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Independent System Operator

# NYC PPTN Update


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## Transmission Planning Advisory Subcommittee (TPAS)
## Electric System Planning Working Group (ESPWG)

Wednesday, June 25, 2025

# Agenda

- **NYC PPTN Review**
- **Preliminary Evaluation Results**
  - Independent Capital Cost Estimates
  - Offshore Wind Injection
  - Production Cost Savings
  - Impact on Transfer Limit
  - Risk Assessment – Potential Construction Delays
- **Next Steps**

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# NYC PPTN Review

# NYC PPTN Review

- **The NYC PPTN calls for proposed solutions that must accommodate the full output of at least 4,770 MW of incremental offshore wind (OSW) generation into New York City**
  - Consistent with the PSC's order identifying the NYC PPTN, the NYISO can use scenarios representing up to 8,000 MW of incremental OSW generation to evaluate performance of proposes solutions for expandability, renewable energy deliverability, and other metrics in evaluation phase
- **"Appendix A: Technical Requirements" of the PSC's order contains technical details that will be used in defining the viability & sufficiency criteria and evaluation criteria**

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# NYC PPTN Review (cont.)

- **Solutions to address the NYC PPTN must, among other things:**
  - Consist of a complete end-to-end solution comprised of both offshore and onshore components to enable power injection into Zone J
  - Contain a plan to complete all permitting and construction activities for facilities required to inject 4,770 MW of OSW generation into Zone J to achieve an in-service date no later than January 1, 2033
  - Contain a plan for how OSW generation would interconnect to the end-to-end transmission proposal at the offshore interconnection points

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# Complete “End-to-End” Solutions

- **A complete end-to-end solution must be comprised of both offshore and onshore components to enable power injection into Zone J and should include the following components:**
  - offshore interconnection point(s),
  - offshore transmission (i.e., submarine cables),
  - sites for cable landing points,
  - onshore transmission path(s) (i.e., terrestrial cables) from cable landing points to points of interconnection in Zone J, including sites for converter stations, and
  - necessary improvements to and/or expansion of the existing onshore transmission system.

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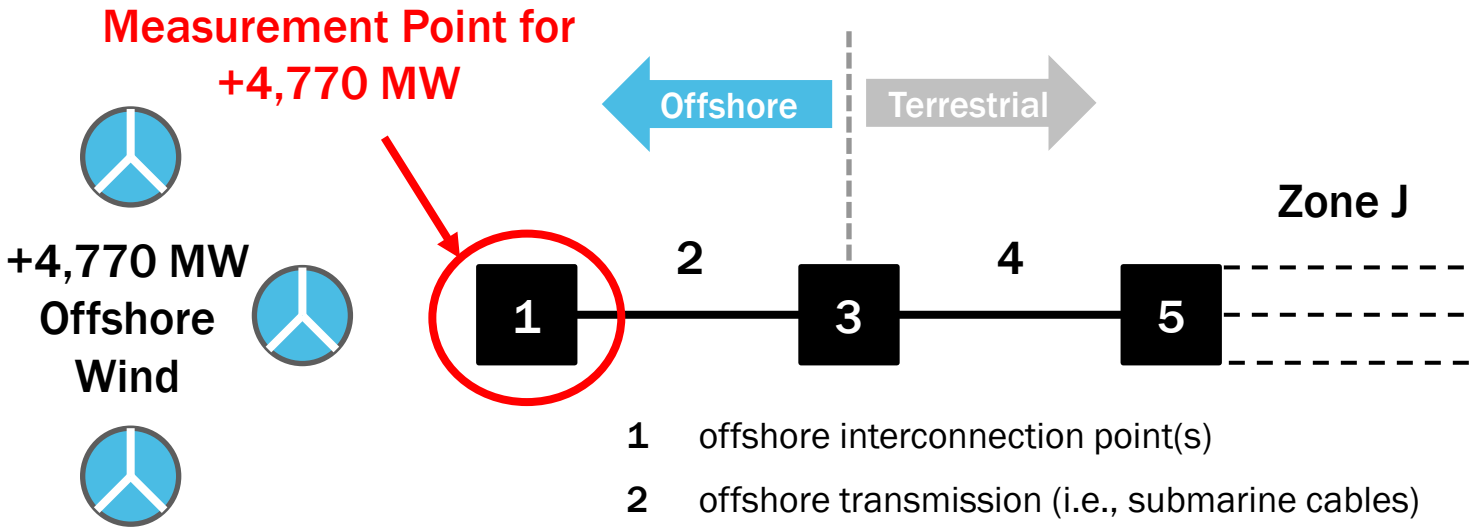
# New York City Offshore Wind PPTN Illustrative Diagram




| | |
|---|---|
| **1** | offshore interconnection point(s) |
| **2** | offshore transmission (i.e., submarine cables) |
| **3** | sites for cable landing points |
| **4** | onshore transmission path(s) (i.e., terrestrial cables) |
| **5** | necessary improvements to and/or expansion of the existing onshore transmission system |

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# Sufficiency Criteria

- Accommodate the full output of at least 4,770 MW of incremental OSW generation injected into New York City (Zone J), under applicable reliability standards, without reducing the overall output of other renewable resources interconnected in Zones J and K
- 4,770 MW of OSW generation is incremental to the 816 MW of OSW generation identified as interconnecting into Zone J in the PSC's order identifying the NYC PPTN

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# Sufficiency Criteria (cont.)

- Consist of a complete end-to-end solution comprised of both offshore and onshore components to enable power injection into Zone J
- Demonstrate that facilities that are required to inject 4,770 MW of OSW generation can achieve an in-service date no later than January 1, 2033

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# Viability and Sufficiency Assessment

- The NYISO's assessment found that all 28 projects meet the viability and sufficiency criteria
- The report was filed with the PSC on October 30, 2024 and is available here

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# NYC PPTN Project Proposals

