

2022 Pilots, Demonstrations and Assessments

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1. Introduction

The Company invests in pilots, demonstrations and assessments to research and develop new measures, solutions, and offerings to expand energy efficiency choices and benefits to customers. The Company has developed a framework to assess and test new innovations for the energy efficiency and active demand response portfolios. The Company has applied this framework in developing the solutions described in the 2023 Annual Plan, including new measures and solutions proposed in prior years' Annual Plans as well as new demonstrations and assessments for 2023.

Process: The Company has developed a standard process by which it tests new ideas and determines if each idea merits a pilot, demonstration, or assessment. There are eight steps in the process. Each idea is first assessed in the **Intake** stage to determine whether the solution can be offered through the energy efficiency or demand reduction programs and whether it is commercially available. The application of the idea, target customers, context of existing programs and offerings, initial identification of market barriers that the idea addresses or faces, and preliminary savings potential are developed in the **Concept** stage. Ideas in these two early stages of review make up the Innovation Pipeline, which continually evolves as new ideas are examined and promising ideas are further vetted and launched into the portfolio.

The Concept stage necessitates preliminary research and analysis of the product, which will inform the **Plan** stage. Key decisions on how to progress with the solution are made during the Plan stage, including whether a pilot, demonstration, or assessment is required to develop the idea and, if so, whether an independent or vendor evaluation approach should be taken. The ideas included in Section 4 are all in the plan stage of development and recommended for a pilot, demonstration, or assessment. The decisions around what type and rigor of testing required for each item will be made with input from the Company Evaluation Measurement & Verification (EM&V) team, EERMC Consultants, and OER.

The planned pilot, demonstration, or assessment will be executed in the **Develop or Demonstrate** stage. Updates will be provided to the stakeholder teams on a quarterly basis.

Once the develop or demonstration stage is complete, the offering will be finalized and launched through the **Qualify, Launch, and Maximize** stages. During these stages, the product will be handed off to the Company's Customer Energy Management (CEM) team, vendor, and implementation teams who will manage the product as part of the Company's energy efficiency portfolio.

During any of the above stages it is possible for the idea to **Exit** the process. There are three possible outcomes of an Exit: The product may be **Retired** if it does not fit into our programs or if there is no viable business case. The product may be **Parked** if the policy or infrastructure required for the idea to be successfully delivered to customers is not available but may be in the near term. Finally, the product may be **Referred** directly to the programs if the idea is expected to produce reliable savings, fits readily into an existing program or measure, and the receiving program has the capability to finalize savings and incentives.

Innovation Pipeline: The process outlined above is designed to bring in as many ideas as possible and quickly determine to what extent the Company should invest resources in developing each idea. Ideas for new product inclusion come from a wide range of sources, including but not limited to: customers, vendors, contractors, supply-chain actors, industry researchers, and other program administrators. The pilots, demonstrations, and assessments discussed here have already been identified as ideas that should be further explored and tested, but ideas included in the Innovation Pipeline may emerge for additional, immediate analysis over the course of 2023. To ensure those emerging ideas can be quickly and efficiently vetted, the Company has set aside budget to fund approximately three ideas in each sector. Promising ideas may progress to a demonstration or as a program measure. Historically, the Company typically waited for approval of the Annual Plan before proceeding with new pilots and demonstrations. In 2023, although the Company is proposing a smaller overall budget for pilots, demonstrations, and assessments, a larger Innovation Pipeline budget has been proposed. Furthermore, the Company intends to leverage the Innovation Pipeline not only for assessments but for in-year pilots and demonstrations. This will allow the Company to act with greater urgency and in a more agile manner moving forward. Stakeholders will be notified prior and allowed to vet projects and provide input before the Company proceeds with pilots, demonstrations, or assessments that the Company considers including in the Innovation Pipeline.

Evaluation: It is to be expected that each idea passing through this process will have a different set of requirements and research questions that must be answered prior to qualification and inclusion in programs. Depending on the characteristics of the idea, the expected program delivery pathway, and the nature of the uncertainty around the idea, the Company plans for different approaches to evaluate the idea during a pilot, demonstration, or assessment. For example, a low touch residential product that we expect to deliver through an upstream program requires a very different analysis than a high touch industrial measure with few potential customers across the state.

