RI 2025 Climate Action Strategy and CCAP

Energy Focus Area Meeting

May 9, 2025

[bw] RESEARCH PARTNERSHIP

Lighthouse Consulting Group, Inc.

Energy+Environmental Economics

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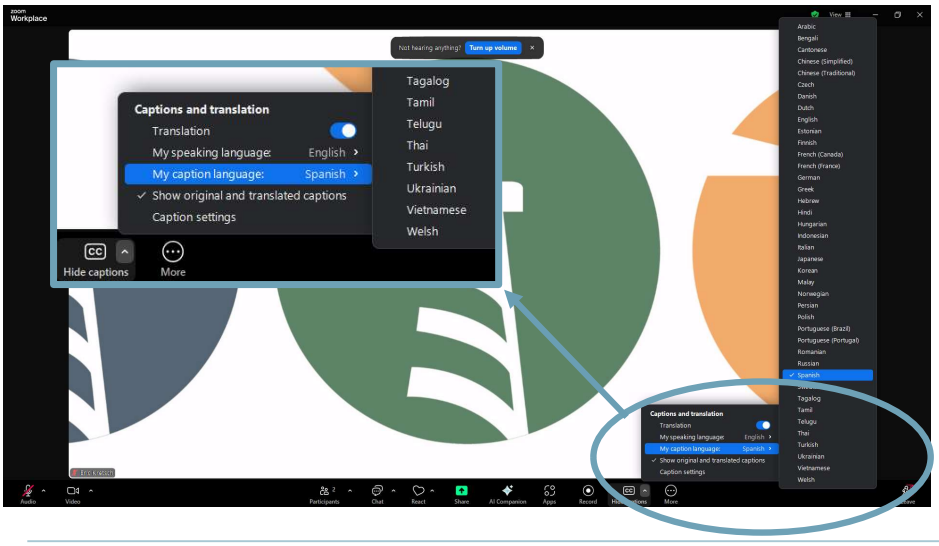

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Ground rules and guidelines to participation

This workshop is being recorded so we can accurately capture your comments. We do not intend to post this recording publicly.

Power off other electronics and mute yourself to limit distractions.

Make space and take space. Be mindful of how much airtime you take, but we encourage you to voice your support and concern.

There are multiple ways to participate:

- Raise your hand to be called on
- Use the chat feature
- Utilize the Survey Monkey Form, so that we capture all you have to say.

Thank you in advance for your participation.

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Agenda

- **Welcome and introductions**
- **Project overview and status**
  - Project goals and status
  - What we've heard thus far
  - Equity framework
- **Electricity sector introduction**
  - Breakout session #1 – Opportunities and barriers
- **Overview of modeling approach**
  - Breakout session #2 – Key considerations
- **Next steps and wrap up**

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Introductions

Energy and Environmental Economics (E3)

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Project Director

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Modeling Specialist

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Project Goals

The overarching goal of this project is to create the RI Comprehensive Climate Action Plan (CCAP) for the Climate Pollution Reduction Grant (CPRG) program and the RI 2025 Climate Action Strategy as part of RI's Act on Climate

+ **The RI CCAP and RI 2025 Climate Action Strategy will consist of:**
  - Robust stakeholder engagement
  - GHG reduction measures modeling and sector-specific GHG target development
  - Policy, technology and cost analyses
  - Macroeconomic, workforce, climate resilience, and benefits analysis
+ **Key elements of each plan will include:**
  - Energy efficiency in buildings and transportation
  - Transition away from fossil fuel
  - Transition to renewable electric power
  - The removal of carbon from the air through land use and forest conservation
  - A just transition for workers
  - Considerations for energy affordability with customers' utility bills
  - Benefits to environmental justice and low-income and disadvantaged communities (LIDAC)

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All Topic Areas for Engagement

How will climate mitigation efforts affect jobs, workforce and businesses? How can RI ensure a just transition as the economy decarbonizes?	What are the most effective strategies to ensure the communities most affected by climate change benefit from GHG reduction measures?	How does decarbonization in RI affect the electric sector? What role do electric and gas utilities play in reducing emissions?
Workforce*	**EJ, equitable transition***	**Energy**
Which subsectors are the biggest contributors to RI's emissions? What strategies should be prioritized to reduce transportation emissions?	What is the role of municipalities in decarbonizing RI's economy?	What pathways for reducing building related emissions should be prioritized?
Transportation	**Municipalities**	**Buildings**

