

# 2021 Plan for DER Roadmap Integration Activities



## Introduction

This plan provides an updated overview of the [2021 Plan for DER Roadmap Integration Activities](#) in support of the [AESO Distributed Energy Resources \(DER\) Roadmap \(DER Roadmap\)](#).

Based on the priority of these DER integration activities, high and medium priority activities will continue to progress in 2021 and most of these activities will be completed or near completion by the end of 2021. Majority of the low priority activities have been scheduled to progress through either the conception phase or the implementation phase in 2021 or beyond.

For those activities that require stakeholder feedback, the AESO will continue to engage with stakeholders during the conception and development phases (described below), in alignment with the AESO Stakeholder Engagement Framework<sup>1</sup>. In addition, progress updates and information on engagement opportunities will be communicated to stakeholders at the regular DER progress update sessions. The plan below outlines timing for the DER Roadmap integration activities and, where applicable, their anticipated stakeholder engagement, while recognizing timelines may change as activities progress and more information becomes available.

The AESO continues to work cross-functionally across the organization to ensure all initiatives which are connected or interrelated will remain coordinated as appropriate.

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<sup>1</sup> <https://www.aeso.ca/assets/downloads/Stakeholder-Engagement-Framework-Report-FINAL.pdf>

## 2021 Plan for DER Roadmap Integration activities

### DER integration process

The following provides a description of the DER integration process:

#### *Analysis (A)*

In the analysis phase, the AESO identifies issues resulting from internal analysis, stakeholder feedback, government policy or market design review. This phase is an internal phase for the AESO and there may be initiatives that have not yet progressed to the point of requiring stakeholder input. Such initiatives may not appear on the plan and may be added once initial analysis has been completed or an engagement decision has been reached. In this phase, the AESO may research and define the issue, analyze the implemented solution in other jurisdictions, perform analytics, and seek out expert opinions to determine whether to move forward to the next phase.

#### *Conception (C)*

During the conception phase, the AESO will formalize the issue and conduct an options analysis. Input for the options analysis may be gathered through stakeholder engagement, and/or third-party studies. The AESO may develop recommendations and determine necessary stakeholder engagement.

#### *Development (D)*

During the development phase, the AESO works with stakeholders to create proposed Independent System Operator (ISO) rules or changes to ISO rules. The proposed drafts are released to stakeholders for comment and those comments are considered in the development of a proposed ISO rule or Authoritative Documents (AD).

#### *Regulatory (R)*

The regulatory phase begins with filing an application for approval of a proposed ISO rule with the Alberta Utilities Commission (AUC) and typically concludes with the issuance of a decision on the application. It may also extend beyond an AUC decision if compliance filings or review and variance applications need to be addressed.

#### *Implementation (I)*

The implementation phase includes changes to information technology, business processes, and training and ISO rules. The longest implementation timeline would be for the new ISO rules.

### ***Engagement (E)***

The engagement phase may include a range of stakeholder engagement approaches - with the purpose to inform or to collaborate - depending on the topic and issue being considered and the outcomes being sought.

The approach taken and the extent of activity for each phase will be dependent on each DER Roadmap Integration Activity. For example, not all activities will result in new proposed ISO rules or changes to an ISO rule, therefore these activities will not go through Development and Regulatory phases prior to entering the Implementation phase.

Classification	DER Roadmap Integration Activities	Priority Rank	2021 Q1			2021 Q2			2021 Q3			2021 Q4		
			J	F	M	A	M	J	J	A	S	O	N	D
<b>Stakeholder Engagement</b>	<b>DER Progress Updates</b> Share progress on activities, other interrelated initiatives and address stakeholder questions.			E			E			E			E	
<b>Reliability</b>	<b>Data</b>													
	Develop a platform to receive standardized DER static data	M	C	I										
	Assess and implement minimum SCADA data trigger level	H	I											
	<b>Forecasting</b>													
	Forecast DER by technology type	H	C					I						
	Forecast DER gross generation and gross load separately (AESO internal activity)	L	C						I					
	Geographical forecast of DER sizes at the POD level (AESO internal activity)	L	Scheduled for 2023											
	Near term/real time forecast to incorporate meteorological data into DER and variable generation (AESO internal activity)	M	I											
	Enhance AESO forecasting processes and incorporate DFO DER forecast information where appropriate	M	Complete											
	End-to-end forecasting process review from LTO to real time (AESO internal activity)	M	Complete											
	<b>Modelling</b>													
Energy storage model	H	Progress will be aligned with <a href="#">AESO Energy Storage Roadmap Schedule</a> – see Phase 2 Long-term Implementation activities												

