# Western NY Public Policy Transmission Planning Report


Dawei Fan

Supervisor, Public Policy and Interregional Planning


**Business Issues Committee**

September 12, 2017

**Operating Committee**

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# Review Process

- June 30, 2017: Posted Draft Western NY Report
- July 20, 2017: ESPWG/TPAS, presented draft report and supporting documentation
- July 27, 2017: ESPWG/TPAS, presented draft ranking and selection recommendation
- August 8, 2017: ESPWG/TPAS, presented updated schedule
- August 18, 2017: ESPWG/TPAS, presented updated report and supporting documentation
- August 28, 2017: ESPWG/TPAS, presented updated report and released FAQ document
- September 12, 2017: Business Issues Committee (advisory vote)
- September 15, 2017: Operating Committee (for information, not required by Tariff)
- September 27, 2017: Management Committee (advisory vote)
- October 2017: Western NY Report delivered to NYISO Board

# Agenda

- Public Policy Transmission Planning Process
- Western NY Public Policy Transmission Need
- Viability and Sufficiency Assessment
- Comparative Evaluation for Selection
- Ranking and Selection Recommendation
- Next Steps

# Public Policy Transmission Planning Process

# Overview

- Section 31.4 of Attachment Y of the NYISO Open Access Transmission Tariff (OATT) describes the planning process that the NYISO, and all interested parties, shall follow to consider needs for new transmission projects on the Bulk Power Transmission Facilities (BPTFs) that are driven by Public Policy Requirements.
- A Public Policy Requirement is a federal or New York State statute or regulation, including a New York State Public Service Commission (PSC) order adopting a rule or regulation subject to and in accordance with the State Administrative Procedure Act, any successor statute, or any duly enacted law or regulation passed by a local governmental entity in New York State, that may relate to transmission planning on the BPTFs.

# Public Policy Planning Process

- **Phase I: Identify Needs and Assess Solutions**
  - NYISO solicits transmission needs driven by Public Policy Requirements
  - PSC identifies transmission needs and defines additional evaluation criteria
  - NYISO solicits solutions (transmission, generation, or EE/DR)
  - NYISO performs Viability and Sufficiency Assessment (VSA)
  - PSC reviews assessment and confirms continued transmission need
- **Phase II: Transmission Evaluation and Selection**
  - NYISO staff evaluates viable and sufficient transmission solutions and recommends the more efficient or cost-effective solution
  - Stakeholder review and advisory votes at BIC and MC
  - NYISO Board may select a transmission solution for purposes of cost allocation under the NYISO Tariff

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# Western NY Public Policy Transmission Need

# Western NY PPTN

- **On July 20, 2015, PSC issued an order identifying the Western NY PPTN**
- **NYISO was required to consider projects that increase the Western NY transmission capability sufficient to:**
  - Ensure the full output from Niagara (2,700 MW including Lewiston Pumped Storage)
  - Maintain certain levels of simultaneous imports from Ontario across the Niagara tie lines (i.e., maximize Ontario imports under normal operating conditions and at least 1,000 MW under emergency operating conditions)
  - Maximize transfers out of Zone A to the rest of the state
  - Prevent transmission security violations (thermal, voltage or stability) that would result under normal and emergency operating conditions
  - Maintain reliability of the transmission system with fossil-fueled generation in Western NY out-of-service, as well as in-service

# Solicitation for Solutions

- The NYISO established the baseline study cases according to the PSC Order, reviewed the results at multiple ESPWG/TPAS meetings, and made the study cases available to facilitate development of the solutions
- On November 1, 2015, the NYISO issued solicitation for solutions
- On December 31, 2015, developers submitted proposed projects

