Providence Clean Energy Task Force
Report to the Providence City Council
March 2007

The Clean Energy Task Force appreciates the opportunity to make the recommendations included in this report, and we commend the mayor and the city council for the leadership that they have shown in promoting clean energy for the city of Providence.

Providence Ordinance 355, which created the Clean Energy Task Force, includes the following language: "Renewable Energy Purchasing Goal: The City of Providence shall, starting in the fiscal year 2010, purchase at least 20% of the energy it consumes annually from clean renewable sources. The City shall begin to make renewable energy purchases in the fiscal year 2006, increasing its renewable energy purchases over time to achieve the 20% goal."

Ordinance 355 directs the Clean Energy Task Force to file reports "detailing its recommendations made toward the 20% by 2010 goal to the City Council for consideration." This is the first of these reports. This report includes six recommendations, the specific wording of which have been approved by the task force. These recommendations appear in bold. Supporting details, which appear below each recommendation, are included for clarification and to explain the Task Force's reasoning. These details were prepared by the chair in collaboration with other Task Force members, but they have not necessarily been approved by the task force as a whole.

(1) The city should meet its FY 2007 obligation through the purchase of renewable energy credits (REC's) corresponding to the annual electricity consumption of City Hall. Specifically, the city should complete the purchase presented as "Alternative 1" at the March 21, 2007 Task Force meeting.

Powering city hall with renewable energy would be a memorable, comprehensible, and affordable way for the city to begin to make progress toward the 20% by 2010 requirement. This purchase has been under discussion since FY 2006, but has not yet been executed. One benefit of this initial purchase is that it will provide information that can be used to estimate the likely costs of the larger purchases that will be required in future years.

(2) The city should adopt a specific plan to increase clean energy procurement over the coming three fiscal years to achieve the 20% by 2010 goal. These incremental steps could be set at 10% by FY08, then 15% in FY09 and 20% in FY10. Alternately, the city could set them at 7% in FY08, then 14% in FY09, and 20% in FY10.

The ordinance describes a gradual increase in purchases over the years 2006 – 2010. Such a gradual increase will help to ensure that the 20% by 2010 requirement can actually be met. Specific intermediate goals are necessary stepping-stones; the Task Force's recommendations are consistent with the specific numerical goal of 20% by 2010. The Task Force has thus far been unable to estimate the likely cost of compliance with the 20% by 2010 or intermediary goals.

The city should consider this recommendation with the knowledge that suppliers are required, under Chapter 39-26 of Rhode Island General Laws, to include 3% renewable energy in the electricity that they sell in 2007, increasing by 0.5% in each subsequent year through 2010.

(3) Consistent with recommendation (2), monies for the purchase REC's corresponding to 7% – 10% of the city's annual electricity consumption should be included in the FY 2008 budget.

Ordinance 355 states that "the City shall begin to make renewable energy purchases in the fiscal year 2006, increasing its renewable purchases over time so as to achieve the 20% goal." As noted above, no purchases were made in FY 2006, and, as of the end of February 2007, no purchases have been made in FY 2007. No funding for such purchases was included in the budget for either FY 2006 or FY 2007. Explicit inclusion in the budget should help to facilitate actual purchases in FY 2008.

(4) To the extent that the requirements of the ordinance are met through the purchase of REC's, these REC's should come from "new" generating sources, as defined in Section 39-26-2 of Rhode Island General Laws.

The Clean Energy ordinance explicitly references the State of Rhode Island's Renewable Energy Standard (Section 39-26-5) for the definition of energy sources that are considered "renewable." The Renewable Energy Standard requires electricity suppliers to include renewable energy, in increasing percentages, with the electricity that they sell in Rhode Island. The law also makes a clear distinction between "new" sources, which began production after 1997, and "existing" sources. The purpose of this important distinction, which is widely observed in the renewable energy field, is to ensure that the law provides the maximum incentive to develop new generating sources. The city's purchases of renewable energy will have the maximum environmental benefit if this distinction is observed and purchases are limited to "new" sources. These sources can be projects developed by the city, like Providence Water Supply Board's Rentricity project, or they can be through the purchase of renewable energy credits from other projects.

(5) The city should interpret Ordinance 355 to apply to all city electricity purchases, including those made by Providence Water and the School Department.

The Task Force understands that electricity purchases by Providence Water and the School Department are not included in the same contract as other city departments, and that

jurisdictional issues may complicate the full implementation of this recommendation. For example, the fact that Providence Water is regulated by the Rhode Island Public Utilities Commission may limit the degree to which substantial costs resulting from Ordinance 355 can be included in the Providence Water budget. On the other hand, there is nothing in the ordinance to indicate that these purchases are exempted from the 20% by 2010 goal.

(6) The city should use some of the savings resulting from energy efficiency programs to fund new clean energy purchases.

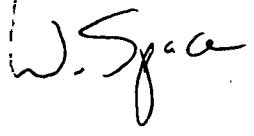
A major purpose of the 20% by 2010 ordinance is to help to move the region away from excessive reliance on fossil fuels. Our reliance on fossil fuels leaves us dangerously dependant on unstable foreign governments, causes a range of well know localized environmental and public-health problems, and is beginning cause irreparable harm to our shared climate system. For example, the air temperature in Providence has risen by 3.3° F since 1900, increasing risk to susceptible populations such as the very young, the very old and persons with heart and lung disease to illness and even death during heat waves. The temperature of Narragansett Bay has rise by nearly 3° since 1950, leading to reductions in valuable cold water fish and shellfish. For more information go to the RI DEM website and click Topics then click Climate Change in Rhode Island.

Our reliance on fossil fuels can be decreased in only two ways: use less energy, and use other energy sources. These two strategies can be explicitly linked by directing some of the savings that result from decreased electricity consumption toward the purchase of electricity derived from renewable sources. The city is engaged in an ongoing effort to increase energy efficiency throughout the school system; early estimates project that the program will save millions of dollars in utility bills and significantly reduce global warming pollutants and other emissions from electric generation. This efficiency program reduces the overall energy used by the city, and thus reduces the amount of renewable energy that will need to be purchased to meet the 20% requirement. Additionally, the savings provide a funding source for the investment in renewable energy.

