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Updates to IESO Monitoring Requirements: Synchrophasor Data

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Territory Acknowledgement

The IESO acknowledges the land we are delivering today's webinar from is the traditional territory of many nations including the Mississaugas of the Credit, the Anishnabeg, the Chippewa, the Haudenosaunee and the Wendat peoples and is now home to many diverse First Nations, Inuit and Métis peoples. We also acknowledge that Toronto is covered by Treaty 13 with the Mississaugas of the Credit First Nation.

As we have attendees from across Ontario, the IESO would also like to acknowledge all of the traditional territories across the province, which includes those of the Algonquin, Anishnawbe, Cree, Oji-Cree, Huron-Wendat, Haudenosaunee and Métis peoples.

Purpose

- Introduction and Background
- Proposed updates to Synchrophasor Data Requirements
- PMU Registration Process and Naming Convention
- Expected Timeline

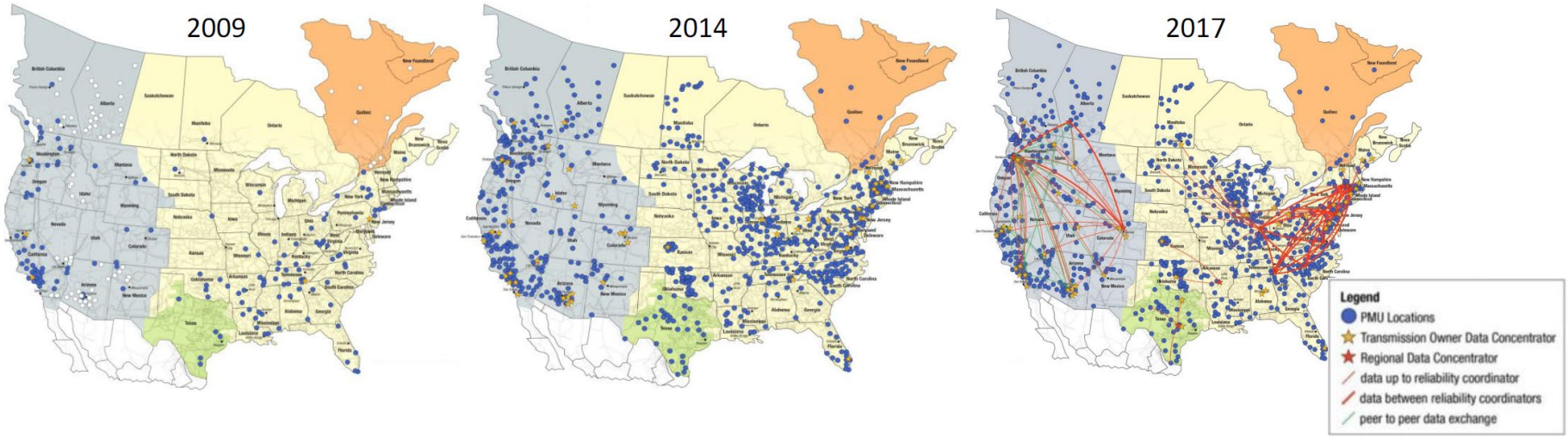
Introduction and Background

PMUs in the Broader Context

- Enhances the IESO's situational awareness – critical to maintaining reliability and resiliency with an increasingly dynamic power system
    - Increasing applications of phasor measurement unit (PMU) data in off-line, near-term and real-time systems
- Facilitates sharing and viewing wider portion of the interconnected grid for both Ontario & neighbouring jurisdictions - more accurately and consistently
- Improves IESO's ability to demonstrate reliability standards compliance
    - NERC reliability guideline for PMU placement published, future PMU related reliability standard anticipated

