

Interconnection Procedures for Electric Generation Projects Located in the State of Vermont

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Of the many necessary milestones required to develop and implement an electric generation project, one that is often overlooked, but is nonetheless critical, is the interconnection of that project to the electric grid. It is a complex mix of physics, economics, and regulatory law, and one through which every developer must successfully navigate. This article describes general terms, identifies the relevant parties involved, and provides a brief overview of the interconnection process. An important note: this article discusses the interconnection procedures for a generation project, it does not address other important aspects of electric generation development, including site permitting and incorporation into the regional energy markets. Moreover, this article focuses on the interconnection process for generation projects in Vermont – the process will be different for projects in other jurisdictions.

1. Introduction

The Department of Energy's U.S. Energy Information Administration defines an electric "interconnection" as:

Two or more electric systems having a common transmission line that permits a flow of energy between them. The physical connection of the electric power transmission facilities allows for the sale or exchange of energy.

Quite simply, the interconnection is the physical equipment that links two or more distinct electric systems. The term can also be used to describe the incorporation of a generation facility to the greater electric grid. This article addresses the term "interconnection" in both these senses.

From a generation developer's perspective, the interconnection is the mechanism by which the developer's products can be delivered to the marketplace. Without it, the developer is limited to supplying electricity only to its own facilities that are not connected to the grid. Therefore, anyone desiring to construct and operate a generation facility and to deliver power to other users, including developers that only desire to net meter, or roll-back their own electric meters, must establish an interconnection with the electric grid. Because the entire electric grid is based on a balance of the power flowing onto and off of the grid, it is critical that the grid planners account for every generation source and end use source. For this reason, there are complex and varying procedures for establishing a generator's interconnection.

2. Determining the Jurisdiction

One of the more complicated aspects of getting an approval of an interconnection is determining what regulatory body has jurisdiction over the interconnection. When proposing a generation facility in Vermont, the entities with jurisdiction are either the ISO New England, Inc. (ISO-NE) or the Vermont Public Service Board (VPSB). The determining factor as to which entity has jurisdiction is whether that entity has jurisdiction over the portion of the grid to which the generation facility is connecting. The federal government, acting through the Federal Energy Regulatory Commission (“FERC”), has jurisdiction over the wholesale, interstate transmission system. In turn, FERC has assigned oversight of the New England wholesale, interstate transmission grid to ISO-NE. Any portion of the electric grid that is not controlled by ISO-NE is subject to the jurisdiction of the VPSB.

The more difficult question is which portions of the electric grid in Vermont are controlled by ISO-NE and which are under the jurisdiction of the VPSB. The answer lies in the various ISO-NE rules, but can be simply stated as follows: any of the Vermont utilities that have signed the ISO-NE Transmission Operating Agreement (TOA) are Participating Transmission Owners and their transmission facilities are subject to ISO-NE control. The Vermont utilities that have signed the TOA are Central Vermont Public Service, Green Mountain Power, Vermont Electric Cooperative, Vermont Electric Power Company/Vermont Transco, and Vermont Public Power Supply Authority. The Vermont utilities that have not signed the TOA are all the municipally-owned utilities, the Washington Electric Cooperative and Vermont Marble Power Division of OMYA. Thus, a generation developer must use the ISO-NE interconnection procedures if it is interconnecting to the transmission system (34.5 kV or higher) of a utility in the former group, or the VPSB interconnection procedures if they are interconnecting to the transmission system of the latter group. For those projects that are interconnecting to a utility’s distribution system (less than 34.5 kV), the VPSB’s interconnection rules will apply.

3. Interconnection Procedures

Once developers know where to look for the applicable interconnection standards (either www.iso-ne.com or psb.vermont.gov), they must then navigate through a time-consuming and complex process. The ISO-NE Large Generation Facility (more than 20 megawatts) interconnection procedure is found in Schedule 22 of Section II of the ISO-NE Tariff and the Small Generation Facility (20 megawatts or less) interconnection procedures is in Schedule 23. Links to these schedules can be found at the end of this article. The relevant VPSB interconnection procedures are located in either Rule 5.100, Appendix A (for net metered projects) or Rule 5.500 (for projects that are delivering power to the grid). Without going through all the various interconnection processes, the basic format can be described as follows:

- (A) Feasibility Study – preliminary evaluation of the feasibility of the proposed interconnection to the transmission/distribution system using available information. This step does not require detailed model development.
- (B) System Impact Study – evaluation of the impact of the proposed interconnection on the reliability and operation of the transmission/distribution system. Includes: short-circuit analysis, stability analysis, power flow analysis, system protection analysis, and any other analyses deemed necessary.
- (C) Facilities Study – specification and estimation of the cost of the equipment, engineering, procurement and construction work needed to implement the conclusions of the System Impact Study in accordance with Good Utility Practice.
- (D) Interconnection Agreement – outlines obligations of each party in implementing the interconnection.

A generation developer should take care to note that the various interconnection procedures require getting a place in the “queue,” so it is critical to submit an application as early as possible. Moreover, each procedure has a “fast track” option for any projects that qualify.

5. Links

Schedule 22 (Large Generation Facilities):

http://www.iso-ne.com/regulatory/tariff/sect_2/sch22/1-24-10-sched_22.pdf S

Schedule 23 (Small Generation Facilities):

http://www.iso-ne.com/regulatory/tariff/sect_2/sch23/1-24-10_sched_23.pdf

Rule 5.100 (Net Metering)

http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/5100adoptedrule_2.pdf

Technical Specifications for Net Metered Projects:

<http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/5100appendixA.pdf>

Net Meter Application:

<http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/5100ApplicationForm2009.pdf>

Rule 5.500 (VPSB Interconnection Procedure)

http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/5500_Electric_Generation_Interconnection_Procedures.pdf

VPSB Standard Application for Interconnection

http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/Rule_5_500_standard_application_form_2010.pdf

VPSB Rule 5.500 Application Instructions:

http://psb.vermont.gov/sites/psb/files/rules/OfficialAdoptedRules/_standard_application_form_instructions_2010.pdf

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