LEAD BY EXAMPLE ANNUAL REPORT

RI Office of Energy Resources

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STATE OF RHODE ISLAND

Office of Energy Resources

Contents

I. Executive Summary

The Lead by Example (LBE) Program is Rhode Island's initiative to reduce greenhouse gas emissions, lower energy costs, and advance clean energy adoption across state agencies and municipalities. Administered by the Office of Energy Resources (OER), the program provides technical, financial, procurement, and project management support for implementing clean energy projects. The LBE Program plays a critical role in achieving the state's climate goals, including the 2021 Act on Climate, positioning Rhode Island as a leader in public-sector sustainability.

In 2023, Governor McKee passed Executive Order 23-06, laying out foundational targets to drive progress towards meeting the statewide 2050 net zero emissions mandate. Using 2014 metrics as a baseline, these new and updated targets encompass emissions reduction, fleet electrification, energy efficiency, electric vehicle charging infrastructure, and renewable energy procurement. As of 2023, significant progress has been made against these targets, positioning the state to meet or exceed its 2030 benchmarks. This report covers program activity through calendar year 2023 and Table 1 highlights Rhode Island's progress toward meeting the five targets outlined in Executive Order 23-06.

Table 1. Executive Order 23-06 Targets & Progress

Objective	2014 Baseline	Current Progress	2030 Goal	2040 Goal	2050 Goal
Reduce GHG Emissions from State Facilities and Vehicles	114,046 mt CO_2e[1]	-31.9%[2]	-40%	-70%	-95%
Increase Zero Emission Vehicles in State Fleet	1% of fleet	15.4% of fleet[3]	25% of fleet	TBD	TBD
Increase Overall State Agency Site Energy Efficiency	103.28 kBtu/ft^2	-18.9%[4]	-20%	-30%	-40%
Increase Total EV Charging Stations at State-owned Properties	2 stations	72 stations	200 stations	TBD	TBD
Procure State Electricity from Entirely Renewable Sources	8.50%	100%	100%	100%	100%

[1] Metric tons of carbon dioxide equivalent
[2] 77,264 mt CO_2e
[3] 133 vehicles
[4] 84.77 kBtu/ft^2

This report provides a detailed analysis of Rhode Island's progress toward the targets outlined in Executive Order 23-06, highlighting key achievements and identifying areas for improvement as the state continues to advance its Lead by Example initiatives. To ensure a comprehensive assessment, we utilized reference data from both 2023 and 2024 to measure progress against the 2014 baseline, selecting the most reliable and complete datasets available for each comparison.

This report was prepared by the Lead by Example team at the Rhode Island Office of Energy Resources, including George Sfinarolakis, Nathan Cleveland, and Maria Mealy, with support from the CLEAResult consulting team. We also acknowledge the valuable contributions to data collection from Kevin Simpson (OMB) and Richard Bremilst (DCAMM).

II. Emissions Reduction

Greenhouse gases (GHGs) are gases – like carbon dioxide and methane - that trap heat in the Earth's atmosphere, contributing to climate change. Reducing GHG emissions is critical to Rhode Island's efforts to solidify a clean energy future. Executive Order 23-06 sets the following goals for reducing emissions:

