

# House Energy Security Resolution Report



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## LETTER FROM THE COMMISSIONER

**To Governor Gina M. Raimondo, Senate President Teresa Paiva Weed, House Speaker Nicholas A. Mattiello, and the Members of the General Assembly:**

In 2014, the Rhode Island House of Representatives passed House Resolution H-8227 “respectfully requesting the Rhode Island Office of Energy Resources to issue a report describing its findings and recommendations on the State’s energy security and improvement opportunities.” The following report presents the Office of Energy Resources’ (OER) findings and recommendations on the State’s energy security and improvement opportunities. OER would like to thank Representative Samuel A. Azzinaro for introducing this Resolution.

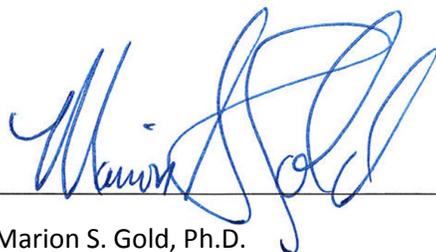
Extreme weather events and the continued likelihood of future natural or manmade disasters pose serious energy security risks to Rhode Island. In the past five years, Rhode Island has experienced numerous severe weather events including floods, blizzards, extended heat waves, extreme cold snaps and hurricanes. Major storms and severe weather endanger life and property; create barriers to economic growth; and threaten our shared quality of life and environment.

The likelihood that future events will occur is high and, without preemptive efforts to address key challenges related to energy assurance, liquid fuel supply, and critical infrastructure energy resiliency, Rhode Island could face disastrous consequences, including loss of life and significant economic damage.

This report summarizes the State’s key program, policy, and planning activities related to energy security. The report highlights energy system vulnerabilities, significant storm events during the past year, federal funding opportunities related to energy security, and policy recommendations to enhance Rhode Island’s energy resiliency and reliability.

OER looks forward to continuing to work diligently with public and private partners to improve the energy security of our state on behalf of all Rhode Island residents, businesses, and communities.

Respectfully submitted,



Marion S. Gold, Ph.D.

Commissioner, Rhode Island Office of Energy Resources



# HOUSE ENERGY SECURITY RESOLUTION REPORT

In 2014, the Rhode Island House of Representatives passed House Resolution H-8227 “respectfully requesting the Rhode Island Office of Energy Resources to issue a report describing its findings and recommendations on the State’s energy security and improvement opportunities.” The following report presents the Office of Energy Resources’ (OER) findings and recommendations on the State’s energy security and improvement opportunities.

The Resolution requested that OER address the following matters:

- 1) Identify, in coordination with the Rhode Island Division of Public Utilities and Carriers and other state agencies, the state’s electrical, gas and distillate fuel vulnerabilities;
- 2) Highlight anything occurring over the next twelve (12) months involving heat waves, tropical storms, hurricanes, and significant winter storms;
- 3) Highlight opportunities for funding that the Rhode Island Office of Energy Resources, in coordination with the Rhode Island Division of Public Utilities and Carriers and the Rhode Island Emergency Management Agency, can potentially pursue with the federal government on energy security; and
- 4) Provide policy recommendations from the State Energy Assurance Plan and State Energy Plan around system reliability, grid modernization and opportunities in diversifying and enhancing the state’s fuel diversity through both natural gas and local and regional distributed generation renewable energy resources.

The report is organized around these four topics, with an introductory section describing background and context.

## Background and Context

Rhode Island has experienced a number of severe weather-related events over the last five years, including floods, blizzards, extended heat waves, extreme cold snaps and hurricanes. These events pose significant financial and energy security risks to the State—they endanger life and property; create barriers to economic growth; and threaten our shared quality of life and environment.

The most direct energy security impacts of major storm events include power outages and disruptions to liquid fuel supply. For example, during Blizzard NEMO in February 2013, all of the fuel terminals in the state lost electrical power for two days and were unable to provide fuel (i.e. gasoline, diesel, heating oil, jet fuel) from their terminal loading rack facilities to the fuel delivery trucks that service gas stations, homes, airports, and other critical facilities. In total, the Blizzard resulted in 1,434 power outage events and 238,611 electric customer interruptions.