Introduction and Background

Growth of PMU Deployments in North America



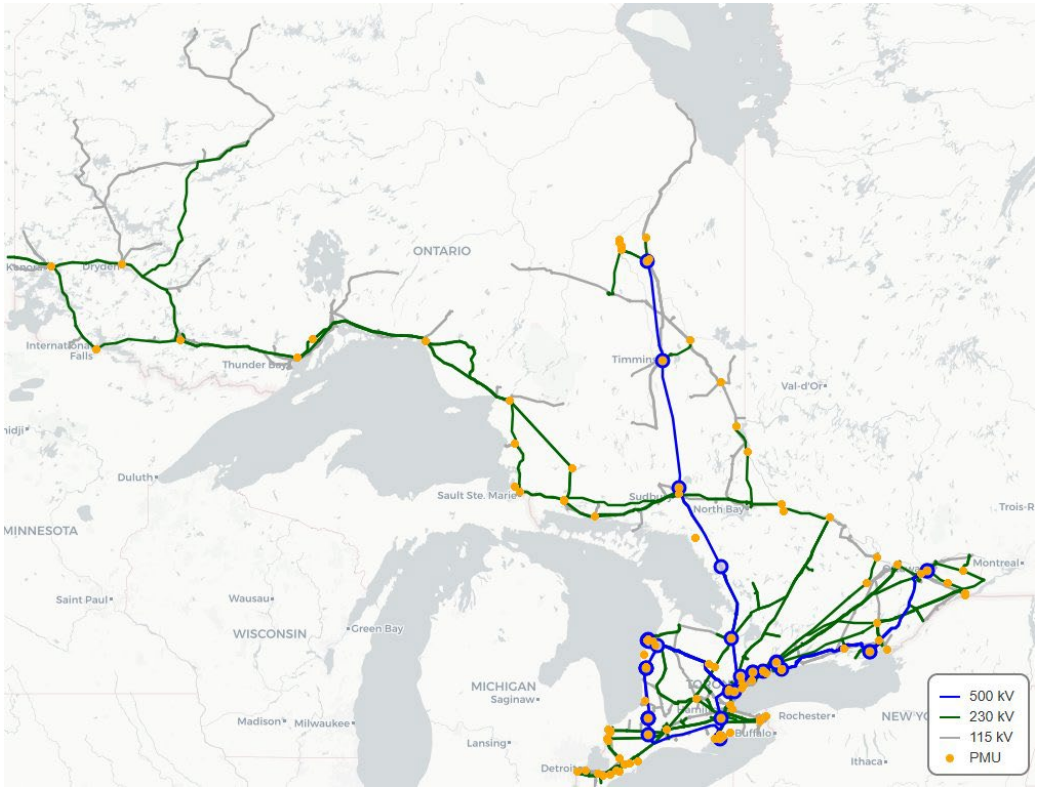
Source: North American Synchrophasor Initiative (NASPI)

PMUs in Ontario

229 PMUs

105 Facilities

24 IBR based



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Proposed Market Rule Changes

Synchrophasor data requirements for Electricity Storage Participants

Type	**Synchrophasor Data Requirements**
Electricity storage facility	The following are required unless otherwise specified by the IESO: 1. For *electricity storage units* rated at greater than 20 MVA name-plate rating, each *electricity storage unit* shall provide for all 3 phases the voltage and current phasor measurements, and frequency 2. For *electricity storage units* connected to the *IESO-controlled grid* through a common connection point whose aggregate rated size is greater than 20 MVA name-plate rating shall provide for all 3 phases the voltage and current phasor measurements, and frequency 3. For *electricity storage units*, regardless of rated size, that are associated with or have the potential to impact a *NERC* Interconnection Reliability Operating Limit (IROL), each *electricity storage unit* shall provide for all 3 phases the voltage and current phasor measurements, and frequency

Proposed Market Manual Changes

- Eligibility criteria for Electricity Storage Facilities
- Specific data requirements:
  - Voltage and Current phasors for each phase
  - Frequency measurements
  - Reporting Rate 60 samples/sec.
  - Implementation guidelines, registration process and compliance expectations