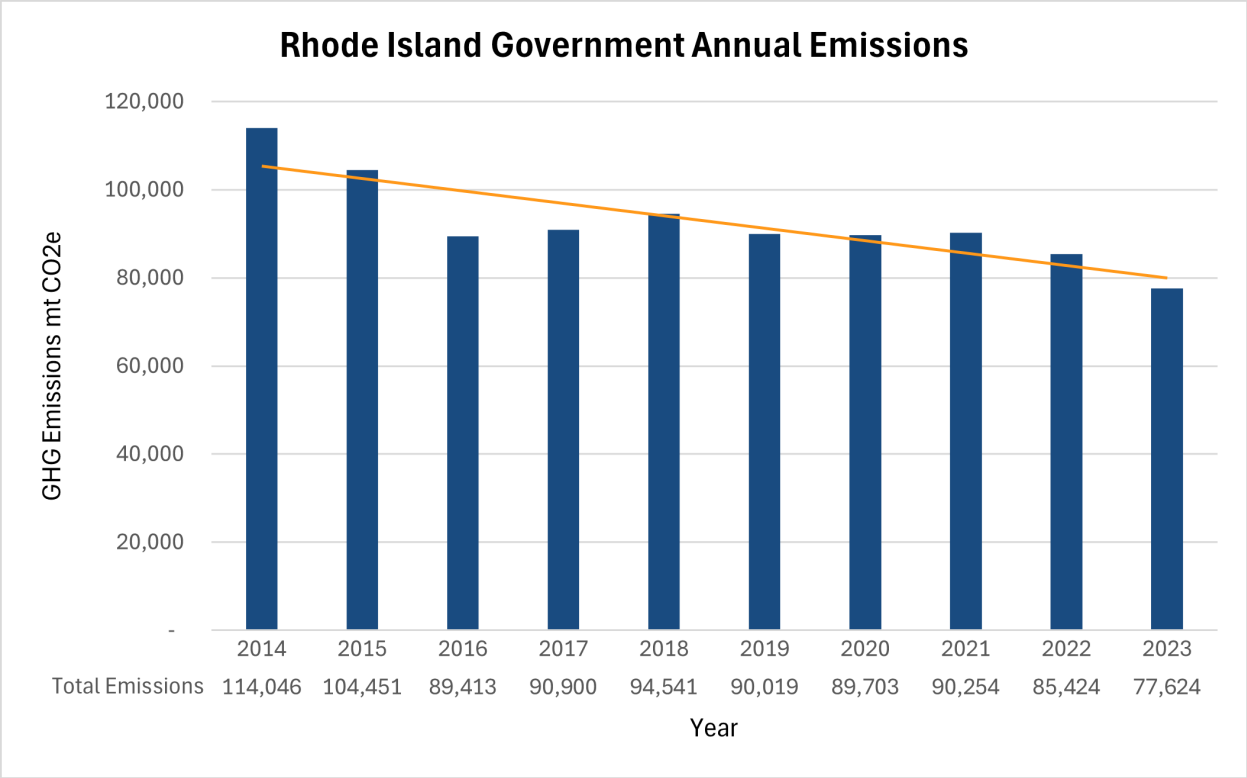
State agencies, as a whole, will reduce emissions from a 2014 baseline associated with the burning of onsite fossil fuels at buildings and in vehicles:

- 40% by 2030
- 70% by 2040
- 95% by 2050

State GHG emissions come from a variety of sources, including the combustion of diesel fuel, gasoline, natural gas, heating oil, and propane. Among these, natural gas is the highest contributor to state emissions, with gasoline as the next largest.

As of 2023, state agencies have reduced their overall GHG emissions from a 2014 baseline of 114,046 metric tons (mt) to 77,624 mt. The 36,422 mt difference between 2014 and 2023 translates to a 31.9% reduction, which puts Rhode Island well on track to reach the 40% reduction target by 2030. Figure 1 illustrates the combined total emissions from state agencies from 2014 to 2023.

Figure 1. Annual Emissions



III. Zero Emission Vehicle Fleet

Rhode Island is actively transitioning its state vehicle fleet to Zero-Emission Vehicles (ZEVs) as part of its commitment to meet the targets established by Executive Order 23-06. The order mandates that 25% of the light-duty fleet consist of ZEVs by 2030. This section details the current fleet composition, progress, and strategies for achieving this goal while addressing key challenges in the electrification process.

ZEV Fleet Composition

ZEVs produce no tailpipe emissions and include battery electric vehicles, plug-in hybrid electric vehicles (PHEVs), and hydrogen fuel cell vehicles. Unlike traditional hybrid vehicles, which combine internal combustion engines with electric motors, ZEVs rely entirely on electric power or, in the case of PHEVs, primarily operate on electric power with internal combustion as a secondary option.

As of June 30th, 2024, the light-duty State fleet consists of the following:

- Total light-duty vehicles: 862
- Total light-duty ZEVs: 133
- Current ZEV percentage: 15.4%

Table 2 displays the entire light-duty State fleet. As can be seen directly below, several state agencies are leading the transition to ZEVs[5]:

- Department of Business Regulation (DBR): 45% ZEVs (19 of 42 vehicles)
- Department of Children, Youth, and Families (DCYF): 47% ZEVs (35 of 75 vehicles)
- Public Utilities Commission (PUC): 50% ZEVs (4 of 8 vehicles)

[5] Note: Law enforcement vehicles are exempt from this calculation due to operational requirements and in accordance with federal guideline and reporting conventions.

