

**Rhode Island State Planning Council**  
**Draft Minutes of Thursday, June 11, 2015 Meeting**  
William E. Powers Building  
Conference Room A  
One Capitol Hill, Providence, RI

**I. ATTENDANCE**

**1. Members Present**

Mr. Michael DiBiase, Chair	Director, Rhode Island Department of Administration
Mr. Kevin Flynn, Secretary	Associate Director, Division of Planning
Ms. Jeanne Boyle	President's Designee, RI League of Cities and Towns
Ms. Janet Coit	Director, RIDEM
Ms. Sharon Conard-Wells	West Elmwood Housing Development Corporation
Mr. Roy Coulombe	Public Member
Ms. Marion Gold	Executive Director, RI Office of Energy Resources
Mr. Leonard Green	Representing Nicole Alexander-Scott, Director RI Department of Health
Mr. Thomas Mullaney	RI Department of Administration, Budget Office
Mr. L. Vincent Murray	RILOCAT, Government Official Representative
Ms. Amy Pettine	Representing Mr. Raymond Studley, RIPTA
Mr. Amy Rainone	Representing Ms. Barbara Fields, Executive Director Rhode Island Housing
Ms. Janet Raymond DeAngelis	Public Member
Mr. M. James Riordan	Public Member
Mr. Peder Schaefer	Representing Daniel Beardsley, RI League of Cities and Towns
Mr. Robert Shawver	Representing Peter Alviti Director, RI Department of Transportation
Mr. John Trevor	Environmental Advocate
Mr. Michael Walker	Representing Stefan Pryor, Secretary of Commerce
Mr. Scott Wolf	Environmental Advocate

**2. Members Absent**

Ms. Jeanne Cola	Chair, RI Housing Resources Commission
Mr. Kevin Gallagher, Vice Chair	Governor's Office
Ms. Ana Cano-Morales	Public Member
Mr. Grover Fugate	Executive Director, RI Coastal Resources Management Council
Mr. Marcus Mitchell	Small Business Representative
Ms. Bonnie Nickerson	Director, Providence Department of Planning and Development
Mr. Samuel Shamoon	Governor's Designee

### 3. **Staff – Division of Planning**

Mr. Jared Rhodes	Chief, Statewide Planning Program
Ms. Karen Scott	Assistant Chief, Statewide Planning Program
Ms. Nancy Hess	Supervising Planner, Statewide Planning Program
Mr. Paul Gonsalves	Senior Planner, Statewide Planning Program
Ms. Kimberly Crabill	Executive Assistant, Statewide Planning Program

### 4. **Guests**

Mr. Corey Bobba	Federal Highway Administration
Mr. Danny Musher	RI Office of Energy Resources
Ms. Elizabeth Stone	Department of Environmental Management

## II. **AGENDA ITEMS**

### 1. **Call to Order**

Chairman DiBiase called the meeting to order on June 11, 2015 at 9:03 a.m.

### 2. **Public Comment on Agenda Items** – *for informational purposes*

There were none.

### 3. **Approval of the May 14, 2015 Meeting Minutes** – *for action*

Chairman DiBiase asked for a motion to approve the minutes of May 14, 2015. Mr. Michael Walker moved to approve the minutes of May 14, 2015 as submitted. The motion was seconded by Ms. Sharon Conrad-Wells & Ms. Jeanne Boyle. There being no discussion, the following members voted aye: Boyle, Conard-Wells, Coulombe, Flynn, Gold, Green, Mullaney, Murray, Pettine, Rainone, Raymond-DeAngelis, Shawver, Trevor, and Walker. Chairman DiBiase abstained. Director Janet Coit, Mr. James Riordan, Mr. Scott Wolf were not yet present. Not voting - Mr. Peder Schaefer. There were no nay votes.

### 4. **Draft Rhode Island State Energy Plan (request to authorize public hearing)** – *for action*

Chairman DiBiase introduced Marion Gold and Danny Musher who delivered the attached power point presentation. Instances where members of the Council engaged in discussion were as follows:

Mr. Leonard Green asked if the plan considered the vulnerability of the grid from a resiliency perspective. Mr. Danny Musher responded that it did.

Mr. Scott Wolf asked if the state is working to address the need to improve natural gas flows into the region, whether it is still a major issue facing the economy, and what the state is doing about it. Mr. Danny Musher responded that it is still an issue and that the OER and the Governor's Office along with other Governors Offices are looking at this in great detail.

Mr. Peder Schaefer asked if the plan's scenarios take into account potential changes in the costs of energy sources. Mr. Danny Musher responded that it does to the degree that it is possible. Ms. Marion Gold also responded that no one can predict exactly what is going to happen but that the New England Governors are working hard to address the high price of natural gas.

Ms. Janet Coit commented that this is the best, most forward looking energy plan the state of Rhode Island has seen and that the team who produced it is to be commended. She further commented however, that there is a need to do some education before initiating the public review process to increase everyone's understanding of the dynamic energy picture that we have here in the State of RI. Mr. Danny Musher acknowledged the need and committed to thinking about ways that the need for further education can be fulfilled prior to public hearing. Ms. Marion Gold also responded that the team has been thinking about preparing an overview and that her office did a lot of education with the General Assembly and the Governor's Office on the whole regional energy issue.

Mr. Michael DiBiase commented that to Director Coit's point, people may question whether the right balance has been struck within the plan and requested that additional outreach be undertaken to ensure that there is sufficient input during the public hearing process. In particular he suggested using press releases and media coverage to generate interest.

Mr. Vincent Murray echoed the public education aspect and the need to generate buy-in and consensus.

Mr. Mike Walker commented that people need to better understand the consequences of not acting to increase the supply to meet the current demand. People don't understand what the consequences are. There is going to be a cost associated with meeting the demand and that is going to affect the rate payers and they are not aware of that either. They will see a rate increase, but should know what is causing it. If we don't do this it will be hard for us to grow our economy and insure people's quality of life.

Mr. Michael DiBiase commented that where we are now is partially due to a failure to plan on a large regional scale. As a result we are now in a situation where we have limitations on growth that will affect people's standard of living in a significant way.

Ms. Janet Coit commented that you can do all the planning you want but if you can't coordinate across regional authorities you won't succeed.

Mr. Danny Musher also noted that there has been a market failure do to de-regulation which further inhibits regional coordination in meeting regional infrastructure needs.

Ms. Amy Rainone & Mr. Scott Wolf thanked the team for including the transportation smart growth linkages. Ms. Rainone then went on to discuss the needs of our public housing stock and the state and federal resources that are available to address those needs and suggested that that sector also have a presence within the plan.

Mr. James Riordan questioned whether the general assembly has had an opportunity to weigh in on the content. Ms. Marion Gold responded that her office has been keeping lines of communications open with the General Assembly and noted that their largest concern has been relative to pricing.

Ms. Nancy Hess assured the Council that Land Use 2025 and Transportation 2035 is cross referenced in the document and that the smart growth policies that are already incorporated into the State Guide Plan are what we are using relating to the topic of energy.

Ms. Amy Pettine commented that the plan should acknowledge the conundrum that is presented by drawing vehicle miles traveled down and therefore further reducing the funding available for transit. Mr. Danny Musher responded that this issue was beyond the scope of this plan to resolve this issue but acknowledged that it is a real concern.

