Jennifer Brooks Hutchinson
Acting Assistant General Counsel and Director

September 17, 2020

VIA ELECTRONIC MAIL

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

RE: Docket 4770 – Electric Base Distribution Rates for Rate Year 3 – Compliance Filing
Responses to PUC Data Requests – Set 3

Dear Ms. Massaro:

On behalf of National Grid,[1] I enclose an electronic version[2] of the Company's response to the Public Utilities Commission's Third Set of Data Requests issued in the above-referenced matter.

The Company received an extension in responding to data request PUC 3-10.

Thank you very much for your time and attention to this matter. If you have any questions, please contact me at 401-784-7288.

Very truly yours,

Jennifer Brooks Hutchinson

Enclosures

cc: Docket 4770 Service List
Linda George
John Bell, Division
Al Mancini, Division
Leo Wold, Esq.
Christy Hetherington, Esq.

[1] The Narragansett Electric Company d/b/a National Grid (National Grid or the Company).
[2] Due to the COVID-19 Pandemic emergency period, the Company is providing a PDF version of the above-referenced transmittal. The Company will provide the PUC with a hard copy and, if needed, additional hard copies at a later date.

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T: 401-784-7288 ■ jennifer.hutchinson@nationalgrid.com ■ www.nationalgrid.com

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

September 17, 2020
Date

National Grid Docket No. 4770 (Rate Application) & Docket No. 4780 (PST)
Combined Service list updated 7/20/2020

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PUC 3-1[1]

Request:

Grid Modernization Information Technology:

Schedule 6 of the Rate Year 3 Compliance Filing set forth the rate year revenue requirements for Grid Modernization Activities (http://www.ripuc.ri.gov/eventsactions/docket/4770-NGrid-Rate%20Year%203-Compliance%20(6-1-2020).pdf.

A review of some information in the Docket No. 4770 rate case provides information about plans then in place for grid modernization investments:
RR 11 (dates in service): http://www.ripuc.ri.gov/eventsactions/docket/4770-4780-NGrid-PUC%20RR%207%2011%2014%2020%20(July%2013%202018).pdf
PHDR 1-5 (how the investments will meet certain goals):
http://www.ripuc.ri.gov/eventsactions/docket/4770-4780-NGrid-PUC-PHDR%201-5%20%201-6%20(July%2026%202018).pdf
The DSCADA and ADMS system is "available and accessible and then the distribution elements will be incorporated into that and they don't all have to happen at the same time, but the system has to be there and we plan to through—our deployments are through the full three-year period and the turn-on date would be soon thereafter," (Sheridan, June 18, 128 and RR-11 and PHDR 1-5).

3-1. Please provide the following information for RTU separation; Enterprise Service Bus; Data Lake; PI Historian; Advanced Analytics; Telecommunications; Cybersecurity (not subject to the 85/15 split):
   a. Tasks that were originally planned for each rate year;
   b. Originally planned rate year spending;
   c. Tasks completed in each rate year;
   d. Dollars expended compared to anticipated;
   e. Percent of expenditures made compared to original spending plan;
   f. Originally expected date in service;
   g. Current expected date in service;
   h. Explanation of difference between expected and actuals;
   i. Whether the projects that were funded for the three rate years will be completed by the end of rate year 3 and if not, an explanation of why not and a projection of when the projects will be completed.

[1] The Company's response to PUC 3-1 begins on page 2.

PUC 3-1, page 2

j. If the projects are not anticipated to be completed, please provide the Company's view of how the Commission might address the fact that ratepayers have paid for something promised that never occurred.

Response:

(a)-(h). Please see Attachments 3-1-A and 3-1-B for responses to (a) through (h) for each of the projects. In addition, the Company provides the following additional information in response to subpart (h):

RTU Separation: Please see the Company's response to PUC-1-2 in Docket No. 4915, which explains the difference between the actual and forecasted capital spending on the EMS/RTU Program in the FY 2020 and FY 2021 Infrastructure, Safety and Reliability Plan, and the RTU Separation investment, the costs of which are being recovered through base distribution rates approved in Docket No. 4770. A copy of the Company's response is attached as Attachment PUC 3-1-C for reference. The RTU Separation investment is part of the Company's anticipated DSCADA deployment. A remote terminal unit ("RTU") separation will segregate distribution data from transmission data. This is necessary to make a clear divide for data and systems held to different security and compliance considerations.

Enterprise Service Bus; Data Lake; PI Historian; Advanced Analytics; Telecommunications; Cybersecurity: These investments are part of the Shared Service Company Information System Investments.

The Company projected the original value assumption for the shared investments assuming a New York and Rhode Island cost-sharing model. Since the Company's 2017 rate case filing, these similar investments and the progression of the Massachusetts grid modernization portfolio found that the value of these investments would extend to all three jurisdictions, and would alter the allocations for the proposed investments.

Below is a summary of the activities completed in Rate Year 1 and Rate Year 2 relevant to these investments.

- Rate Year 1: The Company created an organization and staffed the organization to support the consistent and coordinated activities for all the shared investments for Grid Modernization. This included establishing a Project Management Office and establishing the program frameworks and controls for managing the broad portfolio. The Company completed an effort to define and develop a grid modernization capability model. As part of defining the business and technical architecture for the program, the effort was focused

on the development and assessment of an overall Grid Mod Capability model. The model serves as a foundation to support traceability of capabilities back to strategic objectives and guides the development of future use cases, requirements, technical architecture, and technical decisions.

- Rate Year 2: The Company used the capability model to inform the development of a broader business and technical architecture. This effort looked at the holistic portfolio and developed a conceptual technical model and technical design principles to guide the various investment areas. The Company also looked at the broader real estate of solutions to determine whether the grid modernization requirements and capabilities could be supported through extending existing products and solutions or pursuing more fit for purpose products and solutions. Enterprise Services Bus and Data Management (i.e., Data Lake) also began preliminary scoping and developed specific solution architectures and product directions.

The difference between the expected and actuals is driven by both the differences in the initially planned timeline for investments and changes to some of the planning assumptions, including what the total investments will be in a multi-jurisdiction model. The initial startup activities were necessary to ensure a solid long-term investment aligned to the Grid Modernization goals and objectives. The investment values were derived using as-is and best available information, and there have been some changes in product and solution directions that have occurred since the initial filing that have altered the original assumptions.

(i.) Please refer to the response to PUC-3-3 for estimated and planned in-service dates. The original plans assumed initiation and mobilization of the various projects in Rate Year 1. Most of the projects did not initiate and mobilize until Rate Year 2, which has resulted in the revised timelines and in-service dates. While some of the primary activities originally envisioned are estimated to be completed by the end of Rate Year 3, there is ongoing work expected beyond Rate Year 3, as described in the Company's response to PUC 3-9 which models a fourth rate year.

(j.) The Company views these investments as fundamentally needed to progress the broader grid modernization capabilities and benefits. The Company will allocate any funds approved for these investments as part of the Amended Settlement Agreement, and not spent by the end of Rate Year 3, to work completed during the interim "fourth year," or beyond.

