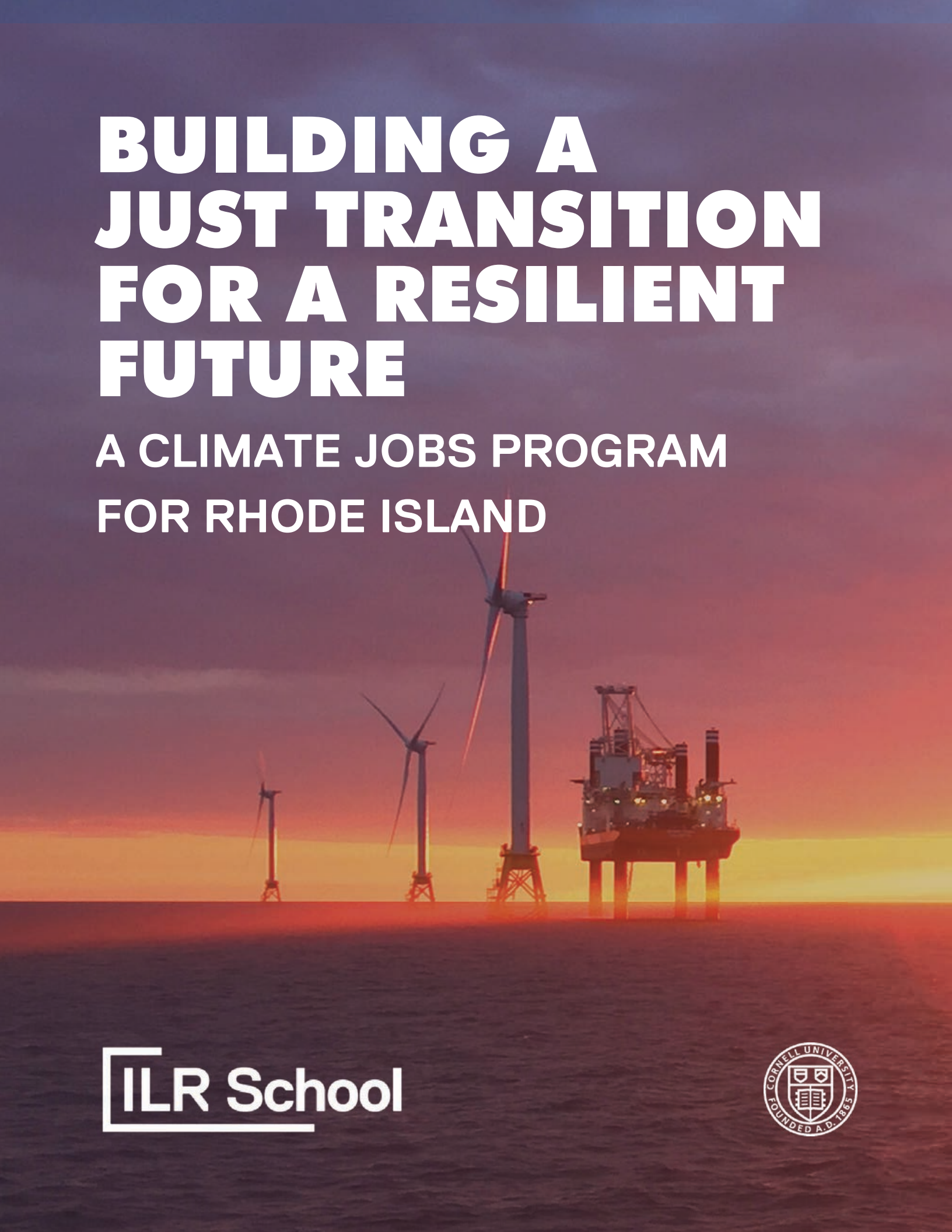
BUILDING A JUST TRANSITION FOR A RESILIENT FUTURE

A CLIMATE JOBS PROGRAM FOR RHODE ISLAND



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JANUARY 2022

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The Worker Institute at Cornell engages in research and education on contemporary labor issues, to generate innovative thinking and solutions to problems related to work, economy and society. The institute brings together researchers, educators and students with practitioners in labor, business and policy making to confront growing economic and social inequalities, in the interests of working people and their families. A core value of the Worker Institute is that collective representation and workers' rights are vital to a fair economy, robust democracy and just society.

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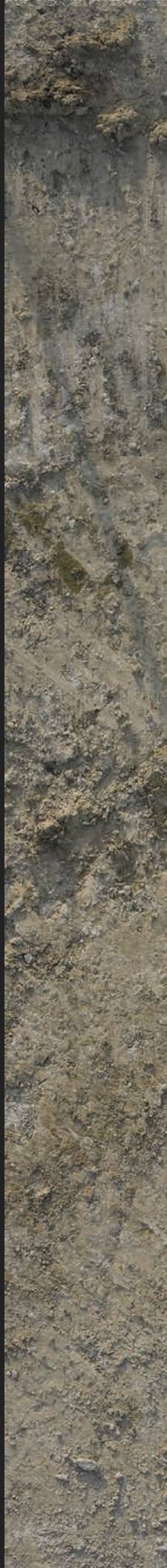



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In early 2021, the Worker Institute's Labor Leading on Climate Initiative, in partnership with Climate Jobs Rhode Island, the Climate Jobs National Resource Center, and the Rhode Island AFL-CIO, began a comprehensive research, educational, and policy process to develop a vision and framework for simultaneously addressing the crises of climate change and inequality in Rhode Island through high-impact job creation strategies. Over the past year, the Labor Leading on Climate team has worked directly with leaders of the local labor and environmental movements, policymakers, and experts in the climate, energy, and labor fields to better understand the challenges and opportunities that climate change and climate protection efforts present to Rhode Island's workers and unions.

The Worker Institute would like to thank Climate Jobs Rhode Island and the many unions, labor federations, and environmental and community groups that participated in this process and continue to show great leadership and commitment to tackling climate change and inequality.

ABOUT CLIMATE JOBS RHODE ISLAND

Climate Jobs Rhode Island is a coalition of Rhode Island labor unions, environmental groups, and community organizations working together to establish a Just Transition in the development of a green economy in Rhode Island grounded in the principles of economic, environmental, racial and social justice.

Climate Jobs Rhode Island's Principles:
1) Establish science-based, mandatory and enforceable emissions limits leading to economy-wide 100% net-zero emissions by 2050, with significant, measurable progress before 2030.
2) Establish state-wide, cost-effective investment in community resiliency (e.g., protecting wastewater treatment plants from rising sea levels) to protect against the effects of climate change and equitably share costs, benefits, and risks.
3) Maximize family-sustaining job growth through the creation and maintenance of good, well-paying union jobs and apprenticeship programs, and create defined career pathways for current workers in the fossil fuel industry.
4) Prioritize solutions developed by underserved communities overburdened by pollution and follow the lead of frontline communities (e.g., low-income communities, senior Rhode Islanders, and Black, Indigenous, and People of Color) disproportionately affected by environmental injustice in the transition to a Green Economy.

More info: www.climatejobsri.org

Special thanks to Rhode Island AFL-CIO, Rhode Island Building & Construction Trades Council, The Nature Conservancy, Green Energy Consumers Alliance, Audubon Society of Rhode Island, International Union of Painters and Allied Trades District 11, Laborers New England Region Organizing Fund, International Brotherhood of Electrical Workers Local 99, New England Regional Council of Carpenters, Service Employees International Union District 1199NE, Acadia Center, Clean Water Action, National Education Association Rhode Island, Rhode Island Federation of Teachers and Health Professionals, Rhode Island Environmental Education Association, Rhode Island Committee on Occupational Safety and Health, Building Futures RI, Fuerza Laboral, Amalgamated Transit Union Division 618,Groundwork Rhode Island and the International Brotherhood of Teamsters Local 251.

This report is an evidence-based analysis of best available data and reports at the time of publication. The authors offer this report for discussion and debate and take full responsibility for any shortcomings.

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INTRODUCTION

On August 22nd, 2021, Tropical Storm Henri made landfall in Westerly, Rhode Island, slamming some areas with up to eight inches of rain and cutting power to 100,000 residents in the Ocean State [1]. The storm followed on the heels of a new report by the United Nations Intergovernmental Panel on Climate Change that warned that current levels of greenhouse gas emissions have locked us into dangerous levels of warming, sea-level rise, and decades of more frequent and intense extreme weather events [2].

In addition to Tropical Storm Henri, the daily onslaught of wildfires, record-breaking heat, droughts, hurricanes, and flooding that is occurring around the country and world reinforces the fact that substantial and urgent action is needed to address climate change and rapidly reduce greenhouse gas emissions. The disproportionate impact that these events have on the most vulnerable in our society -- women, children, the elderly, immigrants, low-income families, and communities of color -- is a reminder that our plans to address climate change must also lift working families and frontline communities to reverse growing social and economic inequality.

Inequality in Rhode Island has continued to rise, and the COVID-19 pandemic beginning in March of 2020 has only made it worse. Many local families struggle to find good jobs and meet their basic housing, food, healthcare, and education needs. As Rhode Island plans its recovery from the COVID-19 pandemic and ensuing economic crisis, it has an opportunity and a responsibility to address the triple crises of climate change, COVID-19, and inequality. Rebuilding from the pandemic can be an opportunity to make a fairer economy, create high-quality jobs for all, and build healthy, resilient, and thriving communities.

Rhode Island took an important step towards building an equitable, climate-friendly economy when it passed the Act on Climate legislation in 2021. This bill commits the Ocean State to a 45% reduction in greenhouse gas emissions by 2030 and net-zero emissions by 2050 [3]. The 12-member state Executive Climate Change Coordination Council will develop the plan to meet emission reductions and address important public health, environmental justice, and employment transition issues [4].

As Rhode Island develops its plans to tackle the climate crisis, it has a once-in-a-generation opportunity to build a new economy based on high-quality, union jobs while expanding access to these jobs for frontline and disadvantaged communities. Only with a firm commitment to addressing both climate change and growing inequality can Rhode Island lead the way in building a robust green economy that provides good jobs that truly support the state's families and communities.

Responding to the climate crisis will require a tremendous amount of work. Homes and buildings must be retrofitted for energy efficiency and renewable energy, vehicles must transition to electric, public transit systems need to be vastly improved and expanded, and energy systems must be made more resilient and renewable. The industrial and agricultural sectors will need to be decarbonized as well.

With climate change already affecting all 50 states, adapting to climate change will be vital. The U.S. will need to make its current infrastructure resilient to severe heat, hurricanes, flooding, and other extreme weather events. All of this amounts to a transformation of our economy that will create 15 to 25 million jobs over the next two decades [5]. At the same time we address the climate crisis, we can put people to work in high-quality jobs that help reduce emissions and pollution, and support families and communities with good-paying careers with benefits. But if this new clean energy economy is built with low-wage, low-quality jobs, it will exacerbate our current crisis of inequality and undercut our efforts to efficiently and effectively address climate change.

Currently, most jobs in the new clean energy economy are low-wage and low-quality [6]. As Rhode Island pursues strong climate action, it can address this problem and ensure new clean energy jobs are family-and-community-sustaining union jobs with a pipeline from disadvantaged communities to highly-skilled, paid, on-the-job training programs that support long-term career advancement.

Workers and communities that are currently engaged in high-carbon and fossil fuel activities need to be protected and supported through this transition. These workers and communities have powered Rhode Island's homes, businesses, and economy for decades. They will need an effective, fair path out of high-carbon sectors and into other economic activities. Significant local, state, and federal, planning and funds will be needed to ensure this is a "just transition."

IUPAT DC 11



The following report examines the climate crisis in Rhode Island and outlines a set of high-impact climate jobs recommendations designed to maximize the state's actions to do three things: 1) Create thousands of good-paying, high-quality jobs that help reverse inequality, 2) Drastically reduce greenhouse gas emissions to avoid the worst impacts of climate change and meet the state's Act on Climate targets, and 3) Invest in infrastructure that will make Rhode Island communities healthier, more resilient and more equitable.

Tackling the Intersecting Crises of COVID-19, Inequality and Climate Change

Before the COVID-19 pandemic and ensuing economic crisis, Rhode Island was already facing a crisis of social and economic inequality. According to the U.S. Census Bureau, as of 2017, Rhode Island had the highest poverty rate in New England. In 2019 over 30% of all Rhode Islanders made less than $30,000/year [7].

The crisis of inequality in Rhode Island is particularly acute for communities of color. The poverty rate for Black and Latinx Rhode Islanders is three times higher than for White Rhode Islanders. The median income for White people in Rhode Island is $71,295, while the median income for Latinx people is $41,123, and just $37,781 for Black people [8]. Men in Rhode Island also make 1.25 times more, on average, than women [8].

The largest employment sectors in Rhode Island are restaurants and food services, elementary and secondary schools, and construction. Unfortunately, there is a high prevalence of low-wage jobs in the state. In May 2021, Rhode Island committed to raising its minimum wage to $15/hour. Currently, 27% of Rhode Island's workers make less than $15/hour, significantly contributing to the state's high levels of income and wealth inequality [9].

The COVID-19 pandemic has both exposed and worsened Rhode Island's crisis of inequality. In January 2021, Rhode Island had the second most coronavirus cases per capita in the U.S. and the fourth-highest deaths per capita [10]. This is not surprising given that Rhode Island has a large share of people employed in low-wage leisure, hospitality, and service sectors that were hit the hardest by the pandemic [11].

When the pandemic first started in March 2020, Rhode Island lost 98,100 jobs, or 1 in 5 jobs, and the state's unemployment rate rose to 18.1% [12]. Seventeen months later, in August 2021, almost 40,000 Rhode Islanders are still out of work and looking for jobs. So far, more than 230,000 unemployment claims have been filed in Rhode Island [13].

Black and Latinx workers represent the majority of low-wage, leisure, hospitality and service jobs that have been deemed "essential" during the pandemic, putting these workers at a much higher risk from COVID-19 [14]. While these workers' incomes are too low to adequately support their families, they often make too much to qualify for essential child care and food benefits. Raising wages for this particular set of workers is essential to building a stronger, more equitable Ocean State economy coming out of the COVID-19 pandemic.

In addition to alarming inequality, Rhode Island is seriously threatened by climate change and extreme weather events. Rhode Island will see a range of effects from the climate crisis, including warmer air and water temperatures and more extreme weather events, such as high precipitation events, hurricanes, flooding, droughts, shorter winters and longer summers, extreme heat, and less snowfall [15]. Climate change will not only negatively affect Rhode Island's natural environment, such as its coastal wetlands and fisheries, but it will also take a huge toll on the state's economy, jobs, health and well-being. There is no doubt that to avoid the worst impacts of climate change, Rhode Island will need to act boldly and swiftly to reduce its emissions and expand its clean energy economy.

The Ocean State, with 400 miles of coastline, is particularly vulnerable to sea-level rise and more intense, frequent tropical storms and hurricanes. The latest United Nations Intergovernmental Panel on Climate Change (IPCC) report projects that Rhode Island will experience between four and nine feet of sea-level rise between now and 2100 [16]. Sea-level rise, shore erosion and higher storm surges will damage coastal homes, public schools and buildings, roads, bridges, and rail lines, and essential energy, communications and wastewater management infrastructure.

The Narragansett Bay, New England's largest estuary, has already warmed approximately 2.5 to 3 degrees Fahrenheit over the past 50 years [17]. Climate scientists predict that the water will warm 5 to 6 degrees Fahrenheit by 2100, significantly harming coastal fisheries such as cod, bass, clams, and lobster [17].

Extreme heat will also affect Rhode Island. By 2100, summers in Providence will feel similar to how South Florida does now and on average, will be about 9 degrees warmer [18]. Hotter temperatures will trap more pollution closer to the ground, especially in urban areas, increasing acute and chronic respiratory issues such as asthma. For people who work outside, such as construction and farm workers, extreme heat will be especially dangerous.

With Rhode Island on the frontlines of the climate crisis, it will take bold, ambitious action to combat climate change and reduce greenhouse gas emissions and pollution to the levels that science demands. Fortunately, tackling climate change is also an opportunity to address the other crises Rhode Island is facing: inequality and pandemic recovery. As a small state with one of the lowest emissions in the country, Rhode Island can be innovative and efficient, employing cutting-edge approaches to reverse climate change and inequality. Rhode Island has the potential to be the first state in the country to fully decarbonize and build out a net-zero economy with high-quality union jobs. This would make Rhode Island's economy stronger, fairer and more inclusive.

The following "Climate Jobs Recommendations" show how the Ocean State can move towards a path of building the equitable, climate-friendly economy that Rhode Islanders deserve.



