



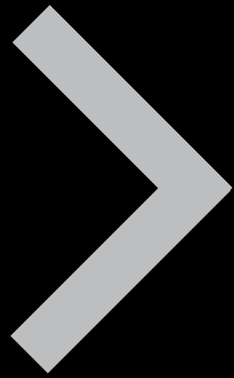
→ **How Energy Efficiency and Electrification can work together to benefit Utilities, Cities, and Provinces**

AEEA Energy Efficiency Virtual Summit 2021

**Joshua Ulliac
Senior Associate**



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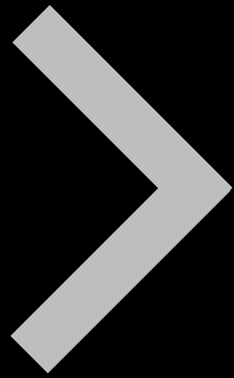


- Electrification is the process of replacing existing energy sources with electricity (e.g., electric motor & internal combustion vehicle)
- Electrification of end-user equipment and facilities simplifies end use energy procurement.
- Technology and application dependent.
- Important to understand end-use needs



→ Understanding Electrification

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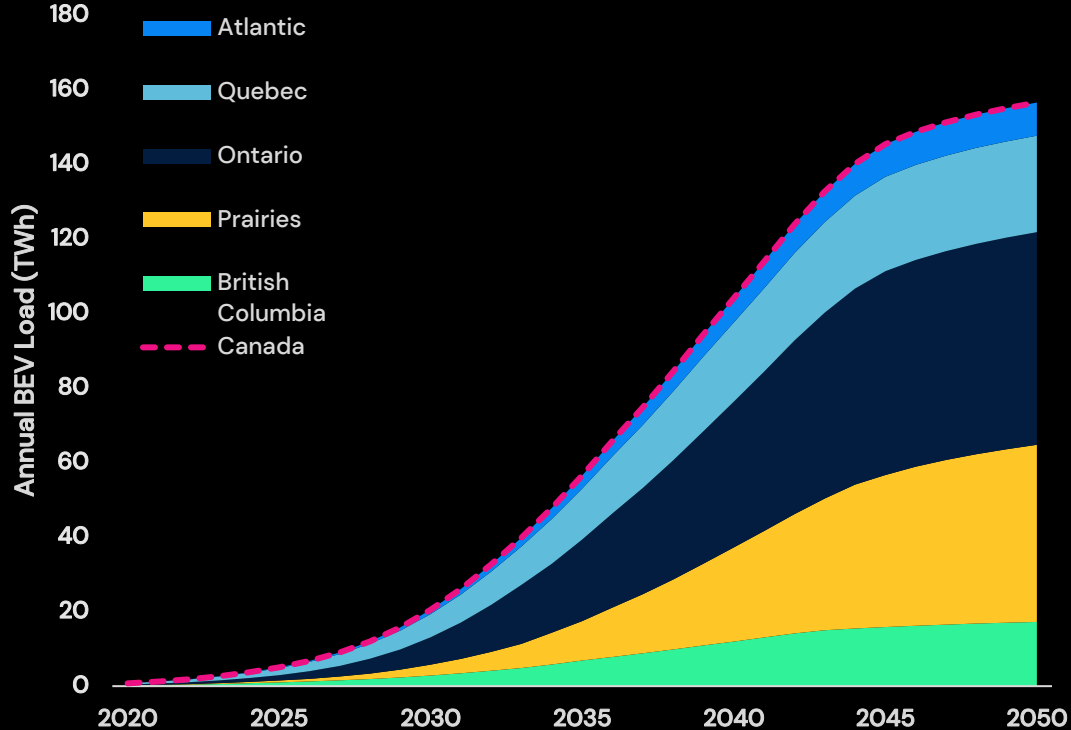


- Decreased maintenance and operating costs
- Decreased energy costs
- Increased pressure to target end-use emissions from existing technologies.
- Decreasing grid emissions can lead to net GHG reductions
- Electrification is major growth opportunity for utilities

→ **What makes Beneficial Electrification?**



Why is the Electrification of transportation important to utilities?