Ms. Jeanne Boyle also complimented the team then noted that if the state is going to rely on municipalities to implement the plan, it should also note the barriers that exist in moving these forward at the local level and identify which office state offices will assist the municipalities in overcoming them. In addition, she raised the statewide concern of how we overcome the inefficiencies of our aged housing stock and also the need for the plan to put forward how the state overcomes those barriers. Mr. Danny Musher noted that similar points came up in the Technical Committee Meeting where he explained that their office will provide technical assistance to the extent that they are able. Mr. Danny Musher further explained that their office is resurrecting a municipal energy working group and trying to respond to the requests that officials have been sending to them.

Ms. Janet Coit next endorsed the overarching vision of the plan and its focus on the big picture. She then emphasized the benefit of receiving public comment.

Ms. Janet Coit made a motion to authorize the public hearing on the draft plan. Council member Trevor seconded the motion. There being no discussion, the following members voted aye: Boyle, Coit, Conard-Wells, Coulombe, Flynn, Gold, Green, Mullaney, Murray, Pettine, Rainone, Raymond-DeAngelis, Riordan, Shawver, Trevor, Wolf and Walker. Chairman DiBiase abstained. Not voting - Mr. Peder Schaefer. There were no nay votes.

5. **FY 16 Unified Transportation Planning Work Program** - *for action*

Chairman DiBiase introduced Mr. Rhodes and asked that he give a brief overview of the Unified Transportation Planning Work Program. Mr. Rhodes presented section 5 of the draft which overviews the finances. Instances where members of the Council engaged in discussion were as follows:

Mr. Vincent Murray asked if expiration of the HUD grant affected staffing. Mr. Rhodes responded that it has in terms of the organization chart but it has not in terms of the number of people working for the program.

Ms. Amy Rainone asked how the National Highway Trust Fund plays into this and what the potential scenarios associated with disruption of that funding are. Mr. Rhodes responded that the Program maintains a one year contingency for personnel costs in order to be able to handle a funding shortfall from Federal Highway.

Mr. Scott Wolf asked Mr. Rhodes to identify some of the types of work that will be incorporated under the environmental sustainability task which he subsequently did.

Chairman DiBiase asked for a motion to approve the Work Program. Council member Walker made the first motion and Council members Coit and Conrad-Wells seconded the motion. There being no discussion, the

following members voted aye: Boyle, Coit, Conard-Wells, Coulombe, Flynn, Gold, Green, Mullaney, Murray, Pettine, Rainone, Raymond-DeAngelis, Riordan, Shawver, Trevor, Wolf and Walker. Chairman DiBiase abstained. Not voting - Mr. Peder Schaefer. There were no nay votes.

6. **Associate Director's Report** – *for discussion*

Mr. Flynn addressed the following items under the Associate Director's report:

- 2015 Legislative Session
- Freight Planning activities
- Relocation of OHCD to the Secretary of Commerce's Office
- Statewide Planning Program hiring status
- The State Planning Council's next meeting will be on August 13th

7. **Announcements**– *for discussion*

Mr. Scott Wolf announced the pending retirement of Ms. Sheila Brush.

Ms. Janet Coit announced the pending retirement of Mr. Scott Millar and the "Great Outdoors Pursuit" launching at Lincoln Woods on Saturday the 13<sup>th</sup>.

8. **Adjourn**

Chairman DiBiase asked for a motion to adjourn. Council member Mr. Michael Walker motioned to adjourn. The motion was seconded by Council member Mr. Scott Wolf. There being no discussion, the following members voted aye Boyle, Coit, Conard-Wells, Coulombe, Flynn, Gold, Green, Mullaney, Murray, Pettine, Rainone, Raymond-DeAngelis, Riordan, Shawver, Trevor, Wolf and Walker. Chairman DiBiase abstained. Not voting - Mr. Peder Schaefer. There were no nay votes. The meeting adjourned at 10:30 a.m.

Respectfully Submitted,



Kevin Flynn  
Secretary



# Rhode Island State Energy Plan (RISEP)

State Planning Council Technical Committee

June 11, 2015

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

# Rhode Island 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 2013-14, OER worked with a twenty-member Advisory Council, stakeholder groups, and a consultant team to complete a 10-year update
  - The planning horizon goes out to 2035

# RISEP Stakeholders

## Project Team

- **Office of Energy Resources (OER)** - Project Management & Report Authorship
- **Division of Planning (DOP)** - Guidance on State Guide Plan Integration

## Consultant Team

- **ENE (Environment Northeast)** - Business-as-Usual Forecast
- **Navigant Consulting** - Scenario Modeling

## Advisory Council

- Twenty members with subject matter expertise in energy
- Representatives from policy-making bodies, regulatory bodies, utility providers, energy users, municipalities, environmental advocacy groups, and industry

## Implementation Group

- Stakeholders with subject matter expertise in each energy sector: electricity, thermal, and transportation

# RISEP Advisory Council

- **Twenty members with subject matter expertise in energy:**
  - policy makers
  - regulatory bodies
  - utility providers
  - energy users
  - municipalities
  - environmental advocacy groups
  - industry

<b>Advisory Council Member</b>	<b>Affiliation</b>
1. <b>Abigail Anthony</b>	<i>Acadia Center<sup>1</sup></i>
2. <b>Anthony Paolantonio</b>	<i>House Policy Office</i>
3. <b>Bill Ferguson</b>	<i>The Energy Council of Rhode Island (TEC-RI)</i>
4. <b>Ben Swanson<sup>2</sup></b>	<i>RGS Energy</i>
5. <b>Cynthia Wilson-Frias<sup>3</sup></b>	<i>RI Public Utilities Commission (RIPUC)</i>
6. <b>Doug McVay</b>	<i>RI Department of Environmental Management (RIDEM)</i>
7. <b>Ian Springsteel</b>	<i>National Grid</i>
8. <b>Jack Leyden</b>	<i>RI Building Code Commission (RIBCC)</i>
9. <b>Jeff Broadhead</b>	<i>Washington County Regional Planning Council (WCRPC)</i>
10. <b>Jerry Elmer</b>	<i>CLF (Conservation Law Foundation)</i>
11. <b>John Gilbrook</b>	<i>National Grid</i>
12. <b>Jon Hagopian</b>	<i>RI Division of Public Utilities and Carriers (RIDPUC)</i>
13. <b>Julian Dash</b>	<i>Clean Energy Development LLC</i>
14. <b>Julie Gill</b>	<i>Oil Heat Institute</i>
15. <b>Kenneth Payne</b>	<i>RI Agricultural Partnership</i>
16. <b>Larry Chretien<sup>4</sup></b>	<i>People's Power &amp; Light (PP&amp;L)</i>
17. <b>Linda George</b>	<i>Senate Policy Office</i>
18. <b>Melissa Long</b>	<i>RI Department of Transportation (RIDOT)</i>
19. <b>Robert Tormey</b>	<i>NERC Solar</i>
20. <b>Sheila Dormody</b>	<i>City of Providence Office of Sustainability</i>