The Customer Energy Management Growth and Development team will recommend a research plan for each pilot, demonstration, or assessment approved through the planning process. The

team will solicit input from the Company’s EM&V team, OER, and EERMC consultants on whether the research requirements can be best met through an independent evaluation, a vendor evaluation, or an internal review. These approaches are further discussed in the next section.

2. Definitions

The Company, using guidance from the PUC, has outlined three separate pathways that may be used to investigate ideas in the Innovation Pipeline: Pilot, Demonstration, or Assessment. It is assumed that any idea selected for a Pilot, Demonstration, or Assessment has been vetted through the Intake and Concept stages outlined above. Ideas are vetted for fit and feasibility, commercial availability, and documented preliminary recommendations of characteristics like target customer, market barriers, magnitude of potential savings, and delivery pathway. A pipeline idea will only be recommended as a pilot, demonstration, or assessment if there are clearly articulated research goals that cannot be answered without a concerted research effort.

The Company has three research pathways that can be applied during a pilot, demonstration, or assessment: Independent Evaluation (highest rigor), Vendor Evaluation, or Internal Review (lowest rigor). The research pathway will be chosen depending on the needs and potential of a Pilot, Demonstration, or Assessment and consider the uncertainty of the savings, scope of the offering, market barriers, and whether the technology is considered under a pilot, demonstration, or assessment. The research pathways and evaluation pathways are summarized in Table 1 and defined further below.

	Pilot	Demonstration	Assessment
Defining Characteristics	<ul style="list-style-type: none"> • May result in independent program • Long-term, comprehensive engagement required to test and develop offering • Market capabilities may need to be developed 	<ul style="list-style-type: none"> • Technology requires information gathering and field installations 	<ul style="list-style-type: none"> • Technology addresses program need that can't be met with other, more certain solutions • Technology does not have a robust basis for energy savings

Cost effective savings information	Unknown or limited	Estimated savings	Unknown or limited
Evaluation Options*	Vendor or Independent	Vendor or Independent	Vendor, Independent, or Internal Review
Savings contribution to shareholder incentive	No	Yes	No
Cost recovery from SBC	Yes	Yes	Yes

* Each evaluation option will include input from EERMC and OER. Evaluation option selection based on factors such as uncertainty of savings, scope of offering, and whether technology is considered a pilot, demonstration, or assessment

Pilots

In 2019, the Company redefined what it considers a pilot in accordance with the Docket No. 4600-A PUC Guidance Document. Per the Guidance Document, “A pilot is a small scale, targeted program that is limited in scope, time, and spending and is designed to test the feasibility of a future program or rate design. It is incumbent upon the proponent of a pilot to define these limits in a proposal for PUC review. Ideally, a pilot can provide net benefits and achieve goals, but the primary design and value of a pilot is to test rather than to achieve.”¹

Pilots are designed to explore technologies and approaches to energy management not included in the core energy efficiency programs (Residential, Commercial and Industrial (C&I), and Multifamily) and that could potentially become a new, standalone program.

Pilots enable the Company to test technologies, new energy management strategies, customer adoption, workforce adoption, and cost effectiveness of emerging and new technologies. While pilots are designed to test standalone programs, pilot results may conclude that a standalone program is not recommended or that certain aspects of the pilot should be offered within existing programs. It is likely that pilots will require a long-term commitment and broader set of stakeholder input, given the scope of adding a new core program to the Company portfolio.

¹ Docket No. 4600-A PUC Guidance Document, October 27, 2017. Section V. Pilots.

Savings associated with Pilots will not contribute to shareholder incentives. Pilots may be evaluated with either an independent or a vendor evaluation.

A pilot is likely to be recommended when a solution:

- Meets the fit and feasibility criteria of the Intake stage.
- Is clearly defined in the Concept stage, including savings and potential estimates.
- Is unique and robust enough to operate as a standalone program.
- Requires comprehensive, long-term engagement to determine the benefits and structure of a potential standalone program.
- May require creation of new market capabilities for program success.

