National Grid

Non-Wires Alternatives in Rhode Island: Using Energy Efficiency and Demand Response for System Reliability

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ASSOCIATION FOR
demand response
smart grid

ADS chose National Grid for this case study for the following reasons:

1. **The utility had a desire to test deferring costly infrastructure development by exploring alternative options;**
2. **There is currently a large amount of interest in programs that successfully combine energy efficiency, smart grid, and demand response;**
3. **Stakeholder buy-in from parties across the state provides an example of successful collaboration;**
4. **The willingness of the utility to shift course during the pilot in order to become more successful and meet stated goals;**
5. **The lessons are applicable to other jurisdictions for utilities of any size or governance structure.**

National Action Plan on Demand Response Case Study #5

The National Action Plan on Demand Response (NAPDR), published by the Federal Energy Regulatory Commission in June 2010, called for the development of case studies that would illustrate "lessons learned."

Case Study Audience

The NAPDR called for the development and dissemination of case studies as an action to support demand response practitioners and policymakers. In developing its own plan, the Association for Demand Response & Smart Grid (ADS) deliberated over what kind of case study would be most useful to its target audiences of DR practitioners, smart grid technology and service providers, policymakers, and other stakeholders involved in demand response and smart grid activities.

The approach we have chosen includes interviewing relevant stakeholders and leveraging other published sources to collect varied perspectives (representative customers, consumer and/or environmental advocates, utility staff, regulators, and relevant technology or service providers and analysts) and present them in a way that would help others apply the practices to their own situations.

Case Study Structure and Uses

We hope these case studies will become the subjects of a series of articles, panels at industry conferences, and used in workshops emulating the business school case study process. Written versions (printable on demand) are posted online with links to relevant studies, data, and web, video, and collateral at: www.demandresponsesmartgrid.org.

To complement the detailed reports and data analyses common in the industry, we chose a narrative style that allows the individuals involved in the program or project to "tell their story" and state the challenges that presented themselves. We focus on questions:

- How did the key players view the challenges?
- What happened? What processes were used to meet the challenges?
- What were the reactions and perspectives of different stakeholders?
- What worked, what didn't work, what problems had to be overcome, what's next?

National Grid: Non-Wires Alternatives in Rhode Island

nationalgrid

National Grid USA is a regulated public utility that provides electrical service to 3.3 million customers in areas of Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. The utility operates over 9,000 miles of electricity transmission.

National Grid Rhode Island serves over 460,000 customers in 38 Rhode Island communities.

This case study was prepared by Jenny Senff of the Association for Demand Response & Smart Grid (ADS) on behalf of the National Action Plan on DR as a basis for conversations among stakeholder groups. Funding was provided by the Association of Demand Response & Smart Grid and the U.S. Department of Energy, Office of Electricity Delivery and Energy Reliability.

The intent of this case study is not to cover ground that other reports have already answered about program performance, but to get a better picture of the internal workings of an organization by telling the practitioners' story.

The idea for the study originated in a Breakout Panel Session during the 2013 National Summit on Integrating Energy Efficiency and Smart Grid that featured Tim Roughan of National Grid presenting on the Non-Wires Alternative (NWA) program in Rhode Island. The presentation was well received by Summit attendees, and there was interest in knowing more.

The chief value of the interviews that follow is to supply other practitioners and interested parties with a sense of the challenges and barriers addressed by National Grid and other stakeholders during the implementation of the pilot, and to explain changes and updates that occurred in the program over the years.

Top lessons learned by National Grid:

1. Regulatory buy-in and stakeholder collaboration from the beginning is invaluable to expediting the process.

2. Be prepared to reassess the structure of the program and its components, including adding additional technologies, as a program continues, in order to maximize benefits.

3. Don't underestimate the need for an intense and multi-channel marketing campaign. Assume you will have to contact people multiple times through different touch points.

4. Make sure you are doing enough communications AND the right kind of communications. To avoid making customers suspicious of the utility's motivations, explain the need and background of the program from the beginning, rather than simply selling customers on "saving energy or money."