Table 2: Rhode Island Executive Branch Light-Duty State Fleet as of 6/30/2024

Agency	Light-Duty Vehicles	Light-Duty ZEVs	Light-Duty ZEV %	Average Vehicle Year	Average Odometer
BHDDH	27	5	19%	2013	103,266
BOE	2	0	0%	2020	47,381
CCRI	13	0	0%	2015	66,926
CRMC	9	3	33%	2018	36,191
DBR	42	19	45%	2020	44,076
DCYF	75	35	47%	2021	32,522
DEM	163	22	13%	2017	77,553
DHS	13	5	38%	2018	40,650
DLT	11	2	18%	2009	104,242
DOA	34	6	18%	2012	83,963
DOC	75	1	1%	2010	75,922
DOH	12	4	33%	2016	46,303
DOR	20	0	0%	2015	56,001
DOT	190	15	8%	2016	86,980
DPS	33	0	0%	2014	97,845
EMA	10	1	10%	2020	55,607
National Guard	2	0	0%	2019	36,294
OPC	1	0	0%	2015	46,063
PUC	8	4	50%	2017	39,243
RIC	12	0	0%	2012	79,590
RIDE	4	1	25%	2012	72,543
URI	106	10	9%	2013	53,800
Total	**862**	**133**	**15.4%**	**2016**	**70,304**

Please note the following:

- Law enforcement vehicles and equipment are omitted from the vehicle counts due to confidentiality.
- Odometer data was collected in December 2023.
- To ensure data integrity, "average odometer" excludes vehicles with readings under 1,000 miles (104 vehicles) and over 400,000 miles (22 vehicles).

Progress Toward the ZEV Target

Executive Order 23-06 requires Rhode Island to achieve 25% ZEVs in its light-duty fleet by 2030. As of 2024, ZEVs account for 15.4% of the fleet, leaving an additional 9.6% (approximately 83 vehicles) to be transitioned over the next six years. This translates to an annual goal of replacing 14 internal combustion engine (ICE) vehicles with ZEVs.

With the average model year of fleet vehicles being 2016, many vehicles are nearing the end of their service life. Prioritizing ZEVs for replacements will help ensure steady progress toward the 2030 target.

Strategies to Achieve ZEV Target

To meet the 25% ZEV goal, Rhode Island is employing the following strategies:

Annual Vehicle Procurement Plan

Developing a structured procurement plan that prioritizes ZEV acquisitions to replace retiring ICE vehicles is essential.

- Incremental estimated Cost per Vehicle: $11,000[6] (ZEV cost premium over ICE vehicles)
- Annual Incremental estimated Cost: $154,000 (for 14 ZEVs)
- Cumulative Additional estimated Cost (6 years): $924,000
- Cost Mitigation Strategies:
    - Leverage federal and state grants, rebates, and incentives to offset upfront costs.
    - Factor in long-term savings from lower maintenance and fuel costs using a total cost of ownership (TCO) analysis.

Centralize Fleet Management

- Policy Alignment: Standardize ZEV adoption policies across all state agencies.
- Efficiency Improvement: Centralize vehicle management to streamline utilization, allocation, and replacement planning.

Challenges in Electrification

Initial Purchase Cost

The upfront cost of ZEVs remains higher than that of traditional ICE vehicles, creating budgetary constraints.

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[6] Estimated amount based on average value of Incremental Cost - Representative Vehicle Classes of Light Duty Vehicles (US DOE, 2022, Incremental Purchase Cost Methodology and Results for Clean Vehicles)

Charging Infrastructure

Expanding charging infrastructure is crucial but requires significant investment and planning. The availability of charging stations, particularly in remote areas, remains a barrier to widespread adoption.

Range Limitations

Some ZEVs have a limited range compared to ICE vehicles, which can affect operations requiring long-distance travel.

Vehicle Availability

The availability of ZEV models that meet the specific needs of various agencies, including specialized equipment or vehicle types, can be limited. This lack of options complicates efforts to replace all ICE vehicles with suitable ZEVs.

Training and Awareness

Fleet management staff and drivers may require training on ZEV operation and maintenance. Ensuring that all personnel are comfortable and proficient with the technology is essential for successful adoption.

Maintenance and Repair Facilities

Specialized skills and equipment are required for ZEV maintenance, potentially posing challenges for timely repairs and operational efficiency.

