Alberta Electric System Operator
3000, 240 4 Avenue SW
Calgary, AB • T2P 4H4
aeso.ca

AESO Congestion Portal

Methodology

Date: Select Date

Classification: Public

Role	Name	Date	Signature
Prepared			
Reviewed			
Approved			

Contents

1. Introduction

This report documents the methodology used to calculate the congestion statistics published through the Alberta Electric System Operator (AESO) Congestion Portal (the portal).

1.1 The Portal Objectives

The portal provides congestion data and geographic context to support market participants in making informed decisions about the size and location of their connection project:

- Areas with higher congestion are likely to result in a more complex connection request.
- Areas with lower congestion are the favorable locations to consider.

1.2 Portal Disclaimer

The AESO makes no representations, warranties, or guarantees, express or implied as to the accuracy, reliability, completeness, currency, or non-infringement of the map and associated information or that it will be suitable for any use. While the AESO has made every attempt to ensure that the information is timely and accurate, the AESO accepts no responsibility whatsoever for any inaccuracy, error, or omission in the map and associated information. The AESO is not responsible for any losses or costs incurred by you or anyone else as a result of the use, conversion, publication, transmission, installation, or improvements to the portal and associated information, even if such losses or costs are foreseeable.

2. Methodology

This section details the methodology used in the portal.

2.1 Process Overview

The portal approximates the congestion in three main steps:

1. **Conduct a congestion assessment:** The first step is to perform a congestion assessment by using a direct current power flow solver with existing generating units, generating units that have met the AESO's project inclusion criteria[1] as of a certain date, forecasted load, and the network topology with planned transmission system projects.

2. **Model the project:** The second step is to model the hourly production profile of the project.

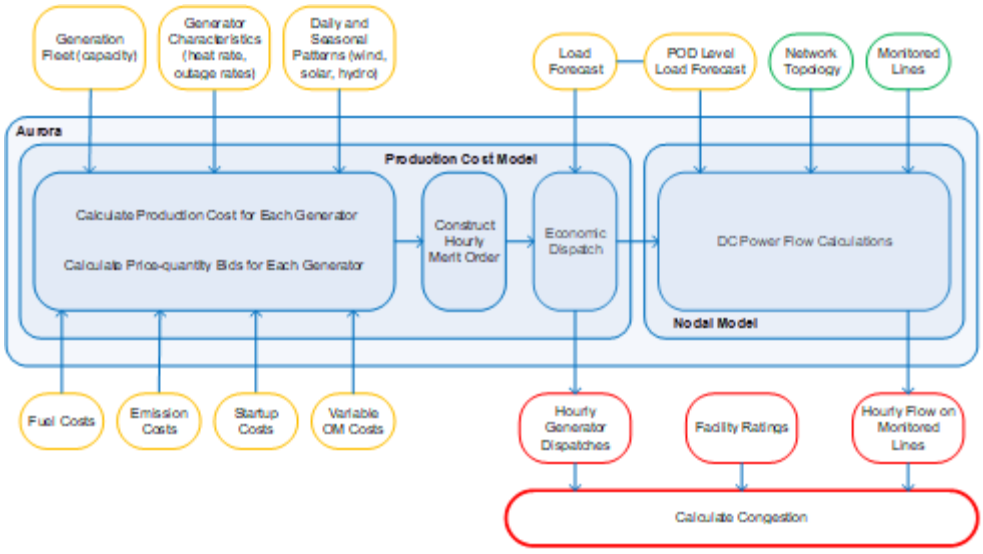
3. **Calculate the congestion statistics:** The third step is to calculate the congestion frequency (%) and congested energy (MWh) for the congested transmission lines.

[1] The definition of project inclusion criteria is available in the Connection Project List Guide on the AESO website.

2.1.1 Conduct a Congestion Assessment

The first step was to perform a congestion assessment. Congestion occurs when the transmission system cannot accommodate all in-merit generation, because the resulting power flows would contravene reliability standards and/or ISO rules.[2] The congestion assessment combines a production cost model with a transmission system network model. The production cost model simulates the hourly energy market economic dispatches required to supply the forecasted hourly demand. Then, the transmission system network model calculates the hourly power flows on each transmission facility that result from the hourly energy market dispatches and demand. Figure 1 illustrates the inputs and processes involved in the congestion assessment.

Figure 1 - Congestion Assessment Process



2.1.2 Model the Project

The second step was to model the hourly production profile of the project. The project's production profile is modelled by scaling the production profile of a generating unit with similar characteristics according to maximum capability.

2.1.3 Calculate the Congestion Statistics

The third step is to calculate congestion. The congestion is calculated by adding the project's hourly production profile to the pre-project transmission flows and calculating the change in flows. The change in flows is calculated using the change in injection at each bus, weighted by their effectiveness factor to each facility.

[2] The reliability standards and ISO rules are available on the AESO website

3. Results

Congestion statistics are calculated based on Category A (N-0) thermal limits under normal system conditions. This assessment does not include Category B (N-1) contingency limits, voltage or transient stability limits, or the effects of remedial action schemes. Voltage and stability criteria are applied to selected transmission corridors to reflect overall system operating limits.

In addition, supply surplus can also impact a generating unit's ability to provide energy to the market. Supply surplus creates an unbalanced supply-demand situation where generation may be curtailed due to excess supply offered to the market rather than transmission constraints.

The results are sensitive to the underlying assumptions and are subject to change. The forecasted congestion may be impacted by the project cancellations or change proposals from other projects.