# Proposed Projects

| Developer | Project Name | Project ID | Category | Type | Location (County/State) |
|---|---|---|---|---|---|
| NRG Dunkirk Power | Dunkirk Gas Addition | OPP02 | OPPP | ST | Chautauqua, NY |
| North America Transmission | Proposal 1 | T006 | PPTP | AC | Niagara-Erie, NY |
| North America Transmission | Proposal 2 | T007 | PPTP | AC | Niagara-Erie, NY, Wyoming, NY |
| North America Transmission | Proposal 3 | T008 | PPTP | AC | Niagara-Erie, NY, Wyoming, NY |
| North America Transmission | Proposal 4 | T009 | PPTP | AC | Niagara-Erie, NY, Wyoming, NY |
| ITC New York Development | 15NYPP1-1 Western NY AC | T010 | PPTP | AC | Niagara-Erie, NY |
| National Grid | Moderate Power Transfer Solution | T011 | PPTP | AC | Niagara-Erie, NY |
| National Grid | High Power Transfer Solution | T012 | PPTP | AC | Niagara-Erie, NY |
| NYPA/NYSEG | Western NY Energy Link | T013 | PPTP | AC | Niagara-Erie, NY, Wyoming, NY |
| NextEra Energy Transmission New York | Empire State Line Proposal 1 | T014 | PPTP | AC | Niagara-Erie, NY |
| NextEra Energy Transmission New York | Empire State Line Proposal 2 | T015 | PPTP | AC | Niagara-Erie, NY |
| Exelon Transmission Company | Niagara Area Transmission Expansion | T017 | PPTP | AC | Niagara-Erie, NY |

PPTP = Public Policy Transmission Project
OPPP = Other Public Policy Project
ST = Steam Turbine
AC = Alternating Current Transmission

# Viability and Sufficiency Assessment

# Viability and Sufficiency Assessment

- In May 2016, the NYISO determined that the following projects are viable and sufficient
  - T006: North America Transmission – Proposal #1
  - T007: North America Transmission – Proposal #2
  - T008: North America Transmission – Proposal #3
  - T009: North America Transmission – Proposal #4
  - T011: National Grid – Moderate Power Transfer Solution
  - T012: National Grid – High Power Transfer Solution
  - T013: NYPA/NYSEG – Western NY Energy Link
  - T014: NextEra Energy Transmission New York – Empire State Line #1
  - T015: NextEra Energy Transmission New York – Empire State Line #2
  - T017: Exelon Transmission Company – Niagara Area Transmission Expansion
- On October 13, 2016, PSC issued an order confirming the Western NY PPTN and requiring certain non-BPTF to be upgraded by National Grid
- The NYISO and its independent consultant (SECO) immediately commenced evaluation of each viable and sufficient project

# Comparative Evaluation for Selection

# Overview

- Evaluated all metrics required by the OATT
- At the December 7, 2016 and January 24, 2017 ESPWG/TPAS meetings, the NYISO presented assumptions used for selection evaluation
- The evaluation of Public Policy Transmission Projects differs from other planning processes because it can give varying levels of consideration to the baseline and the scenarios

# Evaluation Databases

- Power flow: used in metrics such as cost per MW, operability, and expandability
- Resource adequacy: used to analyze LOLE and ICAP benefit
- Production cost: used in metrics such as cost per MW, production cost savings, emission, LBMP, load payment, and performance
- SECO databases: used in metrics such as overnight capital cost, schedules, property rights, and expandability

# Independent Overnight Cost Estimates

- SECO developed the independent cost estimates considering material and labor cost by equipment, engineering and design work, permitting, site acquisition, procurement and construction work, and commissioning needed for the proposed project

| Project ID | Independent Cost Estimate: 2017 $M |
|---|---|
| T006 | 157 |
| T007 | 278 |
| T008 | 356 |
| T009 | 487 |
| T011 | 177 |
| T012 | 433 |
| T013 | 232 |
| T014 | 181 |
| T014_Alt_ROW | 219 |
| T015 | 159 |
| T015_Alt_ROW | 197 |
| T017 | 299 |

