Revised AC Transmission Public Policy Transmission Planning Report

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Management Committee

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DRAFT – FOR DISCUSSION PURPOSES ONLY

Topics

- **Review Process**
- **Summary of Revisions**
  - **Including revisions in response to stakeholder comments**
- **Revised Ranking**

Review Process

Review Process of Draft Report

- March 30, 2018: Posted draft SECO report and preliminary evaluation results
- April 5, 2018: ESPWG/TPAS, summary of the review schedule
- April 6, 2018: Reviewed results with all developers in the same meeting
- April 19, 2018: Reviewed results with all developers in the same meeting
- April 30, 2018: ESPWG/TPAS
- May 10, 2018: ESPWG/TPAS
- May 22, 2018: ESPWG/TPAS
- June 1, 2018: ESPWG/TPAS
- June 14, 2018: ESPWG/TPAS
- June 20, 2018: Business Issue Committee (advisory vote)
- June 21, 2018: Operating Committee (for information)
- June 26, 2018: Special Management Committee (advisory vote)

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Board Review

- The NYISO staff submitted the draft AC Transmission Public Policy Transmission Planning Report ("Draft Report") to the NYISO Board.
- Following its review of the Draft Report and comments submitted by interested parties, the Board directed NYISO staff to conduct certain additional analyses.
- After consideration of the additional analyses performed, the Board concluded that the more efficient or cost effective solution for Segment A is Project T027. The Board concluded that the more efficient or cost effective solution for Segment B is Project T019.
- The Board issued a Summary of Proposed Modifications to the Draft Report and Proposed Selections.

Revised Report

- The NYISO Staff prepared an Addendum to the Draft Report summarizing the results of the additional analyses performed.
- The Board issued a Summary of Proposed Modifications to the Draft AC Transmission Public Policy Transmission Planning Report and Proposed Selections.
- On December 27, 2018, the NYISO posted on its website:
  - The Board Summary
  - The Addendum to the Draft Report
  - Additional Appendices to the Draft Report
- The Revised Report consists of the original Draft Report, the Addendum, and the Appendices.

Review Process for Revised Report

- The tariff establishes that: “If changes are proposed by the Board, the revised report shall be returned to the Management Committee for comment. The Board shall not make a final determination on a revised report until it has reviewed the Management Committee’s comments, including comments regarding the Market Monitoring Unit’s evaluation. Upon approval by the Board, the ISO shall issue the report to the marketplace by posting it on its website.” (OATT Att. Y § 31.4.11.2)

Stakeholder Review of Revised Report

- **January 9, 2019: ESPWG/TPAS**
  - Discussed details of all analysis documented in Addendum
  - Received various written comments afterward
- **February 11, 2019: ESPWG/TPAS**
  - Discussed all further revisions to the Addendum in response to stakeholder comments
- **February 27, 2019: Management Committee**

Management Committee Comment Process

- The Revised Report, including the MMU market impact review, will be submitted to the Board for final review and action after the Management Committee meeting.
- Comments from interested parties will also be provided to the Board.
- Interested parties may provide written comments to the NYISO on the Revised Report no later than March 1, 2019.
  - Parties submitting comments should indicate whether they agree to posting of their comments on the NYISO website.
  - These comments may be sent to PublicPolicyPlanningMailbox@nyiso.com.

Summary of Revisions

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Summary of Board Revisions

- The Board's revisions to the report are summarized in Section 8 of the posted Addendum.

Impedance Correction

- Following the initial review of the Revised Report at the January 9, 2019 ESPWG/TPAS meeting, the NYISO was informed of a modeling error included in the NAT/NYPA and National Grid/Transco Segment B proposals.
- Specifically, the impedance data submitted for the New Scotland – Knickerbocker 345 kV line and the Knickerbocker – Alps 345 kV line was transposed for each project.
- National Grid/Transco and NAT/NYPA each provided corrected data for their respective projects.
- The NYISO assessed the impact of the impedance data correction on the calculated transfer limits and on affected metrics.

Transfer Limits

Transfer Limit Analysis

- All transfer limits were updated to reflect the impedance data corrections.
- As requested by the Board, the NYISO staff evaluated the impact of generation dispatch on the N-1-1 transfer capability by using the dispatch methodology established for calculating transmission security-based floors used in the Alternative Locality Capacity Requirement (LCR) optimization process.

Transfer Capability: Revised Findings

- T019 provides additional N-1 emergency transfer capability of 400 MW to 550 MW for UPNY/SENY relative to the other Segment B projects.
- UPNY/SENY N-1-1 limits under both Normal Transfer Criteria and Emergency Transfer Criteria are not a distinguishing factor among the proposed Segment B projects.

