

FACTS

RHODE ISLAND

A M E R I C A N S E C U R I T Y P R O J E C T

Pay Now, Pay Later: Rhode Island

The Environmental Protection Agency (EPA) estimates that it could cost Rhode Island \$90-\$530 million by the end of the century to protect its coastline from a rise in sea level. Watch Hill could see a rise of over 12 inches by the end of the century.¹

The impact of natural disasters (caused by climate change) on the port of Providence could directly impact manufacturing and trade in Rhode Island, which accounts for 25% of the state's \$45 billion annual earnings.²

Clean energy investments and expanded green technology industries are expected to create more than 5,000 jobs in Rhode Island and increase investment revenue by over \$500 million.³

According to a new study, a failure to mitigate the effects of climate change could begin to cause serious gross domestic product and job losses within the next several decades. Between 2010 and 2050, it could cost Rhode Island \$700 million in GDP and over 3,000 jobs.*

**GDP numbers are based on a 0% discount rate. Job losses are measured in labor years, or entire years of fulltime employment. Backus, George et al., "Assessing the Near-Term Risk of Climate Uncertainty: Interdependencies among the U.S. States," Sandia Report (Sandia National Laboratories, May 2010), 141. https://cfwebprod.sandia.gov/cfdocs/CCIM/docs/Climate_Risk_Assessment.pdf (accessed March 23, 2011).*

Admittedly, the effects of climate change, a complex and intricate phenomenon, are difficult to predict with precision. Informed scientific and economic projections, as we have used in our research, however, allow us to see that Rhode Island faces significant losses in industries crucial to its economy if no action is taken.

Moreover, data shows Rhode Island is poised to benefit from the research, development, and distribution of renewable energy technologies. The Ocean State has the potential to develop offshore wind farms, to generate electricity from hydroelectric power, and to exploit other renewables.⁴ Its state legislative policies already suggest a movement towards renewable energy contracts and increased green technology. Should

we fail to continue on a path to resist climate change, Rhode Island residents have much to lose.

Pay Later: The Cost of Inaction

Climate change is likely to devastate Rhode Island's landscape, industries, and residents' lifestyles. By the end of the century, winter temperatures are predicted to rise 7-13°F and summer temperatures 6-14°F, reducing the length of the snow season and necessitating costly emergency plans for dangerously hot conditions in Providence and other urban areas.⁵ High greenhouse gas emissions are likely to cause annual droughts (as compared

to droughts every two or three years in the past) more severe floods, and, depending on the rate of temperature rise and ice melt, a projected rise in sea level of 10 inches to two feet (7-14 inches under a low emissions scenario).⁶ The resulting economic impacts on the state's agricultural, manufacturing, and trade industries seriously threaten the security of Rhode Island's future.

A Dangerous Rise in Sea Level

The expected global rise in sea level as a result of climate change will cause substantial damage to the property along Rhode Island's coast and the marine ecosystems that provide economic opportunities to the state.

The EPA estimates that it could cost Rhode Island \$90-\$530 million by the end of the century to protect its coastline from the rise in sea level.⁷

For the 400 miles of densely populated coastal communities,⁸ the changes in sea level are already devastating: many insurance companies have begun to withdraw coverage from those areas that are particularly susceptible to flooding and water damage.⁹

Hurricane Bob Damage Compared to Estimated Costs of Climate Change in RI (Millions \$)



Sources: The Toronto Star; National Wildlife Federation; Center for Environmental Studies

The state's lengthy coast is known for attracting beachgoers, boaters, and water sport enthusiasts¹⁰—and generates \$3 billion in tourist revenue each year.¹¹ Seafood is a cultural staple of Rhode Island living; residents engaging in summer events such as clambakes and lobster feasts alone bring in \$23 million each year. These activities are at risk; Rhode Island temperatures, for example, are likely to hit and surpass the maximum level at which lobsters can survive by mid-century.¹²

Threats to coastal property and marine life may be exacerbated by the severe storms that are projected to become more frequent with climate change. Stronger storms in Rhode Island are likely to seriously damage local infrastructure (i.e., beaches, roads, and homes).¹³ **Hurricane Bob, a category 2 storm that surged 5.5 feet in 1991, cost Rhode Island roughly \$115 million.**¹⁴ As climate change causes stronger, more severe weather disasters today than 20 years ago, the cost of future storms will likely be much greater.¹⁵ Brown University's Center for Environmental Studies estimates that total hurricane damage under a high emissions scenario will likely double, possibly more than double, costs projected in the absence climate

change by 2100.¹⁶ In a local example, the Fox Point Hurricane Barrier protects close to \$5 billion of property near the intersection of the Providence and Seekonk Rivers, but may not be strong enough to withstand a severe hurricane or winter storm.¹⁷ For the communities and businesses that rely on Rhode Island's shoreline and coastal resources, climate change poses a serious economic threat.

