
**CLASS YEAR 2010
AFFECTED SYSTEM
FACILITIES STUDY REPORT- PART 1
for the
STEPHENTOWN FLYWHEEL PROJECT
(QUEUE #260)**

June 2010

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I. EXECUTIVE SUMMARY

National Grid (“Affected Transmission Owner”) has completed its portion of the Part 1 of the Class Year 2010 Facilities Study (“Facilities Study-Part 1”), for the Stephentown Flywheel Project (Queue #260) (“the Project”) and presents the conclusions of the study herein. NYSEG has been designated by the NYISO as the Connecting Transmission Owner and the Point of Interconnection is the NYSEG Stephentown Substation (“Stephentown Substation”).

The Project is a proposed 20 MW flywheel generation facility located in Rensselaer County, New York, and interconnecting to the NYSEG 115 kV system at the Stephentown Station, via a single breaker tap to the 115 kV bus at the station. National Grid’s Greenbush-Stephentown 993 Line (“Line 993”) ties to the same 115 kV bus thereby making National Grid an Affected Transmission Owner. Pursuant to the NYISO Queue, the Interconnection Customer’s proposed In Service Date¹ and Initial Synchronization Date² for this Project is 09/2010, and its expected Commercial Operation Date³ is 10/2010.⁴

This Facilities Study-Part 1 report provides all applicable functional and design specifications and drawings associated with the equipment, engineering, procurement, construction, installation, testing, and commissioning work required to build and/or modify the Affected Transmission Owner Facilities and related System Upgrade Facilities (“SUF”), and their integration with the NYSEG System and Interconnection Customer Attachment Facilities (“ICAFs”), so as to ensure the reliable interconnection of the Project to the 115 kV transmission system.

National Grid is responsible for all engineering, design, construction and commissioning of the SUFs at Greenbush Station, except for the procurement of certain equipment as defined herein. The total estimated cost of the work attributed to the interconnection of the Project is \$195,500, and includes:

¹ In accordance with NYISO OATT Attachment Z, In-Service Date shall mean the date upon which the Interconnection Customer reasonably expects it will be ready to begin use of the Transmission Owner’s Attachment Facilities to obtain back feed power.

² In accordance with NYISO OATT Attachment Z, Initial Synchronization Date shall mean the date upon which the Small Generating Facility or Merchant Transmission Facility is initially synchronized and upon which Trial Operation begins.

³ Commercial Operation Date shall mean the date on which the Small Generating Facility commences generating or transmitting electricity for sale, excluding that which is generated or transmitted during trial operation.

⁴ The Interconnection Customer’s desired In-Service, Initial Synchronization, and Commercial Operation Dates are subject to mutual agreement with the Company. Any agreed-upon schedule is subject to change based whether third-parties permits, rights-of-way, and authorizations have been obtained; upon the Company’s work force resource availability; and upon the Company’s other public service requirements.

System Upgrade Facilities (Greenbush Substation DTT)	\$195,500
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The estimated time for NGRID to complete engineering design and installation is 3-4 months and, the approximated Synchronization Date is October 2010. Major Milestones include:

· Engineering, Procurement & Construction Agreement executed	07/30/2010
· Engineering and Procurement completed	09/22/2010
· Installation completed	10/18/2010
· Testing and Commissioning	10/26/2010
· Energization Date	10/27/2010
· As Builts completed	11/30/2010
· Project Closeout	12/31/2010

Pursuant to NYISO OATT, Attachment Z, engineering design, construction and commissioning responsibilities shall be identified and defined as part of the Engineering Procurement and Construction Agreement (“EPC Agreement”).