During Hurricane Sandy in October 2012, approximately 120,000 electric customers lost power (nearly 25% of the state's 482,000 customers), and 1,200 natural gas customers lost service (out of 252,000 gas customers). In

addition, nine substations went out of service; 1,433 sections of wires went down; and 63 poles were broken. Five days passed until National Grid was able to fully restore electric service to all utility customers. Fuel terminals were also severely impacted—four of the state's six terminals were forced to shut down during storm landfall, and the Inland Terminal at Tiverton did not have its power restored for three days.

The increasing frequency of extreme weather events and the ongoing possibility of future natural or manmade disasters pose serious energy security risks to Rhode Island. The likelihood that future events will occur is high and, without preemptive efforts to address key challenges related to energy assurance, liquid fuel supply, and critical infrastructure energy resiliency, Rhode Island could face disastrous consequences, including loss of life and significant economic damage.

This report provides highlights of the key program, policy, and planning activities related to energy security currently occurring in Rhode Island.

## “Identify, in coordination with the Rhode Island Division of Public Utilities and Carriers and other state agencies, the state’s electrical, gas and distillate fuel vulnerabilities”

OER has gathered both existing and new sources of information regarding the state’s electrical, gas and distillate fuel vulnerabilities. The major existing source of information was the Rhode Island Energy Assurance Plan (EAP). New sources of information include data collected in late 2014 as part of an effort to assist the Rhode Island Emergency Management Agency (EMA) in the development of a state-specific Critical Infrastructure Protection Plan for the energy sector. Lastly, National Grid consults with the Division of Public Utilities and Carriers (DPUC) on an annual Infrastructure, Safety, and Reliability Plan to fund electric and gas distribution system projects.

### Rhode Island Energy Assurance Plan

In 2012, with support from the American Recovery and Reinvestment Act (ARRA), OER commissioned an Energy Assurance Plan (EAP). The purpose of the EAP is to provide Rhode Island with guidance to prepare for, monitor, and mitigate energy deficiencies and disruptions. Its focus is on energy-related events, which primarily include electricity, natural gas, and petroleum. The document describes in detail legal authority, stakeholder input processes, strategic response measures, communication plans, and vulnerability and risk assessment regarding managing Rhode Island’s critical energy infrastructure and sector

vulnerabilities.

### Critical Infrastructure/Key Resource Initiative

In 2014 and continuing this year, OER staff is participating in the EMA’s Critical Infrastructure/Key Resource (CI/KR) initiative. The purpose of the initiative is to gather information for the development of a Rhode Island state-specific Critical Infrastructure Protection Plan. The initiative utilizes sixteen (16) key sectors<sup>1</sup> per guidance from the National Infrastructure Protection Plan<sup>2</sup>, which are of critical importance to Rhode Island’s security during manmade or natural disasters. The energy sector is one of the sectors being considered.

The CI/KR initiative involves two steps for each sector: (1) establish definitive criteria for prioritizing critical infrastructure assets for each sector, and (2) use the criteria to identify priority critical assets in each sector. As the lead agency for the energy sector, OER convened key stakeholders<sup>3</sup> with subject matter expertise to develop asset criteria for critical energy infrastructure in Rhode Island.

The CI/KR energy sector working group developed critical energy infrastructure asset criteria for the following sub-sectors: electricity, petroleum, and natural gas. The criteria serve as

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<sup>1</sup>The sectors are: Energy, Critical Manufacturing, Government Facilities, Healthcare, Nuclear Reactors/Materials Waste, Defense Industrial Base, Emergency Services, Commercial Facilities, Food and Agriculture, Banking and Finance, Information Technology, Water and Waste Water Systems, Chemical, Communications, Dams, and Transportation.

