

2020-2021 Plan for DER Roadmap Integration Activities



Introduction

This plan provides an updated overview of the [2020-2021 Plan for DER Roadmap Integration Activities](#), which the AESO published on July 28, 2020, in support of the [AESO Distributed Energy Resources \(DER\) Roadmap \(DER Roadmap\)](#).

In this update, the plan has been expanded to include DER Roadmap integration activities that are specific and internal to the AESO, thereby giving stakeholders a more comprehensive view of the DER Roadmap integration activities and their corresponding schedules. In the table below, using simple ranking, the AESO has indicated its assessment of the relative priority of the various DER Roadmap integration activities. Prioritization of the DER Roadmap integration activities helps to focus all stakeholders' efforts and resources on areas that the AESO currently considers to have the most impact on the Alberta interconnected electric system. The AESO completed the prioritization of the DER Roadmap activities during a working session with AESO team members, focused on potential activity probability and impact on the Alberta Interconnected Electricity System (AIES), as well as the resources and estimated costs required to complete and implement each activity.

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 Framework¹. 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.

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

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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	2020 Q3			2020Q4			2021 Q1			2021 Q2		
			J	A	S	O	N	D	J	F	M	A	M	J
Stakeholder Engagement	DER Progress Updates Share progress on activities, other interrelated initiatives and address stakeholder questions.		E			E				E			E	
	Data													
Reliability	Develop a platform to receive standardized DER static data	M	C						I					
	Assess minimum SCADA data trigger level	H	C						I					
	Forecasting													
	Forecast DER by technology type	H	C											
	Forecast DER gross generation and gross load separately (ASESO internal activity)	L							C					
	Geographical forecast of DER sizes at the POD level (internal activity)	L							C					
	Near term/real time forecast to incorporate meteorological data into DER and variable generation (internal activity)	M	I											
	Enhance AESO forecasting processes and incorporate DFO DER forecast information where appropriate	M	C						I					
	End-to-end forecasting process review from LTO to real time (internal activity)	M	I											
	Modelling													
Energy storage model	H	Progress will be aligned with AESO Energy Storage Roadmap Schedule – see Phase 2 Long-term Implementation activities												

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

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

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 months period are not shown.

DER Roadmap Integration activities

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 five MW) - The AESO is working with the distribution facility owners (DFOs) to standardize the static data submissions for DER and plans to centrally store this information in an internal AESO database. This ensures efficient access to up to date DER information by different functional groups within AESO to support planning and operation duties. Following the conception phase, the activity is planned to proceed to the implementation phase starting in early 2021.

SCADA Data (DER less than five MW) - The AESO presently does not receive SCADA data for DER smaller than five MW. Expanding the AESO Control Centre's real time visibility of DER smaller than five MW is being explored with DFOs and, if cost-effective, enabled.

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 DER 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 be obtained via the 2021 LTO stakeholder engagement process.

Forecast of DER gross generation and gross load separately and incorporate hourly variability – In the AESO's current short-term forecast, DER smaller than five MW is forecasted as part of the net load (gross generation minus gross load) forecast. The AESO plans to establish a process to estimate gross load and gross generation of DER less than five MW for solar to understand the impact on the AESO's net load forecast.

Geographical forecast of DER sizes at the POD level – For DER less than five MW, the AESO plans to establish a process to forecast rooftop solar at the point-of-delivery (POD) level for the short-term forecast.

Near-term/real-time forecast to incorporate meteorological data into DER and variable generation - The AESO continues to enhance near/real forecast by incorporating meteorological data into DER smaller than five MW and variable generation.

Enhance AESO forecasting processes and incorporate DFO DER forecast information where appropriate -The AESO plans to continue to engage and share forecasting knowledge with DFOs and, on an annual basis, gather available DER forecasting information in order to enhance AESO’s forecasts.

End-to-end forecasting process review from LTO to real time – The AESO is 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 – 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 – The AESO should stay connected to DFO advancements in real-time DER modelling in order to potentially leverage new DFO capability in the future. Following the conception phase, the AESO plans to enhance current real time DER modelling and determine future real time DER modelling needs.

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 Q4 2020.

Assess feeder impedance to be included into DER models – The AESO plans to update ID #2010-001R to outline the requirement in Q4 2020.

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, the BTF Process and the Connection Process have been enhanced with

inputs from stakeholders. The BTF process and Connection process will be effective on January 1, 2021 when the Amended 2018 ISO Tariff comes into effect.

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 five MW and incorporate DFO SCADA data and static data for DER smaller than five MW.

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 DER are connecting and supplying energy, they may impact the reliability of the AIES. The AESO is exploring appropriate technical interconnection recommendation with input from DFOs and TFOs via the DER Technical Performance Exploration Group (TPEG). Based on feedback received from TPEG in 2020, the AESO plans to publish a series of technical assessment papers to discuss AESO's approach on DER technical recommendations and plans to seek stakeholder's feedback in 2021. Once the approach is finalized, the remainder of 2021 is planned to be focused on implementation of these technical recommendations based on the priority of these DER technical items.

Voltage and frequency ride-through requirement: AESO, DFOs and TFOs are having exploratory discussions relating to frequency and voltage ride-through capability criteria. An assessment paper on the topic is planned to be published to seek stakeholder's feedback.

Under Frequency Load Shedding (UFLS) coordination: The AESO has completed an assessment of current DER impact on Alberta Underfrequency Load Shedding (UFLS) program. An assessment paper is planned to be published for stakeholder awareness.

Transmission Protection and Control coordination: AESO, DFOs and TFOs are having exploratory discussion relating to Transmission Protection and Control coordination with increasing DER. An assessment paper on this topic is planned to be published to seek stakeholder's feedback.

Islanding/Anti-islanding, and Restoration coordination: AESO, DFOs and TFOs are having exploratory discussion relating to Islanding/Anti-island and Restoration coordination. An Anti-Islanding screening and study guideline is planned to be published to seek stakeholder's feedback.

Commissioning and Testing requirement: Once AESO's approach for technical interconnection recommendations are finalized; AESO's approach for commissioning and testing recommendation will be determined with inputs from stakeholders.

Cybersecurity requirements: The AESO and DFOs are having exploratory discussion whether a foundational cybersecurity guideline would be beneficial for transferring DER SCADA data to the AESO.

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 will be in effect on January 1, 2021.

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:

- Rate Demand Transmission Service (DTS) and Rate Supply Transmission Service (STS) are currently determined at the transformer level rather than at the feeder level. This results in a difference in contract capacity and metering levels at DFO contracted load substations that serve Distributed Connected Generation (DCG).
- Potential reduction of Rate DTS load billing due to DER connection, eroding price signal for System Access Service Request (SASR)
- Potential lack of fair treatment between transmission-connected generation versus distribution-connected generation
- Calculation and use of the AESO's substation fraction formula when DER are added to an existing DFO-contracted load substation

Please refer to [Tariff Consultation](#) for more details.