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Assistant General Counsel

April 30, 2020

VIA ELECTRONIC DELIVERY

Honorable Michelle L. Phillips
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 GENERATION INTERCONNECTION REV DEMONSTRATION PROJECT – Q1 2020 REPORT

Dear Secretary Phillips:

Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid") hereby submits for filing in the subject proceeding the Q1 2020 Report for the Distributed Generation Interconnection REV Demonstration Project covering the period of January 1, 2020 to March 31, 2020.

Please direct any questions regarding this filing to:

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Thank you.

Respectfully submitted,

/s/ Janet M. Audunson

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Enc.

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Distributed Generation Interconnection
REV Demonstration Project
Case 14-M-0101

Quarterly Report – Q1 2020

April 30, 2020

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1.0 Executive Summary

On October 19, 2018, Niagara Mohawk Power Corporation d/b/a National Grid ("National Grid" or the "Company") filed a Revised Implementation Plan (the "Revised Implementation Plan") for the Distributed Generation Interconnection REV Demonstration Project (the "Project") in Case 14-M-0101.[1] The Company designed the initial phase of the Project to test alternative solutions for increasing the pace and scale of interconnecting distributed generation ("DG") systems above 50 kW through upfront investments in common upgrades at two substations (Peterboro and East Golah) coupled with a cost-allocation methodology aimed at removing barriers for DG interconnection applicants. The Company proposed to expand the Project's scope to test: 1) whether the cost-allocation approach can be used to facilitate DG development in targeted areas, such as landfills and brownfields; 2) strategies for proactively and constructively engaging communities and municipalities in the DG development process; 3) whether replacing coupling capacitor voltage transformer ("CCVT") equipment with optical voltage transformer ("VT") equipment in a 115-13.2 kV substation will reduce the time to install zero-sequence overvoltage ("$3V_0$") protection equipment; and 4) the potential for switched-source technology to increase hosting capacity through active power flow control (*i.e.*, diverting power production to adjacent feeders).

The expanded approach enables the Company to build on the Project's early successes without losing momentum. Additionally, the items tested in the Revised Implementation Plan will further help the Company refine its approach for scaling the DG interconnection cost-allocation model in a manner best suited to facilitate the efficient development of DG across the State. The purpose of this quarterly report is to provide an update on the status and changes to the Project

2.0 Highlights Since Previous Quarter

2.1 Initial Phase of the Project

National Grid completed construction of common upgrades at the Peterboro and East Golah substations in late 2017, ahead of schedule. The work included the installation of $3V_0$ protection[2] and load tap changer ("LTC") controller upgrades to two transformers at each substation. During the design and construction phases, the Company marketed the increased hosting capacity and the Project's cost-allocation mechanism to DG developers. With these efforts, the Company was able

[1] Case 14-M-0101, *Proceeding on Motion of the Commission in Regard to Reforming the Energy Vision* ("REV Proceeding"), Niagara Mohawk Power Corporation d/b/a National Grid Distributed Generation Interconnection REV Demonstration Project – Revised Implementation Plan (filed October 19, 2018) ("Revised Implementation Plan").

[2] $3V_0$ protection is required where delta primary-wye grounded secondary power transformers can experience backfeed under light load conditions from sources on the electric distribution system (*e.g.*, DG projects).

to secure a sufficient level of DG interconnection applications for each substation to fully subscribe the available hosting capacity.

2.1.2 Queue Status

Below is the queue status for the East Golah and Peterboro substations.