<sup>2</sup>The National Infrastructure Protection Plan (NIPP) of 2013 meets the requirements of Presidential Policy Directive-21: Critical Infrastructure Security and Resilience, signed in February 2013. The Plan was developed through a collaborative process involving stakeholders from all 16 critical infrastructure sectors, all 50 states, and from all levels of government and industry. It provides a clear call to action to leverage partnerships, innovate for risk management, and focus on outcomes.

<sup>3</sup>The stakeholders that contributed to OER’s CI/KR energy sector working group included representatives from the following groups: EMA, OER, the Rhode Island Public Utilities Commission (PUC), the Rhode Island Division of Public Utilities and Carriers (DPUC), National Grid, Dominion, Tennessee Gas Pipeline/Kinder Morgan, Algonquin Gas Transmission/Spectra Energy, and Motiva.

a screening tool to identify priority critical infrastructure and assets. Table 1 displays the asset prioritization criteria developed by the working group for each of the energy subsectors.

Once the criteria were finalized, the CI/KR energy sector working group used the criteria to identify the priority critical assets in Rhode Island’s electricity, petroleum, and natural gas sectors. The priority critical assets identified through this process are managed under Protected Critical Infrastructure Information (PCII) Program protocols.

Now that asset criteria and critical energy infrastructure assets have been identified, the next step in the CI/KR initiative is to assess risk and identify interdependencies with other sectors; develop a sector plan/annex to the Rhode Island Critical Infrastructure Protection

Plan; and measure progress in resiliency efforts/ goals while managing/coordinating sector-specific responsibilities.

### Infrastructure, Safety and Reliability Plan

National Grid annually submits to the DPUC an Infrastructure, Safety and Reliability (ISR) Plan. The ISR Plan is a program of capital and other spending to address electric and natural gas system reliability and resilience. Program components for the electric distribution system include capital projects such as substation hardening. The electric ISR also funds vegetation management. The gas ISR includes leak-prone pipe replacement.

**Table 1. Rhode Island Critical Energy Infrastructure Asset Criteria**

<b>Subsector #1: Electricity</b>	Power generation facilities having total generating capacity across all units that exceed 50 MW.
	69 kV or above electric transmission lines which are strategic power distribution points within the state.
	Electric distribution facilities and control centers that help to supply priority customers on the state’s power system.
	Power generators with dual-fuel capability (e.g. natural gas and #2 distillate fuel).
	(Interdependency Criteria) Power generation facilities that supply electricity to power plants in a “black start” situation.
	(Interdependency Criteria) Power generation facilities, bulk power transmission, distribution, facilities and control centers that supply power to fuel terminals or priority retail gas stations.
<b>Subsector #2: Petroleum</b>	A facility with a storage capacity exceeding 300,000 barrels or capability, if damaged or destroyed, that would have a detrimental impact on the reliability or operability of a pipeline, bulk storage, or distribution system (including #2 distillate fuel, #6 residual fuel, propane, gasoline, diesel, and other delivered petroleum fuels) and significantly impair the operator’s ability to serve a large number of customers for an extended period.
	(Interdependency Criteria) A facility that provides fuel to a location, identified by the state as requiring essential service to maintain operation of a dual fuel power generation facility, critical facility or one critical to national defense.
<b>Subsector #3: Natural Gas</b>	Natural gas pipelines with a capacity equal to or greater than 100 million cubic feet per day.
	Compression stations located on critical natural gas pipelines.
	Take stations located on critical natural gas pipelines.
	LNG facilities with a storage capacity exceeding 1 Bcf.
	(Interdependency Criteria) Natural gas pipelines vital to Rhode Island’s production of electricity.

## “Highlight anything occurring over the next twelve (12) months involving heat waves, tropical storms, hurricanes, and significant winter storms”

The most significant weather-related events during 2014 and 2015 occurred during winter months. Above-average snowfalls contributed to impacts on electric power outages and fuel supplies. For example, Blizzard Juno in January 2015—although less disruptive than Blizzard NEMO in 2013—resulted in 27 outage events and 3,642 customer interruptions. Beyond weather-effected power outages, the extended low temperatures resulted in freezing and ice accumulation in significant portions of Narragansett Bay and nearby coastal areas. These conditions caused delays and disruptions in delivering fuel supplies into Rhode Island.

