STATE OF NEW YORK
PUBLIC SERVICE COMMISSION

At a session of the Public Service Commission held in the City of Albany on October 15, 2009

COMMISSIONERS PRESENT:

Garry A. Brown, Chairman
Patricia L. Acampora
Maureen F. Harris
Robert E. Curry, Jr.
James L. Larocca

CASE 09-E-0497 – In the Matter of Generator-Specific Energy Deliverability Study Methodology.

ORDER PRESCRIBING STUDY METHODOLOGY

(Issued and Effective October 20, 2009)

BY THE COMMISSION:

BACKGROUND

On June 19, 2008, the Commission stated:[1] "Where new proposed renewable generation may result in displacement of other existing renewable generation, or in forcing a steam host to employ auxiliary steam production (with loss of the efficiency benefits of combined-cycle operation), then those effects should be reasonably qualified and quantified, and discussed in the context of the balancing of impacts and benefits resulting from siting the new generation facility." On September 9, 2008, the Commission required New York State Electric and Gas Corporation (NYSEG) and Rochester Gas and Electric Corporation (RG&E), inter alia, to file documents that clearly define their methods for performing economic deliverability studies for interconnecting

[1] Case 07-E-1343, Marble River, LLC , Order Granting Certificate of Public Convenience and Necessity and Providing for Lightened Regulation (issued June 19, 2008), p.14 (Marble River Order).

generators.[2] Consistency in the information provided to us will allow a more uniform evaluation of each proposed project's impacts and benefits. Therefore, we solicited comments on the NYSEG and RG&E compliance filing (dated November 7, 2008) detailing a process and scope for Generator Energy Deliverability Studies so that we might consider whether to approve a study methodology not only for use by NYSEG and RG&E (in connection with renewable generation projects proposed in their respective service territories) but also for use by developers proposing renewable generation projects in other parts of the state that might come before us. Our goal was to evaluate the NYSEG-RG&E filing for three main purposes: (1) To assist in determining the expected operating impacts of a proposed renewable generation project as part of the decision whether to grant a certificate of public convenience and necessity (CPCN);[3] (2) to obtain information as to where congestion is likely to develop in the future to help direct requests for transmission studies; and (3) to consider incorporating the study results into the evaluation of projects for renewable portfolio standard (RPS) payments in the event of a new auction.[4]

A Notice Soliciting Comments was issued on June 23, 2009. Besides seeking comments generally, the Notice included questions that commenters were asked to answer. In addition, in conformance with State Administrative Procedure Act (SAPA)

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[2] Case 07-M-0906, Iberdrola, S.A., Energy East Corporation, RGS Energy Group, Inc., Green Acquisition Capital, Inc., New York State Electric & Gas Corporation and Rochester Gas and Electric Corporation, Abbreviated Order Authorizing Acquisition Subject to Conditions (issued September 9, 2008), Appendix 3, p.2.

[3] Because we expect to gather pertinent information over time, it is necessary to have the data computed and presented in a form that is comparable across projects. We adopt in this Order a methodology as to how the displacement of existing generation must be qualified and quantified when a renewable generation developer files a petition for a CPCN pursuant to §68 of the Public Service Law (PSL).

[4] Comments on whether and how energy deliverability study results should be used in future RPS auctions will not be discussed further in this Order but will be considered in Case 03-E-0188, Renewable Portfolio Standard.

§202(1), notice regarding our consideration of the study methodology was published in the State Register on July 8, 2009. Moreover, a technical conference was noticed and held on August 4, 2009 to facilitate discussion of the pertinent issues. The SAPA §202(1) comment period expired on August 24, 2009, and comments were timely received from nine entities.[5]

DESCRIPTION OF NYSEG-RG&E STUDY METHODOLOGY

The NYSEG-RG&E proposal defines Generator *Energy* Deliverability for renewable power as the assurance that a generator's energy will not be "bottlenecked", so that the full (or nearly full) available energy output of a generator can be delivered to load; and that market prices will be at levels under most conditions such that the owner of the generator will have an opportunity to recover its total costs[6] without displacing other renewable and/or price-taking generators. Using a newly defined term, an "Energy

[5] Comments were filed by Alliance for Clean Energy New York (ACE), Brookfield Renewable Power (Brookfield), Central Hudson Gas & Electric Corporation (Central Hudson), Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc. (ConEd-O&R), Iberdrola Renewables, Inc. (Iberdrola), Independent Power Producers of New York, Inc. (IPPNY, Niagara Mohawk Power Corporation d/b/a National Grid (National Grid), NorthWind and Power (NorthWind), and New York Independent System Operator, Inc. (NYISO). The comments are summarized in Appendix A.

[6] In this context, the ability for a generator-owner to recover its total costs implies that either: (a) the generator is capable of being a "price-setter" itself; or (b) if the subject generator (such as wind power) can only be a "price-taker", then at least one other generator is capable of setting the price for the "price-takers".

Delivery Interface"[7] would exist between a generator and load if the generator's energy is deliverable.

As stated in the proposal, Energy Deliverability of renewable-power under this definition: (1) avoids curtailment of that renewable-power due to transmission constraints; and (2) avoids downstream congestion if it will significantly reduce location-based marginal prices (LBMP)[8] paid for renewable-power energy, thereby jeopardizing cost recovery of renewable installations. By extension, meeting this latter condition would also: (a) avoid curtailment of other renewables and/or other price-takers[9] in the

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[7] The proposal defined an Energy Delivery Interface as a collection of transmission facilities – including interconnection attachment facilities – that: (a) connects upstream renewable and/or price-taking generators to downstream load such that the maximum simultaneous available energy from those generators can be transmitted to and consumed by sufficient load even under minimum load conditions; and (b) provides additional transfer capability to allow a price-setting generator to set the upstream energy price. It therefore avoids an energy "bottleneck" by providing an outlet for renewable and/or price-taking generators at price levels that offer the opportunity for them to recover their total costs. It is not necessarily one set of transmission lines. In some cases, only an interconnection attachment facility of sufficient capability is needed for this interface to exist because relatively high load levels are close to the generation. In other cases, this interface may need to be relatively long and/or consist of multiple parallel paths because sufficient load is a considerable distance away and/or widely dispersed from the generation.