# Cost Per MW: IESO-WNY Transfer Limits

| Project ID | Independent Cost Estimate: 2017 $M | Baseline (2014 RPP) | | | Scenario (2016 RPP) | | |
|---|---|---|---|---|---|---|---|
| | | SR on 77/78 | Average Limit: MW | Cost/MW: $M/MW | SR on 77/78 | Average Limit: MW | Cost/MW: $M/MW |
| T006 | 157 | Bypassed | 500 | 0.32 | In | 1,440 | 0.11 |
| T007 | 278 | Bypassed | 897 | 0.31 | In | 1,704 | 0.16 |
| T008 | 356 | Bypassed | 1,070 | 0.33 | In | 1,796 | 0.20 |
| T009 | 487 | Bypassed | 1,322 | 0.37 | In | 1,753 | 0.28 |
| T011 | 177 | In | 464 | 0.38 | In | 216 | 0.82 |
| T012 | 433 | In | 1,336 | 0.32 | In | 1,431 | 0.30 |
| T013 | 232 | In | 1,381 | 0.17 | In | 1,482 | 0.16 |
| T014 | 181 | Bypassed | 921 | 0.20 | In | 1,604 | 0.11 |
| T014_Alt | 219 | Bypassed | 921 | 0.24 | In | 1,604 | 0.14 |
| T015 | 159 | Bypassed | 442 | 0.36 | In | 1,403 | 0.11 |
| T015_Alt | 197 | Bypassed | 442 | 0.45 | In | 1,403 | 0.14 |
| T017 | 299 | In | 1,364 | 0.22 | In | 1,536 | 0.19 |

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# Expandability

| Project | Potential Electrical Expandability paths based on transfer limit analysis | Potential Physical Expandability Paths based on substation design | Notes | Ranking |
|---|---|---|---|---|
| T006 | 345, 230S | 345, 230E | significantly higher transfer limits can be achieved if the proposed Dysinger 345 kV substation can be further expanded | Good |
| T007 | 345, 230S, ON-NY | 345, 230E | significantly higher transfer limits can be achieved if the proposed Dysinger 345 kV substation can be further expanded | Good |
| T008 | 345, 230S, ON-NY | 345, 230E | significantly higher transfer limits can be achieved if the proposed Dysinger 345 kV substation can be further expanded | Good |
| T009 | 345, 230S, ON-NY, 230E | 345, 230E | significantly higher transfer limits can be achieved if the proposed Dysinger 345 kV substation can be further expanded | Good |
| T011 | 230S | - | has potential for higher transfer limits, though the current design does not offer readily available options | Fair |
| T012 | 230S, 230E, ON-NY | - | has potential for higher transfer limits, though the current design does not offer readily available options | Fair |
| T013 | 345, 230S, 230E | 345, 230E | significantly higher transfer limits can be achieved and the current design of the Dysinger 345 kV substation already includes a spare bay | Good |
| T014 | 345, 230S, 230E | 230E | significantly higher transfer limits can be achieved if the Stolle Road substation can be further expanded | Good |
| T015 | 345, 230S | 230E | significantly higher transfer limits can be achieved if the Stolle Road substation can be further expanded | Good |
| T017 | 230S, 230E | 345, 230E | has potential for higher transfer limits, though the current design does not offer readily available options | Fair |

ONT: Ontario – New York ties; 345: Niagara – Rochester 345 kV path;
230S: Niagara – Gardenville 230 kV path; and 230E: Niagara – Meyer 230 kV path