100%

The Government of Canada’s Target for new light duty vehicle (LDV) sales to be electric by 2040.

In alignment with trend in Europe, China, and California.

563 TWh

Current Canadian electrical grid demand.

3%

The annual geometric growth rate required by electrical utility operators to meet EV energy demands.

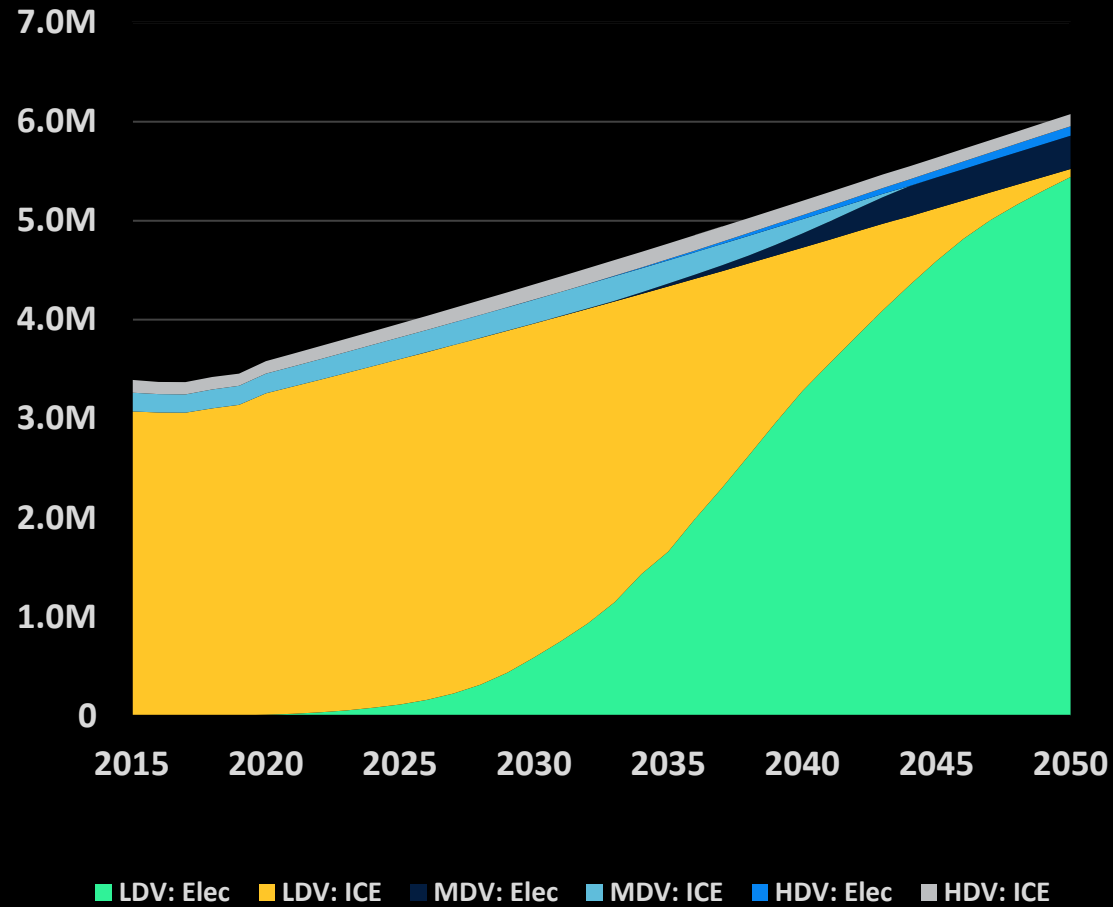
NERC forecast annual growth at 0.7% per year.

157 TWh

Canadian EV energy demand by 2050. Accounts for 22.6% of the Canadian Electrical grid by 2050.

➔ The Electrification of Transportation: Canada’s 2040 Target

A closer look at Alberta.



5.87 M

Estimated ZEV fleet
 Large MDV and HDV fleet in Alberta (431,000).
 Slower adoption than LDV, with assumed 50% HFCEV for HDV.