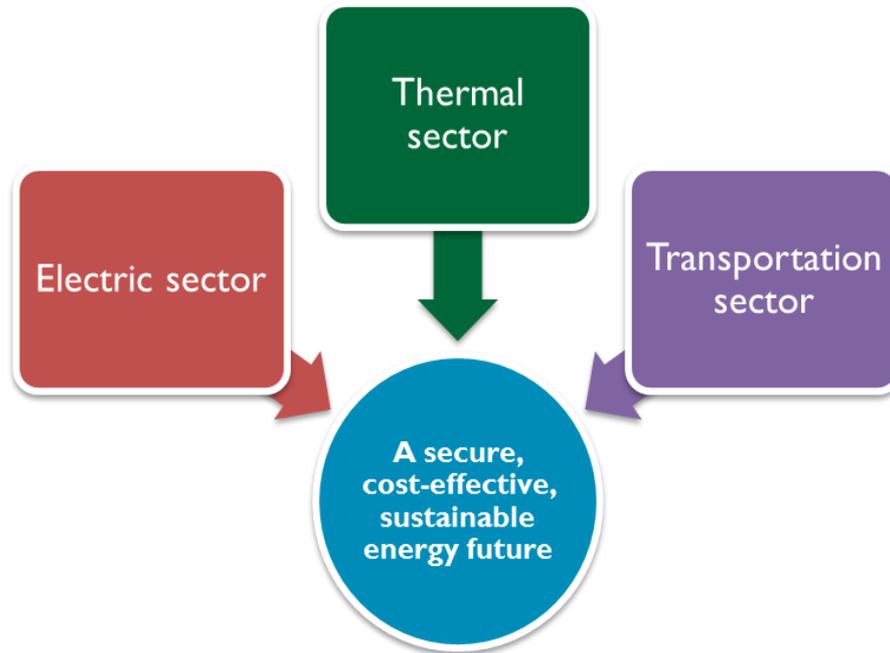
# Philosophy of Approach

- No crystal ball can predict the future
- Directional approach to reflect uncertainties with forecasting a dynamic energy systems
- Scenario modeling sought to understand order-of-magnitude impacts and sensitivities
- Goals and performance measure targets are quantitative at a high level
- Policies and strategies are comprehensive but require further study in order to develop policy and program designs

# Contents of the Plan

- **Introduction and Vision**
- **Part 1: Overview of Energy in Rhode Island**
- **Part 2: Goals and Performance Measure Targets**
- **Part 3: Policies and Strategies**
  
- **Appendix A: Rhode Island Energy Laws**
- **Appendix B: A Portfolio of Strategies**
  
- **Technical Report #1: Business-as-Usual Forecast (ENE)**
- **Technical Report #2: Scenario Modeling (Navigant Consulting)**

# Introduction and Vision



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

# Contents of the Plan

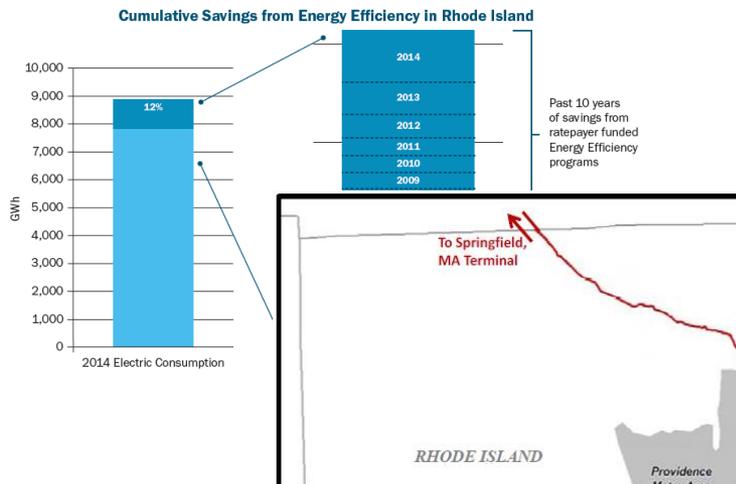
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# Part 1: Overview of Energy in Rhode Island

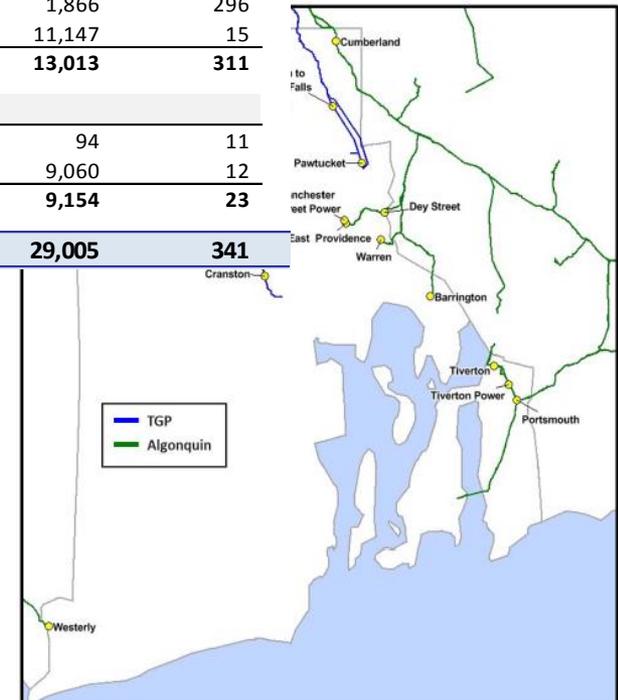
- This section presents information on energy usage in Rhode Island—the types, amount, cost, and environmental effects of major fuels and energy resources used in all sectors of Rhode Island’s economy
- The section also summarizes the major components of Rhode Island’s existing policy framework for addressing energy issues

# Part 1: Overview of Energy in Rhode Island

## Energy Supply and Infrastructure Assets



Technology	Capacity (kW)	# of Systems
<b>Small Hydro</b>		
All sizes	6,656	7
<b>Solar Photovoltaic</b>		
50 kW & under	1,866	296
>50 kW	11,147	15
<b>Grand Total</b>	<b>13,013</b>	<b>311</b>
<b>Wind</b>		
50 kW & under	94	11
>50 kW	9,060	12
<b>Grand Total</b>	<b>9,154</b>	<b>23</b>
<b>Grand Total</b>	<b>29,005</b>	<b>341</b>

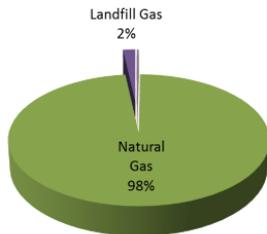


Power Plant	Nameplate Capacity (MW)	Primary Fuel	Dual Fuel Capability
Energy Rhode Island State Energy LP	596	Natural Gas	
Manchester Street	515	Natural Gas	Distillate Fuel Oil
Tiverton Power Plant	272.5	Natural Gas	
Ocean State Power	254.2	Natural Gas	Distillate Fuel Oil
Ocean State Power II	254.2	Natural Gas	Distillate Fuel Oil
Pawtucket Power Associates	68.8	Natural Gas	Distillate Fuel Oil
Rhode Island LFG Genco	33.4	Landfill Gas	
Toray Plastics	12.5	Natural Gas	
Central Power Plant	10.7	Distillate Fuel Oil, Natural Gas	
Rhode Island Hospital	10.4	Natural Gas	Residual Fuel Oil
Block Island	9.6	Distillate Fuel Oil	
Brown University Central Heating	3.2	Natural Gas	Residual Fuel Oil
<b>Total</b>	<b>2,041</b>		