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* These topics will be infused throughout ALL conversations, but also will have their own sessions

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Today's Focus

How will climate mitigation efforts affect jobs, workforce and businesses? How can RI ensure a just transition as the economy decarbonizes?	What are the most effective strategies to ensure the communities most affected by climate change benefit from GHG reduction measures?	How does decarbonization in RI affect the electric sector? What role do electric and gas utilities play in reducing emissions?
Workforce*	**EJ, equitable transition***	**Energy**
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Transportation	**Municipalities**	**Buildings**

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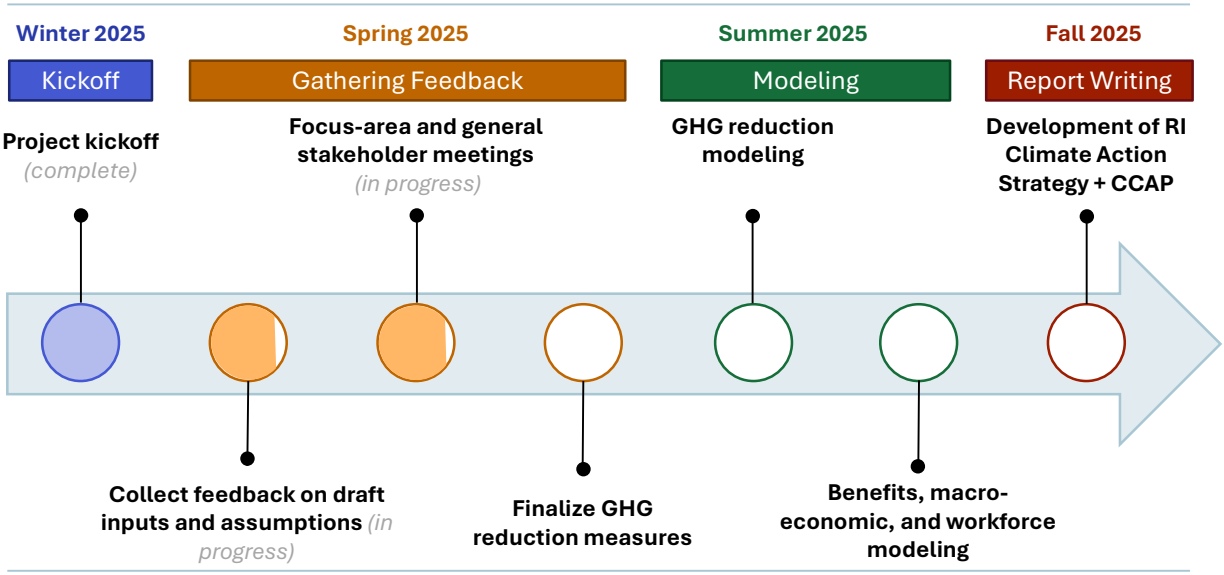
Project Status and Timeline



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The Role of an Equitable Transition in the RI Climate Action Strategy

The Act on Climate dictates that the RI Climate Action Strategy (RI CAS) *"shall include an equitable transition to climate compliance for environmental justice populations, redress past environmental and public health inequities, and include a process where the interests of and people from populations most vulnerable to the effects of climate change and at risk of pollution, displacement, energy burden, and cost influence such plan."*

Prioritize GHG Reduction Strategies that Advance Equity and Environmental Justice

Collaborate with Communities Most Impacted by Climate Change and Policies

Consider Decarbonization Cobenefits* and Energy Costs

*Decarbonization cobenefits include improved air quality, workforce development, and increased climate resilience

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Questions?

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Electricity Sector Introduction

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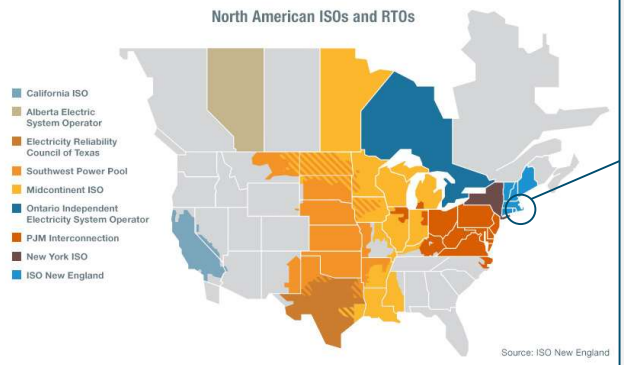
Rhode Island's Role in the New England Power Grid

North American ISOs and RTOs



There are nine Independent System Operators (ISOs) and Regional Transmission Organizations (RTOs) in North America.

