



*9/2/2022*

**ADDITIONAL DRAFT CHAPTERS OF THE ‘2022 UPDATE”**

- 1. PRIORITY ACTIONS FOR THE ELECTRIC SECTOR**
- 2. PRIORITY ACTIONS FOR THE TRANSPORTATION SECTOR**
- 3. PRIORITY ACTIONS FOR THE THERMAL SECTOR**

**RHODE ISLAND EXECUTIVE CLIMATE CHANGE COODINATING COUNCIL**

## Priority Actions for the Electric Sector

There are two ways to reduce emissions from the electric sector: consume less electricity and meet electricity needs using decarbonized energy resources. Rhode Island can ensure we reduce emissions in the electric sector by enacting a 100% Renewable Energy Standard. Enacting a stronger Renewable Energy Standard will grow demand for renewable energy resources; this, in turn, will require strategic investments in our electric grid to enable timely and efficient integration of these resources, as well as bolstering cost-effective renewable energy within Rhode Island’s portfolio through procurement of offshore wind. All actions must be considered within the larger fabric of policy objectives, and should be refined to improve affordability, equity, land use, and other policy objectives. The following table summarizes priority actions, which are described in more detail below. We additionally summarize recommendations from key recent and relevant studies in recognition that action must happen across the board.

**Table X. Summary of Priority Actions in the Electric Sector**

Action	Impact	Lead(s)	Select Considerations
Implement the 100% Renewable Energy Standard	100% reduction in greenhouse gas emissions when 100% target is achieved through REC retirement	Public Utilities Commission	Track schedule of increasing requirement yearly through 2033
Modernize the electric grid	Enables the electric grid to more readily integrate distributed energy resources and improve customer energy management	Electric distribution utilities propose investments  Public Utilities Commission regulates	Timing of investments, scale of investments, use of technologies
Deploy advanced metering	Enables time-varying utility rate designs; allows customers to better manage their energy use; provides additional visibility into the electric grid	Electric distribution utilities propose investments  Public Utilities Commission regulates	Interaction with grid modernization proposal, timing of deployment, subsequent rate design
Procure offshore wind	Expands renewable energy generation portfolio	Electric Distribution Utility  Public Utilities Commission regulates	Local economic development, scale and timing, contract structure
Complete RGGI Program Review and implement suggested changes	Supports regional decarbonization	RIDEM	Equitable investments

### *Implement the 100% Renewable Energy Standard*

During the 2022 legislative session, a 100% Renewable Energy Standard (RES) was enacted by the RI General Assembly. The RES ensures we decarbonize the electric sector with yearly targets. Rhode Island's Renewable Energy Standard is an existing statutory mechanism by which we can require electricity suppliers to meet an increasing percentage of retail electric sales from renewable energy resources. The Renewable Energy Standard also sets forth an accounting methodology and process to ensure compliance.

The newly passed Renewable Energy Standard, enacted in 2004 and revised in 2022, sets a statewide target of 100% renewable energy by 2033. Electric distribution companies and non-regulated power producers comply with the mandate by supplying an increasing percentage of their retail electric sales from renewable energy resources through the purchase and retirement of Renewable Energy Certificates (RECs).<sup>1</sup>

The impact of a 100% RES is that the emissions reduction may be as large as fully eliminating emissions from the electric sector. In 2018, emissions from the electricity consumption were estimated to account for 26.3% of total economy-wide emissions. If a 100% Renewable Energy Standard were met in whole by the purchase of Renewable Energy Certificates, then Rhode Island would reduce its greenhouse gas emissions by 26.3%.<sup>2, 3, 4, 5</sup>

The schedule and yearly targets set forth in the 100% RES bill steadily increase over time starting with an additional four percent of retail electricity sales in 2023 and increases until an additional 9.5% of retail electricity sales are needed in years 2032 and 2033. Additionally, the bill allows for municipalities participating in municipal aggregation to possibly include voluntary renewable energy products to be counted toward the annual targets.

Any impact to electricity costs should be considered within a larger macroeconomic context. For instance, the war in Ukraine has and will continue to result in increased fuel prices, which in turn

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<sup>1</sup> See the discussion on pages 25-28 in the Greenhouse Gas Emissions Inventory chapter for a complete description of how the Renewable Energy Standard works and its interaction with Rhode Island's greenhouse gas emissions inventory.

<sup>2</sup> This simple estimate is *ceteris paribus*: the estimate assumes all else is held equal (e.g., no increase in electricity consumption) and only the Renewable Energy Standard is changed.

<sup>3</sup> More completely: Rhode Island would reduce its emissions by 26.3% below 2018 levels. Emissions resulting from electricity consumption in 1990 were estimated using a different methodology that prevents robust sector-specific comparison between years.

<sup>4</sup> This statement is true if our annual emissions accounting methodology is in place. If instead Rhode Island were to move to a more temporally granular method of emissions accounting, then the emissions reduction impact of a 100% Renewable Energy Standard would be smaller. If hourly accounting capabilities are available, Rhode Island can then consider the value of enacting a more stringent Renewable Energy Standard that requires the timing of renewable energy production (or more specifically, its release into the electric grid for retail consumption) to match the timing of demand. See, for example, Massachusetts's Clean Peak Standard or discussions of private investment in 24/7 clean energy. Moving to this level of standard would not be without cost (e.g. required for energy storage build out), so we recommend first prioritizing increasing the Renewable Energy Standard and then exploring any further enhancements in the 2030s and 2040s, when hourly accounting capabilities exist for both emissions and Renewable Energy Certificates and energy storage is more commonplace and less expensive.

<sup>5</sup> This estimate excludes emissions resulting from methane leakage in Rhode Island's gas distribution system where that gas is used to fuel electricity generators. As gas-fueled electricity generators decrease production in Rhode Island, emissions from methane leakage will decrease accordingly.

increase electricity supply costs. Communities continue to struggle with economic downturn from the COVID-19 pandemic. Supply chain challenges are not only delaying shipments necessary to our energy landscape but are causing cost increases as well for commonplace technologies. However, implementing the 100% Renewable Energy Standard is arguably the most important Rhode Island can take in ensuring statewide, economywide decarbonization.

