Step 2: Draw root causes (No Words allowed)
- Step 3: “Brainwriting”
  - Write up one – two ideas to better reach demographic
  - After 2 minutes, pass your idea to the next person
  - Build on the new ideas (do not add new ideas)
  - Cycle through the group
- Step 4: Draw out best solutions/ ideas (No Words Allowed)
- Step 5: Present ideas