



Alberta Electric System Operator

3000, 240 4 Avenue SW

Calgary, AB • T2P 4H4

aeso.ca

Lethbridge Transmission Development (P7087)

Load Forecast Appendix

Date: September 15, 2026

Prepared by: Mehdi Salamati

Version: 3

Classification: Public

Contents

1. Study Area	2
2. Historical Load Trend	2
3. Load Forecasting Methodology	2
3.1 Base Load	3
3.2 Load Modifiers.....	3
4. Forecast Results and Validation	3

1. Forecast Scope

This document describes the load forecasts used as an input for the Lethbridge Transmission Development Planning Report (Planning Report). The forecasting area for the Planning Report is AESO Planning Area 54,¹ which represents the Lethbridge planning area and includes 13 substations (Area 54). The Lethbridge Transmission Development project (P7087), referred to in this document as “Project,” is located within Area 54. The Planning Report is focused on load driven concerns so a generation forecast was not necessary.

Area 54 is supplied by a mix of larger and smaller substations. Based on historical coincident peak contributions, the two largest contributors are generally Coalbanks 111S and Coaldale 254S substations. These substations represent the main load centers within Area 54 and have the greatest influence on the aggregate study area load profile.

The remaining substations and load points provide smaller contributions, including some with negligible or near-zero contribution during observed annual peak hours. Overall, Area 54 is generally summer peaking, with annual peak hours typically occurring in July or early August.

2. Historical Load Trend

Historical load in Area 54 has shown moderate growth in annual mean load since 2018, increasing from approximately 139 MW in 2018 to approximately 147 MW in 2025. Annual mean load remained relatively stable between 2018 and 2020, followed by higher average load levels from 2021 onward.

Annual maximum load has been more variable than annual mean load. The annual peak increased from approximately 258 MW in 2018 to approximately 272 MW in 2025, while the highest observed annual maximum occurred in 2024, at approximately 291 MW. This indicates that peak demand is more sensitive to short-term conditions, such as weather and operational factors, than average load. The historical peaks are shown in Table 1.

Monthly load patterns confirm that the Lethbridge area is generally summer peaking, with the highest monthly maximum loads typically occurring in July or August. This suggests that summer weather conditions are an important driver of peak demand and should be considered when developing the area load forecast.

3. Load Forecasting Methodology

The Area 54 load forecast is based on the methodology used for the Reference Case scenario in the 2024 Long-term Outlook (2024 LTO).² The forecast consists of two main components: Base Load and Load Modifiers.

¹ Lethbridge is identified as Area 54 on the AESO transmission planning areas map, accessible at <https://www.aeso.ca/assets/Uploads/Planning-Regions.pdf> for reference.

² The methodology is available in the AESO's 2024 Long-term Outlook Load Forecast Methodology: <https://www.aeso.ca/assets/Uploads/grid/lt/2024/2024-LTO-Load-Forecast-Methodology.pdf>.

3.1 Base Load

The Base Load is developed using an econometric model designed to capture the relationship between electricity load and key socioeconomic, environmental, and calendar-related variables. The model uses a composite economic index reflecting real GDP, employment, and population estimates from the Conference Board of Canada's Provincial Outlook.

Weather is also an important input to the forecast. The model applies representative weather assumptions over the forecast horizon, developed through probabilistic analysis of historical weather data in Alberta. For this forecast, P90 weather was used to reflect more extreme weather conditions that have only a 10% probability of being exceeded. This provides a more conservative estimate of peak demand and helps ensure that the forecast captures higher-load conditions that may occur during unusually hot or cold periods.

3.2 Load Modifiers

Load Modifiers represent emerging load drivers that were not materially present in historical load but are expected to influence future demand. These include electric vehicles, building heating and cooling electrification, energy efficiency, distributed energy resources, and other evolving demand-side factors.

The final forecast is developed by combining the Base Load with the applicable Load Modifiers. Among these modifiers, the electric vehicle (EV) load component is particularly important. The Base Load remains consistent across all scenarios, while the Load Modifiers may vary depending on the underlying assumptions. For example, differences in EV adoption rates and charging profiles can result in different forecast outcomes. In this forecast, which is aligned with the 2024 LTO Reference Case, the EV load modifier assumes a moderate EV adoption rate and a managed charging profile.

4. Forecast Results and Validation

The forecast used for this Project is based on the 2024 LTO. To confirm that no significant changes had occurred since the development of that forecast, the model was re-run using updated inputs, including the latest economic forecast³ and recent load history.

The updated model results were reviewed against the 2024 LTO forecast to confirm that the Project forecast remains reasonable and aligned with current conditions. This validation step helps ensure that the forecast used for the Project remains appropriate for assessing future load requirements in Area 54.

The historical peaks and forecast values, in MW, are shown in Table 1.

³ The economic data were updated using Alberta's five- and 20-year outlooks provided by Q1Signal 49, a third-party economic data provider.

Table 1: Historical and Forecasted Annual Peaks for Area 54

Year	Historical Peak load (MW)	Forecasted Peak load (MW)
2018	258	N/A
2019	244	N/A
2020	257	N/A
2021	285	N/A
2022	263	N/A
2023	286	N/A
2024	291	N/A
2025	272	N/A
2026	N/A	302
2027	N/A	303
2028	N/A	303
2029	N/A	303
2030	N/A	305
2031	N/A	305
2032	N/A	309
2033	N/A	310
2034	N/A	313
2035	N/A	316
2036	N/A	319
2037	N/A	323
2038	N/A	328
2039	N/A	331
2040	N/A	335
2041	N/A	340
2042	N/A	343
2043	N/A	347
2044	N/A	352
2045	N/A	357
2046	N/A	361
2047	N/A	367
2048	N/A	372
2049	N/A	378