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September 30, 2018

Via Electronic Mail PublicPolicyPlanningMailbox@nyiso.com

New York Independent System Operator
10 Krey Boulevard
Rensselaer, New York 12144

Re: Request for Proposed Transmission Needs Being Driven by Public Policy Requirements for the 2018-2019 Transmission Planning Cycle

Anbaric Development Partners LLC (Anbaric) provides these comments in response to the NYISO's August 1st Request for Proposed Transmission Needs Being Driven by Public Policy Requirements for the 2018-2019 Transmission Planning Cycle. We applaud NYISO for undertaking this effort to accommodate and support New York State's public policy objectives, and we look forward to continuing engagement in the planning process.
Anbaric has identified two public policy requirements that drive the need for upgrades to the transmission system across New York State at both the Bulk Power System level and at the Local Transmission level. Anbaric understands that the instant solicitation has been undertaken by NYISO pursuant to Section 31.4 of Attachment Y; we also encourage the State's TO's to include Public Policy Requirements in their Local Transmission Plans as required by Section 31.2 of Attachment Y.

Public Policy Need – Offshore Wind Standard

On July 12, 2018 the PSC issued its *Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement* (Case 18-E-0071 – *In the Matter of Offshore Wind Energy*), in which "the Commission determines that a series of actions related to offshore wind are necessary to help achieve the Clean Energy Standard (CES) goal, as part of a strategy to reduce statewide greenhouse gas emissions by 40% by 2030 in a fair and cost-effective manner. The Commission therefore adopts a supplementary goal, to contribute toward the overall objective of the CES, whereby the quantity of electricity supplied by renewable resources and consumed in New York State should include the output of 2.4 GW of new offshore wind generation facilities by 2030."[1]

Compliance with the Offshore Wind Standard will require significant investments in new and upgraded transmission infrastructure.

First, offshore wind development will occur in Federal waters offshore of Zones J and K, where there is currently no electric grid. Wise development of offshore wind resources will require extending the open access transmission system out into the ocean to create new interconnection opportunities for offshore wind generators. Integrating 2.4 GW of a new source of generation into Zones J and K in a manner that makes the best use of its energy production potential will require significant transmission planning and construction.

Longstanding Federal and State policies require separate ownership of generation and transmission. In its seminal Order 888 FERC concluded "that functional unbundling of services [was] necessary to

[1] NYPSC Case 18-E-0071: In the Matter of Offshore Wind Energy, Order Establishing Offshore Wind Standard and Framework for Phase 1 Procurement, July 12, 2018, pages 3-4.

implement non-discriminatory open access transmission"[2] and that "[n]on-discriminatory open access to transmission services is critical to the full development of competitive wholesale generation markets and the lower consumer prices achievable through such competition."[3]

Second, because transmission to support offshore wind will most likely connect into Zones J and K, additional system upgrades will be required to ensure full deliverability into NYCA. Especially during light load conditions within Zones J and K, offshore wind generation may experience significant curtailments if additional onshore upgrades are not undertaken to ensure that electricity generated by offshore wind can be distributed by grid operators to other parts of New York State. Anbaric commissioned Pterra to identify transmission needs that arise from injecting 2,400 MW or more of offshore wind into Zones J and K. As further explained in the attached executive summary, Pterra identified the following two corridors in Zones J and K as needing transmission upgrades to accommodate 2,400 MW of offshore wind:

- In New York City, the 138 kV corridor from Vernon substation to Dunwoodie substation through Sherman Creek, and the path from Farragut to West 48th St through East 13th St.
- In Long Island, the 138 kV corridor from Ruland Rd to Newbridge Rd and East Garden City (EGC), from EGC on two paths, one going north to Shore Rd via Carle Place and Roslyn Rd, and the other going south/southwest to Valley Stream and onto Jamaica substation.

Addressing transmission needs in these corridors will unbottle OSW capacity for up to 2,400 MW by 2030. By sizing the additional transmission capacity appropriately, on the same corridors, as much as 4,800 of OSW can be unbottled. Anbaric would be happy to discuss the details of this study with NYISO upon request.

Proposed evaluation criteria include:

- Proposed offshore transmission systems should make the best use of available points of interconnection.
- Proposed offshore transmission systems should enable, rather than preclude, future expansion of offshore resources.
- Proposed offshore transmission systems should be designed to encourage competition among offshore generators by providing access to multiple Wind Energy Areas.
- Proposals should demonstrate their cost effectiveness of delivering offshore resources ($/MWh).

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[2] *Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities*, Order No. 888, FERC Stats. & Regs. ¶ 31,036 at P 31,093.