IBEW Local 99

RECOMMENDATIONS

SCHOOLS



- Transition all K-12 public schools to net-zero by 2030

BUILDINGS



- Build 35,000 affordable net-zero housing units by 2035
- Perform deep-energy retrofits on 50% of the cost-burdened households in Rhode Island by 2030
- Transition to net-zero emissions in municipal buildings by 2030

ENERGY



- Install 900 MW of utility, commercial, and residential-scale solar by 2030 and a total of 2,000 MW by 2040
- Install 1,300 MW of offshore wind by 2030 and a total of 3,000 MW by 2040
- Modernize the grid by 2030

JUST TRANSITION



- Create a multi-stakeholder Office of Just Transition and require labor representation on existing government agency councils or commissions that work on climate change mitigation and adaptation

HIGH QUALITY JOBS



- Introduce legislation to apply Prevailing Wage, Project Labor Agreements, Labor Peace, Build RI and Buy America provisions; and expand access to new jobs for all non-residential renewable energy projects in Rhode Island
- Require Prevailing Wage, Project Labor Agreements, and Labor Peace on all projects funded under Rhode Island's Renewable Energy Fund and Rhode Island's Infrastructure Bank
- Introduce legislation to establish a Wage Board to set a Minimum Wage for the renewable energy industry

TRANSPORT



- Expand and improve public transportation access
- Electrify public vehicles and install EV-supporting public infrastructure, prioritizing Electric Vehicle Infrastructure Training Program (EVITP) and local manufacturing
- Construct a regional high-speed rail network

RESILIENCE & ADAPTATION



- Transform Lifespan and Care New England Hospital Campus
- Remediate and replace 20,000 lead service lines by 2030
- Require corrosion prevention training for any construction work on critical infrastructure
- Require a climate vulnerability assessment prior to any work done altering, remediating, or expanding any critical infrastructure
- Reduce the gap in access to green infrastructure

RHODE ISLAND AT A GLANCE

COVID-19, Inequality, and Climate Change in Rhode Island



27% OF RHODE ISLAND WORKERS MAKE LESS THAN $15/HR [1]

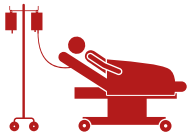


THE TOP 1% EARNS 18x MORE THAN THE BOTTOM 99% [2]

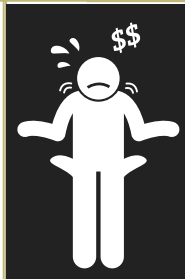


17.8% OF RHODE ISLAND'S WORKFORCE IS UNIONIZED [3]

RHODE ISLAND HAD THE SECOND MOST COVID-19 CASES PER CAPITA IN THE UNITED STATES



[4]

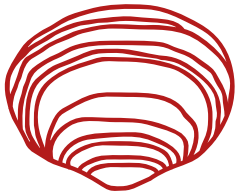


40,000 RHODE ISLANDERS ARE STILL OUT OF WORK SINCE COVID-19 BEGAN

As of August 2021, 230,000 unemployment claims have been filed [5]

NARRAGANSETT BAY HAS ALREADY WARMED ABOUT 2.5 TO 3 DEGREES FAHRENHEIT OVER THE PAST 50 YEARS.

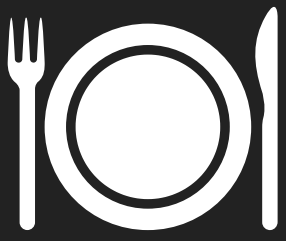
Warming affects survivability of local species including cod, bass, and clams



[6]

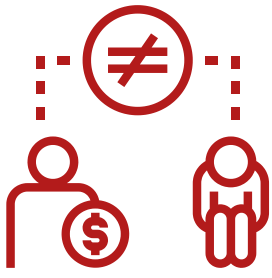
13%

of Rhode Island adults report that children in their household do not have enough food to eat



[7]

Median income is **1.7X** higher for White people than Latinx or Black people and 1.25X higher for men than for women



[8]

CLIMATE CHANGE IN RHODE ISLAND

Rhode Island is experiencing dramatic changes in climate that are impacting the lives of working people across the state. Since the start of the 20th century, temperatures in the state have increased by over 3˚F [1]. Rhode Island saw approximately three more weeks of extreme heat in 2015-2016 than in the 1950s [2].

Hotter temperatures impact vulnerable people the most. Workers who labor outside, such as those in conservation, construction, maritime, or utility work, are especially at risk for health impacts and lost wages due to rising temperatures [3].

This extent of the trend in warming temperatures will continue based on human activity. Temperatures in the Northeast may rise by 4.1˚F by 2050 under a lower-emissions scenario and 5.3˚F by 2050 under a higher-emissions scenario [4].

Winters in Rhode Island may also feel the impacts of climate change with a shorter snow season, including less early snowfall, earlier snow-melt, and less lake ice in the Northeast expected [5].

In addition to rising temperatures, Rhode Island has experienced changing precipitation patterns. Extreme precipitation events with intense rainfall have increased by 71% in New England since 1958 [6]. In the Northeast, each month from December through April is expected to see an additional inch of precipitation by the end of the century [7].

Climate Change has also increased the likelihood of extreme precipitation events and major storms in Rhode Island. In March of 2010, Rhode Island experienced major flooding after a powerful storm led hundreds of people to flee their homes and caused $43 million in flood damage claims across the state. The Pawtuxet River, which is approximately 9 feet deep, rose to above 20 feet, flooding I-95, I-295, and sewage systems [8].

Rhode Island can continue to expect the negative impacts of extreme weather events. Last year, there was an unprecedented hurricane season, with thirty named storms and twelve reaching landfall in the continental United States [9].



Although Rhode Island may experience more overall rainfall, some areas may also see an increase in drought as higher temperatures increase evaporation in the state [10]. In the Northeast, droughts can lead to water scarcity, damage foliage, reduce agricultural yields, and harm soil and land [11]. Some parts of Rhode Island, such as Southern Rhode Island, Block Island, Jamestown, and Aquidneck Island utilize shallow ground-water wells and shallow water reservoirs, where droughts can directly impact access to drinking water [12].

Rhode Island, with a coastline of 400 miles, is directly affected by sea-level rise. Sea-level in Rhode Island is rising faster than at any point in the last 3,000 years [14]. Scientists from the University of Rhode Island have developed models which demonstrate that Barrington, Bristol, and Warren may be the areas of Rhode Island most at risk for sea-level rise [13]. Over the last century, sea level in Rhode Island has risen by 10 inches, about 0.1 inches per year [22].

Sea level rise, damages and floods, infrastructure, transportation networks, energy systems, and water supplies. Between 2005 and 2017, Rhode Island lost $45 million in coastal property value due to sea-level rise [16].

Climate change will continue to increase sea-level rise in Rhode Island by between 2 and 4.5 feet by 2100 under an intermediate to low emissions scenario. In the highest emissions scenario, sea levels in the Northeast could rise by up to 11 feet by the end of the century [15].

Climate change will also have a direct impact on Rhode Island ecosystems. Ocean acidification and rising temperatures can damage fish populations, harm sea life, and drive migration to new areas [17]. Already in the Narragansett Bay, winter flounders have been replaced by scup and butterfish. Ocean acidification presents an additional threat to shell formation and the growth of mollusks. In addition, Rhode Island's salt marshes are home to fish and shellfish, but many of these areas may be washed away or inundated due to sea-level rise. Their current rate of increase of elevation from the build-up of organic material is being outpaced by rising tides [18].

The effects of climate change will also increase the risk of infectious diseases such as the West Nile Virus as the century progresses. Within the Northeast, nearly 500 more cases of West Nile may occur each year by 2090 [19]. The health and safety of Rhode Island communities and vital ecosystems remain at great risk, and action must be taken to protect the state and its most vulnerable people.



RHODE ISLAND'S ACT ON CLIMATE AIMS FOR

NET ZERO

EMISSIONS BY 2050

[20]

IN 2018, RHODE ISLAND EMITTED

11,690,000

METRIC TONS OF CO2 EQUIVALENT

[21]

BUILDINGS

Buildings account for approximately 27% of the state's total greenhouse gas emissions [1]. In urban areas such as Providence, Rhode Island, buildings account for around 70% of the local carbon footprint [2].

Rhode Island's aging buildings have deficient insulation, low overall energy-efficiency, and low availability of air conditioning. This is especially problematic as warmer seasons lengthen and extreme heat increases due to climate change. These conditions emphasize the need for deep retrofits and net-zero buildings that benefit all RI communities. A 2017 study on K-12 public schools found that the average school building age is 56 years old, with 66.7% of all school buildings being between 35 and 85 years old. In the same study over 50,000 building deficiencies were found across all K-12 Rhode Island public schools [3].

These building deficiencies are not uniform statewide. Environmental justice areas such as Central Falls have a higher cost per deficiency square footage [4,5]. Central Falls, which has a majority population of minority individuals, had some of the highest cost of deficiencies in their public schools, where they have also seen school early dismissals and closures due to recent heat waves [6,7].

On a national level, in residential buildings, 36% of Black households, 36% of Indigenous households, and 28% of Latinx households experience a high energy cost burden, where a majority of their household income goes directly to their energy costs [8]. In Rhode Island, Latinx and Black communities experience higher rates of poverty and a higher percentage of Latinx households have high energy burdens in Providence [9,10]. Approximately 139,090 households are considered cost-burdened in Rhode Island [11]. Additionally, almost 30% of all renters in Rhode Island are classified as extremely low-income, with a shortage of over 20,000 affordable housing units available to them [12]. Existing affordable housing in Rhode Island face increasing climate risk from heat waves, natural disasters, and sea-level rise [13,14,15]. With cities such as Providence leading the way on addressing climate justice and Rhode Island's passing of the Act on Climate 2021 legislation - with an admirable goal of economy-wide emissions reduction to net-zero by 2050 - Rhode Island is quickly moving in the right direction [16,17]. However, it is crucial that Rhode Island takes concrete steps to not only reduce building emissions and building electricity consumption, but also simultaneously build resilience and equity by protecting its most vulnerable populations as it adapts to and mitigates climate change.



RHODE ISLAND BUILDINGS ACCOUNT FOR ALMOST

30%

OF ALL STATE EMISSIONS

[1]

DEEP RETROFITS HAVE THE POTENTIAL TO REDUCE A BUILDING'S ENERGY USE BY OVER 50%

[18]

CARBON-FREE AND HEALTHY SCHOOLS

Recommendation: Transition all K-12 public schools to net-zero by 2030 under a PLA

Rhode Island public school buildings should achieve net-zero emissions by 2030 under a Project Labor Agreement.

Rhode Island must aim to achieve a site energy use intensity of no greater than 20 kBtu/squarefoot/year or reduce site energy use intensity by at least 50% from its 2019 baseline [1]. Additionally, schools should have no on-site fossil fuel combustion, reduce life cycle impacts associated with high embodied carbon materials, and utilize low global warming refrigerants. To become net zero Rhode Island schools should aim to incorporate renewable energy sources and battery storage on site, equal to the school's reduced annual energy use after completion of deep retrofits.

Increased state funding will expedite the improvement of facility conditions for the health, safety, and well-being of students and staff. Schools with the worst facility conditions and highest energy use and deficiency cost should be remediated first and transition to net-zero by 2026.

Estimated Job Creation: Transitioning all Rhode Island K-12 public schools to net-zero would create a total of 11,209 direct jobs over a total of eight years or approximately 1,401 direct jobs per year.

Ensuring High-Quality Jobs: Requiring a Project Labor Agreement will guarantee that all work is performed safely by union workers.

Carbon Emissions Reduction: Transitioning all Rhode Island K-12 public schools to net-zero could decrease emissions by 105,913 metric tons of CO2E by 2030.

Estimated Cost: $2.45 Billion



CARBON-FREE AND HEALTHY SCHOOLS



Transitioning schools to be carbon-free will make safer and healthier spaces for our children, while creating good jobs for our communities including:

(1) Construction Laborers and Managers, Operating Engineers;
(2) Painters;
(3) Electricians, Electrical Power-Line Installers and Repairers;
(4) Roofers, Architects,Solar Installers;
(5) Insulation Workers, HVAC installers; and
(6) Welders, Glaziers, and Structural Iron and Steel Workers.

Note this list may not capture all emerging jobs in shifting climate sectors and is subject to change and expansion. Please see Appendix: Endnotes: Potential Job Types

NET-ZERO AFFORDABLE HOUSING

Recommendation: Build 35,000 affordable net-zero housing units under a Project Labor Agreement and Labor Peace Agreement for operations, maintenance and security by 2035

Buildings remain one of the leading sources of emissions in Rhode Island. Building net-zero homes will reduce emissions while creating thousands of jobs across the state and increasing housing security. Investing in housing should remain a priority in the state, especially as a way to guarantee housing security for all state residents.

There is a gap of nearly 20,000 affordable housing units in Rhode Island today based on estimates from the National Low Income Housing Coalition [1]. West Greenwich, Scituate, and Little Compton have the least availability of units for low-and-moderate-income residents, but all communities in the state face a shortage of affordable units [3]. HousingWorks RI also estimates that by 2025 the state will need 35,000-40,000 additional housing units to support increased demand of single-person households [2].

Action must be taken to address this crisis, especially due to the effects of the pandemic on housing. As of July 2021, 17% of Rhode Islanders (43,000 people) are behind on rent payments. In addition, 25% of RI adults reported difficulty covering usual household expenses [5].

Estimated Job Creation: Building 35,000 net-zero affordable housing units would create 65,691 direct jobs over 13 years.

Ensuring High-Quality Jobs: Project Labor Agreements guarantee safe and fair working conditions for those in construction. Labor Peace and Neutrality Agreements ensure that all workers, including those in security and service jobs, have the same benefits and decent compensation. Housing projects create valuable and skilled construction jobs and additional work in the maintenance and servicing of buildings [4].

Estimated Cost: $11.9 Billion



Carpenters Local 330

REDUCE ENERGY BURDENS

Recommendation: Perform deep-energy retrofits on 50% of cost-burdened households in Rhode Island by 2030 with Prevailing Wage and Local Hiring Requirements

This would result in deep retrofitting of almost 70,000 homes.

No Rhode Islander should be burdened by their electric bill or gas bill. Deep retrofits can improve energy-efficiency, help reduce energy bills, fight climate change, create high-quality jobs and increase equity across the state. If retrofitting measures are only available to those with higher incomes and wealth, this creates severe inequity across the state and puts a higher burden of electricity cost on the state's most vulnerable population.

Rhode Island currently participates in numerous federal assistance programs, such as the Weatherization Assistance Program (WAP), Low Income Home Energy Assistance Program (LIHEAP), and Heating System Repair and Replacement Program (HSRRP), as well as the National Grid's energy efficiency programs. These energy-efficient measures should be expanded and be used as a foundation for future energy-efficiency initiatives.

Estimated Job Creation: These deep-energy retrofits would create 24,515 direct jobs over eight years.

Ensuring High-Quality Jobs: Requiring payment of the Prevailing Wage on all projects will ensure fair compensation for all workers. Local Hiring would create direct jobs in the energy burdened communities where deep energy retrofits were being performed.

Carbon Emissions Reduction: This has the potential to save approximately 133,372.61 MT of CO_2 Eq.

Estimated Cost: $5.21 Billion



NET-ZERO MUNICIPAL BUILDINGS

Recommendation: Under a Project Labor Agreement, convert all Providence municipal buildings to net-zero emissions by 2030

State and local governments in Rhode Island can lead by example by transitioning all of its buildings to 100% net-zero by 2030.

Currently, many municipal buildings are older and inefficient with municipal buildings from the 1950s and 1960s often relying on natural gas and electricity produced from fossil fuels [1]. By converting all of Providence's municipal buildings to net-zero and then supplying electricity from sources such as solar energy, Rhode Island can not only save on energy costs, but also help fight climate change and become a leader in the clean energy economy. Converting all municipal buildings in Providence to net-zero will create jobs in renewable energy and energy efficiency sectors for the Rhode Island community.

Estimated Job Creation: Converting all municipal buildings in Providence to net-zero by 2030 (excluding schools and firehouses) can create 576 direct jobs over eight years.

Ensuring High-Quality Jobs: A Project Labor Agreement on all retrofit and renewable energy work will ensure fair compensation and protection for all workers.

Carbon Emissions Reduction: Net-zero buildings in Providence have the potential to eliminate 2,326.7 metric tons of C02 annually.

Estimated Cost: $133 Million



ENERGY

Each year, Rhode Island produces a significant amount of greenhouse gases that directly contribute to climate change and impact people locally and around the planet.

In 2018, the U.S. Environmental Protection Agency (EPA) found that fossil fuels in Rhode Island generated 11.7 million tons of carbon emissions [1]. The largest source of emissions in Rhode Island emerges from the transportation sector, which generates over a third of all emissions (35.7%). Much of this may have been driven by increases in-vehicle use, where net-motor fuel volume increased 185% from 1950 to 2018 [3]. Electric power is the next largest source of emissions, adding up to 27.1% of the state's fossil fuel emissions.

Rhode Island remains heavily reliant on fossil fuels, with natural gas and oil-producing 93.8% of all electricity across the state [4]. In 2019, Rhode Island employed 300 fossil fuel workers. The building sector forms the third highest sector for emissions, with 19.7% emerging from the residential sector and 8.4% from the commercial sector. Industrial emissions also comprise 9.1% of all fossil fuel emissions within the state of Rhode Island.