Non-Wires Alternatives (NWA) include cost-effective energy efficiency measures targeted to reduce peak loads; distributed generation at or near loads; and demand response measures that reduce the peak loads on the electricity grid.

The towns of Tiverton and Little Compton are known for beaches and wineries, not maxed out electrical feeders, but that was exactly the situation facing National Grid in the mid-2000s. These two towns on the eastern shore of Narragansett Bay are disconnected from the rest of the state of Rhode Island, and thus some creative thinking was required for addressing this new problem. Load growth was projected at that point to overload the existing equipment beginning in 2014, especially during the peak hours of hot summer months, so National Grid began looking for a solution. Historically, a decision to build a third feeder from the substation would have been the first choice of the utility, but due to some forward-thinking stakeholders in Rhode Island, including employees at the utility itself, National Grid decided to explore non-wires alternatives (NWA) instead [see sidebar].

Rhode Island's Forward-Thinking Energy Outlook

Back in 2006, Rhode Island passed the *Comprehensive Energy Conservation, Efficiency, and Affordability Act*, which requires distribution utilities to invest in all cost-effective energy efficiency first, before more expensive new supply, in order to create an economics-driven strategy for investing in energy efficiency. "Our organization played a pretty major role in the development and then the successful passing and implementation of Rhode Island's 2006 Comprehensive Energy Act," said Abigail Anthony, Rhode Island Director for Environment Northeast (ENE), a non-profit group tackling environmental challenges in New England and Eastern Canada. Included in the Act was the creation of the Energy Efficiency and Resources Management Council (EERMC), [see sidebar], a diverse stakeholder group responsible for overseeing the development and implementation of the utility's energy efficiency plans and programs. Anthony is one of the 11 appointed members of the Council, which reflects a cross section of interests, providing representation for residential, commercial and industrial, low income, building codes, and environmental interests. Ex-officio, non-voting members represent the electric and natural gas distribution utility, the Office of Energy Resources, and the home heating oil industry.

The **Energy Efficiency & Resource Management Council (EERMC)** in Rhode Island is an appointed group of 11 members representing energy users who serve voluntarily and meet year-round. These members reflect diverse interests and backgrounds, providing representation for residential, commercial and industrial, and low income customers; building codes and environmental interests.

National Grid and the EERMC began working together to create a System Reliability Procurement Plan (SRP) [see sidebar page 5], as part of the Energy Act, in order to reduce energy usage and defer transmission upgrades through non-wires alternatives (including demand response, energy efficiency, and renewable energy). "I think the collaboration with EERMC that went on was vital to getting this off the ground," said Lindsay Foley, Project Manager in the New Products and Services Group at National Grid. "It led to a process whereby the state supports it, National Grid supports it, and stakeholders support it. Collaboration continues as we all work together to try to further prove this concept and maximize the benefits to customers. But having the collaboration from the outset was the important thing – that is when it was really needed."

Discussion Question:

How would you bring your non-utility stakeholder groups up to speed on the reliability challenges the utility is facing?

Anthony of ENE noted that at the beginning, all parties involved needed a better understanding of what system reliability procurement meant and how the utility was going to go about incorporating a new planning and procurement process for grid reliability into their current planning process. National Grid, ENE, and the EERMC's expert consultant team, lead by the Vermont Energy Investment Corporation (VEIC), "worked together to define system reliability procurement,

A **System Reliability Procurement Plan (SRP)** strategically considers an array of customer-sited energy resources and aims to maximize their benefit to the state's energy system. These include NWAs that could be combined with actions to squeeze more out of the existing distribution system. The utility is asked to assess whether an array of such resources could be deployed to avoid dirtier "peaking" generating plants and defer expensive distribution (and potentially transmission) system investments.

Discussion Questions:

How would you identify appropriate opportunities in your service territory?

The **Least Cost Procurement** Law requires distribution utilities to invest in all cost-effective energy efficiency first, before more expensive new supply, creating an economics-driven strategy for investing in energy efficiency.

