

January 31, 2018

VIA ELECTRONIC DELIVERY

Honorable Kathleen H. Burgess
Secretary
New York State Public Service Commission
Three Empire State Plaza, 19th Floor
Albany, New York 12223-1350

RE: Case 14-M-0101 – Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision (REV)

NIAGARA MOHAWK POWER CORPORATION d/b/a NATIONAL GRID: DISTRIBUTED SYSTEM PLATFORM REV DEMONSTRATION PROJECT – Q4 2017 REPORT

Dear Secretary Burgess:

Niagara Mohawk Power Corporation d/b/a National Grid (“National Grid”) hereby submits for filing its quarterly update to the Distributed System Platform REV Demonstration Project Implementation Plan covering the period of October 1, 2017 to December 31, 2017 (“Q4 2017 Report”) as required by the REV Demonstration Project Assessment Report filed by the New York State Department of Public Service Staff (“Staff”) with the Commission on July 15, 2016 in Case 14-M-0101.

Please direct any questions regarding this filing to:

Arunkumar Vedhathiri
Director, New Energy Solutions
National Grid
1125 Broadway
Albany, NY 12204
Tel.: 518-433-5013
Mobile: 518-423-5738
Email: arunkumar.vedhathiri@nationalgrid.com

Hon. Kathleen H. Burgess, Secretary
National Grid: Distributed System Platform REV Demonstration Project
Q4 2017 Report
January 31, 2018
Page 2

National Grid looks forward to continuing to work collaboratively with Staff as it proceeds with the implementation of the Distributed System Platform REV Demonstration Project.

Respectfully submitted,

/s/ Karla M. Corpus

Karla M. Corpus
Senior Counsel

Enc.

cc: Marco Padula, DPS Staff, w/enclosure (via electronic mail)
Christian Bonvin, DPS Staff, w/enclosure (via electronic mail)
Denise Gerbsch, DPS Staff, w/enclosure (via electronic mail)
Michael Summa, DPS Staff, w/enclosure (via electronic mail)
Melanie Littlejohn, w/enclosure (via electronic mail)
Cathy Hughto-Delzer, w/enclosure (via electronic mail)
Arunkumar Vedhathiri, w/enclosure (via electronic mail)
Carlos Nouel, w/enclosure (via electronic mail)
Ronald Diorio, w/enclosure (via electronic mail)
Daniel Payares Luzio, w/enclosure (via electronic mail)
Pamela I. Echenique, w/enclosure (via electronic mail)
Carol Teixeira, w/enclosure (via electronic mail)
Janet Audunson, w/enclosure (via electronic mail)



**Distributed System Platform
REV Demonstration Project
Buffalo, New York**

Q4 2017 Report

January 31, 2018

Table of Content

1.0	Executive Summary	1
2.0	Highlights Since Previous Quarter	3
2.1	Major Task Activities	4
2.2	Challenges, Changes, and Lessons Learned this Quarter	5
3.0	Next Quarter Forecast.....	6
3.1	Checkpoints/Milestone Progress	6
4.0	Work Plan & Budget Review	7
4.1	Updated Work Plan.....	7
4.2	Updated Budget	9
5.0	Progress Metrics	9

1.0 Executive Summary

Under the Commission's Reforming the Energy Vision ("REV") Proceeding, the Distributed System Platform ("DSP") Demonstration Project (the "Project") aims to develop, deploy, and test the first of its kind solution with the objective to create a new distribution-level energy market. The Project will identify the locational generation value of customer-owned distributed energy resources ("DER") and provide a platform that will allow these assets to participate and provide energy and/or ancillary services to the electric distribution system (*i.e.*, the "grid"). The Project was initially filed with the New York State Public Service Commission ("Commission") by Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") on July 1, 2015. A revised scope for the Project was filed with the Commission on June 15, 2016. The review of the revised scope for the Project was completed by the New York State Department of Public Service Staff ("DPS Staff") on June 22, 2016. DPS Staff subsequently filed an assessment report with the Commission on July 15, 2016 finding that the Project meets the Commission's REV policy objectives and demonstration project principles and complies with Ordering Clause 4 of the Commission's Track One Order.¹

The Project will test services based on a local, small-scale, but centralized DSP that will communicate with network-connected Points of Control ("POCs") associated with the Buffalo Niagara Medical Campus Inc. ("BNMC") DERs. DSP is defined as "an intelligent network platform that will provide safe, reliable and efficient electric services by integrating diverse resources to meet customers' and society's evolving needs" where the "DSP fosters broad market activity that monetizes system and social values, by enabling active customer and third party engagement that is aligned with the wholesale market and bulk power system."²

The Project team consists of National Grid, BNMC, and Opus One Solutions ("Opus One"). Opus One will provide contracted services to National Grid. Opus One is a software engineering company which shares the vision for the Project to develop and deploy one platform that can accommodate a complete range of business models. Their role in the Project will encompass not only software development, but also thought leadership, planning, and execution.