Incorporate DFO advancement in real time DER modelling	L	Complete											
DER model directly connected at 25 kV bus	H	I											
Assess feeder impedance to be included into DER models	H	I											
<b>Connection Process</b>													
Review and update the AESO BTF Process - Complete	H	Complete											
<b>Coordinated Planning</b>													
Enhance Transmission planning process in coordination with Transmission/Distribution (Tx/Dx) coordinated planning framework	H	C						I					
<b>Coordinated Operation</b>													
Incorporate DER into net demand forecasting process (AESO internal activity)	H	I											
Enhance real-time operator's supply/demand requirements and displays (AESO internal activity)	M											C	I
Determine DER Trigger on Significant Outage Coordination	H	A						C					
<b>Technical Interconnection Requirement</b>													
Voltage and frequency ride-through requirement	H	C						I					
UFLS program	L	Complete											
Transmission protection and control coordination	M	C						I					
Islanding and anti-islanding coordination	M	C						I					

	Restoration coordination	L				C	I
	Commissioning and testing requirements	L				C	I
	Cybersecurity requirements	L	C			I	
<b>Market Efficiency</b>	<b>Market Participation and Aggregation</b> Evaluate and assess options that encourage DER market participation	M	Progress will be aligned with <a href="#">AESO Market Related Initiative Timeline</a>				
<b>Tariff</b>	<b>Tariff</b> Evolve tariff framework that drives effective long-term price signals that encourage efficient use of the Tx and Dx system	M	Progress will be aligned with <a href="#">Bulk and Regional Tariff Design</a>				

DER Roadmap Implementation Phases: Analysis (A), Conception (C), Development (D), Regulatory (R) Implementation (I), Engagement (E)

DER Roadmap Priority Rank: H= High Priority, M= Medium Priority, L= Low Priority

The completed phases and planned phases outside of this 12 month period are not shown.

## DER Roadmap Integration activities

As activities are completed, they will be marked “complete” in the above schedule. After being posted, the next update will have all completed line items in the above schedule deleted. These completed activities will continue to undergo periodic monitoring and trigger-point assessment reviews twice a year to determine the next level of risk management to be implemented in support of the continued growth of DER volumes and spread.

### 1. Stakeholder engagement

#### a. DER progress update

At quarterly intervals, the AESO will share progress on the DER Roadmap integration activities, provide an update on interrelated initiatives, as well as address stakeholder questions.

### 2. Reliability

Following are reliability-related DER Roadmap integration activities that the AESO is progressing to ensure continued reliability of the AIES, the pace of which is driven by areas experiencing increasing DER growth.

#### a. Data

Accurate knowledge of DER volumes, locations, resource types, and site characteristics is critical to reliably integrate higher volumes of DER into the AIES.

**Static Data (DER less than 5 MW)** - The AESO, working with the distribution facility owners (DFOs), has standardized the static data submissions for DER and is now working on developing a data portal to receive this data from DFOs. This ensures efficient access to up to date DER information by different functional groups within AESO to support planning and operation duties.

**SCADA Data (DER less than 5 MW)** – The AESO presently does not receive SCADA data for DER smaller than 5 MW. Expanding the AESO Control Centre’s real time visibility of DER smaller than 5 MW was explored by the AESO with DFOs. The conclusion of the discussion is that the AESO will continue to maintain 5MW minimum SCADA data trigger. For DER less than 5 MW, the AESO will leverage existing SCADA data from DFOs and will start implementation phase of this work by establishing connectivity with DFOs to enable SCADA data exchange for DER less than 5 MW in 2021.

#### b. Forecasting

Increased knowledge of DER data will enhance the AESO’s forecasting processes, from long term to real time. In addition, these forecasting processes will be enhanced to explicitly forecast DER growth and penetration.

