



Highlights from the MMU Review of the Long Island Offshore Wind Export PPTP Report

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Introduction

- MMU must “review and consider” impact of projects
- PSC: CLCPA constitutes a Public Policy Requirement, incl:
 - ✓ 2030 mandate to generate 70 percent from renewables
 - ✓ 2035 mandate to install 9 GW of offshore wind
 - 3 GW expected on Long Island → PPTN defined to enable
- Uneconomic transmission investment can be harmful if it:
 - ✓ Crowds-out more cost-effective investment, and
 - ✓ Raises cost of satisfying Public Policy Requirements.
 - ✓ Thus, criteria for determining if a project is uneconomic:
 - *Priced and unpriced benefits exceed project costs*



Metrics for Evaluating PPT Projects: Benefit-Cost Ratio

- NYISO evaluated how proposed transmission would affect the cost of achieving the 2030, 2035, and 2040 mandates
 - ✓ Therefore, unpriced environmental benefits are not affected by the proposed transmission
 - ✓ The proposed transmission only affects the cost of satisfying the mandates
- Cost of transmission project is measured against the benefits of:
 - ✓ Production cost savings
 - ✓ Avoided cost of dispatchable generation for reliability
 - ✓ Avoided cost of renewable generation for mandates
- If B-C Ratio < 1.0 , the project increases the cost of satisfying the mandates



Metrics for Evaluating PPT Projects: Implied Net REC Cost

- INREC Cost is the net cost of increasing renewable production from an investment:
 - ✓ $\text{INREC Cost} = \{(\text{Project cost})$
 - (Production cost savings)
 - (Avoided cost of dispatchable generation for reliability)}
 - ÷ {MWh of Reduced Curtailment}
- INREC Cost allows comparison of the transmission project cost against alternative investments (e.g., wind, solar, batteries)
 - ✓ An investment is cost-effective when its INREC Cost is lower than those of the alternatives.

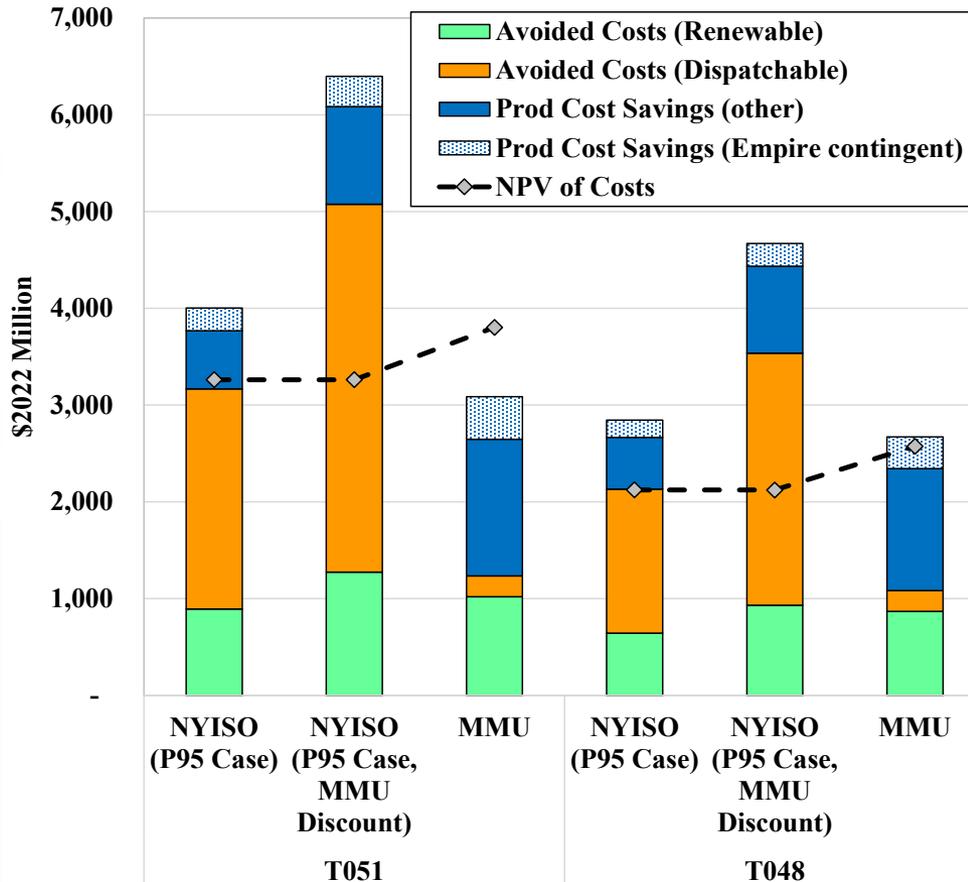


Scenarios for Evaluating PPT Projects

- We focused on the scenarios incorporating the following assumptions:
 - ✓ Policy case – Assumes Long Island OSW reaches 2.5 GW in 2030 and 3.7 GW in 2035
 - ✓ Barrett-Valley Stream constraint – Considers bottleneck affecting the Empire Wind II generator
 - ✓ P95 Net Load Variability – Assumes some transfer capability used to manage intermittent variability
 - Other scenarios underestimate OSW curtailments that will result from net load variability and uncertainty
- We evaluate the recommended project (T051) and the lowest cost-to-build project (T048).