| Developer Name | Project ID # | Project Name | Abbreviated Project Name | Project Proposed In-Service Date | # of Offshore Platforms |
|---|---|---|---|---|---|
| energyRe Giga-Projects USA, LLC | T102 | Clean Borough Power Link 1 | CBPL 1 | Dec-2032 | 4 |
| energyRe Giga-Projects USA, LLC | T103 | Clean Borough Power Link 2 | CBPL 2 | Dec-2032 | 4 |
| energyRe Giga-Projects USA, LLC | T104 | Clean Borough Power Link 3 | CBPL 3 | Dec-2032 | 4 |
| Viridon NY Inc | T105 | Liberty Link 1 | LL 1 | Dec-2032 | 4 |
| Viridon NY Inc | T106 | Liberty Link 2 | LL 2 | Dec-2032 | 4 |
| Viridon NY Inc | T107 | Liberty Link 3 | LL 3 | Dec-2032 | 4 |
| NY Transco LLC | T108 | Energy Link New York Solution 1 | ELNY S1 | Jan-2033 | 4 |
| NY Transco LLC | T109 | Energy Link New York Solution 2 | ELNY S2 | Jan-2033 | 4 |
| NY Transco LLC | T110 | Energy Link New York Solution 3 | ELNY S3 | Jan-2033 | 4 |
| NY Transco LLC | T111 | Energy Link New York Solution 4 | ELNY S4 | Jan-2033 | 4 |
| NY Transco LLC | T112 | Energy Link New York Solution 5 | ELNY S5 | Jan-2033 | 4 |
| NY Transco LLC | T113 | Energy Link New York Solution 6 | ELNY S6 | Jan-2033 | 4 |
| NY Transco LLC | T114 | Energy Link New York Solution 7 | ELNY S7 | Jan-2033 | 4 |
| NY Transco LLC | T115 | Energy Link New York Solution 8 | ELNY S8 | Jan-2033 | 4 |
| NY Transco LLC | T116 | Energy Link New York Solution 9 | ELNY S9 | Jan-2033 | 4 |
| NY Transco LLC | T117 | Energy Link New York Solution 10 | ELNY S10 | Jan-2033 | 4 |
| NYPA & LS Power Grid NY Corporation I | T118 | Five Boro Energy Connect – Mint | FBEC – Mint | Oct-2032 | 4 |
| NYPA & LS Power Grid NY Corporation I | T119 | Five Boro Energy Connect – Sage | FBEC – Sage | Sep-2032 | 4 |
| NYPA & LS Power Grid NY Corporation I | T120 | Five Boro Energy Connect – Olive | FBEC – Olive | Jun-2033 | 5 |
| NYPA & LS Power Grid NY Corporation I | T121 | Five Boro Energy Connect – Kelly | FBEC – Kelly | Aug-2033 | 5 |
| NYPA & LS Power Grid NY Corporation I | T122 | Five Boro Energy Connect – Hazel | FBEC – Hazel | Dec-2033 | 5 |
| NYPA & LS Power Grid NY Corporation I | T123 | Five Boro Energy Connect– Navy | FBEC – Navy | Sep-2032 | 4 |
| NYPA & LS Power Grid NY Corporation I | T124 | Five Boro Energy Connect – Royal | FBEC – Royal | May-2033 | 5 |
| NYPA & LS Power Grid NY Corporation I | T125 | Five Boro Energy Connect– Cobalt | FBEC – Cobalt | Oct-2033 | 6 |
| NYPA & LS Power Grid NY Corporation I | T126 | Five Boro Energy Connect – Ruby | FBEC – Ruby | Sep-2032 | 4 |
| NYPA & LS Power Grid NY Corporation I | T127 | Five Boro Energy Connect – Rose | FBEC – Rose | Sep-2032 | 4 |
| NYPA & LS Power Grid NY Corporation I | T128 | Five Boro Energy Connect – Honey | FBEC – Honey | Oct-2033 | 5 |
| NYPA & LS Power Grid NY Corporation I | T129 | Five Boro Energy Connect – Golden | FBEC – Golden | Oct-2033 | 6 |

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# Preliminary Evaluation Results

# Preliminary Evaluation Results

- Independent Capital Cost Estimates
- Offshore Wind (OSW) Injection
- Production Cost Savings
- Impact on Transfer Limit
- Risk Assessment – Potential Construction Delays

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# Independent Capital Cost Estimates

# Preliminary Independent Capital Cost Estimates

- **Purpose**
  - Overnight independent capital costs developed by NYISO's consultants are used to inform quantitative and qualitative assessment of the proposed projects
- **Evaluation**
  - An overnight independent capital cost includes the following:
    - Major equipment cost (e.g., procurement, installation, testing and commissioning)
    - Labor and construction cost
    - Engineering and design cost
    - Permitting cost
    - Site acquisition
  - Overnight independent capital costs were developed using consistent assumptions, while accommodating differences in design, for example:
    - Accuracy range as per AACE Class 4 Estimating Practices (-15% to -30%) and (+20% to +50%)
    - Contingency
    - No escalation
    - Sales Tax
    - Estimate based on 2025 budgetary pricing

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# Preliminary Independent Capital Cost Estimates

- **Considerations**
  - Primary cost drivers
    - HVDC system
    - Submarine and terrestrial routing
    - Phase angle regulators (“PARs”), transformers, and circuit breakers
    - Construction costs
    - Site Acquisition costs
- **Design summaries for the proposed projects are included in the Appendix**

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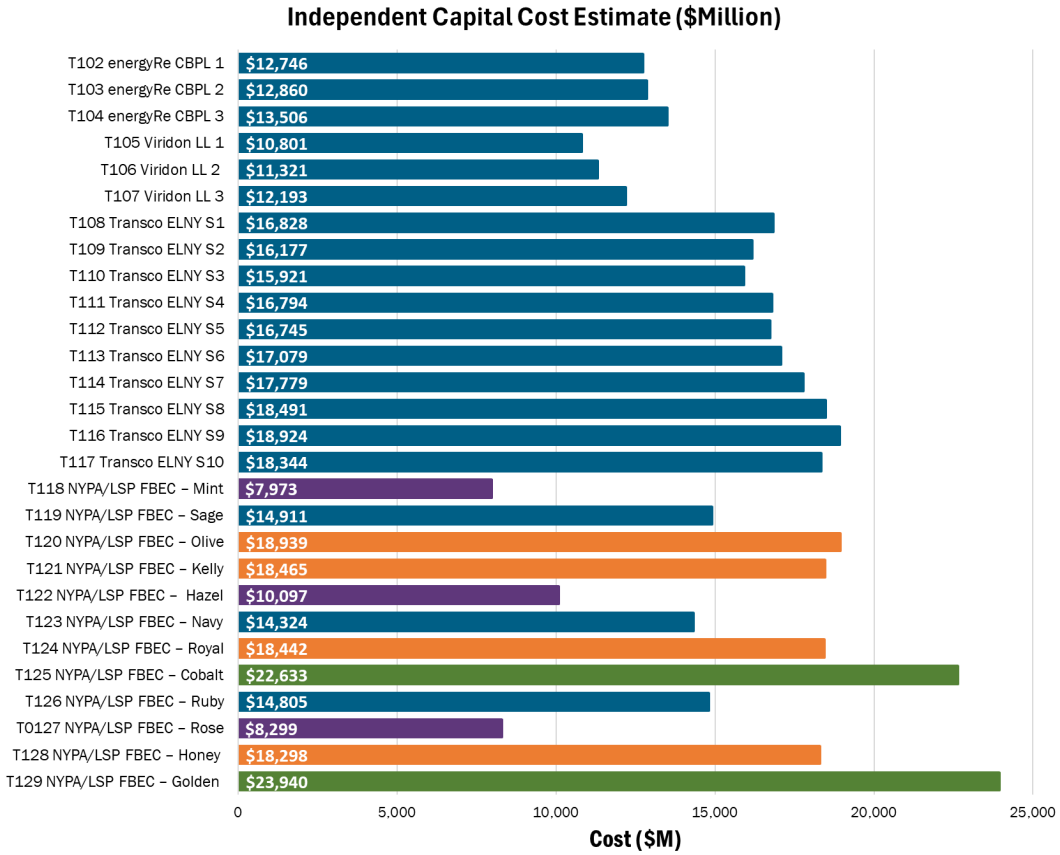
# Preliminary Independent Capital Cost Estimates




Range: $7.9B - $23.9B

- 4 HVDC Links
- 5 HVDC Links
- 6 HVDC Links
- “DC Connector”