**DER Forecasting by Technology** –The AESO’s forecast will include DER by technology such as solar, wind, gas and energy storage to ensure DERs are explicit in the forecast. This will be reflected in the upcoming AESO 2021 Long-term Outlook (LTO). Stakeholder feedback on the DER forecast will continue to be obtained via on-going LTO stakeholder engagement process.

**Forecast of DER gross generation and gross load separately and incorporate hourly variability** – In the AESO’s current near-term/real time forecast (which supports AESO’s real time operation), DER smaller than 5 MW is embedded as part of the net load forecast (i.e., gross load minus DER generation). The AESO plans to establish a process to estimate gross load and gross generation of DER less than 5 MW for solar to understand the impact on the AESO’s net load forecast. Based on the current DER penetration for DER less than 5 MW, this work will add marginal benefit to understanding net load variability; therefore, it is ranked as a low priority and the implementation of this activity will start in late 2021.

**Geographical forecast of DER sizes at the POD level** – For DER less than 5 MW, the AESO plans to establish a process to forecast rooftop solar at the point-of-delivery (POD) level for the near-term/real time forecast. In 2021, the AESO is implementing new planning area-level forecasting with embedded DER generation that will increase the accuracy of operations processes. Further enhancement down to the POD level will provide marginal benefit while requiring capital and significant resource to implement. Hence this is evaluated as a low priority activity and it will be re-evaluated in 2023.

**Near-term/real-time forecast to incorporate meteorological data into DER and variable generation** - The AESO is enhancing near/real forecast by incorporating meteorological data into modelling conducted for DER smaller than 5 MW and variable generation. The activity is targeting implementation by July 2021.

**Enhance AESO forecasting processes and incorporate DFO DER forecast information where appropriate** – In 2020, the AESO engaged DFOs and found that some of the DFOs generate high level DER forecast; however, none of the DFOs have an established methodology for DER forecasting at present till they see higher DER penetration. Going forward, the AESO will continue to engage DFOs on an annual basis and gather available DER forecasting information to enhance AESO’s DER forecasting.

**End-to-end forecasting process review from LTO to real time** – The AESO has completed review of incorporating DER into the AESO’s end-to-end forecasting process.

### ***c. Modelling:***

DER models need to be adequately captured in AESO’s power system models, which will be used in numerous planning and operating processes that support the reliability of the AIES.

**Energy storage model** – DER Energy storage resources (ESRs) need to be modelled in AESO’s Central Power System (CPS) and real-time Energy Management System (EMS) to support various AESO planning and operation functions. In 2020, CPS and EMS energy storage modelling work, which covers both transmission connected and distributed connected energy storage, was completed. The EMS energy



storage model will be enhanced when the EMS will be upgraded in the near future. The details of the DER Energy Storage model is covered in the Energy Storage Initiative and its scope and timeline will be aligned with appropriate Energy Storage model activity in the [Energy Storage Roadmap](#).

**Incorporate DFO advancement in real time DER modelling** – In 2020, the AESO engaged DFOs and found that the DFOs do not have real-time models. The AESO will continue to engage DFOs on a regular basis to leverage DFO real time DER modelling capability.

**DER power system models directly connected at 25 kV bus** - For models of DER to be used in the AESO Central Power System (CPS) model, the AESO has recommended a simplified process for selecting DER models larger than five MW by providing generic typical models per DER technology in the AESO Information Document #2010-001R, *Facility Modelling Data* (“ID #2010-001R”), which relates to Section 304.6 of the ISO rules, [Unplanned Transmission Facility Limit Changes](#) and Section 502.15 of the ISO rules, [Reporting Facility Modelling Data](#). For DER smaller than five MW, the AESO plans to use static data to build aggregated models. ID #2010-001R will be updated and is planned to be published outlining the DER modelling requirement in Q2 2021.

**Assess feeder impedance to be included into DER models** – The AESO plans to update ID #2010-001R to outline the requirement in Q2 2021.

**d. Connection process:**

DER requesting to connect to the AIES will typically progress through AESO’s [Behind The Fence \(BTF\)](#) process. With increasing DER penetration and the [Amended 2018 ISO Tariff](#) coming into effect on January 1, 2021, the BTF Process and the Connection Process have been enhanced with inputs from stakeholders. The updated processes came into effect on January 1, 2021.

