

MEMORANDUM

TO: NEPOOL Participants Committee Members and Alternates
FROM: Eric Runge, NEPOOL Counsel
DATE: January 29, 2016
RE: Generator Interconnection Revisions

At the February 5, 2016, meeting of the Participants Committee you will be asked to vote on generator interconnection revisions to Section II of the ISO New England Transmission, Markets and Services Tariff (“ISO-NE OATT”) (the “Generator Interconnection Revisions”). At its January 26, 2016 meeting the Transmission Committee unanimously recommended Participants Committee support for the Generator Interconnection Revisions, which are included with the materials for the February 5 Participants Committee meeting.¹

By way of background, during the second half of 2015 and into 2016, NEPOOL has been working with the ISO to develop revisions to the regional interconnection rules to improve the interconnection process and specifically to address some of the particular issues related to non-synchronous wind generators coming onto the system. The general goals of the Generator Interconnection Revisions are: (i) to reduce the time to interconnect new generators; (ii) to address some of the operational issues related to inverter-based generators; and (iii) to meet NERC modeling and performance requirements. Among the changes is a reactive power requirement that will apply to wind generators and that is similar to the requirement that the FERC has proposed in its November 19, 2015 notice of proposed rulemaking in Docket No. RM16-1. The changes being proposed are in the Large Generator Interconnection Procedures (Schedule 22 of the ISO-NE OATT), the Small Generator Interconnection Procedures (Schedule 23 of the ISO-NE OATT) and the Elective Transmission Upgrade Interconnection Procedures (Schedule 25 of the ISO-NE OATT).

The following resolution could be used for Participants Committee consideration of this matter:

RESOLVED, that the Participants Committee supports the Generator Interconnection Revisions, as recommended by the Transmission Committee and as reflected in the materials distributed to the Participants Committee for its February 5, 2016 meeting, together with [any changes agreed to at the meeting and] such non-substantive changes as may be agreed to after the meeting by the Chair and Vice-Chair of the Transmission Committee.

¹ An ISO memo describing the Generator Interconnection Revisions is also included with your materials for this agenda item.



memo

To: Transmission Committee

From: Al McBride, Director, Transmission Strategy & Services

Date: December 15, 2015

Subject: Proposed Changes to the Interconnection Procedures in Schedules 22, 23 and 25 of the ISO New England Open Access Transmission Tariff

At the **December 17, 2015** meeting of the Transmission Committee, ISO New England Inc. (the “ISO”) will be presenting proposed changes to the Interconnection Procedures set forth in Schedules 22, 23 and 25 of the ISO New England Open Access Transmission Tariff¹ (“OATT”) that are necessary to improve the current interconnection queue process (“Interconnection Process Improvements – Phase I”). The Interconnection Process Improvements – Phase I are a streamlined version of the changes that the ISO presented and reviewed with the Transmission Committee at the October 27 and November 12, 2015. The refined scope is responsive to stakeholders’ feedback at the November meeting. This memorandum is provided to facilitate your review of the Interconnection Process Improvements – Phase I and discussions at the December meeting.

Brief Background

In recent years, the ISO has received written correspondences and engaged in various discussions regarding key issues in the interconnection queue process in New England, particularly the challenges being experienced by wind developers. Wind developers in New England – individually and through the RENEW² group – have requested improvements in both the timing and cost of Interconnection Studies,³ and have cited challenges with the curtailment of wind generators in actual operations. They have cited the experiences of several of RENEW’s members to claim the Interconnection Study process in New England takes too long to complete and can represent a significant cost to developers. These challenges were recently echoed by the American Wind Energy Association (“AWEA”) in a petition for rulemaking requesting the Federal Energy Regulatory Commission (“FERC”) initiate a rulemaking to revise the provisions of the *pro forma* Large Generator Interconnection Procedures/Agreement on the basis that the Transmission Providers nationwide are not performing Interconnection Studies in a timely and accurate manner.