Investment	a. Tasks that were originally planned for each rate year;	b. Originally planned rate year spending;	c. Tasks completed in each rate year;	d. Dollars expended compared to anticipated;	e. Percent of expenditures made compared to original spending plan;	f. Originally expected date in service;	g. Current expected date in service;	h. Explanation of difference between expected and actuals;
RTU Separation	The Company planned to progress three new RTU's and the enablement of fifty nine additional RTU's through upgrades and reconfigurations to support a future DSCADA. These were planned to start in rate year 1 and progress through rate year 3.	See attachment 3-1-B.	The Company performed detailed scoping and planning of the initial work in Rate Year 1. The Company initiated engineering and design for two of the three new RTU projects in rate year 2. The Company completed RTU Separation for 5 substations in rate year 2.	See attachment 3-1-B.	See attachment 3-1-B.	Two new substation RTU's were anticipated in rate year 2 and the third substation was anticipated in rate year 3. The RTU Separation estimated 19 units in rate year 1 and 32 in rate year 2.	Three new RTU substations are forecasted to be in service in Rate Year 4. There are 7 stations in rate year 3 and 7 stations in rate year 4 that are estimated for RTU separation.	The Company initiated the program to separate distribution RTUs from transmission RTUs in support of DSCADA/ADMS. In the project scoping and assessment phase, it was determined that initial assumptions for the RTU Separation activities and the nature of the work for the targeted substations did not require significant capital investment and for those not requiring significant capital investment could be performed in a shorter timeframe. The Company also has since developed a plan and timing for the future DSCADA that will receive the data from this RTU work. The Company will seek to align the RTU Separation activities and work with the DSCADA timeline. The Company is progressing RTU Separation projects that do require capital investments to support the RTU Separation activities for the future DSCADA.
Enterprise Services Bus	The Company planned to procure the ESB software and licenses and install the software in rate year 1. The Company planned to procure and install the middleware software and licenses in rate year 2. The Company planned to develop the comprehensive integration services starting in rate year 1 through rate year 3.	See attachment 3-1-B.	In rate year 2, the company completed an architecture assessment of the current integration tools in use, and their fitment for the Grid Modernization Program. The Company selected and setup the platform solution in Rate Year 2.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 3	Rate year 4	The initial proposal assumed extension of solutions in use which informed original plans and assumptions. The Company undertook an assessment of products and selected a solution that best met the needs for grid modernization. As per the most current project plan the company anticipates an in-service date in December 2021.
Data Lake	The Company planned to design and build out a suitable data lake environment consisting of four different environments: a Dashboard environment and the Data Lake environments for Production, Development and Quality Assurance in rate year 1 and begin to develop a dashboard and other capabilities in rate year 2 and rate year 3.	See attachment 3-1-B.	Planning and scoping was completed in rate year 2 and is integrated with the advanced analytics investment area. Requirements for Data Catalog and Data Quality. Business Capabilities, High Level Data Use Cases and Preliminary Data Source identification complete.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 1	Rate year 3	This effort was initiated in Rate year 2 and will proceed through rate year 3. The data lake environments from the initial assumptions are being confirmed based on the planning and scoping for the broader Data Management initiative. This will confirm the server, storage and processing requirements for the revised solutions and a projected completion of August 2021.
PI Historian	The Company planned to procure and install hardware to support 8 servers (4 Production, 2 Development, 2 QA).and procure software licenses in rate year 1. Data integrations and development was planned for rate year 2 and rate year 3.	See attachment 3-1-B.	The project will be initiated in rate year 3.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 1	Rate year 4+	The initiation of this effort was delayed due to dependency on the EMS Upgrade project which was completed earlier this year. The project is planned to be initiated in rate year 3 and projected to be complete in December 2022.
Advanced Analytics	The Company planned to procure an ETL (Extract, Transform and Load) tool (includes Data Quality, Change Data Capture and Discovery) and software licenses for data governance and visualization toolsets in rate year 1. Development with these new tools was planned from rate year 1 through rate year 3	See attachment 3-1-B.	Planning and scoping was completed in rate year 2. Requirements for Data Catalog and Data Quality. Business Capabilities, High Level Data Use Cases and Preliminary Data Source identification was completed.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 1 through Rate Year 3	Rate year 4	This effort was initiated in Rate year 2 and will proceed through rate year 4. There were alterations to the initial assumptions based on the planning and scoping for the broader Data Management initiative including prioritization of the Data Catalog and Data Quality investments which were initially included within the advanced analytics investment area.
Telecommunications	The Company planned to initiate corporate backbone, IT/OT backbone and IT/OT mesh backhaul investments in rate year 1 and complete the investments in rate year 3.	See attachment 3-1-B.	The Company initiated planning and scoping to engineer, design, manage, and deliver an extensive network of devices and connectivity in rate year 2 in collaboration with the preferred vendor for AMF. The Company also initiated the planning and scoping for the data lake and advanced analytics in rate year 2. Both of these efforts will inform incremental telecommunication bandwidth investments.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 1	Rate year 3	Advanced Metering and capabilities for ADMS will result in significantly more data being exchanged between back-office systems across the corporate network and thus more capacity is required to enable these capabilities. The slower than anticipated initiation of the advanced analytics and AMF efforts shifted the requirement and timing to increase the bandwidth needs from the original assumptions. The planning and scoping was initiated for both AMF and advanced analytics in rate year 2 and will inform additional bandwidth investments through rate year 3.

Investment	a. Tasks that were originally planned for each rate year;	b. Originally planned rate year spending;	c. Tasks completed in each rate year;	d. Dollars expended compared to anticipated;	e. Percent of expenditures made compared to original spending plan;	f. Originally expected date in service;	g. Current expected date in service;	h. Explanation of difference between expected and actuals;
Cybersecurity	The Company planned to initiate cybersecurity solutions investments across a portfolio of cybersecurity services and tools in rate year 1. By the end of rate year 3, the original plan was to have deployed Cyber Security capabilities alongside Grid Mod applications to address the increased cyber security threats associated with the increased interconnectivity of systems.	See attachment 3-1-B.	Through rate year 2 foundational cybersecurity services have been established within the enterprise context. The Company is progressing the requirements and design efforts to integrate the Grid Modernization needs and use cases within the broader Cybersecurity portfolio through rate year 3.	See attachment 3-1-B.	See attachment 3-1-B.	Rate year 1 through Rate Year 3	Rate year 4+	The proposed grid modernization Cybersecurity investments was completed using a snapshot of as-is Cyber Security capabilities at the point of rate case submission. This resulted in the Cyber Security Grid Mod plan assuming that much of the Cyber capabilities required to support the success of Grid Mod would not be present and therefore initial investment into the foundational capability will be required for Grid Mod. Due to the evolution of Cyber Security threats that the Company face, cyber incidents that have occurred and the strategic direction of Security at National Grid, foundational capabilities have been and continue to be deployed at a faster pace than originally anticipated at the point of filing. These capabilities will be enhanced and integrated with Grid Modernization required security controls, based jointly on the Grid Mod and Security roadmap, respectively. Security investments will continue to be reviewed on an on-going basis to ensure that investment into capability aligns with threats as they evolve and the risk that these threats pose to success of the company's Grid Modernization program.

NOTE: Capital allowances presented are investments (not revenue requirement) for electric only by fiscal year where RY1 = FY 3/31/20
Grid Mod investments benefitting multiple jurisdictions are Service Company investments and will impact future revenue requirements as rent expense.

Table updated to include August actuals to complete Rate Year 2 actuals

			RY1				RY2			
Program		Status	Approved	Actual	Variance	Variance %	Approved	Actual	RY2 Variance	Variance %
			(a)	(b)	(c)=(a)-(b)	(d)=(c)÷(a)	(e)	(f)	(g)=(e)-(f)	(h)=(g)÷(e)
RTU Separation										
	OPEX		-	-	-	0%	60,000	41,804	18,196	30%
	CAPEX		570,000	60,000	510,000	89%	950,000	8,491	941,509	99%
Enterprise Services Bus										
	OPEX		-	-	-	0%	402,346	105,286	297,060	74%
	CAPEX				-	0%		30,059	(30,059)	0%
Data Lake										
	OPEX		-	-	-	0%	388,092	-	388,092	100%
	CAPEX		226,765		226,765	100%		-	-	0%
PI Historian										
	OPEX		-		-	0%	515,000	-	515,000	100%
	CAPEX		113,000		113,000	100%		-	-	0%
Advanced Analytics										
	OPEX		-		-	0%	299,978	111,078	188,900	63%
	CAPEX		2,045,256		2,045,256	100%	952,413	-	952,413	100%
Telecommunications										
	OPEX		-	8,025	(8,025)	0%	425,022	327,349	97,673	23%
	CAPEX		77,748		77,748	100%	38,874	-	38,874	100%
Cybersecurity										
	OPEX		-	696	(696)	0%	802,100	269,999	532,101	66%
	CAPEX		2,564,388		2,564,388	100%	1,247,855	-	1,247,855	100%

The Narragansett Electric Company
d/b/a National Grid
RIPUC Docket No. 4915
In Re: 2020 Electric Infrastructure, Safety, and Reliability
Annual Reconciliation
Responses to the Commission's First Set of Data Requests
Issued on August 25, 2020

PUC 1-2

Request:

Please provide an update for actual spending on the EMS/RTU Program and the RTU Separation Program. Please include an update on expected spending for future years.