East Golah					
CASE#	**Status**	**Step**	**Sub-Step**	**Queue Date**	**Size (kW)**
102158	Connected	Final Approval Sent	N/A	3/8/2016	2000
171687	Construction	In Progress	Design and Engineering (100%)	3/23/2018	5000
171666	Construction	In Progress	Design and Engineering (100%)	3/13/2018	4000
171238	Construction	Not Started	N/A	4/5/2018	5000
171907	Construction	In Progress	Design and Engineering (100%)	3/23/2018	3000
187820	Construction	In Progress	Design and Engineering (100%)	7/5/2018	5000
191001	Connected	Final Approval Sent	N/A	8/3/2018	350
224877	Agreement	Construction Quote	Awaiting Payment	5/13/2019	2200
229610	Agreement	Construction Quote	Payment Processed	6/18/2019	1450

Peterboro					
CASE#	**Status**	**Step**	**Sub-Step**	**Queue Date**	**Size (kW)**
102114	Connected	Final Approval Sent	Reconciliation Complete	6/22/2016	1400
170433	Construction	In Progress	Design and Engineering (100%)	2/27/2018	1980
170444	Construction	In Progress	Design and Engineering (100%)	2/21/2018	3000
172193	Construction	Not Started	N/A	3/26/2018	5000
173939	Construction	In Progress	Design and Engineering (100%)	4/19/2018	5000
173942	Construction	In Progress	Design and Engineering (100%)	4/19/2018	5000
190582	Construction	Not Started	N/A	7/27/2018	2900
199116	Agreement	Construction Quote	Awaiting Payment	10/29/2018	3250
284060	Preliminary Study	Preliminary Results Meeting	Occurred	4/1/2020	5000
287292	Study	Draft	N/A	4/23/2020	1750

2.1.3 Cost Recovery

The Company's actual spending on the initial phase of the Project was $1,751,259, slightly above the initial estimated budget of $1,581,351. The common substation upgrades are complete. To date, the Company has recovered $1,840,238 from DG applicants who initiated the interconnection process at the initial substations. All additional payments received in excess of the total Project spend from developers will be refunded as part of the Project reconciliation process.

2.2 Second Phase of the Project

2.2.1 Major Task Activities

National Grid filed the Revised Implementation Plan in October 2018. In the second phase of the Project, the Company is testing the common-upgrade cost-allocation concept by expanding the Project to areas with municipal landfills and brownfield sites that have high DG (or DG coupled with energy storage) development potential. The sites have drawn interest from municipal officials and the DG developer community. Likewise, the New York State Energy Research and Development Authority (NYSERDA) has redesigned the NY-Sun MW Block Program to include a new $0.10/kW incentive adder for solar projects on landfill/brownfield sites, enhancing the economics of developing DG projects in these areas. Furthermore, developing DG projects on the sites may offer multiple benefits to municipalities by reducing energy costs, meeting local sustainability commitments, and providing an additional stream of revenue via lease payments, all while preserving farmland. Also, the proactive outreach to communities and municipalities in these targeted areas will accelerate the pace of DG development by addressing local concerns and permitting delays. Prospect Hill has failed to garner significant developer interest, and therefore Berry Road substation, which has several projects already in queue, will replace Prospect Hill substation for the second phase of the Project. The Prospect Hill Project installed an optical voltage transformer. The Company's evaluation showed no construction time savings in installing the optical voltage transformer (VT) vs the coupler capacitor voltage transformer CCVT.

Below is the project milestone schedule included in the Revised Implementation Plan, updated to include changes, adjustments, and the status of each milestone.

General Project Milestones	Start Date	Finish Date	Status
Milestone			
Provide funding numbers	11/1/2018	11/15/2018	Completed
Finalize engineering analysis of landfill sites	11/1/2019	11/15/2018	Completed
Substation design	11/15/2018	4/30/2019	Completed
General Project Milestones	**Start Date**	**Finish Date**	**Status**
Outreach to municipalities and industry (4 sites)	1/1/2019		On-going
Order long-lead materials	12/1/2018	12/19/2018	Completed

Begin marketing existing "DG ready sites" - 26 Sites	1/1/2019	3/31/2020	Completed
Outreach to eleven landfill counties along with NYSERDA	1/1/2019	12/31/2019	Completed
Outreach to fifteen landfill counties along with NYSERDA	1/1/2019	3/31/2020	Completed