[8] Even when capacity is shown to be deliverable, if energy becomes "bottle-necked" (i.e., congested) within an area, the addition of renewable-power facilities into the area may reduce the LBMP within that area. In the extreme, if the only generators dispatched within an area are "price-takers" (such as nuclear, hydro and wind plants), the LBMP may drop to zero or even negative values.

[9] The proposal defines a Price-Taking Generator as a supplier that either:(1) can not bid into the energy market because it cannot control its output to follow schedules as directed by the System Operator, and does not wish to be curtailed when it is producing energy because it would irreplaceably lose the use of a renewable resource (e.g., intermittent energy sources such as wind or run-of-river hydro); or (2) it bids a very low (or even negative) price for its energy because it may incur a greater expense if it is curtailed (e.g., nuclear which presumably has relatively low variable production costs, but which has significant shut-down/start-up costs). In either case, in order to recover its total fixed and variable costs, a price-taking generator needs to rely on price-setting generators bidding higher prices to set the energy price.

same area due to transmission constraints; and (b) permit at least one price-setting[10] generator – either upstream or downstream - to supply energy on dispatch thereby setting an energy market price for price-takers. For example, a fossil generating unit would be on the margin rather than a renewable generator.[11]

DISCUSSION OF PURPOSE

Based on the tenor of comments received, an elaboration of the Commission's intent as to how energy deliverability study results are to be used appears desirable. The New York State Energy Research and Development Authority (NYSERDA) contracted with GE Energy Consulting (GE Energy)[12], which prepared a report titled "The Effects of Integrating Wind Power on Transmission System Planning, Reliability and Operations." Two key findings in the Report on Phase 2: System Performance Evaluation, dated March 4, 2005, were that: 1) 3300 megawatts (MW) of wind generation could be "reliably accommodated" on the existing bulk electric system; and 2) the majority of energy displacement expected from wind projects would be from either imports or natural gas, coal and oil fired plants. A key assumption in the GE Energy study was that wind development would occur fairly uniformly across the available wind resources within the state. The reality was that the majority of the first third of the anticipated wind development occurred in a very small area(s) geographically and depended on the same bulk electric facilities to move the wind energy toward loads. These same facilities carry significant amounts of energy produced by hydro and

[10] The proposal defines a Price-Setting Generator as a supplier that bids into the energy market because it can control its output to follow schedules as directed by the System Operator; and therefore – if it is on the margin – it can set the energy price at its location. Price-setting generators generally have significant variable production costs, and are typically fossil fueled.

[11] A unit would be on the "margin" if its bid is setting the market price.

[12] *The Effects of Integrating Wind Power on Transmission System Planning, Reliability, and Operations – Report on Phase 2: System Performance Evaluation*, prepared by GE Energy for the New York State Energy Research and Development Authority, March 4, 2005.

combined cycle plants. RPS goals for New York target 25% of energy consumed to be from renewable sources by 2013. This goal will not be realizable if the energy from new renewable resources just replaces the energy produced by existing renewable resources.

Regulatory conditions in New York are favorable to renewable energy, for example: processes have been streamlined to site renewable projects, auctions are held through NYSERDA to provide incentives for wind project development and, at the Commission's urging, processes at the NYISO have been developed to mainstream renewable project participation in energy markets and system operations. The next major hurdle is ensuring that the transmission resources are available to accommodate renewable energy delivery and that renewable energy, where cost effective, is not subject to unreasonable bottling in remote areas of the electric system. The existence of bottled renewable capacity will not assist the state in realizing the goal of reduced emissions through serving 25% of the load with energy produced from renewable resources.

Anecdotal evidence of bottled renewable energy under current conditions has been sporadically provided to our Staff. This leads to a concern that the addition of new renewable resources in New York can lead to bottling or exacerbate the existing situation. However, affirmative actions cannot be taken to remedy a transmission bottleneck without a clear understanding of the facts of the situation today, as well as in the future as new resources are developed. Several studies conducted at the NYISO and performed by the utilities are modeling scenarios that should provide information on transmission constraints in the future and suggest system upgrades, where cost effective, to respond to the constraints.

By requiring a quantification and qualification as to whether other renewable energy will be displaced by a particular project and in what amounts, and by prescribing a methodology for project developers to use in providing such quantification and qualification, we can make more informed decisions and will have a metric to compare with study results to see if the industry is developing as projected. New transmission resources are expensive and, of equal importance, impose environmental costs in the form of land use effects, visual impacts, etc. Deployment of new

transmission needs to be based on accurate knowledge of where new resources are actually developing and the level of loading expected on the facilities. Provision of displacement information will assist us in determining the need for new facilities and guide the proper investment of ratepayer resources while ensuring minimum land use impacts.

The Marble River Order did not mandate that renewable project developers perform an energy deliverability study, but stated that the developer *should* quantify the deliverability effects when the project *may* result in displacement of other existing renewable generation. This Order identifies what would constitute evidence that a project is not likely to displace energy from existing renewable generation, adopts a methodology for performing energy deliverability studies where energy from existing renewable resources would be displaced, and implements how the Commission wants the information filed in the CPCN process.

DISCUSSION OF GENERIC COMMENTS

Some commenters expressed the view that prescribing a study methodology to be consistently applied somehow conflicts with the exclusive jurisdiction of the Federal Energy Regulatory Commission (FERC). Before granting a CPCN, however, we must find that the construction of the electric plant in question is necessary and convenient for the public service. To do so, as well as to fulfill our obligations under Article 8 of the Environmental Conservation Law, the State Environmental Quality Review Act, we must be able to examine the effects of the construction and operation of proposed generating facilities on the electric system and the environment. Moreover, when developers of renewable generation projects conduct such studies, or have such studies performed on their behalf, their results will be available not only in individual certification proceedings but also in situations involving our consideration of information as to where congestion is likely to develop in the future.

