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March 20, 2023

VIA ELECTRONIC MAIL

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

**RE: Docket No. 22-53-EL – The Narragansett Electric Company
Proposed FY 2024 Electric Infrastructure, Safety, and Reliability Plan
Responses to Record Requests – Batch 2**

Dear Ms. Massaro:

On behalf of The Narragansett Electric Company d/b/a Rhode Island Energy (the “Company”), enclosed, please find the Company’s second batch of responses to record requests issued by the Public Utilities Commission (“Commission”) during the March 8, 2023 and March 9, 2023 hearings for the above-referenced matter. This batch includes the responses to record requests 9, 18, and 22, and completes the set.

Thank you for your attention to this transmittal. If you have any questions or concerns, please do not hesitate to contact me at 401-784-4263.

Sincerely,

A handwritten signature in blue ink, appearing to read "Andrew S. Marcaccio".

Andrew S. Marcaccio

Enclosures

cc: Docket No. 22-53-EL Service List

Record Request No. 9

Request:

RR-9. Witnesses have testified there is a trend in the SAIFI performance data from 2011 through 2021. The testimony is that the trend is positive (meaning a worsening SAIFI score).

- a. Please test the null hypothesis that the trend is the result of random variation. More specifically:
 - Please calculate a p-value for the null hypothesis test, and report if the null hypothesis can be rejected with a 99% confidence interval.
 - Please report the method used (e.g., Mann-Kendall, Spearman, etc.) and a brief statement of why the method was chosen (e.g., appropriate for determining monotonic rank trend for non-parametric data will ties). If other statistical variables were calculated to reach a p-value, please report those (e.g., z-score, Kendall's tau coefficient, Spearman's coefficient).
- b. Please repeat part a, but update the data to include 2022 data. If the final data is not available, please indicate that and proceed with the preliminary data.
- c. Please test the same as in parts a and b, but assume hypothetical data in 2022 just lower than the 2021 score (i.e., .9499).

Response:

The Company did not base its determination on the need for investments to maintain and improve reliability on a statistical analysis of whether there is a worsening SAIFI trend. Rather, the Company observed the linear trend of worsening SAIFI as additional support for its observation that additional investments, such as reclosers, are reasonably needed to maintain reliable distribution service in the short and long term. It is not the Company's position that any particular statistical level of confidence that there is a worsening SAIFI trend under either the Regulatory metric or the IEEE metric is necessary to conclude that there is a need for the reliability investments proposed. Rather, the Company takes the position that the metrics together with other indicators of reliability, such as customer satisfaction scores and the observation of an overall increased number of interruptions, support the need for the cost-effective reliability investments the Company has proposed. However, the Company conducted the requested analysis with PUC and IEEE reliability values using the Mann-Kendall method.

- a) 2011 to 2021 Tests
 - i. Using PUC values
 - a. The p-value for the null hypothesis test was calculated at 0.0430.

- b. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 95% confidence level.
- c. The Mann-Kendall method was used because it was mentioned within the question and is a method to determine upward or downward trends. Specifically, the Mann-Kendall Test is used to determine whether a time series has a monotonic upward or downward trend. It does not require that the data be normally distributed or linear. It does require that there is no autocorrelation.
- d. The variables calculated are shown in the table below.

Mann-Kendall Variables – SAIFI Test – PUC Values - 2011 to 2021
99% and 95% Confidence Tests

n	11	n	11
confidence	99%	confidence	95%
alpha	0.01	alpha	0.05
MK-stat	27	MK-stat	27
s.e.	12.8452	s.e.	12.8452
z-stat	2.0241	z-stat	2.0241
p-value	0.0430	p-value	0.0430
trend	no	trend	yes

- ii. Using IEEE values
 - a. The p-value for the null hypothesis test was calculated at 0.1611.
 - b. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 83% confidence level.
 - c. The variables calculated are shown in the table below.