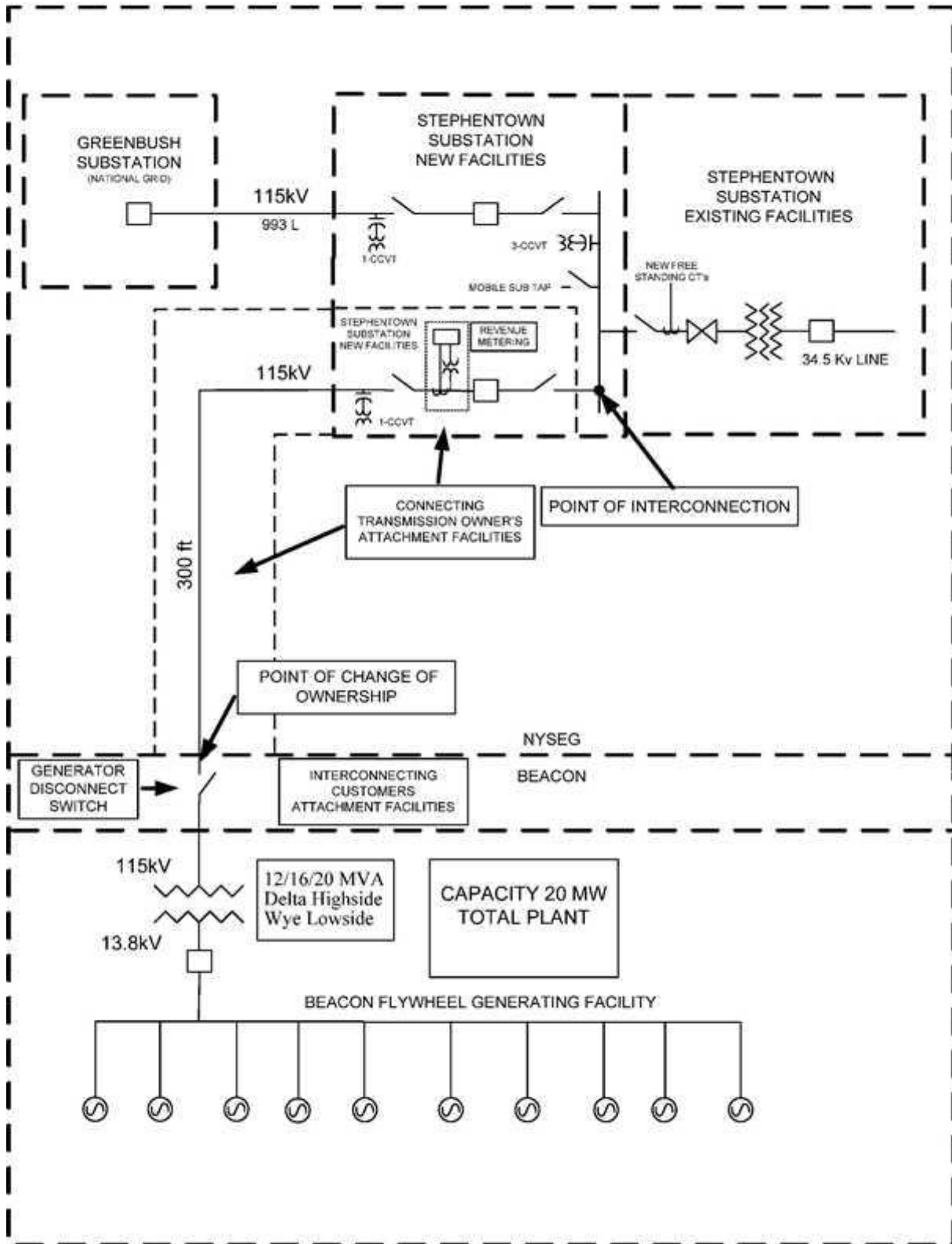
II. PROJECT DESCRIPTION

Beacon Power Corporation has proposed to construct a 20 MW flywheel generation facility in Rensselaer County, New York, and interconnect to the NYSEG Stephentown Station. As depicted in Figure 1, the proposed Point of Interconnection ("POI") for the Project is the 115kV bus at the Stephentown Station. In addition to adding a line terminal for the Project, NYSEG will construct a new line terminal for National Grid's 115kV Greenbush-Stephentown 993 Line ("Line 993").

If, for any reason, the project is modified or delayed such that the proposed In Service Date is extended by one (1) or more years past the date set forth in the Milestone Schedule below, the Affected Transmission Owner shall review and revise this Facilities Study Report, as necessary, to ensure compliance with the then current standards.

