Robert J. Humm
Senior Counsel

March 1, 2019

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

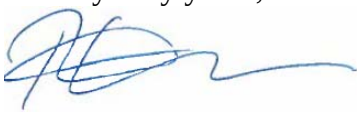
RE: Docket 4916 - National Grid's Proposed FY 2020 Gas Infrastructure, Safety, and Reliability Plan
Responses to PUC Data Requests – Set 3

Dear Ms. Massaro:

Enclosed please find 10 copies of National Grid's[1] responses to the Rhode Island Public Utilities Commission's (PUC) Third Set of Data Requests in the above-referenced matter.

Thank you for your attention to this matter. If you have any questions, please contact me at 401-784-7415.

Very truly yours,



Robert J. Humm

Enclosures

cc: Christy Hetherington, Esq.
Al Mancini, Division
John Bell, Division
Rod Walker, Division

[1] The Narragansett Electric Company d/b/a National Grid (National Grid or the Company).

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PUC 3-1

Response:

On Bates 12 of the FY2020 Gas ISR Plan, the Company reported that it has abandoned a total of 384 miles of LPP, which has contributed to an estimated reduction of 1,075 gas leaks.

a) What is the average avoided repair cost per leak?
b) Can you quantify the average avoided carbon and methane emissions per leak?
c) Can you estimate the average avoided risk or damage cost per leak?

Response:

a) The fully loaded 12-month rolling unit cost is $10,325.00 per leak repair.

b) The Company does not measure carbon and methane emissions on a per leak basis; however, for the purposes of this response, the Company estimated the value based on the U.S. Environmental Protection Agency (EPA) per mile emission factors established by EPA at 40 C.F.R. Part 98, Subpart W. Based on this methodology, which uses the change in pipe material inventory to calculate the change in emissions, the Company estimates that 9,368 metric tons of carbon dioxide equivalent is reduced by replacing 384 miles of leak-prone pipe with plastic pipe.

c) The Company's Distribution Integrity Management Plan requires a risk-based assessment of the distribution system to identify threats to the system in seven categories, which are corrosion, natural forces, excavation, damage, other outside force damage, material and weld failure, equipment failure or malfunction, and inappropriate operation. Implementation of this plan contributed to the abandonment of 384 miles of leak-prone pipe, which mitigated the risks associated with these threats. The Company does not have an existing methodology for quantifying the average avoided risk or damage cost associated with these abandonment miles or the associated leaks.

PUC 3-2

Response:

On Bates 13-16 of the FY2020 Gas ISR Plan, the Company described the Southern Rhode Island project.

a. What, if any, are the alternatives to this project?
b. Why is this preferred alternative?
c. What are the risks and how will they be mitigated?
d. What are the costs and benefits of this project to the gas system, gas customers, economic development, environmental, etc?
e. Can any of the costs and benefits be quantified? If so, please provide.

Response:

a. The Company identified project alternatives and route alternatives to this project. The Company evaluated five project alternatives, including (1) No-Build Alternative; (2) Exeter Take Station Alternative; (3) New Main from Providence to Warwick Alternative; (4) New Main from Westerly to Kenyon Alternative; and (5) the Project Route, which is a new main from Warwick to East Greenwich. These project alternatives are described in Docket No. 4916, Attachment PUC 1-1-2(b), pages 30 to 34. The Company evaluated six alternate routes, including (1) Reuse Existing Route, (2) Eastern Route – Alternative 1, (3) Eastern Route – Alternative 2, (4) Western Route – Alternative 1, (5) Western Route – Alternative 2, and (6) Western Route – Alternative 3. These route alternatives are described in Docket No. 4916, Attachment PUC 1-1-2(b), pages 34 to 39.

b. As detailed in Docket No. 4916, Attachment PUC 1-1-2(b), pages 30-39, the Company selected the project because it meets the need identified by the forecasted growth in the area in the most cost-effective manner and the shortest period of time, thus allowing the Company to provide reliable gas to its customers within the timeframe that the additional capacity is needed.

c. The Company determined that there is a risk to being able to maintain continuous service to all customers in southern Rhode Island. The southern Rhode Island gas system depends on the Exeter LNG facility for pressure support for average daily temperatures of 30 degrees Fahrenheit and colder. The Exeter LNG facility is forecast to exceed the redundant vaporization capacity of 750 dekatherms per hour by 2019. When hourly flow requirements exceed the redundant vaporization capacity and there is an operational issue limiting the hourly vaporization capacity, there is a risk that approximately 3,750 customers will have below minimum pressures and could lose service. If the project is

not completed as proposed, the Company would mitigate this risk by meeting the flow requirements and exceeding the hourly vaporization capacity. The project also reduces the risk to continuous service posed by third-party damage to the existing 12-inch 99 pounds per square inch gauge (psig) distribution main. For further details, please refer to Docket No. 4916, Attachment PUC 1-1-2(b), pages 15-17, 31-32.