Response:

Please see the table below for actual and expected capital spending on the EMS/RTU Program for FY 2020 and forecasted for FY 2021.

in $'000's

	FY 2020		FY 2021		
	Budget	Actual Spending	Budget	Actual Spending through 7/31/20	Forecast
EMS/RTU Program					
Bristol 51 - EMS and breaker rplmt	$ 150	$ 83	$ 430	$ 42	$ 230
EMS Expansion - Tiverton 2 #33	80	-	-	-	-
EMS Expansion - Wood River 85	80	9	200	4	5
EMS Expansion - Bonnet 42	-	14	100	3	4
EMS Expansion - Wampanoag 48	-	-	-	12	105
EMS Expansion - Merton 51	-	-	100	-	13
EMS Expansion - Phillipsdale 20	-	-	150	-	-
Total	$ 310	$ 106	$ 980	$ 61	$ 356

Please see the table below for forecasted RTU Separation Program costs. RTU Separation costs are not part of the ISR Plan. RTU Separation costs are part of the Company's base rates under RIPUC Docket No. 4770.

The Company initiated the program to separate distribution RTUs from transmission RTUs in support of DSCADA/ADMS. In the project scoping and assessment phase, it was determined that initial assumptions for the RTU Separation activities and the nature of the work for the targeted substations did not require significant capital investment and also could be performed in a shorter timeframe. The Company also has since developed a plan and timing for the future DSCADA that

The Narragansett Electric Company
d/b/a National Grid
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Issued on August 25, 2020

PUC 1-2, page 2

will receive the data from this RTU work. The Company will seek to align the RTU Separation activities and work with the DSCADA timeline. The Company is progressing RTU Separation projects that do require capital investments to support the RTU Separation activities for the future DSCADA.

in $'000's

	FY 20		FY21			FY22		FY23	FY24
	Budget	Actual Spending	Budget	Actual Spending through 7/31/20	Forecast	Budget	Forecast	Forecast	Forecast
RTU Separation Program (Docket 4770)									
Bristol 51	$ 187	$ 31	$ 187	$ 3	$ 34	$ -	$ 61	$ 208	$ -
West Cranston 21	187	29	187	6	30	-	122	158	-
Warren 5	-	-	248	-	16	125	82	180	42
RTU Reconfiguration	196	-	328	-	-	65	-	-	-
Total RTU Separation Program	$ 570	$ 60	$ 950	$ 9	$ 80	$ 190	$ 265	$ 546	$ 42

Prepared by or under the supervision of: Mark Phillips and William Jones

PUC 3-2

Request:

Referencing Attachment PUC 2-1-5, please provide a mapping of the expenditures to the revenue requirement.

Response:

Please refer to Attachment PUC 3-2. This Attachment presents the same information included in Attachment PUC 2-1-5 and incorporates the approved revenue requirement in each Rate Year for each program presented with a cross-reference to Schedule 6 of the Rate Year 3 compliance filing.

Power Sector Transformation Initiatives
Rate Year 3 Compliance Filing Schedule 6
Investment Plan Comparison

Line No	Program		Year of Investment	Ending 8/31/19 RY1 Approved (a)	Ending 8/31/19 RY1 Actual (b)	Ending 8/31/19 RY1 Variance (c)=(a)-(b)	Ending 8/31/20 RY2 Approved (d)	Ending 8/31/20 RY2 Actual to Date (e)	Ending 8/31/20 RY2 Projected (f)	Ending 8/31/20 RY2 Actual + Projected (g)=(e)+(f)	Ending 8/31/20 RY2 Variance (h)=(d)-(g)	Cumulative Variance through RY2 (i)=(c)+(h)	Ending 8/31/21 RY3 Approved (j)	Ending 8/31/21 RY3 Projected (k)	Ending 8/31/21 RY3 Variance (l)=(j)-(k)	Cumulative Variance through RY3 (m)=(l)+(i)
	RTU Separation															
1	Investment	OPEX		$0	$0	$0	$60,000	$39,371	$2,500	$41,871	$18,129	$18,129	$60,000	$60,000	$0	$18,129
2		CAPEX		$570,000	$0	$570,000	$950,000	$0	$0	$0	$950,000	$1,520,000	$190,000	$150,000	$40,000	$1,560,000
3																
4	Rev Req	OPEX		$0			$60,000						$60,000			
5		CAPEX	RY1	$0			$75,637						$74,228			
6		CAPEX	RY2	$0			$48,510						$126,062			
7		CAPEX	RY3	$0			$0						$9,702			
8		Total		$0			$184,147						$269,992			
9	Enterprise Services Bus															
10	Investment	OPEX		$0	$0	$0	$402,346	$151,563	$1,113	$152,676	$249,670	$249,670	$504,066	$28,066	$476,000	$725,670
11		CAPEX		$0	$0	$0	$0	$0	$0	$0	$0	$0	$4,022,163	$0	$4,022,163	$4,022,163
12																
13	Rev Req	OPEX		$0			$402,346						$504,066			
14		CAPEX	RY1	$0			$0						$0			
15		CAPEX	RY2	$0			$0						$0			
16		CAPEX	RY3	$0			$0						$436,827			
17		Total		$0			$402,346						$940,893			
18	Data Lake															
19	Investment	OPEX		$0	$0	$0	$388,092	$0	$0	$0	$388,092	$388,092	$545,532	$0	$545,532	$933,624
20		CAPEX		$226,765	$0	$226,765	$0	$0	$0	$0	$0	$226,765	$0	$0	$0	$226,765
21																
22	Rev Req	OPEX		$0			$388,092						$545,532			
23		CAPEX	RY1	$0			$46,245						$42,925			
24		CAPEX	RY2	$0			$0						$0			
25		CAPEX	RY3	$0			$0						$0			
26		Total		$0			$434,337						$588,457			
27	PI Historian															
28	Investment	OPEX		$0	$0	$0	$515,000	$0	$0	$0	$515,000	$515,000	$515,000	$12,170	$502,830	$1,017,830
29		CAPEX		$113,000	$0	$113,000	$0	$0	$0	$0	$0	$113,000	$0	$0	$0	$113,000
30																
31	Rev Req	OPEX		$0			$515,000						$515,000			
32		CAPEX	RY1	$0			$23,044						$21,390			
33		CAPEX	RY2	$0			$0						$0			
34		CAPEX	RY3	$0			$0						$0			
35		Total		$0			$538,044						$536,390			

Power Sector Transformation Initiatives
Rate Year 3 Compliance Filing Schedule 6
Investment Plan Comparison

Line No	Program		Year of Investment	Ending 8/31/19 RY1 Approved (a)	RY1 Actual (b)	RY1 Variance (c)=(a)-(b)	Ending 8/31/20 RY2 Approved (d)	RY2 Actual to Date (e)	RY2 Projected (f)	RY2 Actual + Projected (g)=(e)+(f)	RY2 Variance (h)=(d)-(g)	Cumulative Variance through RY2 (i)=(c)+(h)	Ending 8/31/21 RY3 Approved (j)	RY3 Projected (k)	RY3 Variance (l)=(j)-(k)	Cumulative Variance through RY3 (m)=(l)+(i)
36	Advanced Analytics															
37	Investment	OPEX		$0	$0	$0	$299,978	$95,423	$17,568	$112,991	$186,987	$186,987	$338,852	$72,366	$266,486	$453,473
38		CAPEX		$2,045,256	$0	$2,045,256	$952,413	$0	$0	$0	$952,413	$2,997,669	$609,026	$0	$609,026	$3,606,695
39																
40	Rev Req	OPEX		$0	$0	$0	$299,978						$338,852			
41		CAPEX	RY1	$0	$0	$0	$415,938						$386,079			
42		CAPEX	RY2	$0	$0	$0	$103,437						$198,970			
43		CAPEX	RY3	$0	$0	$0	$0						$66,143			
44		Total		$0	$0	$0	$819,353						$990,044			
45	Telecommunications															
46	Investment	OPEX		$0	$8,025	($8,025)	$425,022	$313,283	$29,996	$343,279	$81,743	$73,718	$636,886	$255,136	$381,750	$455,468
47		CAPEX		$77,748	$0	$77,748	$38,874	$0	$0	$0	$38,874	$116,622	$38,982	$0	$38,982	$155,604
48																
49	Rev Req	OPEX		$0	$0	$0	$425,022						$636,886			
50		CAPEX	RY1	$0	$0	$0	$15,855						$14,717			
51		CAPEX	RY2	$0	$0	$0	$4,222						$8,121			
52		CAPEX	RY3	$0	$0	$0	$0						$4,222			
53		Total		$0	$0	$0	$445,099						$663,946			
54	Cybersecurity															
55	Investment	OPEX		$0	$696	($696)	$802,100	$267,576	$20,000	$287,576	$514,524	$513,828	$623,280	$343,784	$279,496	$793,324
56		CAPEX		$2,564,388	$0	$2,564,388	$1,247,855	$0	$0	$0	$1,247,855	$3,812,244	$826,073	$0	$826,073	$4,638,316
57																
58	Rev Req	OPEX		$0	$0	$0	$802,100						$623,280			
59		CAPEX	RY1	$0	$0	$0	$522,961						$485,420			
60		CAPEX	RY2	$0	$0	$0	$135,523						$260,691			
61		CAPEX	RY3	$0	$0	$0	$0						$89,716			
62		Total		$0	$0	$0	$1,460,584						$1,459,107			