# Part 1: Overview of Energy in Rhode Island

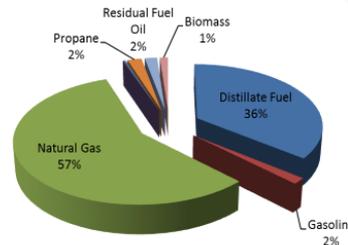
- Energy Use and Historical Trends

## Electricity



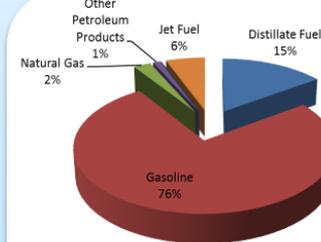
63 Trillion BTUs  
\$1.1 billion / year  
2.9 million tons CO<sub>2</sub>

## Thermal



63 Trillion BTUs  
\$1.1 billion / year  
3.9 million tons CO<sub>2</sub>

## Transportation



64 Trillion BTUs  
\$1.4 billion / year  
4.5 million tons CO<sub>2</sub>

*In 2010, RI spent \$3.6 billion on 190 trillion BTU of energy, emitting 11 million tons of CO<sub>2</sub>*

# Part 1: Overview of Energy in Rhode Island

- **Current Policy Framework**
  - Major legislation: During the two decades following restructuring, Rhode Island enacted subsequent major energy legislation addressing key areas of energy policy, primarily energy efficiency and renewable energy
  - Governance structure: Public responsibilities for energy planning, management, and oversight in Rhode Island are distributed among an array of agencies, each with distinct powers, duties, and functions

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## Part 2: Goals & Performance Measure Targets

- This section sets measurable goals and performance measure targets for achieving an energy system that advances the human, economic, and environmental well-being of the people, communities, and natural resources of Rhode Island.
- The goals sketch a vision for an energy system that advances the human, economic, and environmental well-being of the people, communities, and natural resources of Rhode Island

# Part 2: Goals & Performance Measure Targets

- **RISEP Goals**



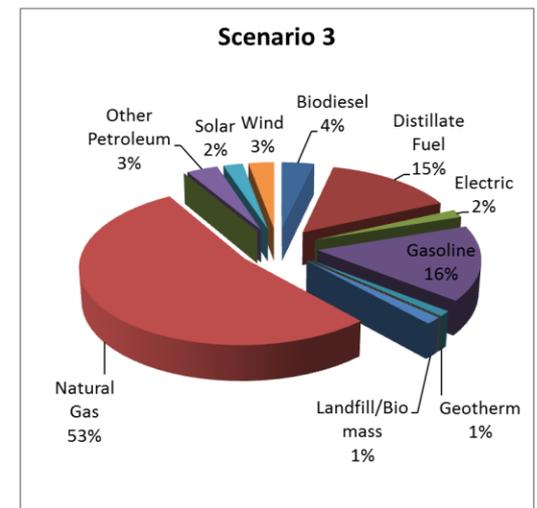
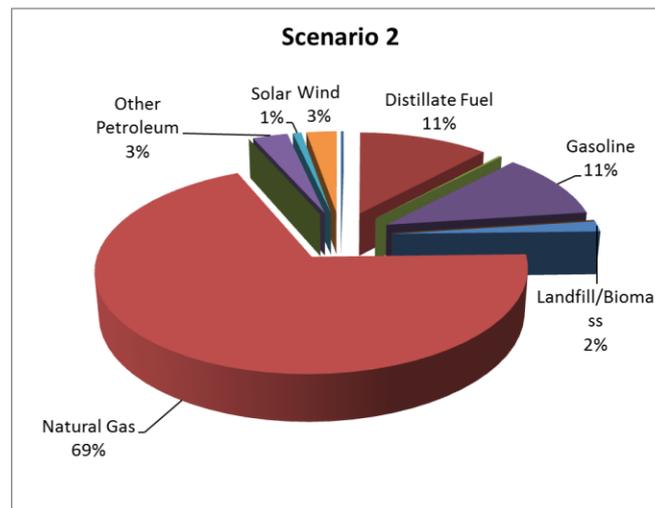
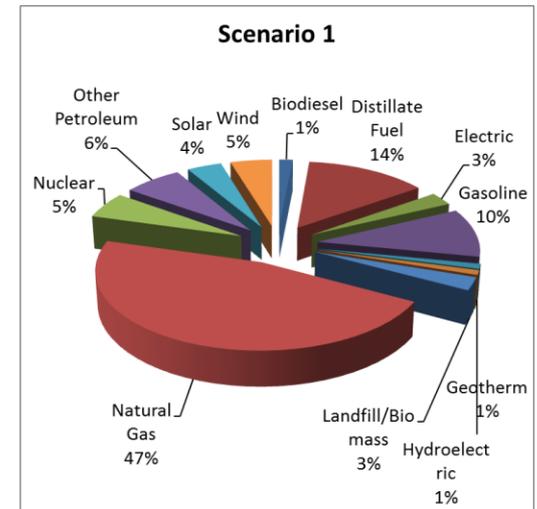
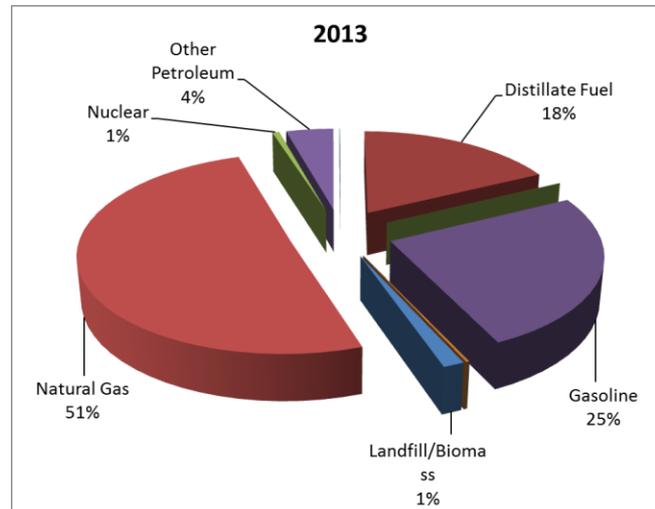
# Part 2: Goals & Performance Measure Targets

- **RISEP Performance Measure Targets**
  - Scenario modeling shows Rhode Island can:



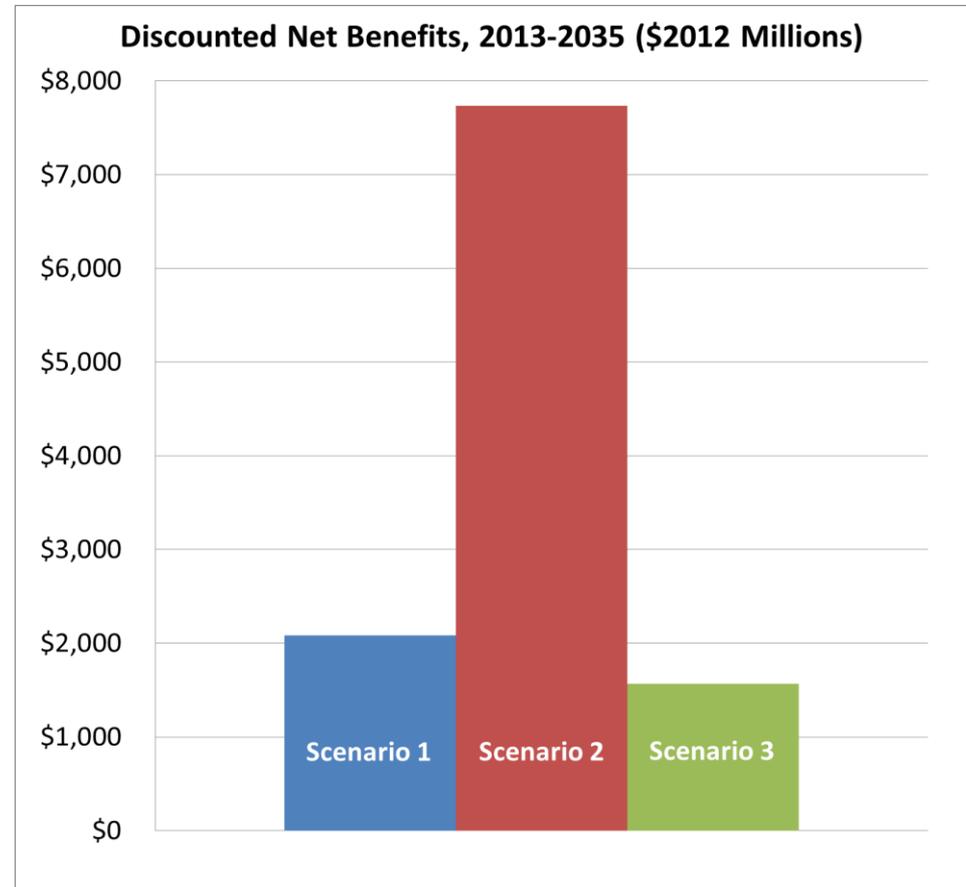
# Energy Security: Fuel Diversity

- Fuel diversity gains are achievable



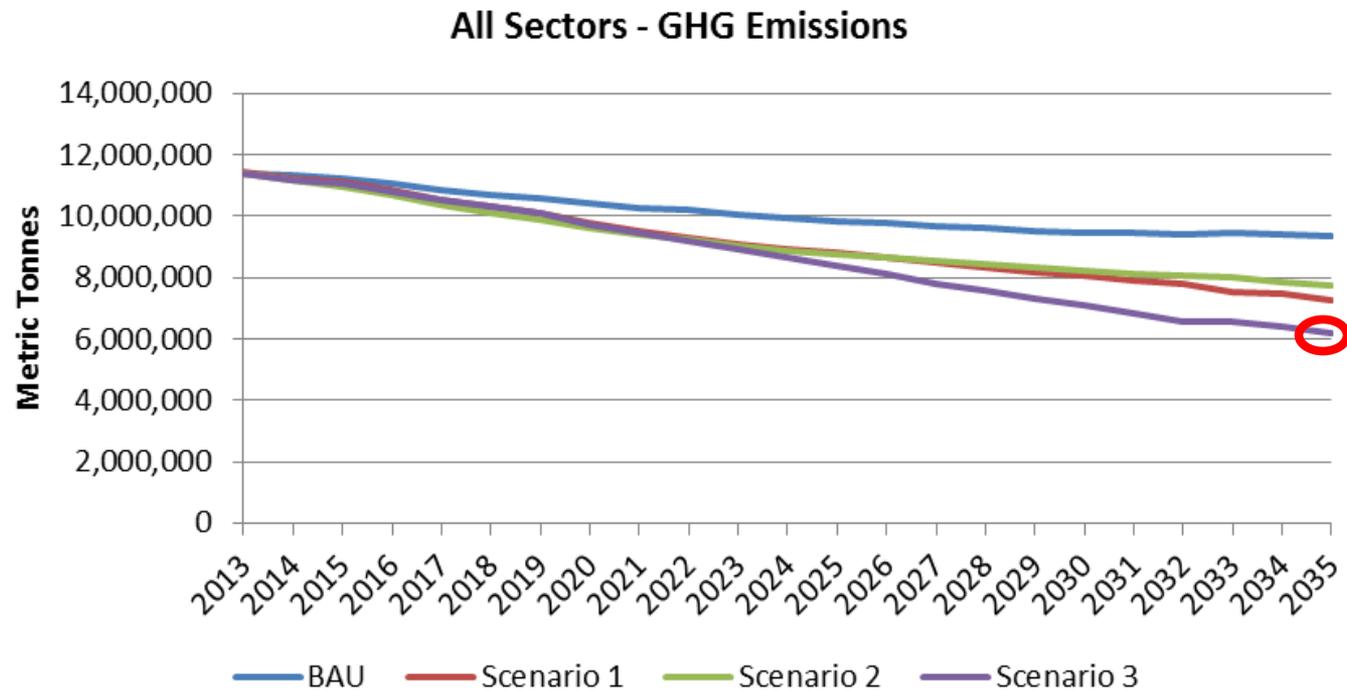
# Cost-Effectiveness: Net Benefits

- **Business-as-Usual is RI's most expensive path**
- **All scenarios are anticipated to provide economy-wide net benefits**
- **All scenarios are net positive first order job creation**



# Sustainability: GHG Reductions

- 45% GHG reductions below 1990 levels by 2035 are achievable



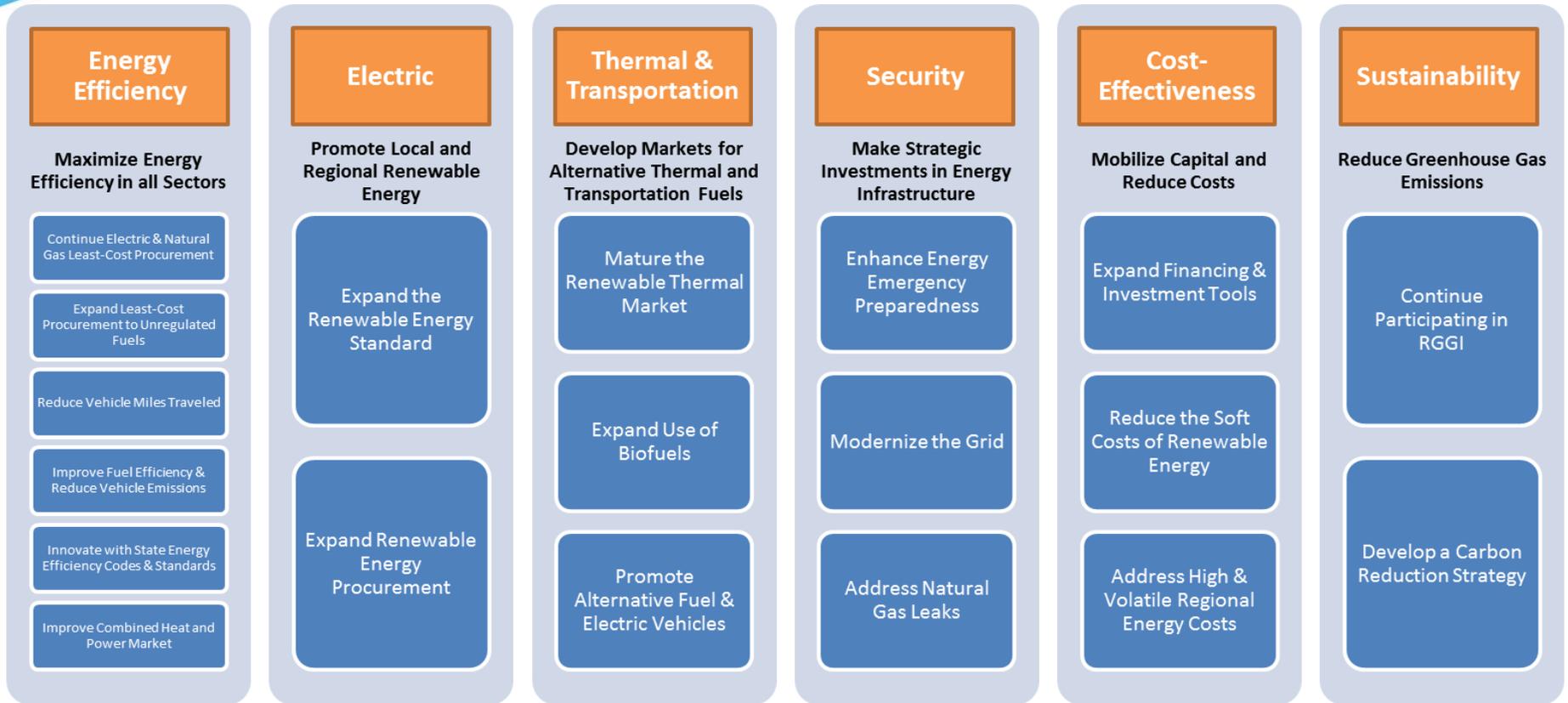
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# Part 3: Policies and Strategies