d. This project provides multiple benefits. First and foremost, the project provides a second distribution main that increases the gas capacity in the southern Rhode Island area to enable customers to choose natural gas service when building or expanding residential, commercial, or industrial operations. The second distribution main also improves reliability by providing redundancy in the southern Rhode Island gas system. In the absence of this project, the Company may need to impose a moratorium on new gas services or the expansion of existing gas services as early as 2022/23, meaning that new and existing residential, commercial, and industrial customers in the southern Rhode Island area would have to opt for other sources of heat such as oil or electricity for any new or expanded construction. A moratorium also would not allow customers to convert from oil to gas service. Consequently, economic development will be hindered if residential and business developments do not have access to lower-cost natural gas for new or expanded construction. Further, the carbon dioxide (CO_2) emission reductions achieved from customers converting from oil to gas service would not be realized. For additional detail, please refer to Docket No. 4916, Attachment PUC 1-1-2(b), pages 16,17, and 31.

e. The Company has quantified the economic and environmental benefits as follows:

   i. The current annual average of oil-gas conversions is 350. Without the project, the Company would not be able to perform any oil-gas conversions due to capacity restrictions. Assuming the annual average of 350 oil-gas conversions continues, the project will enable the reduction of between approximately 635 tons of CO_2 per year (with no concurrent furnace efficiencies) to 1,470 tons of CO_2 per year (with concurrent furnace efficiencies). For additional detail, please refer to Docket No. 4916, Attachment PUC 1-1-2(b), pages 31, 32, and 96).

PUC 3-2, page 3

ii. The Company estimates that the construction of the project will have beneficial effects on the area economy by creating approximately 413 job years during construction through 2023. Of these, 206 are direct construction jobs while 207 are indirect and induced jobs. It is also estimated that spending on pipeline construction will raise Rhode Island Gross State Product by $29.0 million, real personal income by $22.4 million, and State Tax Revenues by $1.4 million. Once constructed, it is estimated that the project will accommodate economic growth in southwestern Rhode Island and allow the State to continue its economic development efforts in this area. This development involves residential, commercial, and industrial expansions, including new businesses already underway at Quonset Business Park and others in surrounding communities. The Project will enable development and the 2,248 technical and manufacturing jobs associated with it, as well as the development of 647 new residential units that are currently planned.

PUC 3-3

Response:

In FY 2019 Gas ISR Plan, the Company stated that there were 1186 miles of leak prone pipes out of a total of 3193 miles of pipes. In FY 2020 Gas ISR Plan, the Company stated that there were 1190 miles of leak prone pipes out of a total of 3205 miles of pipes.

a) Why has the total number of miles of leak-prone pipe increased?

b) These figures appear to indicate that 12 new miles of pipes were installed for one year to the next. If so, where?

Response:

a) Prior to the filing of the Fiscal Year (FY) 2020 Gas Infrastructure, Safety, and Reliability (ISR) Plan with the Public Utilities Commission, the Company had limited the reporting of leak-prone pipe inventory in the ISR Plan to cast iron and bare steel. In FY 2020, the Company added 50 miles of Aldyl-A plastic pipe to its ISR leak-prone pipe classification. Aldyl-A consists of pre-1985 vintage plastic that is susceptible to slow-crack growth failure. Slow-crack growth failures begin when a microscopic defect in the pipe behaves as a stress concentrator when a force is exerted against the defect and enables the defect to grow in response to the stress.

b) The Company is in the process of reviewing the reported inventory increase to identify the locations of any new main. In general, the Company would expect total inventory to increase year to year as a result of new growth main, new pipelines, or other system reliability projects. At this time, the Company anticipates this information will be available by March 14, 2019.

Prepared by or under the supervision of: John B. Currie

PUC 3-4

Response:

Please provide a cross-program summary to describe any interactions or overlap between the Gas ISR Plan, GCR, LRGSP, Rate Case, EE or other dockets.

Response:

Please refer to the information below for a summary regarding the purpose of each of the referenced dockets.