NOTE: Capital allowances presented are investments (not revenue requirement) for electric only by fiscal year where RY1 = FY 3/31/20
Grid Mod investments benefitting multiple jurisdictions are Service Company investments and will impact future revenue requirements as rent expense.

Line Notes:

8 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 6
17 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 7
26 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 8
35 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 9
44 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 10
53 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 11
62 RIPUC Docket No. 4770 Rate Year 3 Compliance filing, Schedule 6 at Page 1, Line 12

PUC 3-3

Request:

For each item in Attachment PUC 2-1-5 that are considered Grid Mod investments benefitting multiple jurisdictions, please indicate when the projects were/are expected to be placed into service and charged to each of the jurisdictions.

Response:

Please see the table below for a list of the Grid Modernization investments benefitting multiple jurisdictions from Attachment PUC 2-1-5, the estimated and planned in-service dates, and a description of the in-service dates for each jurisdiction. Please also see the Company's response to PUC 3-1 for additional information regarding Enterprise Service Bus, Data Lake, PI Historian, Advanced Analytics, Telecommunications, and Cybersecurity.

Investment	**In-Service**		**Description**
	Estimated	**Planned**	
Enterprise Service Bus	RY3	RY4	Platform selected and requirements, design and development efforts in progress expected to complete in December 2021 and placed into service for all jurisdictions.
Data Lake	RY1	RY3	Data Management effort was initiated in Rate Year 2 and is expected to complete initial platform setups in August 2021 and then be placed into service for all jurisdictions.
PI Historian	RY1	RY4+	The initiation of this effort was delayed due to dependency on the EMS Upgrade project which was completed earlier this year. The project is planned to be initiated in rate year 3 and complete in December 2022.
Advanced Analytics	RY1 - RY3	RY4	This effort was initiated in Rate year 2 and will proceed through rate year 4. There were alterations to the initial assumptions based on the planning and scoping for the data management initiative.
Telecommunications	RY1	RY3	The Company initiated planning and scoping to engineer, design, manage, and deliver a network of devices and connectivity in rate year 2 in collaboration with the preferred vendor for AMF. New telecommunication needs for AMF and other Grid Mod investments will continue through rate year 3.
Cyber Security	RY1 - RY3	RY4+	Elements of Cybersecurity have been delivered as part of the enterprise investments. Incremental Cybersecurity needs for grid modernization is initiating detailed requirements and design starting in rate year 3 for all jurisdictions.

Prepared by or under the supervision of: William F. Jones, Jr.

PUC 3-4

Request:

Please provide an explanation of the design, development, investment, and O&M expense that was provided in System Reliability Plan funding by year. Please explain what tasks were funded through SRP and what tasks were completed and what investments were put in service prior to Rate Year 1.

Response:

The 2018 System Reliability Plan ("SRP") was the only year in which the Company included a request for funding for work associated with the Rhode Island System Data Portal ("Portal"). Please see the table below for an explanation of the tasks that were funded through the 2018 SRP, the funding amount, and the dates those investments were put into service. The only investment put in service prior to Rate Year 1 was the Initial Version of the Portal, as detailed in the table below. Please see the Company's response to PUC 3-5 for a complete year-by-year listing of the tasks associated with the Portal work, including the tasks listed in Table 1, below, and an explanation of each task.

Table 1. Rhode Island System Data Portal Tasks Funded through SRP

SRP Year	SRP Funding Request	Task	Complete?	Go-Live Date
2018 SRP Report	$80,000	Initial Version of the Portal (Introduction, Company Reports, Distribution Assets Overview map, and Heat Map tabs)	Yes	June 30, 2018
		Initial Version of Hosting Capacity Map	Yes	September 28, 2018

Neither the 2019 SRP nor the 2020 SRP included a funding request for Portal work. The 2019 SRP included action-based incentive mechanisms for completion of certain Portal work, such as the Electric Vehicle Charging Station Locations and Known Transportation Fleet Location map layer; however, the PUC rejected these action-based incentives and the Company did not follow-up with a specific funding request in the SRP upon completion of these tasks.

Prepared by or under the supervision of: Matthew Chase

PUC 3-5

Request:

Please provide an explanation of the tasks anticipated in each of the three rate years and which tasks were completed (or are expected to be completed in each of the three rate years related to the System Data Portal, both capital and O&M).

Response:

Please see the table below for year-by-year detail on the completed Opex-type tasks related to the Rhode Island System Data Portal ("Portal") in each of the three rate years. Please note that the Portal tasks detailed in the table below are Opex-type only and that no Capex-type tasks were proposed for the three rate years. Additionally, please note that there are no other tasks currently anticipated for the three rate years.

Rate Year	Task	Expenditure Type	Complete?	Go-Live Date
Pre-RY1	Initial Version of the Portal (Introduction, Company Reports, Distribution Assets Overview map, and Heat Map tabs)	Opex	Yes	June 30, 2018
RY1	Initial Version of Hosting Capacity Map	Opex	Yes	September 28, 2018
	Post Redacted Area Studies on the Portal	Opex	Yes	November 28, 2018
	Add a tab for NWA (Discuss Open RFPs)	Opex	Yes	June 11, 2019
	Electric Vehicle ("EV") Charging Station Locations	Opex	Yes	June 28, 2019
RY2	Known Transportation Fleet Location map layer	Opex	Yes	September 16, 2019
	Add FAQ tab	Opex	Yes	November 7, 2019
	NWA tab updated to point to National Grid's new NWA Website	Opex	Yes	November 14, 2019
	Add ZIP Codes Boundaries Layer to all map tabs	Opex	Yes	March 25, 2020
	Second Phase of Transportation Fleet Location data added to Heat Map	Opex	Yes	March 25, 2020
	Add Sea Level Rise map tab	Opex	Yes	May 15, 2020

Prepared by or under the supervision of: Matthew Chase

PUC 3-5, page 2

There are no specific Portal updates identified at this time for Rate Year 3; however, new enhancements are expected to originate from collaborative consultation between National Grid and external stakeholders.

Below is an explanation of each task listed in the table above:

Initial Version of the Portal
The Portal is an interactive online mapping tool developed by the Company.[1] The Portal provides specific information for select electric distribution feeders and associated substations within the Company's electric service area in Rhode Island. This information includes feeder characteristics such as geographic locations, voltage, feeder ID, planning area, substation source, approximate loading, and available distribution generation hosting capacity. The Portal provides this information to stakeholders, customers, and third-party solution providers. The main target audience is third-party solution providers and the main goal of the Portal is to provide information in order to engage the market for cost-effective grid solutions to reduce costs for Rhode Island customers.

Initial Version of Hosting Capacity Map
The Hosting Capacity tab contains an interactive map of distribution feeders based on interconnected distributed generation ("DG") and in-progress DG projects. The hosting capacity map also contains information on substation ground fault overvoltage protection ("3V0") status. The Portal details if 3V0 is installed at a substation or if 3V0 is in construction or slated for construction and the proposed in-service date. Installation of 3V0 makes a substation transformer "DG-ready."

Post Redacted Area Studies on the Portal
Redacted area studies have been posted to the Company Reports tab of the Portal to provide further information to third-party solution providers on system needs in bounded areas of the electric distribution system in Rhode Island.