Comparison of NYISO & MMU B-C Ratios

NPV of Benefits and Costs

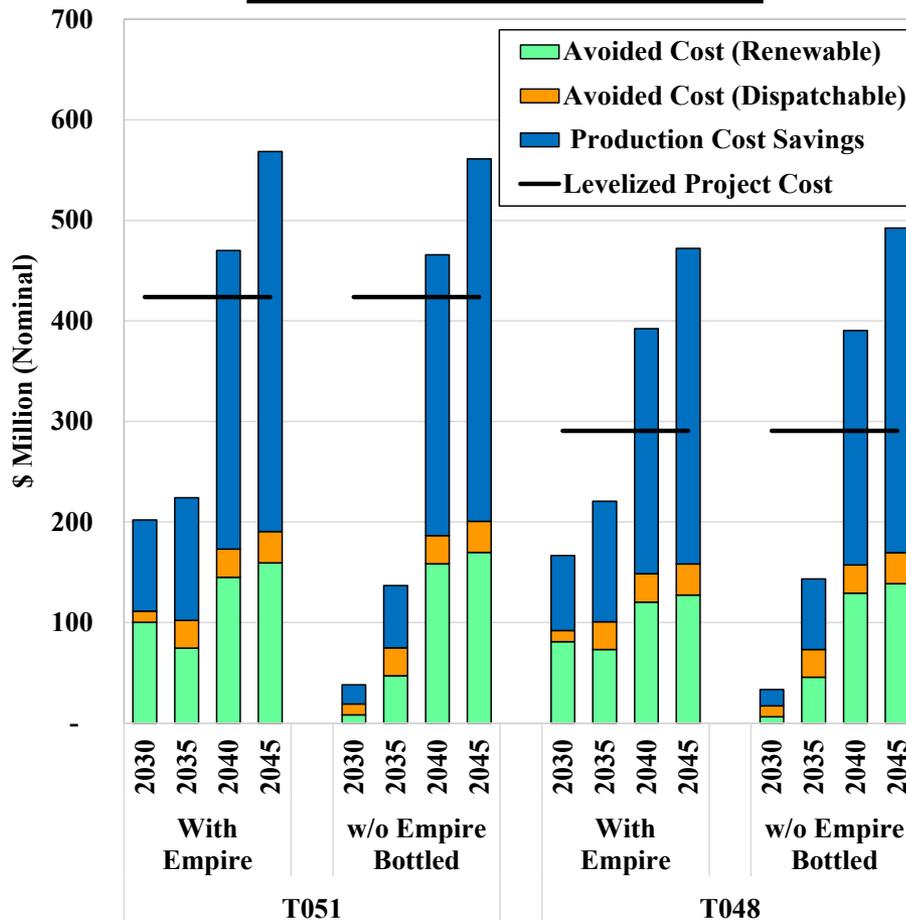


MMU differences:

- Correct discounting would raise benefits
- Avoided Cost (Disp) lower due to:
 - ✓ UPNY-ConEd
 - ✓ Green Hy CONE
- Production cost savings higher due to 40% adjustment
- Includes O&M cost and construction financing