Demonstrations

For actions in this Plan that do not fall under the Docket 4600-A definition of pilots, the Company proposes the following definitions for demonstrations and assessments: Where a pilot will test the feasibility of a new program outside of the existing core programs, a demonstration will test the feasibility of a new product or offering for inclusion in existing programs. It is generally expected that demonstrations will be less time and resource intensive than pilots, since generally there is greater certainty around a narrow, incremental idea added to a program rather than a totally new set of offerings. Savings associated with demonstration projects may contribute to shareholder incentives. Demonstrations may be evaluated with either an independent or a vendor evaluation.

A demonstration is likely to be recommended when a solution:

- Meets the fit and feasibility criteria of the Intake stage.
- Is clearly defined in the Concept stage, including savings and potential estimates.
- May require information-gathering and field installations.
- Offers a robust basis for energy savings.

Assessments

Assessments will be deployed for solutions that address a particular gap or program need but have significant uncertainty around the effectiveness or potential of the solution to realize savings. Because of the uncertainty, assessments will not include field demonstrations or customer installations. Instead, assessments will focus on information gathering to equip Company staff to make a more informed decision of whether and how to proceed with the idea. It is possible that an assessment could recommend further demonstration of the idea or determine the solution should exit the review process. Savings associated with assessments may

not contribute to shareholder incentives. Assessments may be evaluated with an independent evaluation, vendor evaluation, or internal review.

An assessment is likely to be recommended when a solution:

- Has questions of fit and feasibility in the Intake stage.
- Addresses a program need that cannot be met with other, more certain options.
- Lacks a robust basis for energy savings.

The Company employs three methods for conducting pilots, demonstration, and assessment evaluations, described below.

Independent evaluations

Independent evaluations apply the greatest level of rigor to the pilot, demonstration, or assessment and require broad coordination between teams. The Company participates in the planning and review process, but the evaluation itself is subject to the procurement process, oversight, and methods outlined in Attachment 3. The third-party evaluator develops the evaluation plan prior to customer installations to ensure the number and condition of customer installations are appropriately rigorous. The evaluator does not necessarily perform customer installations but is involved to the extent required to ensure appropriate metering and customer feedback needed for the final analysis.

An independent evaluation is likely to be recommended if a solution:

- Is expected to contribute significant savings towards program savings goals.
- Must consider a population-level analysis, as opposed to site-specific analysis, to answer research questions.
- Poses policy or baseline questions that should be addressed through the evaluation framework.

Vendor evaluations

Vendor evaluations are managed by internal staff, with a single vendor completing all tasks. Vendor evaluations may be applied to a pilot, demonstration, or assessment. This evaluation pathway engages vendors to provide initial research on market readiness, market barriers, customer interest, and work in other territories, before they assess, install, and analyze the results of the technology. The vendor must not have a financial interest in the outcome of the pilot, demonstration, or assessment and must have the necessary engineering, research, or M&V experience to evaluate the idea in an unbiased manner. The vendor ultimately recommends whether and how to integrate the technology into the programs and presents key information to inform deployment of the offering, such as target customers, market barriers,

savings methodology, and best practices for installations and commissioning. The key differences between a vendor evaluator and independent evaluator relate to oversight and coordination with the RI EM&V framework described in Attachment 3.

A vendor evaluation is likely to be recommended if a solution:

- Is not expected to contribute significant program savings, either because it is a niche application or the per-project savings are relatively small.
- Is expected to be delivered through a custom pathway with site specific information inputs available during program delivery

Internal reviews

Internal reviews may use internal resources to explore a product through an Assessment. The Company typically relies on external resources for pilots and demonstrations in order to leverage outside expertise and maintain the integrity of the savings calculations. Internal reviews focus on key questions of uncertainty or policy related to technologies under investigation. An internal review can draw on available external resources and data, but will perform the research, analysis, and recommendations internally.

An internal review is likely to be recommended if:

- The solution is examined as an Assessment.
- Research questions can be answered without customer installations.
- Research can be delivered with internal resources and external resources available without undertaking a procurement process (such as ESource).

3. Summary of Pilots, Demonstrations and Assessments

The following pilots, demonstrations, and assessments are proposed for 2023. Savings estimates are approximate and only include primary fuel savings for the target customer population.