What would be the kind of discussions that would need to take place in your organization in order to make active consumer participation part of the solution?

mutually understand what was meant by 'non-wires alternatives,' and come up with a set of planning guidelines that would lead to a typical distribution planning process but with non-wires alternatives in mind," said Anthony. "The new process that was created gives comparable consideration to non-wires alternatives, and provides the utility with criteria for determining when such alternatives were appropriate to be deployed instead of the more traditional distribution system upgrade."

Foley agreed that National Grid "has tried to explore non-wires alternatives before but had not found a successful formula for persistent customer participation and sound economics. The ability of customers to participate, particularly mass market customers is important to future potential for non-wires alternatives to provide value. When the state of Rhode Island expressed an interest in furthering that type of research and doing a pilot in it that sort of lit a fire under us and we got going pretty quickly after that."

Once National Grid and its stakeholders had worked everything out, they took the plan back to the Public Utilities Commission (PUC) for approval. On February 27, 2012 the PUC approved National Grid's 2012 System Reliability Procurement Plan (SRP Plan). The Plan is designed to defer the need for a new substation feeder in the Tiverton/Little Compton region by at least four years. The pilot project proposed to conduct a targeted demand reduction program that would reduce customer air conditioning and lighting loads; if the pilot is successful in providing sustained load relief over its planned lifecycle and enrolling 1 megawatt (MW) of load relief by the end of 2017, defer construction until at least 2018 of a new feeder estimated to cost $2.9 million.

National Grid Internal Planning

At the outset, National Grid determined it did not feel confident enough to do an NWA pilot in an area that needed load reductions of greater than 20 percent in order to avoid traditional infrastructure upgrades. Tiverton and Little Compton ended up being the best choice in the Rhode Island service territory for NWA for this and several other reasons. There were about 5,200 customers in the area with a mix of residential and small commercial, and the collective load reduction needed was fairly small (up to one megawatt by the end of 2017). The feeder overloads were generally occurring in the peak hours of summertime, primarily due to increased use of air conditioning. Deferring the new feeder through the use of energy efficiency and demand response would allow the utility to better utilize its capital and construction resources and provide for a more effective use of the overall existing distribution system.

Foley acknowledged that there was initially some skepticism within National Grid that customers could be relied upon to do what was needed. Anthony had similar thoughts: "I think particularly with demand response, and energy efficiency too, there is less certainty that it's going to be there when you need it." According to Foley, "we were pretty hopeful we could be successful in creating the load reductions that are necessary." However, "we have our distribution planners monitoring the situation so that if it gets to a point where they think reliability is going to be an issue, then we call the pilot off and we absolutely install a wires solution. We're not trying to put the reliability of service for these customers in jeopardy at all, and we're ready to pursue a traditional wires solution should that need to happen. We hope it won't."

Once the program was planned and approved, as a four-year pilot program, all parties began to move forward with implementation, and the pilot became operational in 2012.

Kicking Off the First Year

Discussion Questions:

Who are your existing energy efficiency vendors whose roles could be expanded and take on new opportunities? How do they view the chance to integrate demand response into their programs?

National Grid has been providing energy efficiency audits, rebates, and other programs to its customers for some time, and continues to do so. So in 2012, the first year of this pilot, National Grid worked with its existing energy audits contractor, RISE Engineering, to talk to customers in Tiverton and Little Compton about the new program. Brian Kearney of RISE, explains, "We are what's referred to as the lead vendor in Rhode Island to administer residential energy audits for 1 to 4-family properties throughout the state. So we were asked to, while we were out and about in the target area, talk to our energy audit customers about participating in the NWA pilot." RISE offered Wi-Fi thermostats for central air conditioning units and DR lighting ballast for small commercial customers. If customers agreed to participate, a licensed RISE electrician would return to install the unit. "We would come back for programming concerns and things like that, but National Grid communicated with the participants during the DR events connected to the DR technologies installed."

2012 results:

- 29 participants
- 35 thermostats
- 0 window A/C
- 8kW savings
- 20kW projected DR capacity
- 28 total estimated kW

Tim Roughan, National Grid's Director of Energy and Environmental Policy, agreed that "the beauty of the project is that it is all about leveraging what we were already doing for and with our customers in the existing energy efficiency programs, and then adding on additional options." With a trusted installation company on the ground already working with the utility, National Grid was able to seamlessly integrate its new pilot.