[3] *Id.* at P 31,086; *see also Open Access Same-Time Information System (formerly Real-Time Information Networks) and Standards of Conduct*, Order No. 889, 75 FERC ¶ 61,078 at P 61,135 (1996) ("[w]e will require the functional unbundling of transmission operations and wholesale marketing functions because we are persuaded that this will prevent abuses based on preferential access to information and other discriminatory behavior, without compromising reliability"); *Preventing Undue Discrimination and Preference in Transmission Service*, Order No. 890, FERC Stats. & Regs. ¶ 31,241 at P 61,252 (2007) ("[b]ecause many traditional vertically integrated utilities…did not provide open access to third parties and favored their own generation if and when they provided transmission access to third parties, access to cheaper, more efficient generation sources remained limited"); *Wholesale Competition in Regions with Organized Electric Markets*, Order No. 719, 125 FERC ¶ 61,071 at P 1 (2008) ("[e]ffective wholesale competition protects consumers by providing more supply options, encouraging new entry and innovation, spurring deployment of new technologies,…improving operating performance, exerting downward pressure on costs, and shifting risk away from consumers").

- Demonstration of a proposal's feasibility, including the ability to interconnect the project(s) to the NYISO grid, permit the project(s), finance the project(s), and construct the project(s).

Public Policy Need – Facilitating Clean Energy Standard Compliance in Local Transmission Planning

On August 1, 2016, the New York Public Service Commission (PSC) adopted the State's Clean Energy Standard (CES) (Cases 15-E-0302, *et al., Order Adopting a Clean Energy Standard* [August 1, 2016] [*CES Order*]). The *CES Order* directs load serving entities (LSEs) selling to customers in New York to purchase, either from the New York State Energy Research and Development Authority (NYSERDA) or directly from renewable resource owners, renewable energy credits (RECs) in quantities equal to a portion of their New York State loads.

Achieving the State Energy Plan goal, "that 50% of New York's electricity is to be generated by renewable resources by 2030" (*CES Order* at 2), presents a significant challenge. For LSEs operating in Zones J and K the options for meeting their CES obligations will almost entirely consist of purchasing RECs that are generated by resources located in areas remote from Zones J and K, primarily in western and northern New York (Zones A-E) or from offshore wind resources. However, the supply of RECs from those areas will be constrained by the limits of the transmission system's capability to absorb new renewable energy into the New York Control Area. These challenges were highlighted in the July 27, 2018 NYISO ESPWG/TPAS presentation "Public Policy Transmission Needs Study: Transmission Constrained Renewable Generation Pockets" which identified four 'generation pockets' where output from renewable generators is likely to be significantly constrained as New York expands the availability of new renewable resources in order to satisfy the CES. New transmission solutions, many at the Local Transmission level, will be required to meet the CES and in numerous cases non-transmission solutions may be able to efficient and cost-effective solutions to identified needs.

Anbaric commissioned Pterra to replicate NYISO's Public Policy Transmission Needs Study: Transmission Constrained Renewable Generation Pockets and identify thermal overloads under n-0 and n-1 conditions arising in generation pockets Y and Z that could be solved by transmission and non-transmission solutions. Examples of these needs include:

- 115 kV lines Coddington-Montour Falls, Montour Falls-Ridge Road, and North Waverly-Lounsberry, and the 115/34.5 kV transformer at Coddington substation following contingencies (n-1)
- IP Corinth-Spier Falls Hydro 115 kV line following a tower contingency
- 34.5 kV lines Newark-NRLT-MP and Lansingburg-North Troy from a bus failure and a line outage, respectively
- 115 kV circuit Delhi-Delhi Tap due to a contingency related to Edic-Fraser 345 kV line
- IP Corinth-Spier Falls Hydro 115 kV following a tower contingency
- 34.5 kV circuit G.E.-Oakdale-Westover from contingency loss of the Oakdale-Westover 115 kV line
- Avon-Golah 34.5 kV line from loss of East Golah-Barilla 115 kV circuit and also from loss of General Foods-Barilla 115 kV line
- Numerous additional 34.5, 69 and 115 kV facilities in Zones E, F, and G

Addressing transmission needs in these corridors through the Local Transmission Planning process, which includes a Public Policy Requirements avenue (see OATT 31.2.1.1.2.2), with transmission and non-transmission solutions will unbottle renewable energy generation needed to achieve the CES and increase the flexibility and resiliency as additional renewables are added to the system. Anbaric would be happy to discuss the details of this study with NYISO and the relevant TO's upon request and encourages NYISO to use this opportunity to underscore the role TO's can play in their individual Local Transmission Planning processes.