Several of the commenters objected to providing the energy deliverability information. The Marble River Order clearly encouraged renewable developers to

provide deliverability information whenever a new renewable project would displace existing renewable energy. In this Order, we implement the discussion in the Marble River Order in a manner that will provide comparable information across projects.

Commenters further asserted variously that the test: will conflict with existing wholesale market and interconnection requirements; seeks to maintain a minimum energy price; will determine or require project specific upgrades; and actually interferes with obtaining renewable goals. The act of gathering information cannot result in these outcomes. On the contrary, a stated purpose and intent of the energy deliverability study is to provide information to improve our decision-making process such that the RPS goals are attainable.

Commenters opined that the energy deliverability analysis would duplicate the NYISO capacity deliverability study. As stated by the NYISO in its comments, however, the capacity deliverability study analyzes cases that simulate average generator outputs versus peak load conditions. By the nature of the most prominent renewable under development (wind), energy deliverability is a concern under a representative range of load levels (particularly light load) versus a realistic range of generator output. In contrast to a capacity deliverability study, an energy deliverability study would provide an indication to a new generator on how often its energy output might be curtailed due to transmission constraints. Consequently, a capacity deliverability study cannot substitute for an energy deliverability study for renewable resources.

Various commenters stated their belief that the energy deliverability study should be performed by the NYISO or integrated into the NYISO's existing study processes. While the NYISO may offer to perform this study as part of its services, limiting the study to be performed by the NYISO might conflict with a developer's schedule. As such, this Order only addresses the methodology by which the study should be performed and does not mandate which organization a particular developer might choose to perform the study.

DISCUSSION OF SPECIFIC COMMENTS AND REQUIRED METHODOLOGY

Several commenters expressed concern that the proposed methodology is attempting to assure cost recovery for renewables. While it is likely true that very low energy prices go "hand-in-hand" with generator "bottlenecking", the portion of the NYSEG-RG&E methodology relating to prices is unnecessary for the definition of energy deliverability and will not be adopted. Others commented that, rather than referring to "price-taker" generators, "must run" [13] generators (because of their low anticipated energy price bids) as well as existing renewables should receive preference over new renewables in serving load. Based upon these comments, a more straightforward definition of Energy Deliverability for a new renewable generator, which we adopt, is: "the degree to which transmission capability will be sufficient such that a new generator's available energy output will not be unduly curtailed (or "bottlenecked") due to insufficient load, given the prerequisite that existing renewable and "must run" generators receive first preference in serving load.

A number of commenters offered suggestions regarding the details on how an energy deliverability test should be performed; namely:

1. An energy deliverability study should be done on a statewide basis using a sophisticated security constrained dispatch model with both NYISO and Transmission Owner (TO) involvement. We agree that this type of study

[13] "Must run" generators, in this context, are defined as generators whose owners are contractually or operationally obligated, or economically incentivized, to output a portion or all of their available energy (e.g. co-generators with steam hosts, nuclear plants and those needed for local reliability issues. Because no guarantee exists that a particular generator will be "must run", owners desiring their generators to be "must run" will tend to bid very low (or even negative) energy prices to help insure that they receive first preference in being selected to serve load. Furthermore, even though renewable resources may have very low incremental energy output costs; those resources desired to be "must run" may have even lower incremental energy output costs, particularly in the short term. Consequently, owners of "must runs" will likely bid lower prices than renewables to help insure they are selected first and curtailed last in the presence of a transmission constraint (taking into account, that "must runs" may also have an inherent day-ahead predictability and scheduling advantage over intermittent renewables).

would be desirable in the future but it would be difficult to model at this time without specific knowledge of what projects are likely to be developed.

2. A range of study assumption variations (as opposed to a "single point analysis") should be evaluated. We agree, to the extent they are reasonable, potentially useful and not unnecessarily burdensome.
3. Study assumptions should model available correlations between load levels and expected renewable output. We concur, to the extent that a statistical relationship can be made.
4. An energy deliverability study should be performed employing pre-contingency "all-lines-in" with a security constrained dispatch using a range of representative load levels as opposed to a relatively worst case highly stress single point evaluation. We agree. The intent is to mimic actual market and system operational procedures for generator dispatches and curtailments.
5. An energy deliverability study should be performed on an individual basis for a new renewable generator as opposed to a study of all potential development. We concur. The test should be done sequentially for each new generator in the order the projects appear in the NYISO cue in which each project is studied compared to a base case set of conditions. Consequently, for example, if two renewable projects are scheduled to be in service before a third project, they would be added to a new base case (and considered to be "existing" renewables) before the third project is studied. Additionally, we encourage developers of proposed renewable projects in the same general area of the transmission system to pool their resources to perform larger scale studies.
6. Assumed wind penetration of 5,750 MW was unreasonable and excessive, particularly since wind output diversity exists across the state. As previously stated, an energy deliverability study for each renewable project

should be done on a sequential basis, which should negate the concern of total statewide penetration assumed. To a certain degree, however, many energy deliverability issues will be local in nature, thereby rendering the statewide penetration level and/or statewide wind diversity output somewhat irrelevant in the study.