Conclusion

By addressing these challenges and implementing targeted strategies, Rhode Island is well-positioned to achieve its goal of 25% ZEVs in the light-duty fleet by 2030. This transition not only supports the state's environmental sustainability goals but also modernizes fleet operations across state agencies, paving the way for a cleaner, more efficient future.

IV. Energy Efficiency

Energy use intensity (EUI) measures the energy a site consumes relative to its size and serves as a key indicator of energy efficiency. It is calculated by dividing the total energy consumption of a site by the site's area. A lower EUI indicates higher energy efficiency, meaning the building is consuming less energy per square foot to meet its operational needs. Executive Order 23-06 stipulates the following EUI goal:

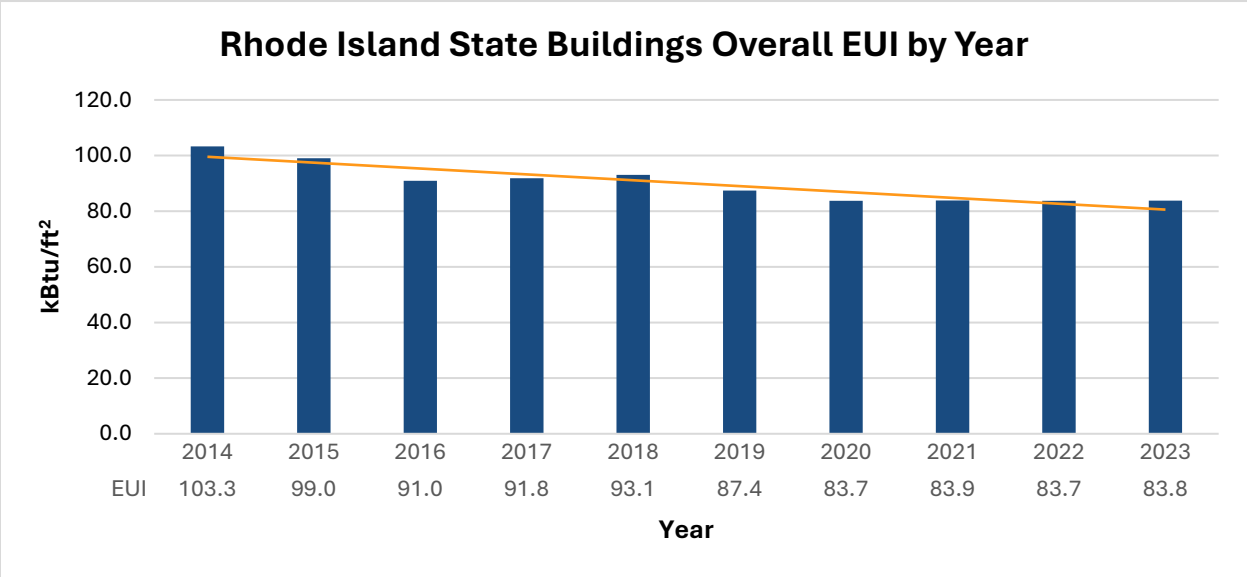
Rhode Island state agencies will reduce overall site EUI, defined as weather-normalized Btu per square foot, from a 2014 baseline at state-owned buildings:

- 20% by 2030
- 30% by 2040
- 40% by 2050

In order to calculate overall site EUI the sum of all state facilities' energy consumption would need to be divided by the sum of their square footage, however OER did not have information for every facility. To provide a reasonable overall EUI estimate, an index of 16 sites was compiled to represent similar sites across Rhode Island state government. The sum of these sites' energy consumption and square footages is what was used to calculate overall EUI as represented in this report. As additional data is acquired, the granularity of site EUI can be expanded in future versions of this report.

As of 2023, these index-listed state buildings have reduced their overall EUI from a 2014 baseline of 103.28 kBtu/ft^2 to 84.77 kBtu/ft^2. The 19 kBtu difference between 2014 and 2023 translates to an 18.9% reduction, which puts Rhode Island agencies well on track to reach the 20% reduction target by 2030. Figure 2 shows the overall EUI for the index of state facilities from 2014 to 2023.

