

Communications and Control Systems – High- Resolution Time Synchronised Data Requirements

WRIG – 29 April 2021

Agenda

1. Recap Section 2.36A of the WEM Rules
2. Proposed High-Resolution Time Synchronised Data Requirements for Network Operator
3. Proposed High-Resolution Time Synchronised Data Requirements for Registered Facility
4. Technical Specifications for High-Resolution Time Synchronised Data Recorder
5. Next Steps

Section 2.36A of the WEM Rules – SCADA, Communication and Monitoring Equipment

- AEMO may direct a Rule Participant to install or upgrade/modify/replace communications and control systems where it considers necessary to monitor the SWIS, in accordance with the WEM Procedure.
- **Clause 2.36A.2** allows AEMO to direct the network operator to install high-resolution time synchronised data recorders or other suitable equipment for a Facility seeking ESS accreditation or where the network shows historical or may show potential instability or high fault activity.
- Equipment must be installed or repaired within a mutually agreed timeframe.
- Rule Participants must operate and maintain the equipment in order to meet the requirements of the communications standard in the WEM Procedure, and must provide data or information from the equipment to AEMO in accordance with the WEM Procedure
- **Clause 2.36A.5** sets out the HOP for the Procedure
- **Clause 2.36A.6** requires AEMO to consult in good faith with Network Operators, particularly regarding the cost-effectiveness of equipment to be installed or upgraded.

WEM Procedure: Communications and Control Systems

- This Procedure is drafted to include the high-resolution time synchronised data recorder (s) requirements and technical specifications to:
 - support the transitional ESS accreditation to ensure sufficient FCESS are accredited at market start;
 - assist with monitoring the performance of the SWIS that has demonstrated historical or potential instability or high fault activity and
 - investigate incidents on the SWIS that impact Power System Security or Power System Reliability
- AEMO will circulate and seek feedback on the WEM Procedure – Communications and Control Systems over the next few weeks.

WEM Procedure: Overview of key changes

- New sections added to the current Procedure
 - New section 5.3 covers the provision of high-resolution time synchronised data requirements for Network Operator Network
 - New section 5.4 covers the provision of high-resolution time synchronised data requirements for other Registered Facilities
- Appendix B.5 covers the High-Resolution time synchronised data recorder specification

WEM Procedure: Requirements for Network Operator

- If AEMO issues a direction under clause 2.36A.2 of the WEM Rules, the Participant must provide, install and maintain high-resolution time synchronised data recorder(s), where this is a NO the device would be installed on its network.
- The device must be capable of monitoring and recording the dynamic performance of a Facility or an area of the SWIS during a system disturbance or system event.
- It must be capable of capturing key measurements, including but not limited to the following:
 - Where relevant - substation busbar voltage, current, real and reactive power output (MW and MVAR) and frequency; and
 - Where required - circuit breaker and protection devices status.

WEM Procedure: Requirements for Network Operator

- The minimum specifications for the high-resolution time synchronised data recorder devices are specified in the Procedure.
- The NO must notify and provide measuring information specified in the procedure to AEMO on an on-going basis following a system disturbance or system event in softcopy in the format and timeframe specified in the Procedure.
 - AEMO is currently working with Western Power on reasonable and achievable timeframes to include in the WEM Procedure
- Devices must be configured to automatically trigger based on pre-set events set by the NO and specified by AEMO in the Procedure, and can be varied on a site by site basis.
- Where existing high speed recorders are already installed but do not meet all of the requirements specified in the Procedure, AEMO may agree to retain the existing device/configuration where it determines that its operational requirements can still be met.
- AEMO may also request specific event data from the NO. The NO, upon receiving a manual notification from AEMO, must furnish such measuring information in softcopy in the format and timeframe specified in the Procedure.
 - AEMO is currently working with Western Power on reasonable and achievable timeframes to include in the WEM Procedure

WEM Procedure: Requirements for Registered Facility

- If AEMO issues a direction under clause 2.36A.1 of the WEM Rules, the Market Participant (MP) must provide, install and maintain high-resolution time synchronised data recorder(s) for monitoring and assessment of performance.
- It must be capable of capturing key measurements, including but not limited to the following (where relevant):
 - The transient and dynamic response of each generating unit in terms of real and reactive power output (MW and MVar);
 - The current (A), voltage (V) and frequency (HZ) at the generating unit terminal; and
 - the current (A) and voltage (V) at the high voltage side of the generating unit's step up transformer.

WEM Procedure: Requirements for Registered Facility

- The MP upon receiving notification from AEMO must furnish such data in softcopy in the format specified in the Procedure within 2 business days.
 - Is this timeframe reasonable?
- The minimum specifications for high-resolution time synchronised data recorder devices are specified in the Procedure.

WEM Procedure: High-Resolution Time Synchronised Data Recorder Specifications – 1/2

The high-resolution time synchronised data recorder installed in the WEM must be suitable for both dynamic and transient recording.

The basic signal to be recorded/monitored includes, but not limited to the following:

- **Recording Sample Rate (base frequency 50Hz)**
 - 32-512 Samples/Cycle 1.6-25.6 kHz for **transient** recording
 - 0.5-2 Samples/Cycle 25-100Hz for **dynamic** recording
- **Recording Resolution/Accuracy**
 - Analog Signals: 16 bits or better than 0.1% of Reading Down to 3% of Full-scale
 - Frequency: $\pm 5\text{mHz}$
- **Trigger Type**
 - Undervoltage
 - Underfrequency
 - Overvoltage
 - Over frequency

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WEM Procedure: High-Resolution Time Synchronised Data Recorder Specifications -2/2

- **Pre-trigger Data Length**
 - 10 second minimum for **dynamic** recording
 - 0.1 second minimum for **transient** recording
- **Post -trigger Data Event Length**
 - Minimum 3 minutes for **dynamic** recording
 - Minimum 1.5 second for **transient** recording
- **Event Storage Capacity**
 - 400 events minimum
 - Minimum a rolling 2 week window of local storage on site
- **Event Data Format**
 - IEEE Comtrade (Preferred by AEMO)
 - ASCII or
 - Spreadsheet
- **Time Stamping**
 - A Global Position Satellite (GPS) clock must be provided for time synchronisation and must have a minimum resolution of 1msec.

Next Steps

- We would appreciate your feedback especially on:
 - High-resolution time synchronised data requirements and data provision timeframes
 - High-resolution time synchronised data recorder technical specifications
- Full Draft WEM Procedure to be provided for consultation in the next few weeks