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# Preliminary Independent Capital Cost Estimates

| Project | Independent Capital Cost Estimate ($Million) |
|---|---|
| T102 energyRe CBPL 1 | $12,746 |
| T103 energyRe CBPL 2 | $12,860 |
| T104 energyRe CBPL 3 | $13,506 |
| T105 Viridon LL 1 | $10,801 |
| T106 Viridon LL 2 | $11,321 |
| T107 Viridon LL 3 | $12,193 |
| T108 Transco ELNY S1 | $16,828 |
| T109 Transco ELNY S2 | $16,177 |
| T110 Transco ELNY S3 | $15,921 |
| T111 Transco ELNY S4 | $16,794 |
| T112 Transco ELNY S5 | $16,745 |
| T113 Transco ELNY S6 | $17,079 |
| T114 Transco ELNY S7 | $17,779 |
| T115 Transco ELNY S8 | $18,491 |
| T116 Transco ELNY S9 | $18,924 |
| T117 Transco ELNY S10 | $18,344 |
| T118 NYPA/LSP FBEC – Mint | $7,973 |
| T119 NYPA/LSP FBEC – Sage | $14,911 |
| T120 NYPA/LSP FBEC – Olive | $18,939 |
| T121 NYPA/LSP FBEC – Kelly | $18,465 |
| T122 NYPA/LSP FBEC – Hazel | $10,097 |
| T123 NYPA/LSP FBEC – Navy | $14,324 |
| T124 NYPA/LSP FBEC – Royal | $18,442 |
| T125 NYPA/LSP FBEC – Cobalt | $22,633 |
| T126 NYPA/LSP FBEC – Ruby | $14,805 |
| T0127 NYPA/LSP FBEC – Rose | $8,299 |
| T128 NYPA/LSP FBEC – Honey | $18,298 |
| T129 NYPA/LSP FBEC – Golden | $23,940 |

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# Preliminary Independent Capital Cost Estimates

- **Preliminary independent cost estimates to be finalized based on the following information:**
  - Developer's feedback on the independent capital cost estimates
  - NUFs identified in the System Impact Study to become available during the evaluation

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# Offshore Wind Injection

# OSW Injection: Overview

- **Purpose**
  - Maximize MW injection of OSW into Zone J under contingency conditions (N-1 and N-1-1)
- **Evaluation**
  - Analysis utilized the VSA baseline case (Summer Peak) and Baseline case (Spring Light load) assumptions. Detailed assumptions are included in the Appendix
  - All 100 kV and above lines were secured to their normal rating under all lines in service condition and to applicable emergency rating (LTE) in post-contingency conditions while maximizing OSW injection into Zone J
  - OSW is dispatched only up to its capability as proposed in the project proposal
- **Considerations**
  - Higher OSW injection under N-1 and N-1-1 contingency conditions
  - OSW injection under N-1 and N-1-1 contingency conditions compared to its proposed capability

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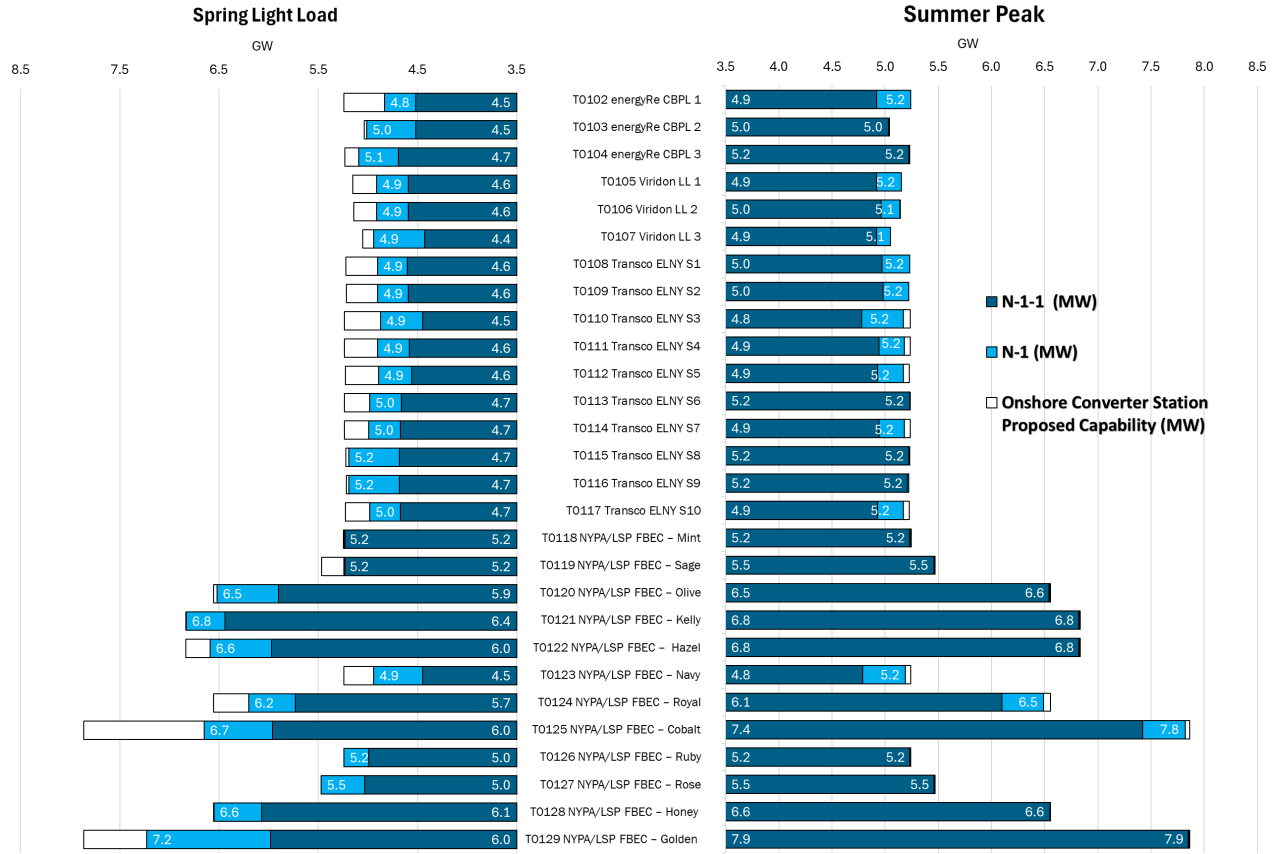
# OSW Injection: Results