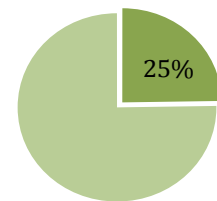
Agricultural and Manufacturing Losses

Climate change will likely cause Rhode Island to lose substantial economic security from reduced productivity in the agriculture, forestry, and manufacturing industries. **Droughts, flooding, and changes in seasonal temperatures—in particular during the growing season—are likely to damage Rhode Island's agricultural sector, which brings in \$90 million; farms are projected to see a reduction in pasture yields by close to 40% and a decrease in potato yields of over 60%.**¹⁸ Droughts, in particular, will be devastating for the state, limiting the amount of water available to sustain crop growth in higher temperature scenarios. A decrease in plants and

trees that can survive Rhode Island's temperature changes will affect the 600,000 hunters, fishers, and wildlife viewers in the state.¹⁹ It will also reduce the sector's profitability, which generated more than \$340 million in 2006 and supported almost 6,000 jobs.²⁰

Rhode Island's manufacturers generate roughly 10% of its gross state product (GSP).²¹ Manufacturers specializing in items such as electronics, textiles, machinery, jewelry, boat building, and biotechnology²² rely on the port of Providence for trade, transportation and utilities (which generate another 15% of Rhode Island's annual revenue).²³ Shipping over 3 million tons of cargo annually, it is the second busiest port in New England after Boston.²⁴ **The potential damage to the port as a result of rising sea levels could have a ripple effect on the state's economy, particularly the one-fourth of GSP generated by manufacturing and trade.**²⁵ Accordingly, one in four of Rhode Island's labor force will be significantly affected by the consequences of climate change.

Rhode Islander Labor Force Projected to be Directly Affected



Source: Rhode Island Department of Labor and Training²⁶

Health Risks from Climate Change

The changes in climate have already begun to affect the health of Rhode Islanders. **Current ozone levels are higher than national health standards recommend;**²⁷ **in 2009, Rhode Islanders experienced a total of 21 high ozone days, putting at risk 19,000 children and 75,400 adults with asthma.**²⁸ Projected water shortages have dangerous implications for Rhode Island residents, as 35% of households depend on wells for drinking water.²⁹ Additionally, the temperature increases create a more favorable environment for pests, which could contribute to a greater prevalence of Lyme disease, other tick-borne infections, and the West Nile virus.³⁰ Climate change presents a serious public health risk to all Rhode Islanders.

Pay Now: Benefits to Taking Action

Rhode Island will benefit by moving to renewable energy sources. Currently, 64% of the state's power comes from oil, coal and gas. By investing in green technology, the state can increase the prominence of the nuclear power plants, hydroelectric plants, dams, and wood burning facilities already in its energy profile.³¹ While, on average, only 9% of Americans rely on heating oil for their homes, 42% of Rhode Islanders spent approximately \$665 million on heating oil in 2007.³² This dependence is a much greater financial drain than investing in green technology, which, though still in its beginning stages, attracted approximately \$22 million in venture capital from within the state between 2006 and 2008.³³

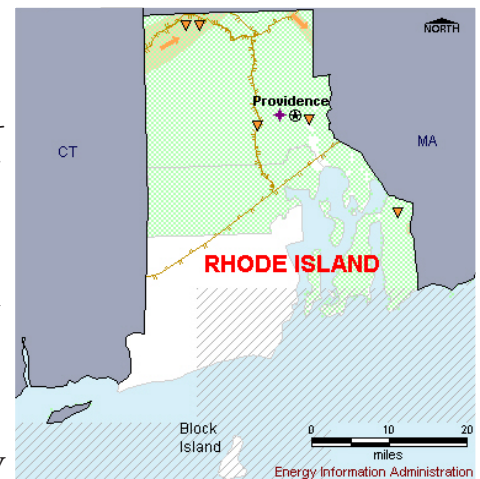
Laudably, the state currently spends more than \$14 million each year to improve its energy sources, and is ranked 6th in the nation in terms of energy efficiency.³⁴ Leading in innovation, Rhode Island is in the process of securing a full offshore wind farm, among the first of its kind in the United States. If successful, the state could generate 15% of its energy from wind power³⁵ and serve as a model to other coastal states. Rhode Island can ultimately save over \$700 million in energy costs by increasing its renewable energy capacity.³⁶

These actions will directly benefit the state's residents: **clean energy investments and expanded green technology industries are expected to create more than 5,000 jobs in Rhode Island and increase investment revenue by over \$500 million.**³⁷ In 2007, Rhode Island had only about 2,300 jobs (0.42% of the workforce) in clean technology.³⁸ Moreover, by making homes more energy efficient and driving cars made with green technology, the average family in Rhode Island could save close to \$800 per year.³⁹

Rhode Island is already heading in the right direction with its commitment to investing in green technology. The Rhode Island Greenhouse Gas Action Plan, adopted in 2002, outlines the state's available resources and the proposals that will most benefit its environmental and economic future.⁴⁰ State leadership has adopted a plan to ensure that by 2020, at least 16% of the energy consumed in Rhode Island will come from renewable sources such as solar and wind power.⁴¹ Through these initial steps, Rhode Island has begun to lay a foundation for securing its economy and environment from the damages of climate change.

Conclusion

Rhode Island must consider action on climate change not just in terms of cost, but also in terms of opportunities. If we give Rhode Island's population, businesses, and investors clear and consistent signals by properly offering initiatives and cultivating demand, investment and innovation in renewable technologies will follow.



Major Electric Power Plants (>100 MW)		Renewable Energy Potential
Coal Mine, Surface	Coal	Biomass (>= 50 tons/sq km/yr)
Coal Mine, Underground	Geothermal	Geothermal (>= 80 milliwatts/m ²)
Natural Gas Hub	Hydroelectric	Solar (>= 6.0 kWh/m ² /day)
Petroleum Refinery	Natural Gas	Wind (>= 3 Power Class)
Oil Import Site	Nuclear	Other Renewable
Oil Seaport	Petroleum	
Electricity Transmission Line (>= 345 kV)	Solar	
Natural Gas Flow (1 mile band width = 100 million cubic feet/day)	Wind	
Oil and Gas Active Leases	Wood	

Rhode Island residents will have to pay for the effects of climate change. The only remaining question is whether they will pay now, or pay later and run the risk of paying significantly more.

(Endnotes)

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