Energy Efficiency (EE)

This program is designed to provide customers with the tools needed to take control of their energy usage and realize savings. The program is implemented with the objective of achieving multi-year savings targets, while also reducing carbon emissions. EE costs are excluded from general rate cases so there is no direct interaction or overlap.

Gas Cost Recovery (GCR)

The annual GCR filing is submitted pursuant to the Gas Cost Recovery Clause found in the Company's gas tariff, RIPUC NG-GAS No. 101, Section 2, Schedule A. The GCR filing reflects the customer class-specific factors necessary for the Company to collect sufficient revenues to recover projected gas costs for a specific time period. This filing typically consists of the pre-filed testimony relative to: (1) the Company's projected gas costs in support of the proposed GCR factors, as well as a description of modifications to the Company's gas supply portfolio for the time period; (2) the development of the GCR factors proposed for the time period, as well as a bill impact analysis relative to those proposed factors; (3) support for the underlying wholesale and retail forecasts that the Company uses to estimate gas costs in the filing; and (4) the results of the Gas Procurement Incentive Plan and the Natural Gas Portfolio Management Plan. Gas costs are excluded from general rate cases, so there is no direct interaction or overlap with the rate case, except for cost of capital and lead lag study that was approved in the most recent general rate case and used in determining gas cost working capital.

Long-Range Resource and Requirements Plan (LRP)

The LRP is submitted to the Rhode Island Public Utilities Commission (PUC) every two years pursuant to R.I. Gen. Laws § 39-24-2. The LRP is designed to demonstrate that the Company's gas-resource planning process has resulted in a reliable resource portfolio to meet the combined forecasted needs of the Company's customers at least-cost. To make this demonstration, the

LRP includes the following information: (i) a step-by-step description of the methodology the Company uses to forecast demand on its system; (ii) a discussion of the process and assumptions that the Company uses to develop its resource portfolio to meet customer requirements under design-weather conditions; and (iii) a complete inventory of the expected available resources in the Company's portfolio, and a demonstration of the adequacy of the portfolio to meet customer demands under a range of weather. The process of developing the customer requirements forecast is the same process employed each year to develop the customer requirements forecast used in the GCR.

Infrastructure, Safety, and Reliability (ISR) Plan

Authorized under the Revenue Decoupling law, R.I. Gen. Laws § 39-1-27.2.1, the ISR Plan is intended to facilitate and encourage investment in infrastructure, safety, and reliability. ISR Plan interactions are limited to general rate cases. See details in the General Rate Case section below.

General Rate Case

In the Company's last two general rate case proceedings (Docket No. 4323 and Docket No. 4770), the Company has used its most recently approved ISR plans as a means of forecasting capital spending into the requested rate year(s). The ISR plan dollars represent a reasonable baseline amount of capital spending to be included in base distribution rates and are not intended to represent a discrete list of projects or defined workplan. Although the baseline amount is assessed for reasonableness during the course of the general rate case proceeding, the review and approval of project or program spending occurs during the annual ISR plan process. Any subsequent ISR plan cost recovery requests that include approved capital investments made during the rate plan periods would recover or refund only the revenue requirement on capital spending incremental or decremental to the baseline level of capital investment assumed in base distribution rates.

PUC 3-5

Response:

On Bates 21 of the FY2020 Gas ISR Plan, the Company indicates that the Plan intends to attain safety and reliability goals through a cost-effective, coordinated work plan. How does the Company assess cost-effectiveness?

Response:

The Company evaluates gas capital projects in accordance with the National Grid U.S. Capital Plan Budget Process Procedure. The purpose of the Capital Plan Procedure is to provide a formal framework to conduct a detailed, multi-tiered capital-planning process to control costs and manage projects within the established budget parameters. The budget is developed by National Grid's Investment Planning group in collaboration with National Grid's Jurisdictions/Operations, Engineering, Asset Management, Resource Planning, Project Management, and Finance departments. Within this framework, National Grid can identify and prioritize key spending initiatives, prior to approval, to allow the Company to evaluate all major projects and to prioritize the use of corporate financial resources.

The overall objective is to arrive at a capital budget that is the optimal balance of making the investments necessary to maintain and improve the performance of the Company's gas system, while also ensuring a cost-effective use of the Company's resources. At the same time, the Company must maintain a level of flexibility inherent in the budget process to ensure that it is able to deal with unanticipated work that inevitably occur during the year. Finalization of the capital budget considers historical trends, mix of work, risk, specific work plan targets, risk ranking, and overall portfolio impact.

