

Executive Summary

Meeting an Ambitious Carbon Neutral Goal

In Providence, most carbon emissions come from our buildings. Reducing these emissions will provide significant impact for our city. Energy use in our buildings contributes to climate pollution and impacts quality of life for our residents. Anchored on the goals of the Climate Justice Plan, Mayor Smiley signed into law the Energy Efficiency and Carbon Neutral Goals for Municipal Buildings Ordinance in March 2024. This commitment to lead by example in phasing out fossil fuels from all municipal buildings by 2040 marked a historic commitment by Providence to unlock the economic, health and environmental benefits of improving our public buildings.

Providence's commitment to achieving carbon neutrality in all city-owned buildings by 2040 also recognized the importance of ensuring a just and equitable transition away from fossil fuels by sustaining and creating green union jobs. While the City of Providence continues to prepare its buildings to be more resilient in the face of a changing climate, federal programs and clean energy incentives are being scaled back. For the city, this current reality results in the urgent need to advance clean energy projects diligently, strategically, and even more cost-effectively. The investments we can make today will safeguard the resiliency of our community centered spaces, including schools and recreation centers, the prosperity of our local economy, and the path to energy affordability by changing how we power, heat, cool, and operate our municipal buildings.

Creating an Energy Efficiency and Carbon Neutral Plan for Municipal Buildings

The City of Providence developed this Decarbonization Roadmap for municipal buildings to advance the lead by example goals of its Climate Justice Plan and to establish a clear pathway for reducing greenhouse gas (GHG) emissions from municipal buildings. The roadmap evaluates cost-effective strategies to decarbonize 130 city-owned facilities while maintaining reliable public services and supporting long-term capital planning. It provides a framework to guide investment decisions and inform prioritization of projects as Providence works toward eliminating on-site fossil fuel use in municipal buildings by 2040.

The roadmap focuses on three decarbonization strategies: energy efficiency, electrification, and on-site solar photovoltaics. Energy efficiency measures reduce overall energy use, and therefore costs, through upgrades such as improved lighting, building envelope, and operational controls. Electrification replaces fossil fuel powered equipment with high-efficiency electric technologies, specifically heat pumps, that can operate on New England's increasingly renewable electric grid. On-site solar systems further reduce emissions and operating costs by supplying clean electricity directly to municipal facilities.

The total estimated investment identified in this roadmap is close to \$61 million, reflecting equipment and installation costs associated with energy efficiency, electrification, and on-site solar measures. The roadmap also identifies available utility, state and federal incentives, resulting in reducing the upfront estimated net cost to \$54 million. These incentives significantly improve project economics and support implementation. The implementation of the measures outlined in this roadmap could save the city up to \$12 million by 2040 (Figure 4).

The costs presented in this roadmap do not include electrical service upgrades, major building renovations, or other infrastructure improvements that may be required to fully electrify certain facilities. As a result, the estimates represent a partial scope of costs and should not be interpreted as the full capital investment needed to electrify all municipal buildings.

There are also options available to finance the implementation of this roadmap. These include capital planning, coordination with scheduled equipment replacements, and the use of available incentives to further reduce net project costs. The city may also pursue alternative delivery models, such as performance contracting or an as-a-service model, which allows projects to be implemented with little or no upfront capital through a service-based payment structure. Together, these approaches allow for emissions reductions while maintaining fiscal responsibility.

By 2040, the roadmap is projected to eliminate fossil fuel use and reduce municipal building emissions by 80%.¹ These reductions position Providence to meet climate commitments and deliver long-term financial, environmental, and public health benefits for residents.

Progress to date: Investments and Cost-Savings Achieved Since 2024

22 Building Electrification Projects have either been completed or are currently under construction. Since 2024, 1.2 million square feet or 22% of the city's building portfolio has been built new or will be updated with heat pump technology by 2028.

Energy efficiency projects and audits have touched more than 60 buildings over the past two years and have resulted in \$3.2 million in utility incentives for lighting, HVAC, and building management system upgrades.

Retro Commissioning (RCx) with assistance from RI Energy and the Rhode Island Department of Education (RIDE) Healthy Environments Advance Learning (HEAL) Program, 18 Providence school buildings have undergone RCx audits to identify energy and cost savings opportunities. Retro commissioning, the tuning up existing mechanical systems will play an important and reoccurring role in the city's efforts to reach its decarbonization goals.

¹ Compared to the City's Calendar Year 2024 baseline emissions and exclusive of Renewable Energy Certificates (RECs).

On-Site Renewable Energy roof top solar assessments have been conducted for all municipal buildings. 62 facilities and two parking lots have been identified as possible solar candidates with the potential to generate 13 million kilowatt-hours (kWh) of electricity, more than 40% of the current annual electrical consumption of the city's buildings and save up to \$2.5 million annually. Installations are planned at four facilities during calendar year 2026.

Off-Site Renewable Energy has been part of the Providence energy mix since 2019. Annually, the city receives 29 million kWh of virtual net metering credits which reduce energy expenditure by \$1.5 million per year and supports the creation of new renewable energy projects. Starting in 2029, the city will retain the environmental attributes generated by this renewable energy system and can use them to meet its building decarbonization and clean energy goals.

Implementation of the Energy Intelligence Suite (EIS) for strategic energy management. PowerOptions' Energy Intelligence Suite (EIS) brought the city's energy management into the 21st century by revamping utility bill tracking and payments for nearly 800 electric and gas accounts and performing better energy data analytics for municipal-owned buildings and streetlights. PowerOptions used data from EIS to develop the decarbonization roadmap and will remain a strategic tool to track and meet the city's energy goals.

Energy benchmarking shows that building energy use is trending down. Over the past four years total energy use in the city's buildings has decreased by 7%. And as would be expected with any decarbonization effort, natural gas usage has decreased by 15% while electricity usage has increased by 10%. As Providence removes fossil fueled energy systems from its buildings and replaces them with dramatically more efficient electric energy systems, total energy use will continue to decline.

Preparing for the next phase and achieving the 2040 Goal

This decarbonization roadmap comprehensively assesses and guides how 130 municipal buildings can be made more energy efficient and eventually be carbon neutral by 2040 where the design, construction, and operations do not contribute to a building emitting greenhouse gas that cause climate change.

The analysis in this roadmap will be updated yearly to report on: the prioritization and progress of projects; the latest investment cost estimates; energy savings from avoided costs; and secured federal, state, and utility incentives and rebates factored into return on investments; the latest improvements in technology and feasibility studies conducted to explore technologies, such as heating districts or thermal energy networks; and, begin to track jobs that are created or sustained by project investments.

The carbon neutral ordinance also calls for the implementation of cost-effective energy efficiency and clean energy projects. And while the efficiency, electrification, and renewable energy recommendations found within this roadmap move from concept to construction, the

project management and operational experience gained from the 22-electrification projects referenced above, coupled with an existing Strategic Energy Management Partnership (SEMP) agreement between the city and RI Energy that provides technical and financial support to develop these projects, the city can move forward with confidence that it will continue to deploy technologies that will save energy and emission and provide more insight into how much savings are possible in the future.

Additionally, to achieve both innovation and economies of scale, the city is looking to create public and private partnerships and identify new funding and financing mechanisms to advance more projects and allocate capital improvement dollars more strategically to better integrate building electrification with our municipal fleet transition to electric vehicles and charging infrastructure expansion.