Figure 2. Annual Overall EUI



V. Electric Vehicle Charging Infrastructure

The State of Rhode Island has developed a target of installing 200 electric vehicle charging stations on State-owned properties by 2030. By setting this goal, the LBE program can support both the electrification of the State fleet as well as the growing share of electric vehicles owned and operated by State employees and the general public who are increasingly looking for convenient access to charging stations.

Figure 3. EV Chargers in front of Capital Building

OER began installing charging stations on its properties in 2013 as a means of generating interest in, and supporting increased adoption of, electric vehicles. Initial installation progress was slow as the demand for EV charging stations was low given the limited number of EVs in operation. Over time, as both the State Fleet and the general public have increased their adoption of electric vehicles, the pace of EV charging station installation has increased to continue meeting this growing demand.

OER has made efforts to install stations in key locations that balance several factors:

- Areas with significant demand for charging infrastructure
- State agencies that have expressed a willingness to have EV charging installed
- Locations that balance the geographic diversity of the EV charging network
- Locations near to, or easily accessible from, major roads and highways.

As demand for charging continues to increase, OER will continue to sustainably expand the network to ensure demand is being met and all user groups have the ability to access the infrastructure.

As of November 2024, OER has installed 72 EV charging stations on State-owned properties.

Table 3. Installation of EV Charging Stations by Year

Year	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**Total**
Number of Stations Activated	2	0	3	3	4	29	1	16	0	7	0	7	**72**

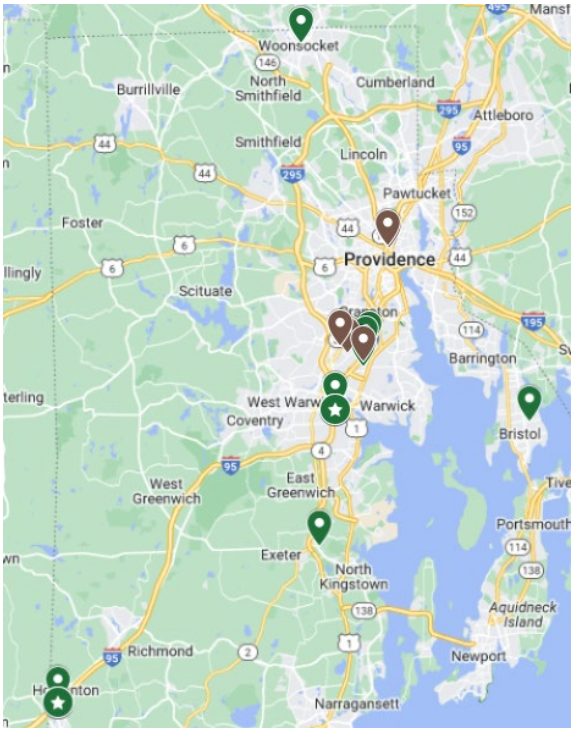
With 72 installed stations, OER is 36% of the way towards the goal of 200 active stations in the network by 2030. In addition to the currently operational stations, OER is actively expanding the network with locations identified for the installation of 60 additional stations over the next 12-18

months. This 36% percent will increase significantly as the planned and identified station locations come online in the coming years.

As mentioned, OER has made efforts to locate stations in areas that balance a number of factors, including demand and geographic distribution. The locations of all current EV charging infrastructure on State Properties can be seen in Figure 4, or in full at the link found in the footnote[7].

As the map indicates, state-owned charging infrastructure is located throughout Rhode Island, with a current concentration along major travel corridors, in large cities, and at large State building complexes. Outside of state-owned chargers, there are 284 locations equipped with Level 2 EV charging stations, offering a total of 650 Level 2 charging ports throughout the state. Additionally, there are 41 locations in Rhode Island with DC fast charging (DCFC) EV stations, providing 94 DCFC ports. The expansion of the state-owned network will continue to grow the number of stations at highly trafficked and populated areas and aims to provide EV charging infrastructure throughout the entire State. OER's objective is to ensure that all agencies, their employees, members of the public, and the State fleet are all properly supported with EV charging infrastructure and that access to charging stations is never a barrier for EV adoption and usage.