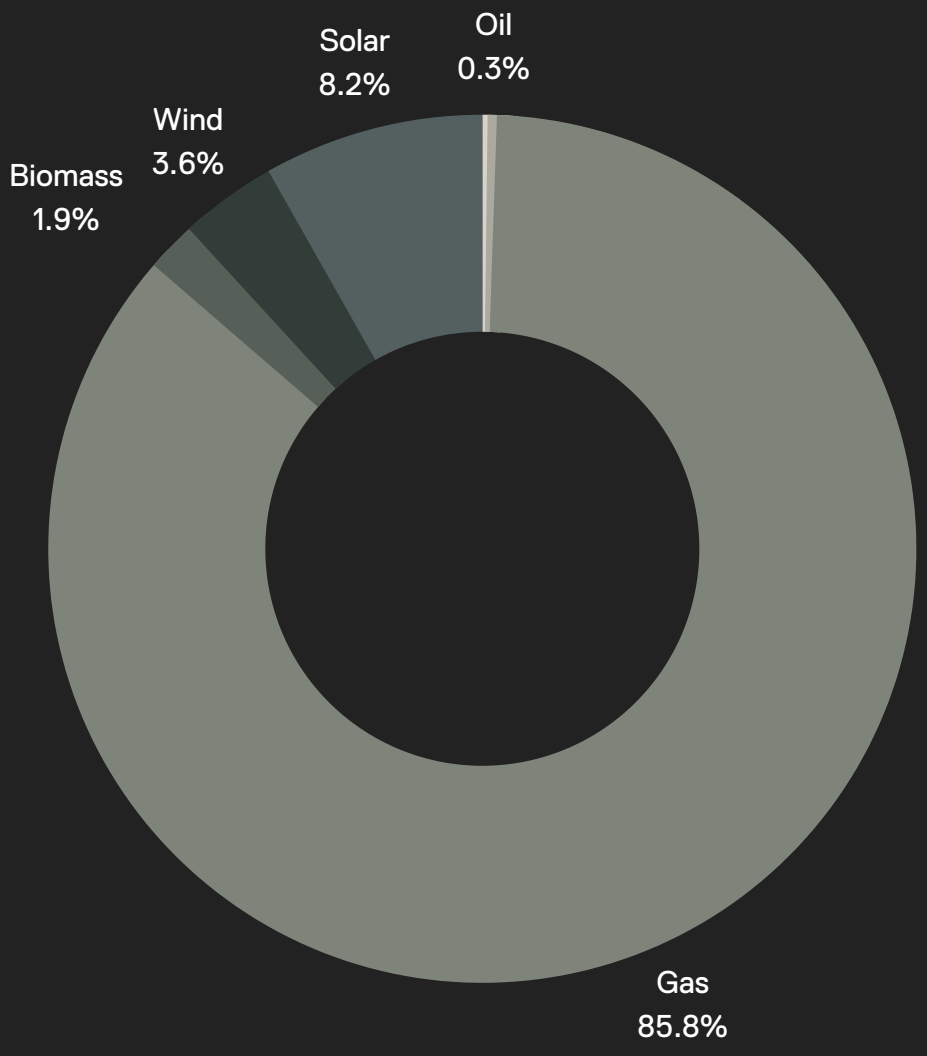
Sector	2018 Fossil Fuel Emissions (MMTC02)	Percentage of Emissions
Commercial	0.98	8.4%
Industrial	1.06	9.1%
Residential	2.30	19.7%
Transportation	4.17	35.7%
Electric Power	3.17	27.1%
Total	11.68	100%

[1]

According to data from S&P 500 from 2021, 2,049 MW of electricity currently operate in the state of Rhode Island [5]. The vast majority of electricity produced within Rhode Island is derived from fossil fuels. The capacity of Rhode Island's natural gas is 1,758 MW, and the capacity of oil is 7 MW, representing 86.1% of the state's total capacity. In contrast, 168 MW of solar capacity, 74 MW of wind, and 4 MW of hydropower exist within the state, representing only 12.0% of the total operating capacity.

However, the state does have a significant renewable energy workforce, with 15,000 workers employed fully or partially in various jobs, including professional, construction, operations, and maintenance roles [7]. Given that the state also has a significant amount of renewable energy potential, including 10 GW of utility-scale solar, 2 GW of solar PV, and 6 GW of offshore wind, many opportunities exist for expanding this workforce [8].

OPERATING CAPACITY OF ELECTRICITY BY ENERGY SOURCE [5]



Percentage of Total Capacity (MW)

In 2021, the state of Rhode Island passed the Act on Climate signed by Governor McKee, which mandates reducing emissions in Rhode Island by 45% below 1990s levels by 2030, 80% by 2040, and requires net-zero emissions by 2050. The law creates a Climate Change Coordinating Committee to enact these goals and release climate plans, with a focus on ensuring quality wages in the clean energy sector and supporting a transition for fossil fuel workers [9].

Governor Raimondo signed an executive order in 2020 requiring the state to achieve 100% renewable electricity by 2030 [10]. The state's current Renewable Energy Standard only requires 16% of electricity to come from renewable energy in 2020 and beyond [11].

Rhode Island is notable for building and operating the country's first offshore wind farm, a 30MW capacity wind farm off of Block Island. Rhode Island has also procured 400 MW from the Revolution Wind project and is seeking an additional 600 MW in a Request For Proposal (RFP) [12]. In total, Rhode Island currently has almost 1,000 MW of clean energy projects with a majority in the pipeline with Power Purchase Agreements (PPAs) approved by the Rhode Island Public Utility Commission [13].

On a regional and national level, Rhode Island has created and participates in a number of renewable energy programs, often in conjunction with the federal government or utilities such as National Grid. These programs offer incentives for businesses and residents to invest in energy efficiency and renewable energy. Rhode Island also belongs to the market-based emission reduction program the Regional Greenhouse Gas Initiative (RGGI).



EXECUTIVE ORDER 20-01 AIMS FOR 100%

RENEWABLE ENERGY BY 2030

[10]

IN 2020 RHODE ISLAND SUPPLIED LESS THAN 10%

OF ITS TOTAL ENERGY GENERATION FROM SOLAR AND WIND ENERGY

[14]

SOLAR

Recommendation: Install 900 MW of utility, commercial, and residential-scale solar by 2030 and a total of 2,000 MW of solar capacity by 2040

Install a total of 2,000 MW of solar energy by 2040 on brownfields, gravel pits, industrial and commercial parcels, parking lots, and rooftop PV under a Project Labor Agreement and Labor Peace for long-term operations and maintenance of sites.

Installing solar across Rhode Island will create high-quality, union jobs and eliminate greenhouse gas emissions that contribute to climate change. Utility-scale solar energy generally represents one of the cheapest forms of energy, far less expensive than coal, nuclear, or gas [1].

In addition, RI has great potential to produce solar energy in various sites, including:

- 1,149 MW in brownfields,
- 70 to 260 MW in landfills,
- 30 to 90 MW in gravel pits,
- 1,160 to 4,600 MW in commercial and industrial businesses,
- 3,400 MW of rooftop and 1,060 MW in parking lots [2].

By installing solar on a wide variety of often overlooked and underutilized areas, the state can generate a high volume of clean energy while preserving existing natural areas for the environment and society.

Estimated Job Creation: Installing 2,000 MW of solar by 2040 can create 19,334 direct jobs over 18 years.

Ensuring High-Quality Jobs: Requiring a Project Labor Agreement on all construction of solar projects will guarantee that all work is performed safely by highly-skilled workers. Labor Peace and Neutrality on long-term operations and maintenance work will ensure that workers across the state have decent working conditions and compensation.

Carbon Emissions Reduction: Installing 2,000 MW of solar will reduce carbon emissions in New England by 1.7 million metric tons of CO_2 annually.

Estimated Cost: $5.09 Billion

WIND

Recommendation: Install 1,300 MW of offshore wind by 2030 and a total of 3,000 MW capacity by 2040

Install 1,300 MW of offshore wind capacity by 2030, and a total of 3,000 MW by 2040 under a Project Labor Agreement and Labor Peace Agreement, and set a target of 50% local manufacturing. Work with BOEM (Bureau of Ocean Energy Management) to ensure enough federal leases are available to support energy for export to aid the Northeast's energy transition. Collaborate directly with states in the region to better plan for transmission, distribution, and projected consumption.

Rhode Island was the nation's first state to build an offshore wind farm and continues to demonstrate itself as a leader in the industry. Installing more offshore wind in Rhode Island will create jobs across the state and reduce carbon emissions, allowing Rhode Island to export energy to other states more reliant on fossil fuels. This will help to build a sustainable offshore wind industry in Rhode Island and aid in a nationwide energy transition. In order to ensure that enough wind leases are available for the goal of 3,000 MW of offshore wind, the state should work closely with BOEM to reshape and streamline the BOEM process for a clean energy future, while also making sure to protect wildlife and the needs of fishing people.

In addition, Rhode Island should position itself as a leader in offshore wind manufacturing. Many jobs could be created in the state if the government and local industry focus on building the supply chain within the state. Rhode Island should encourage in-state manufacturing of major parts, such as foundations, and should set a clear target of 50% local content for its offshore wind projects, similar to what has been established in countries such as the United Kingdom, and require that at least one major component be made within the state [1].



WIND

Estimated Job Creation: Installing 3,000 MW of offshore wind can create 33,425 direct jobs over eighteen years.

Ensuring High-Quality Jobs: Maintaining Labor Peace and Neutrality on all offshore wind projects ensures decent working conditions for workers across the state, including those in the supply chain, security, maintenance, and service sectors. Project Labor Agreements on the construction of wind farms would guarantee that workers will collect fair compensation and meet the demanding standards of the industry. Setting a target of 50% local content in request for proposals for offshore wind projects will keep some benefits of the project within the state of Rhode Island and support the state's workers. The state should require that each offshore wind developer manufacture at least one major component of the project within the state of Rhode Island.

Carbon Emissions Reduction: Installing 3,000 MW of offshore wind has the potential to decrease annual emissions in New England by over 6.1 million metric tons of CO2 per year.

Estimated Cost: $9.55 Billion



GRID MODERNIZATION

Recommendation: Modernize the electrical grid by 2030

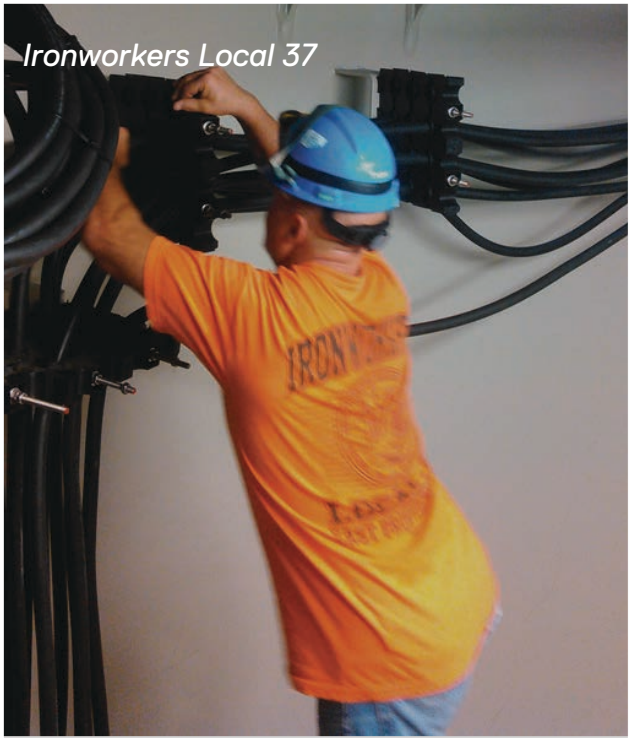
In order to meet the demands of installing new renewable energy, the electrical grid of Rhode Island and New England will require further upgrades. Grid modernization may include updates to both transmission and distribution systems and especially better metering and monitoring of renewable resources, enhanced breakers and capacitors, and improved IT infrastructure and networks [1]. These improvements will create a more reliable grid that allows the state to take full advantage of renewable energy installation and prepare for unpredictable grid needs. This will enhance operations and better meet the demands of electricity customers [2]. Modernizing the grid can create highly-quality jobs across the state in multiple sectors including utility work and internet technology.

In addition to grid modernization, transmission upgrades will be needed for the new wind and solar projects, especially for offshore wind. According to ISO New England, transitioning to renewable energy will require changes in the grid and a reassessment of current infrastructure [3]. A regional approach may be needed for managing offshore wind interconnections in order to streamline the process and prevent future roadblocks to renewable adoption. This type of initiative could employ many union workers in the utility sector.

Estimated Job Creation: Based on a case with a high amount of distributed energy and advanced metering, grid modernization efforts in Rhode Island could create 1,867 direct jobs by 2030.

Ensuring High-Quality Jobs: Requiring a Project Labor Agreement on transmission and modernization work will ensure that all jobs utilize highly-skilled workers in a safe environment and that there is a pipeline from under-resourced communities to high-quality construction careers.

Estimated Cost: $583 million [4]



Ironworkers Local 37

JUST TRANSITION

A "just transition" requires drastically lowering emissions by reducing fossil fuel use while addressing the impact this will have on workers and communities across the state. Rhode Island's fossil fuel workers are essential to the state's ability to successfully transition to a just, low-carbon future. The contribution these workers made must be honored as we transition away from fossil fuel use. Moreover, the disproportionate pollution burden placed upon low-income communities and communities of color from the fossil fuel economy must be acknowledged, addressed, and remediated. The burden of any energy transition should not be carried by workers and communities. Frontline communities often face the highest-burden of pollution and climate risks. Policies should especially be made with the support of frontline communities, which the city of Providence has defined as "communities of color most impacted by the crises of ecology, economy and democracy. In Providence, they generally include the Indigenous, Black, Latinx, and Southeast Asian communities. There is particular emphasis on people of color who are refugees and immigrants, people with criminal records, those who speak languages other than English, and LGBTQIA+ individuals" [1].

Understanding and addressing the negative economic impacts of transitioning away from fossil fuels is often referred to as "just transition." The idea emerged from the late labor leader, Tony Mazzocchi, who argued that some industries were too dangerous for society and that workers in those industries should be supported as they transition away from industrial activity. A just transition recognizes that too often workers and communities bear the burden of transitioning away from fossil fuels. As such, a just transition requires workers, communities, and other directly-impacted stakeholders to be supported economically and socially, while also ensuring a meaningful engagement of these communities so they have a say in their future.

A just transition also requires addressing and mitigating past harms of the extractive economy with a particular focus on the harm wrought upon marginalized communities. As a term, just transition can be contentious and used as an indicator of imminent job loss. This concern is understandable, as every previous transition, such as de-industrialization, left workers and communities largely unsupported.

But, there is no reason an economic transition must be unjust. Workers can, and must, be supported through wage and benefits support, opportunities to retrain, and any other supports needed to thrive. Moreover, there must be something for workers to transition into. Training programs must lead to jobs that pay family-sustaining wages, provide benefits, and a career pathway. Communities must have support to mitigate the loss of oil and gas revenue and investment in new industries. Communities and groups historically barred from family sustaining jobs must also be given a pipeline to green union jobs. We can learn from previous industrial transitions and stop the pattern of unjust transitions.

JUST TRANSITION

Recommendation: Create a multi-stakeholder Office of Just Transition and require labor representation on existing government agency councils or commissions

The Office of Just Transition should be created under the guidance of the Governor's office. Labor representation must also be added to all government agencies, councils or commissions that work on climate change mitigation and adaptation, including but not limited to the Executive Climate Change Coordinating Council, Public Utilities Commission, and the The Rhode Island Green Buildings Advisory Committee

To provide support for workers and communities as fossil fuel activities decline and climate risks continue to grow, an Office of Just Transition should be established to understand the scope of transition, support needed, and potential new industries. The Office must have meaningful labor, environmental justice, racial justice, economic justice, and community representation. The Office could take the form of the Just Transition Task Force created in New York State [2] or the Office of Just Transition created in Colorado [3]. The Office should be fully resourced and hold public meetings across the state to hear directly from impacted workers and communities. The Office should be established through a joint partnership between the Governor's Office and the State Legislature.

As part of its charge, the Office should analyze the socioeconomic impacts of previous plant closures, fossil fuel or otherwise, to understand what happened to the workers at the plants, whether displaced workers were re-employed, and whether communities were able to replace lost revenue. The Office should undertake a racial justice analysis of past transition efforts and provide guidelines for ensuring racial equity in future transition efforts.

JUST TRANSITION

The Office of Just Transition should develop programs, primarily focused on training and economic development, to address climate change while centering equity and develop a targeted labor market strategy, including support for training programs and pre-apprenticeship programs, so the new jobs help expand opportunity and raise incomes. The Office should also examine current and expanding climate risks to workers. Lastly, the Office should oversee the implementation of any new federal climate change legislation and take the lead in understanding how the State of Rhode Island can implement these new initiatives while obtaining maximum benefit.

Existing state agencies that make decisions regarding climate change adaptation and mitigation, whether energy, buildings, transportation or resilience focused, must have labor representation. Rhode Island must ensure that workers and their unions are represented on boards and should amend the authorizing statute of each of these agencies, commissions, or committees to add seats for a labor representative where needed.