Cost per MW

Cost per MW: Revised Findings

- Using the revised transfer limits, the NYISO staff recalculated the Cost per MW ratio.
- Following stakeholder feedback, the Addendum was revised to incorporate synergy savings consistent with the Draft Report.
- The results show that T019 has the lowest Cost per MW ratio of all the Segment B projects.

Operability

Operability Assessment

- The Board requested that the NYISO staff further examine how certain design aspects of the proposed projects could be beneficial to the future operation of the grid under more extreme conditions such as high impact storms or significant generation retirements that could strain the system.
- The NYISO staff performed additional assessments of resilience, generator deactivations, and operating reserves.

Operability: Revised Findings

- T019 utilizes heavier duty structures mounted on drilled-shaft concrete foundations, and also uses more dead-end structures. It demonstrates better resilience compared with other Segment B projects.
- The additional emergency transfer capability provided by T019 would materially improve the resilience of the transmission system in the Southeast New York area, including an increased ability to accommodate additional generator deactivations in Zone G if they occurred.
- T019 would require approximately 475 MW of additional 30-minute reserves compared to other Segment B projects, but the NYCA 30-minute reserve requirement of 2,620 MW would not change as a result of the transmission projects. The increase in SENY locational reserve requirement is not expected to be impactful.

Performance

Performance Assessment

- The Board requested NYISO staff to investigate whether there are potential performance benefits associated with the series compensation capability included with T019, such as operational flexibility to improve system utilization.

Performance: Revised Findings

- The NYISO expects that operational benefits will be realized by the capability to control Segment B power flows by directing the operational status of the series compensation for T019.
  - This would only be likely for a few single 345 kV outages or combination of 345 kV outages and only for the duration of the transmission maintenance.
  - The NYISO does not expect to by-pass the series compensation for long time periods nor entire seasonal capability periods.
- The improved controllability of UPNY/SENY power flows provided by the T019 project will allow the NYISO more flexibility in addressing grid reliability needs and can result in improved utilization of the overall transmission system as compared to the other proposed projects.
- Furthermore, the utilization of the UPNY/ConEd interface could be further increased if future system improvements mitigate voltage limitations.

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Production Cost

Social Cost of Carbon Sensitivity

- The Board requested additional production cost analysis to study the potential impact of incorporating carbon pricing in the NYISO's wholesale market on the relative cost effectiveness of Segment B projects.
- The additional simulations were performed using the CES+Retirement case with CO_2 emissions priced at the social cost of carbon.
- The methodology and social cost of carbon employed in this analysis mirror those being utilized in the carbon pricing market designs discussed at the Integration of Public Policy Task Force (IPPTF).

Production Cost: Revised Findings

- Production cost simulations were updated to reflect the impedance data corrections.
- This analysis shows that while the production cost savings increase for all Segment B projects as a result of the inclusion of the social cost of carbon, the sensitivity did not alter the relative production cost savings to capital cost ratios.

ICAP Benefits

Additional ICAP Benefit Analysis

- **Upon its review of the Draft Report, the Board directed staff to:**
  - Evaluate ICAP benefits for all Segment B projects in combination with the T027 Segment A project
  - Request the MMU to perform an independent assessment of the capacity benefits of the proposed AC Transmission projects

ICAP Benefits from Optimization Method

- The NYISO developed a range of estimates for each of the Segment B projects in combination with the T027 proposal.
- These reasonable order of magnitude estimates do not account for the impedance data correction previously described.
- The estimated 20-year benefits in the "Existing Localities" scenario for T019 range from $744M to $1,040M compared to a range from $584M to $816M for all other Segment B projects.
- A "G-J Elimination" scenario was also performed with numerous assumptions about a theoretical set of future market conditions. For this scenario, the T019 benefits range between $1,385M and $1,936M compared to $1,327M and $1,856M for all other Segment B projects.

MMU Assessment of ICAP Benefits

- The NYISO's Market Monitoring Unit (MMU) estimated capacity benefits for both the Baseline and CES+Retirement cases.
- The MMU's methodology estimates the capacity benefits of a transmission project as the summation of (1) the avoided investment ($) required to meet reliability criteria and (2) the value ($) of the reliability provided to the system in excess of criteria.
- The MMU estimates are not impacted by the impedance data correction.
- Using the MMU methodology, the 20-year ICAP savings in the Baseline case are $237M for T027+T019 and $218M for T027+T029; in the CES+Retirement case, the 20-year savings are $592M for T027+T019 and $523M for T027+T029.