# Operability

| Project | Configuration | Dispatch Flexibility | Controllability | Impact during Construction | Ranking |
|---|---|---|---|---|---|
| T006 | Enhance 345 kV network connectivity in Western NY | Facilitate significant amount of power transfer, and moderately sensitive to generator dispatches | none | Low | Good |
| T007 | Enhance 345 kV and 230 kV network connectivity in Western NY | Facilitate significant amount of power transfer, and moderately sensitive to generator dispatches | none | Medium | Good |
| T008 | Enhance 345 kV and 230 kV network connectivity in Western NY | Facilitate significant amount of power transfer, and less sensitive to generator dispatches | none | Medium | Good |
| T009 | Enhance 345 kV and 230 kV network connectivity in Western NY | Facilitate significant amount of power transfer, and less sensitive to generator dispatches | none | Medium | Good |
| T011 | adequate; advantageous by separating the two lines 61 and 64 on a common tower | Facilitate small amount of power transfer, and extremely sensitive to generator dispatches | none | High | Fair |
| T012 | Enhance 230 kV network connectivity in Western NY; advantageous by separating lines 61 and 64 on a common tower | Facilitate significant amount of power transfer, and very sensitive to generator dispatches | none | High | Good |
| T013 | Enhance 345 kV and 230 kV network connectivity in Western NY; advantageous Stolle design by separating the 345/115 kV transformers | Facilitate significant amount of power transfer, and moderately sensitive to generator dispatches | Proposed 115 kV PAR at South Perry | High | Good |
| T014 | Enhance 345 kV network connectivity in WNY; advantageous Dysinger design by connecting to Somerset 345 kV substation | Facilitate significant amount of power transfer, and moderately sensitive to generator dispatches | Proposed 345 kV PAR at Dysinger | Low | Excellent |
| T015 | Enhance 345 kV network connectivity in Western NY; advantageous Dysinger design by connecting to Somerset 345 kV substation | Facilitate significant amount of power transfer, and moderately sensitive to generator dispatches | none | Low | Good |
| T017 | Enhance 345 kV network connectivity in Western NY; less advantageous straight bus design at Stolle Road 345 kV substation | Facilitate significant amount of power transfer, and very sensitive to generator dispatches | none | Medium | Fair |

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# Production Cost Change: in 2017 M$

| Project ID | Baseline | 2017 Baseline | SR on 77/78 In-service | Historical IESO-MISO Flow Modeled | High Fuel | Low Fuel | High Load | Low Load | National CO2 Removed and SR on 77/78 In-service |
|---|---|---|---|---|---|---|---|---|---|
| | | | Based off 2017 Baseline | | | | | | |
| T006 | (100) | (101) | (209) | (116) | | | | | (106) |
| T007 | (139) | (149) | (231) | (193) | (203) | (139) | (159) | (136) | |
| T008 | (175) | (195) | (230) | (261) | | | | | |
| T009 | (216) | (241) | (269) | (322) | | | | | |
| T011 | 3 | 1 | 1 | (5) | | | | | |
| T012 | (55) | (75) | (75) | (172) | | | | | |
| T013 | (205) | (229) | (229) | (308) | (296) | (210) | (277) | (185) | (138) |
| T014 | (201) | (207) | (274) | (243) | (239) | (181) | (219) | (192) | (210) |
| T015 | (101) | (99) | (225) | (98) | | | | | (108) |
| T017 | (168) | (207) | (207) | (335) | (288) | (172) | (278) | (147) | (127) |

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# System $CO_2$ Emission Change (in 1000 tons)

| Project ID | Baseline | 2017 Baseline | SR on 77/78 In-service | Historical IESO-MISO Flow Modeled | High Fuel | Low Fuel | High Load | Low Load | National CO2 Removed and SR on 77/78 In-service |
|---|---|---|---|---|---|---|---|---|---|
| | | | Based off 2017 Baseline | | | | | | |
| T006 | (12,802) | (11,692) | (11,390) | (12,733) | | | | | (6,871) |
| T007 | (13,323) | (12,109) | (11,582) | (15,639) | (7,502) | (12,585) | (16,971) | (11,278) | |
| T008 | (12,766) | (11,720) | (11,023) | (19,032) | | | | | |
| T009 | (11,874) | (11,373) | (11,061) | (20,967) | | | | | |
| T011 | (980) | (378) | (378) | (1,004) | | | | | |
| T012 | (3,976) | (2,017) | (2,017) | (6,603) | | | | | |
| T013 | (12,564) | (11,305) | (11,305) | (19,182) | (3,541) | (13,647) | (16,732) | (11,056) | (7,505) |
| T014 | (6,059) | (6,473) | (7,362) | (12,050) | (1,202) | (6,452) | (6,049) | (4,860) | (177) |
| T015 | (10,892) | (10,067) | (10,681) | (12,482) | | | | | (4,747) |
| T017 | (9,982) | (11,104) | (11,104) | (19,795) | (2,312) | (14,851) | (19,068) | (10,102) | (7,625) |

