Stakeholder Feedback and IESO Response

Updates to IESO Monitoring Requirements: Phasor Data – September 21, 2021 webinar

Following the September 21, 2021 public webinar where stakeholders were provided an update on the proposed Market Rule and draft market manual amendments specifying synchrophasor monitoring requirements, the Independent Electricity System Operator (IESO) received feedback from participants on the changes made in the proposed Market Rules and Draft Market Manual.

The IESO received feedback from:

- Alectra Utilities
- EverGreen Energy
- Northland Power
- Ontario Power Generation

This feedback has been posted on the Updates to IESO Monitoring Requirements: Phasor Data webpage.

Notes on Feedback Summary

The IESO appreciates the feedback received from stakeholders. The feedback has been noted and will be considered as the engagement moves forward. The IESO has provided a summary below, which outlines specific feedback or questions for which an IESO response was required at this time.

Proposed Market Rules:

Feedback

Two stakeholder submissions indicated they had no comment and/or no issues with the proposed Market Rules.

Ontario Power Generation provided the following feedback:

Feedback	IESO Response
In the "Synchrophasor Data Requirements" table of Appendix 4.15 of the draft Market Rules, the IESO identifies a set of requirements applicable to generation facilities "unless exempted by the IESO". OPG suggests that any exclusions to the Synchrophasor Data Requirements should be explicitly stated in the Market Manuals or Rules, rather than subject to "exemption". The Market Rule exemption process is lengthy and should be avoided by appropriately identifying exclusions in the rules or manuals up front. OPG encourages the IESO to ensure the Market Rules and Manuals provide explicit enough direction, flexibility, and exclusions to facilitate the development of Phasor Monitoring Units (PMUs) at existing facilities.	The IESO agrees with the importance of identifying exclusions in the Market Rules and Market Manual. The proposed Market Manual draft (posted on the IESO engagement webpage here) already includes explicit cases where Market Participants will not (or may not) be required to provide synchrophasor data if they meet specified criteria. The criteria is shown in the following statements (please refer to Table 1 in the proposed Market Manual): "*Eligible generation facilities in (1) and (2) are not required to provide the synchrophasor data if they meet the following criterion:* • *The generation facility is not directly connected to a Bulk Power System (BPS) Station and has no connection point voltage greater than 200 kV.* *Eligible generation facilities in (1) and (2) may not be required to provide the synchrophasor data if they meet one of the following criteria:* *a. The generation facility will be deregistered within a period of 5 years from date of implementation of market rules.* *b. The annual gross capacity factor of the generation facility is significantly low.* *The applicability of criteria (a) and (b) above are subject to the IESO's periodic review and assessment of the decommissioning plan and evaluation of capacity factors respectively, per mutual agreement on a case-by-case basis."*

Draft Market Manual:

Feedback

Two stakeholder submissions indicated they had no comment and/or no issues with the specifications listed in the draft Market Manual.

Ontario Power Generation provided the following points for consideration:

Feedback	IESO Response
Section 1.5 Paragraph two lists "infrastructure required" to provide synchrophasor data. This list should include measuring devices such as instrument transformers.	Agreed; the IESO will make the associated revisions in the next draft. Note: Figure 1 that is mentioned at the end of this paragraph already includes CT and PT with the following description: "CT and PT are used to measure phase current and phase voltage signals from transmission lines and buses"
Section 2.1, Table 1, Attribute *Measurement Point:* The requirement outlines exclusions as follows: • "Generators in (1) and (2) are not required to provide the synchrophasor data if: The generation facility is not a BPS station or has no connection point voltage > 200 kV." • Based on the IESO's stakeholdering discussions, OPG's understanding of the requirement is that a generator must meet both criteria (i.e., "is not a BPS station" and "has no connection point voltage > 200kV"). If OPG's interpretation is correct, more appropriate wording would be: o "Generators in (1) and (2) are not required to provide the synchrophasor data if: The generation facility is not a BPS	Agreed; the IESO will make the associated revisions to replace "or" with "and" in the next draft.

Feedback	IESO Response
station ~~or~~ and has no connection point voltage > 200 kV."	
Time-Tag Accuracy: OPG suggests removing the requirement for less than one microsecond accuracy if this requirement is not critical to the IESO's goals. If a facility can achieve a Total Vector Error of less than 1% (as stated in the Data Format attribute), OPG feels that a time-tag accuracy requirement of one microsecond is unnecessarily limiting.	In order to serve a meaningful purpose of real-time system synchrophasor data monitoring, it is necessary to ensure the time-stamps of all synchrophasor locations across Ontario come from reliable and accurate sources. The IESO is of the opinion that it is necessary to have a requirement for time-tag accuracy in addition to the 1% Total Vector Error requirement. It is important to note that this requirement is inline with the IEC/IEEE 60255-118-1 standard. A phase error of 0.57° will cause 1% TVE. This corresponds to a time error of ±26 µs for a 60 Hz system. According to the IEC/IEEE 60255-118-1 standard, a time source that reliably provides time, frequency, and frequency stability at least 10 times better than these values corresponding to 1% TVE is highly recommended. That corresponds to a maximum of ±2.6µs time tag error. That is why the IEC/IEEE 60255-118-1 standard requires that the time-tag to accurately resolve time of measurement to at least 1µs within a specified 100-year period. The IESO will modify this requirement to provide a clearer description as follows: "*All synchrophasor data shall be reported in Coordinated Universal Time (UTC time) with zero offset. For each phasor measurement, data shall include a time tag traceable to UTC clock that includes the time and time quality at the time of measurement. The time tag shall accurately resolve time of measurement to at least 1µs within a specified 100-year period.* ~~*Provide phasor data with time-stamp equal or less than 1 microsecond accuracy from Coordinated Universal Time (UTC) clock.*~~ ~~*Provide phasors data in UTC with zero offset.*~~