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FIGURE1: BEACON POWER SIMPLIFIED ONE LINE DIAGRAM



III. INTRODUCTION

This Facilities Study-Part 1 is part of the Class Year 2010 Facilities Study, and includes further review and revision of the conclusions in the System Impact Study for the Small Generating Frequency Regulation Facility (NYISO Queue #260) Volume I, dated June 10, 2009 (“SIS Report”). It has been completed by the Affected Transmission Owner in accordance with the requirements set forth in the NYISO OATT, Attachment Z: Small Generator Interconnection Requirements (“Attachment Z”).

IV. OBJECTIVES

Pursuant to the Study Work Agreement, dated March 31, 2010, the objectives of the Facilities Study-Part 1 include:

1. Identify the SUFs necessary for the Project to reliably interconnect to the Transmission Owner’s system;
2. Identify and describe the equipment, engineering, procurement, construction, installation, testing and commissioning work, needed to build the SUFs and integrate them with the Interconnection Customer’s Attachment Facilities (“ICAF”) (e.g., functional and design specifications, drawings, etc.);
3. Provide a one line diagram of the SUFs;
4. Identify the electric switching configuration of the connection equipment, including, but not limited to, the: transformer, switchgear, meters and other station equipment;
5. Provide good faith cost estimates, within a tolerance of +30%/-15%, associated with the SUFs identified in Objective #1; and
6. Provide a good faith estimate of the time required to complete the construction and installation of the SUFs.

V. RESULTS

a. Interconnection Customer Attachment Facilities (ICAF)

The ICAFs will be defined in the Facilities Study report prepared by NYSEG.

b. Connecting Transmission Owner Attachment Facilities (CTO AFs)

The CTO AFs will be defined in the Facilities Study report prepared by NYSEG.

NGRID will need NYSEG to provide thermal rating updates for all the new equipment, associated with the Line 993, being installed at the Stephentown Station. This information shall be provided two (2) months in advance of the installation being completed.

c. System Upgrade Facilities (SUFs)

i. Greenbush Substation

Pursuant to NYSEG's SPR-1214, Rev A, a new unidirectional Direct Transfer Trip (DTT) relay channel using RFL-9745 teleprotection equipment will be required from NGRID's Greenbush Station to NYSEG's Stephentown Station to prevent possible islanding of the Project with NYSEG load. The DTT system is to be keyed at Greenbush Station by any trip issued to the Greenbush R993 breaker, and receipt of the signal at the Stephentown Station will trip the 1 15kV intertie breaker that interconnects the Project to the 1 15kV bus.

Currently the R993 breaker at Greenbush trips for the following conditions:

- 993 Line faults
- 115 kV bus faults
- Transformer #8 faults
- Transformer #1 faults

(There is no breaker failure protection on the R993 breaker.)

To comply with NYSEG's requirements, the protection scheme at Greenbush Station will be modified to initiate DTT to Stephentown whenever the associated protective relays operate to trip R993 (i.e., for the above faults). The modifications include the addition of:

- One (1) RFL-9745 Audio Tone communications unit with unidirectional, dual channel DTT 5;
- One (1) GE On/Off switch, Type SBM; and
- Two (2) GE HFA aux tripping relays.

The required DTT center frequencies (dual channel) are 1275 Hz and 1615 Hz. DTT will also be initiated via an aux “b” contact whenever breaker R993 opens.

The Interconnection Customer will purchase the RFL-9745 unit, and provide it to NGRID for installation. NGRID will complete all engineering design for the Greenbush Station, and will procure all materials and equipment (excluding the RFL-9745 unit). NGRID will also complete all installation and testing at the Greenbush Station. NYSEG will order the telecom circuit.

VI. PERFORMANCE, OPERATION AND MAINTENANCE REQUIREMENTS

Performance, Operation and Maintenance requirements are set forth in National Grid Specifications for Electrical Installations, ESB 750 series bulletins. The most current versions of the bulletins can be at: <http://www.nationalgridus.com/electricalspecifications>.

a. Operations and Maintenance Requirements.