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# Performance: Energy flow in 2025

| Project ID | Niagara Gen + Niagara Ties (GWh) | Dysinger East (GWh) |
|---|---|---|
| T006 | 24,165 | 5,962 |
| T007 | 24,191 | 5,968 |
| T008 | 24,208 | 5,852 |
| T009 | 24,368 | 5,984 |
| T011 | 23,089 | 6,717 |
| T012 | 23,654 | 6,802 |
| T013 | 24,198 | 6,006 |
| T014 | 24,309 | 6,237 |
| T015 | 24,251 | 6,070 |
| T017 | 24,224 | 6,264 |

Note: Dysinger East interface only captures the flows from Zone A to Zones B and C; the interface does not capture all flows out of Zone A.

# Property Rights

- The NYISO and SECO reviewed, in consultation with the DPS, transmission routing studies provided by developers that may identify routing alternatives and land-use or environmentally sensitive areas, such as wetlands, agriculture, and residential areas.
- Results considered in review of developers' project schedules and cost estimates.

| Project ID | Property Rights |
|---|---|
| T006 | Existing ROW |
| T007 | Existing and new ROW |
| T008 | Existing and new ROW |
| T009 | Existing and new ROW |
| T011 | Existing ROW |
| T012 | Existing ROW |
| T013 | Existing ROW |
| T014 | Existing ROW |
| T014_Alt | New ROW as alternative |
| T015 | Existing ROW |
| T015_Alt | New ROW as alternative |
| T017 | Existing and new ROW |

# Project Schedules

| Project ID | Independent Minimum Duration Estimate: months | Independent Anticipated Duration Estimate: months |
|---|---|---|
| T006 | 40 | 43 |
| T007 | 59 | 63 |
| T008 | 65 | 69 |
| T009 | 71 | 75 |
| T011 | 57 | 57 |
| T012 | 60 | 60 |
| T013 | 44 | 55 |
| T014 | 40 | 49 |
| T014_Alt | 49 | 53 |
| T015 | 40 | 49 |
| T015_Alt | 49 | 53 |
| T017 | 66 | 82 |

# Summary of Evaluation

- High-level summary of the relative performance of each project for each metric using certain scenarios

| Project ID | Independent Capital Cost Estimate: 2017 $M | Independent Duration Estimate: months | Ontario-NY Transfer Limit: MW (1) | Cost per MW: $M/MW (1) | Production Cost Savings: 2017 $M (2) | Production Cost Savings / Cost (2) | System $CO_2$ Emission Reduction: 1000 tons (2) | Performance: Niagara Gen + Niagara Ties in 2025: GWh (2) | Operability | Expandability | Property Rights |
|---|---|---|---|---|---|---|---|---|---|---|---|
| T006 | 157 | 40 | 1,440 | 0.11 | 209 | 1.3 | 11,390 | 24,165 | Good | Good | Existing ROW |
| T007 | 278 | 59 | 1,704 | 0.16 | 231 | 0.8 | 11,582 | 24,191 | Good | Good | Existing and new ROW |
| T008 | 356 | 65 | 1,796 | 0.20 | 230 | 0.6 | 11,023 | 24,208 | Good | Good | Existing and new ROW |
| T009 | 487 | 71 | 1,753 | 0.28 | 269 | 0.6 | 11,061 | 24,368 | Good | Good | Existing and new ROW |
| T011 | 177 | 57 | 216 | 0.82 | (1) | 0.0 | 378 | 23,089 | Fair | Fair | Existing ROW |
| T012 | 433 | 60 | 1,431 | 0.30 | 75 | 0.2 | 2,017 | 23,654 | Good | Fair | Existing ROW |
| T013 | 232 | 44 | 1,482 | 0.16 | 229 | 1.0 | 11,305 | 24,198 | Good | Good | Existing ROW |
| T014 | 181 | 40 | 1,604 | 0.11 | 274 | 1.5 | 7,362 | 24,309 | Excellent | Good | Existing ROW |
| T014_Alt | 219 | 49 | 1,604 | 0.14 | 274 | 1.3 | 7,362 | 24,309 | Excellent | Good | New ROW as alternative |
| T015 | 159 | 40 | 1,403 | 0.11 | 225 | 1.4 | 10,681 | 24,251 | Good | Good | Existing ROW |
| T015_Alt | 197 | 49 | 1,403 | 0.14 | 225 | 1.1 | 10,681 | 24,251 | Good | Good | New ROW as alternative |
| T017 | 299 | 66 | 1,536 | 0.19 | 207 | 0.7 | 11,104 | 24,224 | Fair | Fair | Existing and new ROW |