<u>The Providence Clean Energy Task Force</u>

The Task Force, which was created by Ordinance 355, has met approximately monthly since December 2005 at City Hall. Meetings have included presentations from outside experts and extensive discussions of specific and general issues related to clean energy and the 20% by 2010 requirement. Meetings are open to the public. Members of the Task Force are listed below:

Gary Calvino
Sheila Dormody
Janet Keller, Vice Chair
Alan Sepe
Joe Spremulli
Will Space, Chair
Aden van Noppen



City of Providence

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

CHAPTER 2005-42

No. 355 **An Ordinance** RELATING TO CLEAN RENEWABLE ENERGY RESOURCES

Approved July 29, 2005

Be it ordained by the City of Providence:

SECTION 1. Renewable Energy Purchasing Goal: The City of Providence shall, starting in the fiscal year 2010, purchase at least 20% of the energy it consumes annually from clean, renewable sources. The City shall begin to make renewable energy purchases in the fiscal year 2006, increasing its renewable purchases over time so as to achieve the 20% goal.

SECTION 2. Satisfaction of 20% Goal: The City shall achieve the 20% requirement by using renewable energy as defined in Section 39-26-5 of Rhode Island General Laws. The City need not produce such energy itself, but may satisfy the 20% goal by purchasing Renewable Energy Credits.

SECTION 3. Establishment of Energy Task Force:

1. The City shall establish an Energy Task Force to study the scenarios by which the City could meet the 20% by 2010 goal, including the investigation of funding opportunities and the creation of clean energy installations.

2. The Energy Task Force shall consist of 7 individuals, three of whom shall be appointed by and serve at the pleasure of the City Council, three of whom shall be appointed by and serve at the pleasure of the Mayor, and one of whom shall be chosen by and represent the Environment Council of Rhode Island.

3. The Energy Task Force shall meet as often as necessary, but shall meet once within 90 days of the passage of this ordinance, and at least once each quarter until the implementation plan for the 20% by 2010 goal is completed.

4. Six months after passage of this ordinance and every six months thereafter the Clean Energy Task Force will file a final report detailing its recommendations made towards the 20% by 2010 goal to the City Council for consideration. The Energy Task Force shall continue to meet and file reports as described above until it is discontinued by ordinance.

5. City departments, agencies and their staff shall cooperate with the Energy Task Force by providing them with relevant documents and information in a timely manner.

6. This Ordinance shall take effect upon passage.

IN CITY COUNCIL
JUL 21 2005
FIRST READING
READ AND PASSED
Clerk

APPROVED
7/29/05
MAYOR

IN CITY COUNCIL
JUL 25 2005
FINAL READING
READ AND PASSED
PRESIDENT
Acting CLERK

TITLE 39
Public Utilities and Carriers

CHAPTER 39-26
Renewable Energy Standard

SECTION 39-26-5

§ 39-26-5 Eligible renewable energy resources. – (a) For the purposes of the regulations promulgated under this chapter, eligible renewable energy resources are generation units in the NEPOOL control area using:

(1) Direct solar radiation;

(2) The wind;

(3) Movement or the latent heat of the ocean;

(4) The heat of the earth;

(5) Small hydro facilities;

(6) Biomass facilities using eligible biomass fuels and maintaining compliance with current air permits; eligible biomass fuels may be co-fired with fossil fuels, provided that only the renewable energy fraction of production from multi-fuel facilities shall be considered eligible;

(7) Fuel cells using the renewable resources referenced above in this section;

(8) Waste-to-energy combustion of any sort or manner shall in no instance be considered eligible except for fuels identified in § 39-26-2(6).

(b) A generation unit located in an adjacent control area outside of the NEPOOL may qualify as an eligible renewable energy resource, but the associated generation attributes shall be applied to the renewable energy standard only to the extent that the energy produced by the generation unit is actually delivered into NEPOOL for consumption by New England customers. The delivery of such energy from the generation unit into NEPOOL must be generated by:

(1) A unit-specific bilateral contract for the sale and delivery of such energy into NEPOOL; and

(2) Confirmation from ISO-New England that the renewable energy was actually settled in the NEPOOL system; and

(3) Confirmation through the North American Reliability Council tagging system that the import of the energy into NEPOOL actually occurred; or

(4) Any such other requirements as the commission deems appropriate.

Draft CETF Force Recommendations for Discussion at 3/21 meeting only

Renewable energy credits (REC's) corresponding to 7% – 10% of the city government's total annual electricity consumption in FY 2008. Monies dedicated for this purpose should be included in the FY 2008 budget.

Ordinance 355 states that "the City shall begin to make renewable energy purchases in the fiscal year 2006, increasing its renewable purchases over time so as to achieve the 20% goal." No purchases were made in FY 2006, and, as of the end of February 2007, no purchases have been made in FY 2007. No funding for such purchases was included in the budget for either FY 2006 or FY 2007. Explicit inclusion in the budget should help to facilitate actual purchases in FY 2008.

The ordinance describes a gradual increase in purchases over the years 2006 – 2010. Such a gradual increase will help to ensure that the requirement that 20% of annual energy consumption can actually be met in FY 2010. In the judgment of the Task Force, purchases of at least 7%, and ideally closer to 10%, in FY 2008 would be consistent with the intent of the ordinance. The city should consider this recommendation with the knowledge that suppliers are required, under Section 39-26-5 of Rhode Island General Laws, to include 3% renewable energy in the electricity that sell in 2007, increasing by 0.5% in each subsequent year through 2010.

A rough estimate of the potential cost of the recommended purchase can be made by examining a proposal that was made by the City's present electricity supplier in April 2006. The proposal was to blend increasing amounts of renewable energy with the City's normal electricity purchases in 2006 – 2008. The proposed costs ranged from $0.0008/kWh to $0.0045/kWh, additional to the normal cost of electricity. Annual city electricity consumption, exclusive of the school department, is at least 35,000,000 kWh, so this offer represents an annual cost of between $28,000 and $160,000. Only the most expensive proposal includes exclusively "new" (see below) resources. (The Task Force has not yet learned the annual electricity consumption of the school department, but this energy is presumably covered by the ordinance.)