# OSW Injection: Results Summer Peak

| Project | Proposed OSW Injection Capability | | OSW Injection at Onshore Converter Station | |
|---|---|---|---|---|
| | Offshore POI Capability (MW) | Onshore Converter Station Capability (MW) | N-1 (MW) | N-1-1 (MW) |
| T102 energyRe CBPL 1 | 5,352 | 5,240 | 5,240 | 4,920 |
| T103 energyRe CBPL 2 | 5,267 | 5,039 | 5,030 | 5,030 |
| T104 energyRe CBPL 3 | 5,355 | 5,232 | 5,230 | 5,220 |
| T105 Viridon LL 1 | 5,250 | 5,151 | 5,150 | 4,920 |
| T106 Viridon LL 2 | 5,242 | 5,143 | 5,140 | 4,960 |
| T107 Viridon LL 3 | 5,146 | 5,050 | 5,050 | 4,920 |
| T108 Transco ELNY S1 | 5,360 | 5,228 | 5,230 | 4,970 |
| T109 Transco ELNY S2 | 5,360 | 5,216 | 5,220 | 4,980 |
| T110 Transco ELNY S3 | 5,372 | 5,236 | 5,170 | 4,780 |
| T111 Transco ELNY S4 | 5,372 | 5,236 | 5,180 | 4,940 |
| T112 Transco ELNY S5 | 5,372 | 5,228 | 5,170 | 4,930 |
| T113 Transco ELNY S6 | 5,372 | 5,235 | 5,230 | 5,230 |
| T114 Transco ELNY S7 | 5,372 | 5,236 | 5,180 | 4,940 |
| T115 Transco ELNY S8 | 5,360 | 5,227 | 5,230 | 5,220 |
| T116 Transco ELNY S9 | 5,360 | 5,215 | 5,220 | 5,210 |
| T117 Transco ELNY S10 | 5,372 | 5,228 | 5,170 | 4,930 |
| T118 NYPA/LSP FBEC – Mint | 5,370 | 5,244 | 5,240 | 5,230 |
| T119 NYPA/LSP FBEC – Sage | 5,600 | 5,468 | 5,460 | 5,460 |
| T120 NYPA/LSP FBEC – Olive | 6,713 | 6,554 | 6,550 | 6,540 |
| T121 NYPA/LSP FBEC – Kelly | 7,000 | 6,835 | 6,830 | 6,820 |
| T122 NYPA/LSP FBEC – Hazel | 7,000 | 6,835 | 6,830 | 6,820 |
| T123 NYPA/LSP FBEC – Navy | 5,368 | 5,243 | 5,190 | 4,790 |
| T124 NYPA/LSP FBEC – Royal | 6,710 | 6,553 | 6,490 | 6,100 |
| T125 NYPA/LSP FBEC – Cobalt | 8,054 | 7,865 | 7,820 | 7,420 |
| T126 NYPA/LSP FBEC – Ruby | 5,369 | 5,243 | 5,240 | 5,230 |
| T127 NYPA/LSP FBEC – Rose | 5,600 | 5,468 | 5,470 | 5,460 |
| T128 NYPA/LSP FBEC – Honey | 6,712 | 6,554 | 6,550 | 6,550 |
| T129 NYPA/LSP FBEC – Golden | 8,072 | 7,865 | 7,860 | 7,850 |

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# OSW Injection: Results Spring Light Load

| Project | Proposed OSW Injection Capability | | OSW Injection at Onshore Converter Station | |
|---|---|---|---|---|
| | Offshore POI Capability (MW) | Onshore Converter Station Capability (MW) | N-1 (MW) | N-1-1 (MW) |
| T102 energyRe CBPL 1 | 5,352 | 5,240 | 4,830 | 4,520 |
| T103 energyRe CBPL 2 | 5,267 | 5,039 | 5,010 | 4,520 |
| T104 energyRe CBPL 3 | 5,355 | 5,232 | 5,090 | 4,690 |
| T105 Viridon LL 1 | 5,250 | 5,151 | 4,910 | 4,590 |
| T106 Viridon LL 2 | 5,242 | 5,143 | 4,910 | 4,590 |
| T107 Viridon LL 3 | 5,146 | 5,050 | 4,940 | 4,430 |
| T108 Transco ELNY S1 | 5,360 | 5,228 | 4,900 | 4,600 |
| T109 Transco ELNY S2 | 5,360 | 5,216 | 4,900 | 4,590 |
| T110 Transco ELNY S3 | 5,372 | 5,236 | 4,870 | 4,450 |
| T111 Transco ELNY S4 | 5,372 | 5,236 | 4,900 | 4,580 |
| T112 Transco ELNY S5 | 5,372 | 5,228 | 4,890 | 4,560 |
| T113 Transco ELNY S6 | 5,372 | 5,235 | 4,980 | 4,660 |
| T114 Transco ELNY S7 | 5,372 | 5,236 | 4,990 | 4,670 |
| T115 Transco ELNY S8 | 5,360 | 5,227 | 5,190 | 4,680 |
| T116 Transco ELNY S9 | 5,360 | 5,215 | 5,190 | 4,680 |
| T117 Transco ELNY S10 | 5,372 | 5,228 | 4,980 | 4,670 |
| T118 NYPA/LSP FBEC – Mint | 5,370 | 5,244 | 5,240 | 5,230 |
| T119 NYPA/LSP FBEC – Sage | 5,600 | 5,468 | 5,240 | 5,230 |
| T120 NYPA/LSP FBEC – Olive | 6,713 | 6,554 | 6,520 | 5,900 |
| T121 NYPA/LSP FBEC – Kelly | 7,000 | 6,835 | 6,830 | 6,440 |
| T122 NYPA/LSP FBEC – Hazel | 7,000 | 6,835 | 6,590 | 5,970 |
| T123 NYPA/LSP FBEC – Navy | 5,368 | 5,243 | 4,940 | 4,450 |
| T124 NYPA/LSP FBEC – Royal | 6,710 | 6,553 | 6,200 | 5,730 |
| T125 NYPA/LSP FBEC – Cobalt | 8,054 | 7,865 | 6,650 | 5,960 |
| T126 NYPA/LSP FBEC – Ruby | 5,369 | 5,243 | 5,240 | 4,990 |
| T127 NYPA/LSP FBEC – Rose | 5,600 | 5,468 | 5,470 | 5,030 |
| T128 NYPA/LSP FBEC – Honey | 6,712 | 6,554 | 6,550 | 6,070 |
| T129 NYPA/LSP FBEC – Golden | 8,072 | 7,865 | 7,230 | 5,980 |

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# Production Cost Savings

# Production Cost Savings: Overview

- **Purpose**
  - Assess the economic benefits of proposed projects and assumed OSW generation by reducing generation production costs to serve the New York Control Area
- **Evaluation**
  - Hourly resolution production cost simulations for 2033, 2035, 2040, 2045, 2050, 2052 under future scenario modeling
- **Considerations**
  - Projects that facilitate higher levels of OSW energy production have higher production cost savings
  - Production cost savings are a societal benefit that reduce the cost of producing electricity to meet New York electricity demand

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# Production Cost Savings: Assumptions

- **The production cost database is based on the 2023-2042 System & Resource Outlook's Policy Case: Higher Demand Scenario, with modifications to align with other analyses in the NYC PPTN evaluation**
  - Updated generator assumptions (i.e., firm new generators and generator retirements)
  - Updated network model
  - Added contingencies associated with the projects
- **Detailed assumptions are included in the Appendix**

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# Production Cost Savings: Assumptions (cont.)