Table 2. Electric Commercial and Industrial Demonstrations and Assessments							
Classification	Fuel	Name	C&I Program	Duration	Budget*	Savings Est.	Evaluation
Demonstrations							
Lighting	Dual	Network Lighting Controls Plus HVAC (NLC+)	C&I Retrofit	2020-2023	\$124,841	1.44 kWh/SF	Vendor

HVAC	Dual	Air Curtains	C&I Retrofit	2022 - 2023	\$97,389	14 MWh per install	Vendor
	Dual	Automated RTU Optimization	Allocated	2022-2023	\$18,633	115 kWh/ton cooling	Vendor
Innovation Pipeline**	Elec.	Innovative Electric	Allocated	2023	\$62,500	To be estimated	TBD
Assessments							
Active Demand Response	Elec.	Building Flexibility through DR	C&I Retrofit	2022 - 2023	\$24,844	Unknown	Internal Review
HVAC	Elec.	Rightsizing RTUs	Allocated	2022 - 2023	\$12,422	Unknown	Internal Review
Total Electric C&I Demonstration					\$303,363		
Total Electric C&I Assessments					\$37,266		

Table 3. Gas Commercial and Industrial Pilots, Demonstrations and Assessments							
Classification	Fuel	Name	C&I Programs	Duration	Budget*	2023 Savings Est. (Therms)	Evaluation
Pilot							
Active Demand Response	Gas	Gas Demand Response Pilot	N/A	2022-2023	\$268,042	27,520	Vendor
Demonstrations							
HVAC	Dual	Network Lighting Controls Plus HVAC (NLC+)	C&I Retrofit	2020-2023	\$61,489	0.012/sf	Vendor
	Dual	Air Curtains	C&I Retrofit	2022-2023	\$97,389	252 MMBtu per install	Vendor
	Dual	Automated RTU Optimization	Allocated	2022-2023	\$18,633	10-20%	Independent
Innovation Pipeline**	Gas	Innovative Gas	Allocated	2023	\$31,055	To be estimated	TBD
Assessments							
HVAC	Dual	Rightsizing RTUs	Allocated	2022-2023	\$12,422	Unknown	Internal Review
Total Gas C&I Pilots					\$268,042		
Total Gas C&I Demonstrations					\$208,566		
Total Gas C&I Assessments					\$12,422		

3. Summary of Pilots, Demonstrations and Assessments

Table 4. Electric Residential Demonstrations and Assessments							
Classification	Fuel	Name	Residential Program	Duration	Budget*	Savings Estimation	Evaluation
Demonstration							
HVAC	Dual	New Air Sealing and Insulation Products	EnergyWise	2021-2023	\$24,844	0.05 kWh/sqft	Vendor
**Innovation Pipeline	Elec	Innovation Electric	Allocated	2023	\$56,094	To be estimated	TBD
Assessments							
Total Electric Residential Demonstration					\$80,938		
Total Electric Residential Assessments					\$0		

Table 5. Gas Residential Demonstrations and Assessments							
Classification	Fuel	Name	Residential Program	Duration	Budget*	Savings Est.	Evaluation
Demonstrations							
HVAC	Dual	New Air Sealing and Insulation Products	EnergyWise	2021-2023	\$74,532	0.1/sqft	Vendor
Innovation Pipeline**	Gas	Innovation Gas	Allocated	2023	\$31,055	To be estimated	TBD
Total Gas Residential Demonstration					\$105,587		

Note:

*Budgets indicated in this table include, evaluation, incentives, program administration, sales, marketing, technical assistance and training (if applicable). Pilots and Assessments budgets are not included in Performance Incentive calculations.

3. Summary of Pilots, Demonstrations and Assessments

** Innovation budgets are for demonstrations that present opportunities during the plan term. Budget and savings estimates will be developed when the demonstrations are identified.

4. Commercial and Industrial Pilots, Demonstrations, and Assessments

4.1 Commercial and Industrial Pilots

This section summarizes each pilot and describes the way it advances, detracts, or remains neutral on achieving the Docket 4600 goals for the electric and gas system.

a. Gas Demand Response

Pilot Stage: Develop or Demonstrate

Innovation Overview: With gas DR, the Company will test supply and/or distribution system benefits, reduction of gas system peak demand via a reduction in overall natural gas consumption, customer adoption of gas DR and incentive levels to drive participation. Testing Gas DR will allow the Company to understand the impact on gas systems and whether RI Energy's role in the market has influenced market adoption using a follow-up study to the 2021 AESC Study to look more closely at potential Peak Day winter gas costs.