RI is part of **ISO New England** and shares electricity with other New England states.

ISO New England maintains the region's power grid and wholesale power markets. ISO New England is responsible for ensuring reliable electricity, planning for future energy needs, upgrading grid infrastructure, and supporting the transition to cleaner energy.

Because RI is part of a larger energy system, decisions that affect the broader electric grid – such as those about energy infrastructure upgrades or resource needs – are made at the regional level and require regional coordination.

In 2023, RI used approximately 7,600 GWh of electricity and generated approximately 10,300 GWh of electricity, meaning it exported about 2,700 GWh of electricity.*

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*Source: ISO NE's Energy, Load, and Demand Reports

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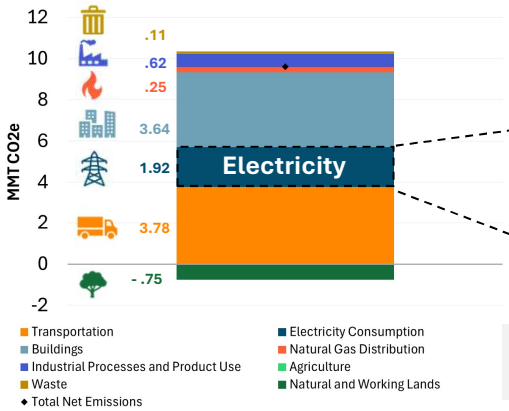
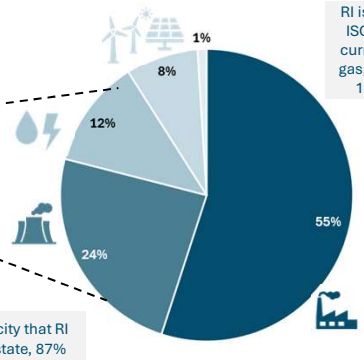
Electricity Emissions in RI

+ **RI emitted 10.4 MMT CO2e total greenhouse gas emissions in 2022, with electricity consumption contributing 19%**
+ **Electricity consumption emissions stem primarily from the combustion of fossil fuels at power plants**

RI Emissions in 2022 (MMT CO2e)



ISO-NE Electricity Resource Mix in 2024 (%)



RI is a part of ISO-NE. ISO- NE's grid mix is currently 55% natural gas, 24% nuclear, and 12% renewables.

Of the electricity that RI produces in state, 87% comes from natural gas

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Sources: RI 2022 GHG Inventory, ISO NE Resource Mix (note the grid mix shown is for 2024, and emissions are from 2022)

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Key Considerations for Decarbonizing the Electric Sector

Meet Energy Demand through Renewable Energy

- Meeting RI's energy needs through 100% renewable sources by 2033 as mandated by the Renewable Energy Standard (RES)

Modernize the Electric Grid

- Modernizing the transmission and distribution system to deliver electricity efficiently and reliably
- Integrating distributed energy resources (DERs) into the grid
- Upgrading monitoring and control equipment

Track and Reduce Energy Use

- Allowing consumers to track energy use in real time through the installation of smart meters
- Advancing energy efficiency programs to reduce emissions and utility bills

Address Energy Costs

- Ensuring that communities have access to affordable and reliable energy
- Balancing climate objectives and customer utility bill impacts

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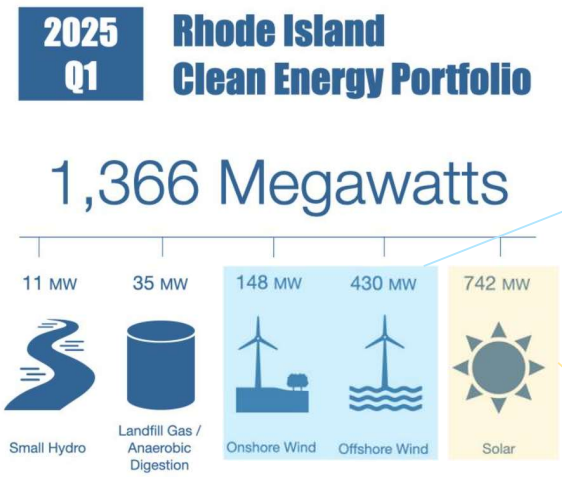
RI's Current In-State Clean Energy Portfolio



The majority of RI's current clean energy portfolio comes from wind and solar power plants