- **Pre-project and post-project cases were developed to quantify the production cost savings associated with the proposed transmission projects**
  - Pre-project case
    - Reflects the system conditions absent proposed transmission to satisfy the NYC PPTN need
    - OSW generation assumed to be in-service aligns with the PSC order identifying the NYC PPTN
      - ~816 MW OSW generation connected to Zone J, ~3,000 MW OSW generation connected to Zone K
  - Post-project cases
    - Inclusion of the proposed transmission project
    - OSW generation assumed to be in-service includes (i) the pre-project assumptions and (ii) the OSW generation identified by the developers based on the stated capacity of their projects

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# Production Cost Savings: Key Takeaways

- **Preliminary results estimate production cost savings between ~$40-70B nominal over a 20-year period (2033-2052)**
  - Savings are in nominal dollars and do not include discounting
  - The capital costs of the proposed NYC PPTN projects and assumed OSW generation projects are not accounted in this metric
- **Preliminary results show a strong correlation between OSW generation and production cost savings (i.e., projects that propose higher OSW injections tend to show higher production cost savings)**
  - The NYISO is evaluating additional factors driving the production cost savings
- **Production cost savings increase significantly for all proposed transmission projects model years 2040 and beyond**

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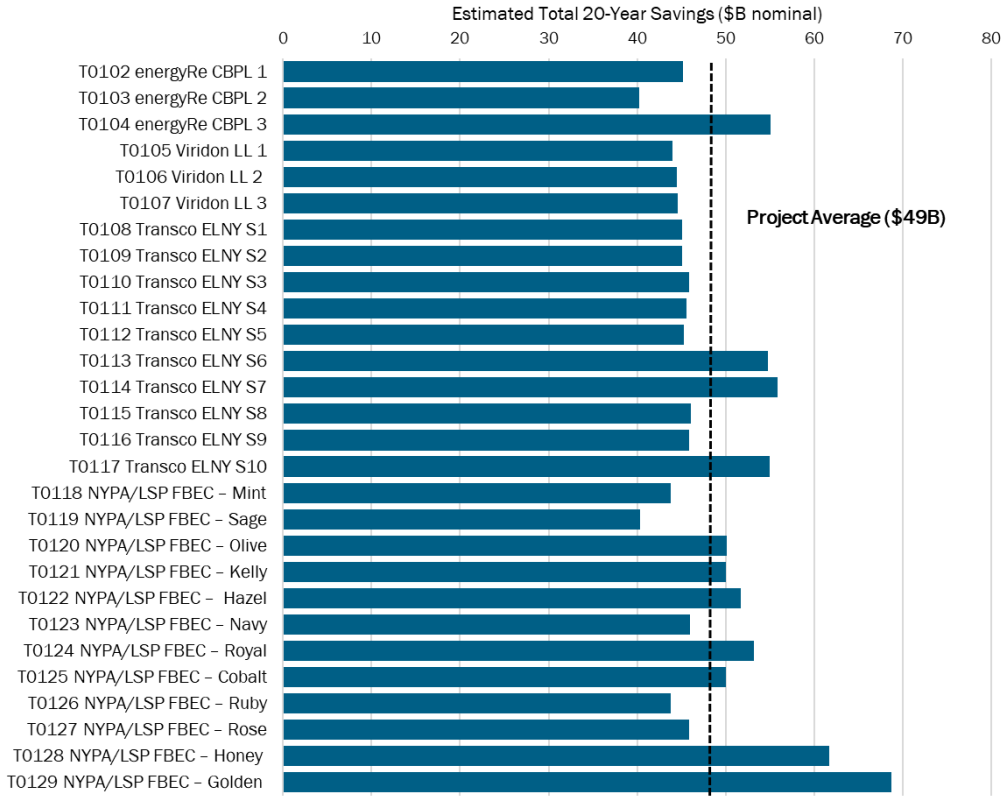
# Production Cost Savings: Preliminary Results



# Production Cost Savings: Preliminary Results

| Project | Estimated Total 20-Year Savings ($B nominal)* |
|---|---|
| T102 energyRe CBPL 1 | 45.2 |
| T103 energyRe CBPL 2 | 40.2 |
| T104 energyRe CBPL 3 | 55.1 |
| T105 Viridon LL 1 | 44.0 |
| T106 Viridon LL 2 | 44.5 |
| T107 Viridon LL 3 | 44.6 |
| T108 Transco ELNY S1 | 45.1 |
| T109 Transco ELNY S2 | 45.1 |
| T110 Transco ELNY S3 | 45.9 |
| T111 Transco ELNY S4 | 45.6 |
| T112 Transco ELNY S5 | 45.3 |
| T113 Transco ELNY S6 | 54.8 |
| T114 Transco ELNY S7 | 55.9 |
| T115 Transco ELNY S8 | 46.1 |
| T116 Transco ELNY S9 | 45.9 |
| T117 Transco ELNY S10 | 55.0 |
| T118 NYPA/LSP FBEC – Mint | 43.8 |
| T119 NYPA/LSP FBEC – Sage | 40.3 |
| T120 NYPA/LSP FBEC – Olive | 50.1 |
| T121 NYPA/LSP FBEC – Kelly | 50.0 |
| T122 NYPA/LSP FBEC – Hazel | 51.7 |
| T123 NYPA/LSP FBEC – Navy | 46.0 |
| T124 NYPA/LSP FBEC – Royal | 53.2 |
| T125 NYPA/LSP FBEC – Cobalt | 50.0 |
| T126 NYPA/LSP FBEC – Ruby | 43.8 |
| T127 NYPA/LSP FBEC – Rose | 45.9 |
| T128 NYPA/LSP FBEC – Honey | 61.7 |
| T129 NYPA/LSP FBEC – Golden | 68.7 |

*The capital costs of the proposed NYC PPTN projects and assumed OSW generation projects are not accounted in this metric

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# Impact on Transfer Limit

# Impact on Transfer Limit: Overview

- **Purpose**
  - Identify incremental impact on import capability into Zone J across Dunwoodie - South interface due to the proposed onshore transmission facilities contained in each project
- **Evaluation**
  - All 100 kV and above lines were secured to their normal rating under all lines in service condition and to applicable emergency rating (LTE) in post-contingency conditions
- **Consideration**
  - Larger increase in transfer limit due to the proposed onshore transmission facilities

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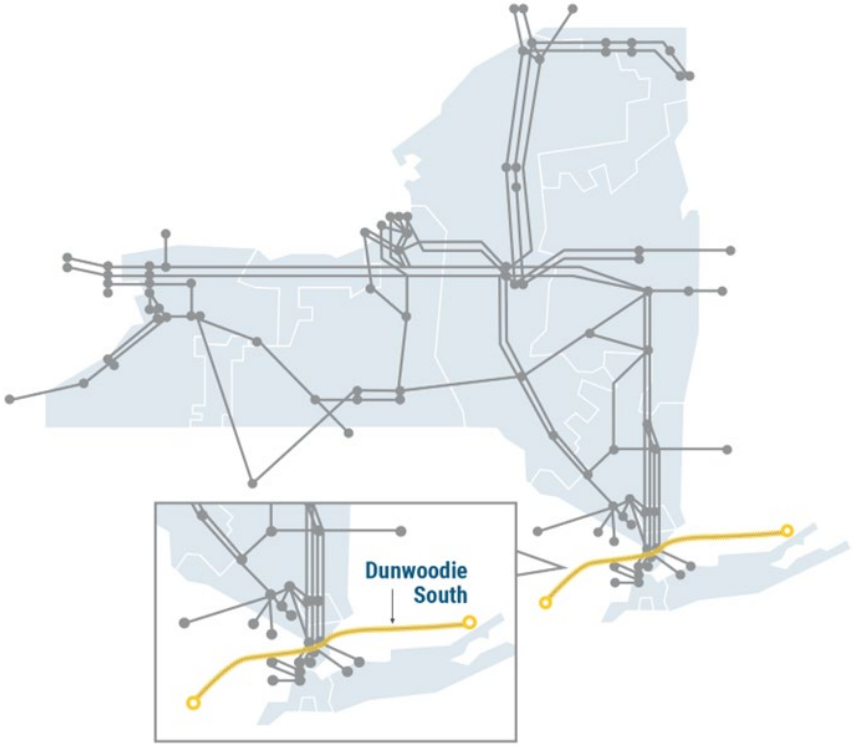
# Impact on Transfer Limit: Results