Once the capital budget is approved, the Company follows a monthly portfolio management process that includes reviews of year-to-date spending and assessment of work plan performance. This process includes updated forecasts that will inform portfolio management prioritization decisions that consider risk and costs as the Company seeks to deliver the Gas Infrastructure, Safety, and Reliability Plan at approved funding levels.

PUC 3-6

Response:

On Bates 38 of the FY2020 Gas ISR Plan, the Company described some cost estimates for the Atwells Avenue project. At Bates 53 of the FY2020 Gas ISR Plan the Company estimates 3-year spending of $7.54 million. Please explain the large difference in cost estimate from Docket 4781 to the current filing.

a) What is the current total estimated cost of the Atwells Ave project?

b) please provide a breakdown of the estimated total cost per year.

c) Please describe what factors may cause a change in these estimates and an approximate time-frame when the Company expects that estimates may change.

Response:

The Company first introduced the Atwells Avenue Main Replacement project in this year's Fiscal Year (FY) 2020 Gas Infrastructure, Safety, and Reliability (ISR) Plan. The Atwells Avenue Main Replacement project was not included in Docket No. 4781. Therefore, there is no cost estimate difference from Docket No. 4781 to the current filing in Docket No. 4916.

a) The current estimate of the Atwells Avenue Main Replacement project is the $7.54 million reported by year on Bates Page 53 of the FY 2020 Gas ISR Plan.

b) Please see the response to part a) above.

c) A combination of external and internal factors could lead to a change in this estimate. Internal factors include, but are not limited to, density of other underground utilities, will force significant offsets to the proposed layout. External factors include, but are not limited to, additional requirement from the city related to paving, traffic management, and permit costs. The project is scheduled to be constructed over a three-year period, ending in FY 2022. By the end of FY 2020, the Company anticipates there will be additional refinements to the overall project estimate that reflects final construction methods, offsets, and permit restrictions.

PUC 3-7

Request:

RR-3 from Docket 4781 references National Grid's 80 x 50 GHG reduction plan, and the company's 70 x 30 interim target. The response shows that 46.94% of the GHG emissions from company operations come from methane from the gas distribution system.

Please explain: How does abandoning cast iron and bare steel pipes compare with other activities the Company undertakes or plans to undertake to reduce its own GHG emissions?

Response:

National Grid's 2030 and 2050 targets can be met, providing there is a continued focus on decarbonization by government and policymakers in the regions in which National Grid operates. The continued decarbonization of electricity will help reduce the emissions in National Grid's Power Generation business and the emissions from electricity line losses, two of National Grid's largest sources of emissions. National Grid will continue to engage with policymakers and ensure National Grid supports the transition to a low carbon economy. In additional, the Regional Greenhouse Gas Initiative (RGGI) is a market-based cap and trade mechanism for reducing emissions from the power sector. RGGI has an emissions cap aimed at reducing emissions by 30% between 2020 and 2030.

National Grid has a key role to play to both influence policymakers and regulators in the continued transition to a low carbon future. National Grid's policy advocacy will continue to positively influence reductions from power plant emissions (not just National Grid assets) as well as methane emissions across the natural gas supply chain.

For example, National Grid is a founding member of the ONE Future Coalition, which aims to improve efficiency of the natural gas supply chain by reducing methane emissions through innovative policy and technology solutions. The development of renewable natural gas (hydrogen and methane derived from biomass and renewable electricity) will also help reduce the emissions from National Grid's gas distribution network.

Prepared by or under the supervision of: Patricia Dorsch

PUC 3-7, page 2

In addition to continued regulatory funding for gas distribution main replacement programs, there is a continued focus on reducing SF6 leakage through repair, refurbishment, and replacement, as well as the identification of opportunities to decarbonize other parts of National Grid's business, such as through the deployment of Alternative Fuel Vehicles (AFVs) in National Grid's fleet. National Grid continues its commitment to the Edison Electric Institute to spend 5% of National Grid's annual US fleet replacement budget on AFVs. Energy efficiency improvements in National Grid's property portfolio will also contribute to a reduction in its emissions.

PUC 3-8

Response:

Please update Table 2 on Bates page 53 to include fiscal year actuals for 2015 thru 2018 and an estimate for 2019.