Feedback	IESO Response
	~~*Notes:*~~ ~~*(1) Time offset is an amount of time subtracted from or added to UTC to get the current civil time, whether it is standard time or daylight saving time (DST).*~~ ~~*(2) A time error of 1 microsecond corresponds to a phasor error of 0.022 degrees for a 60 Hz system.*~~"
Data Format: OPG suggests the IESO allow flexibility in this requirement for existing PMU devices that can provide the required synchrophasor data, but in a form other than IEEE (i.e., DNP3 protocol or Modbus). This flexibility could be included in the Market Manual via a statement such as "approvals will be reviewed by exception or on a case-by-case basis."	The IESO prefers to receive all synchrophasor data from Market Participants in one format which is the IEEE format.
Instrument Transformers: • Please clarify whether metering instrument transformers (specifically current transformers (CTs)) are acceptable for the PMU solution. • Can market participants use CTs on the neutral side of the generator winding of a transformer as part of the PMU solution? • Can market participants use of a combination of transformer high side current and low side voltage (generator output transformer), and allow the IESO to calculate the required PMU measurements?	• Existing Instrument Transformers (ITs) can be used for acquiring synchrophasor data as long as their intended role (such as revenue metering) is not interfered or hampered or degraded by any means with additional usage. Moreover, additional use of such ITs for PMU applications should not compromise the market rules or any applicable reliability related requirements, standards or criteria for either of the applications. • Typically, all synchrophasor data (current, voltage & frequency) should be measured at the same location point. The location of synchrophasor measurement should be at the following locations: o Individual units rated equal to or greater than 100 MVA (name-plate rating) ➔ data should

Feedback	IESO Response
	be measured at generator terminal (i.e. low side of the generator output transformer) ○ Generator facility that has multiple generator units and aggregate equal to or greater than 100 MVA (aggregate name-plate rating) ➔ data should be measured at the generator facility side of each point of connection to the IESO-controlled grid (the transformer high side) Exceptions to the location point can be considered based on a case-by-case basis.
Section 2.2, Figure 4 The figure identifies limits on active power (MW). This does not align with the requirements under the "Measurement Point" attribute in Section 2.1, Table 1, which specifies MVA. Please clarify whether the requirements are based on MW or MVA.	Agreed; the units in the figure should be in MVA. The IESO will make the associated revisions in the next draft.

General Comments/Feedback:

Feedback

Two stakeholder submissions included general comments for consideration:

Feedback	IESO Response
Northland Power suggested consideration be given to coordinating PMU locations between generators and transmsitters. For instance, if a transmitter is to put a PMU on a bus that is very close to where a generator would have to put a PMU then perhaps only one PMU is required instead of both. If this were considered and agreed to, an exception could be issued by the IESO for the respective bus that does not need a PMU.	The criteria for synchrophasor data locations is developed such that the synchrophasor data from transmitters identify overall power system dynamics at network level whereas the synchrophasor data from generators will strongly reflect the behavior of that particular generating facility by monitoring its output. Therefore both locations are required for system analysis of different types.
Ontario Power Generation noted that they appreciate the detailed stakeholdering between	The IESO would like to reiterate that the designation of the synchrophasor data requirements in proposed

the IESO and market participants, and suggested additional discussions should take place with respect to the designation of some attributes as "Required" vs "Preferred".	Market Manual as "Preferred" or "Required" is intended to provide flexibility to MPs. At this point the IESO believes that specifications designated as "Required" must be satisfied, while specifications designated as "Preferred" are not currently required but add additional operational value and should be satisfied wherever practical and may become "Required" in future if needed for any reliability purposes.

Please note that the information and responses provided by the IESO herein are for information and discussion purposes only and are not binding on the IESO. This document does not constitute, nor should it be construed to constitute, legal advice or a guarantee, representation or warranty on behalf of the IESO. In the event that there is any conflict or inconsistency between this document and the Market Rules, Market Manuals or any IESO contract, including any amendments thereto, the terms in the Market Rules, Market Manuals or contract, as applicable, govern.