The Company plans to target 40-50 dekatherms (DTh) of hourly peak reduction in the winter of 2022/23, with the below stated DR offerings. The Company continues to expect that the majority of these peak reduction savings will come from customers participating in the full day Extended Demand Response (EDR) pilot offering, with the remainder from customers participating in Peak Period Gas Demand Response (PPDR) pilot offering. These demand reduction pilot offerings are described in detail below. The above stated target is dependent on enrollment levels and setting an appropriate incentive level to drive participation.

The Company has been utilizing electric Demand Response (DR) to address grid constraints and help provide reliable service to our customers for a number of years. During the winter of 2018/19, the Company launched a Peak Period Gas Demand Response (PPDR) pilot offering, which incentivizes customers to shift their usage outside of the peak-period of the gas system

(6AM-9AM from November 1st to March 31st). This pilot targeted commercial and industrial customers who have intra-day flexibility of their natural gas usage. Customers in this pilot would be able to provide their demand reduction via either fuel-switching or demand control (e.g. thermostat setback). In 2019/20, the company added the Expanded Demand Response (EDR) offering, which targeted large customers that could achieve 24-hour gas reductions, primarily with back-up heating. At the close of the 2021/22 season, the company had no participants in the PPDR pilot offering and two in the EDR pilot offering.

Customer segment addressed: The gas DR pilot offerings are focused on large, firm commercial and industrial customers, specifically those with gas equipment that can be curtailed without creating an unsafe environment. The goal of the project is to test the following:

- Are customers interested in participating in an incentivized Gas Demand Response program?
- If so, what are the acceptable price point values by customer business type and equipment type?
- What are the supply and/or distribution system benefits?
- What is the scalability of the program?
- Can customers that temporarily shift their gas usage outside of peak hours maintain some daily gas usage reductions?

Pilot Delivery: The gas DR pilot involves the installation of data recording hardware that provides granular usage data for participating customers. Data from the pilot will be evaluated each year.

Peak-Period Demand Response (PPDR): For winter 2022/23, the Company expects to maintain participation in PPDR. Many pilot parameters will remain similar to the terms of the pilot offering launched during the winter of 2020/21:

- RI Energy can only call a limited number of event during a given winter.
- Customer participation in this pilot offering and the called events will be compensated via direct incentive payments, not in the form of a reduced rate.
- While enrolled customer participation in called events will be mandatory, this participation will be enforced through contractual structures and financial incentives– National Grid will not maintain a unilateral right to disrupt gas service to participating customers during called events.

Incentive Structure: As was the case in prior years, customer compensation for participation in the PPDR pilot offering will be based on a combination of ‘reservation’ and ‘energy’ payments. Each of these rates will be standard offers to all customers, though customer earning opportunity will vary based on the volume of peak hour Dth reduction that each customer can commit to and deliver. The Company will continue to utilize a rolling performance rating that measures customer reliability and limits payments to non-performing resources.

Extended Demand Response (EDR):

The basic parameters of this pilot offering match those of the PPDR pilot offering. However, in the EDR offering, the duration of each event would be 24 hours (10AM on day 1 until 10AM on day 2, Nov. 1st through March 31st). Customers in the EDR pilot offering are expected to achieve their committed demand reductions via fuel-switching. Limitations will also be put in place that will limit the number of consecutive days on which any individual customer could be called to participate in the EDR pilot offering. National Grid will have the right to call up to 6 events during the winter at the stated incentive rate.

The EDR pilot offering will provide incentives for customers who can eliminate their usage on a given day by switching to an alternative source (most typically a delivered fuel option) to meet their energy needs.

Incentive Structure: Customer compensation for participation in the EDR pilot offering will be based on the same combination of ‘reservation’ and ‘energy’ payments outlined in the PPDR pilot offering description, set at different levels for each pilot offering. Each of these rates will be standard offers to all customers, though customer earnings opportunity will vary based on the volume of peak hour DTh reduction that each customer can commit to and deliver. As with the PPDR pilot offering, the EDR ‘reservation’ incentives will be subject to a performance rating based on a measurement of customer reliability.