Thank you for providing this opportunity to comment on transmission needs being driven by public policy requirements for the 2018-2019 Transmission Planning Cycle.

Respectfully,

Clarke Bruno
Lead Partner, Transmission

Soam Goel,
Lead Partner, Distributed Energy

Attachment:

"Public Policy Transmission Needs for Anbaric Offshore Wind, Executive Summary"
By Pterra, LLC
September 18, 2018

Pterra Report R222-18

Public Policy Transmission Needs for Anbaric Offshore Wind

September 18, 2018

Executive Summary

Pterra, LLC ("Pterra") was contracted by Anbaric Development Partners ("ADP") to conduct a transmission analysis to identify transmission needs in the New York Control Area ("NYCA") associated with development of offshore wind ("OSW") generation.

A previous analysis by the New York Independent System Operator ("NYISO") presented in "Public Policy Transmission Needs Study: Transmission Constrained Renewable Generation Pockets", presented at NYISO ESPWG/TPAS meeting on July 27, 2018 (hereinafter referred as the "NYISO PPTN Study"), indicated that:

- New renewable generation added to meet the 50-by-30 goal of the State's Clean Energy Standard ("CES") could be bottlenecked, with four general areas for potential generation pockets. (All these areas are in upstate New York)
- However, the potential system impacts of injecting 2400 MW of off-shore wind in Zones J (New York City) and K (Long Island) were not analyzed.

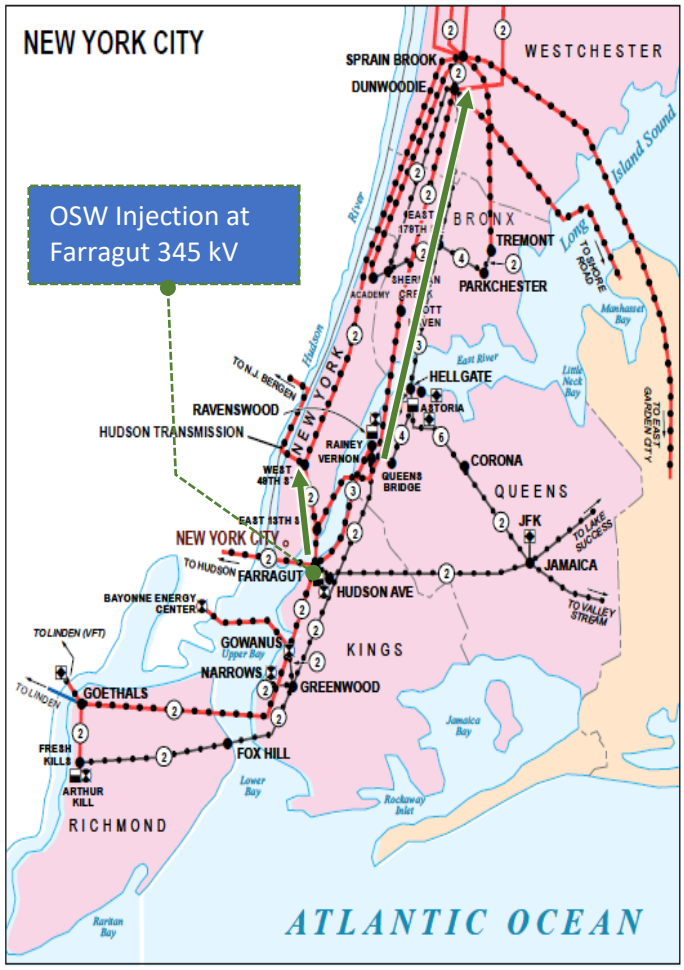
OSW offers the unique transmission perspective of access to the load centers of New York State located in Zones J and K. Relative to the long transmission distances required in the generation pockets identified in the NYISO PPTN Study, transmission needs in Zones J and K can involve much shorter distances due to the more compact nature of the grid there and the immediacy of access to customer loads. The challenges lie in finding routes for new transmission paths, some of which can be alleviated by a finding of Public Policy Transmission Need for key corridors in the specific Zones.

The base case power flow model used in this study was requested from NYISO as part of the FERC 715 filing for 2017. The specific case used is the summer peak base case for 2027. The total NYISO load was adjusted to match the total of about 33,300 MW reported in the NYISO PPTN Study. Imports were adjusted to match those of the summer peak case in the NYISO PPTN Study.