To the extent that the requirements of the ordinance are met through the purchase of REC's, these REC's should come from "new" generating sources, as defined in Section 39-26-2 of Rhode Island General Laws.

Chapter 39-26 of Rhode Island General Laws is the Renewable Energy Standard, which requires electricity suppliers to include renewable energy, in increasing percentages, with the electricity that they sell in Rhode Island. The ordinance that created the Clean Energy Task Force explicitly references Section 39-26-5 of this law, which defines energy sources that are considered "renewable." The law also makes a clear distinction between "new" sources, which began production after 1997, and "existing" sources. The purpose of this distinction is to ensure that the law provides the maximum incentive to develop new generating sources. The city's purchases of renewable energy will have the maximum environmental benefit if this distinction is observed and purchases are limited to "new" sources.

The city should consider the possibility that saving which result from energy conservation programs can be used to fund clean energy purchases.

A major purpose of the 20% by 2010 ordinance is to help to move the region away from excessive reliance on fossil fuels. Our reliance on fossil fuels leaves us dangerously dependant on unstable foreign governments, causes a range of well know localized environmental and public-health problems, and is beginning cause irreparable harm to our shared climate system. Our reliance on fossil fuels can be decreased in two ways: use less energy, and find other energy sources. The Task Force would like the city to consider an explicit linkage between these two strategies by directing some of the savings that result from decreased electricity consumption toward the purchase of energy derived from non-fossil sources.

The city should meet its obligation to purchase clean energy in fiscal year 2007. This obligation should be met through the purchase of REC's corresponding to the annual electricity consumption of City Hall.

Powering city hall with renewable energy would a memorable, comprehensible, and affordable way for the city to begin to make progress toward the 20% by 2010 requirement.

Draft CETF Force Recommendations for Discussion at 3/21 meeting only

TITLE 39
Public Utilities and Carriers

CHAPTER 39-26
Renewable Energy Standard

SECTION 39-26-2

§ 39-26-2 Definitions. – When used in this chapter:

(1) "Alternative compliance payment" means a payment to the Renewable Energy Development Fund of fifty dollars ($50.00) per megawatt-hour of renewable energy obligation, in 2003 dollars, adjusted annually up or down by the consumer price index, which may be made in lieu of standard means of compliance with this statute;

(2) "Commission" means the Rhode Island public utilities commission;

(3) "Compliance year" means a calendar year beginning January 1 and ending December 31, for which an obligated entity must demonstrate that it has met the requirements of this statute;

(4) "Customer-sited generation facility" means a generation unit that is interconnected on the end-use customer's side of the retail electricity meter in such a manner that it displaces all or part of the metered consumption of the end-use customer;

(5) "Electrical energy product" means an electrical energy offering, including, but not limited to, last resort and standard offer service, that can be distinguished by its generation attributes or other characteristics, and that is offered for sale by an obligated entity to end-use customers;

(6) "Eligible biomass fuel" means fuel sources including brush, stumps, lumber ends and trimmings, wood pallets, bark, wood chips, shavings, slash and other clean wood that is not mixed with other solid wastes; agricultural waste, food and vegetative material; energy crops; landfill methane; biogas; or neat bio-diesel and other neat liquid fuels that are derived from such fuel sources;

(7) "Eligible renewable energy resource" means resources as defined in § 39-26-4;

(8) "End-use customer" means a person or entity in Rhode Island that purchases electrical energy at retail from an obligated entity;

(9) "Existing renewable energy resources" means generation units using eligible renewable energy resources and first going into commercial operation before December 31, 1997;

(10) "Generation attributes" means the nonprice characteristics of the electrical energy output of a generation unit including, but not limited to, the unit's fuel type, emissions, vintage and policy eligibility;

(11) "Generation unit" means a facility that converts a fuel or an energy resource into electrical

energy;

(12) "NE-GIS" means the generation information system operated by NEPOOL, its designee or successor entity, which includes a generation information database and certificate system, and that accounts for the generation attributes of electrical energy consumed within NEPOOL;

(13) "NE-GIS certificate" means an electronic record produced by the NE-GIS that identifies the relevant generation attributes of each megawatt-hour accounted for in the NE-GIS;

(14) "NEPOOL" means the New England Power Pool or its successor;

(15) "New renewable energy resources" means generation units using eligible renewable energy resources and first going into commercial operation after December 31, 1997; or the incremental output of generation units using eligible renewable energy resources that have demonstrably increased generation in excess of ten percent (10%) using eligible renewable energy resources through capital investments made after December 31, 1997; but in no case involve any new impoundment or diversion of water with an average salinity of twenty (20) parts per thousand or less;

(16) "Obligated entity" means a person or entity that sells electrical energy to end-use customers in Rhode Island, including, but not limited to: nonregulated power producers and electric utility distribution companies, as defined in § 39-1-2, supplying standard offer service, last resort service, or any successor service to end-use customers; including Narragansett Electric, but not to include Block Island Power Company as described in § 39-26-7 or Pascoag Utility District;

(17) "Off-grid generation facility" means a generation unit that is not connected to a utility transmission or distribution system;

(18) "Reserved certificate" means a NE-GIS certificate sold independent of a transaction involving electrical energy, pursuant to Rule 3.4 or a successor rule of the operating rules of the NE-GIS;

(19) "Reserved certificate account" means a specially designated account established by an obligated entity, pursuant to Rule 3.4 or a successor rule of the operating rules of the NE-GIS, for transfer and retirement of reserved certificated from the NE-GIS;

(20) "Self-generator" means an end-use customer in Rhode Island that displaces all or part of its retail electricity consumption, as metered by the distribution utility to which it interconnects, through the use of a customer-sited generation facility;

(21) "Small hydro facility" means a facility employing one or more hydroelectric turbine generators and with an aggregate capacity not exceeding thirty (30) megawatts. For purposes of this definition, "facility" shall be defined in a manner consistent with Title 18 of the Code of Federal Regulations, section 92.201 et seq.; provided, however, that the size of the facility is limited to thirty (30) megawatts, rather than eighty (80) megawatts.