¹ The Interconnection Procedures include Schedule 22 (Large Generator Interconnection Procedures or LGIP), Schedule 23 (Small Generator Interconnection Procedures or SGIP), and Schedule 25 (Elective Transmission Upgrade Interconnection Procedures or ETU IP).

² RENEW is a consortium of renewable energy developers and environmental advocates

³ Interconnection Studies include the Feasibility Study, System Impact Study and Facilities Study.

Since incorporating the LGIP and LGIA in Schedule 22 of the OATT, the ISO, with full stakeholder support, has made significant enhancements to the Interconnection Procedures to address concerns unique to the region, and continuously reviews the interconnection processes for opportunities to improve transparency and efficiency. These efforts have improved the interconnection queue process. Indeed, as the public version of the interconnection queue shows,⁴ substantially all generator Interconnection Requests made through 2014 have completed the System Impact Study phase or moved into the Interconnection Agreement and commercialization phases of the interconnection process. The one exception pertains to the Interconnection Requests for projects seeking to interconnect in Northern and Western Maine. In general, the average time for performing Interconnection Studies for projects requesting interconnection into non-Maine areas of the system has improved over time, with studies in those areas being completed in reduced timeframes compared to previous years.⁵

While interconnection queue processing is generally up to date in non-Maine areas of the system, there is a significant queue backlog in Maine due to Interconnection Requests for more than 4,000 MW of new generation, mostly wind resources, seeking to interconnect in Northern and Western Maine, which has been exacerbated by a steady stream of additional Interconnection Requests. The ISO has identified three primary sources of the queue backlog in Maine: (1) the underlying nature of the Maine transmission system; (2) the extent of oversubscription of requests to interconnect in Maine; and, (3) the nature of the generator technology being proposed.⁶ Each of these factors introduces significant complexities to the Interconnection Studies, requiring more effort and time to complete those studies, and that does not even account for additional delays introduced by actions and inactions of individual Interconnection Customers; such as, frequent project modifications, untimely submissions of functioning models, and challenges to study/upgrade findings.

Summary of Changes as Originally Proposed

The rule changes, as presented by the ISO at the October and November Transmission Committee meetings, represented a specific set of interconnection process improvements that could be implemented expeditiously. At a high level, the changes sought to improve overall process efficiency by:

⁴ The ISO's interconnection queue is available at <http://www.iso-ne.com/system-planning/transmission-planning/interconnection-request-queue>

⁵ It is important to recognize that factors such as the location of the project (*e.g.*, proximity to the boundary of a major load serving interface) and earlier-queued project withdrawals continue to contribute to study delays for some projects in these areas of the system. In certain cases, the time to complete studies may be lengthened to factor in emerging transmission reliability expansion plans.

⁶ Previous presentations providing additional details on the primary sources of the queue backlog in Maine include the presentations provided at the July 15, 2015 Reliability Committee/Transmission Committee Summer Meeting, August 2015 Reliability Committee Meeting, August 2015 Transmission Committee Meeting, and September 2015 Planning Advisory Committee Meeting. A detailed explanation of each of these sources is also provided in Comments of ISO New England Inc. filed on September 8, 2015, in Docket No. RM15-21-000.

- Requiring all Interconnection Customers to provide completed technical data (including models) called for in Appendix 1, Attachment A for the proposed project with the Interconnection Request. Correspondingly, the proposed changes reduced certain administrative deadlines during the Feasibility Study and System Impact Study stages of the process, as the technical data currently required with the signed study agreement would have already been provided with the Interconnection Request. By providing the data with the Interconnection Request, the ISO would be able to provide feedback regarding project design specifics at the Scoping Meeting, and would be able to perform a Feasibility Study focused on the expected areas of concerns;
- Modifying the scope of the Feasibility Study to provide screening analysis of the expected areas of concern to facilitate focus on the expected problems; thereby, providing meaningful information to Interconnection Customers early in the process and facilitating their determinations as to whether or not to move forward with their projects;
- Adding more clarity to the ISO's review and assessment of Material Modification requests throughout the interconnection process; and,
- Clarifying the distinction between a Base Case and the case developed at the start of an Interconnection Study (referred to as the "Study Case"), and making the Base Case available to Interconnection Customers (not just their third party consultants).