Figure 4. EV Charging Station Locations on State-Owned Properties



[7] Link to map of EV charging station: https://www.google.com/maps/d/u/0/viewer?mid=1AllPsVNcxajBzpluk7EeUGJgB6HwM1w&femb=1&ll=41.75983666762396%2C-71.61463450092411&z=10

VI. Renewable Energy Procurement

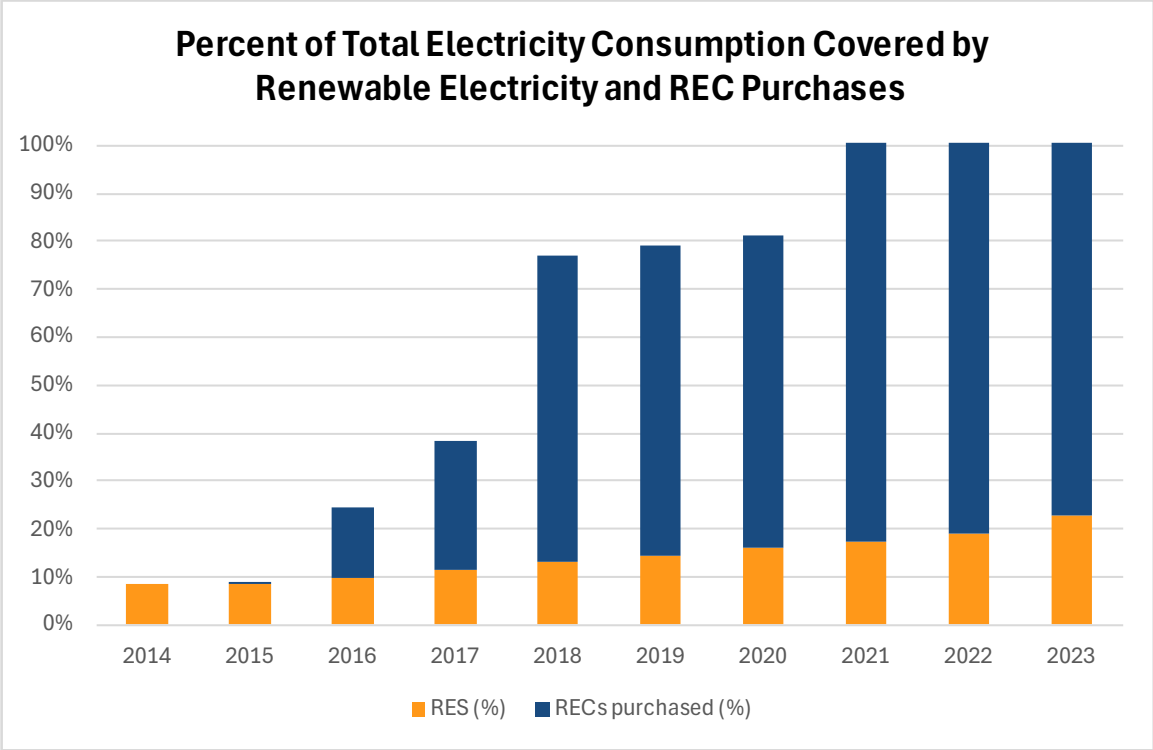
OER oversees energy supply contracts for electricity and natural gas, as well as the payment of utility bills, for the State. Centralizing this process under OER ensures timely bill payments, accurate contract rates, and proper application of billing credits, significantly reducing late fees and generating substantial financial and operational savings for the State.

By leading energy supply contracting, OER leverages economies of scale and market opportunities to secure stable energy pricing, reducing costs compared to default utility supply rates. Additionally, OER extends these benefits to municipalities, schools, and quasi-State entities by allowing them to participate in its procurement efforts, providing substantial energy cost savings across the public sector.

As part of its procurement strategy, OER purchases renewable energy credits (RECs) to ensure 100% of the State's electricity consumption comes from renewable sources, meeting the goal of 100% renewable electricity by 2025. OER has been purchasing RECs since 2015, increasing the percentage procured with each contract. By 2021, OER achieved 100% renewable electricity for State facilities.

To determine REC purchases, OER subtracts the Renewable Energy Standard (RES) requirement from 100%. For example, in 2023, the RES required 23% of utility electricity supply to come from renewable sources, so OER purchased RECs to cover the remaining 77%. When the RES increases to 28% in 2024, OER will adjust by procuring RECs to offset 72% of electricity consumption, maintaining the 100% renewable target. Figure 5 shows OER's progress towards 100% renewable electricity procurement.

