

# Energization Package Requirements

## Overview

The energization package (EP) requirements are laid out in this document in three tables as follows:

- Table 1 – contains EP1-11 and outlines the 100 Day Energization Package requirements
- Table 2 – contains EP12-15 and outlines the requirements that are due 30 days prior to energization
- Table 3 – contains EP16-20 and outlines the requirements that are due after energization

Depending on the characteristics of the project, some energization packages may not be applicable to the project.

## Timelines

The AESO requests that the deliverables outlined below are submitted in the timelines specified below so that the AESO can complete its review of the information received, meet our reporting obligations, and ensure the AESO System Coordination Centre operating personnel have the necessary information for training and to operate the system in a safe, reliable and efficient manner.

Failure to deliver the requirements within the specified timelines may result in energization delays. If there are concerns with meeting the timelines specified below, contact the AESO Project Manager as soon as possible to address the concerns. Timelines presented below may be adjusted by the AESO Project Manager in conjunction with AESO Operations in consideration of project complexity or other project factors that may impact or influence a deliverable(s). Therefore, the timelines presented below may vary depending on the project.

## Submission Details

Submit all energization package requirements to the AESO Project Manager, unless otherwise indicated. Clearly name the files with the project number and include EP1, EP2, etc. in the file name for each energization package. Provide the files in the formats indicated below and submit them via email, zip file, or other means as agreed upon with the AESO Project Manager.

**Table 1: 100 Day Energization Package Requirements – Due 100 Calendar Days Prior to Energization**

Package #	Deliverable	Description	Format	Submitted by
EP1	Preliminary Substation Drawings	<p>Substation single line diagram (SLD) drawing(s) that shows the major equipment, protection &amp; control, and revenue metering.</p> <p>Also include an Ampacity Diagram for projects that add new equipment either in a transmission substation or a customer-owned substation that are subject to <a href="#">FAC-008, Facility Ratings</a>.</p> <p>Also include D-curves for generation projects (applies to transmission- and distribution-connected generation, and energy storage).</p>	Authenticated SLD(s) as PDF	Separate files provided by each facility owner for their own facilities
EP2	Stage 5 PDUP	<p>Refer to the AESO Project Data Update Package – Instruction Manual (<a href="#">PDUP-IM</a>) for requirements. For more information, see <a href="#">Section 502.12</a> of the ISO rules and ID #2010-001R.</p> <p>One party (e.g. TFO or MP) must aggregate all the required information together into one authenticated PDF package. The party responsible for aggregating the PDUP should be chosen early in the project.</p>	Authenticated PDF Package	One aggregated file submitted by one party
EP3	Preliminary Commissioning Plan	<p>Preliminary explanation of:</p> <ul style="list-style-type: none"> <li>• How the project will be energized</li> <li>• Steps and activities to occur in order for equipment to be energized</li> <li>• The process of commissioning for SCADA points</li> <li>• The process for PMU testing (if required)</li> <li>• In-service date for RAS and testing schedule (if required)</li> <li>• Outages (Ensure outage information is aligned with any outage request submissions. Generator outages must be entered into the Energy Trading System (ETS) when access to ETS is granted. Refer to Sections <a href="#">306.3</a>, <a href="#">306.4</a>, and <a href="#">306.5</a> of the ISO rules for more information about planning outages.)</li> </ul>	Word or PDF	Separate files provided by the TFO and MP/GFO, as applicable

Package #	Deliverable	Description	Format	Submitted by
		<p>Also provide a SCADA contact person for testing and, if required, a PMU contact person for testing.</p> <p>For complex projects, also provide staging SLDs showing the various configurations that a project will transition through until the ultimate or final configuration is energized. The staging SLDs are intended to augment the complex timelines of the project's commissioning plan.</p>		
EP4	Preliminary Generator Testing/Commissioning Plan	<p>The preliminary plan includes:</p> <ul style="list-style-type: none"> <li>• date, time, MW, MVA<sub>r</sub>, and test duration</li> </ul> <p>Must be submitted to <a href="mailto:gen.testing@aeso.ca">gen.testing@aeso.ca</a>, <a href="mailto:OPTRAProjects@aeso.ca">OPTRAProjects@aeso.ca</a>, and the AESO Project Manager. Any updates (new versions) should be submitted with a new version number.</p> <p>Refer to Section <a href="#">505.3</a> of the ISO rules and ID #2012-012R for more information.</p>	Word or PDF	Provided by the GFO
EP5	Preliminary SCADA Point List	<p>A list that identifies analog, status, and accumulator points for data communication that match the points specified in the Functional Specification. Each SCADA point needs to have a description listed with it. Refer to <a href="#">Section 502.8</a> of the ISO rules for more information.</p>	Excel or PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP6	Preliminary Communication Block Diagram	<p>A simplified communication block diagram detailing the “designed” communication path for communication troubleshooting purposes. Refer to <a href="#">Section 502.8</a> of the ISO rules for more information.</p>	PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP7	Functional Specification Compliance Letter or Email	<p>Written self-declaration that installation meets the functional specification and connection requirements. Includes the following information:</p> <ul style="list-style-type: none"> <li>• Version of the functional specification</li> <li>• Any deficiencies or outstanding items</li> <li>• Status of studies (if outstanding) identified in the functional specification</li> </ul>	PDF or Email	Separate files provided by each facility owner referenced in the functional specification