Mann-Kendall Variables – SAIFI Test – IEEE Values - 2011 to 2021
99% and 83% Confidence Tests

n	11	n	11
confidence	99%	confidence	83%
alpha	0.01	alpha	0.17
MK-stat	19	MK-stat	19
s.e.	12.8452	s.e.	12.8452
z-stat	1.4013	z-stat	1.4013
p-value	0.1611	p-value	0.1611
trend	no	trend	yes

b) 2011 to 2022 (preliminary value)

i. Using PUC values

- a. The test was repeated with preliminary 2022 data with a SAIFI of 0.866. The p-value for this null hypothesis test was calculated at 0.1499
- b. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 85% confidence level.
- c. The variables calculated are shown in the table below.

Mann-Kendall Variables – SAIFI Test – PUC Values - 2011 to Preliminary 2022
99% and 85% Confidence Tests

n	12	n	12
confidence	99%	confidence	85%
alpha	0.01	alpha	0.15
MK-stat	22	MK-stat	22
s.e.	14.5831	s.e.	14.5831
z-stat	1.4400	z-stat	1.4400
p-value	0.1499	p-value	0.1499
trend	no	trend	yes

ii. Using IEEE values

- a. The test was repeated with preliminary 2022 data with a SAIFI of 0.808. The p-value for this null hypothesis test was calculated at 0.3727
- b. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 62% confidence level.
- c. The variables calculated are shown in the table below.

Mann-Kendall Variables – SAIFI Test – IEEE Values - 2011 to Preliminary 2022

99% and 62% Confidence Tests

n	12	n	12
confidence	99%	confidence	62%
alpha	0.01	alpha	0.38
MK-stat	14	MK-stat	14
s.e.	14.5831	s.e.	14.5831
z-stat	0.8914	z-stat	0.8914
p-value	0.3727	p-value	0.3727
trend	no	trend	yes

- c) 2011 to 2022 (assumed value)
- i. Using PUC values
 - a. The test was repeated with 2022 data set to a SAIFI of 0.947, just below the 2021 SAIFI level of 0.948. The p-value for this null hypothesis test was calculated at 0.0467
 - b. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 95% confidence level.
 - c. The variables calculated are shown in the table below.

Mann-Kendall Variables – SAIFI Test – PUC Values - 2011 to Assumed 2022

99% and 95% Confidence Tests

n	12	n	12
confidence	99%	confidence	95%
alpha	0.01	alpha	0.05
MK-stat	30	MK-stat	30
s.e.	14.5831	s.e.	14.5831
z-stat	1.9886	z-stat	1.9886
p-value	0.0467	p-value	0.0467
trend	no	trend	yes

- ii. Using IEEE values
 - d. The test was repeated with 2022 data set to a SAIFI of 0.921, just below the 2021 SAIFI level of 0.922. The p-value for this null hypothesis test was calculated at 0.1499
 - e. At a 99% confidence interval, the null hypothesis is not rejected and the Mann-Kendall method indicates that there is no trend. Using this method, a trend does exist at 95% confidence level.
 - f. The variables calculated are shown in the table below.

The Narragansett Electric Company

d/b/a Rhode Island Energy

RIPUC Docket No. 22-53-EL

In Re: Proposed FY 2024 Electric Infrastructure, Safety and Reliability Plan

Responses to the Record Requests

Issued at the Commission's Evidentiary Hearings

On March 8 and 9, 2023

Mann-Kendall Variables – SAIFI Test – IEEE Values - 2011 to Assumed 2022
99% and 85% Confidence Tests

n	12	n	12
confidence	99%	confidence	85%
alpha	0.01	alpha	0.15
MK-stat	22	MK-stat	22
s.e.	14.5831	s.e.	14.5831
z-stat	1.4400	z-stat	1.4400
p-value	0.1499	p-value	0.1499
trend	no	trend	yes

The Narragansett Electric Company
d/b/a Rhode Island Energy
RIPUC Docket No. 22-53-EL
In Re: Proposed FY 2024 Electric Infrastructure, Safety and Reliability Plan
Responses to the Record Requests
Issued at the Commission's Evidentiary Hearings
On March 8 and 9, 2023

Record Request No. 18

Request:

RR-18. Please provide a cross-program summary for investments in ISR, AMF, and GMP. To the extent there is any overlap with energy efficiency or other programs, please describe.