7. An energy deliverability test should pertain only to renewable bottling affected by transmission constraints, not curtailments resulting from "non-transmission" causes such as excessive over-generation versus insufficient overall load. We agree. This latter type of curtailment, while real, is outside the scope of the study methodology we adopt. Furthermore, such curtailment may be very difficult to predict
8. New renewables should not be tested at full output for the entire year. We concur. A more sophisticated model should produce a reasonable energy deliverability test for a renewable project over a representative range of annual load levels, given realistic assumptions.
9. For the purposes of an Energy Deliverability Study, existing external renewables (outside New York) should be treated the same as existing internal renewable resources in terms of receiving preference in serving load before new renewables. We agree. To the extent that the external existing renewables are predictable and contribute to New York's RPS, external renewables should be modeled in the study and receive preference in serving load before new renewables.
10. The proposed energy deliverability study is an unnecessary burden for developers. Under certain circumstances, an energy deliverability study would be unnecessary. An electric corporation proposing a renewable project will be exempted from the requirement to conduct a site-specific energy deliverability test, if it requests such exemption in its petition for a CPCN and: (1) demonstrates that its project passes a simplified "first-pass" screening study (i.e., maximum simultaneous expected output under light

load conditions with existing renewables and "must run" generation given first preference in serving load) that can reasonably indicate non-existence of significant energy deliverability restrictions; or (2) provides results from a recent relevant NYISO or TO study indicating that, given its project's size and site location, the project will not likely experience significant energy deliverability restrictions

CONCLUSION

The comments filed in this proceeding have been helpful in developing and prescribing an appropriate generator-specific energy deliverability study methodology and in deciding when to require such study.

The Commission orders:

1. Each electric corporation proposing a renewable generation project shall conduct, or have performed on its behalf, a generator energy deliverability study as discussed herein and prescribed in Appendix B hereto, and shall include the results of such study in its petition for a certificate of public convenience and necessity, unless it requests in its petition an exemption from this requirement and makes the demonstration or provides results from a recent study as discussed herein.

2. This proceeding is closed.

By the Commission,

(SIGNED) JACLYN A. BRILLING
Secretary

APPENDIX A

Summary of Comments

Twelve specific questions in the Notice Seeking Comment are notated as "(Q1)" through "(Q12)", and are included below:

(Q1) Does the NYSEG/RG&E filing appropriately cover the requirements outlined in the Commission Orders? If no, please discuss.

(Q2) Is the NYSEG/RG&E filing appropriate for use by other investor-owned utilities in New York? If no, please discuss.

(Q3) Should the performance of the studies be required of the investor-owned utilities only or is it reasonable to allow other entities, such as contractors or the NYISO, to provide this study service? Please explain.

(Q4) Rather than intending to assure 100% of available renewable energy output can be delivered, it may be useful to review applicable load duration curves along with anticipated generator output availability. From this, it may be reasonable to perform an Energy Deliverability Test in which (for example) 90% of maximum simultaneous available generator energy can be delivered rather than 100%, and/or the test is conducted for a load of 110% of minimum load rather than the actual expected minimum. Should this modification be included in the study methodology? If yes, please explain.

(Q5) If renewable output can be expected to be higher when load is higher, less transmission will be needed to insure energy deliverability. In the extreme (albeit unlikely) case, if the available energy from a renewable generator having a 20% capacity factor coincides with the highest loads, then much less transmission will be needed. To the extent correlations can be made between load and renewable output (e.g., on-peak hours versus off-peak hours for winter, spring, summer, fall, etc.), it would facilitate dividing a year into different segments and conducting a set of separate energy deliverability tests under a variety of expected generation versus load correlations. Should this modification be included in the study methodology? If yes, please explain.

(Q6) In some instances, a new generator may be locating upstream of a transmission constraint that is also impacted by a renewable resource external to New York. It should be noted that – unless an external resource is providing firm ICAP – the NYISO will not likely include the impact of external renewable resources when it performs a capacity deliverability test on a new generator. In the case of an energy deliverability test, if external renewable resources lie upstream of a transmission constraint along with a new renewable resource (that is internal to New York), those external resources would impact energy deliverability as well.

Should consideration of external renewable resources be included in the study methodology? If yes, please explain.

(Q7) In comparison to a more sophisticated model such as security constrained commitment and dispatch production costing software (e.g., the NYISO SCUC or GE-MAPS), the Energy Deliverability Study performed using a power-flow model can provide a more intuitive, more insightful indication of important drivers. This may also provide a less iterative, more straightforward analysis, particularly if detailed generator output versus load data is sparse. Having said that, if detailed estimates of generator output, load and energy bid prices are available (particularly if they can be correlated to one another on a hourly basis) and/or the transmission topography is exceedingly complex, then use of the more sophisticated models to perform an energy deliverability test may be useful. If so, rather than producing a single point outcome, the analysis would likely be more useful if a range of outcomes were produced using optimistic and pessimistic assumptions. Should this approach be included in the study methodology? If yes, please explain.

(Q8) The relative performance of a generator in an Energy Deliverability Test is dependent upon the transmission study criteria used, and needs to be stated in that context. For example, if a generator passes an energy deliverability test under an "all-lines-in" criteria, its energy will not necessarily be deliverable if a single contingency occurs. Based upon the probabilities that a single or multiple contingency might occur, the generator could be evaluated under more stringent criteria to increase its assurance that its energy will be deliverable even under more restrictive conditions. In any event, it would need to accept a certain probability that its energy may not always be deliverable. Should the results of the study be qualified in the context of the evaluation criteria used? If yes, please explain.

(Q9) While the Energy Deliverability Study proposed could be performed on a specifically proposed new generator, it could also be performed for a certain location in the following alternative ways: (a) test the proposed new generator plus potential additional new generators at the same location (which might lead to the need or desire for a more global comprehensive transmission upgrade); (b) test the maximum sized generator whose energy can be generally delivered with the existing transmission system configuration; or (c) test the maximum sized generator whose energy can be generally delivered with one or more specific transmission upgrades. Should this expansion of scope be included in the study methodology? If yes, please explain.

(Q10) Co-generators providing steam service improve the overall efficiency of generators burning fossil fuel. Therefore in performing an Energy Deliverability Test, should generators serving as steam hosts be treated as "must run" at the

minimum output required for maintaining steam production, and/or should their anticipated levels of curtailment be noted? Please explain.