Response:

The information requested for Fiscal Year 2015 to 2018 actuals can be found on Table 3 on Bates Page 54 of the Company's Fiscal Year 2020 Gas Infrastructure, Safety, and Reliability (ISR) Plan. For an estimate for 2019, please refer to Page 7 of 8 in the Company's Fiscal Year 2019 Gas ISR quarterly report for the third quarter ending December 31, 2018, filed with the Public Utilities Commission on February 12, 2019 in Docket No. 4781, a copy of which is provided as Attachment PUC 3-8.

nationalgrid

Robert J. Humm
Senior Counsel

February 12, 2019

VIA HAND DELIVERY & ELECTRONIC MAIL

Luly E. Massaro, Commission Clerk
Rhode Island Public Utilities Commission
89 Jefferson Boulevard
Warwick, RI 02888

RE: Docket 4781 – FY 2019 Gas Infrastructure, Safety, and Reliability Plan
Quarterly Update – Third Quarter Ending December 31, 2018

Dear Ms. Massaro:

On behalf of National Grid,[1] I have enclosed 10 copies of the Company's fiscal year (FY) 2019 Gas Infrastructure, Safety, and Reliability (ISR) Plan quarterly update for the third quarter ending December 31, 2018 in the above-referenced docket.

Pursuant to the provisions of the approved FY 2019 Gas ISR Plan, National Grid committed to providing quarterly updates on the progress of its Gas ISR programs to the Public Utilities Commission and the Division of Public Utilities and Carriers.

Thank you for your attention to this matter. If you have any questions regarding this filing, please contact me at 401-784-7415.

Very truly yours,

Robert J. Humm

Enclosures

cc: Docket 4781 Service List
Leo Wold, Esq.
John Bell, Division
Al Mancini, Division

[1] The Narragansett Electric Company d/b/a National Grid (National Grid or the Company).

Certificate of Service

I hereby certify that a copy of the cover letter and any materials accompanying this certificate was electronically transmitted to the individuals listed below.

The paper copies of this filing are being hand delivered to the Rhode Island Public Utilities Commission and to the Rhode Island Division of Public Utilities and Carriers.

Joanne M. Scanlon

February 12, 2019
Date

Docket No. 4781 - National Grid's FY 2019 Gas Infrastructure, Safety and Reliability (ISR) Plan - Service List 2/21/18

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Gas Infrastructure, Safety, and Reliability Plan

The Narragansett Electric Company

FY 2019 Quarterly Update

Third Quarter - Ending December 31, 2018

Executive Summary

Fiscal year (FY) 2019 Gas Infrastructure, Safety, and Reliability (ISR) third quarter results (Attachment A) reflect that the Company[1] has spent approximately $94.19 million of an estimated year-to-date budget of $97.03 million, resulting in a third quarter under-spending variance of $2.84 million. The third quarter spend includes actual spending of $36.30 million against an estimated year-to-date budget of $35.49 million for Non-Discretionary work, resulting in a third quarter over-spending variance of $0.81 million. In addition, the third quarter spend includes actual spending of $57.48 million of an estimated quarterly budget of $61.16 million on Discretionary work, resulting in a third quarter under-spending variance of $3.69 million. Gas ISR operation and maintenance (O&M) expenses totaled $0.41 million against a budget of $0.38 million. To date, the $94.19 million of actual spend represents approximately 88 percent of the total FY 2019 annual Gas ISR budget of $106.71 million. Total year-end spend is currently forecast to be $1.69 million above the budgeted total, at $108.40 million. Projected over-spend for the Public Works and Proactive Main Replacement programs are partially offset by projected under-spend in the Reliability, Mandated, and Special Project programs. A summary level forecast is provided in Attachment A. Additional details supporting this forecast are provided in Attachment B. In the sections below, the Company explains in more detail the primary drivers for spending to-date and the forecast for each category.

[1] The Narragansett Electric Company d/b/a National Grid (National Grid or the Company).

FY 2019 Capital Spending by Category

Non-Discretionary Work[2]

Public Works Program – $2.18 million over-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company has spent $12.60 million against a projected year-to-date budget of $10.42 million for the Public Works program, resulting in an over-spending variance of $2.18 million. The mix of work, which includes increasing amounts of cast iron and concrete road base, are contributing to this over-spend. To date for FY 2019, the Company has installed 8.9 miles of a plan of 11.0 miles for new gas main and has abandoned 10.3 miles of a plan of 11.0 miles of leak-prone pipe through the Public Works program. Current forecasts call for total abandonment of 11.6 miles in FY 2019. With this level of spending, based on the current project mix in the plan and projected reimbursement funds for prior work, the Company anticipates that the Public Works program will over-spend by $2.00 million at fiscal year-end.