Evaluation: Vendor Evaluation

Changes in 2023: The Gas Peak Period Demand Response and Extended Demand Response pilot offerings will continue in the winter of 2022/23. The Company plans to retain current levels of enrollment in the EDR offering and the PPDR pilot offering. The addition of the previously mentioned performance rating will ensure that incentives paid by the company are aligned with the delivered reliability of customer resources.

Table 6: Docket 4600 Goals - Gas Demand Response	
4600 Goals for Gas distribution System	Advances/Detracts/Neutral

Provide reliable, safe, clean, and affordable energy to Rhode Island customers over the long term (this applies to all energy use, not just regulated fuels).	Advances. DR has the potential for many value streams, such as alleviating local distribution system constraints, increasing system flexibility, potentially delaying infrastructure reinforcement projects, and providing a revenue stream for participants.
Strengthen the Rhode Island economy, support economic competitiveness, retain and create jobs by optimizing the benefits of a modern grid and attaining appropriate rate design structures.	Advances. DR has the potential for many value streams, such as alleviating local distribution system constraints, increasing system flexibility, potentially delaying infrastructure reinforcement projects, and providing a revenue stream for participants that would support economic growth.
Address the challenge of climate change and other forms of pollution.	Advances. While demand response does not directly address climate change, the additional insight into usage due to the increased data resolution provided to participants may create an opportunity for additional energy efficiency projects. Additionally, there may be a reduction in carbon due to participation in DR events. Providing alternatives to gas infrastructure may also provide indirect benefits for combatting climate change.
Prioritize and facilitate increasing customer investment in their facilities (efficiency, distributed generation, storage, responsive demand, and the electrification of vehicles and heating) where that investment provides recognizable net benefits.	Neutral – this pilot is neutral on this goal
Appropriately compensate distributed energy resources for the value they provide to the gas system, customers, and society.	Neutral – this pilot is neutral on this goal
Appropriately charge customers for the cost they impose on the grid.	Neutral – this pilot is neutral on this goal
Appropriately compensate the distribution utility for the services it provides.	Neutral – this pilot is neutral on this goal
Align distribution utility, customer, and policy objectives and interests through the regulatory framework, including rate design, cost recovery, and incentive.	Advances. Gas DR pilot advances this goal by putting incentives towards peak reduction on the gas distribution network that may help to achieve the GHG reduction goals of the Resilient Rhode Island Act of 2014 and the Rhode Island GHG Emissions Reduction Plan of 2016. There is also an alignment in the sense that customer participation could affect system planning, which could have a larger financial impact for all customers.

4. Commercial and Industrial Pilots, Demonstrations, and Assessments

	In this way, participants are incentivized for providing the behavior that matches the goals of the company.
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4.2 Commercial and Industrial Demonstrations

The Company is prioritizing one new demonstration in 2023, as well as the continuation of five demonstrations included in prior-year plans.

a. Network Lighting Controls Plus HVAC

Demonstration Stage: Develop or Demonstrate

Innovation Overview: Network Lighting Control Plus HVAC (NLC+) go beyond traditional advanced lighting controls. NLC+ systems have the hardware and software capabilities to act as a simple, stand-alone energy management system or to interface seamlessly with more sophisticated existing building systems. In either case, local, granular occupancy, and other sensing data from the NLC+ system facilitates additional savings from HVAC, plug loads, and complete energy management. This technology could be implemented as a retrofit to existing buildings, or as a component of a comprehensive new construction project. The most significant challenge in realizing savings for these projects is the integration of HVAC controls, the commissioning of the system, and conveying the cumulative value of this approach with customers. A successful program offering must support the commissioning process.

Target Customer and Program Fit: Initial customer segments to be considered for this analysis are offices, schools/universities, industrial, retail and hospitals.

Prior Efforts: The NCL+ demonstration was initiated in 2020. Phase I of the research, which concluded in July 2020, included a market readiness assessment for this technology. Twenty-two interviews were completed with a collection of lighting and HVAC industry representatives, customers, and internal program staff. Interviews identified barriers and opportunities for NLC+ in Rhode Island.

Phase II of the research began in 2020 and includes customer installations and M&V efforts. Phase II will continue into 2022 due to the longer than anticipated time required to recruit customers for the demonstration and long lead times of the lighting projects. At the time of writing, one project is expected to move forward, and additional leads are being processed.