To reduce the time needed to complete Interconnection Studies for wind generators seeking to interconnect into weak areas of the system – such as, Northern and Western Maine – an objective of the ISO proposals was to make these types of generator projects more “study-ready,” similar to conventional generators. More specifically, the proposed changes incorporated: (1) reactive performance requirements for wind generators, which would reduce the reliance on design of reactive solutions in the System Impact Study; and (2) new “up-front” design requirements for wind generators that were designed to increase readiness to initiate study analysis and reduce time to complete studies (*e.g.*, providing detailed project design, addressing weak grid performance as part of the Interconnection Request). These improvements were expected to reduce the likelihood of project modifications, particularly given the effect on queue backlog of poor quality data submissions and continued requests to perform Material Modification determinations.

Finally, the proposed changes sought to address curtailment and performance issues in system operations for wind generators, as well as meet modeling and performance requirements being introduced by new NERC standards by: (1) including a phase-in requirement for standardized component models and parameters for powerflows and dynamic cases; and, (2) incorporating a phase measurement unit (“PMU”) requirement for all technologies with maximum facility output equal to or greater than 100 MW to, among other things, facilitate model validations.

Importantly, as the ISO has clearly stated, these changes alone would not resolve the queue backlog in Maine. Interconnection Customers there are seeking to interconnect their projects in an oversubscribed portion of the system that is at its performance limit with no remaining margin. Significant transmission

infrastructure is needed to integrate the proposed amounts of wind generation in Maine, and the ISO is committed to continuing discussions with stakeholders as to how to address these infrastructure issues. In the meantime, with the proposed changes, the ISO sought to speed the interconnection study process, and, concomitantly, the queue study wait time for those projects currently in queue backlog.

Overview Interconnection Process Improvements – Phase I (as Refined)

At the November meeting of the Transmission Committee, stakeholders expressed a clear desire to maintain flexibility in the interconnection process even where such flexibility might mean more Interconnection Study time. Indeed, when asked to articulate the problem stakeholders want the ISO to resolve, the feedback received by the ISO was that the problem is not with the *time* that it takes to complete Interconnection Studies; but rather, dealing with the *volume* of Interconnection Requests pending in Maine. At that meeting, stakeholders asked the ISO to consider whether the proposed changes could be streamlined so that these Phase 1 discussions could be concluded and the focus could be turned to the larger issues.

Based on stakeholders’ feedback, the ISO has refined the scope of the proposed changes to the Interconnection Procedures in order to continue to offer the flexibility requested. The changes, as deleted, maintained or added, are summarized in the table, below.⁷

| Original Set of Interconnection Improvements | Streamlined Set of Interconnection Improvements |
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| <p>Timeline for Providing Project Technical Data: Changes related to the requirement for complete technical data (including models) called for in Appendix 1, Attachment A to be submitted with Interconnection Request, including corresponding changes (e.g., reduction of administrative deadlines during Feasibility Study and System Impact Study, deletion of Appendix 1, Attachment B, deletion of Appendix 7, etc.).</p> | <p>Proposed changes deleted and currently effective pro forma language reinstated. However, under the existing rules, Interconnection Customers can choose to submit all of the technical data and models called for in Appendix 1, Attachment A with the Interconnection Request. Added language providing that, if an Interconnection Customer chooses to do so, then the ISO will discuss the detailed project design at the Scoping Meeting. See LGIP, Section 3.3.4.</p> <p>Maintained new form for wind and inverter-based generating facilities-specific data to be provided along with the Appendix 1, Attachment A, to speed the System Impact Study process.</p> |

⁷ The table summarizes the changes made in Schedule 22 of the OATT. Note, however, that conforming changes, as well as ministerial/clean-up type changes have also been made in Schedules 23 and 25 of the OATT. Materials posted for the Transmission Committee’s review reflect, in redlined text, the changes made to the Interconnection Procedures as they are currently in effect and not incremental changes to the versions reviewed by the Committee in November.