Mandated Programs – $0.80 million under-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company has spent approximately $15.69 million of a projected year-to-date budget of $16.49 million for Mandated Programs, resulting in an under-spending variance of $0.80 million. The primary drivers in this category include under-spend in the Corrosion and Non-Leaks/Other categories. This is largely offset by over-spend in Reactive Leaks that is, in part, the result of the number of leak repairs exceeding plan. At this time, the Mandated Programs are forecast to under-spend by $1.30 million at fiscal year-end.

[2] Non-Discretionary programs include those required by legal, regulatory code, and/or agreement, or as a result of damage or failure, with limited exceptions.

Damage/Failure Reactive Program – $0.19 million under-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company has spent $0.00 million of a projected year-to-date budget of $0.19 million for the Damage/Failure Reactive program, resulting in an under-spending variance of $0.19 million. At this time, the Damage/Failure Reactive program category is projected to be on-budget at fiscal year-end.

Special Projects – $0.38 million under-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company spent $8.01 million of a projected year-to-date budget of $8.39 million for Special Projects, resulting in an under-spending variance of $0.38 million. The primary driver for the under-spend is based on the status of the Veterans Memorial Main Replacement projects. Plans for developing the Veterans Memorial property have been put on hold by the property owner, which has resulted in the Company deferring all work associated with the 200 pounds per square inch gauge (psig) replacement portion of the Veterans Memorial Main Replacement project. The vault portion of the Veterans Memorial Main Replacement project, prioritized based on asset condition, was completed in October 2018. The under-spending on the Veterans Memorial Main Replacement projects is partially offset by over-spend on the Gas Expansion projects and the Allens Avenue 200 psig Main Replacement project. Factors contributing to the over-spend on the Gas Expansion project include increased spending in the Engineering and Environmental and Permitting categories due to the existence of contaminated sites along the route that required extensive review and subsurface exploration and monitoring wells. Additional factors include design and engineering costs for horizontal directional drilling for multiple bridge crossings and traffic management plans. The Allens Avenue 200 psig main replacement project cost increases are attributed to post-estimate market condition changes that impacted project oversight, materials, and Non-

Destructive Examination. The Company expects to under-spend the Special Projects category by $0.40 million at fiscal year-end.

Discretionary Work[3]

Proactive Main Replacement Program – $0.63 million over-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company has spent approximately $49.73 million against a projected year-to-date budget of $49.11 million for the Proactive Main Replacement program, resulting in an over-spending variance of approximately $0.63 million. To date for FY 2019, the Company has installed 44.1 miles of new main against a plan of 40.6 miles, and has abandoned 36.5 miles of leak-prone pipe of a plan of 47.1 miles. The Company has accumulated an inventory of main ready for abandonment and is forecasting in combination with the Public Works program to achieve the FY 2019 plan of 60 abandonment miles. The Proactive Main Replacement program is forecast to be $3.00 million over-budget for fiscal year-end. Forecasted under-spend in other program categories are partially offsetting this amount, which is contributing to the projected overall ISR over-spend of $1.69 million for FY 2019. The over-spend for the Proactive Main Replacement program at fiscal year-end is attributed to a current projection of installing an additional four miles of main, which will support the FY 2020 abandonment miles. This will support the Company's overall Proactive Main Replacement program objectives as it seeks to increase the percentage of cast iron miles to replace, which have historically presented challenges such as permit restrictions and underground congestion.

[3] Discretionary programs are not required by legal, regulatory code, and/or agreement, or as a result of damage or failure, with limited exceptions.

Reliability Programs – $4.31 million under-spending variance to budget year-to-date

Through the third quarter of FY 2019, the Company has spent $7.74 million of a projected year-to-date budget of $12.06 million for Reliability programs, resulting in an under-spending variance of $4.31 million for this category. The primary drivers of this under-spending variance are the Allens Avenue Multi Station Rebuild project and the Gas System Reliability program. Under spending for the Allens Avenue Multi Station Rebuild project has resulted from delays associated with contractor mobilization, significant weather impacts, and environmental dewatering. The Company expects that these timing delays will be remediated in the fourth quarter of FY 2019. Gas System Reliability is under spending due to siting delays associated with the installation of a new regulator station. At this time, the Reliability programs are expected to under-spend by $1.62 million at fiscal year-end. This includes projected under-spend associated with the deferral of a portion of the Heater Program and Take Station work plans, and identification of Allens Avenue Multi Station Rebuild construction that will be completed to support liquefied natural gas (LNG) operations. The Allens Avenue LNG-related costs will be excluded from the ISR. These items are partially offset by projected over-spend for Pressure Regulating Facilities as a result of carryover from the FY 2018 work plan that included the final abandonment of two regulator stations.