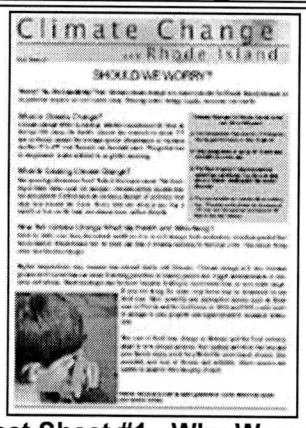
RI Greenhouse Gas Project

Climate Change and Rhode Island

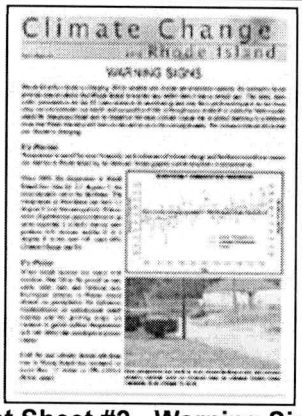
Global climate change, specifically global warming, is a major concern for Rhode Island because its potential impacts on our coastal areas, drinking water, energy supply, economy and health.

Learn more about climate change and what you can do to help slow it.

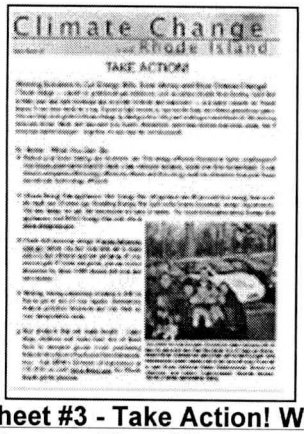
Climate Change and Rhode Island Publications



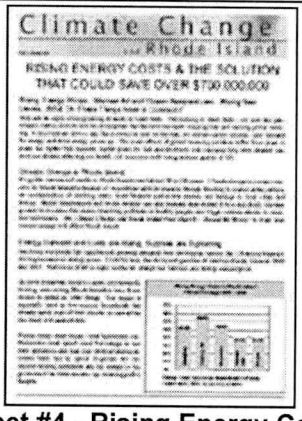
Fact Sheet #1 - Why Worry?



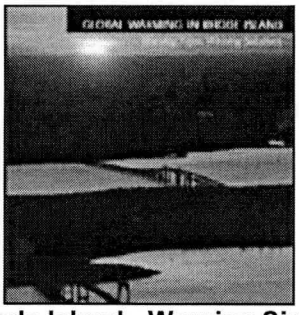
Fact Sheet #2 - Warning Signs



Fact Sheet #3 - Take Action! Winning Solutions to Slow Climate Change



Fact Sheet #4 - Rising Energy Costs and the Solution that Could Save Over $700,000,000



Global Warming in Rhode Island - Warning Signs, Winning Solutions

Energy Saving Tips

- Alliance to Save Energy EXIT DEM

Rhode Island Greenhouse Gas Project

- Project Description
- Rhode Island Greenhouse Gas Action Plan
  - Body of Report
  - Appendices
- Rhode Island Greenhouse Gas Process EXIT DEM

Rhode Island Greenhouse Gas Inventory EXIT DEM

Other links of interest

- New England Governors and Eastern Canadian Premiers Climate Change Action Plan Discussion Paper EXIT DEM
- RI State Energy Office EXIT DEM
- Greenhouse Gas Education Site EXIT DEM
- EPA Global Warming Information EXIT DEM

Climate Change and Rhode Island

Fact Sheet #1

SHOULD WE WORRY?

Worry? No. Do Something? Yes! Global climate change is a major concern for Rhode Island because of its potential impacts on our coastal areas, drinking water, energy supply, economy and health.

What is Climate Change?

Climate change refers to average weather conditions over time. In the last 100 years, the Earth's climate has warmed by about 1°F and scientists expect the average global temperature to increase another 2° to 6°F over the next one hundred years. The global rise in temperature is also referred to as global warming.

What Is Causing Climate Change?

Our growing reliance on fossil fuels is the major cause. The burning of fossil fuels - coal, oil, and gas - releases carbon dioxide into the atmosphere. Carbon dioxide creates a blanket of pollution that traps heat around the Earth. Every time we drive a car, flip a switch or turn on the heat, we release more carbon dioxide.

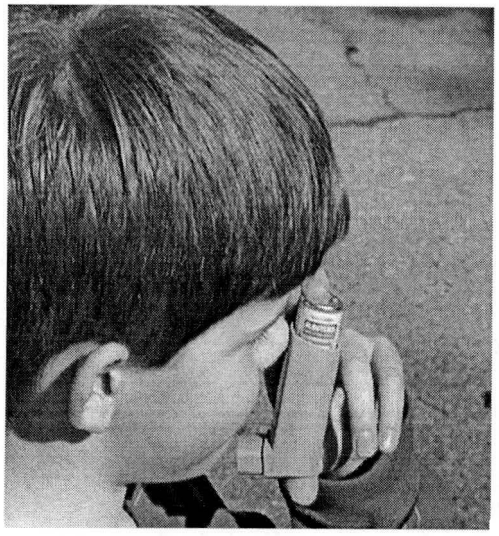
Climate Changes in Rhode Island in the last 50 to 100 years

- Our temperature has risen by 2.3 degrees, the biggest increase in New England.
- Total precipitation is up by 40 % with less snowfall but more rain.
- The Bay is nearly 3 degrees warmer, which has contributed to a decade long drop in bottom dwelling fish like winter flounder.
- The sea level in our communities is rising too. Providence has seen an increase of .62 feet and Newport an increase of .84 feet in the last century.

How Will Climate Change Affect My Health and Well-Being?

Little by little, over time, the natural world we live in will change. Left unchecked, scientists predict that the climate of Rhode Island will be more like that of Atlanta, Georgia by the year 2100. This would bring some unwelcome changes.