Substation Milestones for Cedar, Indian River and Butler

Milestone	Start Date	Finish Date	Status
$3V_0$ design and engineering	11/15/2018	4/30/2019	Completed
Civil work	7/1/2019	7/31/2019	Completed
Electrical work	8/1/2019	9/30/2019	Completed
Relay work	10/1/2019	11/30/2019	Completed
Anticipated In-Service Date		12/31/2019	Completed

Substation Milestones for Berry Road

Milestone	Start Date	Finish Date	Status
$3V_0$ design and engineering	5/9/2019	12/5/2019	Completed
Civil work	5/4/2020	5/22/2020	
Electrical work	5/26/2020	6/30/2020	
Relay work	7/1/2020	7/24/2020	
Anticipated In-Service Date		7/31/2020	

2.2.2 Municipal / Community Engagement

The Company's "Going Solar for Municipalities" event was successful, with the Company seeing an increase in the number of distributed generation applications following the October 3, 2019 event. Only one substation, Prospect Hill, has failed to garner significant developer interest, and therefore Berry Road substation, which has several projects already in queue, will replace Prospect Hill for the second phase of the Project. The Company also plans to work with the New York Solar Energy Industry Association on further marketing efforts.

2.2.3 Scaling Common Upgrade Cost Allocation Model

The Company worked with NYSERDA to identify four substations where common upgrades were required before DG projects (or DG coupled with energy storage) would be capable of

interconnecting from nearby landfill/brownfield sites. As with the initial phase of the Project (*i.e.*, East Golah and Peterboro substations), National Grid proposed to upgrade the distribution system at four substations, making them ready for future DG applicants to interconnect.[3] The investment includes the installation of $3V_0$ protection and LTC controller upgrades for the transformer banks below:

Substations	Added Hosting Capacity	Area Landfill/Brownfield* Sites Served	Anticipated Construction
Cedar	17 MW	Fort Ann, Queensbury, Evans Mills, and Moreau in Washington, Warren, Jefferson, Colonie, and Saratoga counties, respectively	Complete
Indian River	20 MW		
Butler	17 MW		
Berry Road	24 MW	Chautauqua County	July 31, 2020
*Note: Berry Road is not an Area Landfill/ Brownfield Site			

The Company has already constructed the upgrades at Cedar, Indian River, and Butler substations, and has completed the reconciliations this quarter. Berry Road substation, which is being added to the Project to replace Prospect Hill, expects construction to be completed by July 31, 2020.

2.2.4 Switch-Source Tie Controller

To further increase hosting capacity, the Company researched Switch-Source Tie Controller technology. Based on the initial analysis, required system protection, and associated costs, the Company cancelled this portion of the Project in the second quarter of 2019. However, the Company is planning to further investigate this technology in the near future for loading relief, providing volt/VAR support, and improving reliability.

2.2.5 Financial Summary

As shown in Section 4, the Company estimates total common upgrade costs of $2,826,180 for the four substations originally identified in the Revised Implementation Plan (*i.e.*, Cedar, Indian River, Butler, Prospect Hill). The amount, which was initially funded using the Company's REV demonstration project budget, includes capital and marketing costs. The Project has been updated to replace Prospect Hill with Berry Road

The Company is recovering the initial REV demonstration investment through a one-time, pro-rated fee charged to all applicants (not just the first applicant) with DG systems above 50 kW[4] who connect to the upgraded substation transformer banks.[5] The fee is based on the Company's estimated common system upgrade costs (subject to true-up once actual costs are known) for each

[3] If this method is approved for use across the National Grid service territory, the costs of the upgrades would be reflected in the Company's net utility plant and depreciation expense reconciliation mechanism.
[4] The 50 kW threshold would apply to an aggregate amount of DG service.
[5] DG applicants would still bear full responsibility for their respective site-specific and distribution line upgrade costs. The pro-rated fee for the substation common upgrades would be due at the same time as the fees associated with the DG applicant-specific upgrades, including distribution line upgrade costs.

of the substations divided by a factor that represents the total substation transformer bank capacity at each location.