Figure 5. Renewable Electricity Procurement



As of 2021, the State has achieved its goal of 100% renewable electricity at State facilities and will continue this REC purchasing process until 2033, when the Rhode Island grid is required by law to transition to 100% renewable energy under the RES. For a detailed table of values regarding REC purchases and renewable electricity procurement, please see Table 6 in the appendix.

VII. Challenges and Recommendations

This section discusses strategic recommendations to further optimize the accuracy, consistency, and efficiency of data collection and analysis.

Standardize Agency Tracking Across Datasets

State agencies should be tracked accurately and consistently across all datasets to improve data alignment and reporting efficiency. There are three large datasets for emissions data: fleet fuel data, delivered fuels data, and utility data (natural gas and electricity). Currently, fleet fuel data for 2023 relies on agency descriptions like "Department of Transportation" or "Public Safety" to assign energy consumption to state agencies.[8] Fleet fuel data prior to 2023 and delivered fuels data uses agency codes to tie energy use to specific agencies while utility data relies on a table that matches agencies based on meter identification. Additionally, RECs are not assigned to any specific agency.

Ideally, every dataset would use a standardized agency code system. Developing a comprehensive table that matches all agency codes with their respective agency descriptions would lead to more simplicity and uniformity.

Improve Utility Data Tracking and Reporting Consistency

Utility data for electricity and natural gas should be tracked more consistently and over longer time periods for each export to enhance reporting efficiency and accuracy. Currently, data is exported as separate XLS files for each billing month, which requires manual conversion and consolidation. Since XLS files are no longer supported by many modern data processing tools, including Power BI, this process introduces inefficiencies and potential errors.

Additionally, discrepancies in data columns present across different report files for the same energy type have been identified, requiring manual adjustments before data can be processed. To address these challenges, utility data should be standardized and stored in a more compatible format, such as CSV or database tables, with uniform column structures. Consolidating data over longer time periods before exporting would further streamline the reporting process and reduce manual effort.

[8] Please note that there are three fleet fuel consumption entries from 2023 that did not have a usable agency description attached to them. These emissions were used in calculating total, statewide emissions but were treated as "unassigned emissions" in agency-specific calculations.

Conduct Comprehensive Reviews of Utility Energy Data

Utility energy data should be reviewed more comprehensively across physical meters and facilities to improve accuracy and reliability. Currently, preliminary reviews focus on ensuring consistent record counts and energy consumption. Follow-ups are conducted on months with unusually high or low energy use to address potential data issues. However, unexpected utility readings are often attributed to factors such as shifting billing cycles or operational changes, like COVID-19 closures, without deeper investigation.

A more thorough review process would involve additional meter identification criteria to confidently track physical meters over time. This approach would account for scenarios where meters are started, stopped, combined, or split, which can result in changing meter identifications. By implementing these comprehensive reviews, data integrity can be strengthened, leading to better-informed energy management decisions.

Expand Facility Utility Meter Mapping for EUI Analysis

Efforts should be made to identify additional utility meters and building area data for a more comprehensive Energy Use Intensity (EUI) analysis. Currently, only 16 facilities are linked to specific utility meters for EUI calculations in an index of State properties. However, many facilities lack consistent, dedicated utility meters that provide data extending back to 2014, limiting the scope of facility-specific EUI analysis.

To address this, adjustments may be necessary to account for changes in utility meter coverage over time. For example, some utility meters may serve multiple facilities or entire campuses, while others may have been replaced or split into separate meters during a facility's lifespan. Grouping facilities or campuses under shared utility meters where applicable could allow for their inclusion in the EUI analysis, ensuring a more complete and accurate assessment of energy performance across the State's portfolio of buildings.

Transition Fleet Fuel Data Tracking to Spreadsheets

Currently, fleet fuel data is tracked in Word documents, which requires manual transfer of data into Excel for analysis. This process opens up the possibility for errors during the data transfer, as it relies on more manual data extraction processes. Moving the data tracking directly into spreadsheets would eliminate the need for this manual step, reducing the risk of errors and allowing for more streamlined data analysis and reporting.

Track Fuel Data in Volumetric Units to Avoid Spend-Based Conversion Factors

Delivered fuels data from 2013-2024 is tracked using dollar amounts, which require a spend-based conversion factor to calculate emissions. Although spend-based conversion factors are viable, volume-based conversion factors are the most accurate option. Where possible, tracking fuel data in volumetric units (e.g., gallons or liters) would provide more accurate and consistent information, eliminating the need for conversions based on cost.