OER monitors energy security and energy assurance issues related to severe weather events. During Winter 2015, OER kept in close communication with the Rhode Island fuel terminals with respect to the adequacy of their fuel supplies to meet demand from homeowners, businesses and municipalities. Beyond frequent phone and email contact before, during and after storms, OER receives monthly updates on the status of fuel supplies at each terminal in Rhode Island.

## “Highlight opportunities for funding that the Rhode Island Office of Energy Resources, in coordination with the Rhode Island Division of Public Utilities and Carriers and the Rhode Island Emergency Management Agency, can potentially pursue with the federal government on energy security”

During the past year, OER pursued two federal funding opportunities related to energy security. The first grant application was the “Energy Resilience Project,” or “Resilient Microgrids for Critical Services.” This grant proposed to use Hurricane Sandy Community Development Block Grant Disaster Recovery (CDBG-DR) funds to assess the opportunity, costs, and benefits for developing a microgrids program in Rhode Island, and develop recommendations for designing an initial pilot in areas impacted by Hurricane Sandy, including those with vulnerable populations. The second grant application was the “Gas Station Generators Project.” This grant proposed to use Homeland Security Grant Program funds to provide incentives for Rhode Island gas stations to install backup generation in order to continue operating during power outages. The first grant application was successful; the second grant application was not.

### Resilient Microgrids for Critical Services

Microgrids, combined with backup or distributed generation, are a cutting-edge and emerging technology that enables a host site to continue operating without power interruption or loss even if the surrounding electric grid loses power. States, including neighboring Connecticut, are actively exploring ways to deploy microgrids to improve power resiliency at critical infrastructure assets and mitigate localized energy security risks.

In order to understand how Rhode Island could benefit from this emerging technology, OER applied for a grant to assess the opportunity, costs, and benefits for developing a microgrids program in Rhode Island, and develop

recommendations for designing an initial pilot in areas impacted by Hurricane Sandy, including those with vulnerable populations.

OER was awarded a grant for the Energy Resilience Project (“Resilient Microgrids for Critical Services”) in Fall 2014; the project will commence during Spring 2015. The project will consist of two main phases: (1) an opportunity and needs assessment for resilient microgrids for critical services in Rhode Island, and (2) a resilient microgrids pilot design and policy recommendations.

### Gas Station Generators Project

Both during and in the aftermath of major storm events, Rhode Island residents rely on access to gas stations for fuel and emergency supplies (e.g. water, batteries, and non-perishable food). Power outages, however, can affect gas stations’ ability to operate gas pumps, credit card machines, and stores during these severe weather events. In response to significant electrical outages after recent storms (such as Hurricanes Sandy and Irene), several nearby states (including New Jersey, New York, and Maryland) have taken the lead in developing programs to encourage or require targeted numbers of gas stations to install backup power generation.

In order to support the ability of gas stations to continue operating during severe weather power outages, OER submitted a proposal to provide incentives for up to 30 of Rhode Island’s 362 gas stations to install backup generation assets. The proposal was submitted to EMA as part of an application to the federal Homeland Security Grant Program, but was not selected for funding. OER will continue to monitor and check with EMA on any federal grant opportunities to explore this issue.

## “Provide policy recommendations from the State Energy Assurance Plan and State Energy Plan around system reliability, grid modernization and opportunities in diversifying and enhancing the state’s fuel diversity through both natural gas and local and regional distributed generation renewable energy resources”

A number of policy recommendations proposed in the EAP and in the Rhode Island State Energy Plan (RISEP) address the stated topics of “system reliability, grid modernization and opportunities in diversifying and enhancing the state’s fuel diversity through both natural gas and local and regional distributed generation renewable energy resources.” A summary of the applicable policy recommendations is detailed below, along with identification of near-term actions that are being taken, or could be taken, to implement the recommendation. For more information on the EAP or RISEP, please contact Christopher.Kearns@energy.ri.gov.