Add a tab for NWA (Discuss Open RFPs)
An initial version of the NWA tab was set up to display a list of upcoming and active NWA opportunities to provide further information for and engagement with third-party solution providers. The initial version of the NWA tab hosted a text-based table of NWA opportunities, which fulfilled the need to communicate RFPs openly to the market.

[1] See Rhode Island System Data Portal. *National Grid US*, National Grid USA Service Company, Inc., 2018, www.nationalgridus.com/Business-Partners/RI-System-Portal.

PUC 3-5, page 3

Electric Vehicle ("EV") Charging Station Locations
Identify locations where EV level 3 charging stations can potentially be implemented or installed, without negatively affecting the health or rating of an electric grid feeder. Level 3 charging stations are units that are rated at approximately 300 kW. This information is illustrated on the Heat Map tab in the "Potential Available Load Capacity ("MVA")" data value of the dropdown for each respective feeder.

Known Transportation Fleet Location map layer
Identify areas where large non-EV public transportation fleets are located in order to forecast where potential fleet conversion of non-EV to EV may occur. These locations are indicated by vehicle markers on the Heat Map in the "Known Transportation Fleet Locations" map layer. The data was sourced from OpenStreetMap.[2]

Add FAQ tab
The FAQ tab lists common questions with standard responses to proactively inform and resolve confusion for visitors to the Portal, such as third-party solution providers. This alleviates repetitive communication on basic inquiries.

NWA tab updated to point to National Grid's new NWA Website
The initial version of the NWA tab displayed a list of upcoming and active NWA opportunities. This setup was similar to the New York System Data Portal. In order to reduce maintenance time and operational expenditure from managing separate, different NWA opportunities lists on different Portals, the Company set up the centralized NWA Website[3] to consolidate all jurisdiction NWA opportunities into one easily accessible location for the market. The NWA tab on all Portals (RI, MA, NY) have been updated to redirect to National Grid's NWA Website.

Add ZIP Codes Boundaries Layer to all map tabs
A static ZIP Codes overlay map layer is available for all map tabs on the Portal, with data sourced from the Rhode Island Geographic Information System ("RIGIS") Zip Code Tabulation Areas map.[4]

[2] *OpenStreetMap*, OpenStreetMap Contributors, www.openstreetmap.org/.
[3] "Non-Wires Alternatives." *National Grid Business Partners*, National Grid USA, Inc., 13 Nov. 2019, www.nationalgridus.com/Business-Partners/Non-Wires-Alternatives/.
[4] "Zip Code Tabulation Areas." *RIGIS*, Rhode Island Geographic Information System, 23 June 2017, www.rigis.org/datasets/zip-code-tabulation-areas.

PUC 3-5, page 4

Second Phase of Transportation Fleet Location data added to Heat Map
Nineteen new locations were added to the Known Transportation Fleet Locations map layer on the Heat Map tab. Same data source used for initial build of map layer.

Add Sea Level Rise map tab
The Sea Level Rise tab is an interactive map that overlays National Oceanic and Atmospheric Administration ("NOAA") federal sea level rise map data with National Grid's electric distribution network map data in Rhode Island. This map provides information intended to help third-party solution providers and DER developers identify locations on the National Grid electric distribution network in relation to areas that may experience potential coastal flooding impacts in the future. All sea level rise data is sourced and mirrored from the NOAA Sea Level Rise Viewer.[5]

[5] "NOAA Sea Level Rise Viewer." *NOAA Sea Level Rise and Coastal Flooding Impacts*, National Oceanic and Atmospheric Administration of the United States Department of Commerce, https://coast.noaa.gov/slr/.

PUC 3-6

Request:

a. Please explain how the content of the system data portal has grown and evolved over the past two years and how it is expected to continue to grow over the next two years.
b. Has the Company completed the interactive heat maps? If so, when did the initial heat map go live?
c. How often is it updated?
d. How has the heat map evolved since the initial "go live" date?

Response:

a. The Rhode Island System Data Portal ("Portal") is an interactive online mapping tool developed by the Company.[1] The initial version of the Portal went live on June 30, 2018 and included the Introduction tab, Company Reports tab, Distribution Assets Overview tab, and Heat Map tab.

   Following this initial Portal go-live date, the initial version of the Hosting Capacity map resource of the Portal went live on September 28, 2018.

   The 2019 SRP Report included a proposal for additional enhancement work on the Portal. Initial posting of redacted area studies to the Company Reports tab started in November 28, 2018. The initial version of the NWA tab resource of the Portal went live on June 11, 2019, which contained a table list of upcoming and active NWA opportunities. The work related to electric vehicles ("EV") proposed in the 2019 SRP Report was completed on June 28, 2019 with the addition of "Known Transportation Fleet Locations" and on September 16, 2019 with the addition of data related to the "locations where EV level 3 charging stations can potentially be implemented". Both EV-related additions were added to the Heat Map tab.

   The Company updated the NWA tab on November 14, 2019 to instead contain a link to National Grid's NWA Website,[2] which is the centralized site that contains information on the Company's NWA process and NWA RFP opportunities. The Company also added a new FAQ tab to the Portal on November 7, 2019 to proactively provide answers to third parties about the Portal.

[1] See Rhode Island System Data Portal. *National Grid US*, National Grid USA Service Company, Inc., 2018, www.nationalgridus.com/Business-Partners/RI-System-Portal.
[2] "Non-Wires Alternatives." *National Grid Business Partners*, National Grid USA, Inc., 13 Nov. 2019, www.nationalgridus.com/Business-Partners/Non-Wires-Alternatives/.

On March 25, 2020, the Company added a ZIP Codes boundaries layer to all map tabs. Additionally, a second phase of additional transportation fleet data was added to the Heat Map tab on March 25, 2020. The Sea Level Rise map tab went live on May 15, 2020 with data directly sourced from the National Oceanic and Atmospheric Administration ("NOAA").[3]

There are no specific Portal updates identified over the next two years at this time; however, new enhancements are expected to originate from collaborative consultation between National Grid and external stakeholders.

b. Yes, the Company has completed the interactive Heat Map. The Heat Map went live on the same date as the Portal, June 30, 2018.

c. The data for all maps is updated at least annually or as needed. The current update frequency for the Portal Distribution Assets Overview map and Heat Map data is on an annual basis, to reflect the summer peak data when distribution feeders and substations are typically most highly loaded. The current timeframe is around June of each year. This update frequency is acceptable for considering feeder loading in project planning and there are no plans currently to change this update frequency.

The update frequency for the Company Reports tab data is as needed, which is usually every few months and therefore on a quarterly basis. The Company Reports tab is much easier to update since it is mostly text information versus the databases of the map tabs.

The distributed generation ("DG") information tabulated on the Hosting Capacity (interconnected and pending) section will be updated approximately monthly. The 3V0 substation information tabulated on the Hosting Capacity map will be updated monthly for Rhode Island. The "last updated" date is posted in the About information drop-down in each map tab. The data will continue to be updated, maintained, and refined as needed going forward.

d. The Heat Map tab was included in the initial version of the Portal. Please see the response to subpart (a), above discussing the additions to the Heat Map tab between 2018 and 2020.

[3] "NOAA Sea Level Rise Viewer." *NOAA Sea Level Rise and Coastal Flooding Impacts*, National Oceanic and Atmospheric Administration of the United States Department of Commerce, https://coast.noaa.gov/slr/.

PUC 3-7

Request:

The Company initially represented that the labor to develop and maintain the information posted on the portal is the major cost component. Further, the Company provided, this is incremental work beyond traditional distribution system planning, the Company plans to hire additional engineers and analysts to manage the portal. The Amended Settlement provided funding for three additional FTEs in Rate Years 1 and 2. Attachment PUC 2-1-4 appears to show that none of those funds were expended.

a. Were the FTEs hired? If so, when. If not, why not?
b. Who performed the work described in PUC 3-4 and PUC 3-5?
c. Who is responsible for maintaining and updating the heat map?
d. From which funding sources are those individual(s)' compensation accounted for?
e. Please provide the Company's view of how the Commission might address the fact that ratepayers have paid for new FTEs that never were hired.

