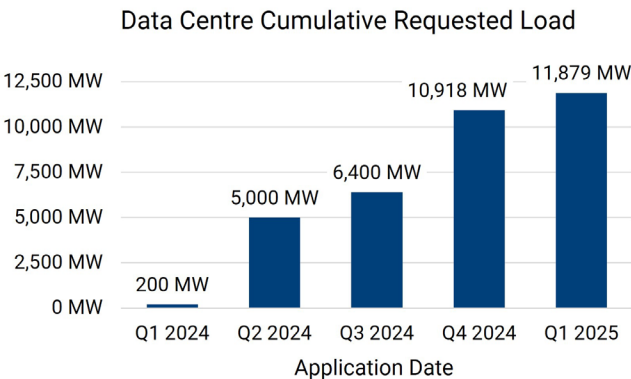


Connecting data centres to Alberta’s electricity grid\* is a rapidly evolving process. Data centres introduce complex technical and operational challenges, and those without generation significantly strain supply. The AESO is committed to action, by advancing projects efficiently while ensuring a safe, reliable, and affordable grid.

## Background on Data Centre Applications in Alberta

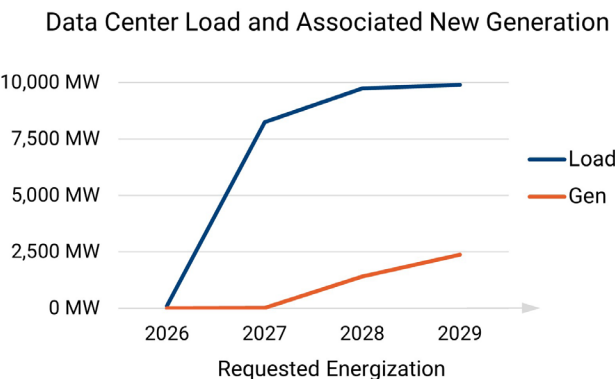
### Requests for connection have surged

The volume and pace of applications drive the need for expedited analysis and changes to existing processes to keep up with demand.



### Load requests are without generation

Data centres are rapidly increasing load with most not contributing sufficient or timely generation, creating grid reliability issues.



### Urban centres are attracting projects

Data centres are clustering in the Edmonton and Calgary regions. Too high a concentration in a single area will cause capacity issues.

Click [here](#) for an interactive data centre map.

Region	Projects	Load
Calgary	8	3,533 MW
Edmonton	6	3,161 MW
Central	4	2,440 MW
Northwest	2	2,200 MW
South	2	500 MW

### Data centres require huge power volumes, both individually and collectively

Connecting projects with loads larger than most cities creates unique operational and technical challenges to grid reliability.

The requested new load is fast approaching Alberta’s peak demand, an amount that the grid cannot immediately serve.

Project Size	Minimum	10 MW	City Load	Calgary	1,800 MW
	Average	540 MW		Edmonton	1,400 MW
	Maximum	1,864 MW		Lethbridge	150 MW



SUMMER 2024  
NEW ALL-TIME  
PEAK DEMAND (MW)  
**12,219**



WINTER 2024  
NEW ALL-TIME  
PEAK DEMAND (MW)  
**12,384**

## Data Centres and the AESO Mandate

*The AESO is responsible for the safe, reliable, and economic planning and operation of the Alberta Interconnected Electric System. The integration of data centres presents challenges to two key mandates:*

### A Safe and Reliable Grid

Ensuring data centres can be connected while maintaining grid reliability for **all** loads in Alberta.

### An Affordable Grid

Ensuring system enhancements occur in a responsible and economically efficient manner.

## Data Centre Challenges for the AESO to Overcome

### Safe and Reliable Grid



#### Load Reliability

The grid simply cannot serve all load requests without new generation; connecting too much load causes load shed.



#### Grid Stability

Sudden load ramping, load variability, and high reactive power demand cause grid instability, impacting reliability.