- Block Island Wind Farm, a 30 MW offshore wind project, came online in 2016 (first in US)
- Revolution Wind is a **704 MW** offshore wind project off the coast of RI that is expected to be fully operational in late 2026
  - **RI has secured 400 MW** of the 704 MW in a long-term power purchase agreement, with the other 304 MW contracted to CT

As of early 2025, solar energy, mostly comprised of rooftop residential/commercial and community solar, totaled 742 MW capacity

Source: RI Office of Energy Resources, Energy Storage Dashboard
Data last updated *February 5, 2025*. Retrieved April 30, 2025 from: https://energy.ri.gov/renewable-energy/energy-storage-0

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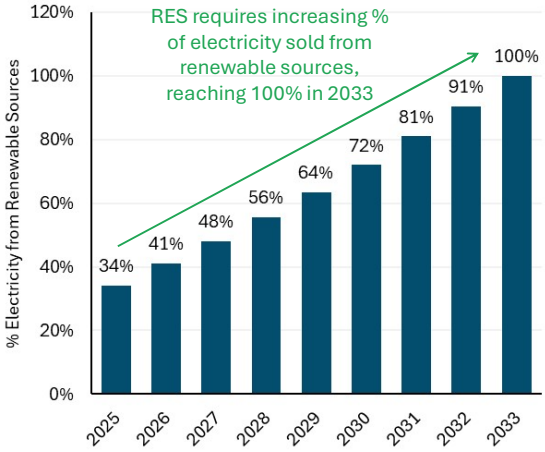
RI's Renewable Energy Standard (RES)

- **Rhode Island has enacted a Renewable Energy Standard (RES) that requires that 100% of electricity sold in RI be generated from renewable sources by 2033, with annual targets**
- **RES compliance does not require physical procurement of electricity from renewable sources, i.e., it is not a production target**
- **Electricity suppliers meet targets through the purchase of Renewable Energy Certificates (RECs) or by making an alternative compliance payment to the state's Renewable Energy Development Fund.**
  - One REC represents the attribution of one MWh of power generated through a renewable resource; Electric utilities can purchase RECs to represent an increasing percentage of the power they sell annually
  - RI will need to purchase a significant number of RECs to comply with the RES, with the RI Public Utilities Commission (RIPUC) estimating over 8M RECs (MWh) needed by 2033

% of Electricity Sold from Renewable Sources



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Source: Implementation of a Renewable Energy Standard (810-RICR-40-05-2). Microsoft Word - 810-RICR-40-05-2_DOS_Proposed (1).

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Summary

- **As of 2022, electricity consumption in Rhode Island made up 19% of total GHG emissions**
- **RI is part of ISO-NE; ISO- NE's grid mix is currently 55% natural gas, 24% nuclear, and 12% renewables**
  - 87% of electricity generated within RI is from gas; RI doesn't produce or store gas but imports it through pipelines
- **ISO New England is responsible for maintaining the region's power grid, ensuring reliability, and planning for future energy needs**
- **RI has a Renewable Energy Standard of 100% retail electricity sales being renewable by 2033; Compliance is met through Renewable Energy Certificates (RECs) or compliance payments**
- **Key considerations for decarbonizing the electricity sector include:**
  - Reaching 100% renewable electricity sales by complying with RI's Renewable Energy Standard (RES)
  - Modernizing the electric grid and ensuring reliability
  - Tracking and reducing energy use
  - Considering affordability of household energy bills
- **As of early 2025, RI had 1,366 MW of renewable energy operational and under contract, mostly from wind and solar**

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Breakout Session #1

- **What are the greatest opportunities for decarbonizing the energy sector in Rhode Island?**

¿Cuáles son las mayores oportunidades para descarbonizar el sector energético en Rhode Island?

- **Where do you see opportunities to reduce both emissions and energy costs at the same time? How can a more sustainable energy system advance equity in Rhode Island?**

¿Dónde ve oportunidades para reducir simultáneamente las emisiones y los costos energéticos? ¿Cómo puede un sistema energético más sostenible promover la equidad en Rhode Island?

- **What are the greatest barriers for decarbonizing the energy sector in Rhode Island?**

¿Cuáles son las mayores barreras para descarbonizar el sector energético en Rhode Island?

- **How do utility costs create barriers to participation in Rhode Island's renewable energy transition?**

¿Cómo crean los costos de los servicios públicos barreras a la participación en la transición a la energía renovable de Rhode Island?