| Project | Incremental Impact on Dunwoodie South (MW) |
|---|---|
| T102 energyRe CBPL 1 | +291 |
| T103 energyRe CBPL 2 | +191 |
| T104 energyRe CBPL 3 | +197 |
| T105 Viridon LL 1 | +293 |
| T106 Viridon LL 2 | +296 |
| T107 Viridon LL 3 | +199 |
| T108 Transco ELNY S1 | +312 |
| T109 Transco ELNY S2 | +300 |
| T110 Transco ELNY S3 | +290 |
| T111 Transco ELNY S4 | +317 |
| T112 Transco ELNY S5 | +316 |
| T113 Transco ELNY S6 | +288 |
| T114 Transco ELNY S7 | +314 |
| T115 Transco ELNY S8 | +566 |
| T116 Transco ELNY S9 | +568 |
| T117 Transco ELNY S10 | +304 |
| T118 NYPA/LSP FBEC – Mint | +295 |
| T119 NYPA/LSP FBEC – Sage | +275 |
| T120 NYPA/LSP FBEC – Olive | +273 |
| T121 NYPA/LSP FBEC – Kelly | +571 |
| T122 NYPA/LSP FBEC – Hazel | +281 |
| T123 NYPA/LSP FBEC – Navy | +638 |
| T124 NYPA/LSP FBEC – Royal | +924 |
| T125 NYPA/LSP FBEC – Cobalt | +288 |
| T126 NYPA/LSP FBEC – Ruby | +656 |
| T127 NYPA/LSP FBEC – Rose | +609 |
| T128 NYPA/LSP FBEC – Honey | +277 |
| T129 NYPA/LSP FBEC – Golden | +345 |

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# Risk Assessment - Potential Construction Delays

# Risk Assessment

- **NYISO's independent consultant identified risks in each proposed project, including the following categories:**
  - Potential Construction Delays
    - Design Concerns
    - Construction Concerns

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# Potential Drivers for Construction Delays

- Substation Modifications
- Construction Outages
- Routing - Submarine and Terrestrial
- Onshore Converter Designs
- Offshore Point of Interconnection Design (i.e., “DC Connectors”)
- Long-Lead-Time Equipment

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# Potential Construction Delays – Substation Modifications

- **Installing proposed underground cables and/or new equipment in the existing substations pose the following challenges:**
  - Potential impact on existing foundations, conduit/trench systems, grounding, and bus work
  - Relocation of existing assets and complex construction sequences
  - Additional or concurrent outages
  - Expensive construction methods

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# Potential Construction Delays – Construction Outages

- In order to construct the proposed projects, several existing elements (e.g., transformers, PARs, transmission lines, main buses) will need to be removed from service
- Developer's proposed outage plans were reviewed for
  - Reasonableness of proposed outage window compared to the scope of work to be completed during the proposed outage window
  - Potential impact on the reliability of the system

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# Potential Construction Delays – Routing

- **Terrestrial**
  - Modifications may be required for routing cables through congested areas and due to existing utility underground infrastructure
  - Different construction techniques than those planned may need to be used to cross multi-lane roadways, under low clearance bridges, and crossing railroads
- **Submarine**
  - Narrows
    - Cables entering through the Narrows and the areas immediately north pose a physical constraint due to the number of cables coming into the Upper NY Harbor
    - Owner consent/consultation may be required to cross existing infrastructure (e.g., cables, pipelines, tunnels)
    - Given the limited amount of space that physically exists in the Narrows and setbacks between cables necessary for installation and maintenance, cable routing may pose a construction sequencing challenge
  - Long Island Sound
    - Time of year restrictions will likely be imposed during construction. Combined restrictions from federal and state agencies would result in smaller allowable work window

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# Potential Construction Delays – Long-Lead-Time Equipment

- Due to high demand and equipment complexities, manufacturers are quoting longer lead times after execution of the contract for HVDC converter stations and other major equipment like transformers and PARs
- Longer lead times to procure equipment will require the developers to work with the manufacturers to mitigate potential delays in schedule

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# Potential Construction Delays – Proposed Onshore HVDC Converter Design

- **Unique onshore HVDC converter design may lead to longer than planned engineering and installation time**
  - Multi-floor HVDC designs (stacked or 2 story) that have components (example converter valves, filters) physically arranged across two vertical floors as opposed to a flat design in which all components are installed on single level may require longer than planned engineering and installation time

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# Potential Construction Delays – Proposed Offshore POI Design

- **Certain projects proposed an offshore POI which is an offshore platform without an HVDC converter station ("DC Connector")**
  - The use of a "DC Connector" for the purpose of OSW generation integration has not been used in the past and may present challenges associated with design, engineering, and installation
  - As proposed by the developer, DC Connectors require offshore converter stations that would be required to be installed by another entity (e.g., OSW generator) to facilitate interconnection of offshore wind generation in the future
  - This unique design and approach requires extensive cooperation and coordination with OSW generators to design and install compatible offshore converter stations beyond the developer's proposal

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# Summary of Risks

| Project | Potential Construction Delays | | | | |
|---|---|---|---|---|---|
| | Substation Modifications | | | | |
| | Academy 345 kV | Mott Haven 345 kV | Rainey 345 kV | Sprainbrook 345 kV | W49th St. 345 kV |
| T102 energyRe CBPL 1 | | | | X | |
| T103 energyRe CBPL 2 | | | | | |
| T104 energyRe CBPL 3 | | | | | |
| T105 Viridon LL 1 | | | | X | |
| T106 Viridon LL 2 | | | | X | |
| T107 Viridon LL 3 | | | | | |
| T108 Transco ELNY S1 | | | | X | |
| T109 Transco ELNY S2 | | | | X | |
| T110 Transco ELNY S3 | | | | X | |
| T111 Transco ELNY S4 | | | | X | |
| T112 Transco ELNY S5 | | | | X | |
| T113 Transco ELNY S6 | | | | X | |
| T114 Transco ELNY S7 | | | | X | |
| T115 Transco ELNY S8 | | X | X | X | |
| T116 Transco ELNY S9 | | X | X | X | |
| T117 Transco ELNY S10 | | | | X | |
| T118 NYPA/LSP FBEC – Mint | X | | X | | |
| T119 NYPA/LSP FBEC – Sage | X | | | | |
| T120 NYPA/LSP FBEC – Olive | X | | X | | |
| T121 NYPA/LSP FBEC – Kelly | X | | X | | |
| T122 NYPA/LSP FBEC – Hazel | X | | X | | |
| T123 NYPA/LSP FBEC – Navy | | | | | |
| T124 NYPA/LSP FBEC – Royal | | | X | | X |
| T125 NYPA/LSP FBEC – Cobalt | X | | X | | |
| T126 NYPA/LSP FBEC – Ruby | | | X | | X |
| T127 NYPA/LSP FBEC – Rose | | | X | | X |
| T128 NYPA/LSP FBEC – Honey | X | | X | | |
| T129 NYPA/LSP FBEC – Golden | X | | X | | |