Package #	Deliverable	Description	Format	Submitted by
EP8	Phasor Measurement Unit (PMU) Three Line Diagrams	<p>If applicable, will be noted in the functional specification. Applies to generation projects per Sections <a href="#">502.1</a>, <a href="#">502.5</a>, and <a href="#">502.13</a> of the ISO rules.</p> <p>Three Line Diagram(s) that represent the physical connections of the facility. The PT (Potential Transformer) and CT (Current Transformer) ratios of the connections for the PMU inputs must be specified. Also include any other PMU-related supporting documentation (e.g. user guides, commissioning report). Refer to Section <a href="#">502.9</a> of the ISO rules for more information.</p>	Authenticated Three Line Diagram(s) as PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP9	GIS Mapping Data	A set of shape files containing preliminary GIS data for any new facility (line or substation) that will be constructed and any existing facility (line or substation) physically changed through the project. This includes changes to substation boundaries and new or rerouted transmission lines. Refer to the AESO <a href="#">GIS Data Requirements</a> for more information.	Shape Format (NAD83)	Separate files provided by the TFO and MP/GFO, as applicable
EP10	Connection Order	The Connection Order issued by the AUC for the interconnection of a generator to the AIES or for the interconnection of two transmission elements owned by different parties. Refer to section 5 of AUC Rule 007 for more information.	PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP11	PSCAD Model, supporting document, and checklist (optional)	<p>A PSCAD model compatible with PSCAD version 4.6 or above for inverter-based resources along with supporting document describing the model and required PSCAD setup. A checklist, which can be found <a href="#">here</a>, should also be provided to ensure all requirements are met.</p> <p>The models shall follow the requirements in the following documents:</p> <ul style="list-style-type: none"> <li>Electranix's recommended PSCAD model requirements Rev. 5: <a href="http://www.electranix.com/wp-content/uploads/2018/02/Technical-memo-PSCAD-requirements-V5.pdf">http://www.electranix.com/wp-content/uploads/2018/02/Technical-memo-PSCAD-requirements-V5.pdf</a></li> </ul>	PSCAD Model in version 4.6 or above; supporting document and checklist in PDF	Provided by the GFO

Package #	Deliverable	Description	Format	Submitted by
		<ul style="list-style-type: none"> <li data-bbox="646 337 1444 578">           NERC's Reliability Guideline "Improvement to Interconnection Requirements for BPS-Connected Inverter-Based Resources", Refer to sections on Electromagnetic Transient Modelling and Benchmarking Positive Sequence Stability Models with EMT Models:  <a href="https://www.nerc.com/comm/OC_Reliability_Guidelines_DL/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf">https://www.nerc.com/comm/OC_Reliability_Guidelines_DL/Reliability_Guideline_IBR_Interconnection_Requirements_Improvements.pdf</a> </li> </ul>		

**Table 2: Energization Package Requirements – Due 30 Calendar Days Prior to Energization**

Package #	Deliverable	Description	Format	Submitted by
EP12	Final Commissioning Plan	<p>May submit the preliminary commissioning plan again if nothing has changed. Refer to Section <a href="#">504.3</a> of the ISO rules and ID #2012-011R for more information.</p> <p>Final explanation of:</p> <ul style="list-style-type: none"> <li>• How the project will be energized</li> <li>• Steps and activities to occur in order for equipment to be energized</li> <li>• The process of commissioning for SCADA points</li> <li>• The process for PMU testing (if required)</li> <li>• In-service date for RAS and testing schedule (if required)</li> <li>• Outages (Ensure outage information is aligned with any outage request submissions. Generator outages must be entered into the Energy Trading System (ETS) when access to ETS is granted. Refer to Sections <a href="#">306.3</a>, <a href="#">306.4</a>, and <a href="#">306.5</a> of the ISO rules for more information about planning outages.)</li> </ul> <p>Also provide a SCADA contact person for testing and, if required, a PMU contact person for testing.</p> <p>For complex projects, also provide staging SLDs showing the various configurations that a project will transition through until the ultimate or final configuration is energized. The staging SLDs are intended to augment the complex timelines of the project's commissioning plan.</p>	Word or PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP13	Interconnection Agreement Confirmation Letter or Email	Written confirmation that an Interconnection Agreement or Joint Operating Procedure (JOP) is in place between the TFO and the customer.	PDF or Email	Provided by the TFO