Demonstration Delivery: The demonstration is focused on the potential of integrating lighting and HVAC controls through the networked lighting controls system. The most significant barriers

identified in the Phase I research were related to the integration of the two systems, including bridging the siloed lighting and HVAC trades. Phase II of the demonstration will include up to four customer installations. The goal of the installation will be to investigate the energy and non-energy benefits of projects, pain points in commissioning the projects, and knowledge gaps that may hinder fully realizing expected HVAC savings. Finally, Phase II will recommend if and how this technology can be included in the energy efficiency programs.

Evaluation: Vendor evaluation

b. Air Curtains

Demonstration Stage: Concept

Innovation Overview: Air Curtains are placed over doorways between two differently conditioned environments to limit heat transfer between the two spaces, thus reducing the heating/cooling load needed to maintain their separate environments. They are an effective alternative to plastic vinyl strip curtains and high speed roll up doors, particularly in areas of heavy human/vehicle traffic. Air curtains consist of a fan mounted over a doorway which when turned on, creates a seamless air barrier over the open doorway. This serves a dual purpose of preventing mixture of air between the separated spaces and entry of dust and other contaminants.

Target Customer and Program Fit: This technology will be a benefit to industrial customers with large overhead doors separating indoor and outdoor spaces where there is high foot or vehicular traffic, such as loading docks or warehouses. There is potential that this technology can also benefit smaller industrial and commercial customers with areas of high foot traffic, such as small retail businesses or restaurants. In addition, this technology has been utilized in refrigeration applications, and could be utilized in large industrial refrigerated warehouses and smaller coolers with high foot traffic.

Prior Efforts: No prior efforts, in Rhode Island, have been undertaken to include air curtains as a prescriptive measure. There is a limited history of air curtains being included in prior custom projects.

Demonstration Delivery: The Company would demonstrate the effectiveness of air curtains in a few different scenarios, as there are several applications of air curtains. Primarily, demonstrating capability in a large industrial setting separating a conditioned indoor space and an unconditioned outdoor space, a small commercial application separating a conditioned indoor space and an unconditioned outdoor space, and refrigerated spaces both large and small.

Evaluation: Vendor Evaluation

c. Automated RTU Optimization

Demonstration Stage: Concept

Innovation Overview: The Company is looking for new ways for customers to improve control of their HVAC systems to realize energy savings and improve comfort. One such approach is automated systems optimization, in which software analyzes and modifies the control of equipment automatically. This demonstration project will examine the SwarmStat™ product, which can be deployed for smaller customers with 2 or more RTUs controlled by smart thermostats and no existing EMS. This product is of particular interest since it allows simple, enhanced controls for small to medium customers with minimal upfront investment.

Target Customer and Program Fit: Customers with 4+ RTUs and no building automation or energy management system.

Prior Efforts: In 2022, the Company began recruitment for this Demonstration. No efforts had been made prior to that.

Demonstration Delivery: The Company will work with an independent evaluator to assess gas and electric savings realized by automated optimization software. The Company expects the demonstration to include a pre/post analysis of energy consumption for 10-15 customers, which will be used to develop deemed savings estimates. To date, recruitment has been challenging. At the time of this writing, just two customers have signed up to participate. The Company is continuing to recruit additional customers, however, without at least 10-15 customers, there will be insufficient data to develop a deemed savings estimate.

Evaluation: Independent Evaluation

d. Gas Leak Survey and Repair

Demonstration Stage: Develop or Demonstrate

Innovation Overview: Facilities with large natural gas use often have extensive internal gas infrastructure beyond the utility meter, including pipes and valves. Over time, degradation in valves, fittings, and other gas infrastructure components can occur, resulting in natural gas being leaked into the ambient environment. These leaks represent both a waste of energy, as the leaked gas is purchased by the customer but not put to use, and a direct negative environmental impact as the methane in natural gas is a potent greenhouse gas.

This demonstration intends to investigate the program potential of providing customers with gas leak detection and repair services. Vendors will survey customers' internal gas infrastructure to identify and quantify leaks, which will be repaired by vendors or internal customer labor, reducing overall customer gas purchase.

Target Customer and Program Fit: Initial customer segments to be considered for this analysis are large natural gas users with significant internal gas infrastructure (for example, large valves typically in the 6" or larger size range), such as industrial manufacturing facilities.