Proposed Market Manual Changes

Requirements: Electricity Storage Units

Attribute	Status	Requirement
Measurement Point	Required	*Electricity storage facility* that has one or multiple electricity storage units that aggregate to 20 MVA or more must provide phasor measurements for all 3 phases as well as frequency measurements *Electricity storage units*, regardless of rated size, that are associated with or have the potential to impact a NERC IROL must provide phasor measurements for all 3 phases as well as frequency measurements
Measured Quantities and Units	Required	Provide frequency (Hz), voltage magnitude and phasor angle (3-phase), current magnitude and phasor angle (3-phase), ROCOF.
Coordinates	Required	Provide phasor data in polar coordinates, magnitudes in SI units.

Proposed Market Manual Changes

Requirements: Electricity Storage Units

Attribute	Status	Requirement
System Frequency	Required	Provide data continuously between 57 Hz and 62 Hz.
Reporting Rate	Required	Provide data at minimum 60 samples per second (1/60th of a second intervals).
Time-Tag Format and Accuracy	Required	Report time in UTC with zero offset. Include time tag traceable to UTC clock with accuracy of at least 1µs within 100 years.
Data Format and Accuracy Standard	Required	New installations to comply with IEEE Std 60255-118-1-2018. Existing installations may comply with (IEEE Std. C37.118 2005/2011/2014)

Proposed Market Manual Changes

Requirements: Electricity Storage Units

Attribute	Status	Requirement
Network Protocol	Required	Provide phasor data via site-to-site VPN with the IESO. A public static IP address is required.
Instrumentation Channel	Required	Provide instrument transformers and corresponding channel components accurate enough for IESO real-time applications.
Latency	Required	Total latency from PMU to IESO ≤ 500 ms.
Latency	Preferred	Total latency ≤ 100 ms

Proposed Market Manual Changes

Requirements: Electricity Storage Units

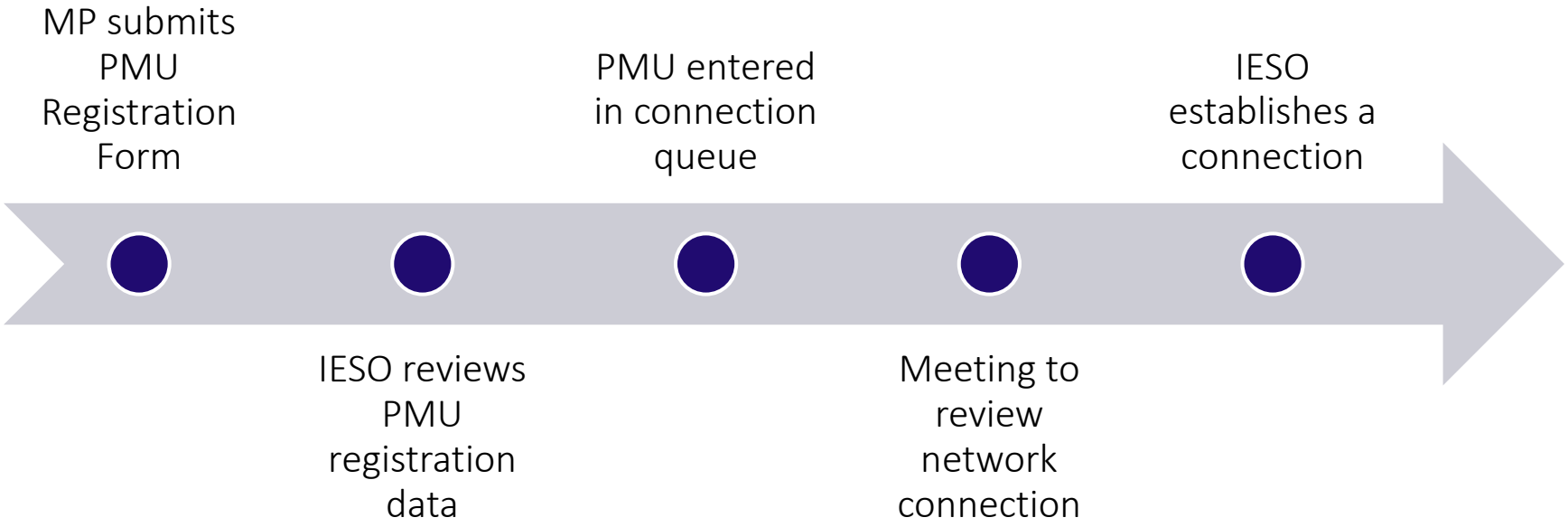
Attribute	Status	Requirement
Bandwidth	Required	Provide adequate bandwidth to transmit PMU data at selected reporting rate (typically 1 Mbps per transmitting PMU device).
Bandwidth	Preferred	Provide dedicated communication channels to avoid data transmission interruptions and fluctuations in latency.
Critical Infrastructure Protection (CIP)	Preferred	Include synchrophasor data under NERC CIP program.
Redundancy	Required	Provide primary communication path for synchrophasor data to the IESO