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| <p>Interconnection Study Related Changes:</p> <p>Feasibility Study – Changes to streamline the Feasibility Study scope to a screening analysis-type study focusing on the expected areas of concern, and to the Point of Interconnection provisions.</p> <p>System Impact Study – Changes to include estimated date System Impact Study will start and conclude in study agreements.</p> <p>Administrative deadlines – Changes to the signed study agreement and comment deadlines.</p> | <p>Proposed changes to the Feasibility Study scope deleted and currently effective pro forma language reinstated. Added language to afford Interconnection Customers the option to request a screening analysis as initially proposed. See LGIP, Section 6.2.</p> <p>Proposed changes to System Impact Study agreements to include estimated start and end timeframes maintained. See LGIP, Section 7, and System Impact Study Agreement.</p> <p>Proposed timeline changes deleted.</p> |
| <p>Material Modification Clarifications: Changes to clarify ISO’s review and assessment of proposed Material Modifications.</p> | <p>Proposed changes to the Material Modification provisions (except for the proposed clean-up changes in LGIP, Section 4) deleted and currently effective pro forma language reinstated. Added clarification to the “material impact” component of the Material Modification definition.</p> <p>Maintained proposed changes to allow for technical data to be “refreshed prior to the beginning of the System Impact Study. See LGIP, Section 7.4.</p> <p>Made certain clean up changes in 4.1 and 4.4</p> |
| <p>Interconnection Customer Access to Base Cases: Changes to clarify the distinction between a Base Case and the case prepared at the start of an Interconnection Study, and provide Interconnection Customers (as opposed to just their third party consultants) access to the Base Case.</p> | <p>Maintained proposed changes. See LGIP, Sections 2.3, 6, 7, 8 and 10.</p> |
| <p>Transition Rules: Changes to transmission rules, which sought to mimic previously used transition rules, and are consistent with Order No. 2003 transition rules.</p> | <p>Maintained proposed transition rules. See LGIP, Section 5.</p> |
| <p>Reactive Capability/Low Voltage Ride Through Requirements: Changes to remove reactive capability exemption for wind generating facilities, and apply the Low Voltage Ride Through requirements to wind and inverter-based technologies.</p> | <p>Maintained proposed changes to delete the reactive capability exemption for wind, and the extension of the Low Voltage Ride Through requirements to inverter-based technologies. However, revised proposed changes so that new power factor</p> |

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| | requirement applies to wind generators whose System Impact Study starts after the effective date of the proposed changes. See LGIP, Appendix G, and LGIA, Article 9. |
| Standard Models and PSCAD Model Requirements: Changes to include a phase-in requirement for standardized component models and parameters for powerflows and dynamic cases. | Maintained proposed changes for standardized models and dynamic cases, including PSCAD models for all wind and inverter-based technologies. See LGIP, Section 3.3.4, and Appendix 1, Attachments A and B. |
| Phase Measurement Unit: Changes to incorporate a PMU requirement for all technologies with maximum facility output equal to or greater than 100 MW. | Proposed changes deleted, to be addressed in a future effort. |
| Ministerial/clean-up type changes: Proposed clarifications to the following definitions: CNR Capability (and the associated fill-in the blank section in LGIA, Appendix C), and Interconnection Request. Proposed changes to require all deposits to the System Operator by electronic transfer. Proposed clean-up changes in Long Lead Facility provisions in LGIP, Section 3.2.3 Proposed clean-up change in LGIP, Section 3.3.1. Proposed changes for all Interconnection Requests to be submitted through IRTT, and other clean-up changes to the Interconnection Request Form in Appendix 1. | All proposed ministerial/clean-up type changes maintained. |

Should you have any questions regarding the proposed Interconnection Process Improvements – Phase 1, please contact Al McBride at amcbride@iso-ne.com.