FY 2019 O&M Spending

O&M – $0.03 million over-spending variance to budget year-to-date

In the FY 2019 Gas ISR Plan, the Company agreed to track the incremental O&M expenses associated with the hiring, training, and work of 16 additional full-time equivalent personnel required for the acceleration of replacement of leak-prone pipe relating to the Public Works and Proactive Main Replacement work in FY 2019. The Company is slightly over-budget through the third quarter of FY 2019, having incurred O&M expenses totaling approximately $0.41

million for these 16 individuals against a year-to-date budget of $0.38 million. At this time, the Company expects the O&M category will be on budget at fiscal year-end.

Attachment A

The Narragansett Electric Company
d/b/a National Grid - RI Gas
Capital Spending by Investment Categories
FY 2019 through December, 2018
($000)

Investment Categories	Budget	FYTD Actual	Variance	Budget	FY19 - Total Forecast	Variance
NON-DISCRETIONARY						
Public Works Program*	$10,419	$12,595	$2,176	$11,084	$13,084	$2,000
Mandated Program	$16,488	$15,690	($798)	$19,926	$18,629	($1,297)
Damage / Failure Reactive	$188	$0	($188)	$250	$250	$0
Special Projects	$8,393	$8,014	($379)	$8,768	$8,368	($400)
NON-DISCRETIONARY SUB-TOTAL	$35,487	$36,299	$812	$40,028	$40,331	$303
DISCRETIONARY						
Proactive Main Replacement	$49,105	$49,731	$626	$52,802	$55,802	$3,000
Reliability Programs	$12,056	$7,744	($4,313)	$13,382	$11,764	($1,618)
DISCRETIONARY SUB-TOTAL	$61,162	$57,475	($3,687)	$66,184	$67,566	$1,382
TOTAL CAPITAL INVESTMENT	$96,649	$93,774	($2,875)	$106,211	$107,897	$1,685
O&M	$377	$413	$37	$502	$502	$0
TOTAL CAPITAL and O&M	$97,026	$94,187	($2,839)	$106,713	$108,399	$1,685

( ) denotes under-spend
*Public Works Program includes reimbursements which will be credited as received throughout the year.

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4781
FY 2019 Gas Infrastructure, Safety, and Reliability Plan
FY 2019 Quarterly Update
Third Quarter Ending December 31, 2018

Fiscal Year 2019 Forecast
($000)

Category	FY 2019 Budget	FY 2019 Forecast	Variance
NON-DISCRETIONARY			
Public Works			
City State Construction - Non-Reimbursable	$11,084	$13,084	$2,000
City State Construction - Reimbursable	$1,354	$1,354	$0
City State Construction - Reimbursements	-$1,354	-$1,354	$0
Public Works Total	**$11,084**	**$13,084**	**$2,000**
Mandated Programs			
Corrosion	$1,144	$480	($664)
Purchase Meters (Replacements)	$4,371	$3,742	($629)
Pipeline Integrity IVP (Integrity Verification Program)	$252	$0	($252)
Service Replacements (Reactive) - Non-Leaks/Other	$2,331	$2,041	($290)
Other Mandated	$0	$98	$98
Main Replacement (Reactive) - Maintenance	$670	$670	$0
Main Replacement (Reactive) - CI Joint Encapsulation	$4,012	$7,481	$3,469
Service Replacement (Reactive) - Leaks	$7,146	$4,117	($3,029)
Sub-Total Reactive Leaks	**$11,828**	**$12,268**	**$440**
Mandated Total	**$19,926**	**$18,629**	**($1,297)**
Damage / Failure (Reactive)	**$250**	**$250**	**$0**
Special Project			
Gas Expansion Plan	$1,500	$1,979	$479
Pipeline Integrity IVP - Allens Ave 200 psig main replacement due to weld issue	$4,735	$5,264	$529
Pipeline Integrity IVP - Veterans Memorial Drive 200 psig main replacement	$2,533	$1,125	($1,408)
Special Project Total	**$8,768**	**$8,368**	**($400)**
NON-DISCRETIONARY TOTAL	**$40,028**	**$40,331**	**$303**
DISCRETIONARY			
Proactive Main Replacement			
Main Replacement (Proactive) - Leak Prone Pipe	**$52,802**	**$55,802**	**$3,000**
Reliability			
Gas System Control	$550	$550	$0
Valve Installation/Replacement	$159	$137	($22)
System Automation	$1,033	$1,033	$0
Heater Program	$800	$275	($525)
Pressure Regulating Facilities	$2,666	$3,957	$1,291
Allens Ave Multi Station Rebuild	$2,970	$1,693	($1,277)
Take Stations	$1,000	$422	($578)
Gas System Reliability - Gas Planning	$1,472	$1,472	$0
I&R - Reactive	$1,202	$1,202	$0
LNG	$903	$494	($409)
Replace Pipe on Bridges	$100	$0	($100)
Access Protection Remediation	$100	$100	($0)
Other Reliability	$0	-$98	($98)
Tools & Equipment	$427	$527	$100
Reliability Total	**$13,382**	**$11,764**	($1,618)
DISCRETIONARY TOTAL	**$66,184**	**$67,566**	$1,382
Capital Spending Total	**$106,211**	**$107,897**	$1,685
O&M	**$502**	**$502**	$0
Gas ISR Plan Total	**$106,713**	**$108,399**	$1,685