### Enhance Energy Emergency Preparedness (RISEP Strategy #12)

A 2013 report prepared by the Obama administration found that 670 widespread weather-related power outages occurred nationwide over the past decade, with an estimated annual cost to the United States economy of between \$18 billion and \$33 billion. Rhode Island has witnessed many severe weather events over the last four years, including floods, blizzards, extended heat waves, extreme cold snaps, and hurricanes. The increasing frequency of these extreme storm events and the ongoing possibility of future natural or manmade disasters pose serious energy security risks to Rhode Island. The likelihood that future events will occur is high, and without preemptive efforts to address critical infrastructure energy resiliency, Rhode Island could face disastrous consequences, including loss of life and significant economic damage.

Rhode Island has already taken initial steps to gather high-level information on energy emergency considerations through the development of an Energy Assurance Plan (EAP), which was funded with American Recovery and Reinvestment Act funds in 2012. The State, however, has not yet drawn on the recommendations of the EAP to design or implement a comprehensive, targeted strategy that addresses energy security vulnerabilities at the municipal or facility level, specifically at discrete critical infrastructure assets—hospitals, police and fire stations; water and sewage treatment plants; senior centers and nursing homes; shelters; correctional facilities; fueling stations; and grocery stores.

Smart energy security investments at these locations and energy resiliency solutions could help alleviate the effects of power outages and fuel supply disruptions in energy emergencies. Examples of such solutions are backup generation, fuel reserves, distributed generation, combined heat and power, energy storage, and microgrids. In addition, vulnerability assessments and strategic long-term planning are necessary for improving the resiliency of key critical facilities in the face of future impacts of climate change. Critical energy infrastructure in the state, including the fuel terminals at the Port of Providence, are likely to be at risk for such impacts, especially sea level rise.

*RISEP Strategy #12 recommends the formation of a working group charged with the task of developing a short- and long-term strategy for mitigating critical infrastructure energy security risks and investing in power resiliency solutions.*

The working group should convene the appropriate set of stakeholders to review the state of current critical infrastructure, fully characterize the need for resiliency investments, assess existing information and options, evaluate costs and benefits—and most important, devise a sustained and institutionalized funding mechanism to help ensure that the recommended energy security improvements can be made to critical infrastructure locations throughout the state.

Next Steps: OER’s participation in EMA’s Critical Infrastructure/Key Resources initiative and OER’s “Resilient Microgrids for Critical Services” project both address this RISEP Strategy.

### **Modernize the Grid (RISEP Strategy #13)**

The design and operation of the electric distribution grid has changed little over the past century. As new smart grid and clean energy technologies become increasingly cost-competitive and sophisticated, the traditional model of distribution system management must adapt. Over the coming decades, investments in the grid of the future—grid hardening, non-wires alternatives, advanced metering infrastructure (AMI) technologies, distributed generation, and energy storage—offer the potential to yield substantial consumer and system benefits. Implementing concomitant improvements to rate and regulatory regimes will help accelerate the integration of non-conventional resources and support the development of a more resilient, reliable, efficient, and flexible electric grid.

*RISEP Strategy #13 recommends convening a working group to develop recommendations for electric grid, rate, and regulatory modernization*

*in Rhode Island.* The working group should convene the appropriate set of stakeholders to examine key issues: current status of electric grid infrastructure modernization in Rhode Island, modernization objectives and an implementation strategy for customer- and grid-facing elements, evaluating costs and benefits, cost recovery, customer engagement, and security and privacy concerns.

Next Steps: OER’s “System Integration Rhode Island” (SIRI) working group is addressing this strategy. SIRI is focused on addressing the numerous issues involved in integrating new clean energy programs and technologies in a way that learns from the existing programmatic platform and utility infrastructure while applying the principles of Least-Cost Procurement more fully in both Rhode Island’s utility sector and its total energy economy.