Beyond the enhancement of the outreach by its current efficiency vendor, marketing was one of the toughest aspects of the program for National Grid. "The program was originally advertised as a special exclusive opportunity for customers in the area," Foley explained. "Since air conditioning was identified as a major load driver, we pushed Wi-Fi thermostats as the primary means of participation." National Grid sent out direct mail letters to a targeted list of customers who had recently had home energy assessments and also to those customers identified as high users of electricity. When they did not see the anticipated level of participation in the first year, the team regrouped and decided that some tweaks were necessary to both the technology choices and marketing plans for 2013.

[see sidebar for 2012 pilot results]

Customers plug their window air conditioners into the **plug load device**, which controls the flow of electricity to the A/C and wirelessly connects to the Internet. The device's on-board thermostat allows users to remotely set a temperature for their apartment. When the room falls below that temperature, the smart plug shuts the air off, then turns the unit back on if it gets too hot. The device can also be controlled through a utility's DR program.

Learning and Changing in the Second Year

Expanding Technology Options

A major technology addition in year two included adding plug load devices [see sidebar] for window air conditioning units to expand eligibility in the pilot area. "What we found was that the prevalence of central air conditioning was not as high as we originally thought," said Foley. "So that's why in 2013 we added the plug load devices and Wi-Fi thermostats for folks who had window A/C. This immediately expanded and opened up the eligibility pool. By adding the plug

Discussion Questions:

What are the kinds of options that your utility could realistically offer?

Home and business energy assessments are an entry point for offering solutions. How could smart grid enabled capabilities further expand the opportunities?

load devices that would communicate with these Wi-Fi thermostats, all of a sudden people who had window A/Cs could participate and that was huge. We installed almost 150 plug load devices just in 2013. That was 150 people that we would not have even had a chance of recruiting if we hadn't done that. Diversifying the options definitely broadened the participation."

Some customers were uncomfortable signing on to participate in demand response events, even with the ability to opt-out, so National Grid pursued other options to invite greater participation. Along with the efficiency audits, the program also added an Energy Star window A/C purchase rebate, as well as options for recycling older, less efficient A/C units. "We found that even if customers are not interested in participating in the pilot through these enhanced measures, they still are interested in saving money in ways that are comfortable for them," said Foley. "Those home and business energy assessments provide a whole list of recommendations that are personalized based on an assessment of their own home. That's still something. Any savings is better than nothing," she concluded. The combination of integrating both demand response and new energy efficiency options into the audit considerably increased adoption in the pilot.

Targeting the Right People in the Right Way

How much of your marketing budget is devoted to targeted outreach?

As the pilot transitioned into its second year in 2013, Dan Carazo, Lead Program Manager, New Technologies, became the point person for marketing the program. "We were, in my estimation, under financed in the original marketing outreach budget in 2012," said Carazo. "I felt that the future marketing effort needed to be more aggressive and intense and more direct to the slightly over 5,000 customers within the pilot footprint."

Where do you have the potential for program synergy in your organization?

So in 2013 a much more comprehensive and intense marketing campaign was instituted. To start, telemarketing calls were made to everyone that was geographically eligible. Kearney of RISE Engineering noted that National Grid "worked with a telemarketing company called RAM to make outbound phone calls to those customers who are eligible. [RISE] then received those leads on a weekly basis from RAM and made outbound appointments to schedule not only the energy assessments, but also the installation of the thermostat." This allowed RISE to accomplish multiple program goals within one home visit.

What cross-training or contract modifications would be required?

Kearney also explained one of the hurdles he encountered as the person on the ground in Rhode Island: "It's kind of tough to convince the customer that you are going to control their thermostat. We had a few customers that were worried about both security and comfort in their homes. That's understandable, but most people ended up being pretty open to the idea once you explain the functionality of being able to control a thermostat on your Smartphone. I think that is a really huge win." Being able to have an actual conversation with customers helped allay their fears.