CARPENTERS LOCAL 330

NATIONAL LEGISLATION, LOCAL IMPACT

THE INFRASTRUCTURE INVESTMENT AND JOBS ACT

OVER THE NEXT FIVE YEARS RHODE ISLAND IS EXPECTED TO RECEIVE:



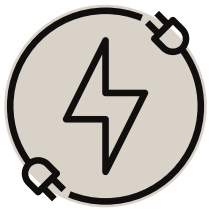
$1.5 billion for federal-aid highway apportioned programs



$242 million for bridge replacement and repairs



$272 million to improve public transportation



$23 million to expand electric vehicle infrastructure



$100 million to expand broadband coverage



$2 million for wildfire protection



$378 million to improve water infrastructure



$45 million for airport infrastructure development

With requirements that construction workers on projects funded by the Infrastructure Investment and Jobs Act are paid prevailing wages under the Davis-Bacon Act. [1]

*BUILD BACK BETTER**
CLIMATE AND JOBS NATIONAL HIGHLIGHTS THROUGH 2026 [2]

LABOR RIGHTS AND WORKFORCE DEVELOPMENT

- $2 billion to rebuild capacity of worker protection agencies in Department of Labor
  - $350 million to rebuild capacity of the National Labor Relations Board
  - Increase monetary penalties under OSHA, FLSA, Migrant and Seasonal Agricultural Worker Protection Act, and the Mental Health Parity and Addiction Equity Act
- $20 billion for Department of Education and Department of Labor for various workforce development activities including:
  - $2 billion for dislocated worker state grants
  - $1 billion for registered apprenticeship programs, pre-apprenticeship programs that lead to registered apprenticeships, and youth apprenticeship programs
  - $5 billion for grants to industry or sector partnerships, including state or local workforce boards, employers, labor organizations, or training providers
- $4.3 billion for employment and training opportunities in industry sectors or occupations related to climate resilience or mitigation including:
  - $1 billion to create pre-apprenticeship programs that articulate to registered apprenticeship programs
  - $150 million for partnerships between pre-apprenticeship programs and the programs funded by the CNCS to expand access to pre-apprenticeship programs
  - $450 million to create or expand registered apprenticeship programs in climate-related nontraditional apprenticeship occupations
  - $350 million for pre-apprenticeship and registered apprenticeship programs that serve a high number or high percentage of individuals with barriers to employment
  - $1 billion over five years for the Reentry Employment Opportunities program

LABOR STANDARDS FOR GREEN ENERGY WORK

- Green energy tax credit with two-tiered approach to incentives, with a “base rate” and a “bonus rate” that is five times the amount of the base rate
  - To qualify for the bonus rate you must meet Prevailing Wage and apprenticeship requirements
- Domestic content bonus rates of 10% built into the tax credit structure, with requirements on the adjusted percentage of US-made components in the cost of manufactured products

**DATA WAS RETRIEVED FROM 11/15/21 FUNDING STRUCTURES AND AMOUNTS ARE SUBJECT TO CHANGE. BILL IS NOT LAW. SEE APPENDIX: ENDNOTES FOR MORE DETAILS.*

ENSURING HIGH-QUALITY JOB CREATION

Recommendation 1: Introduce legislation to apply Prevailing Wage, Project Labor Agreements (PLAs), Labor Peace, and Build RI and Buy America provisions for all non-residential renewable energy projects in Rhode Island

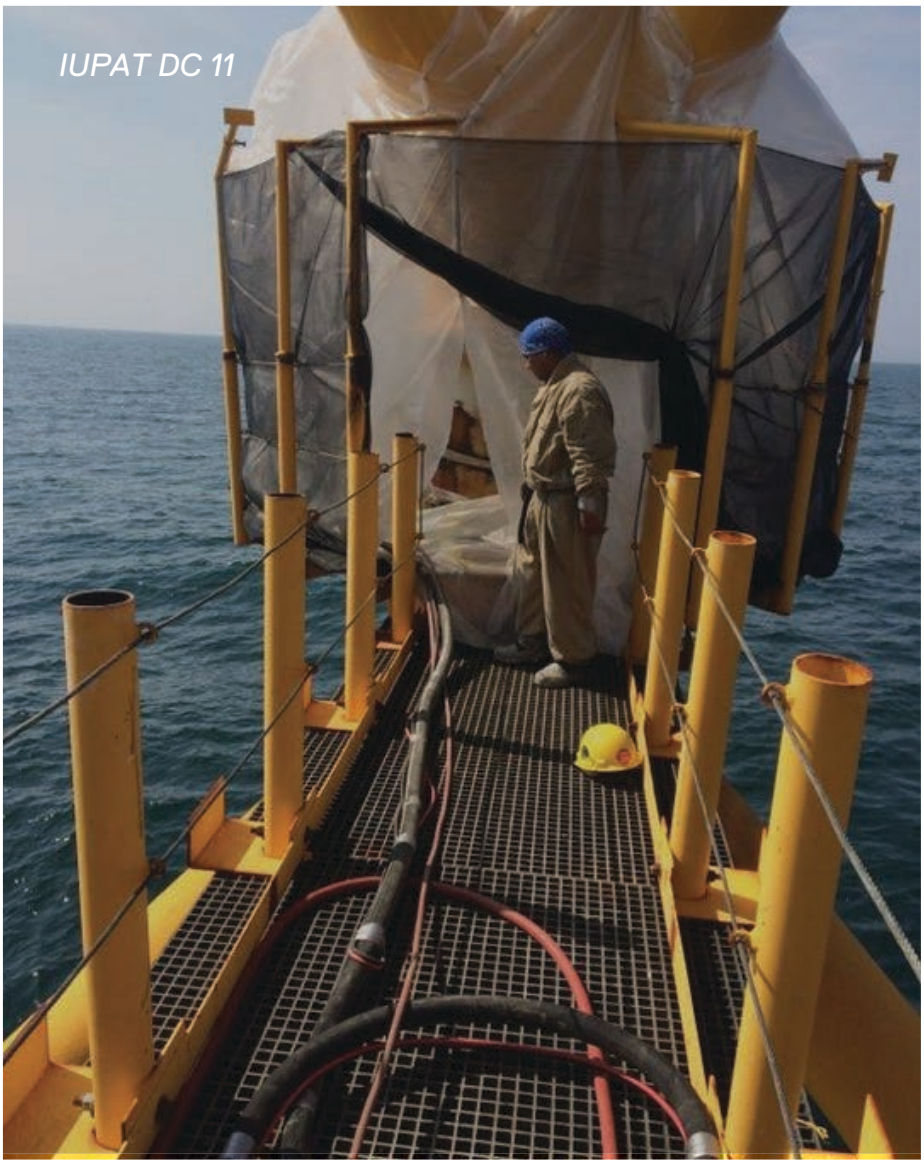
While unions in Rhode Island have had a central role in the clean energy economy, many jobs in the renewable energy, climate resiliency, and buildings sectors continue to exist outside the protection of labor unions and in poor working conditions. Requiring Prevailing Wage legislation and Project Labor Agreements on all utility-scale renewable projects and infrastructure projects will ensure that all workers labor in a safe environment where they receive fair compensation. For example, recent legislation in Connecticut requires Prevailing Wage to cover all construction, operations, and maintenance work on renewable energy projects larger than 2 MW [1] . Rhode Island should consider passing similar legislation, and possibly decreasing the size standard to any project larger than 300 kW to account for smaller installations in RI. As shown by the Connecticut legislation, employment protections should not just apply to those directly working on projects, but all workers involved including service workers and those in the supply chain. Labor Peace and Neutrality Agreements should be required for all service jobs including janitorial, security, and maintenance along with supply chain work such as manufacturing of parts for renewable energy and infrastructure projects. These labor peace agreements guarantee that management cannot unfairly pressure employees into not utilizing their right to collective representation, which allows workers a voice in the workplace and an ability to improve their conditions of employment.

In order to maintain fair working conditions, the state should follow the lead of New York's recent renewable energy and labor standards which ensures Buy America provisions are required on all projects which utilize funding to purchase manufactured good or raw materials such as iron and steel [2]. In paralleling this New York legislation, Rhode Island should also enact a "Build RI" provision that incentivizes the procurement of materials and services for clean energy work from Rhode Island based suppliers. Any labor standard legislation should also expand access to new jobs on non-residential renewable energy projects in Rhode Island for those who have been historically marginalized. The state government and union apprentice programs should prioritize the hiring of people of color and individuals from local communities in all clean energy work and Rhode Island must guarantee that frontline communities will not be left out of the benefits of renewable energy work.

ENSURING HIGH-QUALITY JOB CREATION

Recommendation 2: Require Prevailing Wage, PLAs and Labor Peace on all projects funded under Rhode Island's Renewable Energy Fund and Rhode Island's Infrastructure Bank

As stated in Recommendation 1, Project Labor Agreements, Prevailing Wage Requirements, and Labor Peace Agreements on operations, service, and supply chain work are necessary to guarantee that workers receive a living wage and decent working conditions. Any project that receives state funding, through Rhode Island's Renewable Energy Fund or Infrastructure Bank should be required to meet these same requirements in order to receive investments.



ENSURING HIGH-QUALITY JOB CREATION

Recommendation 3: Introduce legislation to establish a Wage Board to set a Minimum Wage for the renewable energy industry

On small or residential renewable projects, non-union workers often labor in precarious situations or work for subcontractors. In these circumstances, employment violations and low-pay remain common and workers have little or no ability to redress wage theft or poor working conditions without fear of retaliation. These workers cannot be ignored by renewable labor standards, and Wage Boards offer the ability to raise the pay off all workers, regardless of the size of the project in which they labor or if they are covered by a union contract. Wage boards are commissions that enact a minimum wage and labor standards for a single industry statewide. Wage board legislation exists in several U.S. states already with New York providing the best example. In 2015, a New York wage board increased the minimum wage for fast food workers to $15 per hour, and the state recently convened a wage board to discuss overtime work in farm labor [3].

Rhode Island should enact its own legislation that allows state and municipal officials to convene wage boards and increase the minimum wage, benefits, and terms of employment for workers across the state. All convened Wage Boards should include representation of labor unions and worker justice organizations and must rely on the input of workers in the industry when making changes to payment and employment standards. Wage Board decisions should be binding or require immediate approval by the legislature [3].



CARPENTERS LOCAL 330

RECENTLY PASSED LEGISLATION

Led by local Climate Jobs coalitions

ILLINOIS: WIND & SOLAR ≥ 5 MW

Climate and Equitable Jobs Act [1]



Prevailing Wage Requirements on Construction Excluding Residential



Project Labor Agreement Requirements on Utility Scale Projects



Incentivized Preapprenticeship Requirements to Diversify Workforce

CONNECTICUT: RENEWABLES ≥ 2 MW

An Act Concerning a Just Transition to Climate Protective Energy Production and Community Investment [2]



Prevailing Wage Requirements on Construction, Operations, Maintenance, and Security



Responsible Contractor Policy on Construction



Apprenticeship and Preapprenticeship Requirements

NEW YORK : RENEWABLES ≥ 5 MW

2021 State Budget [3]



Prevailing Wage Requirements and Project Labor Agreements on Construction



Labor Peace Requirements on Operation and Maintenance



Build New York, Buy America Provisions

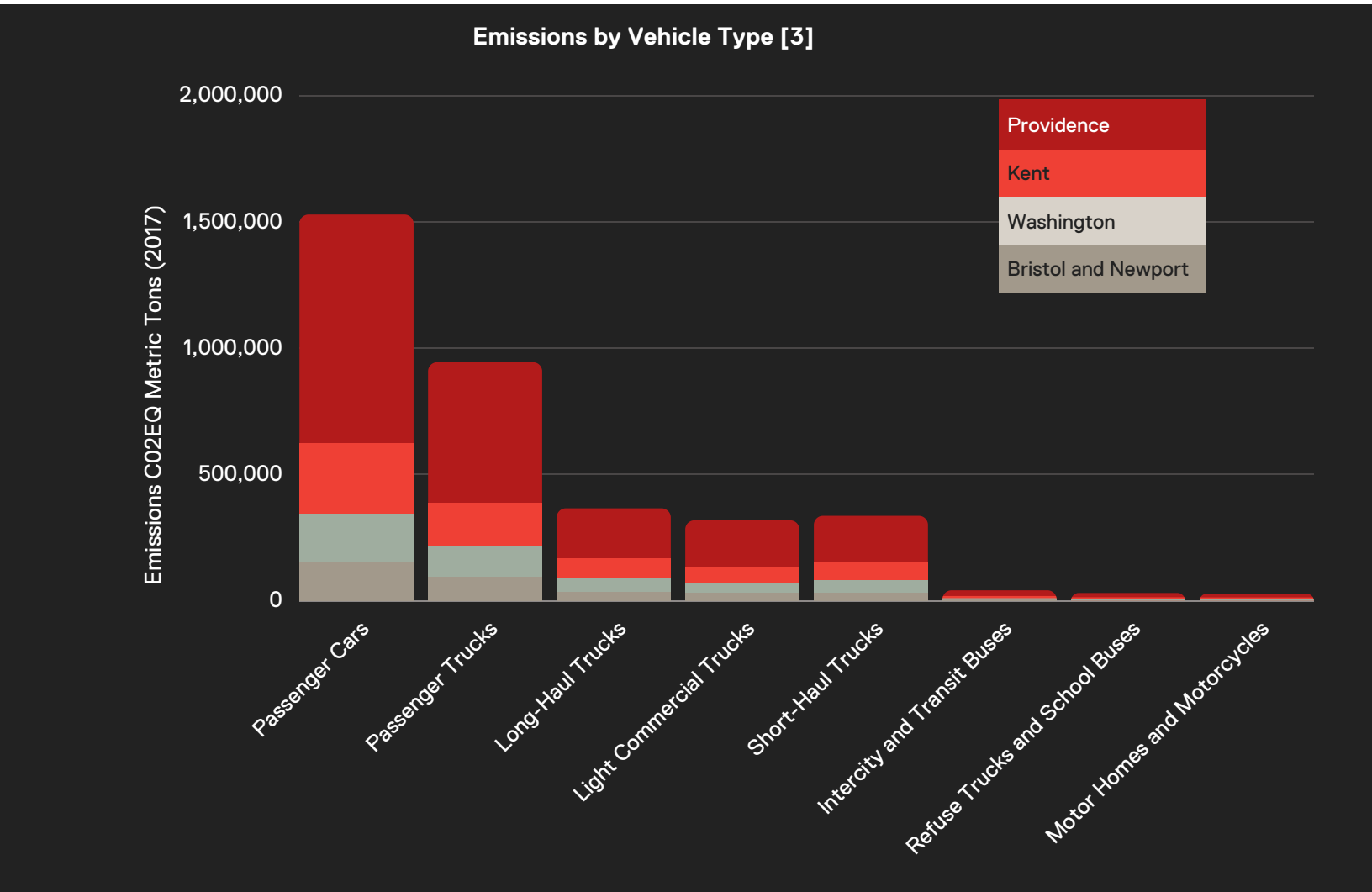
TRANSPORTATION

Rhode Island has a major opportunity to lead the nation by being the first state to achieve net-zero emissions and address inequality by making investments in the transportation sector.

The transportation sector in Rhode Island has historically been the greatest source of state emissions. Transportation in 2018 accounted for 4.1 million metric tons of C02Eq -- more than one-third of all state emissions [1].

Passenger Cars and Trucks are the greatest sources of emissions in Rhode Island, and Providence County creates the majority of emissions for all vehicles and contributed to 57% of all the transportation emissions in Rhode Island in 2017 [2].

In all five counties, passenger cars are the greatest source of C02Eq emissions, followed closely by passenger trucks [3]. Long-haul trucks are the greatest emitter of particulate matter in the state and contribute significantly to air pollution. All other emissions come from a mix of commercial and short-haul trucks, buses, refuse trucks, motor-homes, and motorcycles.



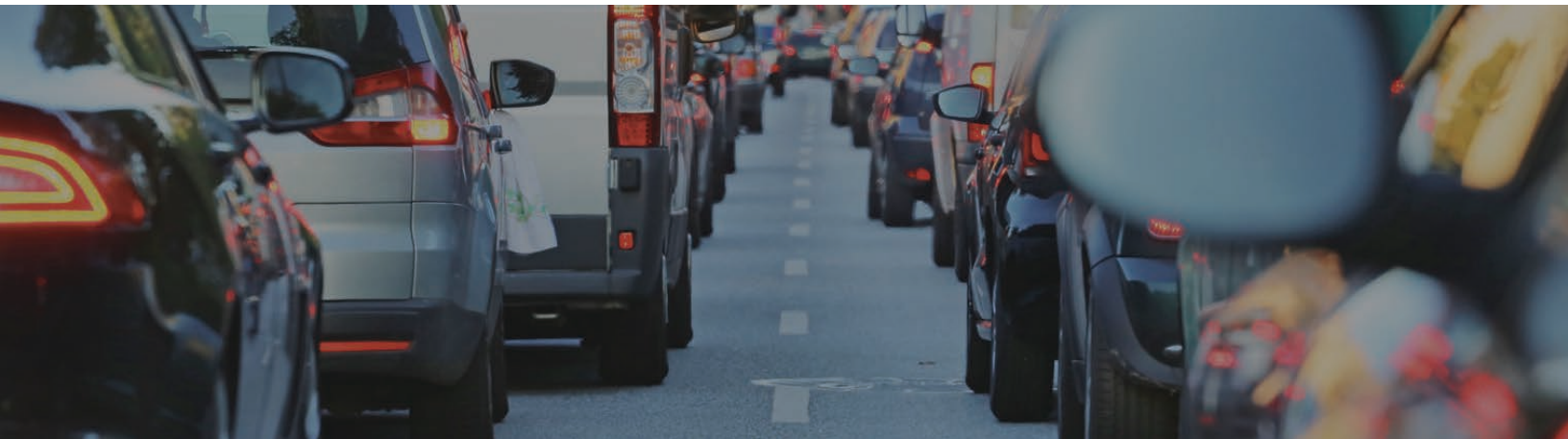
In 2018, nearly 80% of people in Rhode Island drove alone -- higher than the US average -- and only 3% commuted with public transportation, an alarmingly low amount [4]. The air pollution created by these vehicles has direct health impacts across the state.