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Overview of Modeling Approach

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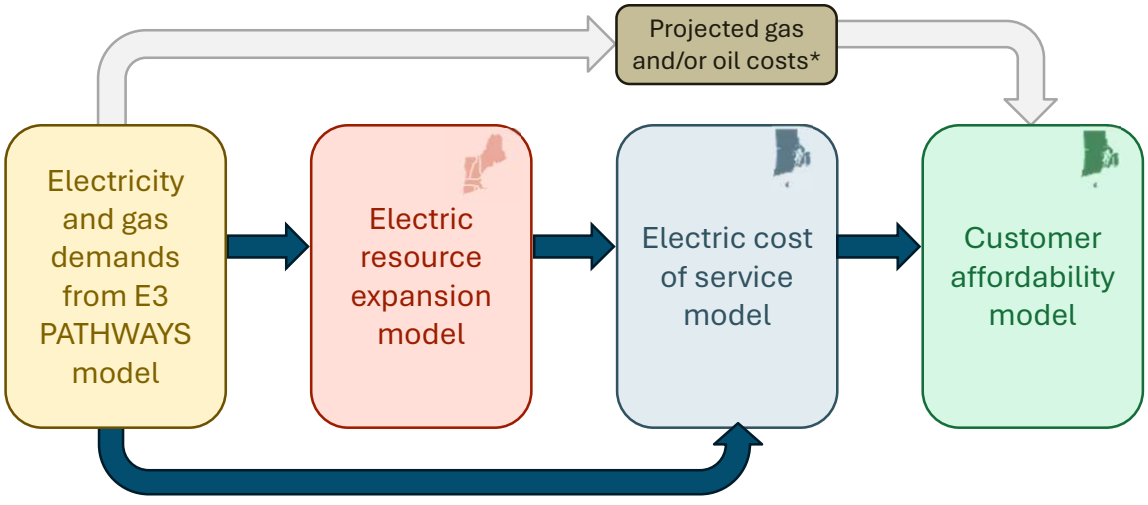
Simplified Energy Sector Model Framework



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*This analysis will include a high-level projection of future gas costs, leaning on the findings from the Future of Gas study. Fuel oil costs can also be explored.

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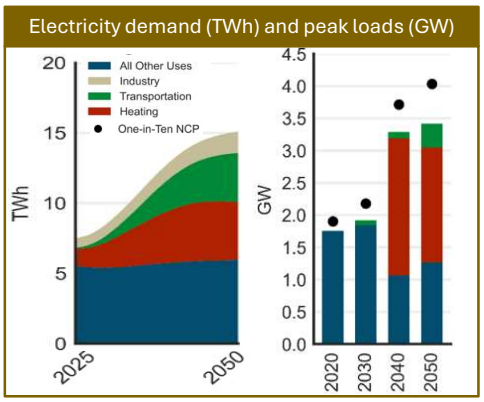
Electric Demand and Load Shaping Projection

Key Components

Electricity and gas demands from E3 PATHWAYS model



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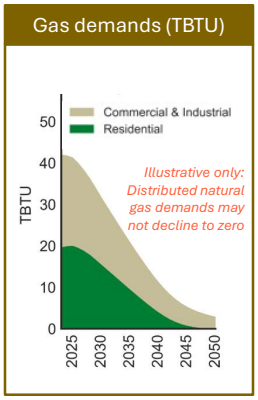

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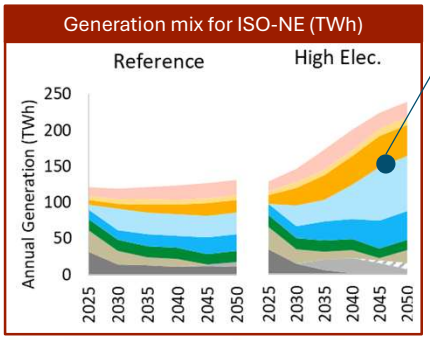
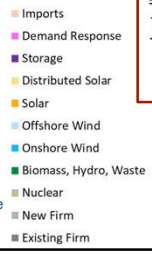
Electric Resource Expansion Model

Key Components

Electric resource expansion model

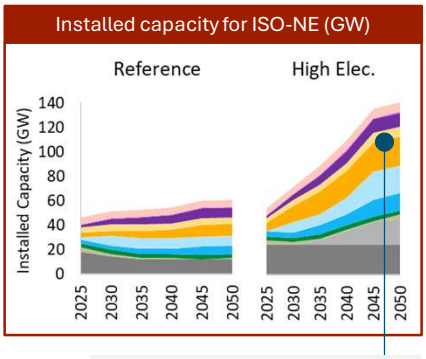


Capacity expansion example results shown here are from RI Future of Gas. Findings subject to change.