Response:

Please see the cross-program summary for investments in ISR, AMF, GMP and other programs in Attachment RR-18. There is no overlap in spend across the different programs included in the summary.

Program/Description and Purpose	SR - System Capacity & Performance (SCP)	SR - Asset Condition (AC)	GMP - ADMS/DERMS Advanced	GMP - Advanced Reclosers	GMP - Smart Capacitors & Regulators	GMP - IT Infrastructure	GMP - Electromechanical Relay Repl Pgm	GMP - Fiber Network	AMF	Energy Efficiency	Net Metering	Renewable Energy Growth
<p>IRR Vegetation Management</p> <p>The Company's Vegetation Management ("VM") Program is essential to reduce the leading cause of customer interruptions as well as keeping vegetation clear from overhead lines and equipment to ensure the system is capable of responding to an event reducing magnitude and duration.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, system capacity & performance prevents capacity related outages and ensures the system is capable of responding to an event reducing magnitude and duration.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, AC prevents deteriorated equipment, mostly substation, related outages and ensures equipment is able to properly respond to an outage reducing magnitude and duration.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	<p>Investments in these programs are essential to maintain reliability but it is achieved through different mechanisms. Vegetation Mgt reduces/prevents tree related outages, GMP investments reduce the frequency of customer outages and improve restoration efficiency.</p>	na	na	na	na
<p>IRR - System Capacity & Performance (SCP)</p> <p>System capacity and performance projects are required to ensure that the electric network has sufficient capacity to meet the existing and growing and/or shifting demands of customers. Generally, projects in this category address load conditions on substation transformers and distribution feeders recommended by the Company's annual capacity review and Area Planning Studies. These investments are essential and are scheduled to minimize the potential for safety and reliability issues.</p>	<p>Investments in these programs are essential to maintain safety and reliability but it is achieved through different mechanisms. Refer to description for differences.</p>	<p>Investments in these programs are essential to maintain safety and reliability but it is achieved through different mechanisms. Refer to description for differences.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>SCP Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current SCP investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	na	na	na	na
<p>IRR - Asset Condition (AC)</p> <p>Asset Condition projects and programs have been identified to reduce the risk and consequences of unplanned asset failures and are identified as part of the System Planning process. The focus is to identify specific susceptibilities (failure modes) and develop alternatives to avoid such failure modes. These investments are essential and are scheduled to minimize the potential for safety and reliability issues.</p>	<p>Investments in these programs are essential to maintain safety and reliability but it is achieved through different mechanisms. Refer to description for differences.</p>	<p>Investments in these programs are essential to maintain safety and reliability but it is achieved through different mechanisms. Refer to description for differences.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	<p>AC Area Study recommendations were incorporated into the GMP base case to: 1) ensuring that grid modernization infrastructure would not build upon retiring assets nor duplicate planned assets; and 2) ensuring that the Area Study plans would sufficiently support grid modernization needs. The GMP analysis ensures that the current AC investments are sound for future conditions with grid modernization and, therefore, has long range usefulness.</p>	na	na	na	na
<p>GMP - ADMS/DERMS Advanced</p> <p>Software that will support implementation of adaptive protection systems, coordination of multiple voltage regulating devices and load management devices. ADMS is essential to respond to changing fault conditions to properly coordinate circuit protective devices, achieve optimal CWR performance and reduce customer demand and energy use, and achieve fast, reliable, and safe FLISR, which can reduce frequency of customer outages and improve restoration efficiency.</p> <p>ADMS/DERMS is a suite of software tools to integrate DER resources with grid operations, including integrating DER Monitor/Manage to dispatch DER in a manner that maintains the security of the distribution system while ensuring an optimal economic solution.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	<p>GMP investments will provide functionality that will allow operators to manage extreme peak usage contributing significantly to future avoided infrastructure cost.</p>	na	na	na	na
<p>GMP - Advanced Reclosers</p> <p>Deployment of advanced reclosers that have controls and sensing to ensure distribution equipment to operate within its rated capacity and that faults on the system are cleared efficiently. Operate in conjunction with ADMS - FLISR targeting those areas and feeders with greatest needs for reliability improvement and where there is existing DER penetration that presents risk of possible protection coordination challenges.</p>	<p>GMP reclosers do provide sectionalizing functionality essential to improving reliability on their own. However, there are certain functionalities of ADMS and the GMP Cap/Reg that are interdependent of each other. These include but are not limited to enabling adaptive protection systems that can respond to changing fault conditions to properly coordinate circuit protective devices to ensure worker safety and reliable operation of the grid and to implement FLISR for automatic customer segmentation.</p>	<p>GMP reclosers do provide sectionalizing functionality essential to improving reliability on their own. However, there are certain functionalities of ADMS and the GMP Cap/Reg that are interdependent of each other. These include but are not limited to enabling adaptive protection systems that can respond to changing fault conditions to properly coordinate circuit protective devices to ensure worker safety and reliable operation of the grid and to implement FLISR for automatic customer segmentation.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	na	na	na	na
<p>GMP - Smart Capacitors & Regulators</p> <p>Deployment of capacitors and regulators with advanced controls and sensing to manage voltage within ANSI voltage standards, targeting those areas and feeders with existing DER penetration and the greatest risk of voltage violations.</p>	<p>These investments together provide digital intelligence and automation to create a more efficient, resilient electric system capable of efficiently utilizing all grid-connected resources to properly address technical and operational issues arising from the rapidly changing operating characteristics of the power system and to cost-effectively meet customer expectations.</p>	<p>These investments together provide digital intelligence and automation to create a more efficient, resilient electric system capable of efficiently utilizing all grid-connected resources to properly address technical and operational issues arising from the rapidly changing operating characteristics of the power system and to cost-effectively meet customer expectations.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	na	na	na	na
<p>GMP - IT Infrastructure</p> <p>Build foundational data management capabilities by enabling enhanced data governance across key datasets including an enterprise integration platform that will provide all the necessary integrations between the various GMP applications such as ADMS, VVO/CVR, DER management and storage, and GIS integration. This plan also includes a cyber services component that is built from the principles and policies established in the PR, Data Governance Plan.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	<p>The Foundational Investments include proposed underlying IT infrastructure investments in data management, enterprise integration platform, and data storage necessary to enable grid modernization functionalities and realize its full benefits. Additionally, this investment is essential to provide necessary cybersecurity as more intelligent devices, the GMP Cap/Regs, are interconnected, and integrated with utility operations. The IT infrastructure will be placed in service incrementally as components of the GMP are completed.</p>	na	na	na	na