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ICAP Benefits – Findings

- Although the precise quantity of future benefits may be uncertain, under both the NYISO and MMU methodologies, the Installed Capacity savings for T019 exceed those of all other Segment B projects.

Interconnection Studies

Additional Interconnection Studies

- The Public Policy Transmission Planning Process considers the status and results of the interconnection studies in evaluating and selecting the more efficient or cost-effective project.
- The Board requested further investigation of two interconnection issues that were outstanding at the time the Draft Report was issued:
  - Potential subsynchronous resonance (SSR) due to series compensation
  - The feasibility of a Middletown transformer upgrade

SSR Mitigation

- T019 introduces a potential SSR risk that may be caused by interactions between the proposed 50% series compensation and nearby generators.
- The NYISO staff engaged ABB to independently estimate costs for conceptual mitigation solutions to resolve the potential SSR issues identified in the screening study for T019.
- The ABB Report indicates that any potential SSR issue resulting from the series compensation associated with T019 can be mitigated in a manner that is cost effective and does not affect T019's project ranking.
- Further examination of the SSR issue and any necessary mitigation measures will be determined during the remaining portion of the interconnection process and design phase for T019.

Middletown Transformer

- T029 and T030 Segment B proposals include replacement of the existing Orange & Rockland (O&R) Middletown 345/138 kV transformer with a larger one.
- In response to O&R's concerns regarding physical limitations of the substation, SECO conducted a site visit with O&R at the Middletown substation on August 13, 2018, to perform an independent physical feasibility evaluation and environmental assessment of the proposed replacement of the Middletown transformer.
- SECO determined that the larger transformer would fit inside the Middletown substation, which is assessed to be capable of holding a transformer with a depth of up to 60 feet.
- Additional equipment at Middletown Substation would have to be replaced and/or relocated. SECO determined the installation of the proposed transformer is physically feasible without impacting the nearby wetlands.

Revised Ranking

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Ranking Process

- Based on consideration of all the evaluation metrics for efficiency or cost effectiveness, and having given due weight to metrics according to input from the NYISO Board and subsequent conclusions reached by the Board, the NYISO has revised the ranking for the Segment B projects.

Distinguishing Comparisons of Segment B Projects

- T019 has the highest incremental UPNY/SENY transfer capability, resulting in the lowest cost per MW ratio, highest production cost savings, highest CO_2 emissions savings, and highest ICAP savings of the Segment B projects.
- The series compensation component of the project provides performance benefits through greater operational flexibility and utilization of the UPNY/SENY interface. The project also has the most resilient foundation and structure design resulting in significant benefits for the operability of the transmission system during extreme weather events.

Distinguishing Comparisons of Segment B Projects

- T029 is estimated to have the second-lowest capital costs among the Segment B projects. However, the project achieves less production cost savings than T019 and has a higher cost per MW ratio. T019 also has a more resilient foundation and structure design than T029.
- T023's capital costs are estimated to be slightly more than T029 with comparable electrical performance and comparable replacement of aging infrastructure, therefore T023 is ranked lower than T029. T023 would retire additional aging lattice transmission structures compared to T022 resulting in a more resilient design overall.

Distinguishing Comparisons of Segment B Projects

- T022 is estimated to have the lowest capital costs of the Segment B projects with comparable electrical performance as the other Segment B projects, with the exception of T019. However, T022 proposes the least amount of aging infrastructure replacement among Segment B projects.
- T030 is more expensive because of an additional conductor (triple-bundle rather than double-bundle), however the additional conductor actually results in less production cost savings in the CES+Retirement scenario while only achieving slightly greater emergency transfer capability compared to T029. As such, T030 has the lowest production cost savings of the Segment B projects and would not have materially higher ICAP savings.
- T032 is the most expensive Segment B project with numerous inherent siting risks in the design, as identified in the Draft Report, with no material incremental performance benefits. T032 has the lowest production cost benefit/cost ratio and the highest cost-per-MW ratio.

Revised Ranking for Segment B Projects

Ranking	Project ID	Developer Name	Project Name
1	T019	National Grid / Transco	New York Energy Solution Seg. B
2	T029	North America Transmission / NYPA	Segment B Base
3	T023	NextEra Energy Transmission New York	Enterprise Line: Segment B-Alt
4	T022	NextEra Energy Transmission New York	Enterprise Line: Segment B
5	T030	North America Transmission / NYPA	Segment B Enhanced
6	T032	ITC New York Development	16NYPP1-1B AC Transmission

In-Service Date

- Based on the estimated project schedules, the in-service date established for the purposes of the Development Agreements for the selected Segment A and Segment B projects is December 2023.

Questions?

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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