Notes:

(1) Transfer scenario with series reactors on Packard-Huntley lines in-service for all projects

(2) MAPS scenario 2 with series reactors on Packard-Huntley lines in-service for all projects

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# Ranking and Selection Recommendation



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# Ranking and Selection

- Based on consideration of all the evaluation metrics and input from stakeholders
- Initially distinguished the proposed projects into two tiers based on performance relative to cost
- Compared the tiered projects and identified distinguishing factors
- Ranked the ten projects and determined the more efficient or cost effective solution

# Ranking

| Tier | Ranking | Project ID | Developer | Project Name |
|---|---|---|---|---|
| 1 | 1 | T014 | NextEra Energy Transmission New York | Empire State Line Proposal 1 |
| | 2 | T015 | NextEra Energy Transmission New York | Empire State Line Proposal 2 |
| | 3 | T006 | North America Transmission | Proposal 1 |
| | 4 | T013 | NYPA/NYSEG | Western NY Energy Link |
| 2 | 5 | T007 | North America Transmission | Proposal 2 |
| | 6 | T008 | North America Transmission | Proposal 3 |
| | 7 | T017 | Exelon Transmission Company | Niagara Area Transmission Expansion |
| | 8 | T009 | North America Transmission | Proposal 4 |
| | 9 | T012 | National Grid | High Power Transfer Solution |
| | 10 | T011 | National Grid | Moderate Power Transfer Solution |

# Recommended Selection

- **The NYISO recommends T014 as the more efficient and cost effective solution to satisfy the Western NY Public Policy Transmission Need**
- **T014 efficiently utilizes both the existing and proposed transmission facilities:**
  - The proposed Dysinger substation would become the new 345 kV hub in Western NY where seven 345 kV lines are connected, and electrically reduce the distance between Niagara and Rochester
  - The proposed PAR on the Dysinger – East Stolle Road 345 kV line provides additional operational flexibility to the 345 kV system. Even when the PAR is bypassed, the project still demonstrates significant benefits
- **T014 is efficient and cost effective:**
  - The independent cost estimate is among the lowest
  - The cost per MW ratio is among the lowest, and the production cost saving over the cost ratio is the highest across all scenarios
- **No critical risks regarding siting, equipment procurement, real estate acquisition, construction and schedule were identified in the evaluation process**

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# In-Service Date for Recommended Selection

- The tariff requires the Public Policy Transmission Planning Report to specify the in-service date for the selected project
- Based on SECO's independent project schedule estimates, the in-service date for T014 is June 2022

# Next Steps

# Next Steps

- September 27, 2017: Management Committee (advisory vote)
- October 2017:  Western NY Report delivered to NYISO Board
- Following the Board approval, the NYISO will tender a Development Agreement to the Developer of the selected project

**The Mission of the New York Independent System Operator, in collaboration with its stakeholders, is to serve the public interest and provide benefits to consumers by:**

- Maintaining and enhancing regional reliability
- Operating open, fair and competitive wholesale electricity markets
- Planning the power system for the future
- Providing factual information to policy makers, stakeholders and investors in the power system

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