(Q11) Although low or negative Real-Time energy prices can be caused by transmission constraints as identified in the proposed Energy Deliverability Test, some low or negative Real-Time prices may also be caused by temporary over-generation problems caused by momentary upward excursions of out-of-merit generation and/or rapid drops in load to which generation can not adequately respond in the short term. Thus, for a more "complete picture", it may be useful to provide a renewable energy developer with both : (a) an estimate of energy curtailment and/or low or negative prices due to transmission constraints (which presumably can be determined with the Energy Deliverability Test and can be mitigated with transmission upgrades); and (b) an estimate (based upon historical data) of low or negative LBMPs caused by temporary out-of-merit over-generation (which presumably can't be mitigated with transmission upgrades). Therefore should the proposed Energy Deliverability Test be supplemented with an estimate of expected negative energy price conditions caused by temporary over-generation conditions? If so, please explain.

(Q12) Is it appropriate to require renewable developers/sponsors to demonstrate "deliverability" of renewable energy production as a direct evaluation criteria in the selection of bids under the Renewable Portfolio Standard (RPS) program administered by NYSERDA? If yes, please explain how?

Comments of ACE

- Opposes applying the test to developers of generators seeking a CPCN.
- Opposes applying the test to owners of generators bidding on RPS contracts.
- Argues Methodology undercuts expressed state policy objectives to maximize investment in renewable resources and conflicts with the existing wholesale market and interconnection requirements.
- States proposal ignores the fundamental question the Commission should be asking: how should New York ensure it can use its renewable resources to their fullest extent.
- Does not believe the Marble River Case ordered an energy deliverability test; argues for a public discussion before this approach is adopted.
- Believes the Commission is making economic decisions instead of letting the market dictate.
- Does not think it is the Commission's role to ensure a developer is able to recover its costs.
- Supports analysis of transmission constraints and bottled generation, and supports efforts to resolve barriers to renewables.
- Argues for consideration of NYISO Wind Integration Study, Congestion Assessment and Resource Integration Study (CARIS) and NYS Transmission Assessment & Reliability Studies (STARS)

- Asserts proposed cost allocation is inappropriate in that transmission has widespread benefits, so should not be paid for solely by generators
- Raises the following concerns:
    - Proposed rule changes discriminate against new renewables
    - New York market rules already reward projects that can maximize revenues
    - Inaccurate modeling assumptions may "pass" less efficient projects and thwart more economic projects
    - Approach is overly theoretical, static and inconsistent (too much new generation modeled; load profile theoretical; plug-in cars may add to off-peak load
    - No evidence that new renewables will back down existing renewable generation

Comments of Brookfield

- Supports the intent of the methodology.
- States Renewable power development should be encouraged with adequate transmission. Otherwise new renewables that displace other existing renewables will not be in the best interest of New York's citizens.
- Provides Northern Maine example where a large wind project was sited with the assumption that Brookfield's hydro resources and neighboring bio-mass generation would be curtailed in the process.
- Contends new developers need to consider the impact they have on existing renewables, and should ensure proper transmission reinforcements are made.

Comments of Central Hudson

<u>Responses pertaining to specific questions in June 23, 2009 Notice Seeking Comments:</u>

(Q3) Claims study should be the responsibility of the developer but the TO and NYISO need to be involved.

(Q4) Avers variations in study assumptions (e.g., use of a load duration curve for generator output) seem reasonable.

(Q5) Considers it unlikely that lasting correlation exists between load and wind output, so this type of analysis is unnecessary.

(Q6) Argues external renewables should be in the base cases.

(Q8) Believes study results should be qualified based on evaluation criteria used.

(Q9) Contends study should focus on the proposed project and not be expanded to other possible configurations.

(Q10) Asserts co-generators with steam hosts should be must-run in the base cases.

(Q11) Argues should only perform energy deliverability test impacted by transmission constraints – estimate of low energy prices caused by over-generation versus load is a market risk outside the scope of this study.

(Q12) Contends results should be used in the NYSERDA RPS evaluation.

Comments of ConEd-O&R

- Supports the deliverability test as it will enable analysis to include proper costing of the project on a comparable basis.
- Claims preliminary results of NYISO Wind Integration Study show a potential increase in bottled renewable energy.
- Asserts the study should be part of the NYISO interconnection study process.
- Argues the test should not seek to maintain a minimum energy price.
- Explains that, if renewable generation fully displaces other renewables, it should receive no RPS payments; if it partially displaces other renewables, its RPS payment should be prorated.
- Contends invoking an energy deliverability requirement on new renewables insures all will be evaluated on a consistent basis so only cost effective projects receive RPS funding.
- Alleges Commission should require renewable generators to ask NYISO to perform an energy deliverability study. The existing NYISO Capacity Deliverability test is insufficient for this.
- Avers undeliverable renewable energy will: (1) increase business risk of existing renewables without increasing renewable output; and (2) give a false indication that New York is achieving its renewable energy goals when it is not.
- Claims new renewables should pay for transmission upgrades to improve energy deliverability (so that total costs of all alternative projects are considered and are consistent with current interconnection practices).
- States Commission should initiate collaborative proceeding to refine energy deliverability requirements.
- Contends "[i]f the generator is only partially deliverable, the developer would have three options: (1) reduce the size of its project to a level that is fully deliverable; (2) pay for transmission upgrades to make the project fully deliverable; and/or (3) offer to receive RPS payments for only the deliverable portion of its output.

<u>Responses pertaining to specific questions in June 23, 2009 Notice Seeking Comments:</u>

(Q1,2,3) NYISO and/or an outside vendor (with TO input), rather than TOs, should perform the energy deliverability studies.

(Q4) Studies should consider a range of assumptions.

(Q5) Studies should be performed on an hourly basis with load/generation correlations as appropriate.

(Q6) Developer should include external renewables when testing.

(Q7) Developer should use GE MAPS as opposed to DC power-flow.

(Q8) Test should be conducted under pre-contingency (all-lines-in) conditions.

(Q9) Test should be performed on generator-by-generator basis – not composite.