### *Modernize the Electric Grid*

Our current electric grid is built for one-way flow of electricity from a few large power generators to many end customers. However, decarbonizing our electric grid necessitates a paradigm of two-way power flow between renewable energy systems of all sizes distributed throughout the electric grid to all customers. Safely, reliably, and affordably building out the electric grid will require electric distribution companies to make strategic investments in technologies for a twenty-first century electric grid.

Grid modernization technologies serve the purpose of managing power flow, protecting workers and customers, improving visibility into electricity consumption and grid conditions, building resilience from power outages, and giving customers more choice and control over their electricity use.

### *Deploy Advanced Meters*

Meters that measure electric (and gas) consumption for utility accounts range in capability from simple counting and aggregation of energy use over a billing period to detailed accounting of consumption throughout minutes-long intervals and real-time communication with customers. Most meters in Rhode Island are more like the former – basic gadgets that report how much energy a customer uses over the course of a month – and they are reaching the ends of their useful and reliable lives.

As Rhode Island considers how to replace its aging meters, advanced meters may be the more cost-effective option that also supports progress toward our climate mandates. The granularity of data and method of data communication that advanced meters use allows for innovative rate designs that deliver appropriate signals about the true cost of electricity use throughout the day and year, enables customers to better understand and control their electricity use, and provides important visibility into the electric grid that allows us to make the most use of our infrastructure.

### *Procure Offshore Wind*

Offshore wind is not only a vital renewable energy resource but a significant economic driver of growth and jobs in Rhode Island. As we move to implement the 100% Renewable Energy Standard, offshore wind will play a critical role in affordable meeting both our in-state renewable energy requirements as well as supporting the region as a whole.

On July 6, 2022 Governor Dan McKee signed a bill into law adding up to 1,000MW more megawatts of offshore wind to Rhode Island's clean energy portfolio. Rhode Island Energy will release a request for proposals for public comment through the Public Utilities Commission in the Fall of 2022. It is expected that any new offshore wind projects procured through the RFP would be operational later in the decade.

### *Complete RGGI Program Review and implement suggested changes*

The [Regional Greenhouse Gas Initiative \(RGGI\)](#) is a cooperative, market-based effort among the states of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Virginia to cap and reduce CO2 emissions from the power sector. It represents the first cap-and-invest regional initiative implemented in the United States. Rhode

Island has continued to be an active participant in RGGI since 2009. A Third Program Review is currently underway throughout 2021-2023, which will inform RGGI program design for future years. Once the ongoing Third Program Review is completed, Rhode Island can examine adopting new program design elements aimed at continued reduction in greenhouse gas emissions in Rhode Island and the region. The 2025 Climate Strategy should be informed by and responsive to the recommendations of the RGGI Third Program Review.

**Table X. Summary of Remaining Recommendations for the Electric Sector from Select Recent and Relevant Studies**

Report Title	
Status	Recommendation
<b>100% Renewable Energy by 2030</b>	
Complete <sup>6</sup>	We must ensure we meet our clean energy goals by advancing a 100% Renewable Energy Standard.
Complete <sup>7</sup>	Continued efforts to decrease energy consumption necessitate extension of Least-Cost Procurement and Nation-Leading Energy Efficiency Programs.
Underway <sup>8</sup>	Maintaining continued support for in-state renewable energy development, while supporting programmatic evolution to deliver more affordable and sustainable outcomes.
Underway <sup>9</sup>	Optimize the electric grid through collaborative, integrated grid planning.
Priority action <sup>10</sup>	Facilitate integration of distributed energy resources by advancing Power Sector Transformation and Grid Modernization.
On the horizon <sup>11</sup>	Build out a strategic role for energy storage technologies.
Underway <sup>12</sup>	Continue regional collaboration on wholesale markets and interstate transmission.
Needs more work	Partner with trusted community organizations to listen, learn, support, and establish foundational definitions. Based on foundational definitions, develop equity metrics with the community to track and monitor progress towards equitable outcomes. Improve outcomes identified and prioritized by communities through rate design, program adjustments, and policy.
<b>Power Sector Transformation</b>	
Implemented <sup>13</sup>	Create a multi-year rate plan and budget with a revenue cap to incentivize cost savings.

<sup>6</sup> Cite RIGL (To be added)

<sup>7</sup> Cite LCP RIGL, extended through YYYY (To be added)

<sup>8</sup> The Division of Public Utilities and Carriers is conducting a study to understand programmatic costs and benefits.

<sup>9</sup> The Office of Energy Resources, National Grid, Regulatory Assistance Project, and Lawrence Berkeley National Lab are developing an exploratory pilot project to understand process options and viability.

<sup>10</sup> Modernizing the electric grid, which includes upgrading metering functionality, is a priority action for the short-term. Other recommendations from the Power Sector Transformation Report are noted within this table.

<sup>11</sup> This recommendation is ripe for further consideration and discussion in the development of the *2025 Climate Strategy*.

<sup>12</sup> See <https://newenglandenergyvision.com/> for more information about this effort.

<sup>13</sup> See [Commission Docket 4770](#).