- **This section lays out a comprehensive implementation plan for meeting the Plan’s goals and performance measure targets**
- **The policies and strategies are meant to provide decision makers with a complete picture of the near- and long-term actions Rhode Island should consider in each sector of the economy—electric, thermal, and transportation**

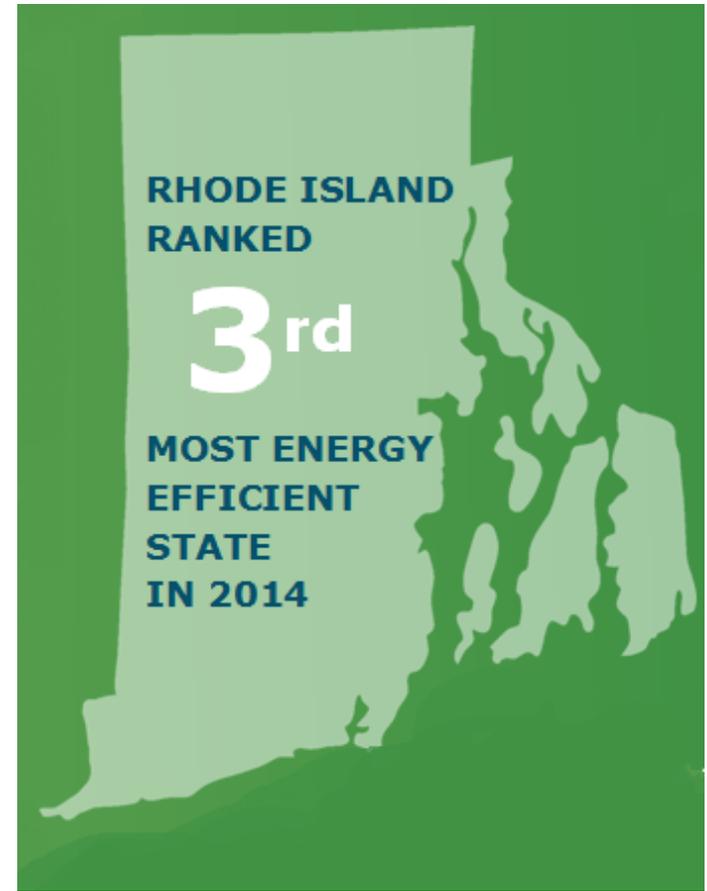
# Part 3: Policies and Strategies



Lead by Example

# Part 3: Policies and Strategies

- **Maximize Energy Efficiency in all Sectors**
  - Continue Electric & Natural Gas Least-Cost Procurement
  - Expand Least-Cost Procurement to Unregulated Fuels
  - Reduce Vehicle Miles Traveled
  - Improve Fuel Efficiency & Reduce Vehicle Emissions
  - Innovate with State Energy Efficiency Codes & Standards
  - Improve Combined Heat and Power Market



# Part 3: Policies and Strategies

- **Promote Local and Regional Renewable Energy**
  - Expand the Renewable Energy Standard
  - Expand Renewable Energy Procurement



# Part 3: Policies and Strategies

- **Develop Markets for Alternative Thermal and Transportation Fuels**
  - Mature the Renewable Thermal Market
  - Expand Use of Biofuels
  - Promote Alternative Fuel & Electric Vehicles



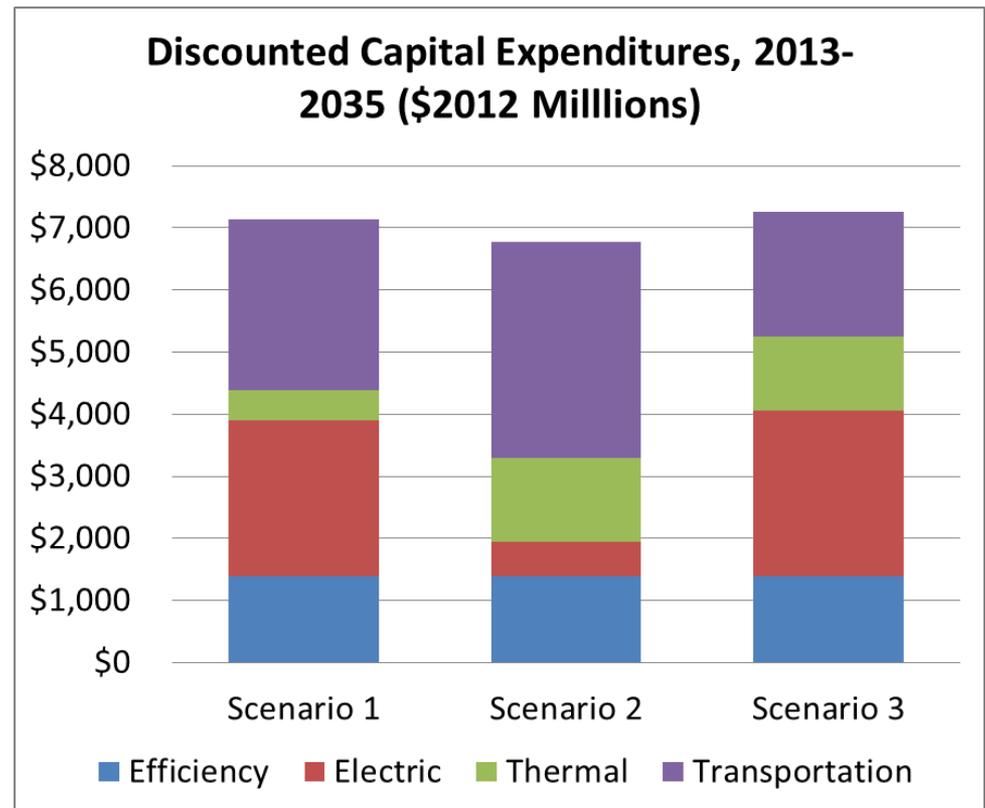
# Part 3: Policies and Strategies

- **Make Strategic Investments in Energy Infrastructure**
  - Enhance Energy Emergency Preparedness
  - Modernize the Grid
  - Address Natural Gas Leaks



