

**STATE OF VERMONT
PUBLIC SERVICE BOARD**

Petition of Champlain VT, LLC d/b/a TDI New England)
for a Certificate of Public Good, pursuant to 30 V.S.A. §248,)
authorizing the installation and operation of a high voltage)
direct current (HVDC) underwater and underground electric)
transmission line with a capacity of 1,000 MW, a converter)
station, and other associated facilities, to be located in Lake)
Champlain and in the Counties of Grand Isle, Chittenden,)
Addison, Rutland, and Windsor, Vermont, and to be known)
as the New England Clean Power Link Project (“NECPL”))

Docket No. 8400

**SUPPLEMENTAL PREFILED DIRECT TESTIMONY OF
LARRY ENG**

ON BEHALF OF CHAMPLAIN VT, LLC

August 26, 2105

Summary:

Mr. Eng’s supplemental testimony provides an update on several issues covered in his prefiled direct testimony, including the status of the System Impact Study (“SIS”), and to respond to a number of questions raised by the Public Service Department in the prefiled testimony of Bill Jordan.

1 **Q. Please State your name, occupation and business address.**

2 Response: My name is Larry Eng. I am a Staff Consultant with Siemens Industry Inc.,
3 Power Technologies International (“Siemens PIT”). My office address is 400 State Street,
4 Schenectady, New York 12301.

5
6 **Q. Have you previously filed testimony in this proceeding?**

7 Response: Yes, I submitted prefiled direct testimony on behalf of Champlain VT, LLC
8 d/b/a TDI New England concerning the New England Clean Power Link (“NECPL”)
9 Project on December 8, 2014.

10

11 **Q. What is the purpose of your supplemental testimony?**

12 Response: The purpose of my supplemental testimony is to provide an update on several
13 issues discussed in my earlier testimony, including the status of the System Impact Study
14 (“SIS”) and to respond to a number of questions raised by the Public Service Department in
15 the prefiled testimony of Bill Jordan.

16

17 **Q. Has the System Impact Study (SIS) process changed since you previously submitted**
18 **testimony, and if so, how has it changed?**

19 Response: Yes. On February 13, 2015, ISO-NE submitted, to the Federal Energy
20 Regulatory Commission (“FERC”), proposed modifications to the ISO-NE OATT that
21 (among other things) significantly modified the SIS process for Elective Transmission
22 Upgrades (“ETUs”) such as the NECPL. On April 14, 2015, FERC approved those
23 modifications, with an effective date of February 16, 2015.

1 One of the most significant aspects of these tariff modifications (the “ETU
2 Modifications”) was the full integration of interconnection requests associated with ETUs
3 into the queue of interconnection requests associated with new generating facilities located
4 in New England. Prior to the ETU Modifications, the interconnection studies for an ETU
5 (which are an integral part of the SIS process for the ETU) were performed by the project
6 proponent, with oversight by ISO-NE, but were effectively “outside” of the serial process
7 that ISO-NE employs for generator interconnection studies. To a certain extent, ETU
8 interconnection requests operated in a “parallel” interconnection queue that did not use the
9 same study processes as were used for generation interconnections.

10 The ETU Modifications introduced three significant changes to the SIS process:

- 11 1. Interconnection requests for ETUs are now subject to the same requirements as
12 large generators with respect to the initial study deposit, information supplied to
13 ISO-NE, site control obligations and other criteria that must be met to establish a
14 position in the interconnection queue.
- 15 2. ISO-NE, or a consultant working directly under contract with ISO-NE, now
16 performs the interconnections studies for an ETU, using the same serial process
17 applied to the interconnection studies for generating facilities. That is, the
18 interconnection studies for an ETU can only commence when the interconnection
19 studies for all higher queued projects - both generators and other ETUs - have been
20 sufficiently completed as to allow ISO-NE to develop an appropriate ‘base case’ for
21 the subject ETU.
- 22 3. As part of the transition from the SIS process that was previously applicable to
23 ETUs to the SIS process applicable under the ETU Modifications, ISO-NE:

1 (a) required all ETUs with pending interconnection requests to submit a new
2 interconnection request that conformed to the new interconnection request
3 requirements;

4 (b) replaced all pending ETU interconnection requests with the new
5 conforming interconnection request;

6 (c) assigned new interconnection queue positions to the new conforming
7 interconnection requests, with the new queue positions determined by the transition
8 rules included in the ETU Modifications;

9 (d) assumed direct control of the SIS study work that had been previously
10 performed by the ETU proponents; and

11 (e) began applying the serial interconnection study process reflecting the
12 restated interconnection queue positions (*e.g.*, a given ETU interconnection request
13 will now only be studied when all higher-ETU interconnection requests have been
14 sufficiently progressed to conform to ISO-NE's study requirements).

15
16 **Q. Has your role changed with respect to the SIS?**

17 Response: Yes. I am no longer performing the interconnection studies for the NECPL that
18 are integral to the SIS process. While I continue to advise TDI on issues related to the
19 interconnection studies being performed by ISO-NE's consultant, I am not directly involved
20 in the study process.