Ongoing <sup>14</sup>	Shift to a pay-for-performance model by developing performance incentive mechanisms for system efficiency, distributed energy resources, and customer and network support.
Ongoing <sup>15</sup>	Develop new value streams from the distribution grid to generate third-party revenue and reduce burden on ratepayers.
Ongoing <sup>69, 71</sup>	Update service quality metrics to address today's priorities, including power outage prevention, cyber-resiliency, and customer engagement.
Needs more work	Assess the existing split treatment of capital and operating expenses.
Priority action	Deploy advanced meters.
Ongoing <sup>69, 71</sup>	Plan for third-party access and innovation.
Ongoing <sup>69, 71</sup>	Share the cost burden of advanced metering through partnerships.
Ongoing <sup>69, 71</sup>	Focus on capabilities to avoid technological obsolescence.
Ongoing <sup>69</sup>	Proactively manage cyber-resilience.
Implemented <sup>16</sup>	Synchronize filings related to distribution system planning.
Ongoing	Improve forecasting.
Ongoing <sup>69, 71</sup>	Establish customer and third-party data access plans.
Ongoing <sup>17</sup>	Compensate locational value.
Ongoing and on the horizon <sup>18</sup>	Design rates to increase system efficiency.
Ongoing <sup>69, 71</sup>	Establish outcome-based metrics.
Needs more work	Beneficial heating proposals should be consistent with principles outlined in the Commission white paper on beneficial electrification.
<b>Solar Siting Opportunities</b>	
Ongoing	This report estimated viability of solar in preferred locations. Considerations are embedded throughout the report,
<b>Docket 4600</b>	
Ongoing	This report included a number of next steps for the Public Utilities Commission to consider, some of which fed into the Power Sector Transformation report and subsequent work to develop a grid modernization plan and advanced metering functionality business case in collaboration with National Grid's Power Sector Transformation Advisory Group.
<b>Energy Efficiency Market Potential Study</b>	
Ongoing	There is significant opportunity to expand DR programs in RI in a cost-effective manner, both through growing the market for existing programs, and introducing new measures and programs.
Ongoing	C&I lighting remains by far the largest opportunity, both in terms of annual and lifetime savings.

<sup>14</sup> See for example [Commission Docket 4943](#).

<sup>15</sup> This will likely be a consideration in any future electric distribution utility filing requested cost recovery for investments in grid modernization and advanced metering. See stayed Commission Dockets [5113](#) and [5114](#).

<sup>16</sup> See [Commission Docket 5015](#).

<sup>17</sup> See for example [National Grid's process for procuring non-traditional electric grid solutions](#).

<sup>18</sup> In [Commission Docket 4770](#), the Commission approved a performance incentive for meeting system efficiency targets; however, rate designs specifically targeting system efficiency are not likely to be proposed until metering functionality is improved (i.e. such as to allow for time-varying rate structures).

## Priority Actions for the Transportation Sector

There are two ways to reduce emissions in the transportation sector: consume less fuel and consume lower-emissions fuel. To consume less fuel, we can discourage high-emissions driving and encourage low-emissions mobility solutions. To consume lower-emissions fuel, we need to encourage electric vehicles and expand electric vehicle charging infrastructure. Over the next five years, we can strengthen the groundwork for integrating climate into our investment decisions and take action to incentivize lower-emissions mobility.

**Table X. Summary of Priority Actions for the Transportation Sector**

Action	Impact	Lead(s)	Select Considerations
Increase light-duty ZEV penetration to at least 30% by 2027.	≈ x% reduction in greenhouse gas emissions	Administration (RIDOT, RIDEM, OER, DMV, Commerce, RIIB)	Incentive programs, interaction with electric vehicle charging infrastructure.  State fleet transportation Lead by Example.
Implement Transit Forward RI 2040, Rhode Island's Transit Master Plan, to grow transit ridership from 53,000 to 87,000 daily passenger trips  As resources are available, look to the Transit Master Plan and Bicycle Mobility Plan as well-vetted strategies for next steps	≈ x% reduction in greenhouse gas emissions	RIPTA, Division of Statewide Planning, RIDOT and RIDEM	This will mitigate 231,000 MTCO <sub>2e</sub> .  Projects in the TMP and BMP are not fully designed and developed: this is the next step, a realistic evaluation of needs and connections.
Reduce RIPTA's carbon footprint by electrifying Rhode Island's transit fleet.	≈ x% reduction in greenhouse gas emissions	RIPTA	This will mitigate 14,122 MTCO <sub>2e</sub> .
Maintain increasing fuel economy and low-and zero-emission vehicle standards	≈ x% reduction in greenhouse gas emissions	RIDEM	Maintain adherence to Corporate Average Fuel Economy and GHG emission standards.  Maintain adherence to California low-emission and zero-emission vehicle requirements. Includes amending existing rules to

			<p>incorporate Advanced Clean Cars II.</p> <p>Adopt New Rules: California’s Advanced Clean Trucks (ACT), the Low NOx Heavy-Duty Omnibus (HD Omnibus), and Phase 2 Greenhouse Gas (Phase 2 GHG) emission standards for trucks and trailers.</p>
Incentivize electric mobility	Enables switch to electric vehicles	Office of Energy Resources	<p>New and used, personal and fleet, BEV PHEV and MHD, future expansion of incentives to e-bikes.</p> <p>Utilize Diesel Emissions Reduction Act (DERA) funds to provide incentives to RI entities to replace older diesel engines and vehicles with cleaner and zero-emission alternatives.</p>
Model climate impacts of transportation demand (in UPWP)	Allows weighing climate impacts of transportation investment decisions among policy objectives	Division of Statewide Planning, RIDOT and RIDEM	<p>This is not an issue only at the state level, but nationally and regionally. RIDOT and RIDSP will work together with other federal, state and regional partners to improve the GHG modeling capacities as this is a FHWA requirement for transportation capital projects and establish a model for decision-making.</p>
Develop ‘complete streets’ state plan leveraging federal funding	Reduces fuel consumed through decrease in vehicle miles traveled and encourages lower-emissions mobility	Division of Statewide Planning, RIDOT and RIPTA	<p>The IJJA resulted in specific formula funding set-asides for developing a Complete Streets plan and implementation strategy: RIDSP will be the lead but work closely with a robust group of partners and stakeholders. Anticipated completion in 2025.</p>



### *Target 30% penetration of electric vehicles*

In the latest [Rhode Island Greenhouse Gas \(GHG\) Emissions Inventory report](#), the Transportation sector was responsible for the highest gross greenhouse gas emissions (35%) by economic sector in 2018. Emerging technologies in the transportation sector, such as electric vehicles, are paving the way for alternative fuels to be used as a solution for reducing GHG emissions. Clean transportation will also deliver substantial energy security and economic benefits as cleaner electricity derived from renewable energy and other low-carbon sources replaces imported gasoline and diesel as transportation fuels.