3.0 Next Quarter Forecast

As set forth in Section 2, the Company has recovered most substation upgrade costs for the initial phase and expects to recover the remaining costs this year. For the work in the Revised Implementation Plan, the Company will continue its marketing efforts for the landfill and brownfield sites, as well as the four substations included in Phase 2.

4.0 Work Plan and Budget Review

4.1 Updated Work Plan

The Berry Road substation is replacing the Prospect Hill substation as one of the four Phase 2 projects. The Berry Road design is complete with the current plan to start construction on May 4, 2020 and complete by July 31, 2020.

4.2 Current Budget

The current budget for the Revised Implementation Plan (Phase 2) is provided below:

Substation	Total Estimated Spend	Actual Spend	Difference
Cedar	$ 508,000	$ 603,890	$ (95,890)
Indian River	$ 508,000	$ 556,592	$ (48,592)
Butler	$ 508,000	$ 586,574	$ (78,574)
Prospect Hill	$	$ -	$
Berry Road	$ 508,000	$ 59,507	$ 448,493
Tax Liability Applied to Capital Improvement	$ 202,980	$ 166,986	$ 35,994
Total Funds for Marketing the existing “DG Ready” Sites	$ 62,400	$ 35,000	$ 27,400
Total Funds for Marketing the Four Sites	$ 28,800	$ 71,066	$ (42,266)
Total Funds to Pilot Switched -Source Technology at Butler Substation	$ 500,000	$ 209,432	$ 290,568
Total	$ 2,826,180	$ 2,289,047	$ 537,133
Note: Berry Road is a replacement to Prospect Hill and all costs previously attributed to Prospect Hill have been removed from the Project cost. Berry Road spend includes material and construction cost only as Case # 106008 is covering the Engineering Costs.			

5.0 Quarterly Report Template

Quarterly Report Template	
Milestones:	
Last Project Milestone:	Construction completed
Next Project Milestone:	Market available capacity at Indian River, Butler, Cedar, and Berry Road. Advance Construction Milestone Activities for Berry Road.
Tasks/Timeline:	
Completed Project Tasks Since Last Quarterly Report:	As Built and Reconciliation for Indian River, Butler and Cedar.
Changes or Impacts to Schedule Since Last Quarterly Report:	N/A
Lessons Learned:	N/A
Risks:	
Identified Risks:	Protection analysis identified major system upgrades requirement for switched-source technology. Thus, the switch-source portion of the Project has been cancelled.
Risk Mitigation Plan:	N/A
Finance:	
Total Spend to Date (Initial Phase and Revised Implementation):	$4,040,306
Forecast Spend:	$4,577,439
Queue Status Update:	
East Golah	Two projects (2.35 MW) are connected
	Five projects (22 MW) are currently in construction.
	Two projects (3.65 MW) are in the interconnection agreement process.
Peterboro	One project (1.4 MW) has been interconnected.
	Six projects (22.88 MW) are in construction
	One project (3.25 MW) is in the interconnection agreement process

Quarterly Report Template	
	One project (1.75 MW) is in the CESIR process
	One project (5 MW) is in preliminary study
Cedar	One project (4.65 MW) is in the interconnection agreement process
Butler	One project (0.07 MW) has been interconnected
	Two projects (10 MW) are in interconnection agreement process
	One project (0.10 MW) is in the supplemental study process
Indian River	Six projects (20MW) are in the interconnection agreement process
Berry Road	Two projects (6.1 MW) are in construction
	Eight projects (15 MW) are in the interconnection agreement phase
	Seven projects (28.275 MW) are in the study phase