**e. Coordinated planning**

With increasing DER penetration, AESO’s transmission planning will be enhanced with inputs from improved data, forecasting and modelling processes coupled with the Tx/Dx Coordinated Planning framework initiative. Engagement with DFOs, transmission facility owners (TFOs) and industry participants will follow the [Tx/Dx Coordinated Planning framework initiative timeline](#).

**f. Coordinated operation**

**Incorporate DER into net demand forecasting process** – Enhance AESO’s net demand forecasting by incorporating wind and solar variability in the net demand for renewable DER larger than 5 MW and incorporate DFO SCADA data and static data for DER smaller than 5 MW. This activity will continue to progress in 2021.

**Enhance real-time operator’s supply/demand requirements and displays** – Enhance real time processes and tools in consideration of available DER SCADA data, forecasting and modelling information. This ensures continued reliable operation of the AIES as DER penetration continues to increase.

### ***g. Technical interconnection***

As more DERs are connecting and supplying energy, they may impact the reliability of the AIES. The AESO explored appropriate technical interconnection recommendations with input from DFOs and TFOs via the DER Technical Performance Exploration Group (TPEG). Based on feedback received from TPEG, the AESO plans to publish, in 2021, a series of technical assessment papers to identify the AESO's recommended implementation approaches to address various technical aspects of integrating DERs. Based on a prioritization exercise completed by the AESO in Q1 2021, The remainder of these DER technical interconnection recommendations and other DER implementation activities will continue to progress to completion through 2021 and 2022.

**Voltage and frequency ride-through requirement:** AESO, DFOs and TFOs had exploratory discussions relating to frequency and voltage ride-through capability criteria. An assessment paper on the topic is planned to be published in Q1/Q2 2021.

**Under Frequency Load Shedding (UFLS) coordination:** The AESO has completed an assessment of current DER impact on Alberta Underfrequency Load Shedding (UFLS) program. The outcome of this assessment was presented at the [Feb. 23, 2021 DER Stakeholder Engagement Session](#).

**Transmission Protection and Control coordination:** AESO, DFOs and TFOs had exploratory discussion relating to Transmission Protection and Control coordination as well as effective grounding and TOV/TRV with increasing DER. Assessment papers on the topics are planned to be published in 2021.

**Islanding/Anti-islanding, and Restoration coordination:** AESO, DFOs and TFOs had exploratory discussion relating to Islanding/Anti-island and Restoration coordination. An Anti-Islanding screening and study guideline is planned to be published in 2021.

**Commissioning and Testing requirement:** Once AESO's assessment for commissioning and testing requirements are finalized; AESO's recommendation will be explored with DFOs and TFOs in 2021.

**Cybersecurity requirements:** The AESO and DFOs will have exploratory discussion whether a foundational cybersecurity guideline would be beneficial for transferring DER SCADA data to the AESO in 2021.

## **3. Market**

This activity is designed to facilitate DER integration and access to the energy and ancillary services markets by removing unnecessary barriers and ensuring a fair, efficient, and openly competitive (FEOC) market. The AESO intends to review and update any ISO rule changes (if recommended) to foster investor understanding of market expectations and aid them when making future decisions.

Please refer to the [2020-2021 Market Related Initiative Plan](#) for more details.

#### 4. Tariff

The AESO's Amended 2018 ISO Tariff Compliance Filing has been approved by the Alberta Utilities Commission (AUC) and came into effect on January 1, 2021. In addition, the AUC has approved the AESO's proposal to set the substation fraction equal to one for DCG projects (Decision 25848-D01-2020). The AUC also approved the implementation of the Adjusted Metering Practice ("AMP") without legacy treatment and the AUC has directed the AESO to submit an implementation plan that addresses the timing and costs of implementing the AMP. As part of preparing and developing the AMP implementation plan, the AESO will be reaching out to DFOs to gather information and feedback to incorporate into the plan.

With increasing DER, the current ISO Tariff may require future changes. The AESO is currently evaluating how the ISO tariff should evolve in response to the following:

- The AUC is considering whether distribution-connected generation (DCG) credits should continue to be included in a distribution utility's tariff

*Please refer to [Bulk Regional Tariff Design](#) for more details on the stakeholder engagement on bulk and regional cost recover that may impact the future calculation of the Rate DTS tariff.*