The following Study Cases were developed for this study: Case A – This is the 2027 summer peak case with NYISO loads modified to total about 33,300 MW. This case does not have any OSW injection. Cases B, C and D – Case A but with OSW total of 2400, 3600 and 4800 MW, respectively. Injection points for the OSW were limited to Farragut substation in Zone J and Ruland Rd substation in Zone K. Additional renewables totaling 404 MW in zone K were applied to match the total new renewables for the Zone as reported in the NYISO PPTN Study. All OSW and new renewables were dispatched at maximum, while the rest of the NYISO system was dispatched for typical summer peak conditions using "frequently committed units" (this term is derived from the NYISO PPTN Study) and existing renewables.

To identify transmission needs, steady-state thermal normal (n-0) and contingency (n-1) analyses[1] were conducted using the TARA[2] software. Monitored elements comprised of 115 kV and above portions of the New York state transmission system in Millwood (Zone H), Dunwoodie (Zone I), New York City (Zone J), and Long Island (Zone K). Additionally, Long Island 69 kV facilities were also monitored in the study. To identify bottled OSW capacity, the security-constrained dispatch option of TARA was used.

The analysis is based on "snapshot" system conditions as represented by the power flow cases. The results are indicative, rather than normative, consistent with planning practice.



Findings:

1. Normal and contingency analysis identified a number of thermal overloads in Zone J. The figure at left shows the transmission system in Zone J. The general vicinity of the overloads for an OSW injection of 1200 MW at the Farragut substation is indicated by the green path. As the OSW injection is increased to 1800 and 2400 MW, other parallel paths, indicated by orange arrow, also begin to show overloads.

The transmission need for Zone J can be generally described as the path from Vernon substation to Dunwoodie substation through Sherman Creek for OSW of up to 1200 MW, with the addition of the path from Farragut to West 48th St through East 13th St for additional OSW up to 2400 MW.

Using the optimization feature of TARA shows that the OSW injection is limited to 968 MW to avoid the n-1 overloads.

Sensitivity analysis of alternative OSW injections points at Gowanus 345 kV and Hudson Ave East 138 kV substations show additional overloads and even less injection capacity without transmission upgrades.

2. For Zone K, normal and contingency overloads were likewise observed. In the figure on the next page, showing the transmission system in Zone K, the overloads for a 1200 MW injection at Ruland Rd are observed for the path from Ruland Rd to Newbridge Rd and East Garden City (EGC), and from EGC to Shore Rd via Carle Place and Roslyn Rd. From Valley Stream, the overloads extend to Jamaica substation on the interface with Zone J. A portion of the 69 kV system from Bellmore is also overloaded. As the injection is increased, up to

[1] All the proposed analyses address thermal n-0 and n-1 constraints issues only. Reliability issues relating to voltage, stability, short circuit, deliverability and other technical aspects are not included in the Scope, and hence, were not performed in this study.

[2] TARA (Transmission Adequacy & Reliability Assessment) is a power flow program developed by PowerGem LLC.

2400 MW, the overloads increase in magnitude, and the underlying 69 kV system is also affected.

To avoid the overloads, OSW generation injection at Ruland Rd is limited to 718 MW.

Sensitivity analysis of alternative OSW injection points in Zone K of East Garden City and Valley Stream 138 kV substations show much larger magnitudes of overloads with maximum OSW injection much less than that of Ruland Rd.

Conclusions:

The New York State target of having 2400 MW of Off Shore Wind capacity by 2030 would need to have supporting transmission in order to come to fruition. The injection capacity at the most likely OSW generation injection locations in New York City (Zone J) and Long Island (K) is limited. This study of 2028 conditions, extended from a previous study by NYISO[3], determined that available transmission capacity limits OSW to about 1,686 MW. Additional OSW injection above this limit would lead to thermal overloads of transmission facilities, including the underlying 69 kV distribution system in Long Island.

Designating the following corridors as public policy transmission needs would lead to unbottling of the OSW generation:

- In New York City, the 138 kV corridor from Vernon substation to Dunwoodie substation through Sherman Creek, and the path from Farragut to West 48th St through East 13th St.
- In Long Island, the 138 kV corridor from Ruland Rd to Newbridge Rd and East Garden City (EGC), from EGC on two paths, one going north to Shore Rd via Carle Place and Roslyn Rd, and the other going south/southwest to Valley Stream and onto Jamaica substation.

[3] "Public Policy Transmission Needs Study: Transmission Constrained Renewable Generation Pockets", presented at NYISO ESPWG/TPAS meeting on July 27, 2018

Addressing transmission needs in this corridor will unbottle OSW capacity for up to 2400 MW by 2030. By sizing the additional transmission capacity appropriately, on the same corridors, as much as 4800 of OSW can be unbottled.