CONCENTRIC ENERGY ADVISORS

F O L L O W - U P I T E M S

TO: NEPOOL Markets Committee

FROM: Concentric Energy Advisors/Mott MacDonald

DATE: September 28, 2020

RE: **Additional Follow-up Items**

This memorandum serves to provide answers and additional information in response to requests from NEPOOL Markets Committee Stakeholders ("Stakeholders").

1. Offshore Wind – Additional details on cabling and interconnection costs

Regarding the assumptions around cabling, a Stakeholder has requested more information. The connection between the offshore wind park(s) and the coastal substation are complex.

To save costs, most planners are interconnecting the wind turbines with a central floating substation and from this substation they are running in parallel at least two undersea cables with ample separation so that if one is affected by storms or sea animals the other can continue to supply the power to the onshore substation facility.

There may be additional inspection points set up to monitor the operational behavior of these systems so that if damaged they can be repaired as quickly as possible. All of these costs are carried by the owner of the offshore wind utility park at this time.

Regarding interconnection costs for the Offshore Wind unit, it has been suggested that the interconnection costs for a comparable project was estimated at $15.5 MM and the average interconnection costs for the thirteen Offshore Wind projects studied by ISO-NE was $35.5 million compared to the Concentric/Mott MacDonald estimate of $70 million We have reviewed the System Impact Studies for three projects (the other ten projects have System Feasibility Studies, not System Impact Studies, which are preliminary studies that include a non-binding good faith order of magnitude estimated cost of and the time to construct the interconnection facilities and any Network Upgrades). The three System Impact Studies included interconnection costs ranging from $7.6 million to $112.6 million. It is not reasonable to draw any conclusions on three System Impact Studies with a high significant range of estimated costs based on estimates that include a +/- 50% range of accuracy.

2. Combustion Turbine interconnection costs

Concentric/Mott MacDonald have reviewed the assumptions regarding the interconnection of the reference unit in NE Connecticut. Our assumption includes $7 million for the interconnection to the 345 kV system, revenue grade current transformers and potential transformers on the high side of the generator step-up transformer, a revenue grade power meter in accordance with utility requirements, and $20 million in Network Upgrade costs necessary for Capacity Network Resource Capability (CNRC) designation.

At the suggestion of a Stakeholder, we have reviewed the System Impact Study prepared for a proposed new unit in CT. The System Impact Study included the following:

- Transmission Owner Interconnection Facilities:
  - Generator lead lines
- Network Upgrades:
  - Sectionalizing a line with a tap in and out of the new substation; and
  - A new 345 kV three breaker ring bus

The non-binding, good faith estimate contained in the System Impact Study included $6.3 million for the generator lead and $24 million in network upgrades for a three breaker ring bus for a total estimated cost of $30.3 million.[1] It is important to note that this estimate was described as having a range of -25%/+50%.

It was suggested by a Stakeholder that the estimate contained in the System Impact Study should be used as the basis for our generator interconnection estimate, and that any required network upgrades would be additive to the $30.3 million estimate.

Our estimated interconnection cost of totaling $27M includes a three breaker ring, line intercept, remote end relay communications work, and two miles of overhead line transmission. This estimate is based on recent projects with a similar work scope in an area in reasonable proximity to the proposed Connecticut location. We continue to believe that our $27M cost estimate is within the range of reasonableness.

3. Intraday gas prices

We have revisited the issue of intraday gas price premiums at the Algonquin City Gate for the simple cycle and aeroderivative units at the request of a Stakeholder. Further analysis of natural gas price data[2] for next-day and intraday (or "same day") indicates that an intraday gas premium existed on the days the simple cycle and aeroderivative were dispatched in real-time. Accordingly, the dispatch model for the simple cycle and aeroderivative will be updated to include the following intraday fuel price seasonal premiums:

[1] Steady State System Impact Study Report for Generation Interconnection Request Queue Project 724, March 11. 2019, pg. 2.

[2] The source of both the Next Day and Same Day gas prices are for the location - "AGT-CG (non-G)".

Season	Intraday Gas Premium
SUMMER	4%
WINTER	20%
SHOULDER	11%

The intraday gas premiums are based on the average, by season, of actual intraday gas premiums (i.e., intraday price minus the next-day price for the same operating day) during the 2017-2019 period on the days when the simple cycle was dispatched in real time. The intraday gas premium will be applied to the day-ahead and real-time energy offers of the simple cycle and aeroderivative units in the dispatch models used to estimate each unit's energy and ancillary services revenue offset. Note that the combined cycle unit is expected to receive a financially binding day-ahead commitment and purchase natural gas at the next-day price. Accordingly, the combined cycle dispatch model will not include an intraday gas premium. Only the simple cycle and aeroderivative dispatch models (with and without the FRM) will be modified to include the intraday gas premiums above. Including an intraday gas premium reduced the estimated capacity factor of both the simple cycle and aeroderivative units.

4. Insurance expense during Construction

Regarding the "Other Indirect Costs" included in the standalone solar, standalone battery, and solar+battery plants, Mott MacDonald has included an allowance for insurance during construction. The types of insurance that were included are considered standard for the industry and are as follows:

- Liquidated Damages Insurance
- Taxes, Escalation, and Logistics
- Commercial General Liability Insurance
- Builder's Risk Insurance
- Ocean Freight Insurance

It is industry standard practice for an insurance expense to be incurred by the EPC contractor covering the construction contractor's efforts. For the solar, standalone battery, and solar+battery units, there is no separate EPC contractor fee in the capital costs and therefore these costs are included in the Other Indirect Costs category and not in the EPC Contractor category. It is also industry standard to consider ongoing insurance throughout the life of the project, like that in Concentric's model. Therefore, the insurance costs are not "double counted".

5. Other follow ups in process:

Concentric and Mott MacDonald continue to work on the remaining outstanding questions, including:

a. Gas Turbine Degradation Assumptions

b. Behind-the-Meter Demand Response resources and Regional Network Service (RNS) in avoided cost calculation