(Q10) Co-generators and "baseload" generation should be modeled on-line in the test.

(Q11) Over-generation is an item of interest to the developer, but only the energy deliverability test impacted by transmission constraints should be done.

(Q12) Energy Deliverability demonstration test should be required as part of the NYSERDA RPS program.

Comments of Iberdrola

- Opposes use of the test for either a CPCN or RPS funding.
- Claims changing the rules discriminates against current project investments
- Argues existing NYISO Market rules already provide signals for developers to maximize revenue.
- Asserts existing market rules maximize energy delivery.
- Alleges insufficient detail on how the study would be performed.
- Avers test is short-sighted and static as it does not account for potential changes in load or transmission.
- Contends there should be stakeholder consensus that the deliverability test is needed.
- Asserts that focus should be on solutions such as investing in transmission, alternative dispatch and inclusion of transmission upgrade costs in RPS cost study and NYSERDA benchmarks.
- Favors the NYISO approach over the NYSEG/RG&E approach.
- Fails to identify a Benefit-Cost analysis.
- Proposes to have price-takers back down to allow some amount of price-setter generation to be on the margin to avoid negative energy prices.
- Proposes "if situation is temporary to allow for zero or negative pricing for a few hours". Additionally, claims there are other sources of revenue besides energy sales.
- Alleges other price-taking resources have a day-ahead predictability advantage over wind.
- Claims consumers benefit from wind in the form of lower energy prices which should be included in the analysis.
- Argues 5,750 MW of assumed wind was excessive.
- States wind should not be on-line at full output.
- States stakeholder group should discuss this in more detail and focus on solutions.
- Contends rate payers will benefit from enhanced reliability and lower energy prices should cover a fair share of transmission upgrade costs.

Comments of IPPNY

- Claims the Commission is preempted from requiring the test by the Supremacy Clause because it would conflict with FERC's jurisdiction over sales of electric energy for resale.
- Expresses concern that energy deliverability may become mandatory.
- States concern that this may lead to mandated transmission upgrades to be paid for by generator developers as a condition to receiving a CPCN.
- Explains concern that generator developers will pay for transmission upgrades needed by load.
- Asserts study requirement discriminates against renewable generation because it imposes a new interconnection requirement for them.
- Alleges energy deliverability study should be part of NYISO process and should be advisory - should not lead to mandated transmission upgrade.

Comments of National Grid

- Contends NYISO should do the study with all renewables at once; should not have utility-by-utility or project-by-project analysis.
- States focus should be on state-wide studies that indicate transmission upgrades are required as part of the NYISO processes.
- Claims energy-deliverability should be part of the NYISO class year study.
- Focuses on concern that the study is to determine upgrades rather than decisions needed to be made in a CPCN.
- Avers need NYISO tariff changes for transmission upgrade cost allocation.

<u>Responses pertaining to specific questions in June 23, 2009 Notice Seeking Comments:</u>

(Q1) Has no comment on whether NYSEG/RG&E study met requirements.

(Q2,3) Alleges NYISO (with TO input), rather than TOs, should perform the energy deliverability studies.

(Q4) Asserts stakeholders should decide on amount of energy that should be deliverable.

(Q5) Avers deliverability of all generation (not just renewables) needs to be considered.

(Q6) Claims developer should include external renewables when testing.

(Q7) Argues NYISO should use GE MAPS and power-flow.

(Q8) Contends test should be done using planning criteria.

(Q9) States approach is too "piecemeal" – should test all potential generation on a regional basis to arrive at ultimate transmission solutions.

(Q10) Regarding co-generation "must-run", explains system should be robust enough to handle single contingency – market should determine what runs.

(Q11) Contends likelihood of over-generation must be complemented with the ability of these generators to provide regulation.

(Q12) Is unclear on whether energy deliverability should be an RPS requirement

Comments of NYISO

- Argues proposed study/requirements may be duplicative and result in inconsistencies with other studies as well as cause timing conflicts
- Seems to believe that upgrades will be required by the Commission from the deliverability test.
- Asserts markets encourage siting where needed.
- Claims wind and STARS study will provide significant info on transmission constraints.
- Contends only FERC can require transmission upgrades as a condition to licensing a renewable project.
- States Commission should hold a stakeholder process to consider how the energy deliverability requirement will be coordinated with NYISO interconnection studies.
- Avers requirement could create uncertainty and deter development; and that requiring the study will lengthen the time to site a plant.
- Alleges market prices due to over-generation are a FERC matter.
- Argues need stakeholder process on how to coordinate energy deliverability into interconnection studies.
- Claims the goal to ensure cost recovery of renewable generation is unclear and may conflict with the market.

<u>Responses pertaining to specific questions in June 23, 2009 Notice Seeking Comments:</u>

(Q1) States NYSEG/RG&E study appears to comport with PSC orders, and provide a screening tool; but it's not clear how Iberdrola market power concern was addressed, and/or amount of environmental benefits as per Marble River order. Study should be done on a statewide basis.

(Q2) Alleges study should be done on a statewide basis, and methodology should be used as a screening tool for local constraints, but a comprehensive statewide analysis such as STARS or CARIS approach should be used to identify solutions.

(Q3) Argues system wide studies, such as CARIS, should be used.

(Q4, 5) Asserts developer should perform test on hourly basis with load/generation correlations as appropriate.

(Q6) Contends developer should include external renewables when testing.

(Q7) Claims developer should use CARIS.

(Q8) States developer should test under pre-contingency (all-lines-in) conditions with security constrained dispatch.

(Q9) Explains developer should test on generator-by-generator basis, but can also evaluate combinations.

(Q10) Asserts co-generators should be must run, but should also include contractual or operational must run generators.

(Q11) Claims this test should not delve into curtailments caused by over-generation conditions.