Traffic pollution can cause and worsen respiratory illnesses, especially among children living and attending school near major highways [5]. In Providence alone, 24 schools are within 1,000 feet of major highways [6]. Rhode Island child asthma rates are the ninth highest in the nation, with Black and Latinx children most often hospitalized [7].

Rhode Island must focus on emissions reduction in their transportation sector to address climate change, improve public health, and increase access to family-sustaining jobs.

Improving Rhode Island's transportation system provides a major economic development opportunity for the state. Ambitious and strategic investments can create job opportunities in areas such as construction, vehicle or vehicle parts manufacturing, electrical and electronic equipment installation, and engine and other machine assembling. Major investments in transportation can create many high-quality jobs and provide better access to those jobs for disadvantaged communities. Rhode Island was previously part of the multi-state Transportation Climate Initiative (TCI), a cap and invest program projected to bring $20 million per year to improve transportation infrastructure and reduce inequity and emissions before the agreement collapsed in November 2021 [8].

There are also costs to not investing in transportation infrastructure. Under a 5-feet sea-level rise scenario, 15 Rhode Island Public Transit Authority (RIPTA) lines and 44 RIPTA stops could be inundated with flooding, including: Downtown Providence, the Jewelry District, Narragansett, Jamestown, Barrington/Warren, and Newport Gateway [9]. Currently, only about half of roads in Rhode Island are considered "acceptable," and some roads could be permanently flooded due to sea-level rise [10,11]. The state ranks last in the nation for bridge conditions with 115 structurally deficient bridges that will be further tested during more frequent and intense extreme events [12]. Lack of resilience planning could lead to higher costs for repair and recovery down the line, in addition to the loss of life and property.



PUBLIC TRANSPORTATION

Recommendation: Expand and improve public transportation access

Expand and improve transit service, particularly in overburdened and under-resourced communities, increase frequency and range of services, increase the number of jobs in public transit and increase transit ridership by up to 60%. Convert MBTA Providence Line to faster, higher-frequency electrified service and construct a new station at TF Green Airport.

An important part of reducing Rhode Island's transportation emissions is significantly improving and expanding public transit, creating fast, frequent and reliable service. Rhode Island should focus on improving its transit system to ensure that at least 10% of total trips are made by public transit by 2030. Rhode Island's current transit system focuses on taking people to and from Providence, neglecting other resident needs to travel between other urban areas. New service is especially needed between Providence, Pawtucket, Central Falls, North and East Providence, Warwick and Cranston. Expanded service should include new and expanded bus lines with greater frequency and reliability, and the integration of rapid bus service and light-rail. Making RIPTA free could also be a mechanism for increasing ridership, reducing emissions, and building transportation equity. Upgrading the MBTA Providence Line to faster, higher-frequency electrified service and constructing a new station at TF Green Airport is also important to making public transit an attractive, cleaner alternative to driving.

Estimated Job Creation: Implementing the Rhode Island Transit Master Plan could create 35,960 direct jobs over eight years.

Ensuring High-Quality Jobs: In order to rapidly and dramatically expand and improve public transit service, the Rhode Island Public Transit Authority should invest in expanding the total number of jobs and access to good jobs for women and workers of color, who are historically underrepresented in public sector employment. Public transit improvements are also critical to expanding access to jobs for frontline and disadvantaged communities.

Carbon Emissions Reduction: Improving and expanding public transit could reduce passenger vehicle miles traveled by 10% which would reduce Rhode Island's transportation emissions by 335,538 metric tons per year.

Estimated Cost: $3.1 Billion

STATE FLEET

Recommendation: Electrify public vehicles by 2033 and install EV-supporting public infrastructure by 2030, prioritizing EVITP training and local manufacturing

Rhode Island has an opportunity to make a significant reduction in their transportation emissions, improve air quality, and create jobs by electrifying their vehicle fleets. This can be done while prioritizing local manufacturing and creating local jobs.

RIPTA Bus Fleet

Rhode Island is unique because it has a quasi-public, independent transportation authority for the entire state. Rhode Island Public Transit Authority (RIPTA) vehicles have a large reach, serving 36 out of 39 communities in the state [1]. It also provides low-cost transportation to Providence, it's most densely populated area.

RIPTA can swiftly electrify its approximately 224 buses, which will reduce transportation emissions and improve air quality and health in the communities it serves. In addition, it can build EV charging stations both within existing bus depots and stations en-route. The cost to electrify RIPTA buses is approximately $465 million over eleven years.

State Passenger Fleet

Using existing technologies, Rhode Island could quickly electrify its 683 state passenger fleet vehicles and adopt a Green Fleet Employee Pricing Program.

To boost the local economy, the state can electrify its passenger vehicle fleet and contract with companies that provide locally-manufactured, union-made electric vehicles. There can be an option for state employees to participate in bulk purchases under a Green Fleet Employee Pricing Program and purchase personal electric vehicles at the same discount rate as the state fleet. The Department of Administration reimburses employees that travel in their own vehicles and of RI state employee vehicle miles traveled in 2012, 69% were in the employees' own cars. Adopting a Green Fleet Employee Pricing Program would significantly increase both EV adoption and reduce government emissions. To electrify the state passenger fleet and install supporting charging infrastructure is approximately $26,945,033 over eleven years.

The cost to electrify both RIPTA and state passenger vehicles and install supporting charging infrastructure is approximately $483 million, which could take place over eleven years.

EVITP Requirements

Rhode Island could introduce legislation that will require EV Infrastructure Training Program (EVITP) certified workers install EV supply equipment. This will ensure that workers are trained to both safely and properly install EV charging equipment.

11,655 New Public EV Chargers

If Rhode Island installs the charging infrastructure needed to support all vehicles in the state, it could lead to higher investment in electric vehicles. Rhode Island had 833,600 light-duty vehicles in 2016 and only 800, or approximately 0.1%, were plug-in EVs. Installing charging stations in both urban and rural areas will increase accessibility to all residents.

Range anxiety -- the fear that a vehicle will not reach its destination and leave passengers stranded -- is a commonly-cited barrier to the adoption of electric vehicles. Creating the public infrastructure to power electric vehicles operating in Rhode Island would create local jobs and reduce emissions.

If Rhode Island replaced 832,800 passenger vehicles with EVs, it would require an additional 10,684 Public Level 2 Chargers and 971 DC Fast Chargers. This would create a total of 193 direct jobs. The estimate for charging infrastructure and associated costs is $138 million, noting that this could vary considerably depending on the location of the charger and available electrical capacity.

Existing and installed EV chargers should be tested and evaluated regularly to ensure chargers are properly maintained and available for use.

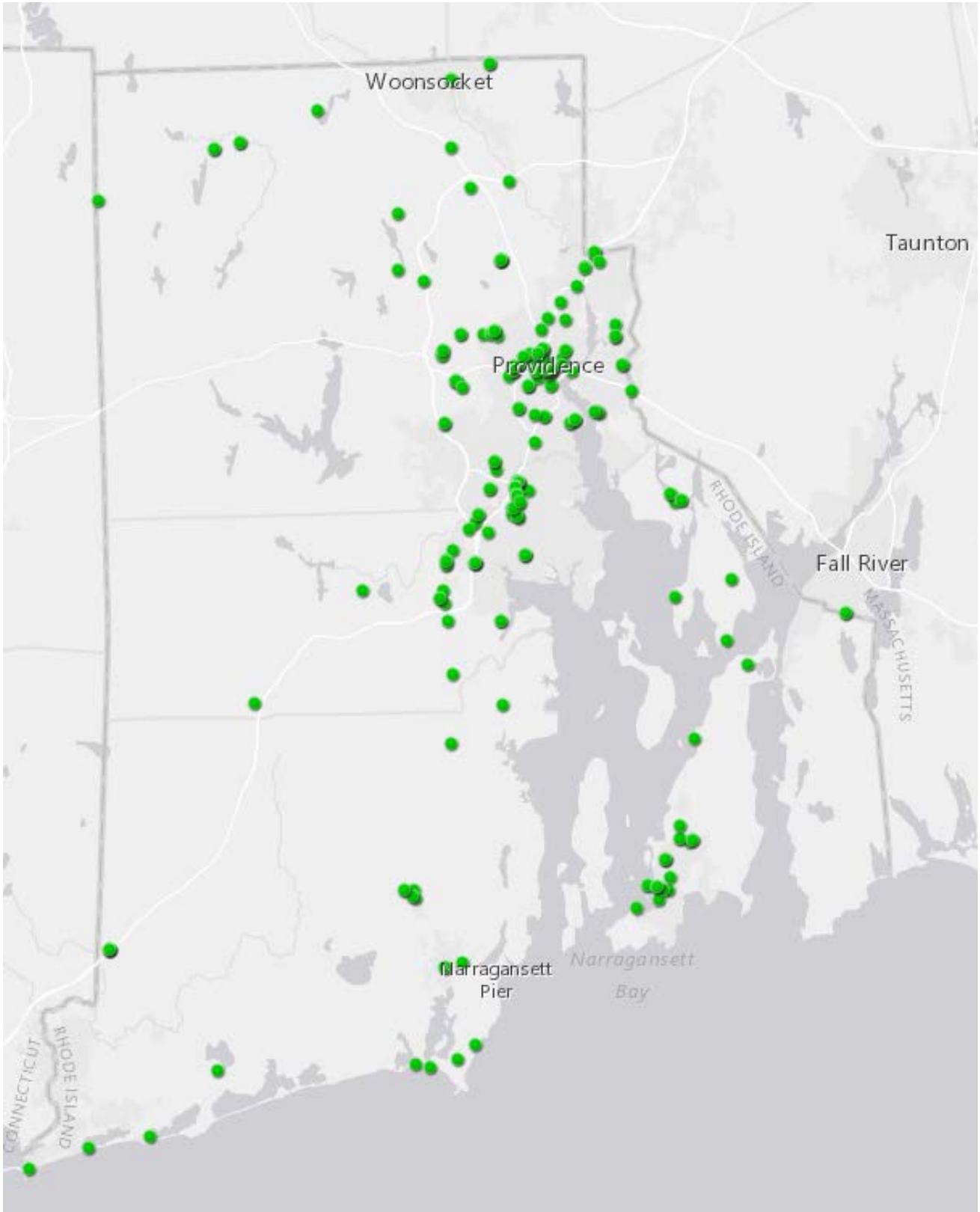
Estimated Job Creation: Electrifying RIPTA and State fleets would create roughly 676 direct jobs over 11 years. Installation of public chargers would create another 193 direct jobs over 8 years.

Ensuring High-Quality Jobs: Charger installation should require EVITP requirements and prevailing wages for installers. All work done under the recently passed infrastructure bill should follow federal labor standards as well. With electric vehicles come opportunities to manufacture vehicles, vehicle parts, electrical and electronic equipment, in addition to engine and machine assembling. Requirements for local sourcing and procurement of union-made state fleet vehicles would boost the economy and create community-sustaining jobs.

Carbon Emissions Reduction: Electrifying both RIPTA and State Agency Fleets could reduce emissions by roughly 10,453 metric tons of CO2 per year.

Estimated Cost: $621 million

Public EV Charging Stations in Rhode Island



There are currently 236 public EV charging station locations (with mostly Level-2, 240 V chargers) and most are located near Providence. Data from DOE Alternative Fuels Data Center, November 2021

HIGH-SPEED RAIL

Recommendation: Construct a regional high-speed rail network by 2035

Construct a dedicated multi-state high-speed rail network through Rhode Island with a targeted local hire program.

In the 1950s, the U.S. built the Interstate Highway System to connect communities and expand economic opportunities throughout the country. Now it's time for Rhode Island to help build the 21st-century transportation system the Northeast needs. A high-speed rail (HSR) line from Richmond, Virginia to Bangor, Maine, with stops in Rhode Island, will provide a fast, safe and clean alternative to cars. Ridership on public transit, especially trains, continues to climb, and building an efficient, reliable alternative to cars is the only way we will tackle climate change and reduce emissions and pollution at scale.

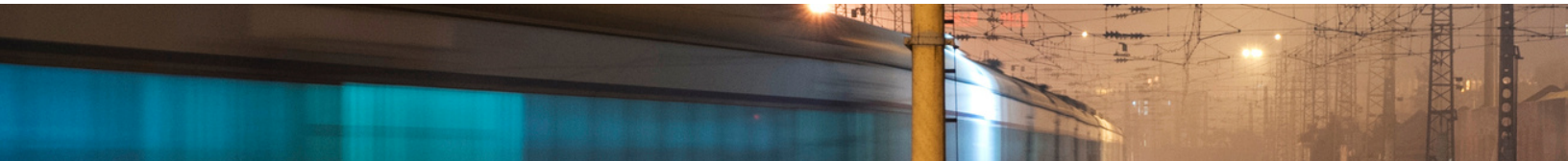
A current proposed Amtrak route for a high-speed rail line is from Richmond, Virginia to Boston, Massachusetts through Providence, with a cost of approximately $110 billion (in 2011 dollars). This route should include Local Hire Requirements for all Rhode Island work and could be extended to Bangor, Maine to incentivize mass transit use in the entire Northeast. The HSR route should comply with local laws with respect to protecting the environment, public health, and safety.

Estimated Job Creation: To build the currently proposed Amtrak high-speed rail corridor would create 352,000 jobs over 13 years across the entire multi-state route.

Ensuring High-Quality Jobs: Rhode Island sections of the railway should have Local Hire Requirements to ensure direct benefits for Rhode Island communities where the line is being built.

Carbon Emissions Reductions: HSR is one of the most efficient and lowest carbon-emitting modes of transportation. It reduces pollution, congestion, and greenhouse gas emissions, especially if powered by renewable energy. HSR is particularly effective at replacing short-haul flights, like those within NE states, as the technology is faster and much more climate-friendly than an airline flight. HSR would reduce travel time to 100 minutes from Boston to Manhattan for example. If HSR access reduces passenger vehicle miles traveled by 10%, Rhode Island's transportation emissions could fall by 335,538 metric tons of CO_2 per year.

Estimated Cost: $110 Billion



RESILIENCE AND ADAPTATION

Rhode Island is currently experiencing the impacts of climate change, from flash flooding to severe storms. With existing infrastructure in Rhode Island already deteriorating from under-funding, it is necessary for the state to change course.

Climate change exacerbates already existing infrastructure deficits and societal vulnerabilities and it is vital to quickly adapt to the consequences of a warming planet. The direct cost of corrosion for all US industry was estimated to be $275.7 billion per year, or 3.14% of the 1998 US GDP [10]. In a 2002 Federal Transit Authority study, higher temperature, humidity and salt intrusion have direct impacts on corrosion of basic infrastructure [2]. Currently, 25,000 Rhode Islanders (over 2% of the state population) live in low-lying coastal regions with a high risk of coastal flooding [1]. This is projected to grow by at least an additional 8,000 people by 2050 with heightened risk of sea level rise and storm surge.

Climate change increasingly threatens the water infrastructure of Rhode Island. Rhode Island supplies 85% of its public drinking water with surface water reservoirs [2]. Water resources face increased risks of saltwater intrusion from sea level rise and coastal flooding along with other risks from riverine flooding and hurricanes [2]. Remediating and protecting existing drinking water infrastructure is crucial to adapting to climate change and strengthening community resilience.

Approximately 20,000 lead service lines exist in Rhode Island, which create increased risk to the public health of Rhode Island communities [3]. Water pipelines, along with critical infrastructure in the transportation sector, may corrode from sea level rise and flooding events. In 2020 the EPA awarded $6.4 million to Providence Water to address lead piping and corrosion issues in water infrastructure [4].

Transportation infrastructure has already seen impacts of climate change with areas of Rhode Island's I-95 highway flooding during hurricanes and heavy rain becoming increasingly common [5]. In 2019, the American Society of Civil Engineers estimated that around 22% of Rhode Island's bridges were structurally deficient [6]. Additionally, the Rhode Island Department of Transportation (RIDOT) identified almost $400 million of unfunded pavement maintenance and reconstruction needs, with the state's rural roads ranked as some of the worst in the country [6].

While climate change impacts all communities, high-income and low-income communities may experience these impacts far differently. The number of heat wave days per year in Rhode Island is expected to increase to over 40 days per year by 2050, with worse impacts in urban areas due to the urban heat island effect [7]. Wealthier communities in Rhode Island have more dense tree canopies and more access to air conditioning systems, decreasing their risks from the worst impacts of extreme heat [8].

CARBON-FREE HOSPITAL DISTRICT

Recommendation: Transform Lifespan and Care New England Hospital Campus by 2025

Conduct Clean Energy Transformation of Lifespan and Care New England Hospital Campus in Providence under PLA and Labor Peace Agreements through the installation of onsite solar energy, battery storage, and the addition of a public transit hub.

Providence is home to some of the largest and most specialized hospitals in the state. These include the Rhode Island Hospital, Hasbro Children's Hospital, and Women and Infants Hospital within the Hospital District in Downtown Providence.

Solar energy and battery storage would be a valuable addition to the hospital district, given the high concentration of hospitals in one area and the requirements for continuous reliable energy. Utilizing parking areas and hospital roof space, this district could install and generate at least 3 MW of solar energy and manage a 4-hour battery on site. The state could also conduct a complete energy audit and feasibility study for the hospital system to determine energy efficiency and retrofitting opportunities.

