

Systems Integration Rhode Island (SIRI) Vision Document – Executive Summary

November 2015

1. Introduction

Rhode Island’s energy system is at the cusp of a fundamental long-term transformation. Our electric grid is becoming increasingly more complex as consumers adopt distributed energy resources—energy efficiency, demand response, renewable energy, and energy storage, among others. New electric technologies are entering the home heating and transportation markets—from highly efficient cold climate heat pumps to electric vehicles. These resources and technologies are becoming more affordable and widely available; many of them benefit from Rhode Island’s strong state support, public policies, and goals for clean energy deployment and greenhouse gas emissions reduction. The changing nature and growth of customer resources holds significant implications for the state’s electric grid and grid managers.

As Rhode Island’s energy system evolves, we face new challenges and opportunities. Utility operators will need to manage distributed generation in a system originally designed for centralized production and one-way power flow. This new requirement at the distribution level will entail new types of investment and operating expertise to allow management of distributed resources in a manner that enables more efficient solutions for customers. At the same time, some distributed energy resources offer the promise of creative new ways to manage and optimize energy demand. Furthermore, utility planners can reduce, defer, or possibly avoid traditional investments in certain types of grid infrastructure to meet growing electric demand by using strategically deployed energy efficiency, renewable energy, or other “non-wires alternatives” projects. For utility regulators, the changing system may raise new questions about traditional utility planning processes, rate structures, cost recovery mechanisms, incentives and weighing the benefits and costs of new investments. As Rhode Island successfully facilitates a transition to a more distributed grid that values, integrates, and plans for growth in customer resources, it will stimulate further economic development in its clean energy industry sector; give consumers and communities more opportunities to take control of and manage their energy costs and preferences for greater system efficiency; lower costs than would otherwise be experienced in the future; and help the state meet climate goals by reducing greenhouse gas emissions.

In order to better understand the challenges and capitalize on the opportunities described above, representatives from the Office of Energy Resources (OER), the Energy Efficiency and Resource Management Council (EERMC), the Distributed Generation Board (DG Board), and National Grid convened a “Systems Integration Rhode Island” (SIRI) working group during 2014-2015. The idea of “systems integration” recognizes that Rhode Island already has several focused, strong, and effective energy processes that can be built upon to support the achievement of future objectives for the electric grid.

The purpose of the SIRI group was to take a first step at mapping out key issues related to the future of Rhode Island’s electric grid and offer early stage recommendations for addressing opportunities, filling gaps, and gaining efficiencies in existing state processes.

The SIRI working group’s efforts culminated in a report that is intended to be a resource for decision-makers. The document itself holds no regulatory authority. The purpose of the report is to provide a framework of understanding and a collective roadmap for interested parties—including the utility, utility regulators, and key energy stakeholders—in order to identify areas of mutual collaboration, guide near-term efforts, assist in acquiring and applying new information, and facilitate the development of future proposals. Some recommendations from the report may rise to the level of needing PUC attention; others may not.

SIRI is particularly focused on the short to medium term, but is also motivated by longer term technology trends and clean energy goals. The report raises prospective recommendations for Rhode Island processes in order to advance outcomes relative to state priorities, including achieving energy, economic, and environmental goals while providing safe, reliable and efficient service to customers at a reasonable price. The recommendations should be understood as forward-looking. The SIRI team approached discussions from the perspective that both National Grid and other stakeholders have been working diligently to meet obligations under current programs and expectations. The SIRI report recommendations both acknowledge the good work done to date, but also focus on future opportunities and needs to unlock new potential in our future electric grid planning and investments. The SIRI group envisions that this report will provide a solid framework to advance this important and complex discussion and decision-making process going forward.

The SIRI group undertook the following tasks, which are documented in detail in the report and summarized in the remainder of this Executive Summary:

- Define what “systems integration” means for Rhode Island within the context of the newly-approved State Energy Plan and ongoing energy/grid planning, procurement, and investment processes;
- Inventory and map out the applicable existing energy policy/regulatory processes in Rhode Island and their interaction;
- Propose preliminary approaches and recommendations for addressing key issues; and
- Establish a work plan, based on the recommendations, that defines next steps and milestones related to systems integration.