On April 14, 2021, Governor Dan McKee signed into law the [2021 Act on Climate](#) which sets mandatory, enforceable climate emissions reduction goals leading the state to achieve net-zero emissions economy-wide by 2050. By 2030, the Act on Climate instructs the state to develop a plan to reduce all climate emissions from transportation, buildings and heating, and electricity used economywide to 45 percent below 1990 level. As of June 2022, Rhode Island has [5,627 registered electric vehicles](#), which is a 232% increase in EVs since 2018. In order for the transportation sector to meet its 2030 emissions reduction, Rhode Island will need to have roughly 86,000<sup>19</sup> registered EVs on the road. By having programs focused on Zero-Emission Vehicles, such as [DRIVE EV](#), an electric vehicle rebate program available to Rhode Island residents and businesses, it will help increase the amount of registered electric vehicles on the road in Rhode Island as mandated by the 2021 Act on Climate, as well as paving the way for further expansion of EV penetration, post 2030.

### *Implement Transit Forward RI 2040, Rhode Island's Transit Master Plan, to grow transit ridership from 53,000 to 87,000 daily passenger trips and to mitigate 231,000 MTCO<sub>2</sub>e.*

Implementing the plan will require an approximate average annual capital investment of \$100-160M over 20 years. Operating costs will increase roughly \$150M annually, from \$130M (2020) to \$280M).

### *As resources are available, look to the Transit Master Plan and Bicycle Mobility Plan as well-vetted strategies for next steps*

RIDOT, RIPTA, and RIDSP have all developed planning work tasks to support mapping, evaluation, and implementation of projects which were recommended in the TMP or BMP. While “fully funding” both the TMP and BMP are not possible at this time, the state is working to prioritize projects for better connections for both the transit and bicycle/pedestrian modes.

Some of the projects related to these steps include funding for long-range planning studies that take conceptual proposals and prepare design and cost details. In addition, staff resources are used to map the projects in the BMP and TMP to show where overlap may occur with existing planned projects, allowing incorporation of bike, pedestrian, and transit components into projects already programmed in the STIP.

### *Reduce RIPTA's carbon footprint by electrifying Rhode Island's transit fleet. This will mitigate 14,122 MTCO<sub>2</sub>e.*

The full cost of fleet electrification is currently unknown. RIPTA is preparing an Action Plan for Electrification and Service Growth which will provide estimated annual electrification infrastructure, vehicle, and energy costs. This plan will be complete by June of 2023.

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<sup>19</sup> This estimate is based on an internal scatter model used by Rhode Island Energy (RIE).

### *Adopt Advanced Clean Trucks rule*

The 2021 Act on Climate sets mandatory, enforceable climate emissions reduction goals leading the state to achieve net-zero emissions economy-wide by 2050. The transportation sector is responsible for approximately 35% of Rhode Island's greenhouse gas emissions.

The federal Clean Air Act (CAA) grants the U.S. Environmental Protection Agency (EPA) original jurisdiction for establishing emission standards for new motor vehicles, including heavy-duty trucks. Section 209(a) of the federal Clean Air Act (42 USC § 7543) prohibits states (except California) or other political sub-divisions, such as local or regional governments, from establishing emission standards for new motor vehicles.

Under CAA Section 177 (42 USC § 7507), however, states that choose to adopt vehicle emission standards that are more stringent than the federal standards for new vehicles may adopt standards that are identical to any standards adopted by California.

Rhode Island has previously adopted California's emissions standards for passenger cars and trucks and, through the state's rulemaking process, could further opt-in to California's standards by amending 250-RICR-120-05-37 to include new standards for medium- and heavy-duty vehicles.

Reducing emissions from the vehicles on our road is an important part of Rhode Island's programs to meet and maintain the health-based National Ambient Air Quality Standards (NAAQS), reduce the risk of exposure to toxic diesel particulate matter, and reduce the GHG emissions that contribute to climate change. The adoption of California's emissions standards is an imperative piece of the puzzle to Rhode Island's response and action on climate change.

Adopt New Rules: California's Advanced Clean Trucks (ACT), the Low NOx Heavy-Duty Omnibus (HD Omnibus), and Phase 2 Greenhouse Gas (Phase 2 GHG) emission standards for trucks and trailers.

- **ACT:** The purpose of the ACT Rule is to accelerate the widespread adoption of ZEVs in the medium- and heavy-duty truck sector and reduce the amount of harmful emissions generated from on-road trucks. The ACT Rule applies to manufacturers of medium- and heavy-duty vehicles over 8,500 pounds gross vehicle weight rating (GVWR)<sup>8</sup> which includes passenger vans, buses, pickups, vocational trucks, box trucks, and tractor trailer combinations used locally and for long-haul applications. The ACT Rule requires manufacturers to sell ZEV trucks as an increasing percentage of their annual sales from model years 2026 to 2035. (\*\*MY26 or MY27 pending if we move forward in 2022 or 2023).
- **HD Omnibus:** The Heavy-Duty Engine and Vehicle Omnibus (HD Omnibus) Rule and associated amendments require NOx emissions reductions from new on road heavy-duty engines and vehicles and ensure emission reductions are maintained as those engines and vehicles are operated.<sup>12</sup> The HD Omnibus Rule requires a 90% reduction in NOx emission from model year 2027 engines.
- **Phase 2 GHG:** The Phase 2 GHG Rule sets standards to reduce GHG emissions associated with medium- and heavy-duty engines, vocational vehicles, heavy-duty pick-up trucks and vans (PUVs), and applicable tractors and trailers. The Phase 2 GHG Rule requires manufacturers to improve existing technologies or develop new technologies to meet the GHG emission standards. It also amends requirements for glider vehicles, glider engines, and glider kits. The

Phase 2 GHG requirements would apply to model year 2026 and newer Class 2b to 8 medium- and heavy-duty vehicles with greater than 8,500 pounds GVWR and the engines that power them, except for medium-duty passenger vehicles already covered in the light-duty regulations. (\*\*MY26 or MY27 pending if we move forward in 2022 or 2023).