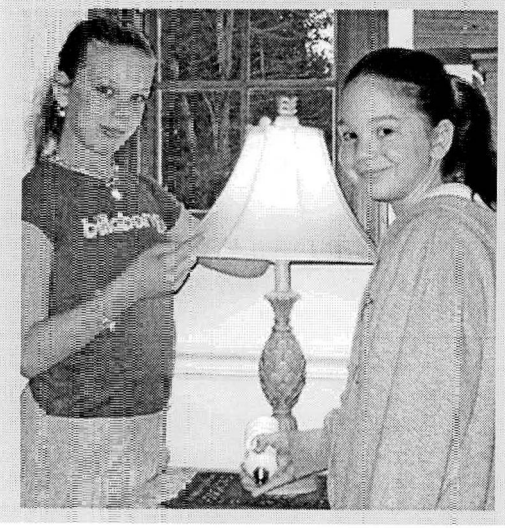
Higher temperatures may increase heat-related deaths and illnesses. Climate change will also increase ground-level ozone that can cause breathing problems in healthy people and trigger asthma attacks in sensitive individuals. Water shortages may be more frequent, leading to more restrictions on your water usage.



Warmer temperatures will increase ground-level ozone, which may cause more asthma attacks.

If you live along the coast, your home may be threatened by sea level rise. More powerful and destructive storms, such as those seen in Florida and the Gulf states in 2004 and 2005, could result in damage to your property and higher property insurance premiums.

The cost of food may change as farmers and the food industry adapt to new climate patterns. And outdoor activities that you and your family enjoy could be affected by more beach erosion, less snowfall, and loss of forests and wildlife, where species are unable to adapt to the changing climate.



While climate change is a global issue, small actions can make a big difference. If every American home changed just 5 high-use light fixtures or bulbs with ones that have earned the ENERGY STAR rating, each family would save more than $60 in energy costs each year, and together we'd keep more than one trillion pounds of greenhouse gases out of our air - equal to the emissions of 8 million cars. At left, Sara and Jenna Capobianco, of Foster, replace inefficient lightbulbs with Energy Star bulbs.

What Is Rhode Island Doing?

Addressing climate change is no simple task. That's why the Rhode Island Energy Office and Department of Environmental Management formed a consortium of government, business, citizen and environmental groups to find ways to reduce greenhouse gas emissions.

The Consortium came up with 52 ways in the *2001 Greenhouse Gas Action* to reduce greenhouse gases and *save Rhode Islanders $700,000,000* as well!

Rhode Island communities are also doing their part. Providence is the first Capital City in New England to commit to using 20% clean energy by the year 2010. Schools in Warwick are using bio-diesel fuels. Cranston began a comprehensive energy efficiency program at Park View Middle School.

What Can I Do?

Individuals can reduce the need for fossil fuels by driving less and driving more fuel-efficient cars, by using energy efficient appliances and by using less electricity. Businesses can do the same things on a larger scale. Many energy-saving measures can often save money as well. For more ideas, see Climate Change and Rhode Island Fact Sheet #3 - *Take Action: Winning Solutions to Cut Energy Bills, Save Money and Slow Climate Change.*

Notable Consortium Accomplishments

- Renewable Energy Standard Law - requires electricity suppliers to purchase 16% clean energy by 2020.
- RI Energy and Consumer Savings Act- requires appliance retailers to only sell energy efficiency products.
- Clean Car Standards - Two sets of changes to State Air Quality rules would cut greenhouse gasses and other pollutants from light duty vehicles. DEM recently adopted California low emission vehicle rules (CA-LEV) that will cut conventional and toxic pollutants. DEM is promulgating new rules, based on California's Pavley regulations, which will cut greenhouse gas emissions from vehicles starting in 2009.
- Executive Orders for green state buildings and fleets signed by Governor Donald Carcieri. Green buildings order requires that any new or renovated public buildings meet strict energy efficiency standards, thereby saving $39 million on energy costs by 2020.
- The Green Fleets order will reduce fuel consumption, improve fuel efficiency and reduce pollution emissions from state vehicles, and save $10 million on energy costs.

Where Can I Get More Information?

Learn more about climate change, global warming, and money saving ideas at www.dem.ri.gov/climate.

RHODE ISLAND CLIMATE CHANGE CONSORTIUM
235 PROMENADE STREET · PROVIDENCE, RI 02908 · (401) 222-3434 · WWW.DEM.RI.GOV/CLIMATE
A PARTNERSHIP OF THE STATE OF RHODE ISLAND, BUSINESS, INDUSTRY, CITIZENS GROUPS AND ENVIRONMENTAL ORGANIZATIONS

Climate Change and Rhode Island

Fact Sheet #2

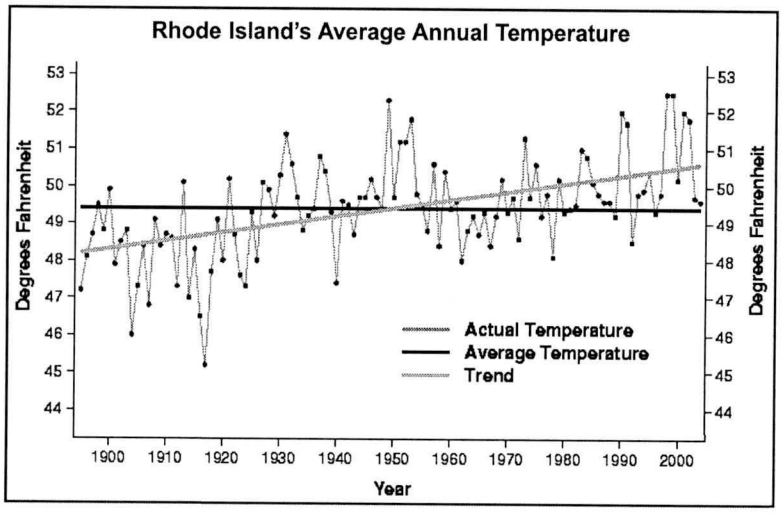
WARNING SIGNS

Rhode Island's climate is changing. While weather and climate are extremely variable, the indicators below provide clear evidence that Rhode Island is warmer and wetter than it was a century ago. This trend, especially prominent in the last 30 years, seems to be accelerating and may have profound impacts on our economy, our environment, our health and our quality of life. Although more research is needed to better understand the changing climate and its impact on the state, climate change due to global warming is a phenomenon that Rhode Islanders will have to take action on in the coming decades. The indicators below show how our climate is changing.