Benefit-Cost Ratio Over Time

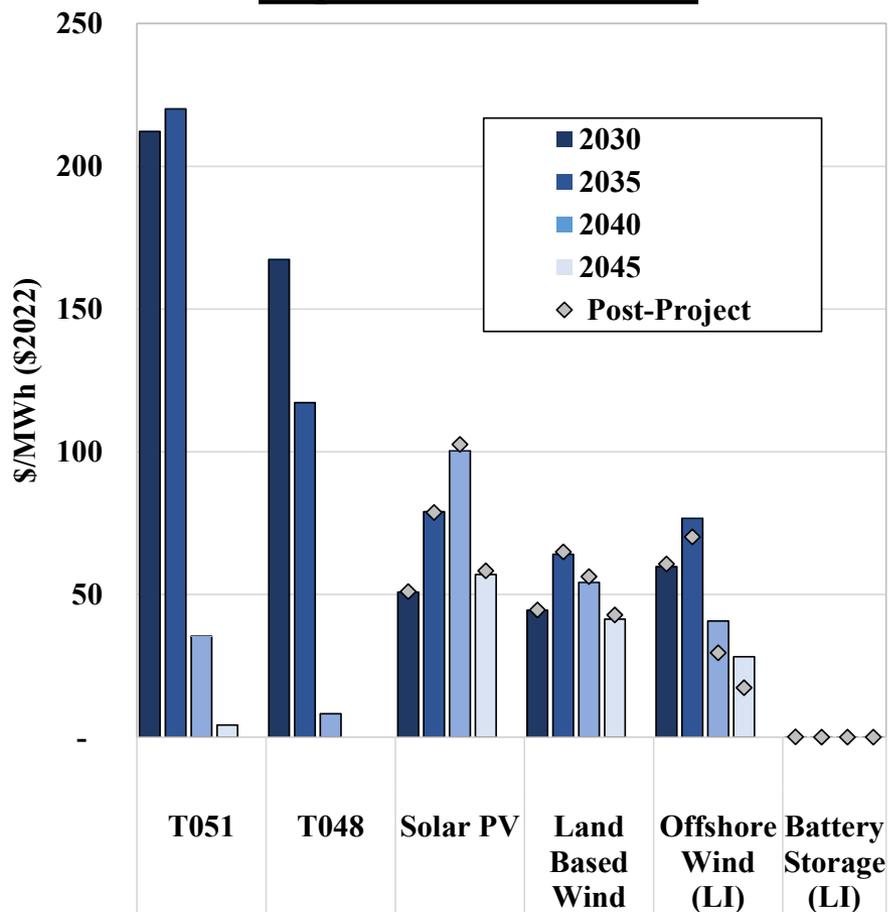
Annual Benefits and Costs



- In 2030, most benefits contingent on Empire II connecting at bottled interconnection point
- In 2035, B-C ratios still well below 1.0
- In 2040 & 2045, benefits depend on DEFR cost of \$150/MWh
- T048 estimated to be the lowest cost project, resulting in higher B-C ratios

INREC Cost of Tx versus Clean Technologies

Implied Net REC Cost



- 2030s Tx projects higher-cost than renew & battery
 - ✓ Avoided Cost (Renew) is not cost-effective
- 2040s Tx projects cost fall below wind and solar due to DEFR assumptions
- Tx project impact on OSW INREC cost:
 - ✓ \$0/MWh in 2030
 - ✓ \$7/MWh in 2035
- Higher battery penetration would be efficient



Findings and Conclusions

- Based on our evaluation, the proposed projects:
 - ✓ No estimated to be helpful for satisfying 2030 mandate
 - ✓ Modest contribution toward 2035 mandate
 - ✓ Larger benefits by 2040, depend on DEFR cost/characteristics
- Given 6-yr lead time for proposed projects and benefit timing:
 - ✓ It is not advisable to move forward at this time;
 - ✓ If NYISO selects a project, we recommend reconsidering the recommendation of T051 since it may not be most cost-effective; and
 - ✓ We recommend NYISO provide initial estimates of costs and benefits of generic solutions to the PSC before future PPTN determinations.



New Recommendations for Future Studies

Modeling Enhancements:

- P23-1: Evaluate capacity benefits using realistic LCRs to estimate: (a) avoided cost of generation investment, plus (b) economic value of improved resource adequacy.
- P23-2: Model DEFRs with a range of costs and characteristics to understand effects on future value of new transmission.

Recommendations for Transmission Planners:

- P23-3: Provide additional information on costs and benefits of generic potential transmission solutions in comments to the PSC before its determination of the PPTN.



Previous Recommendations for Future Studies

Modeling Enhancements:

- P22-1: Model ancillary services in production cost models. Consider adoption of different software if needed.
- P22-2: Perform ‘optimized’ production cost model sensitivity case in which renewable capacity in locations with high marginal rates of curtailment is relocated to locations with lower marginal rates.
- P22-3: Improve modeling of energy storage to more accurately estimate the benefits of storage in the capacity expansion and production cost models.
- P22-4: Include options for 2-, 6- and 8-hour storage in the Capacity Expansion Model.
- P19-6: Consider transmission outages and other unforeseen factors in estimating production cost savings



Previous Recommendations for Future Studies

Recommendations for Transmission Planners:

- P22-5: Estimate INREC Cost of proposed regulated projects and compare to market-based alternatives including merchant battery storage and renewables. This will indicate if the transmission project is a cost-effective means to increase the supply of RECs to load compared to other investments.
- P22-6: Exercise caution when evaluating benefits of transmission projects whose value is strongly linked to uncertain long-term generator-siting decisions.
- P19-2: Estimate O&M costs of new and decommissioned facilities.

Recommendations for Policymakers:

- P22-7: Price incremental clean energy from new and existing renewables in a uniform manner so that environmental goals can be satisfied in a more cost-effective manner.