2. Defining “Systems Integration”

The SIRI effort proceeds within the context of overarching goals set by Rhode Island for the future of the state’s energy system. These goals are established in the recently adopted 10-year update to the Rhode Island State Energy Plan. Achieving Rhode Island’s energy goals is anticipated to involve significant changes in the electric sector, which will become more distributed and will converge with the thermal and transportation sectors. The SIRI working group acknowledged that current processes for electric distribution grid system planning and investment are robust, support the state’s goals, and will continue to be important. However, essential gaps and areas for improvement exist. The SIRI team developed the following description for “systems integration”:

“Systems Integration” refers to the intentional and thoughtful coordination of existing systems (i.e. processes and stakeholders), so as to harmonize them with the ability to achieve stated goals. While there is currently some coordination among processes and stakeholders, SIRI asks the following questions to examine potential improvements:

- What steps can Rhode Island take today to put us on a path to achieve our energy goals?
- What can Rhode Island achieve if all processes are tuned to work optimally together?
- After considering how the integration of existing processes can be improved and maximized, what are the remaining gaps, and what new or revised processes will address them?

3. Mapping Existing Processes

To answer these questions, the SIRI group began by inventorying and mapping out existing energy policy/regulatory processes in Rhode Island and their interaction. The team identified thirteen distinct processes in which state regulation influences electricity consumers, utilities, and private sector actors to consider the state’s priorities on climate, clean energy, and customers. To help build a framework for the processes, the SIRI group binned the processes into three categories: (1) Customer-Facing, (2) Renewable Energy Promotion, and (3) Grid Planning, Procurement and Investment. The table below lists the processes that SIRI considered.

Category	Process
Customer-Facing Processes	Energy Efficiency Program/Least-Cost Procurement
	Ratemaking – Delivery Prices
	Retail Choice
	Interconnection Standards
Renewable Energy Promotion Processes	Renewable Energy Growth Program
	Net Metering
	Renewable Energy Standard
	Long-Term Contracting Standard for Renewable Energy
Grid Planning, Procurement and Investment Processes	System Reliability Procurement/Least-Cost Procurement
	Infrastructure, Safety, and Reliability Plan
	Utility Financial Incentive
	Standard Offer Supply Plan
	Environmental Regulation

The SIRI team took the following approach to consider these processes through the lens of systems integration:

- List and characterize current Rhode Island energy processes;
- Reflect on how the processes interact with and inform each other;
- Note gaps or barriers in the ways the processes interact and inform each other; and
- Identify and discuss opportunities for improvements in the performance of the processes to further Rhode Island energy goals.

The SIRI team examined how each process interacts with the other processes, identified gaps where processes did not address state priorities, and brainstormed recommendations to address these gaps.

4. Test Cases

After mapping the relationships among Rhode Island’s current energy/grid planning, procurement, and investment processes, the SIRI team considered five “test case” scenarios through the lens of these existing processes. The purpose of the test cases was to better understand the effect of the existing processes on key issues related to Rhode Island’s evolving electric grid and the state’s energy goals. The team evaluated how a select group of resource, end use, and grid planning outcomes would be promoted or inhibited by existing processes. The following test cases were examined:

- Non-wires solutions in utility planning: Implementing “non-wires alternatives” (NWA) can potentially cost-effectively defer, avoid, or reduce the size/scope of transmission and distribution investments.
- Solar PV deployment: Expanding solar PV deployment on the distribution grid could test various regulatory, operational, and programmatic aspects of Rhode Island’s existing electric distribution system processes.
- Strategic electrification – heating: Emerging electric technologies (e.g. highly efficient heat pump technologies) may provide significant savings not just through increased efficiency of electric use, but also through effective substitution of electric use for applications that have traditionally been dominated by fossil fuels (e.g. heating, transportation).
- Strategic electrification – transportation: Emerging electric technologies (e.g. electric vehicles) may provide significant savings and benefits through effective substitution of electric use for applications that have traditionally been dominated by fossil fuels (e.g. transportation).
- Active load management: Active load management (ALM) involves direct control of electric loads—by the utility, the customer, or a third party—in order to reduce demand during peak periods or balance the supply of electricity at other times.