21
22 **Q. Do the changes to the SIS process affect the scope of study or criteria used for the**
23 **SIS, as reflected in your prior Exhibit TDI-LE-5, and if so, how?**

1 Response: The changes to the SIS process may *potentially* affect the *scope* of the
2 interconnection studies, due to the reordering of the interconnection queue. For instance,
3 the interconnection studies for higher queued generation or ETU projects (which must be
4 sufficiently progressed before the NECPL interconnection studies can be initiated) could
5 identify a need to modify the transmission and/or subtransmission systems in Vermont to
6 accommodate that higher queued project. In turn, those system modifications (and the
7 presence of those projects themselves) would become part of the “pre-project” study case
8 for the NECPL, and could potentially result in a somewhat different set of system
9 conditions and/or system contingencies that would then be studied as part of the SIS
10 process for the NECPL.

11 However, the changes to the SIS process should not result in any material changes to
12 the *criteria* used in the interconnection studies, since the ETU Modifications did not result in
13 any material modifications to the planning criteria used by ISO-NE.

14
15 **Q. What other studies (in addition to the steady state analysis) comprise the SIS, and**
16 **what types of system upgrades might these studies identify?**

17 Response: In addition to the steady state analysis, the SIS process includes various other
18 studies, such as a stability analysis and short circuit analysis. These additional analyses may
19 indicate the same types of system modifications and/or upgrades that are identified by the
20 steady state analysis (*e.g.*, modification of a control system, addition of voltage control
21 equipment, etc.) However, the stability analysis and short circuit analysis performed for the
22 Q425 Study did not indicate any stability or short circuit issues which would require system

1 modifications or system upgrades. The system upgrades identified in the Q425 Study were
2 required to mitigate thermal overloads of existing transmission and subtransmission facilities.

3
4 **Q. What are the reasons for the withdrawal of the NECPL from Queue position Q425
5 and reapplication to Q501?**

6 Response: As discussed above, ISO-NE effectively “reordered” the interconnection queue
7 as part of the ETU Modifications. As part of that queue re-ordering, ISO-NE withdrew all
8 of the pending ETU interconnection requests that were under study, and then reassigned
9 new queue positions that reflected the transition rules included in the ETU Modifications.
10 Consequently, ISO-NE: (a) withdrew the interconnection request at queue position 425
11 (which was NECPL’s previous queue position), and (b) assigned a new queue position of
12 501 to the NECPL’s restated interconnection request.

13
14 **Q. How does the new queue position affect the NECPL’s SIS, including the presence of
15 any additional projects that may now be in front of and could affect the NECPL SIS, such as
16 Anbaric’s “Vermont Green Line” or any other projects?**

17 Response: Under the new ETU interconnection process, each ETU interconnection request
18 is studied in sequential order of its new queue position. Although some degree of parallel
19 studies may be possible (*e.g.*, ISO-NE may be able to study a generation project in northern
20 Maine in parallel with an ETU project in western Vermont), queued projects in the same
21 region are studied in queue sequence.

22 Under the restated interconnection queue, three proposed projects in Vermont have
23 a lower queue position (*i.e.*, a higher queue priority) than the NECPL. Those projects are:

- 1 1. A 30 MW wind project that holds queue position 477 (this project was in the
- 2 base case for the original Q425 Steady State Analysis);
- 3 2. A 96.9 MW wind project that holds queue position 488; and
- 4 3. A 400 MW ETU project that holds queue position 498.

5 In accordance with the ETU Modifications, the NECPL's interconnection studies
6 can only be initiated once the interconnection studies for these three projects have been
7 sufficiently progressed to allow ISO-NE to develop an appropriate base case for the
8 NECPL's interconnection studies.

9
10 **Q. What system upgrades were identified by the Q425 draft steady state analysis, and**
11 **how will studying the Project under Q501 affect the conclusions of the Q425 steady state**
12 **analysis?**

13 Response: The Q425 draft steady state analysis identified the following upgrades to the
14 Vermont transmission and/or subtransmission systems as needed for the NECPL:

- 15 • Upgrade the PSNH section and Vernon-NU border section of the Vernon-
- 16 Northfield 345 kV transmission line 381.
- 17 • Accelerate the planned upgrade of Ascutney-Coolidge 115 kV line.
- 18 • Upgrade the following facilities of the Vermont subtransmission system to increase
- 19 their thermal capabilities:
 - 20 ○ Reconductor the Rochester-Silver lake-Smead-Middlebury 46 kV line
 - 21 ○ Reconductor the Hydeville-Blissville 46 kV line
 - 22 ○ Add a new 46/115 kV transformer at or near N. Rutland or Cold River

- 1 o Reconductor the Kendall Farm-Rawsonville-Londonderry-Jamaica Tap-
2 Newfane 46 kV line

3 The reassessment of the NECPL project under Q501 may eliminate the need for
4 some of the upgrades identified in the Q425 system impact study, or could identify a
5 different set of upgrades; the final list of upgrades required by ISO-NE for the NECPL will
6 only be known when the Q501 studies have been finalized and approved. However, as
7 stated below, it is my professional opinion that the Q501 upgrades should not be materially
8 different than the Q425 upgrades. For instance, VELCO's Ascutney-Coolidge 115 kV line
9 upgrade is now included in the NECPL's base case because VELCO has received the I.3.9
10 approval for this project. Also, the upgrades to the Vermont subtransmission system
11 previously identified in the Q425 study may now be required for preceding queue projects
12 and thus may also be included in the Q501 base case.