Providence currently has only a single transit hub for RIPTA buses located at Kennedy Plaza. Due to city growth, this terminal has become overcrowded. Providence can create an additional RIPTA bus terminal near the Hospital Campus with electric buses and chargers. Procuring electric RIPTA vehicles will ensure that the site is zero-emissions and does not harm the air quality near the hospitals. Adding a bus terminal will increase access for low-income and ill individuals to get to the hospital and enable workers to more easily get to work during all hours.

The cost to install solar panels, battery storage, and a new transit hub is estimated to be $74,472,278 and would create 255 direct jobs per year over three years.



CARBON-FREE HOSPITAL DISTRICT

Estimated Job Creation: Installation of solar, battery storage, and a transportation hub on site could create 764 direct jobs over three years.

Ensuring High-Quality Jobs: This work could be performed under a PLA, similar to new PLA requirements on New York City hospitals.

Carbon Emissions Reduction: Installing solar and battery storage on site could reduce CO2 emissions by nearly 18,730 metric tons per year. In addition, it would increase energy security for the hospitals, especially during the occurrence of extreme events. Installing a zero-carbon bus terminal in the hospital district will increase transportation access without depleting air quality.

Estimated Cost: $74.4 million



Hospital District in Downtown Providence.
Hospital Facilities Data from RI Department of Health Facilities, 2021 and GIS layer from University of Rhode Island Environmental Data Center.

STRENGTHENING WATER INFRASTRUCTURE

Recommendation: Remediate and replace 20,000 lead service lines by 2030

Replacing 100% of the estimated existing lead piping in Rhode Island under a Project Labor Agreement would reduce the health risks communities face from lead while providing good, community-sustaining jobs.

Lead pipes pose a significant health risk to the population of Rhode Island and must be fixed. When service lines corrode, they release lead into the drinking water. The Centers for Disease Control and Prevention (CDC) and the U.S. Environmental Protection Agency (EPA) report that there is no safe level of lead contamination. Even low levels can be harmful. Children and pregnant women may be especially at risk, and studies show that Black children in America have a far higher risk of lead poisonings [1].

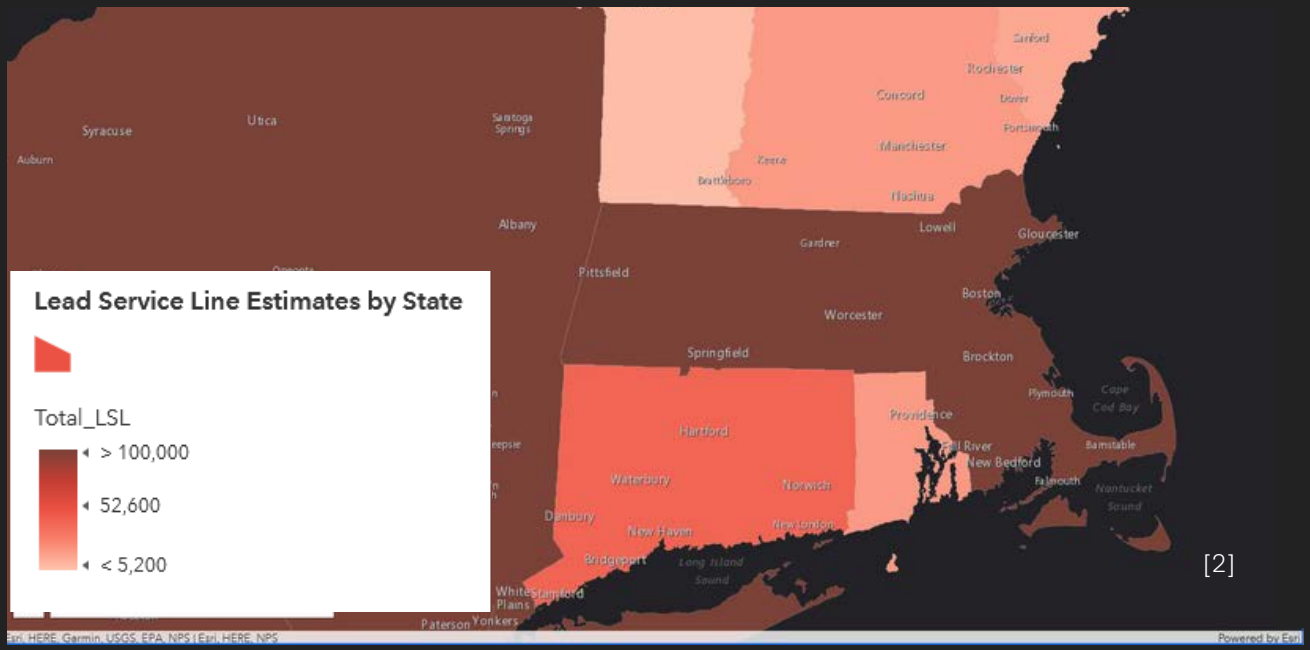
Replacing lead pipes is not only necessary to protect Rhode Island residents, but will create hundreds of high-quality jobs across the state for union workers.

Estimated Job Creation: Replacing all lead pipes could create 555 direct jobs over eight years.

Ensuring High-Quality Jobs: Requiring a PLA on lead pipe replacement will ensure that all jobs utilize trained union workers in a safe environment.

Estimated Cost: $94 million

Lead Service Line Estimates By State



[2]

CORROSION

Recommendation: Require corrosion prevention training for any construction work on critical infrastructure

Any contractors or subcontractors completing construction work on critical infrastructure must be required to have someone on site who has completed a certification in corrosion prevention through the SSPC Coating Application Specialist Certification (CAS) or a Certified Coating Applicator (CCA).

Corrosion mitigation and prevention is vital to protecting our critical infrastructure as climate change progresses. Much of the essential infrastructure in the United States is at risk from damage due to corrosion. Corrosion can be especially harmful to water supply and distribution systems, as water leaks from pipes leading to higher water prices and problems in water treatment plants. Severe weather events and increased precipitation due to climate change can rapidly increase corrosion [1]. Preventing corrosion before it occurs can have considerable costs savings, and protect people from the dangers of faulty infrastructure. One study found that corrosion control measures can save between 15% and 35% of the cost of corrosion in a project [2].

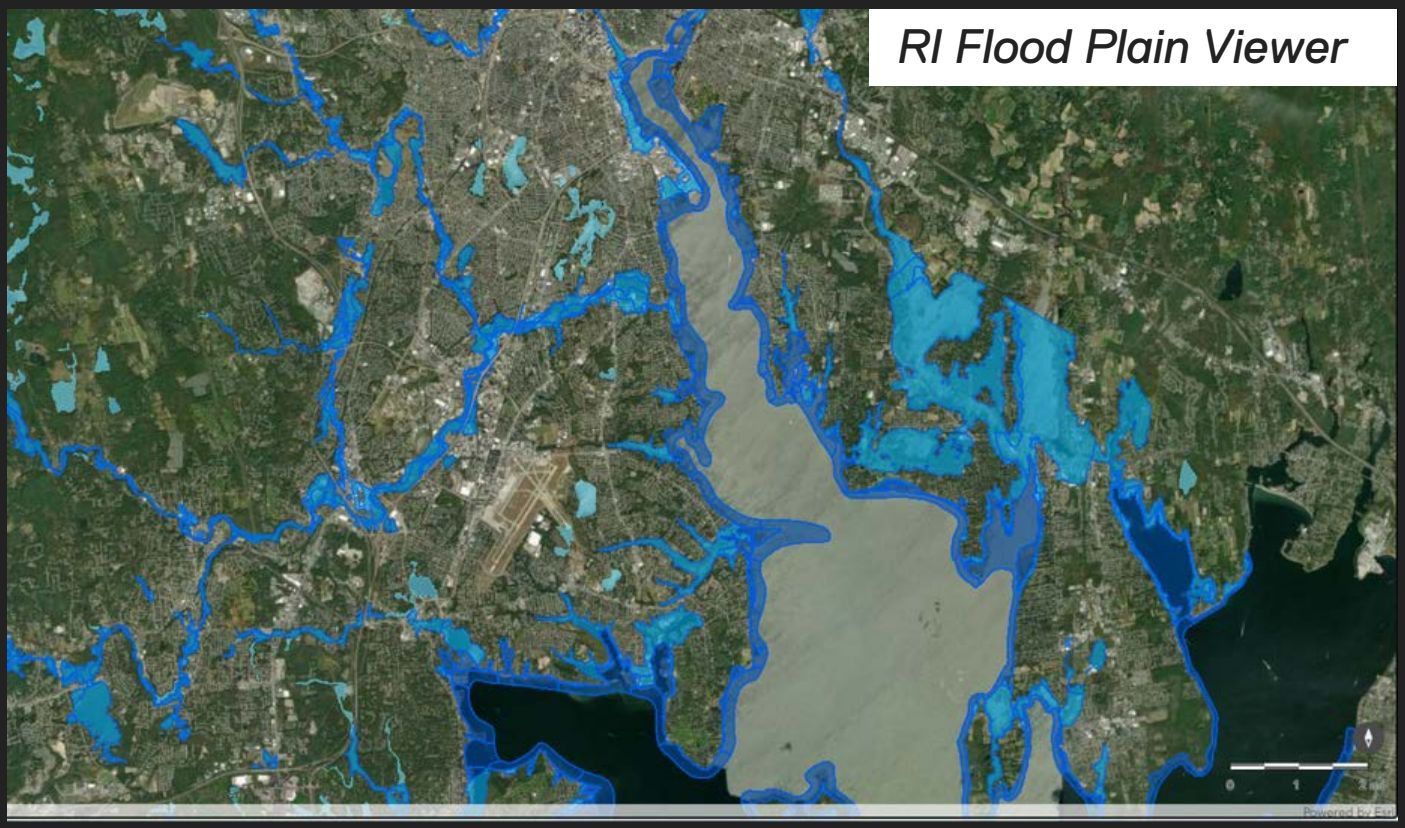
Improperly performed corrosion work can lead to premature coating failures and puts the safety of the public at risk, while needlessly increasing costs for government authorities. Therefore, all contractors and subcontractors completing construction work on critical infrastructure should be required to have proper certification for corrosion prevention through the CAS or CCA certifications.



PROTECT CRITICAL INFRASTRUCTURE

Recommendation: Require a climate vulnerability assessment prior to any work done altering, remediating, or expanding any critical infrastructure

Any updates to critical infrastructure must require climate vulnerability assessments using high-risk climate models to determine whether the infrastructure should be adapted, hardened, relocated or removed. Critical infrastructure includes, but is not limited to, coastal drinking water reservoirs, wastewater treatment plants, dams, bridges, major roads, hospitals, fire stations, schools, ports and energy generation facilities.



Areas of Providence, East Providence, Barrington, and Warwick have very low-lying infrastructure in Special Flood Hazard Area (SFHA) defined by FEMA as "area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year." SFHAs are highlighted in blue colors.
Data from Rhode Island Floodplain Viewer, November 2021 [1]

EXPAND GREEN INFRASTRUCTURE ACCESS

Recommendation: Reduce the gap in access to green infrastructure

Develop an implementation plan to increase access to green infrastructure in under-resourced communities of Rhode Island. Prioritize Local Hiring and Prevailing Wage Requirements for all green infrastructure installation and maintenance.

Green infrastructure is an adaptive way to respond to expanding climate risks from heat to excessive flooding. Green infrastructure includes resources such as urban forests, green roofs, rain gardens, and bioswales [1].



SUMMER DAYS IN URBAN AREAS LIKE PROVIDENCE CAN BE UP TO **15 DEGREES (F) HOTTER** THAN RURAL AREAS OF RHODE ISLAND [2]

GREEN ROOFS, A FORM OF GREEN INFRASTRUCTURE, CAN REDUCE CITY WIDE AMBIENT TEMPERATURES BY UP TO **5 DEGREES (F)** [3]

JOB CREATION SUMMARY

RECOMMENDATION	DIRECT JOBS PER YEAR	YEARS OF INVESTMENT	TOTAL DIRECT JOBS
INSTALL 2,000 MW OF SOLAR BY 2040	1,074	18	19,334
INSTALL 3,000 MW OF OFFSHORE WIND BY 2040	1,857	18	33,425
MODERNIZE GRID BY 2030	233	8	1,867
ELECTRIFY PUBLIC VEHICLES BY 2033	61	11	676
INSTALL EV-SUPPORTING PUBLIC INFRASTRUCTURE BY 2030	24	8	193
EXPAND AND IMPROVE PUBLIC TRANSIT SERVICE	4,495	8	35,960
NET-ZERO K-12 PUBLIC SCHOOLS BY 2030	1,401	8	11,209
BUILD 35,000 AFFORDABLE NET-ZERO HOUSING UNITS BY 2035	5,053	13	65,691
DEEP RETROFITS ON 50% COST BURDENED HOUSEHOLDS IN RHODE ISLAND BY 2030	3,064	8	24,515

RECOMMENDATION	DIRECT JOBS PER YEAR	YEARS OF INVESTMENT	TOTAL DIRECT JOBS
NET-ZERO PROVIDENCE MUNICIPAL BUILDINGS BY 2030	72	8	576
CLEAN ENERGY TRANSFORMATION OF LIFESPAN AND CARE NEW ENGLAND HOSPITAL BY 2025	255	3	764
REMEDIATE/REPLACE 20,000 LEAD SERVICE LINES BY 2030	69	8	555

POTENTIAL JOB TYPES

INDUSTRY	RECOMMENDATIONS	COMMON OCCUPATION CLASSIFICATIONS
SCHOOLS	TRANSITION ALL K-12 PUBLIC SCHOOLS TO NET-ZERO BY 2030	Construction Laborers, Construction Managers, Operating Engineers, Electricians, HVAC Installers, Plumbers and Pipefitters, Insulation Workers, Painters, Roofers, Glaziers, Architects, and Engineers, Solar Installers
BUILDINGS	BUILD 35,000 AFFORDABLE NET-ZERO HOUSING UNITS	General Laborers, Cement Masons, Ironworkers, Structural Engineers, Carpenters, Roofers, Electricians, Painters, Glaziers, Plumbers and Pipefitters
BUILDINGS	PERFORM DEEP-ENERGY RETROFITS ON 50% OF THE COST-BURDENED HOUSEHOLDS IN RHODE ISLAND BY 2030	Construction Laborers, Construction Managers, Operating Engineers, Electricians, HVAC Installers,Plumbers and Pipefitters, Insulation Workers, Painters, Roofers, Glaziers, Architects, Engineers
BUILDINGS	TRANSITION TO NET-ZERO EMISSIONS IN MUNICIPAL BUILDINGS BY 2030	Energy Efficiency Engineers, Energy Efficiency Evaluators, Structural Engineers, Lighting / Electrical Engineers, Mechanical Engineers, Consulting Engineers, Architects, Lighting / Designers, Energy Auditors, Energy Use Modelers, Electrical Contractors, Plumbing Contractors, Refrigeration Contractors, Sales Engineers, Construction Managers, Energy Rate Assessors, HVAC Technicians and Installers, Lighting Technicians and Installers, Insulation Technicians and Installers, Refrigeration Technicians, Roofers, Laborers, Solar Installers
ENERGY	INSTALL 900 MW OF UTILITY, COMMERCIAL, AND RESIDENTIAL-SCALE SOLAR BY 2030 AND A TOTAL OF 2,000 MW CAPACITY BY 2040	Construction Laborers, Operating Engineers, Construction Managers, Welders, Glaziers, Structural Iron and Steel Workers, Electricians, Electrical and Electronics Repairers, Power Plant Operators, Roofers, Coating and Painting Machine Setters, Computer-Controlled Machine Tool Operators, Electrical and Electronic Equipment Assemblers, Scientists, and Engineers

INDUSTRY	RECOMMENDATIONS	COMMON OCCUPATION CLASSIFICATIONS
ENERGY	INSTALL 1,300 MW OF OFFSHORE WIND BY 2030 AND A TOTAL OF 3,000 MW CAPACITY BY 2040	Construction Laborers, Operating Engineers, Crane and Tower Operators, Electricians, Machinists, Team Assemblers, Welders, Engineers, Scientists, Computer Controlled Machine Tool Operators, Industrial Production Managers
ENERGY	MODERNIZE THE GRID BY 2030	Electrical Power-Line Installers and Repairers, Power Plant Operators, Other Installation and Repair, Electrical and Electronics Engineers, and Electrical and Electronic Equipment Mechanics and Repairers
TRANSPORT	EXPAND AND IMPROVE PUBLIC TRANSPORTATION ACCESS	Urban and Regional Planners, Electrical Power-Line Installers and Repairers, Electricians, General Laborers, Utilities Jobs, Specialty Trade Contractors, Merchant Wholesalers, Motor Vehicle and Parts Dealers, Software Publishers, Insurance Carriers , Repair and Maintenance Workers, Managers of Companies and Enterprises, Administrators
TRANSPORT	ELECTRIFY PUBLIC VEHICLES AND INSTALL EV-SUPPORTING PUBLIC INFRASTRUCTURE BY 2033, PRIORITIZING EVITP TRAINING AND LOCAL MANUFACTURING	Urban and Regional Planners, Electrical Power-Line Installers and Repairers, and Electricians. Electrical and Electronic Equipment Assemblers, Engine and Machine Assemblers,Team Assemblers, Computer-Controlled Machine Tool Operators, Machinists, Industrial Production Managers, Scientists, Engineers, Drafters, Industrial Designers, Auto Painters and Detailers Utilities Jobs, Specialty Trade Contractors, Merchant Wholesalers, Durable Goods, Motor Vehicle and Parts Dealers, Software Publishers, Insurance Carriers , Repair and Maintenance, Securities, Commodities Contracts Jobs, Managers of Companies and Enterprises, Administrators