The SIRI team identified a list of synergies and barriers within each existing process for the applicable test case, as well as gaps and recommendations where current processes do not adequately address the test case.

5. Recommendations

The SIRI group’s final step was developing six overarching recommendations for next steps distilled from the process mapping and test case exercises. The recommendations should be considered as early stage, near-term recommendations for systems integration in Rhode Island. The list of recommended actions is not necessarily comprehensive, nor does it attempt to grapple with the full scope of policy, regulatory, and technical challenges that Rhode Island will face as its electric distribution grid evolves in the coming years. The SIRI team recognizes that further efforts and discussions will certainly be needed to flesh out the full range of issues at hand, as well as to delve deeper into the details of the recommendations described below. The six recommendations are summarized below:

1. Identify ways to promote more cost-effective, comprehensive non-wires alternative distribution planning

As different types of distributed energy resources become increasingly prevalent on the state’s electric grid, opportunities may arise to cost-effectively defer, avoid, or reduce the size/scope of traditional distribution investments through incorporating more of these technologies into the distribution planning process. This recommendation identifies next steps for increasing collaborative engagement in the distribution planning process; improving the coordination of distribution planning and System Reliability Procurement (SRP) with other processes; fulfilling the objective of executing on all cost-effective non-wires alternative (NWA) opportunities; exploring ways to address funding issues; and creating a suitable financial incentive for NWA distribution planning.

2. Assess market potential, costs, and benefits of strategic electrification and active load management

Strategic electrification and active load management (ALM) are two strategies that may provide cost-effective energy, economic, and environmental benefits to Rhode Island. These strategies have been explored only on a very limited basis to date in Rhode Island, and information is currently lacking on

the market potential, costs, and benefits of broader implementation. This recommendation identifies next steps to continue gathering data and information through ongoing programs and pilot experiences and explore formal incorporation of strategic electrification and ALM into the Energy Efficiency Program process.

3. Pave the way for accelerated use of electric vehicles

Electrification of the transportation sector through the increasing use of electric vehicles will help Rhode Island achieve energy, economic, climate, and air quality goals. Separate from SIRI, Rhode Island established a Zero Emission Vehicle (ZEV) Working Group in 2014 in order to discuss actions necessary to promote the responsible growth of the ZEV market in Rhode Island. The working group explored issues critical to the efficient and effective deployment of ZEV solutions across the policy, regulatory, and business landscapes. This recommendation draws on the action items developed by the ZEV Working Group and blends in some additional observations on EVs made by the SIRI team.

4. Map Rhode Island's current renewable energy promotion processes and assess adequacy and gaps

Rhode Island has four major processes that promote renewable energy: the Renewable Energy Growth Program, Net Metering, the Renewable Energy Standard, and the Long-Term Contracting Standard for Renewable Energy. Each process serves a distinct purpose; however, based on the process mapping and test case exercises, there appear to be some ways in which the different programs do overlap, as well as some gaps not covered by the current suite of programs. This recommendation identifies next steps to confirm that the processes are adequately serving the state's clean energy goals; integrating so as to simplify the experience of customers and developers; optimally stimulating the state's growing clean energy industry; and achieving clean energy goals at maximum benefit and minimum cost.

5. Assess market potential, costs, and benefits of advanced metering infrastructure and time-varying rates

There are promising rate design models, such as time-varying rates (TVR) that may provide cost-effective energy, economic, and environmental benefits to Rhode Island. However, these rate design structures require enabling technology—advanced metering infrastructure (AMI)—to be implemented. Limited or no information is available on the market potential, costs, and benefits of implementing AMI and TVR in Rhode Island specifically. This recommendation identifies next steps to study the business case for AMI and TVR in Rhode Island.

6. Consider whether methods of performance regulation can be implemented to further the public good

There are several different financial structures by which the utility earns revenue and recovers costs that vary across all processes examined. In some cases, relatively strong performance incentives exist, however, in other cases, there is no incentive or financial structure in place. This recommendation identifies next steps to explore the potential expanded use of performance incentives in Rhode Island, with the intent of examining opportunities to better align the utility's incentives across various processes with policy goals and priorities.