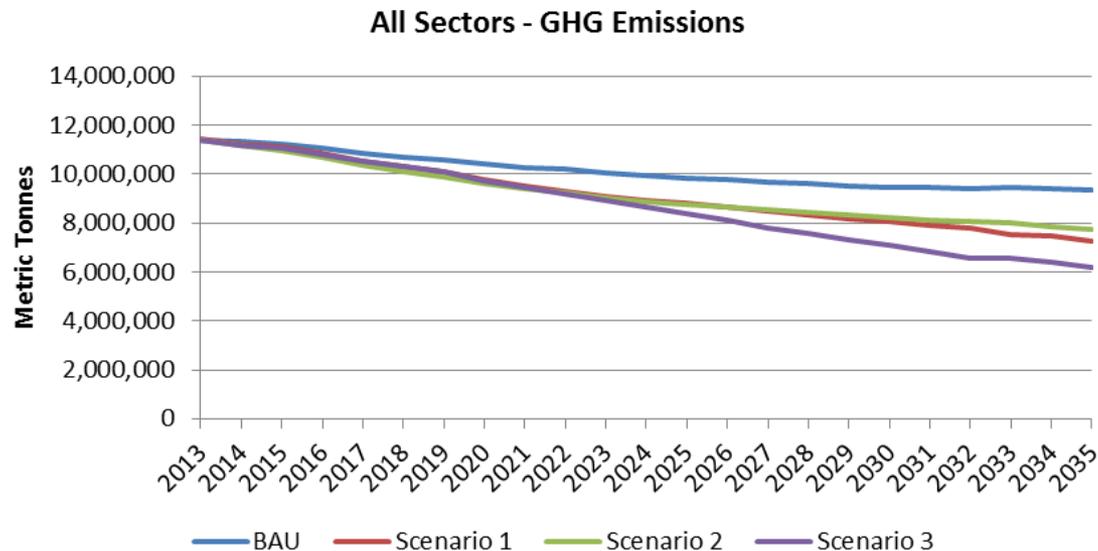
# Part 3: Policies and Strategies

- **Mobilize Capital and Reduce Costs**
  - Expand Financing & Investment Tools
  - Reduce the Soft Costs of Renewable Energy
  - Address High & Volatile Regional Energy Costs



# Part 3: Policies and Strategies

- **Reduce Greenhouse Gas Emissions**
  - Continue Participating in RGGI
  - Develop a Carbon Reduction Strategy



# Part 3: Policies and Strategies

- **Lead by Example**

- State

- Municipal

<b>Municipal Energy Sectors</b>	<b>Sample Implementation Actions</b>
Energy Efficiency and Buildings	Conduct a municipal <b>energy use baseline</b> and develop a <b>plan to reduce public sector energy</b> consumption
	Seek <b>Property Assessed Clean Energy (PACE)</b> designation for your city/town
Renewable Energy	Adopt zoning policies and <b>siting standards for renewable energy</b> projects
	Use an <b>expedited application and permit process</b> for renewable energy facilities
Transportation and Land Use	Replace end-of-life municipal-owned vehicles with <b>high fuel efficiency and/or electric vehicles</b>
	Adopt <b>property tax and zoning policies</b> that preserve open space and promote "smart growth"

# Thank You!

**Danny Musher**  
**Office of Energy Resources**  
**[danny.musher@energy.ri.gov](mailto:danny.musher@energy.ri.gov)**  
**401-574-9112**

# Supplemental Slides

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# Business-as-Usual Forecast

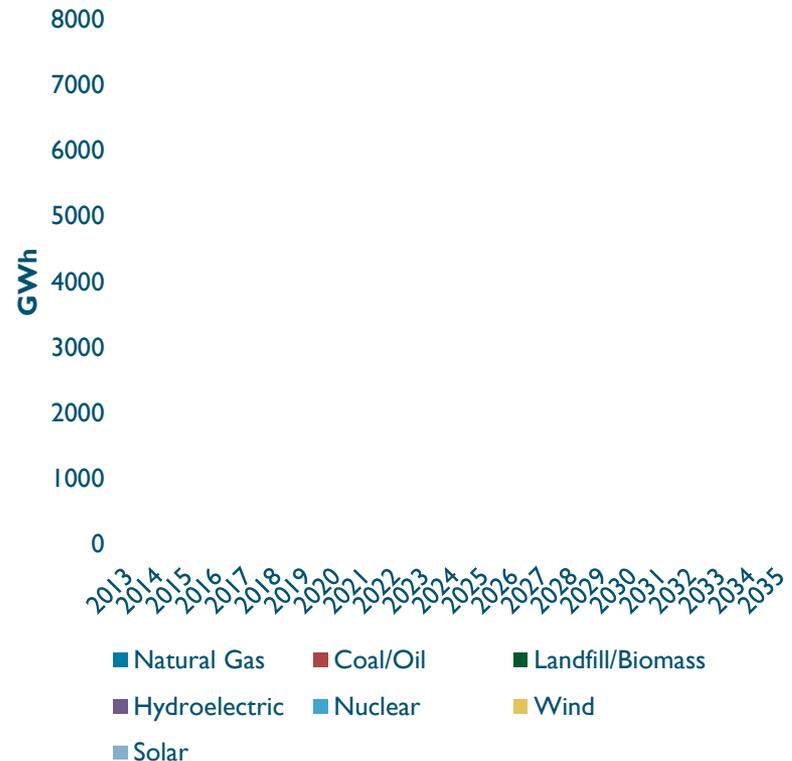
- **Electric Demand Decreasing**

- 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)