13
14 **Q. To what extent will the new SIS study the Vermont subtransmission system, and**
15 **from whom was the Vermont subtransmission model obtained?**

16 Response: The new SIS study being conducted by ISO-NE should examine the Vermont
17 subtransmission system to a similar extent as the previous SIS study performed by me on
18 behalf of TDI-NE. I believe that ISO-NE would obtain information about the Vermont
19 subtransmission system from the owners of those subtransmission facilities.

20
21 **Q. Based on the changes to the SIS process, when do you anticipate it will be finalized**
22 **and approved?**

1 Response: According the ISO-NE interconnection request tracking tool as of August 2,
2 2015, the SIS study for the NECPL is listed as “in progress,” but with a “project
3 dependency” (*i.e.*, a need to sufficiently progress studies for higher queued projects) that
4 must be resolved before the NECPL’s studies can be completed. Based on this project
5 dependency and the probable scope of the studies, I would anticipate that the SIS process
6 for the NECPL would be finalized and approved in the first half of 2016.

7
8 **Q. Based on your technical knowledge of this project, is there any other information you**
9 **can provide specific to the NECPL at Q501?**

10 Response: The system impact of NECPL at Q501 should be similar to the response
11 observed in the Q425 SIS. The preceding, higher queued projects are basically current
12 injection projects. As such, those projects may have an impact on the level of power flow
13 through the transmission and subtransmission system but they do not necessarily change the
14 topology or the impedance of the AC network. Under the criteria that ISO-NE will use for
15 the NECPL’s study, the presence of these higher queued projects will not necessarily result
16 in any additional network upgrades that would be required by ISO-NE for the NECPL, due
17 to ISO-NE’s ability to reduce the output of those higher queued facilities as necessary as
18 part of the study process. More specifically, ISO-NE can, under the minimum
19 interconnection standard used in the Q501 studies, reduce the output of other energy
20 resources (including the higher queued projects) to alleviate overloads that might otherwise
21 occur after the addition of the NECPL. (Note that under the GMP Stipulation (*Exhibit*
22 *TDI-JMB-22*), additional subtransmission upgrades may be identified in a supplemental
23 study). It is therefore my professional opinion that Q501 upgrades will not materially

1 change from Q425 previously identified upgrades even with the presence of higher queued
2 projects.

3
4 **Q. In your professional opinion and based upon the information available to date, what**
5 **are your expectations regarding the conclusions of the completed Q501 SIS?**

6 Response: The NECPL should have the same impact in the Q501 SIS as the Q425 SIS.

7

8 **Q: Your testimony above discusses the conduct of the ISO-NE Study. Has TDI-NE**
9 **addressed this issue in any of the agreements reached in this case?**

10 Response: Yes, Section 3 of the GMP Stipulation (*Exh. TDI-JMB-22*) provides the
11 following:

12 The Parties agree to collaborate during the SIS process to facilitate the review of
13 appropriate components of Vermont's subtransmission system in light of the fact that
14 ISO-NE cannot recognize Vermont's lower voltage subtransmission system (69 kV,
15 46 kV and 34.5 kV) in its real-time monitoring system, and therefore, will not know
16 when a potential adverse impact is threatening Vermont's subtransmission system.
17 The parties further agree that GMP should be involved in the SIS process.

18 GMP's involvement in the SIS process may influence the standard that ISO-NE uses to review
19 the Project.

20

21 **Q: Will any additional interconnection studies be performed after the completion of the**
22 **Q501 SIS being conducted by ISO-NE?**

23 Response: Additional interconnection studies may be performed after the completion of the
24 Q501 SIS. Per Section 5 of the GMP Stipulation, additional studies of the VT
25 subtransmission system may be conducted, following the completion of the Q501 SIS. Such
26 a "Supplemental Subtransmission Study" (if required) would appropriately consider that

1 ISO-NE cannot recognize Vermont's lower voltage subtransmission system (69 kV, 46 kV
2 and 34.5 kV) in its real-time monitoring system, and therefore, will not know when a
3 potential adverse impact is threatening Vermont's subtransmission system. If the results of
4 any Supplemental Subtransmission Study identify any potential adverse impacts on the VT
5 subtransmission system that were not identified in the QP501 SIS, then TDI will collaborate
6 with the affected utilities to develop and implement specific additional mitigation strategies
7 and /or upgrades that would address such additional adverse impacts.

8

9 **Q. Are there any other updates or changes to your prefiled direct testimony?**

10 Response: No.

11

12 **Q. Does this conclude your testimony at this time?**

13 Response: Yes it does.