If a risk identified for the Project, it is indicated with an “X”

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# Summary of Risks

| Project | Potential Construction Delays | | | | | |
|---|---|---|---|---|---|---|
| | Terrestrial Routing | Submarine Routing | | Onshore Converter Station Design | Offshore POI Design | Construction Outage |
| | Misc | Narrows | Long Island Sound | Multi-floor Design | DC Connector | |
| T102 energyRe CBPL 1 | X | X | | | | X |
| T103 energyRe CBPL 2 | X | X | | | | X |
| T104 energyRe CBPL 3 | X | X | X | | | X |
| T105 Viridon LL 1 | | X | | | | X |
| T106 Viridon LL 2 | | X | | | | X |
| T107 Viridon LL 3 | | X | | | | X |
| T108 Transco ELNY S1 | X | | | | | X |
| T109 Transco ELNY S2 | X | | | | | X |
| T110 Transco ELNY S3 | X | X | | | | X |
| T111 Transco ELNY S4 | X | X | | | | X |
| T112 Transco ELNY S5 | X | X | | | | X |
| T113 Transco ELNY S6 | X | | | | | X |
| T114 Transco ELNY S7 | X | X | | | | X |
| T115 Transco ELNY S8 | X | | | | | X |
| T116 Transco ELNY S9 | X | | | | | X |
| T117 Transco ELNY S10 | X | X | | | | X |
| T118 NYPA/LSP FBEC – Mint | X | X | | X | X | X |
| T119 NYPA/LSP FBEC – Sage | X | X | | X | | X |
| T120 NYPA/LSP FBEC – Olive | X | X | X | X | | X |
| T121 NYPA/LSP FBEC – Kelly | X | X | | X | | X |
| T122 NYPA/LSP FBEC – Hazel | X | X | | X | X | X |
| T123 NYPA/LSP FBEC – Navy | X | X | | X | | X |
| T124 NYPA/LSP FBEC – Royal | X | X | | X | | X |
| T125 NYPA/LSP FBEC – Cobalt | X | X | X | X | | X |
| T126 NYPA/LSP FBEC – Ruby | X | X | | X | | X |
| T127 NYPA/LSP FBEC – Rose | X | X | | X | X | X |
| T128 NYPA/LSP FBEC – Honey | X | X | | X | | X |
| T129 NYPA/LSP FBEC – Golden | X | X | X | X | X | X |

If a risk identified for the Project, it is indicated with an “X”

# Additional Risks

- **NYISO is continuing to assess additional risks associated with the proposed solutions, such as:**
  - Property Acquisition
  - Environmental and Permitting Concerns
  - Supplemental Criteria from the PSC Order (Appendix B)
  - System Impact Study Results

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# Next Steps

# Targeted Review Schedule

- **Further metric results will be presented at future TPAS/ESPWG meetings, specifically leading to:**
  - September TPAS/ESPWG: Top tier project list
  - October/November TPAS/ESPWG: Initial report review

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# Feedback

- Feedback and questions related to the NYC PPTN should be raised during stakeholder discussions or provided to the NYISO by submitting questions to stakeholder_services@nyiso.com with the subject line “NYC PPTN”

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# New York City PPTN Data Catalog

## Stakeholder Presentations

July 25, 2023
- NYC PPTN Update

August 22, 2023
- NYC PPTN Update
- PPTPP Lessons Learned

September 21, 2023
- NYC PPTN Update

October 2, 2023
- NYC PPTN Update

October 24, 2023
- NYC PPTN Update

November 2, 2023
- NYC PPTN Update

November 6, 2023
- NYISO Technical Conference

November 21, 2023
- NYC PPTN Update

December 7, 2023
- NYISO Technical Conference

December 19, 2023
- PPTPP Manual Updates

January 23, 2024
- NYC PPTN Update

February 6, 2024
- NYC PPTN Update

February 22, 2024
- NYC PPTN Update

March 8, 2024
- NYC PPTN Update

March 21, 2024
- NYC PPTN Update

June 7, 2024
- NYC PPTN Update

August 6, 2024
- NYC PPTN Update

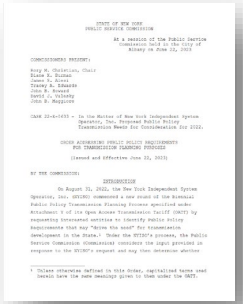
September 27, 2024
- NYC PPTN Update

October 21, 2024
- NYC PPTN Update

January 6, 2025
- NYC PPTN Update

May 21, 2025
- NYC PPTN Update

## PSC Order



## NYC PPTN Report

## Other Documents

- DPS/NYISO PSC Order Q&A Document
- NYISO CEII Data Request Form
- Con Edison NYC PPTN Related Website
- NYSERDA Offshore Wind Cable Corridor Constraints Assessment
- Agency Working Group Technical Conference Presentation
- Con Edison Technical Conference Presentation
- Con Edison FAQs
- NYISO FAQs #1 NYISO FAQs #2 NYISO FAQs #3 NYISO FAQs #4
- DPS PSC Order Q&A Document (Jan 2024)
- DPS PSC Order Q&A Document (Feb 2024)
- DPS NYC PPTN Letter to NYISO
- Attachment B, Q13 – NYC PPTN Information Request Form
- NYCPPTN Final Facility Characterization List
- NYC PPTN Viability and Sufficiency Report

# Our Mission & Vision

## Mission

Ensure power system reliability and competitive markets for New York in a clean energy future

## Vision

Working together with stakeholders to build the cleanest, most reliable electric system in the nation

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# Appendix

# Project Design Summary

| Major Equipment Information | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Project | HVAC Cable Terrestrial Mileage (approx. miles) | HVAC Cable Submarine Mileage (approx. miles) | HVDC Cable Terrestrial Mileage (approx. miles) | HVDC Cable Submarine Mileage (approx. miles) | No. of Proposed 345 kV/138 kV PARs | No. of 345 kV Breakers | No. of 345-138 kV Transformers | No. of 138 kV Breakers |
| T102 energyRe CBPL 1 | 12 | 14 | 1 | 347 | 6 - 345 kV | 4 | - | - |
| T103 energyRe CBPL 2 | 7 | 19 | 1 | 352 | - | 11 | - | - |
| T104 energyRe CBPL 3 | 11 | 9 | 0 | 423 | 2-345 kV<br>2-138 kV | 11 | 2 | - |
| T105 Viridon LL 1 | 1 | 61 | 0 | 340 | 4 - 345 kV | 4 | - | - |
| T106 Viridon LL 2 | 1 | 42 | 0 | 340 | 4 - 345 kV | 4 | - | - |
| T107 Viridon LL 3 | 0 | 56 | 0 | 339 | 2 - 345 kV | 14 | - | - |
| T108 Transco ELNY S1 | 47 | 0 | 59 | 325 | 6 - 345 kV | 4 | - | - |
| T109 Transco ELNY S2 | 47 | 0 | 59 | 419 | 6 - 345 kV | 4 | - | - |
| T110 Transco ELNY S3 | 77 | 0 | 28 | 338 | 6 - 345 kV | 10 | - | - |
| T111 Transco ELNY S4 | 91 | 3 | 29 | 341 | 6 - 345 kV | 9 | - | - |
| T112 Transco ELNY S5 | 93 | 0 | 29 | 440 | 6 - 345 kV | 9 | - | - |
| T113 Transco ELNY S6 | 61 | 0 | 58 | 325 | 6 - 345 kV<br>2 - 138 kV | 13 | 2 | - |
| T114 Transco ELNY S7 | 95 | 0 | 29 | 341 | 6 - 345 kV<br>2 - 138 kV | 20 | 2 | - |
| T115 Transco ELNY S8 | 55 | 0 | 58 | 325 | 4 - 345 kV | 35 | - | - |
| T116 Transco ELNY S9 | 55 | 0 | 59 | 419 | 4 - 345 kV | 35 | - | - |
| T117 Transco ELNY S10 | 108 | 0 | 29 | 438 | 6 - 345 kV<br>2 - 138 kV | 20 | 2 | - |