Foley admitted that "while we did see a big uptick in participation in 2013 as a result of the more direct and intense marketing campaign, some customers remain concerned about privacy and security. We're hoping to engage those customers and address their issues more fully in 2014."

Discussion Questions:

What face to face events are already scheduled or in development where you could introduce complementary offerings and programs?

In addition to the telemarketing and in-person visits, Carazo and Foley decided to take advantage of a scheduled National Grid community event to reach their target audience in a more personal way. The event was organized by the National Grid energy efficiency (EE) team working in the area. The NWA pilot budget paid for distribution of an invitation to residents from the pilot area, while the EE team paid for media placements and other advertising. Foley said the event "was extremely successful in helping customers understand both what our goals are and what the products are. We had samples and product demos there. They could see and touch the thermostats and ask us questions about them. They could have a casual conversation with us about the pilot."

Carazo concurred. "It was well-attended and proved to be a good opportunity to educate people, answer questions, and interact with them in a community setting. The feeling now is that there is a synergy between our pilot's need to have community contact and the goals of the broader EE team's interests, so we're going to duplicate a similar kind of event in 2014." They were also able to keep costs low by partnering with the EE team and holding the event at a local restaurant.

"Customer outreach and marketing is so much more important here than I think we were first aware of. We did a lot to increase that and to make it better in 2013. We grew smarter in how we did it, and more targeted," concluded Foley.

Carazo added "it was really a combination of the change in marketing strategy, plus the expansion into plug load devices and rebates, that enabled the growth and success in 2013. With our improved offer of no-cost solutions and the increased marketing, we generated an 'interested' response from 13 percent of the eligible pilot customers. Convincing the public to embrace energy savings is challenging work, and we are adapting and exploring new ideas and options to continue to grow the program."

[see sidebar for 2013 pilot results]

2013 results:

- 146 participants
- 99 thermostats
- 119 window A/C
- 91kW savings
- 85kW projected DR capacity
- 176 total estimated kW

What would be realistic adoption rates for a program like this in your service territory?

Refining the Message in the Third Year

You want to do what? Why?

With two years of experience under their belts, the team at National Grid continues to evolve and update the pilot in 2014 based on lessons from 2012 and 2013. The new methods for targeting customers seem to be working, but there is recognition that messages the company is using could be more effective.

Roughan noted a potential sticking point: "These customers may not have heard from us for many years. Unless the lights go out, they don't really care about talking to their utility. So if we are now trying to engage with them to a greater extent, the message is especially important."

Carazo observed many members of the public are skeptical or suspicious as to why utilities are offering rebates and incentives. He says customers have said, "We always wondered why you wanted to give us a free digital thermostat and free smart plug devices and rebates on our energy efficient window air conditioners, etc., not to mention free home energy audits. Why are you doing all this?"

Discussion Questions:

What are other goals and concerns that might be relevant in your service territory (such as reliability during extreme weather events or rising sea levels)?

By listening, the team learned the message of simply saving money did not resonate as well with customers as National Grid originally thought it would. The community was more eager to rally around the idea of avoiding costly infrastructure development and helping their community.

Carazo admitted "in year three we are shifting the emphasis on the messaging very significantly. It turns out that most of our targeted households are not terribly interested in the message of saving energy. Yet in general we spend a large amount of our resources and time trying to talk about that. We are not explaining the underlying rationale and motivations for customers to take action. This is where we've made a major shift."

So in 2014, National Grid is giving customers the whole story, and fully explaining the reason for the NWA pilot in terms of avoided infrastructure, helping out the community as a whole, and inviting them to be a part of the solution. Carazo has now tailored the message to reflect why "the program is good for them. It's good for their community. It's good for everyone. It's good for the whole economy in the area."

Kearney agreed with the change, noting, "One of the things we've been pushing for is to just give more information for the customer about what is going on and why. Using community as a driver to participate seems to be of importance to the customers."