Response:

a. The Company added two full-time equivalents ("FTEs") to its workforce in Rate Year 1 and has delivered the work it committed to delivering for the System Data Portal. Please see the Company's response to PUC 3-5 for a description of the System Data Portal tasks that were completed in each rate year. The Company hired one incremental FTE in the Asset Data & Analytics ("ADA") group in December 2018 and one incremental FTE in Distribution Planning & Asset Management ("DPAM") in June 2019.

   As a result of emerging and changing needs, and the availability of qualified candidates, the Company decided these new FTEs would also have job responsibilities broader than just the System Data Portal. The work associated with the System Data Portal was evolving, and the Company anticipated additional work to support the Non-Wires Alternative ("NWA") efforts that resulted from the use of the System Data Portal, namely the request for proposal ("RFP") process, which was significantly increasing. The incremental work that the Company had anticipated would be for the System Data Portal ended up being incremental NWA work. The Company expected customers to proactively identify and submit new projects through the System Data Portal for analysis and development of NWA opportunities based on system needs, internally identified by the DPAM team; however, that did not occur, as expected, so the Company shifted around its resources to be able to address this incremental NWA work.

   In the case of FTEs, whose salaries are recovered in base rates, there is a natural ebb and flow. The Company manages its dynamic work requirements and its workforce needed to complete those requirements on a continual basis. The Company must continually rebalance responsibilities as people are hired, change roles, or leave a position. The NWA effort is one

example, where that work has shifted across multiple departments and away from the System Data Portal. Today, the System Data Portal work is distributed among many employees, across multiple departments, including existing employees, rather than two dedicated FTEs. When the Company hired the two new FTEs, these resources were added to the total pool of resources who delivered not only System Data Portal work, but all of the other work across the ADA, DPAM, and NWA teams, and continue to do so today.

b. The DPAM, ADA, and NWA teams all performed work for the System Data Portal described in the Company's response to PUC 3-4 and PUC 3-5.

c. The DPAM, ADA, and NWA teams are responsible for maintaining and updating the Heat Map.

d. Because the two new FTEs were added to the total pool of resources to deliver the System Data Portal work, the Company did not establish specific time-charging processes to track this work. The teams charged their time spent doing this work to their home cost center and are recovered in base distribution rates.

e. Please see the Company's response to subpart (a) of this response. The Company is in the process of quantifying the labor dollars associated with the System Data Portal work and will provide that information to the PUC in advance of the PST Technical Session on September 24, 2020.

PUC 3-8

Request:

The Company is projecting a variance of $940,355 in GIS Enhancement (BR) and $151, 250 in GIS Enhancement (IS) at the conclusion of Rate Year 3.

a. What is GIS Enhancement (BR)?
b. What is GIS Enhancement (IS)?
c. Has the GIS been fully populated?
d. When is the population of the GIS expected to be completed?
e. If the population of the GIS is not expected to be completed by the end of Rate Year 3, will the funds included in the variance be used for GIS activities in the interim year (between Rate Year 3 and a rate case filing)?
f. If the project(s) are not anticipated to be completed, please provide the Company's view of how the Commission might address the fact that ratepayers have paid for something promised that never occurred.

Response:

a. The GIS system and underlying data represents the authoritative source for the Company's electric distribution line assets and how they interact electrically and physically (connected model).
The GIS Enhancement (BR) was used to denote the investments and business resources to analyze, identify, enhance and populate the new or updated data for Rhode Island. The GIS Enhancement (BR) work is focused on activities to prepare the Company's distribution system data to support the increasingly granular data requirements of the advanced capabilities of ADMS (Advanced Distribution Management System) and system planning. This work incorporates three primary activities: 1) analyze and enhance existing data including network connectivity, configuration, and attribute-level values, 2) identify and populate additional attributes and new asset types through field photo acquisition and other available data sources (field survey), and 3) identify and implement changes to enhance processes, quality control, and data governance.

b. The GIS Enhancement (IS) was used to denote the investments and information services resources to configure, develop and improve the GIS solution. GIS Enhancement (IS) is also focused on activities to support ADMS and system planning needs and is complementary to the GIS Enhancement (BR) work.

Prepared by or under the supervision of: William F. Jones, Jr.

Specifically, this project addresses 3 key areas. The first is to configure and program GIS to accommodate new asset types, equipment and data attributes (data model changes). The second, develop additional tools and enhance existing toolsets used to manage data quality and processes in GIS. The last is to refresh technical elements necessary to maintain the platform performance.

c. No, GIS is not fully populated. The activities and changes described above are still underway. Please see the response to subpart (d) for a status of when these activities and changes are expected to be completed.

d. The Company estimates that the rate case scope of work for GIS Enhancements (BR) and the GIS Enhancements (IS) will be complete by the end of July 2022. The data governance process and tools have been established and the remaining enhancements are estimated for December 2020. The field survey work is underway and is estimated to be completed by March 2021. GIS Enhancement (IS) work is estimated to be completed by June 2021. The GIS Enhancement (BR) data enhancement work is estimated to be completed by July 2022.

e. While some of the primary activities are estimated to be completed by the end of Rate Year 3, there is ongoing work expected through the end of July 2022 to complete the rate case scope of work. The Company views these activities as fundamentally needed to enable the advanced capabilities of ADMS and system planning and is committed to completing this work. The Company will allocate any funds approved for these activities as part of the Amended Settlement Agreement, and not spent by the end of Rate Year 3, to work completed during the interim "fourth year," where it deems appropriate.

f. The Company anticipates completing the projects described above. Please see the response to subpart (e).

PUC 3-9

Request:

Approval of the Amended Settlement set rates for three separate rate years but anticipated National Grid's next rate case filing would be timed so new rates would go into effect up to one year beyond the end of rate year 3. Please update the schedules to add a "fourth year." Also provide an explanation of the work that will be completed in that fourth year.

Response:

The Company has updated the schedules it provided in its response to PUC 2-1 to include a fourth year ("Rate Year 4") and has included an explanation, below, of the work the Company anticipates will be completed in Rate Year 4. The Company has also taken this opportunity to supplement the information initially provided in its response to PUC 2-1 regarding the status of certain investments.

Advanced Metering Functionality ("AMF")

Please see Attachment PUC 3-9-1 for an updated schedule of the investment plan, including a fourth year. In addition, the Company has updated the actual spending (column b) for this investment for Rate Years 1, 2 and 3 to develop the Updated AMF Business Case. In its response to PUC 2-1, the Company only reflected costs spent to contract with The Willdan Company (formerly, Energy and Environmental Economics, referred to as "E3"). The Willdan Company, formerly E3, has worked with the Company on the Updated AMF Business Case and the PST Subcommittee process since Rate Year 1; however, prior to the Willdan Company's involvement, the Company contracted with Accenture to assist with developing the Updated AMF Business Case. The Company inadvertently omitted the Accenture portion of the work from its response to PUC 2-1. The Company remains on track to finalize and file the Updated AMF Business Case during Rate Year 3. The Company does not estimate any additional spending during Rate Year 4 for the development of the Updated AMF Business Case. With regard to the projected underspend of $325,733 during Rate Year 4, that amount is directly attributable to the carryover into a fourth year, and the Company proposes to credit this against the revenue requirement for the AMF investment, if it is approved by the Commission.

Prepared by or under the supervision of: Kristoffer Kiefer, Assila Bataineh, Jason Small, Mark Siegel, William F. Jones, and Rashmi Kadam

PUC 3-9, page 2

Energy Storage

Please see Attachment PUC 3-9-2 for an updated schedule of the investment plan, including Rate Year 4.

The Company has shifted the funds related to the front-of-the-meter ("FTM") project from Rate Year 3 to Rate Year 4 to complete the project, as shown on Attachment PUC 3-9-2. Although the Company is still committed to and still expects the FTM project to be constructed as originally planned by the end of Rate Year 3, it does not reasonably expect that the project will be interconnected and fully operational before the end of Rate Year 3 because of potential delays of the winning bidder's in-service date. These delays may be caused by indirect and direct impacts from the COVID-19 pandemic on the developer's ability to deliver on the same time frame the Company expected before the COVID-19 pandemic. Direct impacts include supply chain delays and a non-standard workforce (*i.e.*, working from home); indirect impacts include those caused by the downturn of the economy, as an example. Based on the payment structure outlined in the FTM Request for Proposal, which the Company previously filed with the Commission on July 17, 2020, some of the contract payments to the winning bidder may not be paid until Rate Year 4.