Program/Description and Purpose	SR - System Capacity & Performance (SCP)	SR - Asset Condition (AC)	GMP - ADMS/DERMS Advanced	GMP - Advanced Reclosers	GMP - Smart Capacitors & Regulators	GMP - IT Infrastructure	GMP - Electromechanical Relay Repl Pgm	GMP - Fiber Network	AMF	Energy Efficiency	Net Metering	Renewable Energy Growth
GMP - Electromechanical Relay Repl Pgm								The Foundational Investments include a private fiber backhaul communications network with substation interfacing infrastructure essential to enable secure, efficient and more resilient two-way communication of operational information and data with the head-end IT systems. Refer to Figure 6.22 of the GMP for visual.	AMF and GMP investments are independently viable. However AMF will provide: Observability, Power Quality Management, Distribution Grid Control, Grid Optimization, and Reliability Management functionality which further enables and optimizes GMP solutions.	The existing Demand Response system doesn't have all of the functionality required to respond to the constraints of the local distribution system. The grid modernization functionality and infrastructure provided by the Foundational Investments is essential to extending the DR programs to provide support to distribution-level NWAs using the new. New enhancements to the DR program will be proposed through annual Energy Efficiency Plan or SRP filings. In the future, the new ADMS - DERMS deployment will enable DR performance for more customer DER.	na	GMP Foundational Investments are essential to provide granular information to potentially set pricing more accurately via "zonal payment" mechanism within the regrowth statute.
GMP - Fiber Network								The Foundational Investments include a private fiber backhaul communications network with substation interfacing infrastructure essential to enable secure and efficient two-way communication of information and data between the Rhode Island ADMS and other head-end IT systems including AMF meters at customers' homes. Refer to Figure 6.22 of the GMP for visual.		The existing Demand Response system doesn't have all of the functionality required to respond to the constraints of the local distribution system. The grid modernization functionality and infrastructure provided by the Foundational Investments is essential to extending the DR programs to provide support to distribution-level NWAs using the new. New enhancements to the DR program will be proposed through annual Energy Efficiency Plan or SRP filings. In the future, the new ADMS - DERMS deployment will enable DR performance for more customer DER.	na	GMP Foundational Investments are essential to provide granular information to potentially set pricing more accurately via "zonal payment" mechanism within the regrowth statute.
AMF										The deployment of AMF for residential and small commercial customers will establish a basis for TVR implementation, to provide improved price signals to residential and small commercial customers optimizing the Demand Response program under the Energy Efficiency umbrella. It can also help optimize event dispatch and device control. AMF can also help improve Evaluation, Measurement, and Verification by providing more granular and accurate data. Also, AMF can enhance behavioral EE programs and program target marketing by providing better usage data for customers to do more customization and provide customers with better information to make more-informed decisions.	AMF granular and accurate data will optimize NM billing and reconciliation.	AMF is essential to provide granular information to potentially set pricing more accurately via "zonal payment" mechanism within the regrowth statute.