Keeping everyone engaged

A key challenge is retaining past participants and encouraging the right actions. Kearney explained, "we want to make sure that when customers are pulling out their window A/Cs for the spring they're putting in the plugs and making sure that everything is stored and bundled together." He admits, "That's going to be a challenge. Making sure that participants are not just getting a free thermostat and ignoring the event or they don't have their air conditioner on during that time anyway."

How much technical or insider information do consumers need to feel informed? How do you make different levels of detail available for the subset who is interested?

Roughan noted the high level of marketing must be maintained to sustain and grow the program. "It is easy to assume that customers will do whatever we want and need, but that just doesn't happen automatically," he said. "We had to quadruple our marketing budget just to get the success we've had today, and we're going to have to keep that level of marketing in place to keep engaged with people who are in the program, and then also sign up the others."

One method that Carazo has used to communicate in 2014 is a newsletter sent out in February to everyone in the pilot area. This newsletter recapped the success to that point, explained other things National Grid has been doing in Rhode Island to reduce energy costs, and highlighted the benefits that Rhode Islanders have seen in jobs created and money saved. "The state of Rhode Island has had some very significant challenges bouncing back from the economic downturn," said Carazo. "National Grid is impressed with how the residents have become part of this program in their community, so we are changing the way we plan to improve the amount of energy and quality of energy that's available for them. This community is growing, energy demand is growing, and our customers have a role in planning for that."

Lessons Beyond the Pilot

The stakeholders in Rhode Island recognize that while there are unique aspects to this particular pilot, there are relevant lessons that could be applicable to other projects and locations.

#1 Regulatory buy-in and stakeholder collaboration from the beginning is invaluable to expediting the process.

Lindsay Foley, Project Manager at National Grid, felt collaboration among the utility, the PUC, and other outside stakeholders was vital to getting the non-wires alternatives pilot approved and implemented. Abigail Anthony of Environment Northeast concurred that being able to have input from the start helped the process immensely.

#2 Be prepared to reassess the structure of the program and its components, including adding additional technologies, as a program continues, in order to maximize benefits.

Often the initial plan must be tweaked due to limits of the original technology, new technological advances, and additional opportunities that arise during a pilot operation. Remaining flexible and open to new options allows for greater penetration and participation as a program matures.

#3 Don't underestimate the need for an intense and multi-channel marketing campaign. Assume you will have to contact people multiple times through different touch points.

Utility marketing executive, Dan Carazo of National Grid, urged others to embrace similar pilots or programs as quintessential direct marketing efforts. "I would not be relying on media, press, and online as any significant portion of the budget," he said, "because if you're spending a significant amount of your resources in reaching a broader community than the pilot footprint individuals, you're going to make your results murky and you're going to waste resources. If you can mail, email, or call directly into the individual's home or business you're more sure that they're going to get the message."

#4 Make sure you are doing enough communications AND the right kind of communications.

To avoid making customers suspicious of the utility's motivations, explain the need and background of the program from the beginning, rather than simply selling customers on "saving energy or money." By listening to feedback from customers, utilities can customize their message so that it will resonate most strongly with the target audience.

Anthony encouraged National Grid and other utilities to continue to pursue programs such as this. "I think National Grid's pilot will help develop capability to more broadly apply non-wires alternatives as a tool for utilities. The results of the pilot will educate National Grid, other utilities, and stakeholders in methods to engage customers and to focus energy efficiency resources on a particular reliability concern."

Tim Roughan of National Grid admitted that non-wires alternatives "must have fairly specific parameters to avoid infrastructure by using demand response and energy efficiency measures." But, he argued that there is certainly an opportunity for NWA to help utilities with peak management. "The peaks continue to rise, and that's the real larger challenge. The more we get non-wires technologies to manage peak loads on the system, our future supply costs should be moderated to some degree."

Anthony concurred that "if throughout this pilot energy efficiency and demand response can be proven to provide enough sustained load relief to actually defer this distribution upgrade at lower cost, then further opportunities will be open to broaden the application of NWA. It's an opportunity to see if we can successfully change the utility business model and provide appropriate financial incentive, while maintaining the ability of utilities to provide safe, reliable service to customers confidently.

"This is the goal of the pilot," Anthony concluded. "Learn so that we can do more."