Package #	Deliverable	Description	Format	Submitted by
EP14	Generator Testing/ Commissioning Plan	<p>The plan includes:</p> <ul style="list-style-type: none"> <li>• date, time, MW, MVA<sub>r</sub>, and test duration</li> </ul> <p>The latest version of the plan should be sent to the AESO 30 days prior to energization, however the plan must be finalized at least 30 days prior to commissioning or testing as per Section <a href="#">505.3</a> of the ISO rules and ID #2012-012R.</p> <p>Must be submitted to <a href="mailto:gen.testing@aeso.ca">gen.testing@aeso.ca</a>, <a href="mailto:OPTRAProjects@aeso.ca">OPTRAProjects@aeso.ca</a>, and the AESO Project Manager. Any updates (new versions) should be submitted with a new version number.</p>	Word or PDF	Provided by the GFO
EP15	Coordination with AESO Operations for SCADA Testing and RAS Testing (if required) Confirmation Letter or Email	<p>Confirmation that coordination of SCADA Testing and RAS Testing (if required) has been initiated with AESO Operations.</p> <p>When completed, written confirmation must be submitted that SCADA and RAS (if required) identified in the functional specification:</p> <ul style="list-style-type: none"> <li>• has been successfully tested;</li> <li>• is ready for energization; and</li> <li>• meets the requirements of <a href="#">Section 502.8</a> of the ISO rules.</li> </ul> <p>As indicated in the Commissioning Plan, SCADA testing and RAS testing (if required) will occur between AESO Operations and the TFO/MP/GFO typically during the two weeks prior to energization.</p>	PDF or Email	Separate files provided by the TFO and MP/GFO, as applicable

**Once all the above items are complete, the AESO Project Manager will send a letter to all parties confirming that all energization deliverables and activities are complete.**

Note for GFOs: At the end of commissioning, upon request of the GFO, the AESO will issue a Commissioning Certificate letter to mark the commercial operation date (COD). Until this time, if the GFO submits offers, they must submit offers of zero dollars (\$0) in accordance with subsection 4 of Section [203.1](#) of the ISO rules.

**Table 3: Post-Energization Package Requirements**

Package #	Deliverable	Description	Due	Format	Submitted by
EP16	As Built Substation Drawings	<p>As built substation SLD drawing(s) that provide the final description of the major equipment, protection &amp; control, and revenue metering.</p> <p>If no changes have been made since the previous submission then a letter or email stating this is acceptable.</p>	30 days after	Authenticated SLD(s) as PDF	Separate files provided by each facility owner for their own facilities
EP17	As Built SCADA Point List	<p>The as built SCADA point list serves to record and report any variances from the points specified within the Functional Specification.</p> <p>A list that identifies analog, status, and accumulator points for data communication that match the points specified in the Functional Specification. Each SCADA point needs to have a description listed with it. Refer to <a href="#">Section 502.8</a> of the ISO rules for more information.</p> <p>If no changes have been made since the previous submission then a letter or email stating this is acceptable.</p>	60 days after	Excel or PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP18	As Built Communication Block Diagram	<p>A simplified communication block diagram detailing the as built communication path for communication troubleshooting purposes. Refer to <a href="#">Section 502.8</a> of the ISO rules for more information.</p> <p>If no changes have been made since the previous submission then a letter or email stating this is acceptable.</p>	90 days after	PDF	Separate files provided by the TFO and MP/GFO, as applicable



EP19	As Built RAS Logic Diagram	Includes input and output from all sites involved, high-level RAS logic, thresholds and timing, and relay model number. TFO and MP to provide as built detailed RAS relay internal logic diagrams (if available).	90 days after	PDF	Separate files provided by the TFO and MP/GFO, as applicable
EP20	Generating Unit Model Validation and Reactive Power Verification Report	Refer to Sections <a href="#">502.6</a> and <a href="#">502.16</a> of the ISO rules and ID #2017-013R for more information.	180 days after	Word or PDF	Provided by the GFO