Record Request No. 22

Request:

RR-22. Please provide a description of all assumptions made by Mr. Constable behind the inputs to the ICE calculator and the foundation of the assumptions.

Response:

There are two benefit-cost analyses for which the Company used the United States Department of Energy ("DOE") Interruption Cost Estimator ("ICE") calculator: (i) the Mainline Recloser Enhancement program, and (ii) the Customers Experiencing Multiple Interruptions ("CEMI") program.

(i) The Mainline Recloser Enhancement program used the following ICE calculator assumptions:

- Number of customers – 235,213
 - Residential – 207,532
 - Small commercial/industrial – 23,165
 - Large commercial/industrial – 4,516
- SAIFI - 0.44 to 0.385
- SAIDI – 25 to 21.6
- CAIDI – 56.8 to 56.1
- Expected annual inflation – 2%
- Discount rate – 6%
- Year of benefits – 20 years

The number of customers is the subset of total system customer associated with the Mainline Recloser Enhancement program. The SAIFI value of 0.44 and SAIDI value of 25 represent the average system frequency and duration for mainline interruptions for the subset of circuits considered in the program. The program is expected to reduce SAIFI by 0.0575 resulting in a value of 0.385. This corresponds to a SAIDI reduction of 3.4 minutes resulting, in a new value of 21.6. CAIDI values are derived within the program from the SAIFI and SAIDI values. The expected annual inflation and discount rate are ICE calculator defaults. The program years are set to 20 as a typical benefit evaluation period.

(ii) The CEMI program used the following ICE Calculator assumptions:

- Number of customers – 45,000 (9,000 per year for 5 years)
 - Residential – 9,000
 - Small commercial/industrial – 0
 - Large commercial/industrial – 0

- Value of one 4 hour outage determined for 1 residential customer
 - SAIFI – 1.0
 - SAIDI – 240
 - \$8.49 per 4 hour outage
 - 3 outages saved per customer = \$25.46 saved per customer per year.
- Inflation 2016 to present – 10%. Results in \$28.00 saved per customer per year.
- Expected annual inflation – 2%
- Discount Rate – 6.97%
- Year of benefits – 20 years

The number of customers for the CEMI program are the identified number of customers experiencing four or more interruptions per year. The program is designed to address one fifth or approximately 9,000 customers per year for 5 years. For the benefit calculation, all customers were considered to be residential to be conservative. The ICE calculator was used to determine the value of one 4-hour outage. The CEMI program is designed to address the customers experiencing multiple interruptions greater than 4 with the expectation that those customers would experience performance similar to the system average frequency, which was considered close to 1 to simplify this analysis. Therefore, it was assumed 3 interruptions per customer per year would be saved. The Company's pretax weighted average cost of capital rate of 6.97% was used. The expected annual inflation rate is an ICE calculator default. The program years are set to 20 as a typical benefit evaluation period.