Source: Rhode Island Investigation into the Future of the Regulated Gas Distribution Business, Technical Analysis Report

From prior study, results showed that renewable generation in NE would be dominated by wind and solar in future years



Results from prior study showed substantial increase in renewables leading to nearly 3x higher installed capacity needs by 2050.

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Electric Resource Expansion Model

- **E3 will use the existing ISO New England (ISO-NE) PLEXOS model* to capture future generation and capacity needs under different levels of electrification and load growth**
- **The existing ISO-NE PLEXOS model was optimized for least-cost electric resource portfolios**
- **These portfolios comply with key New England policies, such as:**
  - **100% Renewable Electricity Standard (RES)** in Rhode Island by 2033
  - **Offshore wind procurement requirements** in MA (5.6 GW by 2027) and RI (600-1000 MW by 2030)
  - **ISO-NE's reliability standard** to ensure the future electricity system retains reliability in compliance with current industry standards

ISO new england

PLEXOS

*PLEXOS is an energy market simulation tool that simulates generation and transmission capacity expansion given specific assumptions about future electric load, technology costs, fuel prices, and policy. PLEXOS Energy Modeling Software

Cost of Service Model (Revenue Requirement)

Key Components

Electric cost of service (revenue requirement) model

Current cost of service

Generation costs:
- Cost to purchase energy
- Capacity and ancillary services cost

Non-generation costs:
- Regional transmission costs
- Distribution costs

Future cost of service

Changes in generation costs
Variable cost of generation (fuels, O&M), fixed cost of generation for existing and new resources

Changes in non-generation costs
Existing and new non-generation costs for transmission and distribution infrastructure

Electric rate projections

Note: This analysis will use current assumptions about how electric service costs are distributed among customer groups. It will also use existing rate structures when projecting future rates.

Major Inputs & Assumptions for Electricity Sector Modeling

- **Renewable Energy Certificates (REC) prices**
  - 100% Renewable Energy Standard (RES) requires 100% renewable retail electricity sales in RI by 2033, which will primarily be met via purchases of Renewable Energy Certificates (RECs)
- **Offshore wind**
  - Rhode Island has a legislated goal to procure 600-1,000 MW of capacity of offshore wind by 2030
  - The Revolution Wind project will add 400 MW of offshore wind capacity to RI in 2026
- **Cost of renewables**
  - The team will be vetting the most recent costs of renewables and strategizing with RI to determine a realistic outlook for their costs
- **Inflation Reduction Act (IRA) tax credits**
  - Federal incentives, which have been threatened by the Trump administration, affect renewable resource costs

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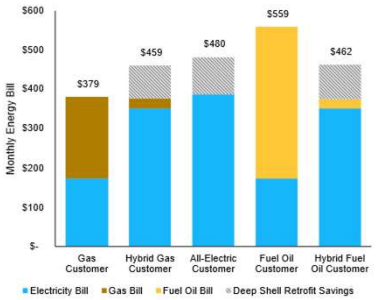
Affordability Model

Outputs

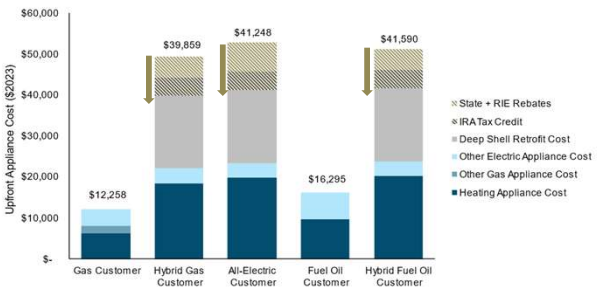
Customer Affordability Model

- **The affordability tool outputs will include:**
  - **Monthly energy bills** for customers by customer type (residential single family, residential multifamily, commercial)
  - **Total upfront appliance costs** by customer type (e.g., single family gas customer, single family all-electric customer, etc.)
  - **Energy burden** calculations, which is equivalent to annual utility bills divided by annual household income

Ex. Affordability Metrics for Different Customer Types (2023*)



Ex. Upfront Costs for Different Customer Types (2023)**



Source: Rhode Island Investigation into the Future of the Regulated Gas Distribution Business, Technical Analysis Report Presentation