<b>Avoided Medium- and Heavy-Duty Emissions, 2020-2040</b>		
NOx (short tons)	PM2.5 (short tons)	CO2e (million metric tons)
4,740	25	1.96
<b>Avoided Medium- and Heavy-Duty Emissions, 2020-2050</b>		
13,080	76	5.59

Table: Cumulative emissions avoided with 2025 implementation of ACT, HD Omnibus, and Phase 2 GHG rules. <sup>20</sup>

Amend Existing Rules to incorporate California’s Advanced Clean Cars II:

- Rhode Island Department of Environmental Management will also have the ability to amend our existing Advanced Clean Cars program to adopt California’s Advanced Clean Cars II (ACCII). The ACCII ZEV regulation requires that all passenger car and light-duty truck vehicles delivered by manufacturers for sale in Rhode Island by 2035 meet the definition of zero-emission vehicle (ZEV). The ACCII regulation will reduce NOx, PM2.5, and GHG emissions. (\*\*GHG reduction analysis pending)

*Incentivize electric mobility*

Rhode Island has a history of impactful planning and programming related to clean transportation programs. In the past, the Office of Energy Resources has successfully administered programs incentivizing electric mobility.

<b>Program</b>	<b>Targeted Technology</b>	<b>Program Duration</b>	<b>% Increase</b>
DRIVE	Electric Vehicles	January 2016 – July 2017	20-35% (254 EVs)
Electrify RI	Electric Vehicle Charging Stations	October 2019 – July 2021	83 Operational Charging Stations and 14 Pending Activation (as of August 24, 2022).

The success of the programs implemented in the table above provided several best-practices and mechanisms used to incentivize electric mobility. On July 7, 2022, OER launched an electric vehicle rebate program, [DRIVE EV](#). Driving Rhode Island to Vehicle Electrification (DRIVE) is an electric vehicle (EV) rebate program administered by the Rhode Island Office of Energy Resources (OER) to support adoption of electric vehicles by Rhode Island residents, small-businesses, non-profits, and public sector entities. DRIVE EV also provides additional incentives for qualified Rhode Islanders who purchase or lease an eligible electric vehicle and meet certain income requirements or participate in a State or Federal Income-Qualifying Program.

<sup>20</sup> Source: ICCT Report “Benefits of state level adoption of MHDV Regulations” <https://theicct.org/>

In the coming years, there will be opportunities to identify long-term, sustainable fundings sources to continue incentivizing electric vehicle adoption. An increased focus on providing additional incentives aimed at reducing the barrier-to-entry costs related to electric vehicles, as well as providing programs aimed at providing electric vehicle charging stations for non-homeowners, and those that live at multi-unit dwellings, as well as businesses looking to transition their fleet.

There will also be programs, and incentive opportunities, available for e-bikes in the near future. Although the current DRIVE EV rebate program only gives rebates for light-duty electric vehicles, OER is looking to expand its scope in the future to include rebates for e-bikes (pending funding opportunity). OER is aware that other states are developing rebate programs for e-bikes and acknowledges the demand for e-bikes and the role it may play in Rhode Island's climate strategy.

#### *Model climate impacts of transportation demand (in UPWP)*

Transportation accounts for the largest share of Greenhouse Gas (GHG) emissions in Rhode Island, with passenger vehicles being the largest contributor to pollution caused by transportation related emissions<sup>21</sup>. RIDOT and the Rhode Island MPO must adopt long-range transportation plans that reduce GHGs to set reduction levels. Current air quality measurements and travel-demand models do not specify GHG levels as they pertain to transportation projects in the STIP, so a new model is needed.

To understand how projects of regional significance in the State Transportation Improvement Program (STIP) contribute to GHG emissions and to assess future policy options and investment strategies towards the reduction of those emissions, Rhode Island Department of Transportation (RIDOT) is working with other state partners to improve the modeling of GHG, establishing performance measures to help reduce emissions and creating a Carbon Reduction Plan per federal guidelines.

Investments in transportation capital projects are prioritized based on many factors, including asset management, readiness, risk levels, available funding and opportunities for partnership. Due to changes in both state and federal regulations and guidelines, this data-driven process now will include another layer that determines how regionally significant projects impact carbon emissions in the state. The state planning process determines these priorities so that adequate investments are made based on the proper funding sources and uses, and to meet mandates such as performance measures.

In addition, the Rhode Island Division of Statewide Planning (RIDSP) hosts and maintains the State's Travel Demand Model.

#### *Develop 'complete streets' state plan leveraging federal funding*

In addition to the state requirements around complete streets, Complete Streets law: <http://webserver.rilin.state.ri.us/Statutes/TITLE24/24-16/24-16-1.HTM> there is a federal requirement to develop a complete streets plan and design guidance. In December 2021, USDOT sent a letter to all state and regional offices to highlight new Planning Emphasis Areas (PEAs), which included Complete Streets as a focus for planning-level funds and projects. The IIJA requires that states and metropolitan planning organizations set aside 2.5 percent of their highway planning funding for designing "complete streets" projects and policies that will improve safety and accessibility for all users of the road.

USDOT's definition of "Complete Streets" as "Streets that are streets designed and operated to enable safe use and support mobility for all users. Those include people of all ages and abilities, regardless of

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<sup>21</sup> Per [Transportation Emissions Dashboard | Rhode Island Department of Environmental Management \(ri.gov\)](#)

whether they are travelling as drivers, pedestrians, bicyclists, or public transportation riders. The concept of Complete Streets encompasses many approaches to planning, designing, and operating roadways and rights of way with all users in mind to make the transportation network safer and more efficient. Complete Street policies are set at the state, regional, and local levels and are frequently supported by roadway design guidelines.”

In Rhode Island, RIDOT and RIDSP have joined together to maximize the impact of that funding. RIDSP will lead a 2.5-year effort to invest more than \$250,000 in combined planning funds into development of a Complete Streets Plan and Design Guidelines. Work on this project is expected to begin in fall 2022 as RIDSP brings new staff on board and coordinates with RIDOT and RIPTA to develop an RFP for consultant assistance. This project is included in the FY2023 [Unified Planning Work Program](#) (UPWP), which defines the tasks to be undertaken in the coming year.