#### Operating Concerns

Frequency and voltage ride-through deficiencies cause disturbances on the grid.



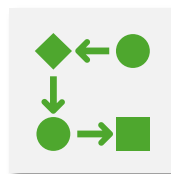
#### Power Quality

Data centre operations cause harmonics and flicker that affect grid performance.



#### Study Requirements

Data centres require advanced technical studies but are difficult to model accurately.



#### System Planning

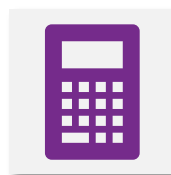
Project speed outpaces the planning process and causes transmission constraints.

### Affordable Grid



#### Transmission Build

Data centre connections must be balanced with increased transmission costs.



#### ISO Tariff

Tariff rates and provisions must ensure data centres pay their fair share.

## The Path Forward

*The AESO will provide data centres with a reasonable opportunity to connect to the grid in a fair, efficient, and openly competitive manner.*

### Immediate



### Balancing reliability with timely project progression

April 2025



#### »» Taking a new technology into consideration

Data centres present novel technical and operating challenges. The AESO requires specific information that differs from that of a typical load to effectively respond to a request for system access service.

The AESO has created a list of additional facility and operating details that will be required as the project progresses through Stage 3 of the Connection Process.

This list will be posted to the AESO website in April 2025, and refined as work progresses on the development of technical requirements.

May 2025



#### »» Responding to a new challenge to grid reliability

The volume of data centre requests strains supply. The AESO must ensure that load can be safely and reliably served, for existing customers, near-term forecasted load growth, and requested large loads.

The Connection Process has not previously included an assessment of reliability related to the risk of load shed. Analysis is ongoing to determine the amount of load that can be reliably served with available and planned supply. This will impact the connection alternatives offered to the numerous large load requests.

The AESO will communicate to the industry:

- The amount (MW) of new large loads that can be reliably served in the immediate term
- The methodology to assign that load amount to the data centres currently requesting system access
- Any Connection Process updates required to enable the assignment methodology

These details will be published on the AESO website in May 2025, followed by an information session in mid Q2. Required process changes will apply to all projects, immediately following the information session.



## Near-Term

Q2 2025

## Enhancements to Processes & Technical Requirements

### »»» Ensuring projects are set up to progress successfully

The AESO will issue functional specifications with preliminary sections for mitigating reliability and power quality issues, while specific requirements are being developed. This includes sections for mitigation of:

- Voltage and frequency ride-through
- Load ramping and variability
- Harmonics

The Connection Process will be updated with these details in May 2025.

To provide locational signals to developers, the AESO will publish a Load Capability Map on the AESO website by mid Q2 2025.

Q4 2025

### »»» Developing requirements in parallel with industry

Electricity regulatory agencies have identified the need for new requirements for large loads, including data centres. The AESO is a member of the NERC Large Loads Task Force, which is developing industry standards for these types of interconnections. Recommendations will be published in Q4 2025.

To avoid delays, the AESO is developing advanced study parameters and facility mitigation measures in parallel, to be applied to in-flight projects when ready, and aligned with the NERC recommendations when available.

## Long-Term

2025 - 2027

## Creating a Sustainable Framework for Large Loads

### »»» Implementing a forward-looking vision

The AESO will establish an enhanced long-term framework for connecting large loads in alignment with government policy. This includes new processes and authoritative components such as:

- Adoption of NERC Large Load Standards, including the development of new or updated ISO rules as required
- Rate or provision changes for large loads explored and identified through the ongoing ISO Tariff Redesign engagement
- Future Long-Term Transmission Plans taking large loads into account as part of optimized transmission planning for the grid
- Connection Process changes as needed to implement the above

*Integrating data centres into Alberta's grid is a complex task. We will advance projects quickly, ensuring safety, reliability, and affordability. Together, let's build a strong and resilient power system supporting technology innovation.*