INDUSTRY	RECOMMENDATIONS	COMMON OCCUPATION CLASSIFICATIONS
TRANSPORT	CONSTRUCT A HIGH-SPEED RAIL NETWORK	Construction Laborers, Operating Engineers, Construction Carpenters, Cement Masons, Rail Car Repairers, Iron and Steel Workers, Cleaners of Vehicles and Equipment, Railroad Conductors and Yardmasters, Mining Machine Operators, Crane and Tower Operators, Engineering Managers, and Electricians.
ADAPTATION & RESILIENCE	TRANSFORM LIFESPAN AND CARE NEW ENGLAND HOSPITAL CAMPUS	Local Energy Efficiency Administrators, Program Administrators, Program Implementation Contractors, Marketing, Account Managers, Energy Efficiency Planners, Energy Efficiency Managers, Energy Efficiency Program Fulfillment Staff, Energy Efficiency Engineers, Energy Efficiency Evaluators, Structural Engineers, Lighting / Electrical Engineers, Mechanical Engineers, Consulting Engineers, Architects, Lighting / Designers, Energy Auditors, Energy Use Modelers, Electrical Contractors, Plumbing Contractors, Refrigeration Contractors, Sales Engineers, Construction Managers, Energy Rate Assessors, HVAC Technicians and Installers, Lighting Technicians and Installers, Insulation Technicians and Installers, Refrigeration Technicians, Roofers
ADAPTATION & RESILIENCE	REMEDIATE AND REPLACE 20,000 LEAD SERVICE LINES BY 2030	Plumbers and Pipefitters, General Laborers, Construction Managers
ADAPTATION & RESILIENCE	REDUCE THE GAP IN ACCESS TO GREEN INFRASTRUCTURE	Roofers, Laborers, Gardeners, Pavers, Cement Masons, Metal Lathers, Plumbers, Foresters, Soil Scientists

Note this list may not capture all emerging jobs in shifting climate sectors and is subject to change and expansion. Please see Appendix: Endnotes: Potential Job Types

ANNUAL EMISSIONS REDUCTION SUMMARY

RECOMMENDATION	EMISSIONS POTENTIAL REDUCTION IN METRIC TONS OF C02 (MTCO2)	CARS EQUIVALENT (PASSENGER VEHICLES DRIVEN IN A YEAR)	HOMES EQUIVALENT (ENERGY USE FOR ONE YEAR)
INSTALL 2000 MW OF SOLAR ENERGY	1,738,400	378,067	209,344
INSTALL 3000 MW OF OFFSHORE WIND	6,049,200	1,315,579	728,464
ELECTRIFY PUBLIC VEHICLES AND INSTALL EV-SUPPORTING PUBLIC INFRASTRUCTURE	10,453	2,273	1,259
EXPAND AND IMPROVE TRANSIT SERVICE	335,538*	72,973	40,407
REGIONAL HIGH-SPEED RAIL	335,538*	72,973	40,407
NET-ZERO K-12 PUBLIC SCHOOLS	105,913	23,034	12,754
NET-ZERO EMISSIONS IN PROVIDENCE MUNICIPAL BUILDINGS	2,327	506	280
DEEP RETROFITS ON 50% COST BURDENED HOUSEHOLDS IN RHODE ISLAND	133,373	29,006	16,061
CLEAN ENERGY TRANSFORMATION OF LIFESPAN AND CARE NEW ENGLAND HOSPITAL	18,730	4,073	2,256

**Assuming Light-Duty VMT in Rhode Island is reduced by 10%*
Equivalencies were found using the EPA Greenhouse Gas Equivalencies Calculator, https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

ESTIMATED COSTS SUMMARY

RECOMMENDATION	ESTIMATED COST	YEARS OF INVESTMENT
INSTALL 2,000 MW OF SOLAR BY 2040	$5,100,000,000	18 YEARS
INSTALL 3,000 MW OF OFFSHORE WIND BY 2040	$9,550,000,000	18 YEARS
MODERNIZE GRID BY 2030	$584,000,000	8 YEARS
ELECTRIFY PUBLIC VEHICLES BY 2033	$483,000,000	11 YEARS
INSTALL EV-SUPPORTING PUBLIC INFRASTRUCTURE BY 2030	$138,000,000	8 YEARS
HIGH-SPEED RAIL BY 2035	$110,000,000,000*	13 YEARS
EXPAND AND IMPROVE PUBLIC TRANSIT SERVICE	$3,100,000,000	8 YEARS
NET-ZERO K-12 PUBLIC SCHOOLS BY 2030	$2,500,000,000	8 YEARS

**Regional Cost*

RECOMMENDATION	ESTIMATED COST	YEARS OF INVESTMENT
BUILD 35,000 AFFORDABLE NET-ZERO HOUSING UNITS BY 2030	$11,900,000,000	8 YEARS
NET-ZERO PROVIDENCE MUNICIPAL BUILDINGS BY 2030	$133,000,000	8 YEARS
DEEP RETROFITS ON 50% COST BURDENED HOUSEHOLDS IN RHODE ISLANDS BY 2030.	$5,210,000,000	8 YEARS
CLEAN ENERGY TRANSFORMATION OF LIFESPAN AND CARE NEW ENGLAND HOSPITAL BY 2025	$75,000,000	3 YEARS
REMEDIATE/REPLACE 20,000 LEAD SERVICE LINES BY 2030	$94,000,000	9 YEARS

EXISTING AND POTENTIAL FUNDING OPTIONS FOR RHODE ISLAND

State Level

- Carbon Tax [1] A potential tax on the amount of carbon released into the atmosphere. ECRA finds that a $15 tax on every metric ton of carbon burned would result in $57 million of revenue generated in 2022.
- Increase Gas Tax [2] A potential tax on the amount of gasoline Rhode Island consumers use. Currently, the tax is 34 cents per gallon. According to U.S. Energy Information and Administration, Rhode Island used approximately 546,621,000 gallons of gasoline in 2020. Given this, a 5 cent increase on the gas tax would have generated $27,331,050 in increased revenue.
- Increase State Income Tax Rate [3] All people working within the state of Rhode Island pay taxes on their income which could be used to pay for climate initiatives, especially if taxes are equitably geared toward high-income earners. A 5% increase in revenue from state income taxes would generate 81 million dollars annually.
- Increase State Corporate Tax Rate [4] Corporations in Rhode Island pay taxes on their earnings (typically 7% of net income), and a 5% revenue increase from corporation state taxes would generate $10 million per year.
- Increasing Vehicle Registration Fee [5] Rhode Island currently charges between $45 and $987 (plus $24 per ton) for vehicle registration depending on the size of the vehicle. With 436,247 vehicles registered in the state as of 2016, doubling the vehicle registration fee across vehicles of all sizes would result in a potential revenue increase of millions of dollars per year.
- Progressive Income Tax Reform [36] Restructuring Rhode Island's current tax system to increase taxes on big businesses and highest incomes of the state
- Rhode Island Infrastructure Bank Commercial Property Assessed Clean Energy [6] Finances energy efficiency and renewable energy projects in commercial and industrial properties.
- Rhode Island Infrastructure Bank Efficient Buildings Fund [7] Makes long-term financing available for energy efficiency and renewable energy projects.
- Rhode Island Infrastructure Bank Municipal Road and Bridge Revolving Fund [8] Makes financing available to Rhode Island municipalities for transportation and other infrastructure projects. Approved borrowers are given a below market interest rate from the Rhode Island Infrastructure Bank. The rate is currently 33% of the market rate.

- Statewide School Construction Bond [9] Offers up to $250 million in upfront funding for the construction of new schools with a focus on sustainable and energy efficient schools.

Regional Level

- Regional Greenhouse Gas Initiative [10] Greenhouse gas generating facilities auction for CO2 allowances to emit. The proceeds that come from these allowances are reinvested in energy efficiency and renewable energy projects or greenhouse gas reduction programs.

Federal Level

- Build Back Better Bill Includes significant climate spending with strong labor standards. As of November 2021, bill status and final form is unknown. [11]
- Infrastructure and Investment Jobs Act [35] Passed in November 2021 that includes significant funding opportunities in Rhode Island including potentially $1.5 billion for highways, $292 million for bridges, $272 million for transportation infrastructure, $2.5 billion for EV funding, $100 million for broadband access, and $378 million for clean drinking water. Strong labor standards included in this bill. [xx]
- Buses and Bus Facilities Program (FTA) [12] Provides $809 million in funding for improvements in buses and bus facilities. Many places have used money to purchase electric buses. Both a formula and a discretionary program.
- Capital Investment Grants Program (FTA) [13] This program funds $2.3 billion in new heavy rail, commuter rail, light rail, streetcars, and bus rapid transit projects. Projects must have a budget of $300 million or more and a federal investment of at least $100 million. This is a discretionary program.
- Congestion Mitigation and Air Quality Improvement (CMAQ) Program (FTA) [14] Provides $2.5 billion in funding for states to reduce their transportation emissions. This is a formula program that may need to be spent on already federally funded programs.
- Energy Efficiency and Renewable Energy Office (DOE) [15] Provides numerous programs that allow local and state governments funding for renewable energy, energy efficiency, and transportation such as the Low Greenhouse Gas (GHG) Vehicle Technologies Research, Development, Demonstration and Deployment. These programs tend to be trials of new technologies.

- EPA's Brownfield Program [16] This program works to clean-up America's brownfields for alternative usage and provides job-training grants, a revolving loan-program, assessment grants, and other types of funding. Some grants range up to $2,000,000 for state assessments.
- FEMA Hazard Mitigation [17] Grant that provides funding for the mitigation of extreme weather events, including long-term planning. Local governments can apply and grants can go to, among other uses, "storm-water, drainage and culvert improvements, flood control, property acquisition, slope stabilization, infrastructure protection, seismic and wind retrofits, and structure elevations."
- State Energy Program (DOE) [18] Provides $55 million in total funding to states for reducing energy costs and improving resiliency. Each grant is usually around $300,000-$450,000, and has been used to seed green banks. This is a formula program.
- State of Good Repair Grants (FTA) [19] Provides $2.7 billion for funding fixed guide-way and high intensity motor-bus systems in revenue service for at least seven years. Federal government provides 80% of the net capital cost. This is a formula program.
- Surface Transportation Block Grant Program (STBG) (FTA) [20]Provided $12.1 billion in funding for states to improve transportation infrastructure, usually related to highways or alternative transportation methods. This is a formula program.
- Title 17 Innovative Energy Loan Guarantee Program (DOE) [21] Provides up to $4.5 billion in loan guarantees for innovative technological projects. Has been used to start large-scale renewable energy projects.
- Urbanized Area Formula Program (FTA) [22] Provides $4.9 billion in funding for public transportation operations and capital assistance in urbanized areas (those with more than 50,000 people). This is a formula program.

State Programs for Indviduals, Schools, Businesses and Municipalities

- Clean Energy Grant Incentive Program [23] Currently provides $1,500,000 of funding to renewable solar energy projects. The offer is available to Public Colleges and Universities and State Agencies.
- Energy Efficiency and Resource Management Council Income Eligible Service [24] Currently offers energy assessments and energy efficiency upgrades to qualifying households at no cost.

- Low Income Home Energy Assistance Program [25] Currently provides grants for low income families to pay their heating bills and qualifies them to use the Weatherization Assistance Program. Federally Funded.
- National Grid Electric Transportation and Charging Programs [26] Existing program will fund 100% of electric infrastructure costs and installation costs, and 75% of charging station costs for the adoption of fully electric municipal school buses. Also, the program will fund 100% of electrical infrastructure for charging stations for other approved electric vehicle charging station projects while offering rebates for equipment installations.
- National Grid Energy Wise Program [27] Provides families with free home energy assessments, recommendations on how to reduce usage, and financial incentives for switching to more energy efficient systems in their homes. The program is funded by the systems benefit charge, as mandated by law.
- National Grid Residential New Construction Program [28] Incentivizes the construction of energy efficient homes and renovation to energy efficient homes. The program is funded by the systems benefit charge, as mandated by law.
- Property Tax Exemption for Renewable Energy [29] State exempts residential and manufacturing renewable energy systems from paying property taxes.
- Renewable Energy Fund [30] Provides grants of up to $1,224,500 to Rhode Island renewable energy projects.
- Renewable Energy Growth Program [31] Allows users to sell their energy generation output at fixed prices.
- Sales Tax Exemption for Renewable Energy [32] Makes certain renewable energy materials exempt from sales tax in Rhode Island.
- Solarize Rhode Island[33] Encourages the use of small scale solar electricity in participating communities through savings plans.
- Weatherization Assistance Program [34] Allows homeowners and renters to decrease energy costs by providing them with low-cost installation of energy efficient heating, cooling, and ventilation systems. Federally funded.

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METHODOLOGY

Please note all estimates are based on the best currently available data. Job numbers, cost, and demand may shift due to changing economic markets and technological developments. Any policy implementation of these recommendations should require an additional review process.

BUILDINGS

RECOMMENDATION

TRANSITION ALL K-12 PUBLIC SCHOOLS TO NET-ZERO BY 2030

COST CALCULATION

RHODE ISLAND PUBLIC SCHOOLS HAVE A SQUARE FOOTAGE OF 24,100,000 (RIDE 2017) WHERE WE ESTIMATE DEEP RETROFITS COST $88/SQF (RMI 2012). WHERE THE RI SCHOOL BUILDING AUTHORITY REPORTED A NEED OF 125 MW OF RENEWABLE CAPACITY TO POWER SCHOOLS DISTRICT WIDE. WHERE WE ASSUME EACH RENEWABLE INSTALLATION ON SCHOOLS WOULD BE UNDER 5 MW AND COST $2,614 PER KW OF CAPACITY INSTALLED (EIA 2019) [1].

JOB CREATION

FOR DEEP RETROFITS: 4.7 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.7 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. FOR SOLAR INSTALLATIONS: 3.8 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.4 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 3. 1 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED [2].

EMISSIONS REDUCTION

WHERE WE ASSUME TRANSITIONING ALL RHODE ISLAND K-12 PUBLIC SCHOOLS WOULD REDUCE EMISSIONS BY 105,913 MT CO2 (NBI 2021) [3].

RECOMMENDATION

BUILD 35,000 AFFORDABLE NET-ZERO HOUSING UNITS

COST CALCULATION

FOR A SINGLE MULTIFAMILY DWELLING IN THE NORTHEAST, THE AVERAGE SQUARE FOOTAGE IN 2020 WAS 1,050FT FROM U.S. CENSUS. AVERAGE COST OF CONSTRUCTING A ZERO-EMISSION MULTI-FAMILY DWELLING IS $325.00 PER SQUARE FOOT WHICH WAS UTILIZED FOR 35,000 UNITS (US GREEN BUILDING COUNCIL, 2019). EXISTING GAP OF NEARLY 20,000 AFFORDABLE HOUSING UNITS IN RHODE ISLAND TODAY BASED ON ESTIMATES FROM THE (NATIONAL LOW INCOME HOUSING COALITION), HOUSING WORKS RI ESTIMATES LARGER GAP OF 35,000-40,000 ADDITIONAL HOUSING UNITS NEEDED TO SUPPORT INCREASED DEMAND FOR SINGLE-PERSON HOUSEHOLDS BY 2025 [4].

JOB CREATION	5.5 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4.8 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 6.1 INDUCED JOBS PER MILLION DOLLARS INVESTED (EPI,2019) [5].
RECOMMENDATION	PERFORM ENERGY RETROFITS ON 50% COST BURDENED HOUSEHOLDS IN RHODE ISLANDS BY 2030
COST CALCULATION	RHODE ISLAND HAS 139,090 COST BURDENED HOUSEHOLDS (HOUSING WORKS, 2021) WHERE THE COST OF A RESIDENTIAL DEEP RETROFIT IN RHODE ISLAND RANGED BETWEEN $50,000 TO $100,000 WHERE WE SEE THE MEDIAN HOUSING SIZE 1,400 SQUARE FEET IN 2021 (ENERGY RI) [6]
JOB CREATION	4.7 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4.0 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.7 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1.0 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. [7]
EMISSIONS REDUCTION	A STUDY OF DEEP RETROFITS IN CALIFORNIA ESTIMATES A REDUCTION OF 59.5% CO2 EQ PER SQF AND ESTIMATES A CO2 EMISSIONS REDUCTION OF 0.0014 MT TONS PER SQF. THE RESIDENTIAL ENERGY EMISSIONS IN 2018 IN RHODE ISLAND WERE 2.3 MILLION MT OF CO2. [8]
RECOMMENDATION	TRANSITION TO NET-ZERO EMISSIONS IN PROVIDENCE MUNICIPAL BUILDINGS BY 2030
COST CALCULATION	ALL GOVERNMENT BUILDINGS IN PROVIDENCE (29 BUILDINGS) EXCEPTS SCHOOLS, FIREHOUSES, AND GARAGES AND CLOSED BUILDINGS HAVE A TOTAL SQUARE FOOTAGE OF 900,473 SQUARE FEET (SUSTAIN PVD, 2019). THESE BUILDING GENERATED A TOTAL OF 23,324,188 KWH IN 2019, WHICH WOULD NEED 20,475 KW, WORTH OF SOLAR AT A CAPACITY FACTOR OF 13% TO MEET THEIR EXISTING ENERGY DEMANDS. ASSUMING ONSITE SOLAR INSTALLATIONS WOULD BE LESS THAN 5 MW AT A COST OF $2,614 PER KW OF CAPACITY INSTALLED (EIA 2019). WHERE WE ESTIMATE DEEP RETROFITS COST $88 SQF (RMI 2012). NOTE ENERGY DEMANDS MAY FLUCTUATE BY YEAR AND ADDITIONAL HEATING AND COOLING CAPACITY MAY BE NEEDED [9].