For operational purposes, NYSEG shall provide breaker status and metering information for all the breakers and metering across the transformer at the Stephentown Station. This shall be transmitted via the existing company-to-company ICCP communications link.

⁵. NGRID’s standard application applies both DTT and POTT schemes in common RFL-9745 chassis, but, upon review, accepts NYSEG’s request to install a unidirectional DTT only RFL-9745 unit w/ the test panel included in the same chassis.

VII. COST ESTIMATE

The cost estimate provided in this report is based on the assumptions listed below. Any variance to the assumptions, including the energization date, will void this cost estimate and a revised estimate will be required.

Stephentown Flywheel Project (Greenbush Station DTT)	
Description:	Estimated Costs:
Engineering and Procurement	\$37,400
Construction	\$61,300
Materials	\$18,200
Project Management	\$35,100
Overheads	\$43,500
Total Costs for this Project:	\$195,500

The cost estimates provided in the table above include (as applicable):

- Applicable surcharges;
- Sales Tax;
- Allowance for funds used during construction (AFUDC)
(Please note: If payment is made up front, AFUDC charges will not be applied.); and
- Capital Addition Distributable (CAD)
- Administration & General.

and exclude (as applicable):

- Property, income, and use taxes;
- future operation and maintenance costs;
- adverse field conditions such as rock, water, matting, road construction, weather, and Interconnection Customer electrical equipment obstructions;
- extended construction hours to minimize outage time or National Grid's public duty to serve;
- the cost of any temporary construction service, or any required permits;
- Telecommunications medium costs, including, but not limited to, data circuits, phone lines, and any associated HVSP equipment, as such costs are dictated by the telco companies and are not determined until final engineering; and
- Distribution station service for the Stebbins Road Station, the PSU

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Transformer Station and the Ball Hill Collection Station.

VIII. MAJOR MILESTONES

The milestone schedule presented below provides an approximation of the Project schedule, based on a presumed completion date for the Class Year 2010 study, an approximate completion date of the subsequent execution of an EPC Agreement, and the following assumptions:

1. The Interconnection Customer has obtained all property requirements, including, but not limited to, property rights, permitting, and licensing.
2. Affected Transmission Owner is constructing its SUFs.
3. Interconnection Customer and NYSEG adhere to the schedule in Attachment I.
4. CLASS YEAR 2010 completion date of September 2010 and final acceptance and approvals completed December 2010.
5. EPC Agreement is signed by July 31, 2010.

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MILESTONE SCHEDULE

Task	Milestone	Date	Responsible
1.	Execute Engineering, Procurement and Construction Agreement	7/30/2010	IC/AF TO
2.	Provide Security	7/30/2010	IC
3.	Start Engineering and Procurement for SUFs	8/02/2010	AF TO
4.	Provide thermal ratings for Stephentown Station to AF TO	8/13/2010	CTO
5.	Complete engineering and procurement of SUFs and CTOAFs	9/22/2010	AF TO
6.	Start Construction of SUFs	10/7/2010	AF TO
7.	Complete Construction of SUFs	10/18/2010	AF TO
8.	Reconnect Line 993	10/25/2010	CTO
9.	Testing and Commissioning	10/26/2010	CTO/AF TO
10.	Energization	10/27/2010	ALL
11.	As Builts Completed	11/30/2010	AF TO
12.	Complete close-out	12/31/2010	AF TO/IC

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VIII. CONCLUSION

The purpose of this study was to identify the SUFs required at the Greenbush Station to accommodate the interconnection of the Stephentown Flywheel Project to the NYSEG Stephentown Substation, and provide a cost estimate and milestone schedule for the design and installation of such facilities.

SUFs are required at the Greenbush Station to prevent possible islanding of the Project with NYSEG load. The estimated time to complete engineering, procurement and installation of the SUFs is 3-4 months, at an estimated cost of \$195,500.

APPENDIX A
NYSEG's Stephentown Flywheel
Project Schedule
(dated 6/21/2010)

STEPHENTOWN FLYWHEEL PROJECT (QUEUE #260)
CLASS YEAR 2010
DRAFT

AFFECTED SYSTEM FACILITIES STUDY REPORT-PART 1
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