It's Warmer

Temperature is one of the most frequently used indicators of climate change and has been recorded at numerous stations in Rhode Island by the National Oceanographic and Atmospheric Administration.

Since 1899, the temperature in Rhode Island has risen by 2.3 degrees F, the most dramatic rise in the Northeast. The temperature in Providence has risen 3.3 degrees F over the same period. If emissions of greenhouse gases continue to go up as expected, it is likely that our temperature will increase another 2 to 6 degrees F in the next 100 years *(EPA Climate Change and RI)*.



It's Wetter

When clouds become too heavy with moisture, they fall to the ground as rain, snow, sleet, hail, and freezing rain. Ecological systems in Rhode Island depend on precipitation for hydration, replenishment of underground water sources and for growing crops. An increase in global surface temperatures will very likely lead to changes in precipitation.

Over the past century, annual precipitation in Rhode Island has increased by more than 11 inches or 28% *(NOAA NCDC Data)*.

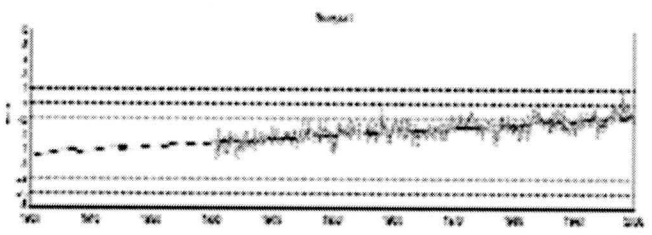
More precipitation may result in more severe flooding events and increase property damage, such as occurred here on Callahan School Road, Harrisville, RI on October 15, 2005.

The Sea Is Rising

Mean sea level is defined as the average height of the surface of the sea for all stages of the tide over a certain amount of time. For the past 150 years, mean sea level has been monitored at Providence and Newport, RI. From these records, it is clear that the sea level has risen due to a combination of natural processes and human actions. Changes in sea level can contribute to erosion and saltwater contamination of freshwater ecosystems and water sources. Also, as sea level rises, thousands of RI citizens who live along Rhode Island's 440 miles of coastline could be forced to adapt or re-locate. Warmer temperatures in the future will likely further melt continental glaciers and contribute to the thermal expansion of ocean water, raising worldwide sea level even further.

Newport has seen an average mean sea level trend increase of 7 inches per century (*NOAA*). A current scenario suggests that if sea level rises approximately 12.4 inches in the next century, 604 acres of Rhode Island's coasts will be lost (Brown University Study). If global temperatures continue to increase, sea level will follow closely, putting all of RI's coastal areas at risk.

Mean Sea Level Trend - Newport, Rhode Island

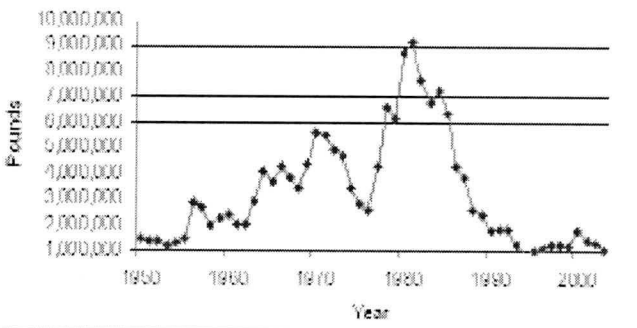


The mean sea level trend is 2.57 millimeters/year (0.84 feet/century) with a standard error of 0.11 mm/yr based on monthly mean sea level data from 1930 to 1999.

The Ocean Is Warmer

Since 1979, global sea temperatures have risen 0.3 degrees F every 10 years (*NOAA)*. For the past 40 years, Narragansett Bay has seen a 1-degree rise in temperature per decade (*New England Regional Assessment, EPA)*. In the winter alone, RI's coastal temperatures have increased 3 degrees F from 1960 to 1990 (*New England Regional Assessment, EPA*).

Winter Flounder Landings - Rhode Island 1950-2003



As bay temperatures have increased, winter flounder abundances have been in decline for the past 25 years. Since 1981, winter flounder landings have dropped from more than 9 million pounds to well less than 2 million pounds annually, a loss of roughly $2 million per year to RI fisheries (*Narragansett Bay Journal*). Lobsters have also been in decline since 2001, and rising sea temperatures may play a part in the rapid loss of lobster landings. A continual rise in sea temperatures will have unknown effects on marine fisheries that could further stress an already hurting industry.

Learn More!

Clean Air-Cool Planet and the Climate Change Research Center at the University of New Hampshire recently released their *Northeast Indicators of Climate Change 2005* report; using data on a dozen physical and biological occurrences in New York and New England, it shows dramatic regional changes. Visit their website at http://www.cleanair-coolplanet.org/.

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Climate Change and Rhode Island

Fact Sheet #3

TAKE ACTION!

Winning Solutions to Cut Energy Bills, Save Money and Slow Climate Change!

Climate change — caused by greenhouse gas emissions, such as carbon dioxide from burning fossil fuel to heat, cool and light buildings and to power vehicles and machinery — is a major concern for Rhode Island. Every time we drive a car, flip on a light switch, or turn on the heat, we release greenhouse gases. You can help slow global climate change by taking action today and making a commitment to the winning solutions below. Many will also save you money. Remember: individual actions may seem small, but if everyone makes changes - together, we can turn the world around!

At Home - What You Can Do:

- Reduce your home heating and electricity use. Use energy efficient fluorescent lights, weatherproof your house, plant native trees for shade, clean vents and radiators, install low-flow showerheads. Local electric companies offer energy efficiency rebates and free energy audits to determine how your house can become more energy efficient.