VIII. Appendix 1 – Calculation Methodology

Emissions Analysis

OER followed GHG Protocol standards to retrieve, account, and report GHG emissions data. To account for scope 1 emissions, OER collected energy use data in the form of natural gas utility bills and order invoices for fuels used in the operation of vehicles and other machinery. Fuel types included gasoline, heating oil, propane, compressed natural gas, and automobile diesel fuel. To account for scope 2 emissions, OER collected electricity utility bills and compiled records of all purchased renewable energy credits (RECs). The compiled energy use and spend data was then matched with relevant emissions factors to calculate emissions. Emissions factors were retrieved from the EPA 2024 GHG Emissions Factors Hub.

Site EUI and Agency-Specific Analysis

Energy data with identifying utility meter keys was apportioned to associated state agency sites. Energy use was used to calculate emissions from agencies in accordance with GHG Protocol standards. Energy use across these sites was divided by site square footages to calculate site EUIs. Total energy use and total square footage were used to calculate overall EUI.

Note that not every OER facility was measured during the EUI analysis. Rather, certain sites were selected to create a representative index of State properties generally to provide a proximate estimation of EUI for the State. These representative facilities were used in the EUI calculations to create an accurate estimate of overall EUI.

IX. Appendix II – Detailed Emissions Data

This section presents the following information:

- Annual Emissions
- Renewable Energy Procurement and REC Purchases

Annual Emissions

Table 4 tracks emissions from State agencies as a whole as both gross emissions and net emissions. Gross emissions represent the total GHG output before any reductions. The net emissions account for emissions reductions in the form of RECs. Emissions are further broken down by scope. Scope 1 emissions are direct GHG emissions from sources that are owned or controlled by the state (not including purchased electricity) such as fuel for heating or vehicle use. Scope 2 emissions are indirect GHG emissions from the consumption of purchased electricity.

Table 4. Annual Emissions

Year	Annual Gross Emissions	Scope 1 Emissions	Scope 2 Emissions	Annual Net Emissions	Scope 2 Net Emissions
2014	114,046.20	95,970.67	18,075.53	114,046.20	18,075.53
2015	104,450.72	87,960.23	16,490.49	104,342.05	16,381.82
2016	89,413.35	72,444.31	16,969.04	86,963.56	14,519.25
2017	90,899.92	73,532.90	17,367.03	87,119.32	13,586.42
2018	94,541.06	76,930.74	17,610.33	83,301.98	6,371.25
2019	90,019.14	73,756.31	16,262.83	79,519.79	5,763.48
2020	89,703.16	72,383.49	17,319.67	78,435.12	6,051.63
2021	90,253.79	73,094.77	17,159.02	70,212.95	-2,881.83
2022	85,423.60	68,357.73	17,065.87	65,805.40	-2,552.33
2023	77,624.06	61,147.52	16,476.54	58,364.30	-2,783.22

*Note: Emissions are presented in metric tons of CO_2e

Renewable Energy Procurement

The following table shows the progress toward achieving 100% renewable electricity for State facilities. It highlights the annual percentage of renewable energy required by the State Renewable Energy Standard (RES), the percentage of electricity consumption covered by Renewable Energy Credits (RECs) purchased by OER, and the total percentage of electricity sourced from renewable energy each year. Note that in the years 2021-2023, the total MWh from purchased RECs was larger than total electricity consumption by the state leading to values larger than 100% in the RECs Purchased (%) column. Years in which REC purchases exceeded total electricity consumption are likely a result of mechanisms within the purchasing process that cause energy consumption from pseudo-state agencies that are not associated with the state's emissions to still be counted towards REC offsets.

Table 5. Renewable Energy Procurement and REC Purchases

Year	State Renewable Electricity Standard (%)	RECs Purchased (%)	Total Renewable Electricity Coverage (%)	MWh Retired via REC Purchases
2014	8.50%	0%	8.50%	0
2015	8.50%	1%	9.16%	425
2016	10.00%	14%	24.44%	9,581
2017	11.50%	27%	38.22%	19,388
2018	13.00%	64%	76.82%	46,963
2019	14.50%	65%	79.06%	46,875
2020	16.00%	65%	81.06%	46,607
2021	17.50%	117%	100%	81,217
2022	19.00%	115%	100%	80,019
2023	23.00%	117%	100%	78,557