### **Additional Applicable RISEP Policy Recommendations (RISEP Strategies #1, 8, 17)**

There are additional RISEP policy recommendations that are applicable to “opportunities in diversifying and enhancing the state’s fuel diversity through both natural gas and local and regional distributed generation renewable energy resources.” These recommendations include:

- Continue Electric and Natural Gas Least-Cost Procurement (RISEP Strategy #1)
- Expand Renewable Energy Procurement (RISEP Strategy #8)
- Address High and Volatile Regional Energy Costs (RISEP Strategy #17)

*RISEP Strategy #1 recommends renewing Rhode Island’s commitment to leadership in energy*

*efficiency by extending the Least-Cost Procurement mandate and its associated provisions to 2035.* Least-Cost Procurement is a policy that requires Rhode Island electric and natural gas distribution companies to invest in all cost-effective energy efficiency before the acquisition of additional supply. Least-Cost Procurement contains an important component addressing system reliability, which considers the potential of “non-wires alternatives”—energy efficiency, demand response, distributed generation, and other innovative methods—to curtail electric load in constrained areas of the distribution network. System reliability and least-cost planning and procurement are crucial to maintaining and expanding the diversity of resources used to meet electric and gas demand in Rhode Island.

**Next Steps: Governor Gina M. Raimondo and Treasurer Seth Magaziner are seeking to extend Least-Cost Procurement and associated state energy efficiency programs under Article 24 of the proposed FY2016 State Budget legislation. Under Least-Cost Procurement, Rhode Island has invested \$558 million in energy efficiency since 2008, with consumers realizing \$1.99 billion in economic benefits.**

*RISEP Strategy #8 recommends increasing the share of renewable energy in Rhode Island’s electricity supply portfolio through a mix of clean energy imports, distributed renewable generation, and utility-scale in-state projects.* This entails a long-term expansion of the Long-Term Contracting Standard for Renewable Energy (LTC) and/or Distributed Generation (DG) programs, maintaining the state’s commitment to offshore wind generation sited in Rhode Island state and federal waters, and participating in regional collaborations to expand New England’s access to low- and no-

carbon electric resources, such as Canadian hydropower and on-shore wind. Expanding renewable energy procurement will increase the diversity of resources used to meet electric demand through both local renewable generation and regional renewable supply.

**Next Steps: The General Assembly enacted the Renewable Energy Growth (REG) Program in 2014. The REG Program expanded the 40 MW DG Program by an additional 160 MW, for a total of 200 MW of local renewable energy projects in Rhode Island by 2019. Also, in 2014, the General Assembly passed, and Governor Lincoln D. Chafee signed, the Affordable Clean Energy Security (ACES) Act. The law established a framework for the Office of Energy Resources and Division of Public Utilities and Carriers to work with the state’s electric and gas distribution companies—and other New England states—to make strategic investments in cost-effective energy infrastructure projects, including electric transmission projects that facilitate the delivery of clean energy resources (i.e. renewables and large-scale hydropower) into regional load centers.**

*RISEP Strategy #17 recommends that Rhode Island continue to partner closely with other New England states to address regional energy supply challenges and identify cost-effective strategies to mitigate the impacts of rising energy costs.* States should give thorough consideration to the range of available options—from customer-side investments in energy efficiency, combined heat and power, renewable heating, and distributed renewable generation to infrastructure investments in the region’s electric and natural gas transmission systems—as they develop coordinated plans. Pursuing cost-effective solutions—including electric transmission and natural gas

infrastructure—may lower long-term consumer energy costs; reduce energy cost volatility; improve energy system reliability; diversify our resource mix; and advance important environmental goals.

**Next Steps: The Affordable Clean Energy Security Act (ACES), signed into law in July 2014, establishes a framework for Rhode Island state agencies and its primary electric and gas distribution companies to work with other New England states in the development and implementation of competitive procurement mechanisms that identify strategic investment opportunities in regional energy infrastructure.**