### *Electrifying Transportation Strategic Policy Guide*<sup>22</sup>

In December 2021, ‘*Electrifying Transportation: A Strategic Policy Guide for Improving Public Access to Electric Vehicle Charging Infrastructure in Rhode Island*’ was released in response to S-0994 and H-5031, which directed numerous agencies to develop a coordinated plan to improve access to electric vehicle charging stations across the state. The policy guide highlighted the following key priorities for Rhode Island in the coming years:

- Reinvest in incentive programs for electric vehicles and charging infrastructure;
- Refine electric vehicle and charging infrastructure programs to align with priorities and to center equity such that benefits accrue to underserved and overburdened communities;
- Demonstrate progress in electrifying transit, school buses, and medium- and heavy-duty vehicles in order to reduce harmful emissions and improve public health;
- Conduct an analysis to understand transportation revenue impacts and develop recommendations for future action to ensure sustainable funding streams;
- Support a 100% Renewable Energy Standard to ensure electric transportation is truly decarbonized;
- Develop a clean transportation dashboard to track progress; and
- Demonstrate action through state agency commitments and accountability.

A number of these priorities have already been accomplished or are underway. A specific meaningful action item for all agencies represented by the RI Executive Climate Change Coordinating Council (RIEC4) was included in the final guide. The RIEC4 should continue to track progress on all the agency specific action items and coordinate implementation across agencies to maximize impact. Looking ahead, the 2025 Climate Strategy will be able to revisit both the priorities outlined above and the agency specific action items and recommend changes as needed.

*[ Note: In coming months, the EC4 will release draft of “call out boxes” on specific priority topics, including one on the Transportation & Climate Initiative (TCI) which will accompany this chapter.]*

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<sup>22</sup> Please see the [Electrifying Transportation Strategic Policy Guide](#) for additional recommendations throughout the entire text of the report.

## Priority Actions for the Thermal Sector

The thermal sector consists of emissions from all thermal processes, including space heating and cooling, high-heat industrial processes, refrigeration, cooking, and household activities such as clothes drying. Fossil fuels, electricity, and bio-based materials are all used as energy sources for thermal processes in Rhode Island. Because of the variety of energy sources, emissions accounting for the thermal sector is spread across different categories in the state’s greenhouse gas reporting. Over the next decades, the fuel sources we use for the thermal sector will begin to shift as we transition to lower emissions fuels.

At a high level, the two primary ways to reduce emissions from the thermal sector are to, 1) consume less fuel, and 2) to consume lower emissions fuels. Consuming less fuel means optimizing efficiency and reducing wasted fuel or heat that does not get used for its primary purpose or providing heating or cooling to Rhode Islanders. The ways we can use lower emissions fuels are summarized in Figure X and generally involve two over-arching pathways: strategic electrification and decarbonized fuels.

<b>Thermal Processes</b>	<b>Strategic electrification</b>	<b>Air Source Heat Pumps (ASHPs)</b> -e.g., air to air, air to water heat pumps
		<b>Ground Source Heat Pumps (GSHPs)</b> -e.g., ground to air, water to air heat pumps, and geothermal district systems
	<b>Decarbonized Fuel</b>	<b>Renewable Liquid Fuels</b> -e.g., biodiesel, ethanol
		<b>Renewable Gases</b> -e.g., renewable natural gas, hydrogen

Figure X. Thermal Decarbonization Pathways (adapted from the Heating Sector Transformation Report)

Table X summarizes priority actions for decarbonizing the thermal sector. The priority actions focus on consuming less fuel, consuming lower emissions fuel, or a combination of both.

**Table X. Summary of Priority Actions in the Thermal Sector**

Action	Impact	Lead(s)	Select Considerations
<b>Strategic Electrification</b>			
Target 15% penetration of energy efficient electric heating by 2030	≈ x% reduction in greenhouse gas emissions	OER and RIE	Workforce training, consumer education, utility coordination

Pursue district geothermal	Pilot most efficient electric thermal system	OER and RIE	Utility coordination, community involvement, integrated systems and planning
Incentivize efficient electric heating technologies	Increases affordability of technologies and spurs market growth	State and federal government	Funding streams and associated limitations, consumer and contractor trust and awareness
<b>Decarbonized Fuels</b>			
Increase biofuel blending in accordance with the 2021 Biofuel Heating Oil Act	≈ x% reduction in greenhouse gas emissions	Industry	Equipment compatibility, cost and quantity of supply, life cycle carbon intensity and environmental impact
Continue to abandon leak-prone gas pipes and pursue non-pipe alternatives	≈ x% reduction in greenhouse gas emissions	RIE DPUC + PUC	whether replacement is consistent with climate mandates
Pursue hydrogen demonstration projects in coordination with the Northeast Regional Hydrogen Hub	Creates opportunities for decarbonization of hard to electrify areas, such as high-heat industrial processes	State of RI, led by OER; Northeast Hydrogen Hub state and private sector partners	Technology research and development, workforce development, zoning, codes, safety regulations
Continue to pursue solutions to reduce emissions from solid waste	Lowers direct emissions from waste, creates source of renewable methane	OER in coordination with relevant waste facilities	Overlap with biofuels and biogas planning, ideally solid waste amounts decrease in future, consider implications on renewable gas supply
Future of the gas distribution system	Enables cost-effective decarbonization, planning, and aligning utility business model	PUC	Trimming branches of the distribution system where we can electrify, strengthening branches where we can't electrify
Begin developing a renewable thermal standard	Progressive scale down of thermal sector emissions	Legislature	Interplay of all different decarbonization technologies, cost effectiveness, jobs impacts, rethinking role of the utility

*Strategic Electrification*

One pathway to thermal decarbonization is through strategic electrification. Converting thermal processes from fossil fuel power to energy efficient electric appliances can reduce emissions immediately. Air source heat pumps, for example, are three times more efficient at providing heat than fossil fuel heating systems, resulting in an immediate increase in fuel efficiency. The emissions of electric

appliances for thermal processes will continue to decrease to zero, as we move toward the state's 100% Renewable Energy Standard by 2033.