*Monthly energy bills for residential Single Family pre-1960s home
** Upfront costs for residential Single Family pre-1960s home

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What's Covered in the Analysis

What is included in the modeling

- Least-cost electric resource portfolio for ISO-NE. Specific outputs include:
  - New resources selected by year
  - New bulk/local transmission projects selected
  - Hourly dispatches of resources in portfolio
  - Total investment, fuel, supply, and system costs by year
  - Total electric sector GHG emissions
- Current and future cost of electric service projections, using current cost allocations across customer classes.
- Affordability analysis that examines the impact of adopting different types of decarbonized technologies, e.g., all-electric heat pump) on customer utility bills and upfront costs.
  - Customer utility bill calculations assume current rate structure.
- High level projection of future natural gas costs.

What is not included in the modeling

- Cost of service calculations assuming future changes to cost allocation methodologies.
  - I.e., the analysis will be grounded in the current cost of service framework that includes existing assumptions about how system costs are allocated across different customer classes (e.g., residential, commercial, industrial).
- Alternative rate design options or how rates may or may not be redesigned in the future to address equity or the economics of electrification.
  - I.e., in projecting future electricity rates, this analysis will apply the existing rate structures currently in place.
- Detailed gas system revenue requirement modeling.
- Detailed exploration of alternative futures for regulated distributed gas (see Future of Gas Docket-22-01-NG)

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Questions?

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Breakout Session #2

+ **What considerations for the energy sector are most important to you?**

¿Qué consideraciones para el sector energético son las más importantes para usted?

+ **As we plan for a renewable energy future, how should we account for the cost of electricity?**

Al planificar un futuro con energía renovable, ¿cómo debemos tener en cuenta el costo de la electricidad?

+ **What strategies to advance decarbonization efforts in the electricity sector should be prioritized in the RI Climate Action Strategy?**

¿Qué estrategias para avanzar en los esfuerzos de descarbonización en el sector eléctrico deberían priorizarse en la Estrategia de Acción Climática de RI?

+ **What strategies should the state prioritize to balance energy costs while still meeting climate goals?**

¿Qué estrategias debería priorizar el Estado para equilibrar los costos energéticos y al mismo tiempo cumplir con los objetivos climáticos?

+ **How should RI consider electric reliability? Is the level of reliability today satisfactory? How will expectations and needs change as we electrify household devices and vehicles?**

¿Cómo debería RI considerar la confiabilidad eléctrica? ¿Es satisfactorio el nivel de confiabilidad actual? ¿Cómo cambiarán las expectativas y necesidades a medida que electrifiquemos los electrodomésticos y vehículos?

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Wrap-up Question

What energy topics discussed today are most important to you?

¿Qué temas energéticos discutidos hoy son los más importantes para usted?

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Mentimeter

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Wrap Up and Next Steps

- E3 and RI will consider feedback from this session throughout the electric sector modeling process
- Please feel free to submit additional feedback on the role of the energy sector using the SmartComment Portal or Meeting Survey:

SmartComment portal:
https://ri.commentinput.com/?id=em4auDNSK

https://www.surveymonkey.com/r/RICASEnergySurvey

- E3 and BW will complete the quantitative GHG and workforce modeling over the summer
- Additional engagement opportunities will be in the fall; more details to come

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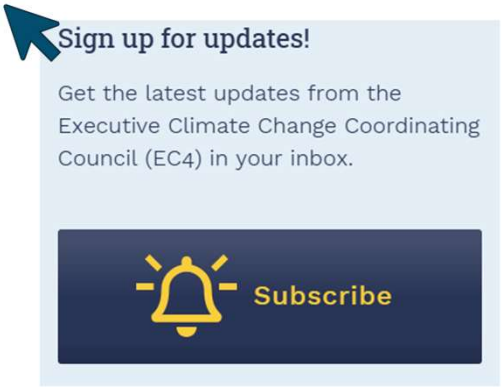
Staying in the Loop on the 2025 Strategy

Sign up to receive ongoing announcements about engagement on the RI 2025 Climate Action Strategy HERE



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Thank You

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How did we do? Help improve future engagement events

English

Español

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Appendix

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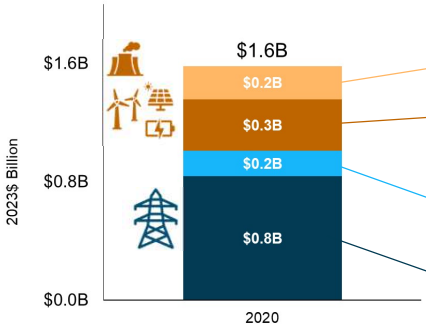
Revenue Requirement Model

Cost of Service

Revenue Requirement Model

+ The electric revenue requirement model calculates the total cost to provide electric service. This cost must be recovered through customer rates.
+ E3's revenue requirement model starts with the current electric cost of service (derived from public data) and is benchmarked to Rhode Island Energy's previous regulatory filings. The model then projects electric cost of service into the future, considering incremental generation costs and incremental costs for transmission & distribution upgrades.