Comments of NorthWind

- Supports analysis of transmission constraints and bottled generation; and encourages efforts to eliminate such barriers.
- Opposes study as it conflicts with the wholesale market and interconnection requirements.
- Contends study interferes with reaching renewable goals.
- Asserts study may be needed for large projects but not all and should be performed under NYISO rules.
- Claims focus should be on state-wide need studies for transmission.
- Argues modeling 5,750 MW at full output is excessive; also believes considerable wind diversity output exists across the state – need to address local impacts.
- Asserts should concentrate on finding bottlenecks and expanding transmission.
- Contends study should not be used for RPS.

Responses pertaining to specific questions in June 23, 2009 Notice Seeking Comments:

(Q1) Asserts 5,750 MW on-line all at same time is not realistic – should be done on a statewide basis

(Q2) Avers TO should find low cost upgrades.

(Q3) Alleges NYISO should do study.

(Q4) Contends variations should be realistic.

(Q5) Claims should look for/model load/wind output correlations.

(Q6) If NYISO Wind Integration study claims gas and oil are being displaced by new renewables, explains disposition of external renewables should not be a concern.

(Q7) Asserts should use more sophisticated models.

(Q8) Contends this should be the Developer's option with consultative support from NYISO.

(Q9) Argues there is merit in identifying good deliverability areas.

(Q10) Alleges co-generators should not be protected as they were not in the 2004 RPS Order.

(Q11) Argues low or negative energy price information would be useful.

(Q12) Claims energy Deliverability test should be a part of the NYSERDA RPS.

APPENDIX B

Renewable Energy Deliverability Test

Introduction

An "energy" deliverability test is fundamentally different from the NYISO generator deliverability study which, in essence, is a capacity deliverability test. For the latter, the NYISO will study a new generator to determine: (a) if its intended installed capacity (ICAP) can be expected to be delivered to meet reliability requirements; and (b) that it will not degrade transmission such that Loss of Load Probability (LOLP) will be worsened. This test[1] is presumably less stringent than an energy deliverability test would need to be. In the case of wind and other intermittent renewables with relatively low capacity factors, a capacity equivalent to average output would be tested by the NYISO under peak load conditions. As a result, renewable capacity would be deemed deliverable by the NYISO test even if its peak energy output is not deliverable. Consequently, the NYISO generator capacity deliverability study will not necessarily indicate whether a significant amount of a new generator's energy output will be curtailed due to transmission constraints.

A renewable resource energy deliverability study would provide an indication to the owner of a new generator on how much of the facility's available energy out put might be curtailed due to transmission constraints. In the process, the generator-owner could also receive a reading on how extensive a transmission upgrade (if any) would be needed to help assure that its facility's anticipated energy output will generally be deliverable.

This study proposal does not address the economic justification for a transmission upgrade to provide energy deliverability.

Definition for Renewable Power Energy Deliverability

Generator *Energy* Deliverability for a renewable resource is the degree to which transmission capability will be sufficient such that a new generator's available energy output will not be unduly curtailed (or "bottlenecked") due to insufficient load, given the

[1] The NYISO generator capacity deliverability test is intended to determine whether average available generator capability can be delivered to peak loads using transmission emergency transfer limits.

prerequisite that existing renewable and "must run"[2] generators receive first preference in serving load. Using a newly defined term, an "Energy Delivery Interface"[3] would exist between a generator and load if the generator's energy is deliverable.

Description of Energy Deliverability Test

The assumptions and procedures used in an Energy Deliverability Test would be based upon:

1) Expected output from existing renewable and "must run" generators
2) A range of representative load levels

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[2] In this context, a "must run" generator is one that is presumed to be on-line at its available and required output due to: (1) contractual requirements (including bilateral transaction obligations); (2) system operational requirements (i.e., it is specifically needed to meet system reliability needs; or (3) economic requirements (i.e., the intent is to avoid the generator's being curtailed because curtailment would incur significant costs, at least in the short term, to do so. Because – under NYISO market rules and operations – no guarantee exists that a particular generator will be "must run", owners of these generators will tend to bid very low (or even negative) energy prices to help insure that they receive first preference in being dispatched. Some generators that may fall into the "must run" category include nuclear power plants, co-generators and those needed for local reliability issues. Thus, even though renewable resources may have very low incremental energy output costs; "must run" resources may have even lower incremental energy output costs, particularly in the short term. Consequently, it is reasonable to expect that their owners will bid lower prices than renewables (taking into account, that "must runs" also have an inherent day-ahead predictability and scheduling advantage over intermittent renewables) – to help insure they are dispatched first and curtailed last in the presence of a transmission constraint.

[3] An Energy Delivery Interface is a collection of transmission facilities – including interconnection attachment facilities – that: (a) connects upstream renewable and/or price-taking generators to downstream load such that the maximum simultaneous available energy from those generators can be transmitted to and consumed by sufficient load even under minimum load conditions; and (b) provides additional transfer capability to allow a price-setting generator to set the upstream energy price. It therefore avoids an energy "bottleneck" by providing an outlet for renewable and/or price-taking generators at price levels that offer the opportunity for them to recover their total costs. It is not necessarily one set of transmission lines. In some cases, only an interconnection attachment facility of sufficient capability is needed for this interface to exist because relatively high load levels are close to the generation. In other cases, this interface may need to be relatively long and/or consist of multiple parallel paths because sufficient load is a considerable distance away and/or widely dispersed from the generation.

3) A realistic range of the new renewable generator's expected energy output simultaneous with existing renewables (including external renewables to the extent they are predictable and contribute to New York's RPS) and "must run" generation sharing the same transmission export path and including any established correlations between load levels and available generation energy
4) Transmission capabilities (which may vary seasonally and/or through time)
5) Other relevant system characteristics, conditions and operating criteria
6) Variations in study assumptions to the extent they are reasonable, potentially useful and not unnecessarily burdensome.
7) A simulation model using a pre-contingency "all-lines-in" transmission system employing a security constrained dispatch
8) Study criteria which mimic actual market and system operational procedures and protocols for generator dispatches and curtailments.