Converting fossil fuel technologies to electric power will pose new challenges for our electric grid. According to the Heating Sector Transformation Report, 100% electrification of the thermal sector is not only unlikely, but also not cost effective.<sup>23</sup> Electrification is not appropriate for certain components of the thermal sector, such as high-heat industrial processes. Additionally, we must be cognizant of the impacts heat pump conversions will have on our electric distribution system. As we design incentives and other mechanisms to support the market for electrification, we need to remain strategic in how we plan for necessary changes to the electric system and simultaneously support other decarbonization technologies to reach our emissions reductions targets.

#### *Target 15% penetration of energy efficient electric heating by 2030*

A conversion of 15% of Rhode Island's buildings from fossil fuel heat to efficient electric heating by 2030 is an aggressive, but attainable and necessary target. This rate of conversion will reduce thermal sector emissions by an estimated █%. While the market for efficient electric heating—including a variety of heat pump technologies—is relatively nascent in Rhode Island, the next several years will be used to build a strong foundation for the market to expand at a quicker pace in the last two decades as we approach 2050. The priority actions below, will help us reach this 15% target and plan for further expansion, in tandem with other decarbonized thermal technologies, post 2030.

#### *Efficient heat pump incentives*

There are several mechanisms for incentivizing efficient heat pumps that are expected to be used in the coming years. First, the Office of Energy Resources will be launching the High Efficiency Heat Pump Program (HHPP)<sup>24</sup> in 2023, which will combine federal funding from the American Rescue Plan Act (ARPA) with existing incentives provided by Rhode Island Energy's energy efficiency programs. The aim of the program is to create a robust incentive program, extending greater financial incentives to more Rhode Islanders who want to convert to efficient heat pumps. The program will also emphasize education and workforce development to build a solid market for this efficient, and ultimately emissions-free, thermal technology.

Second, the Inflation Reduction Act, recently passed by the U.S. Congress, will provide a suite of incentives including █ for heat pumps. The State will work diligently to ensure that the maximum benefits are easily accessible to Rhode Islanders and that federal incentives for heat pumps compliment State offerings.

Third, in the coming years, there will likely be opportunities through policy and regulation to identify long-term, sustainable funding sources for efficient electric heat that go beyond one-time federal stimulus funding. While federal funding can provide a very solid basis for standing up efficient electric heating programs, there may be a need to craft novel funding mechanisms that can carry electrification efforts well into the future.

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<sup>23</sup> <https://energy.ri.gov/heating-cooling/heating-sector-transformation>

<sup>24</sup> <https://energy.ri.gov/heating-cooling/high-efficiency-heat-pump-program>



### *Pursue district geothermal*

District geothermal systems are being piloted in neighboring states as a solution for providing extremely efficient electric-powered heating and cooling that is delivered by a thermal utility company.

Traditionally, gas utilities have delivered fossil fuel to customers connected to the gas distribution system to fuel heating appliances. Geothermal systems (a.k.a. ground source heat pumps) use the least amount of energy to deliver space heating and cooling, of all the electric thermal technologies currently available. Drawbacks to geothermal include high upfront costs, and disruptive installation practices, which involve laying pipe in the ground or a body of water. Once geothermal systems are installed though, they have an extremely long lifespan and very low operating costs—providing clean, affordable, and reliable heating and cooling to customers.

The challenges with geothermal systems make it difficult for many homeowners to install these systems themselves; gas utilities, however, are uniquely well-positioned to carry the high upfront costs and engineering challenges given their experience with gas infrastructure. In the next 1-3 years, OER will work together with the utility to assess the opportunities for district geothermal.

### *Decarbonized Fuels*

Priority actions in this category mainly focus on using lower emissions fuels and using them more efficiently, but also contain actions to consume less fuel, by avoiding emissions caused by wasted fuel.

### *Increase biofuel blending in accordance with the 2021 Biofuel Heating Oil Act*

The 2021 Biofuel Heating Oil Act requires that, by 2030, all No. 2 distillate heating oil sold in Rhode Island, “shall at a minimum meet the standards for B50 biodiesel blend and/or renewable hydrocarbon diesel.”<sup>25</sup> This means that by 2050 all heating oil in the state will contain at least 50% biodiesel, significantly decreasing the carbon intensity of home heating oil.

As the state moves incrementally toward the 2030 biofuel mandate, it will be necessary to consider the impacts on customers, heating oil companies, and emissions. In the next two to three years, as biodiesel blending mandates increase, it will be important to anticipate and monitor potential implications of using higher biodiesel blends with existing heating equipment. Generally, biodiesel is considered a “like-for-like” swap with heating oil, because it can be used with existing oil boilers and furnaces. There are, however, concerns that higher biodiesel blends can wear on existing heating systems and may require retrofits.

Additionally, in the next two to three years, compliance plans for the mandate should be made.

Currently, there is no robust system for monitoring compliance with the blending mandate, nor are there requirements for biodiesel feedstocks and sourcing, both of which greatly impact the emissions profile of biodiesel. At this time, there is a very limited supply of bio-based fuels and in the context of significantly increasing global demand, future biodiesel prices are a concern. Therefore, we must consider strategies for mitigating the impacts of supply-side cost increases on local business.

While biodiesel has fewer greenhouse gas emissions than fossil diesel, using biodiesel and other bio-based fuels for heating still results in emissions. Biodiesel and other biofuels have a wide range of potential feedstocks, and numerous additional supply chain factors impact the emissions intensity of biodiesel. In order to effectively track our state’s emissions, it will be necessary to understand the

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<sup>25</sup> <http://webserver.rilin.state.ri.us/BillText/BillText21/HouseText21/H5132A.pdf> p. 3

different emissions profiles of biodiesel and require biodiesel blending with the lowest emissions. Beyond the 2030 biodiesel blending mandate, there will need to be solutions for fully decarbonizing oil heating by 2050.