Prior Efforts: The Gas Leak Survey demonstration was initiated in 2022. The Company has received anecdotal information regarding the costs and benefits of similar efforts carried out in other territories. At the time of this writing, an initial leak survey vendor has been identified, and the Company is working to identify customers whose facilities are good fits for this demonstration, as well as determining technical requirements and financial support levels.

Demonstration Delivery: The demonstration is anticipated to include two to four customer sites, depending on cost and customer interest. The goal of the demonstration is to investigate the:

- Parameters for determining appropriate customer sites.
- Costs to conduct the survey and complete fixes.
- Energy and non-energy benefits of projects, including measure persistence.
- Challenges and knowledge gaps in conducting the survey and making fixes identified.
- Knowledge gaps that may hinder fully realizing expected natural gas savings.

The most significant barriers anticipated are:

- Coordination with the identified initial leak survey vendor.
- Identification of qualified leak survey vendors in the local area.

Evaluation: Vendor evaluation

4.3 Commercial and Industrial Assessments

The Company is exploring new C&I assessments, however, at the time of this writing, no new assessments have been proposed for 2023.

a. Software and Hardware Solutions for Rightsizing RTUs

Demonstration Stage: Concept

Innovation Overview: Along with installing more efficient HVAC equipment customers can avoid energy consumption over time by rightsizing their equipment at the time of design or specification. Equipment is often oversized to ensure occupant comfort, but the same levels of comfort can be provided with appropriately sized and controlled equipment.

This assessment will explore developing an approach for identifying rightsizing opportunities and estimating incremental savings through rightsizing equipment. Two potential opportunities are rightsizing when an older oversized system is replaced or switching from whole-building heating to spot heating. Further, the Company will explore how software can be used to encourage rightsizing, either by more effective control of smaller equipment or by establishing that existing equipment is oversized.

Target Customer and Program Fit: All commercial and industrial customers

Prior Efforts: An effort was begun in 2022 to systematically consider rightsizing in the C&I sector. The residential programs have offered downsizing HVAC system incentives for some time.

Assessment Delivery: The assessment will establish a protocol for when and how rightsizing should be considered. This will include discussions with market actors to understand how equipment is typically sized and barriers to more appropriate sizing for new installations and for time of replacement installations. The Company will include discussions with the EM&V team about savings and baseline documentation. The assessment will make recommendations on whether rightsizing should be considered within the prescriptive HVAC offerings or only on a custom basis.

Evaluation: Internal Review

5. Residential Pilots, Demonstrations, and Assessments

5.1 Residential Pilots

The Company does not propose any new or continued Residential Pilots for 2023.

5.2 Residential Demonstrations

The Company plans to continue one demonstration for the Residential sector in 2023.

a. New Air Sealing and Insulation Products

Demonstration Stage: Develop or Demonstrate

Innovation Overview: Several new technologies claim to improve infiltration and insulation of homes. The two technologies of focus in this demonstration are sprayed-in air-sealing and injection foam for residential and multifamily buildings.

Vendors such as AeroBarrier operate in both new construction and renovations, offering a waterborne acrylic sealing fluid, which is sprayed into homes, covering surfaces and filling gaps up to one-quarter inch in width. AeroBarrier performs this service alongside a blower door test to monitor leakage as the spray seals gaps.

Building Envelope Materials offers a polyurethane foam that can be injected into building cavities to improve R-value. The conventional limitation for this technology has been the risk of toxicity and hazardous particulates, but the product manufacturer believes it has solved this problem.

Target Customer and Program Fit: Both technologies have the potential to significantly improve the heating and cooling efficiency of under-insulated buildings. Target customers are single-family homes, particularly those that are under-insulated.

Demonstration Delivery: The Company will work with the residential implementation vendor to identify several residential single-family sites with a need for improved insulation and will work with the two vendors to deploy their systems at those sites. Six homes in total will participate, two each with the individual technologies and two with both deployed.

Prior Efforts: The demonstration began in 2021. The Company screened the processes for residential customer cost and benefit and determined applicable customer characteristics. The Company also interviewed vendors to determine pricing and feasibility, scoping out project deliverables; the demonstration will continue in 2023.

Evaluation: Vendor Evaluation

5.3 Residential Assessments

The company is not planning any new or continued Residential Assessments for 2023.