Except for the above, the Company is neither requesting additional funds nor proposing additional scope for the energy storage projects in Rate Year 4. In addition, the Company is on to track to complete construction of the behind-the-meter project by end of Rate Year 3 and is not proposing to extend any work or funding for the project in Rate Year 4.

Electric Transportation

Please see Attachment PUC 3-9-3 for an updated schedule of the investment plan, including Rate Year 4.

The Company is proposing to continue each of the Electric Transportation programs in Rate Year 4 at the Rate Year 3 funding levels. This includes the Charging Station Demonstration Program ($4.3 million), Fleet Advisory Services Program ($0.1 million), Discount Pilot for Direct Current Fast Charging Station Accounts ($0.3 million), Off-Peak Charging Rebate Pilot ($.25 million), and Evaluation ($0.03 million).

PUC 3-9, page 3

Grid Modernization

Please see Attachment PUC 3-9-4 for an updated schedule of the investment plan, including Rate Year 4. In addition, the Company has taken this opportunity to supplement the information it provided in its response to PUC 2-1 regarding a summary of the investment plan to include a more detailed status of each of the following grid modernization investments in Rate Years 1, 2 and 3, as well as an explanation of the work the Company anticipates will be completed in Rate Year 4. Please also see the Company's response to PUC 3-1 for more detail regarding these investments.

- System Data Portal: The data contained in the System Data Portal will continue to be maintained and updated as described in the Company's response to PUC-3-6(c). There are no specific System Data Portal enhancements identified for Rate Year 4; however, new enhancements are expected to originate from collaborative consultation between the Company and external stakeholders. Please also see the Company's response to PUC 3-7 regarding the status of the hiring of full-time equivalents to do System Data Portal work.

- GIS Enhancement (IS): The Company is intending to initiate Phase 2 of the GIS System related enhancements. These are incremental to Phase 1 and accommodate further technical upgrades and additional enhancements including support for advanced analytics and ADMS/DSCADA Phase 2 requirements.

- GIS Enhancement (BR): The Company will continue to deliver activities that 1) analyze and enhance existing data including network connectivity, configuration, and attribute-level values, and 2) ongoing changes to enhance processes, quality control, and data governance.

- DSCADA/ADMS: The ADMS/DSCADA project will be implemented utilizing a phased approach putting different modules and functionality into service over the next four years. Phase 2 will be progressed, which builds upon the Phase 1 deliverable and adds additional capabilities, functionalities and features focusing on outage management and DSCADA.

PUC 3-9, page 4

Grid Modernization Information Technology ("IT")

Please see Attachment PUC 3-9-5 for an updated schedule of the investment plan, including Rate Year 4. In addition, the Company has taken this opportunity to supplement the information it provided in its response to PUC 2-1 regarding a summary of the investment plan to include a more detailed status of each of the following IT investments in Rate Years 1, 2 and 3, as well as an explanation of the work the Company anticipates will be completed in the fourth year.

- RTU Separation: The Company is forecasting completion of the three new RTU substations to be in service in Rate Year 4. An additional seven substations are planned to be dual ported as part of the RTU separation.

- Enterprise Service Bus: The Company is projecting the Enterprise Service Bus implementation to be completed December 2021. This would include completion of the development and implementation of the initial use cases and integrations for ADMS Phase 1 and GIS Phase 1. The Company will also progress additional integration use cases for other grid modernization integrations, including advanced analytics, GIS Phase 2 and ADMS Phase 2.

- Data Lake: Ongoing maintenance and support of the Data Lake implementation investments for data storage and hardware/server environments that will be established in Rate Year 3.

- PI Historian: Progression of the PI Historian implementation effort, including data and environment setups, completion of system/functional/performance testing, end user training and implementation readiness. This investment will not be completed until after Rate Year 4.

- Advanced Analytics: The Company will progress the advanced analytics end-to-end requirements, design, development and implementation for grid modernization reporting and analytics. It will maintain and expand data models, build additional data extractions, evolve tools and features to enhance the available data in an enterprise data warehouse, and deliver the remainder of the data management business use cases.

PUC 3-9, page 5

- Telecommunications: Based on the progression of both the AMF and Grid Modernization investments, there will be continued investments in network bandwidth, including implementation of a telecommunications engineering, design, and operations management platform. There will also be an effort to design and implement tools and solutions to support a network operations center to monitor, manage and maintain as National Grid telecom will provide critical infrastructure for grid operations.

- Cybersecurity: Based on the outcomes from the requirements and design efforts to integrate the Grid Modernization needs and use cases within the broader cybersecurity portfolio, the Company will progress the activities to design, build, integrate and deploy cybersecurity capabilities and features.

Power Sector Transmission Initiatives
Rate Year 3 Compliance Filing Schedule 6

			Ending 8/31/19			Ending 8/31/20						Ending 8/31/21				Ending 8/31/22			
			RY1			RY2						RY3				RY4			
Program		Status	Approved	Actual*	Variance	Approved	Actual to Date	Projected	Actual + Projected	RY2 Variance	RY2 Cumulative Variance	Approved	Projected	RY3 Variance	RY3 Cumulative Variance	Approved	Projected	RY4 Variance	RY4 Cumulative Variance
AMI Buisness Case			$ 666,667.00	$2,007,427.92	$ (1,340,760.92)	$ 666,667.00	$ 245,024.94	$ -	$ 245,024.94	$ 421,642.06	$ (919,118.86)	$ 666,667.00	$ 88,482.13	$ 578,184.87	$ (340,933.99)	$ 666,667.00	$ -	$ 666,667.00	$ 325,733.01
	OPEX		$ 666,667.00	$ 2,007,427.92	$ (1,340,760.92)	$ 666,667.00	$ 245,024.94	$ -	$ 245,024.94	$ 421,642.06	$ (919,118.86)	$ 666,667.00	$ 88,482.13	$ 578,184.87	$ (340,933.99)	$ 666,667.00	$ -	$ 666,667.00	$ 325,733.01
	CAPEX		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
System Data Portal																			
	OPEX				$ -				$ -	$ -	$ -			$ -	$ -			$ -	$ -
	CAPEX				$ -				$ -	$ -	$ -			$ -	$ -			$ -	$ -
GIS Enhancement																			
	OPEX				$ -				$ -	$ -	$ -			$ -	$ -			$ -	$ -
	CAPEX				$ -				$ -	$ -	$ -			$ -	$ -			$ -	$ -
Etc.																			
	OPEX																		
	CAPEX																		

* The $2,007,427.92 includes $492,209.17 in AMF Business Case-related costs incurred prior to Rate Year 1 and in anticipation of the preliminary AMF work identified in the initial and Amended Settlement Agreement.

Explanation:

This attachment includes an updated schedule of the investment plan, including a fourth year. In addition, the Company has updated the actual spending (column b) for this investment for Rate Years 1, 2 and 3 to develop the Updated AMF Business Case. In its response to PUC 2-1, the Company only reflected costs spent to contract with The Willdan Company (formerly, Energy and Environmental Economics, referred to as "E3"). The Willdan Company, formerly E3, has worked with the Company on the Updated AMF Business Case and the PST Subcommittee process since Rate Year 1; however, prior to the Willdan Company's involvement, the Company contracted with Accenture to assist with developing the Updated AMF Business Case. The Company inadvertently omitted the Accenture portion of the work from its response to PUC 2-1. The Company remains on track to finalize and file the Updated AMF Business Case during Rate Year 3. The Company does not estimate any additional spending during Rate Year 4 for the development of the Updated AMF Business Case. With regard to the projected underspend of $325,733 during Rate Year 4, that amount is directly attributable to the carryover into a fourth year, and the Company proposes to credit this against the revenue requirement for the AMF investment, if it is approved by the Commission.