JOB CREATION	FOR SOLAR ON BUILDINGS: 3.8 DIRECT JOBS PER MILLION DOLLAR INVESTED, 4.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.4 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 3.1 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. FOR RETROFITS: 4.7 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4.0 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.7 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1.0 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED [10]
EMISSION REDUCTION	EMISSION DATA FROM SUSTAIN PVD, 2019 [11]

ENERGY

RECOMMENDATION	INSTALL 900 MW OF UTILITY, COMMERCIAL, AND RESIDENTIAL SCALE SOLAR BY 2030 AND A TOTAL OF 2000 MW OF CAPACITY BY 2040.
SIZE DETERMINATION	THIS REPORT'S ELECTRICITY GOALS ACCOUNT FOR THE PROCESS OF TRANSITION TO A CLEAN ENERGY ECONOMY. CAPACITY NUMBERS ARRIVED FROM DATA IN THE ROAD TO "100% RENEWABLE ELECTRICITY BY 2030 REPORT" BY THE BRATTLE GROUP ALONG WITH THE MOST RECENT EIA ELECTRIC GENERATION DATA . THESE CAPACITY NUMBERS REPRESENT CURRENTLY INSTALLED CAPACITY AND DO INCLUDE FUTURE OR PLANNED PROJECTS THAT HAVE NOT BEEN CONSTRUCTED. INSTALLING 900 MW OF SOLAR AND 1300 MW OF WIND BY 2030 WILL ALLOW RHODE ISLAND TO TRANSITION TO 100% RENEWABLE ELECTRICITY BY 2030. INSTALLING 2,000 MW OF SOLAR AND 3,000 MW OF WIND BY 2040 WILL ENSURE MAINTENANCE OF THE 100% ELECTRICITY AND PROVIDE ADDITIONAL ELECTRICITY FOR ELECTRIFICATION OF VEHICLES AND HEATING AS RHODE ISLAND MOVES TO A FULLY RENEWABLE ENERGY FUTURE [12].
COST CALCULATION	COST OF INSTALLATION OF A SOLAR GENERATOR IN THE NORTHEAST IN 2019 WAS $2,544/KW (EIA, 2021) WAS USED TO GET TOTAL COST FOR 2000 MW SOLAR INSTALLATION [13].

JOB CREATION	3.8 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.4 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 3.1 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED (PERI REPORT 2021) [14]
EMISSION REDUCTION	CO2 EMISSION REDUCTION WERE CALCULATED USING THE EPA AVERT MODEL, USING TOTAL REDUCTIONS FOR THE NEW ENGLAND REGION. [15]

RECOMMENDATION	INSTALL 1300 MW OF OFFSHORE WIND BY 2030 AND A TOTAL OF 3000 MW CAPACITY BY 2040.
COST CALCULATION	COST OF INSTALLATION OF AN OFFSHORE WIND GENERATOR IN 2019 IN THE UNITED STATES WAS $4,077/KW (NREL, 2020). GLOBAL WIND COSTS WILL DECLINE BELOW $2,500/KW BY 2030 (IAE, 2020). THESE NUMBERS WERE USED TO GET TOTAL COST FOR 3000 MW OF OFFSHORE WIND INSTALLATION [16]
JOB CREATION	3.5 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.6 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.7 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 2.8 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [17].
EMISSION REDUCTION	CO2 EMISSION REDUCTION WERE CALCULATED LEARNING THE EPA AVERT MODEL, USING TOTAL REDUCTIONS FOR THE NEW ENGLAND REGION [18].

RECOMMENDATION	MODERNIZE THE ELECTRICAL GRID BY 2030
COST CALCULATION	ACCORDING TO NATIONAL GRID'S MODERNIZATION PLAN, THE COST OF MODERNIZING THE GRID UNDER A HIGH DISTRIBUTED ENERGY SCENARIO WITH ADVANCE METERING WOULD BE $583.35 MILLION [19].
JOB CREATION	3.2 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.2 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 2.7 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [20].

TRANSPORTATION

RECOMMENDATION	EXPAND AND IMPROVE PUBLIC TRANSPORTATION ACCESS
COST CALCULATION	THE TOTAL COST AS DEFINED BY THE STATE PLANNING COUNCIL IS $1.9-3.1 BILLION. THIS ESTIMATE IS USING THE HIGHER RANGE COST IF COMPLETED UTILIZING ZERO EMISSION TRANSPORTATION [21].
JOB CREATION	11.6 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.3 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.5 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1.5 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [22]
EMMISSION REDUCTION	VEHICLE MILES TRAVELED (VMT) FOR LIGHT-DUTY VEHICLES IN RI IN 2017 WAS 8,198,676,993 (RI TRANSIT EMISSIONS DASHBOARD). EMISSIONS WERE CALCULATED USING THE FTE GHG CALCULATOR UNDER A 10% DECREASE IN VMT SCENARIO [23].

RECOMMENDATION	ELECTRIFY PUBLIC VEHICLES AND INSTALL EV SUPPORTING INFRASTRUCTURE BY 2033, PRIORITIZING EVITP TRAINING AND LOCAL MANUFACTURING
COST CALCULATION	ELECTRIFYING THE RIPTA BUS FLEET WOULD COST $456 MILLION OVER 12 YEARS. IN 2019 RHODE ISLAND'S STATE FLEET INCLUDES 683 PASSENGER VEHICLES EXCLUDING ALL OTHER (RHODE ISLAND DIVISION OF PURCHASES DATA REQUEST 2021). THE AVERAGE COST OF LIGHT-DUTY ELECTRIC VEHICLE IS $34,011 PER CAR FOUND THROUGH LOOKING AT MARKET RATE OF CURRENT VEHICLES. CHARGING INFRASTRUCTURE AND ASSOCIATED COSTS FOR AN L2 CHARGER IS $5,440 (2019-2025) (ICCT, 2019). NUMBER OF VMT BY STATE PASSENGER VEHICLES WAS 5,993,707 MILES IN 2019 (RI DIVISION OF PURCHASES) [24].

COST CALCULATION CONT.	THERE WERE 833,600 LIGHT DUTY VEHICLES AND 800 PEVS IN 2016 (AFDC, 2021). TO SUPPORT 832,600 PEV WOULD REQUIRE 18,253 WORKPLACE LEVEL 2 CHARGING PLUGS, 10,684 PUBLIC LEVEL 2 CHARGING PLUGS AND 971 PUBLIC DC FAST CHARGERS (AFDC, 2021). CHARGING INFRASTRUCTURE AND ASSOCIATED COSTS FOR AN L2 CHARGER IS $5,440 (2019-2025) AND FOR DCFC IS $81,818 (2019-2025) (ICCT, 2019) PER CHARGER. [25]
JOB CREATION	1.4 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.7 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 3.5 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 2.9 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [26]

RECOMMENDATION	CONSTRUCT A HIGH-SPEED RAIL NETWORK
COST CALCULATION	THE NEXTGEN HSR CONSTRUCTION COST IS APPROXIMATELY $110 BILLION (USING PRICING ESTIMATES FROM DOLLAR AMOUNTS IN 2011) [27].
JOB CREATION	3.2 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.5 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.5 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1.7 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [28].
EMISSION REDUCTION	VEHICLE MILES TRAVELED (VMT) FOR LIGHT-DUTY VEHICLES IN RI IN 2017 WAS 8,198,676,993 (RI TRANSIT EMISSIONS DASHBOARD). EMISSIONS WAS CALCULATED USING THE FTE GHG CALCULATOR UNDER A 10% DECREASE IN VMT SCENARIO [29].

ADAPTATION AND RESILIENCE

RECOMMENDATION

CONDUCT CLEAN ENERGY TRANSFORMATION OF LIFESPAN AND CARE NEW ENGLAND HOSPITAL CAMPUS 2025. THIS WOULD INCLUDE INSTALLING ONSITE SOLAR AND BATTERY STORAGE AND AN ELECTRIC BUS HUB TO INCREASE PUBLIC TRANSPORTATION ACCESS.

COST CALCULATION

USING GEO-SPATIAL TOOLS TO MEASURE PARKING AREA SPACE ADJACENT TO RHODE ISLAND HOSPITAL, WOMEN AND INFANTS HOSPITAL, AND HASBRO HOSPITAL TO CALCULATE 132,087 SQUARE FEET, AND HOSPITAL ROOF AREA AS 83,413 SQUARE FEET. THE AVERAGE SOLAR CAPACITY PER SQUARE FOOT IS .014KW/SQUARE FOOT (GOOGLE SUNROOF) ASSUMING $2614 PER KW/SQUARE FOOT AND A TOTAL KW CAPACITY OF 3,017. ASSUMING CAPITAL COST FOR BATTERY STORAGE UP TO 4 HOURS IS $380/KWH OR $1520/KW FOR 4 HOURS. ESTIMATED COST OF A NEW ELECTRIC BUS FACILITY WITH STORAGE AND MAINTENANCE IS $62,000,000 (A BETTER CITY, 2019). ACTUAL SOLAR CAPACITY MAY VARY BASED ON SITE CONDITIONS [30].

JOB CREATION

FOR SOLAR: 3.8 DIRECT JOBS PER MILLION DOLLARS INVESTED, 4.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.4 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 3.1 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED (PERI REPORT 2021). FOR BUS FACILITY: 1.6 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.3 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 5.7 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 1.5 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. FOR BATTERY STORAGE: 3.2 DIRECT JOBS PER MILLION DOLLARS INVESTED, 3.1 INDIRECT JOBS PER MILLION DOLLARS INVESTED, 4.2 INDUCED JOBS PER MILLION DOLLARS INVESTED. AND A SUBSET OF 2.7 MANUFACTURING JOBS PER MILLION DOLLARS INVESTED. (PERI REPORT 2021) [31]

EMISSION REDUCTION

USED EPA CARBON EQUIVALENCY CALCULATOR AND APPROXIMATE ENERGY PRODUCED THAT WILL BE RENEWABLE FOR ONE YEAR (3017 KW) [32]

RECOMMENDATION	REMEDIATE AND REPLACE 20,000 LEAD SERVICE LINES BY 2030
COST CALCULATION	NRDC ESTIMATES THAT THERE ARE 20,000 LEAD SERVICE LINES IN RHODE ISLAND, AROUND 1800 PER 100,000 PEOPLE. THE EPA ASSUMES THE COST TO REPLACE A LEAD PIPE AVERAGES AT $4,700 [33].
JOB CREATION	DIRECT JOBS: 5.9, INDIRECT: 3.4, INDUCED: 5.4, MANUFACTURING: 1.4 [34].

GLOSSARY OF TERMS

APPRENTICESHIP PROGRAM

According to the DOL, "paid on-the-job training and related classroom training under the guidance of experienced journey workers for workers learning a new trade." [1]

BOEM (BUREAU OF OCEAN ENERGY MANAGEMENT)

An agency within the United States Department of Interior that deals with "managing development of U.S. Outer Continental Shelf energy and mineral resources." They supervise the federal offshore wind lease process. [2]

BROWNFIELD

"A property which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." [3]

CO2EQ (CO2 EQUIVALENT)

Emissions of greenhouse gases are typically expressed in a common metric so that their impacts can be directly compared, as some gases are more or less potent (i.e., have a higher global warming potential) than others. The international standard practice is to express greenhouse gases in carbon dioxide equivalents (CO2e). [4]

COST-BURDENED HOUSEHOLD

"A household that spends more than 30% of its income on housing costs." [5]

DEEP-ENERGY RETROFITS/DEEP RETROFITS

"A whole-building analysis and construction process that achieves much larger energy cost savings—sometimes more than 50% reduction—than those of simpler energy retrofits and fundamentally enhances the building value." [6]

DIRECT JOBS

"Jobs created to deliver a final project or product." [7]

ENERGY BURDEN

"The percentage of gross household income spent on energy costs." [8]

ENVIRONMENTAL JUSTICE AREA

The US Department of Environmental Protection defines an EJ Area as "any census tract where 20 percent or more individuals live at or below the federal poverty line, and/or 30 percent or more of the population identifies as a non-white minority, based on data from the U.S. Census." [9]

EVITP

The Electric Vehicle Infrastructure Training Program is a comprehensive program that trains workers to install electric vehicle supply equipment. [10]

GREENHOUSE GAS

"Gases that trap heat in the atmosphere" including Carbon Dioxide, Methane, Nitrous Oxide, and Fluorinated gases. [11]

GREEN INFRASTRUCTURE

"The range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, storm-water harvest and reuse, or landscaping to store, infiltrate, or evapotranspirate storm-water and reduce flows to sewer systems or to surface waters." [12]

HEATING SYSTEM REPAIR AND REPLACEMENT PROGRAM (HSRRP)

Rhode Island program that provides a "one-time service to increase the heating system efficiency of owner-occupied income-eligible households or replaces systems in instances where heating systems cannot be made efficient and meets certain requirements." [13]

HIGH-SPEED RAIL

Passenger train system that cruises at a higher velocity with some trains going as fast as 220 MPH. [14]

INDIRECT JOBS

"Supply chain jobs created to provide inputs to a final project or product." [15]

INDUCED JOBS

"Jobs created by wages earned from the projects and spent in other parts of the economy, thereby creating additional jobs." [16]

INTERNATIONAL PANEL ON CLIMATE CHANGE (IPCC)

"United Nations organization that releases scientific assessments on the worldwide impact of climate change and strategies for mitigation." Thousands of scientists from around the world contribute to its findings. [17]

ISO (INDEPENDENT SYSTEM OPERATOR) NEW ENGLAND

A non-profit organization that owns and maintains the power grids for New England. Part of a network of regional system operators who manage the U.S. electricity grid. [18]

LABOR PEACE

An agreement entered into between an employer and a union where the employer agrees not to oppose unionization and the union agrees to not strike or otherwise stop work. [19]

LOW INCOME HOME ENERGY ASSISTANCE PROGRAM (LIHEAP)

Federal program operated with state authorities that "offers funding to pay utility bills of low-income customers and those in need of financial support." [20]

MEDIAN HOUSEHOLD INCOME

A particular income amount of a region or population that divides it into two equal parts: those who make above this level and those who make below this level. [21]

MEGAWATT

The standard term of measurement for bulk electricity. “One million watts of electricity.” [22]

MEGAWATT HOUR

"One thousand kilowatt-hours or 1 million watt-hours.” A unit that is used to calculate electric output. [23]

MILLION METRIC TONS OF CARBON DIOXIDE EMISSIONS (MMTC02)

“Measurement of carbon emissions often utilized for determining the number of greenhouse gases emitted from energy production and extraction using the metric system.” [24]

NET ZERO BUILDINGS/ SCHOOLS

“Zero energy buildings combine energy efficiency and renewable energy generation to consume only as much energy as can be produced onsite through renewable resources over a specified time period.” [25]

PRE-APPRENTICESHIP PROGRAM

A “program or set of services designed to prepare individuals to enter and succeed in a Registered Apprenticeship program” by definition having “a documented partnership with at least one Registered Apprenticeship program.” [26]

PREVAILING WAGE

A wage standard. In Rhode Island refers to the requirements of the Rhode Island General Law 37-13 and the general prevailing rate of pay for regular, holiday and overtime wages to be paid to each craftsmen, mechanic, teamster, laborer or other types of worker performing work on public works projects when state or municipal funds are used in excess of $1,000. [27]

PROJECT LABOR AGREEMENT (PLA):	"Collective bargaining agreements between building trade unions and contractors. They govern terms and conditions of employment for all craft workers—union and nonunion—on a construction project. They protect taxpayers by eliminating costly delays due to labor conflicts or shortages of skilled workers." [28]
RESPONSIBLE CONTRACTOR POLICY	"Policy that establishes a hiring preference for the selection of contractors who pay their workers a fair wage and provide employer-paid family health insurance, pension benefits and training opportunities." [29]
REQUEST FOR PROPOSAL (RFP)	A request to offshore wind developers, which "specifies eligibility requirements, contract requirements, and evaluation criteria based upon the PSC Order and stakeholder input." [30]
RHODE ISLAND'S RENEWABLE ENERGY FUND	A fund that "provides grants for renewable energy projects that have the potential to produce electricity in a cleaner, more sustainable manner, while stimulating job growth in the green technology and energy sectors." [31]
RIPTA	The Rhode Island Public Transit Authority. The body that provides public transportation in Rhode Island. [32]
STORM SURGE	"The rise in seawater level caused solely by a storm." [33]
WEATHERIZATION ASSISTANCE PROGRAM (WAP)	Federal program operated with state authorities that "retrofits and weatherizes homes of low-income Americans in order to reduce utility bills." [34]

ENDNOTES

INTRODUCTION

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