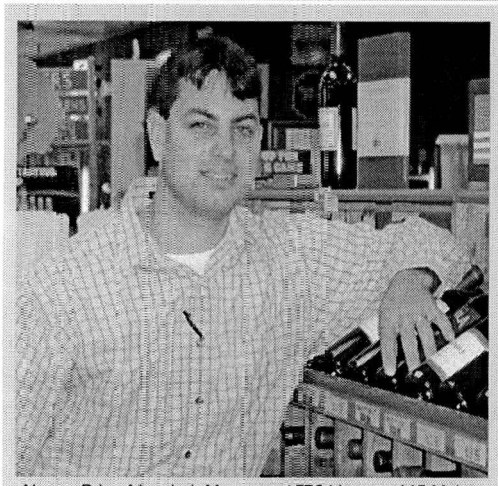
- Choose Energy Star appliances. New Energy Star refrigerators use 40 per cent less energy than models made just 10 years ago. Installing Energy Star light bulbs lowers household energy requirements. The less energy we use, the less money we have to spend. For more information about Energy Star appliances, visit EPA's Energy Star web site at www.energystar.gov.

- Check fuel economy ratings at www.fuel-economy.gov before you buy your next car to make sure it's fuel efficient and low polluting. If your new car gets 32 miles per gallon, you can reduce emissions by about 5,600 pounds per year and save money.

- Walking, biking, carpooling or taking a RIPTA bus to get to one of your regular destinations reduces pollution emissions and cuts back on your transportation costs.

- Buy products that are made locally. Cargo ships, airplanes and trucks burn lots of fossil fuels to transport goods. Local purchasing reduces the amount of pollution from transportation. Call DEM's Division of Agriculture at 222-2781 or visit www.dem.ri.gov for Rhode Island-grown products.

The owner of a car that gets 32 miles per gallon will spend $724 less on gas each year than the owner of a 20 mpg car! Above, these Rhode Islanders are doing their part by driving super ultra low-emission hybrid vehicles which get up to 60 mpg. From left to right, Myron Waldman, Eliana Waldmanwerth, Sharon Lee Waldman, and Katrina Waldmanwerth, Michael Durette, Timothy Hutzley and Meimei Tsang.



Above, Brian Mancieri, Manager, 1776 Liquors, 145 Main Street, Warren

1776 Liquors Saves $2,400 Annually on Energy Costs

1776 Liquors of Warren, Rhode Island saves $2,400 a year on energy costs, thanks to Narragansett Electric's Small Business Services programs. The business lowered its annual energy usage by over 25,000 kWh by installing fan controls and door heater controls. Narragansett programs recommended the energy efficient measures and paid over $3,440 toward the installation. 1776 Liquors' investment paid for itself in just eight months!

"Our business offers consumers fine products and knowledgeable service, but keeping pricing competitive is also important. Installing energy efficiency measures gives us over $2400 in savings every year. That's money we can really use to invest in maintaining our fine selection." -- Tom Souza, Owner, 1776 Liquors.

For more information, call Narragansett Electric at 1-800-332-3333 or visit their website at www.narragansett.com.

At Work - What Businesses Can Do:

- Buy energy-saving office appliances and equipment, such as EnergyStar-approved computers, LCD monitors, printers and photocopiers. Reducing a company's energy requirements saves energy and money at the same time.

- Install lighting controls to turn lights on only when needed and to provide the required amount of light to reduce energy needs.

- Encourage staff to take alternative modes of transportation for their daily commute at least once a month. This can include options such as car-pooling, cycling, taking the bus or walking where possible.

- Create an office recycling program. Encourage your staff to be mindful of how much paper they use - remind your staff that copying and printing on both sides of a page saves trees and money.

- If you have a fleet of vehicles, try to use the most energy-efficient models possible.

- Energy-efficiency upgrades and retrofits to office buildings can have both short and long-term paybacks. Most electric companies offer FREE energy audits and recommend appropriate energy efficiency measures for your business. If you decide to install the energy improvements, they may also pay a portion of the installation and equipment costs!

Learn More To Save Energy And Money

The Alliance to Save Energy offers consumers a variety of tips to fit individual pocketbooks, including no-cost and low-cost money and energy saving tips. Visit their website at www.ase.org/consumers. Also, be sure to call or visit the website of your local electric company. Most offer rebates and incentive programs to help you lower your energy bills.

Climate Change and Rhode Island

Fact Sheet #4

RISING ENERGY COSTS & THE SOLUTION THAT COULD SAVE OVER $700,000,000

Rising Energy Prices...Warmer Air and Ocean Temperatures...Rising Sea Levels...What Do These Things have in Common?

They are all signs of our growing reliance on fossil fuels. The burning of fossil fuels – oil, coal and gas– releases carbon dioxide into the atmosphere that blankets the earth, trapping heat and causing global warming. Every time we drive a car, flip a switch or turn on the heat, we release carbon dioxide, raise demand for energy and drive energy prices up. The exact effects of global warming pollution differ from place to place, but tighter fuel supplies, higher prices for fuel and electricity and changing long term weather patterns are already affecting our health, our economic well-being and our quality of life.

Climate Change in Rhode Island

It's gotten warmer and wetter in Rhode Island over the last 50 to 100 years. Climate change is a major concern for Rhode Islanders because of its potential adverse impacts through flooding in coastal areas, saltwater contamination of drinking water, more frequent and severe storms, and damage to local crops and forests. Higher temperatures and wetter weather can also increase heat-related illness and death, increase ground-level ozone that causes breathing problems in healthy people, and trigger asthma attacks in sensitive individuals. See *Climate Change and Rhode Island Fact Sheet #1: Should We Worry?* to learn how climate change will affect Rhode Island.