PUC 3-9

Request:

Table 1 on page 8 of the 80 x 50 plan shows that gas as a percent of service territory residential heating demand should grow from 55% to 60% by 2030, and electric heating use should grow from 2% to 28% over the same time period.

a) Is there a RI-specific version of this Table?

b) Would carbon reductions be greater or achieved faster under a scenario of greater heat pump adoption and slowed or reversed gas conversions?

Response:

a) There is no Rhode Island-specific version of Table 1 on page 8 of the 80 x 50 plan. National Grid's intent regarding the 80 x 50 Pathway was to model the entire Northeast region, and the analysis used aggregate New England and New York data.

   Specifically, the underlying data for the residential heating demand analysis was derived from the 2009 Energy Information Administration (EIA) Residential Energy Consumption Survey (RECS) data on home heating fuel type: Table HC1.8 "Fuels Used and End Uses in Homes in Northeast Region, Divisions, and States."[1] EIA publishes this data only at the level of the New England Census Division. Though EIA breaks out Massachusetts, it does not publish more granular data for the other New England states.

b) Statewide and regional CO_2 reductions from heating depend critically upon three factors: building envelope improvement, "before" and "after" heating system emission, and the pace of system conversion.

   If heat pump adoption occurs with insufficient building envelope improvement, the CO_2 impacts could be negative relative to gas conversions.

   Assuming sufficient building envelope improvement and based only on the emissions of the "before" and "after" heating system types, emissions reductions could be increased marginally under a scenario of greater heat pump adoption. Importantly, however, this outcome would depend on sustained improvement of ISO-NE electric CO_2 intensity

[1] See Table HC1.8 here:
https://www.eia.gov/consumption/residential/data/2009/index.php?view=characteristics#fueluses

during winter months. Such improvement is not the present trend and appears uncertain in light of forthcoming nuclear power retirements.

Finally, the speed of statewide CO_2 reductions is also a function of the realized rate of customer conversions. The Northeast 80 x 50 Pathway scenario assumes an aggressive acceleration of the rate of customer conversions – roughly 100,000 oil-to-gas conversions per year (New York + New England), and roughly 300,000 oil-to-heat pump conversions per year (New York + New England). Although both assumptions are well above historical rates of conversion, the heat pump figure in particular would require a complete step change in the market. Although there is not yet a definitive data source for heat pump conversions across the Northeast region, this figure of 300,000 oil-to-heat pump conversions is approximately 10 times the recent rates of conversion.

The implication is that a "scenario of greater heat pump adoption" would require that the heat pump market be accelerated immediately to *greater than* 10 times current conversion rates, and, furthermore, that such acceleration would require the abandonment of the other proven and economically viable emissions reduction strategy for heat, namely oil-to-gas conversion.

PUC 3-10

Response:

What is the percent of gas for residential heating in RI now? How much will be added via this Gas ISR? What will be the percentage in 2030 in RI if we continue this rate of expansion?

Response:

For 2018, the Company had 228,314 residential heating customers. Using the U.S. Bureau of Census 2018 figure for total Rhode Island housing stock (468,590), the Company estimates that it supplies natural gas to 48.7 percent of all Rhode Island residential heating customers.

The capital costs associated with connecting individual commercial and residential growth customers are not included in the Gas Infrastructure, Safety, and Reliability Plan.

For 2030, the Company estimates that it will have 252,021 residential heating customers. Using the U.S. Bureau of Census 2030 projection of total Rhode Island housing stock (487,722), the Company estimates that it will supply natural gas to 51.6 percent of all Rhode Island residential heating customers.