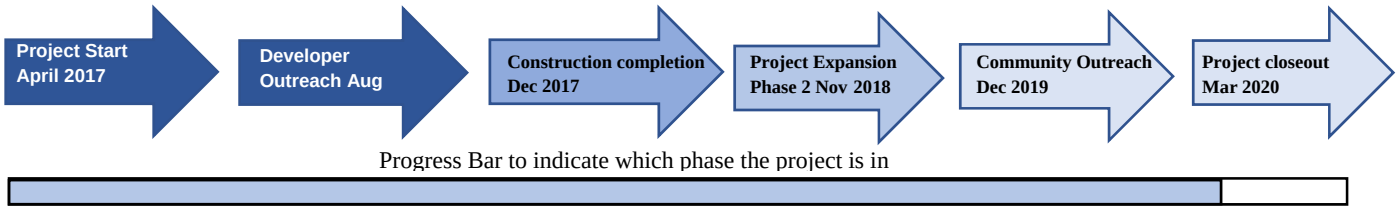
Appendix A

Distributed Generation Interconnection
REV Demonstration Project
One-Page Summary

Distributed Generation Interconnection ($3V_0$) 4/30/20 (Q1 20) On track (Active)

- **Project Start Date: 4/24/2017 Project End Date: 10/31/2020 Budget: $4,407,531**

Customer Payments to Date: $2,632,636 Current Quarter Spend: $582,662 Cumulative Spend: $4,040,306



Project Summary: In 2017, Niagara Mohawk Power Corporation d/b/a National Grid (the "Company") proposed a cost-sharing solution for increasing the pace and scale of interconnecting distributed generation ("DG") systems through upfront investment by the Company coupled with a cost-allocation methodology aimed at removing barriers for DG interconnection applicants. The Company installed $3V_0$ technology at two substations, Peterboro and East Golah, creating 40 MW of hosting capacity. In 2018, the Company expanded the Project to upgrade four additional substations (Cedar, Indian River, Butler, and Prospect Hill) and create an additional 71 MW of hosting capacity and testing methods for further enhancing the effectiveness of the approach at increasing DG interconnections. In 2020, the Company replaced the Prospect Hill substation (17 MW of hosting capacity) with the Berry Road substation (24 MW of hosting capacity) increasing the hosting capacity created by the second phase of the Project to 78 MW.

Cumulative Lessons Learned		
The Customer	**Market Partner**	**Utility Operations**
• Prebuilt $3V_0$ system upgrades at substations reduce interconnection lead times. • The cost-allocation methodology reduces upfront costs, enabling developers to pay a proportionate share of common upgrade costs. • Upfront engagement with municipalities is a key to reduce permitting and zoning delays for DG projects.	• Developing DG projects on municipal landfills and brownfield sites may benefit municipalities by reducing energy costs, meeting local sustainability commitments, providing an additional stream of revenue via lease payments, and protecting farmland.	• Prebuilt $3V_0$ system upgrades at substations located near landfills and brownfields may lead to increased DG in those areas. • The Company believes that reducing upfront costs for DG projects and accelerating the installation will help meet clean energy goals. • The potential benefits of switch-source technology are outweighed by the cost of required system protections.

Application of lessons learned: By expanding the initial successful phase of the Project to test strategies for community / municipal engagement, facilitating DG development on landfill / brownfield sites, and evaluating the potential benefits of new technologies, the Company believes it can further reduce upfront costs and accelerate interconnections.

Explanation for overbudget: *N/A*

Issues Identified: To further increase hosting capacity, the Company researched Switch-Source Tie Controller technology. Based on the initial analysis, required system protection, and associated costs, the Company cancelled this portion of the Project in the second quarter of 2019.

Solutions Identified: *N/A*

Recent Milestones/Targets Met: *N/A*

Upcoming Milestones/Targets: Continue marketing remaining capacity at Cedar, Butler, and Berry Road substations.