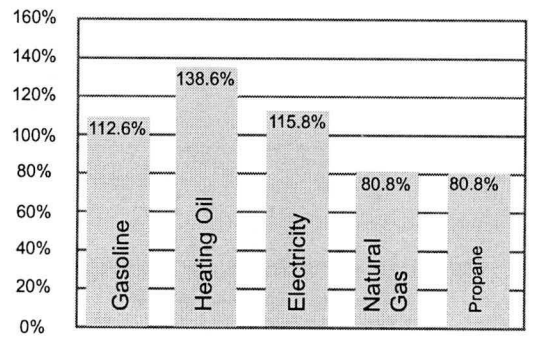
Energy Demand and Costs are Rising, Supplies are Tightening

Declining worldwide fuel supplies and growing demands from developing nations like China and India are driving increases in energy prices. Costs for heat, electricity and gasoline all went up sharply between 2000 and 2005. There's no relief in sight, unless we change our fuel mix and energy consumption.

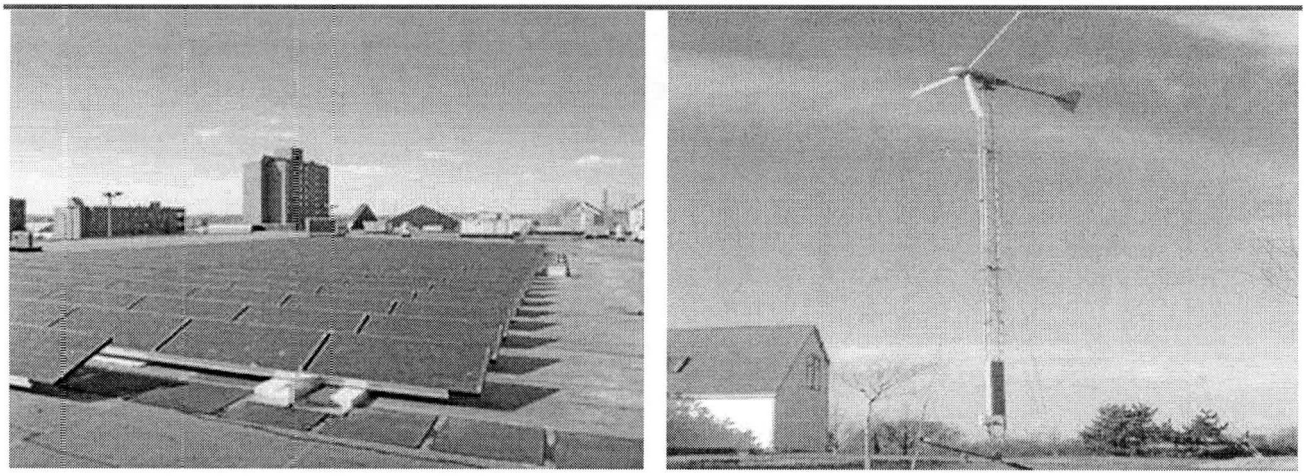
As more household money is spent on electricity, heating, and cooling, Rhode Islanders have fewer dollars to spend on other things. The impact is especially hard on low-income households that already spend most of their income on necessities like food, rent and utilities.

Rising energy costs impact local businesses, too. Businesses must spend more for energy to run their operations and may lose revenue when customers have less to spend. Expenses for low income heating assistance and for energy to run government facilities are also up, straining public budgets.

Rising Energy Costs in Rhode Island
Percent Change 2000 - 2005



Energy costs have risen dramatically in Rhode Island since 2000. Sources: EIA and RIPUC.



Rhode Island hopes to spur wider use of renewable energy technologies. Left, a photovoltaic system provides solar power to Whole Foods Market in Providence, RI. Right, a wind turbine on Block Island provides power to a home. The State's Renewable Energy Portfolio Standards Law will require electricity suppliers to purchase 16% of Rhode Island's energy from clean, renewable sources by 2020.

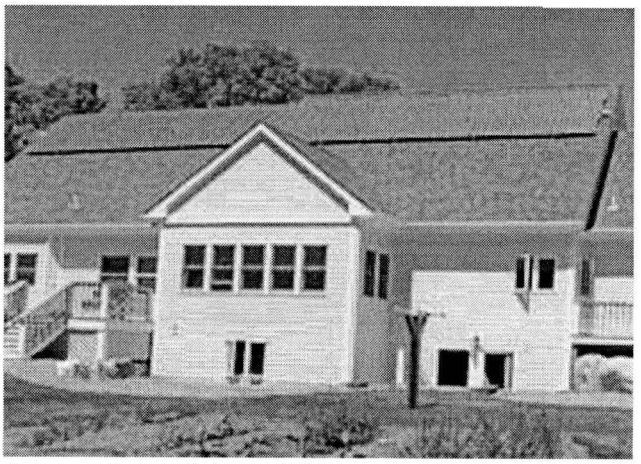
The Solution: Smart Energy Choices!

Smart energy choices can begin to change these trends. Increasing the use of renewable energy and energy efficient equipment and materials over the next fifteen years can reduce demand for fossil fuel and new utility plants, **save** Rhode Islanders over **$700,000,000** on energy costs, cut our carbon dioxide releases by one quarter from 4 million to 3 million tons, and reduce other air pollution. For more information about the 52 ways Rhode Island can achieve these savings, see the *2001 Rhode Island Greenhouse Gas Action Plan*.

You can do your part as well. There are many ways to be more energy efficient. See *Climate Change and Rhode Island Fact Sheet # 3: Take Action!* for specific ideas and actions on how to save energy. Most of these ideas can also save you money.

You may also want to purchase green power. You can buy green power from companies doing business in Rhode Island, without leaving your current utility. Your purchase will support development and generation of clean and renewable energy. This program is available to all residential and small business customers in Rhode Island except Block Island and Pascoag Utility District. For more information, visit www.cleanenergyri.com.

If you are interested in a clean energy system for your home, the Rhode Island Renewable Energy Funds has rebate and incentive programs to help homeowners, businesses and institutions choose and purchase clean energy systems, such as wind turbines and solar photovoltaic ("PV") systems and electricity products. Visit the State Energy Office website for more information at www.riseo.ri.gov.



Solar panels on this house in Westerly make it nearly energy independent. Photo courtesy of SolarWrights.