A "first pass" screening study and/or results from other relevant studies (as previously described in more detail) may obviate the need for a more rigorous energy deliverability test.

In terms of producing energy deliverability test results to indicate the amount of expected available energy that a new renewable will output versus the amount that will be curtailed; a "Change Case" would be compared against a "Base Case" in which …

1) A Base Case that would model a realistic simultaneous available energy output of existing renewable and "must run" generators versus a representative range of local loads and transmission export capability to identify base level energy deliverability
2) A Change Case that would model a realistic simultaneous available energy output of the new renewable generator added to the Base Case with the requirement that existing renewable and "must run" generators will not be displaced to accommodate the new renewable
3) In the case of multiple projects in the same location, each would be evaluated by each developer separately and sequentially for each new generator in the order the projects appear in the NYISO queue (i.e., so that the first project scheduled to be in service would become part of a new Base Case before the second project is studied, etc.).

Example of Energy Deliverability Test

Figure 1 shows a power system consisting of a new (proposed) renewable, existing renewable, "must run" and dispatchable[4] generators located upstream of a transmission interface that may limit the ability of the generators to deliver their available energy output that is in excess of local load that can be served.

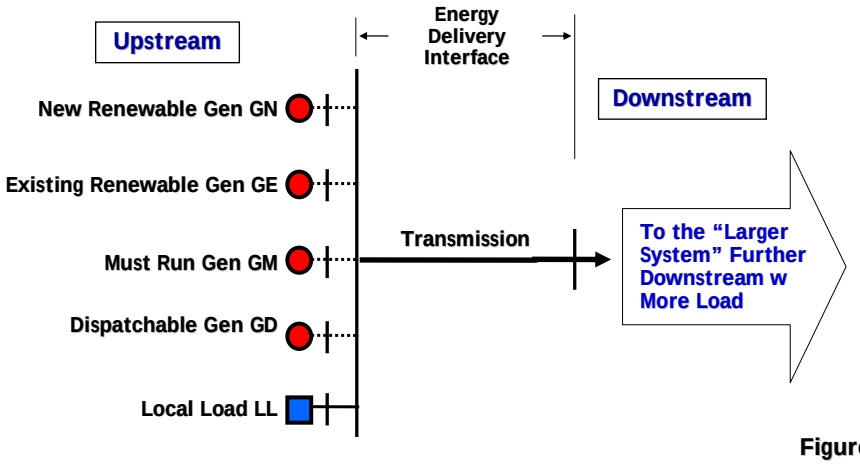

Figure 1

The amount of available energy from the new upstream renewable generator GN that can be delivered – as determined in an energy deliverability study – would be dependent upon the level of local load, the export capability of the transmission system linked to the larger downstream system with additional load that can be served, and the output from existing renewable and "must run" generators (which would be given first preference in serving load first). Dispatchable generators would be assumed to serve remaining load after available energy from the new and existing renewables and "must run" generators is first used to serve load

Figure 2 illustrates an example of an Energy Deliverability Test for a new renewable generator GN. GN, GE and GM are assumed to have realistic maximum simultaneous energy output[5] of 100, 300 and 500 MW per hour respectively. The upstream dispatchable generator GD can also produce up to 700 MW per hour.

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[4] Dispatchable generators are economically selected to run and produce output based upon their relative energy bid prices, which presumably are higher than bid prices for renewables and "must run" generators.

[5] "Realistic simultaneous energy output" for these generators is their highest expected coincident production for the composite of all renewable and "must run" generators upstream from the same common transmission path.

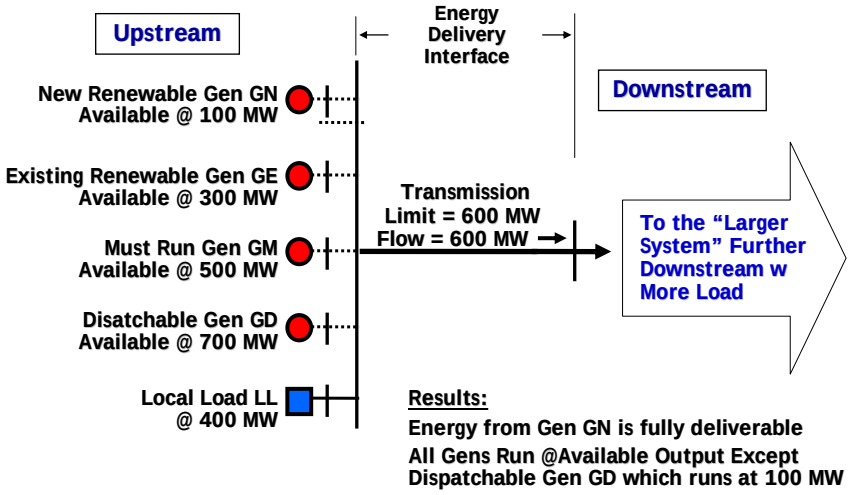

Figure 2

Transmission Capability of 500 MW Provides Energy Deliverability for GN – Given the assumed total simultaneous expected generator output of 900 MW per hour (from all renewable and/or "must run" generators), along with a local load level of 400 MW per hour, the energy from GN would be fully deliverable[6] if a transmission export capability of 500MW existed. Because the transmission export capability is 600 MW, the expected available output from GN would be deliverable. (Note that the dispatchable generator GD can also be run at up to 100 MW in this example.) Given the available transmission capability, GN's available energy would be fully deliverable for a GN expected simultaneous output up to 200 MW

GN Energy is Partially Deliverable Above 200 MW – Also, based upon the assumptions in this example, GN's available energy would be partially deliverable above 200 MW per hour. For example, if GN had a simultaneous expected energy output of 250 MW per hour, 50 MW per hour would be undeliverable energy (i.e., in this instance, 80% of its available energy would be deliverable, and 20% would not).

[6] Each generator is presumed to possess sufficient export/transfer capability on its individual interconnection attachment facility as indicated by the dotted line emanating from each generator.