Proposed Market Manual Changes

Requirements: Electricity Storage Units

Attribute	Status	Requirement
Redundancy	Preferred	Provide primary and secondary communication paths for Linear State Estimator use.
CVT/PT Selection	Preferred	Use Metering Class Bus CVT/PT or Metering Class Transmission line/feeder CVT/PT measurements where possible.
CT Selection	Preferred	Use Protection Class CTs for dynamic and fault conditions.
Reliability, Maintenance and Repair	Required	Adhere to MR Ch.4 s.7.7 for all installed synchrophasor data devices and infrastructure (transformers, communication channels, PDCs).

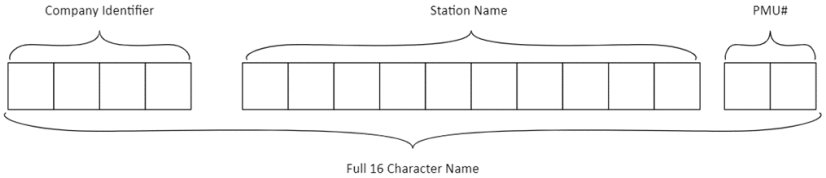
PMU Registration



Naming Convention

Station Name

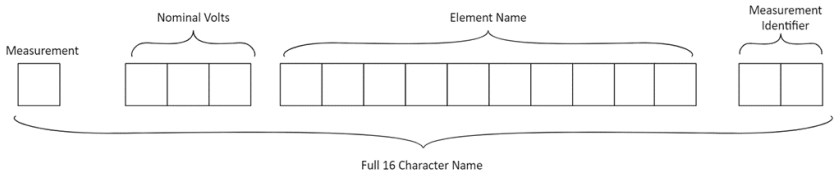
- Company Identifier – IESO assigns the identifier
- Station Name – up to 10 characters for the name of station where PMU is installed
- PMU# - number of PMU in the station (e.g., 01 to 99)



Naming Convention

Channel Name

- Measurement – 1 character identify the type of measurement
- Nominal Volts – 3 characters to identify the nominal voltage of the measurement location
- Element Name – 10 characters to identify the equipment where measurement is taken
- Measurement Identifier – 2 characters that signifies the type of measurement



Proposed Implementation Plan

Activity	Expected Time
Stakeholder new proposed synchrophasor data requirements	June 26, 2025
Receive and review stakeholder feedback	July 10, 2025
Technical board reviews and approves proposed MR changes	Q4 2025
Market Participants register PMUs	Q1 2026
MR changes come in effect	Q4 2026
MM changes published	Q1 2027

Additional Support

- Market Participants are encouraged to reach out to the IESO if they require support.

Thank You

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