Image 1.1 – Part of the Buffalo Niagara Medical Campus

¹ Case 14-M-0101 – *Proceeding On Motion of the Commission in Regard to Reforming the Energy Vision* ("REV Proceeding"), Order Adopting Regulatory Policy Framework and Implementation Plan (issued February 26, 2015) ("Track One Order"), p. 132.

² *Id.*, p. 31

The BNMC (depicted in Image 1.1), consisting of thirteen (13) member institutions and close to one hundred (100) public and private companies that are a dynamic mix of health care, life sciences, medical education, and private enterprise, is spurring significant growth in Western New York. As healthcare providers, most BNMC member institutions are required to have access to back-up or emergency power, which typically employ distributed generation (“DG”). However, even in an area that is affected by extreme weather such as Buffalo, these expensive DG assets sit idle most of the time. With the DSP, DER owners would have an option to extract more value from those DG assets by participating in the energy market through the DSP.

If successful, the DSP will create new revenue streams for both the DER owners and National Grid, and meet the other New York REV objectives as stated in the Track One Order. The DSP could then be extended across National Grid’s service territory.



Image 1.2 – Images of Kaleida Health (left) and the Roswell Park Cancer Institute (right), members of the BNMC

The Financial Model for DER Value Streams: LMP+D+E

In the near term, services transacted and purchased through the DSP will test the implementation of a “LMP+D+E” financial model approach for electric services. The value of “LMP+D” will be evaluated in the Project and is expected to generate sufficient financial incentives for existing DERs to participate in the DSP market. For LMP, the Project will consider New York Independent System Operator (“NYISO”) locational-based marginal prices (“LBMP”) Zone-A West for day-ahead and real-time market prices³ and any additional capacity constraints and transmission losses that may be priced into the local area through the New York Installed Capacity Market (“ICAP”), if they can be determined.

“D” refers to distribution delivery value, which is the value that DERs can provide to the electric distribution system, such as load relief to help alleviate substation or feeder constraints. This evaluation effort will analyze potential issues with capacity provision by considering average demand, peak demand, forecasts of demand growth, day-ahead load forecast, and historical demand at the feeder and substation levels. After analyzing these issues, values can be assigned to each of these items. Energy supply, volt-ampere reactive (“VAR”) support, voltage

³ NYISO LBMP and real-time pricing information, available at: http://www.nyiso.com/public/markets_operations/market_data/pricing_data/index.jsp

2.1 Major Task Activities

1. DSP First Feature Release (In Progress)

National Grid and Opus One focused significant effort on the technology development in this quarter, as the development of various software features and services was originally planned for parallel development to meet an aggressive time schedule of Q4 2017 for a Release 1 completion.

These features were created in an Amazon Web Services (“AWS”) Cloud development environment, and released to a testing environment in three (3) sub-releases. The main features developed were:

- Ability to calculate Day-Ahead and Same-Day events using NYISO data for Zone A West, with key active “LMP+D+E” components;
- Ability to manually create and accept events;
- Ability to view feeder and assets using Geographic Information System (“GIS”); and
- Several User Interfaces (“UI”) for the DSP Operator.

2. DSP End-to-End Testing

The Project Team worked closely with National Grid Information Services (“IS”) and Opus One in the functional and acceptance testing. National Grid IS was able to successfully test all the developed data feeds to the DSP.

At the same time, the Project Team developed the testing scenarios that served as basis for the User Acceptance Testing prior to the Go/No-Go Decision of the planned Release 1 Go Live. During the validation of these scenarios, the Project Team identified a few key gaps that did not meet the design or operational requirements needed for the seamless integration of customer’s assets and market operations in the DSP. This resulted in the postponement of the Go Live date to Q2 2018. The key gaps were mainly related to:

- Interoperability of the Day-Ahead and Same-Day Markets; and
- Event communications.

The Project Team is currently working closely with all stakeholders in order to assess the impact of this delay on the overall Project schedule, while working in a new process to improve the alignment of the software development with the business requirements.