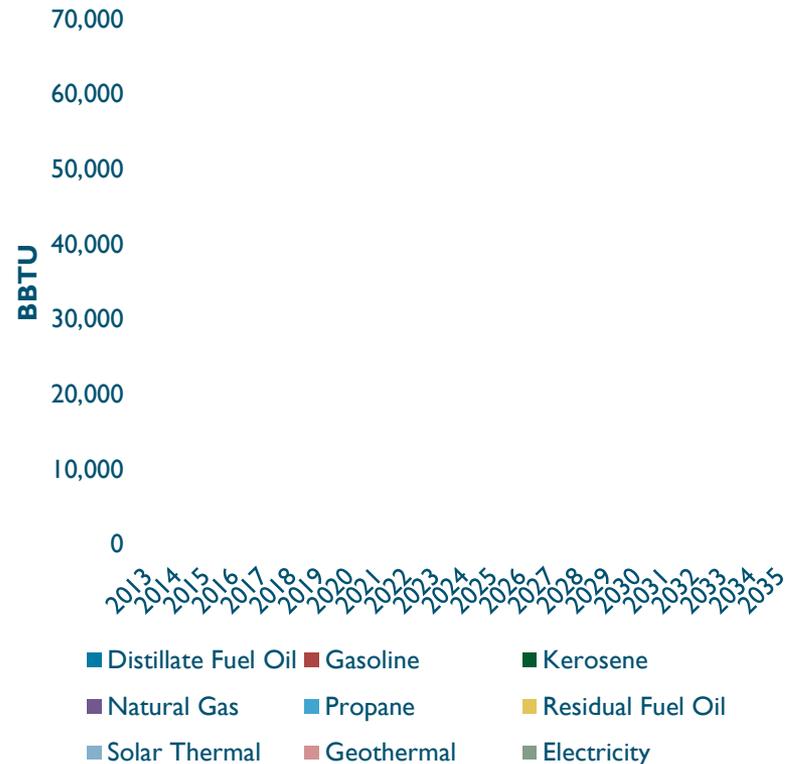


# Business-as-Usual Forecast

- **Thermal Demand Decreasing**

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

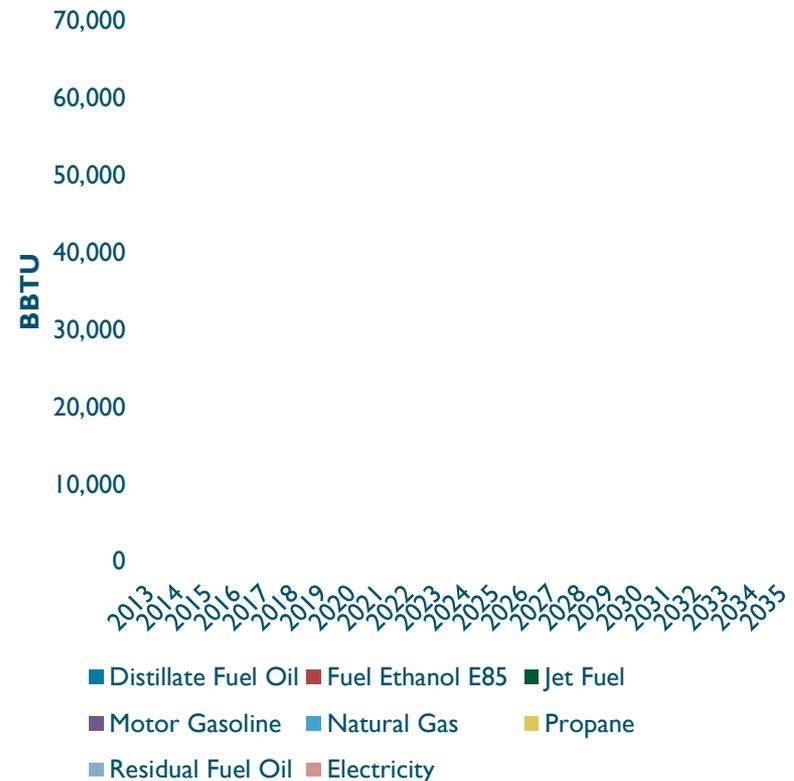
RI Thermal Demand  
Business As Usual (BAU)



# Business-as-Usual Forecast

- **Transportation Demand Decreasing**
  - Federal Corporate Average Fuel Economy (CAFE) Standards
    - >10% projected GHG reductions
    - 17% project decrease in gasoline consumption
  - Zero Emission Vehicle (ZEV) MOU
    - 3.3 million ZEVs in participating states

RI Transportation Demand Business As Usual (BAU)



# Contents of the Plan

- **Introduction and Vision**
- **Part 1: Overview of Energy in Rhode Island**
- **Part 2: Goals and Performance Measure Targets**
- **Part 3: Policies and Strategies**
  
- **Appendix A: Rhode Island Energy Laws**
- **Appendix B: A Portfolio of Strategies**
  
- **Technical Report #1: Business-as-Usual Forecast (ENE)**
- **Technical Report #2: Scenario Modeling (Navigant Consulting)**

# Scenario Modeling

- The RISEP scenario modeling analyzed the impacts of three unique alternative energy futures
- Three scenarios focused on each of the three RISEP themes energy security, cost-effectiveness, and sustainability
- Each scenario considered different changes to Rhode Island's demand and supply resource portfolio and evaluated resulting impacts

## Scenario 1 (Security)

- Prioritizes energy security through fuel diversification and grid modernization

## Scenario 2 (Cost-Effectiveness)

- Prioritizes cost-effectiveness and economic development while hitting key targets for GHG reduction

## Scenario 3 (Sustainability)

- Prioritizes the sustainability of Rhode Island's energy economy through the widespread deployment of renewables, thermal alternatives, and vehicle electrification

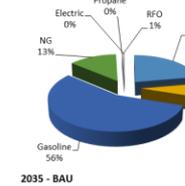
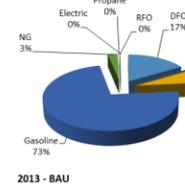
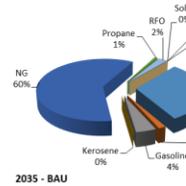
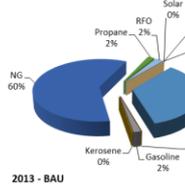
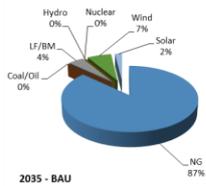
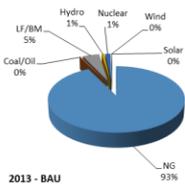
# Scenario Modeling

Electric sector: 2013 vs 2035

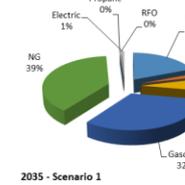
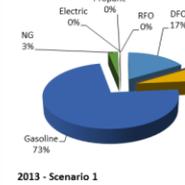
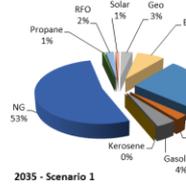
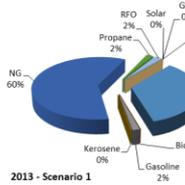
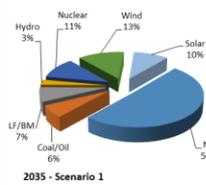
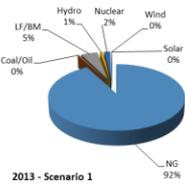
Thermal sector: 2013 vs 2035

Transportation sector: 2013 vs 2035

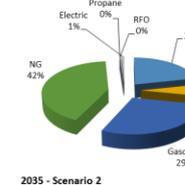
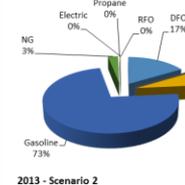
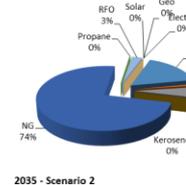
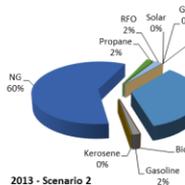
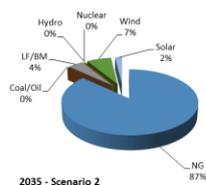
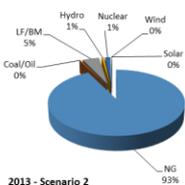
Business-as-usual



Scenario 1 (Security)



Scenario 2 (Cost-Effectiveness)



Scenario 3 (Sustainability)