#### *Continue to abandon leak-prone gas pipes and pursue non-pipe alternatives*

Public Utilities Commission Docket No. 5210, “National Grid’s FY 2023 Gas Infrastructure, Safety and Reliability (ISR) Plan,” contains the Leak Prone Pipe Replacement Program which replaces leak-prone gas mains throughout the Rhode Island gas distribution network. Since the program’s beginning in 2012, 537 miles of leak-prone pipe have been replaced and an additional 951 miles are expected to be completed by the program’s end in 2035. The program so far has avoided an estimated \_\_\_ in methane emissions, which are equivalent to \_\_\_ tons of CO<sub>2</sub>.

While the avoidance of methane leaks along the gas system is extremely important to reducing our state’s emissions, the efficacy of the Leak Prone Pipe Replacement Program, in light of the goals of the Act on Climate, needs to be evaluated. Gas mains that are replaced through this program have an expected lifespan between 50-100 years, locking in gas infrastructure well beyond the target date for an emissions-free state. Currently, there are extremely limited supplies of decarbonized gases, and the ratepayer cost impacts of future decarbonized gas supplies must be considered. It would be imprudent to continue to reinforce and expand gas infrastructure that could not be easily and affordably decarbonized by 2050. Therefore, in the coming years, more emphasis should be placed on non-pipes alternatives (NPA). NPA seeks alternative ways of providing thermal service to Rhode Islanders, rather than expanding and enforcing the fossil gas network. The gas utility has already formed a working group to discuss developments in NPA.

#### *Continue to pursue solutions to reduce emissions from solid waste*

Waste streams, such as landfills and water treatment facilities, produce highly penetrative greenhouse gases that result from the breakdown of biological material. If not captured, these greenhouse gases are released directly into the atmosphere and contribute to global warming. One method of decreasing direct emissions from waste is to capture these gases and use them as a source of renewable gas.

The future of the state’s solid waste streams should be considered in the context of thermal decarbonization opportunities as well. There are numerous technologies that could be explored, but the climate and environment impacts must also be critically examined.

#### *Future of the gas distribution system*

Just over half of Rhode Islanders are connected to the gas system for heating, cooking, and various other household appliances. Gas is also used for high-heat industrial processes. At this time, Rhode Island is supplied with fossil gas that, while cleaner than other fossil fuels like oil and coal, still emits greenhouse gases and contributes substantially to climate change. The gas system in Rhode Island relies on extensive physical infrastructure in the form of pipelines and supporting facilities. Pipelines and other gas infrastructure have been, and continue to be, built with decades to centuries-long time horizons. There is an urgent need to reconsider the existing gas infrastructure and planning in our state to avoid burdening consumers with the cost of stranded fossil gas assets, as the state transitions to carbon neutrality.

In August 2022 the Rhode Island Public Utilities Commission (PUC) opened Docket 22-01-NG, “Investigation into the Future of the Regulated Gas Distribution Business in Rhode Island in Light of the

Act on Climate.”<sup>26</sup> This docket will serve as an important first step in beginning to plan for the gas system’s transition to carbon neutrality. There are many options for decarbonizing the thermal sector, and as the HST Report notes, it is unlikely that one single technology will prevail. Instead, to optimize costs and emissions reductions, a mix of solutions will need to be pursued. Other states are looking to transform their gas systems to work cohesively with a mix of decarbonized thermal technologies. In light of the Act on Climate, it will be important to engage in a very robust planning process that ensures a viable future for the thermal sector with a mix of different technologies. The utility company is uniquely positioned to tackle large decarbonization challenges and substantially help move the state toward our emissions reduction goals.

*Begin developing a renewable thermal standard*

Similar to the recently enacted 100% Renewable Energy Standard, the state should begin to plan for a renewable thermal standard to phase thermal emissions down at intervals that align with the Act on Climate Mandates. The results of Docket 22-01-NG “The Future of Gas” may provide a good foundation to begin planning for such a standard. Additionally, other states with drafted renewable thermal standards could be looked to for best practices and guidance.

**Table X. Summary of Remaining Recommendations for the Thermal Sector from Select Recent and Relevant Studies**

Report Title	
Status	Recommendation
<b>Heating Sector Transformation Report</b>	
Priority action <sup>27</sup>	Ensure: Increase efficiency and reduce carbon content of all fuels to zero over time – ensures progress no matter which technologies are used
Priority actions <sup>28</sup>	Learn: Data collection, R&D, pilot projects to understand technologies, infrastructure, and customers
Underway <sup>29</sup>	Inform: Educate stakeholders – customers, installers, policy-makers – about pros and cons of options, system interactions, etc.
Priority Action <sup>30</sup>	Enable: Facilitate deployment with incentives; target natural investment opportunities; align regulation, rules, codes; expand workforce
Priority Action <sup>31</sup>	Plan: Expand planning horizon; develop long-term, high-level contingency plans now (don’t commit yet) and use to guide near-term policy
<b>Energy Efficiency Market Potential Study</b>	
Underway <sup>32</sup>	Electrifying oil and propane-based systems offers the bulk of the economic opportunity for heating electrification.

<sup>26</sup> <https://ripuc.ri.gov/Docket-22-01-NG>

<sup>27</sup> Our priority action to begin the development of a renewable thermal standards is responsive to this recommendation.

<sup>28</sup> Two priority actions are responsive to this recommendation: pursue district geothermal, and pursue hydrogen demonstration projects in coordination with the Northeast Regional Hydrogen Hub.

<sup>29</sup> This recommendation is central to all new and upcoming thermal policies led by OER. For example, [the High-efficiency Heat Pump Program](#) will have a consumer and workforce education component.

<sup>30</sup> Priority actions to incentivize heat pumps, the future of gas docket, and planning for the renewable thermal standard are responsive to this recommendation.

<sup>31</sup> Future of gas docket and planning for the renewable thermal standard are priority actions responsive to this recommendation.

<sup>32</sup> Current and upcoming heat pump incentive programs sponsored by OER and RIE incentivize the switch from oil and propane heating to efficient electric heat pumps.