Current

- Energy: cost to purchase energy at locational marginal energy prices (LMPs)
- Non-Energy: Capacity and ancillary services Cost
- Regional Tx: Regional Net Load costs that cover the use of Tx facilities operated by ISO-NE
- Delivery: Regulated component of the cost including distribution charges, open access transmission tariffs, and others

Future

Changes in generation costs:

- **Variable cost of generation** (fuels, variable O&M, market purchases)
- **Fixed cost of generation** for existing resources that may retire
- **Fixed cost of generation for new resources** including new renewables to meet electricity targets or new capacity resources to meet increasing peak demand.

Changes in non-generation costs:

- **Existing non-generation costs** for current T&D infrastructure
- **New investment in T&D infrastructure** to meet increasing peak demand

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Source: Rhode Island Investigation into the Future of the Regulated Gas Distribution Business, Technical Analysis Appendix A

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Revenue Requirement Model

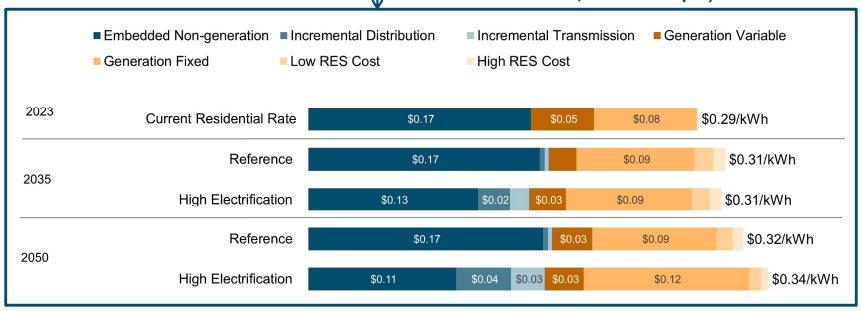
Electricity Rates

Revenue Requirement Model

+ Once the total cost of service ("revenue requirement") is calculated, electricity rates are determined by dividing the revenue requirement by total retail sales (kWh)

Total Revenue Requirement ($) / **Electricity Retail Sales by Customer Class (kWh)** = **Electricity Rate ($/kWh)**

Residential Electric Rates by Scenario (from Future of Gas, as an example)



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Source: Rhode Island Investigation into the Future of the Regulated Gas Distribution Business, Technical Analysis Report

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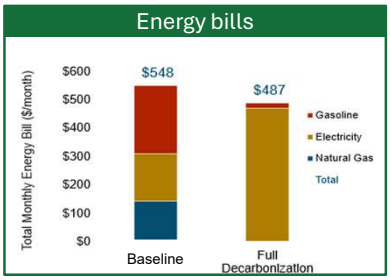
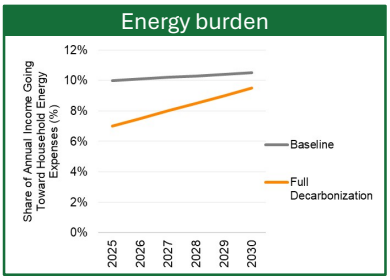
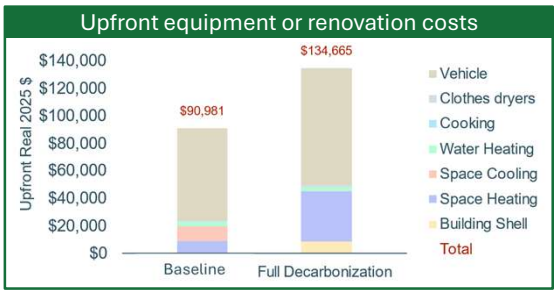
Affordability Tool

Key Components

Customer affordability model







ALL FIGURES ARE ILLUSTRATIVE ONLY

Energy+Environmental Economics

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