2.2 Challenges, Changes, and Lessons Learned this Quarter

2017	Issue or Change	Resulting Change to Project Scope/Timeline?	Strategies to Resolve	Lessons Learned
Q4	Challenges in the software development for Release 1 resulted in few but key gaps in the DSP functionality that prevented user acceptance.	The Release 1 Go Live date was postponed. The Project Team is currently assessing the impact on the overall Project timeline.	The Project Team is working closely with the stakeholders to efficiently address these issues.	A direct line of communication between the end user and the developer is critical, as it prevents confusion and erroneous prioritization of requirements.
Q4	Conflicting projects could result in the voluntary exclusion of Roswell Park Cancer Institute ("RPCI") from this Project.	The BNMC could effectively have one (1) remaining active participant (Kaleida Health).	The Project Team is working closely with RPCI to address any issues that could obtrude their participation in the DSP.	During the design phase, utilities and regulators must be aware of conflicting projects and other limitations that may impact Project participants.
Q4	Certain capital expenses were determined to be more properly categorized as operating expenses.	None.	The Company updated the Project budget to account for costs that may have originally been characterized as capital or operating expenses, but now, because of changed circumstances (e.g., licensing instead of owning software), should be categorized differently.	The characterization of Project expenses is subject to revision.

After a reevaluation of the status of the software development and customer readiness, the Project Team currently anticipates a DSP launch, and the commencement of financial transactions by Q2 2018.

3.0 Next Quarter Forecast

During the 1st Quarter of 2018 the Project team will continue to work on the technology development of the DSP software. The majority of the effort will be devoted in coding, releasing, and testing the features of the DSP.

At the same time, the Project team will continue to work with the BNMC, especially Kaleida Health, which has continued to show strong interest in participating in the final stage of the Project by selecting and installing M&V equipment and setting up the required communications network.

3.1 Checkpoints/Milestone Progress

Checkpoint/Milestone	Anticipated Start-End Date	Revised Start-End Date	Status
1 DSP Sprint Releases	10/27/17 – 4/9/18	1/10/18 – 6/1/18	●
2 Customer M&V Equipment Installation	1/5/18 – 2/5/18	1/10/18 – 6/1/18	●
Key			
● On-Track			
● Delayed start, at risk of missing on-time completion, or over-budget			
● Terminated/abandoned checkpoint			

1. DSP Sprint Releases

Status: [●]
Start Date: 1/10/18
End Date: 6/1/18

National Grid and Opus One will continue to work closely, changing strategy by adopting an agile process using a scrum framework for a deeper coordination in software development, improving communications and accelerating the release of features for the DSP. Under the new process, the Project Team will work directly with Opus One's development team in multi week sessions, in order to detail and groom feature requirements.

Each development sprint will have two (2) week duration. After each sprint, the development team will showcase the progress during a demonstration session. When enough requirements are developed, the Project Team will migrate the code to the testing environment for a final end to end testing before the final push into production.

In order to be successful, this process will need active and constant engagement from the Project Team, Opus One's development team and National Grid IS testing team. Doing so will allow the Project Team to adjust quickly, customizing the software to address all the customer

and end-user needs. National Grid anticipates that this development cycle will result in a stable flow of software modules that will be reliable during the Project demonstration stage.

Initially, the Project Team will focus in completing the requirements to meet the gaps found during the User Acceptance Testing phase. In order to mitigate the impact on the Project's schedule, the Project Team will work to develop the software incrementally, commencing with the requirements needed for a Proof of Concept, a Minimum Viable Product, and then the fully developed DSP.

2. Customer M&V Equipment Installation

Status: [●]

Start Date: 1/10/18

End Date: 6/1/18

National Grid's Control and Integration ("C&I"), Meter Data Services and Meter Data Engineering will work closely with the BNMC in order to design, procure and install the M&V equipment for the DSP. The initial design requires an advanced revenue grade meter using a Verizon Wireless Network in order to push data at a fifteen (15) minute interval to the DSP. Each participating asset will require a dedicated meter in order to gather the required information for settlement purposes.

The Project Team will work closely with the BNMC to coordinate the required modifications and upgrades for the installation of the equipment. Kaleida Health is currently undergoing several renovation projects in their facility and is working with National Grid engineers to allocate sufficient space for the corresponding meters and Current Transformers ("CT"). However, there is some risk that the customer's timeline for renovation may delay the installation of the meters.

4.0 Work Plan & Budget Review

4.1 Updated Work Plan

An updated version of the Gantt chart found in the DSP Project Implementation Plan is set out below.