Power Sector Transformation Initiatives
Rate Year 3 Compliance Filing Schedule 6
Investment Plan Comparison

		RY1 - End 08/31/2019			RY2 - End 08/31/2020						RY3 - End 08/31/2021				RY4 - End 08/31/2022			
	Program	Approved	Actual	Variance	Approved	Actual to Date	Projected	Actual + Projected	RY2 Variance	RY2 Cumulative Variance	Approved	Projected	RY3 Variance	RY3 Cumulative Variance	Approved	Projected	RY4 Variance	RY4 Cumulative Variance
Storage	CAPEX	$ 894,375	$ -	$ 894,375	$ 1,341,563	$ 7,958	$ 1,200	$ 9,158	$ 1,332,405	$ 2,226,780	$ -	$ 1,726,780	$ (1,726,780)	$ 500,000	$ -	$ 500,000	$ (500,000)	$ -
	Opex	$ 5,000	$ 29,226	$ (24,226)	$ 24,000	$ -	$ -	$ -	$ 24,000	$ (226)	$ 41,250	$ 31,024	$ 10,226	$ 10,000	$ -	$ 10,000	$ (10,000)	$ -

Power Sector Transmission Initiatives
Rate Year 3 Compliance Filing Schedule 6

			RY1			RY2						RY3				RY4			
Program		Status	Approved	Actual	Variance	Approved	Actual to Date	Projected	Actual + Projected	RY2 Variance	RY2 Cumulative Variance	Approved	Projected	RY3 Variance	RY3 Cumulative Variance	Proposed	Projected	RY3 Variance	RY4 Cumulative Variance
ELECTRIC TRANSPORTATION																			
	OPEX	Ongoing	$634,197	$ 377,195	$ 257,002	$949,951	$ 956,294	$ -	$ 956,294	$ (6,343)	$ 250,659	$1,635,170	$ 992,259	$ 642,911	$ 893,570	$1,635,170	$1,715,230	$ (80,060)	$ 813,510
	CAPEX	Ongoing	$824,748	$ 75,204	$ 749,544	$1,419,195	$ 1,711,110	$ -	$ 1,711,110	$ (291,915)	$ 457,629	$3,262,316	$ 2,351,200	$ 911,116	$1,368,745	$3,262,316	$3,186,615	$ 75,701	$1,444,446

Power Sector Transformation Initiatives
Rate Year 3 Compliance Filing Schedule 6
Investment Plan Comparison

			Ending 8/31/19				Ending 8/31/20			Ending 8/31/21				Ending 8/31/22			
			RY1			RY2			Cumulative	RY3			Cumulative	RY4			Cumulative
Program		Status	Approved	Actual	RY 1 Variance	Approved	Actual	RY2 Variance	Variance through RY2	Approved	Projected	RY3 Variance	Variance through RY3	Approved	Projected	RY4 Variance	Variance through RY4
			(a)	(b)	(c)=(a)-(b)	(d)	(e)	(f)=(d)-(e)	(g)=(c)+(f)	(h)	(i)	(j)=(h)-(i)	(k)=(g)+(j)	(l)	(m)	(n)=(l)-(m)	(o)=(k)+(n)
System Data Portal																	
	OPEX		$466,667	$0	$466,667	$700,000	$0	$700,000	$1,166,667	$700,000	$0	$700,000	$1,866,667		$700,000	($700,000)	$1,166,667
	CAPEX				$0		$0	$0	$0			$0	$0			$0	$0
GIS Enhancement (IS)																	
	OPEX		$142,333	$33,789	$108,544	$142,333	$33,872	$108,461	$217,005	$142,333	$209,985	($67,652)	$149,353		$160,000	($160,000)	($10,647)
	CAPEX				$0		$188,454	($188,454)	($188,454)		$828,850	($828,850)	($1,017,304)		$984,498	($984,498)	($2,001,802)
GIS Enhancement (BR)																	
	OPEX		$0	$43,182	($43,182)	$1,028,000	$646,278	$381,722	$338,540	$1,028,000	$538,400	$489,600	$828,140		$200,000	($200,000)	$628,140
	CAPEX				$0		$0	$0	$0			$0	$0			$0	$0
DSCADA/ADMS																	
	OPEX		$0	$62,171	($62,171)	$436,000	$404,650	$31,350	($30,821)	$0	$972,035	($972,035)	($1,002,856)		$1,143,000	($1,143,000)	($2,145,856)
	CAPEX				$0		$1,456,651	($1,456,651)	($1,456,651)		$3,062,000	($3,062,000)	($4,518,651)		$3,102,000	($3,102,000)	($7,620,651)

Grid Mod investments benefitting multiple jurisdictions are Service Company investments and will impact future revenue requirements as rent expense.
Actual capital amounts represent expenditures for each year. It is not plant in-service for calculating revenue requirements

Power Sector Transformation Initiatives
Rate Year 3 Compliance Filing Schedule 6
Investment Plan Comparison

		Ending 8/31/19			Ending 8/31/20				Ending 8/31/21				Ending 8/31/22			
		RY1			RY2			Cumulative	RY3			Cumulative	RY4			Cumulative
Program		Approved	Actual	RY 1 Variance	Approved	Actual	RY2 Variance	Variance through RY2	Approved	Projected	RY3 Variance	Variance through RY3	Approved	Projected	RY4 Variance	Variance through RY4
		(a)	(b)	(c)=(a)-(b)	(d)	(e)	(f)=(d)-(e)	(g)=(c)+(f)	(h)	(i)	(j)=(h)-(i)	(k)=(g)+(j)	(l)	(m)	(n)=(l)-(m)	(o)=(k)+(n)
RTU Separation																
	OPEX	$0	$0	$0	$60,000	$41,804	$18,196	$18,196	$60,000	$60,000	$0	$18,196	$60,000	$60,000	$0	$18,196
	CAPEX	$570,000	$60,000	$510,000	$950,000	$8,491	$941,509	$1,451,509	$190,000	$150,000	$40,000	$1,491,509	$190,000	$265,000	($75,000)	$1,416,509
Enterprise Services Bus																
	OPEX	$0	$0	$0	$402,346	$105,286	$297,060	$297,060	$504,066	$28,066	$476,000	$773,060	$0	$335,000	($335,000)	$438,060
	CAPEX	$0	$0	$0	$0	$30,059	($30,059)	($30,059)	$4,022,163	$394,502	$3,627,661	$3,597,603	$0	$291,454	($291,454)	$3,306,149
Data Lake																
	OPEX	$0	$0	$0	$388,092	$0	$388,092	$388,092	$545,532	$0	$545,532	$933,624	$0	$0	$0	$933,624
	CAPEX	$226,765	$0	$226,765	$0	$0	$0	$226,765	$0	$0	$0	$226,765	$0	$0	$0	$226,765
PI Historian																
	OPEX	$0	$0	$0	$515,000	$0	$515,000	$515,000	$515,000	$12,170	$502,830	$1,017,830	$0	$505,000	($505,000)	$512,830
	CAPEX	$113,000	$0	$113,000	$0	$0	$0	$113,000	$0	$42,792	($42,792)	$70,208	$0	$102,700	($102,700)	($32,492)
Advanced Analytics																
	OPEX	$0	$0	$0	$299,978	$111,078	$188,900	$188,900	$338,852	$72,366	$266,486	$455,386	$0	$305,000	($305,000)	$150,386
	CAPEX	$2,045,256	$0	$2,045,256	$952,413	$0	$952,413	$2,997,669	$609,026	$435,813	$173,213	$3,170,882	$0	$559,229	($559,229)	$2,611,653
Telecommunications																
	OPEX	$0	$8,025	($8,025)	$425,022	$327,349	$97,673	$89,648	$636,886	$255,136	$381,750	$471,398	$0	$390,000	($390,000)	$81,398
	CAPEX	$77,748	$0	$77,748	$38,874	$0	$38,874	$116,622	$38,982	$861,141	($822,159)	($705,537)	$0	$1,258,325	($1,258,325)	($1,963,862)
Cybersecurity																
	OPEX	$0	$696	($696)	$802,100	$269,999	$532,101	$531,405	$623,280	$343,784	$279,496	$810,901	$0	$150,000	($150,000)	$660,901
	CAPEX	$2,564,388	$0	$2,564,388	$1,247,855	$0	$1,247,855	$3,812,244	$826,073	$476,884	$349,189	$4,161,432	$0	$511,538	($511,538)	$3,649,894

Grid Mod investments benefitting multiple jurisdictions are Service Company investments and will impact future revenue requirements as rent expense.
Actual capital amounts represent expenditures for each year. It is not plant in-service for calculating revenue requirements