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| Major Equipment Information | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Project | HVAC Cable Terrestrial Mileage (approx. miles) | HVAC Cable Submarine Mileage (approx. miles) | HVDC Cable Terrestrial Mileage (approx. miles) | HVDC Cable Submarine Mileage (approx. miles) | No. of Proposed 345 kV/138 kV PARs | No. of 345 kV Breakers | No. of 345-138 kV Transformers | No. of 138 kV Breakers |
| T118 NYPA/LSP FBEC – Mint | 15 | 4 | 4 | 262 | 1 - 345 kV | 12 | - | - |
| T119 NYPA/LSP FBEC – Sage | 14 | 5 | 8 | 412 | 1 - 345 kV | 19 | - | - |
| T120 NYPA/LSP FBEC – Olive | 14 | 6 | 4 | 608 | 1 - 345 kV | 21 | - | - |
| T121 NYPA/LSP FBEC – Kelly | 19 | 6 | 7 | 603 | 2 - 345 kV | 22 | - | - |
| T122 NYPA/LSP FBEC – Hazel | 14 | 6 | 7 | 356 | 1 - 345 kV | 21 | - | - |
| T123 NYPA/LSP FBEC – Navy | 9 | 4 | 11 | 396 | 2 - 345 kV<br>1- 138 kV | 21 | - | - |
| T124 NYPA/LSP FBEC – Royal | 19 | 7 | 11 | 501 | 2 - 345 kV<br>1- 138 kV | 30 | - | - |
| T125 NYPA/LSP FBEC – Cobalt | 14 | 6 | 11 | 696 | 1 - 345 kV<br>1- 138 kV | 29 | - | - |
| T126 NYPA/LSP FBEC – Ruby | 14 | 5 | 4 | 413 | 1 - 345 kV | 18 | - | - |
| T127 NYPA/LSP FBEC – Rose | 14 | 5 | 4 | 262 | 1 - 345 kV | 18 | - | - |
| T128 NYPA/LSP FBEC – Honey | 15 | 5 | 4 | 504 | 3 - 345 kV | 24 | 2 | 8 |
| T129 NYPA/LSP FBEC – Golden | 14 | 17 | 0 | 789 | 3 - 345 kV | 39 | 2 | 8 |

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# Preliminary Evaluation Results

# OSW Injection: Assumptions

| | OSW Injection | |
|---|---|---|
| | Summer Peak | Spring Light Load |
| **Zone J Seasonal Peak Load** | ~11,310 MW | ~4,773 MW |
| **Zone J Total OSW Capacity** | 816 MW | |
| Empire Wind 1 (J) Gowanus 345 kV | 816 MW | |
| OSW Generation | Pre-Project: 0 MW<br>Post-Project: As proposed by developer | |
| **Zone K Total OSW Capacity** | 3,895 MW | |
| South Fork Wind (K) East Hampton 69 kV | 139 MW | |
| Sunrise Wind (K) Holbrook 138 kV | 880 MW | |
| Empire Wind 2 (K) Barrett 138 kV | 1,260 MW | |
| Additional (i.e., non-awarded, K): Ruland Road 138 kV | 800 MW | |
| **Renewable Build Out** | 70% by 2030 build out based on 2021-2040 Outlook<br>Projects that have accepted and posted Security for its cost allocation in Class Year '21 | |

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# OSW Injection: Assumptions

| | OSW Injection | |
|---|---|---|
| | Summer Peak | Spring Light Load |
| **Zone J Local Transmission Plan Projects (Firm)** | Brooklyn Clean Energy Hub 345 kV | |
| | Eastern Queens Substation 138 kV | |
| | 4th Gowanus - Greenwood 138 kV Feeder | |
| **Transmission Projects** | | |
| T051 Propel Alternate Solution 5 | Yes | Yes |
| Champlain-Hudson Power Express | ~600 MW* | 0 MW |
| Clean Path NY | 0 MW | 0 MW |
| **NYC Import Schedules** | | |
| HTP | 0 MW | |
| Linden VFT | 311 MW | |
| ConEd-LIPA-Wheel | 300 MW | |
| **Pre-Contingency Rating** | Normal | |
| **Post-Contigency Rating** | LTE | |

*Based on the document filed by PSC on February 14, 2024 available at the following location.

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# Production Cost Savings

# Production Cost: Assumptions

- **Key considerations for the production cost database:**
  - 2023-2042 System & Resource Outlook's Policy Case: Higher Demand Scenario is the starting point for the NYC PPTN evaluation cases
    - Details on the assumptions from the 2023-2042 System & Resource Outlook can be found in the Outlook Data Catalog
  - Updated generation assumptions (i.e., firm new generators and generator retirements)
    - Included generation from Class Year 2021 (e.g., batteries, UPV, LBW)
    - Included OSW generation to align with the PSC Order identifying the NYC PPTN
    - Updated fossil retirements to align with the 2023 Q3 through 2024 Q4 STAR reports
    - Replaced the generic solution to 2023 Q2 STAR need, as assumed in the 2023-2042 Outlook, with the retention of the peaker generators on the Gowanus 2 & 3 and Narrows 1 & 2 barges
  - Updated the network model to align with other analyses in the NYC PPTN evaluation
    - Added Dover PARs, Hillside PARs, and 3rd Gowanus-Greenwood PAR
    - Added 4th Gowanus-Greenwood 345/138 kV PAR controlled feeder (2025 ConEd LTP)
  - Added limiting contingencies within Zone J (NYC) as identified by N-1 analysis to align with other analyses in the OSW injection metric

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# Production Cost

- Represents the societal cost of producing electricity to meet New York electricity demand
- NYISO adjusts for import cost and export "revenue" and designates the adjusted metric as the "NYCA Wide Production Cost"

$$Annual\ NYCA\ Wide\ Production\ Cost = \sum_{hour\ 1}^{hour\ 8760} Fuel + VOM + Emissions + Net\ Import\ Cost$$

*Note: Import cost is negative if exporting, which looks like a "revenue." Import/export transactions are priced using LBMP at a proxy node.*

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