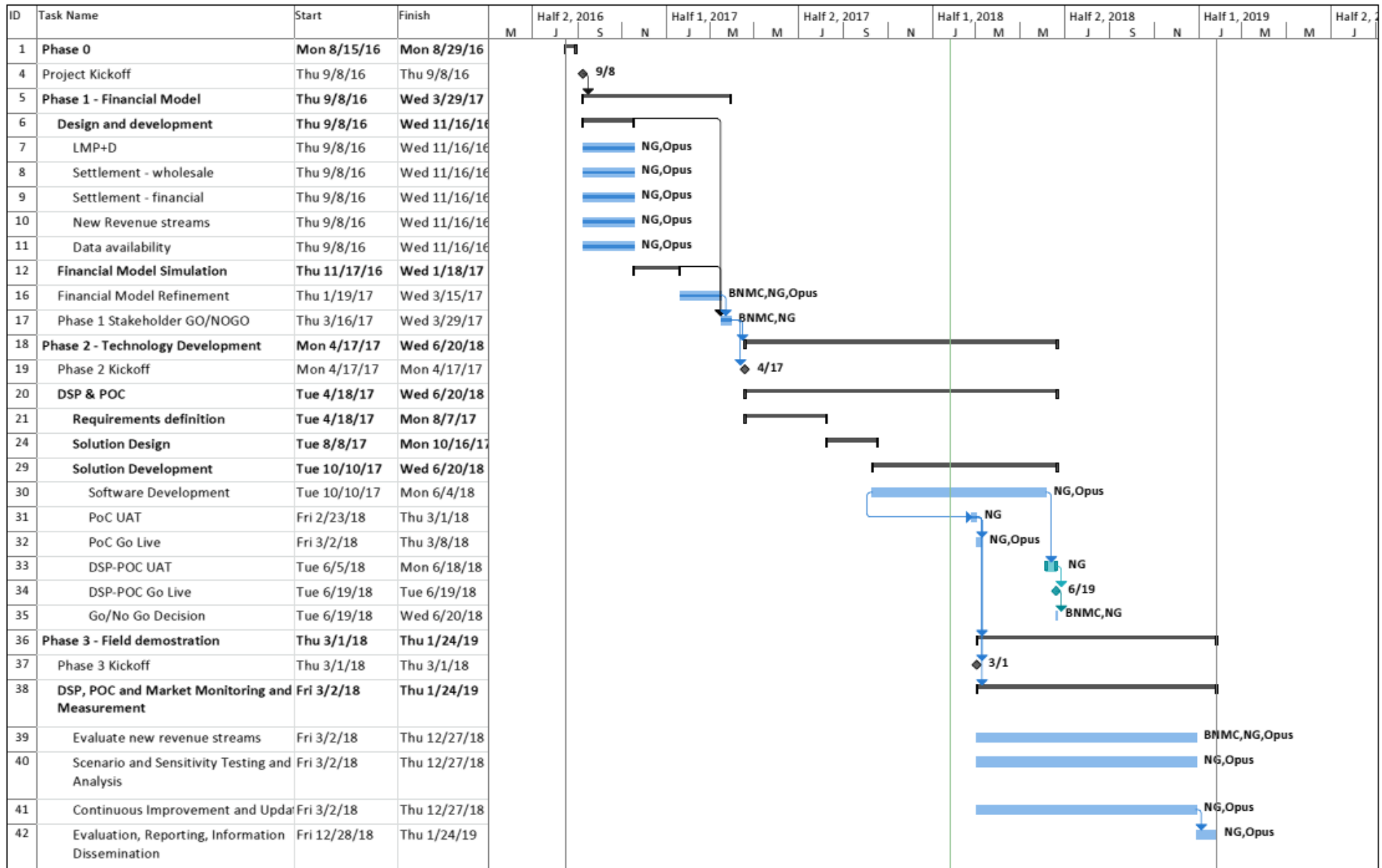


Figure 4.1 – Update of original Gantt Chart found in DSP Implementation Plan

4.2 Updated Budget

There are updates to the estimated budget set forth in the filed DSP Implementation Plan. The updated budget information is displayed in the table below.

Project Task	4 th Quarter Actual Spend	Project Total Spend to Date	Project Budget ⁶	Remaining Balance
CapEx				
	\$ 0	\$ 0	\$ 0	\$0
OpEx				
NG Resources	\$ 87,385	\$ 706,806	\$ 1,022,000	\$ 315,194
IT Integration Services	\$ 79,871	\$ 213,796	\$ 1,050,000	\$ 836,204
Program Management	\$ 266,379	\$ 872,363	\$ 2,000,000	\$ 1,127,637
Software License (est)	\$ -	\$ -	\$ 1,000,000	\$ 1,000,000
Software Development (\$2M in kind)	\$ -	\$ -	\$ -	\$ -
Annual License Maintenance (est)	\$ -	\$ -	\$ 200,000	\$ 200,000
Total	\$ 433,635	\$ 1,792,965	\$ 5,272,000	\$ 3,479,035

Table 4.1 – Updated Budget

The incremental costs associated with the Project as of December 31, 2017 total \$821,629. Continued monitoring and reporting of incremental costs will be included in subsequent quarterly reports.

5.0 Progress Metrics

Key Progress Metrics have not yet been finalized, but will continue to be developed during Phase 2 based on the Check Points identified in pages 15 and 16 of the DSP Implementation Plan.

⁶ The Company updated the Project budget to reflect incremental costs, and to account for costs that may have originally been characterized as capital or operating expenses, but now, because of changed circumstances (e.g., licensing instead of owning software), should be categorized differently.