33 TWh

Alberta EV energy demand by 2050.
 Accounts for 30.8% of the Albertan Electrical grid by 2050.

3.8%

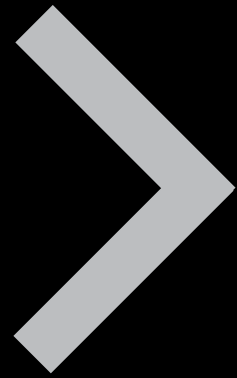
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➔ **The Electrification of Transportation: Canada's 2040 Target**



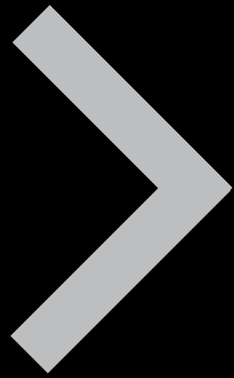
How can Electrification Work with
Energy Efficiency?



- Electrification can greatly reduce energy usage
 - Irrigation pumps
 - Non-road vehicles
 - Heat pumps (geo and air source)
 - Industrial processes electrification
- Strategic planning & the integration of electrification and energy efficiency programs
 - Incentive or technical assistance programs

→ Energy Efficiency & Electrification

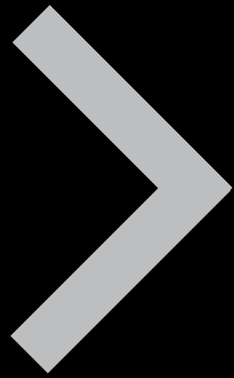




- Manage rate in growth for electrical demand
- Demand side management (DSM) can target system bottlenecks
- Electrification targets areas with decreased demand
- Can model lessons for electrification off lessons from EE
 - Smart vs Programmable thermostats
 - Variable rate structures
 - Dynamic device control

→ Energy Efficiency & Electrification



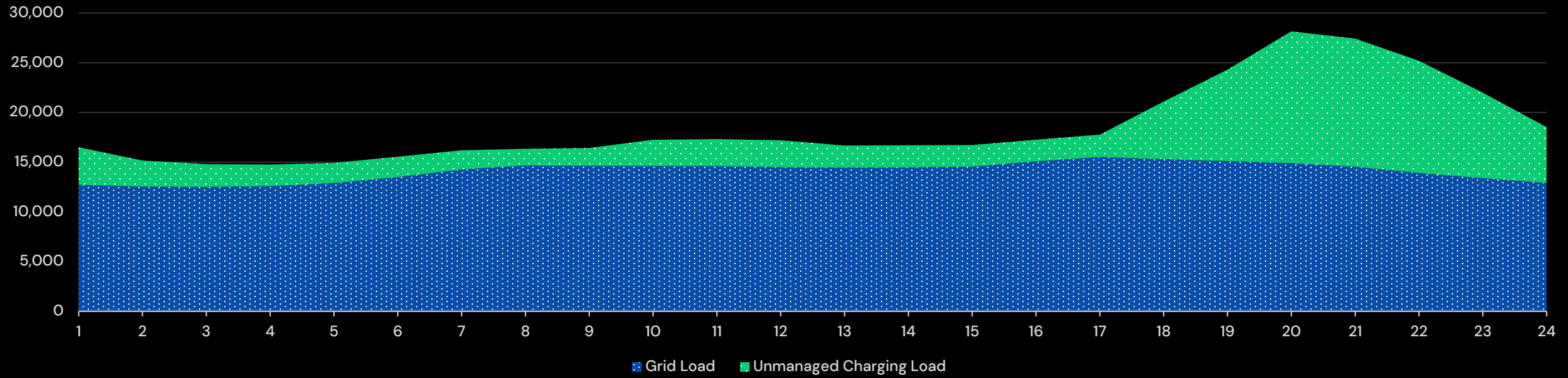


- Electric vehicle charging is manageable load
- Can help meet grid excess production or curtail during high-demand periods
- Managed charging can help maximize asset utilization
- Minimize future infrastructure upgrades

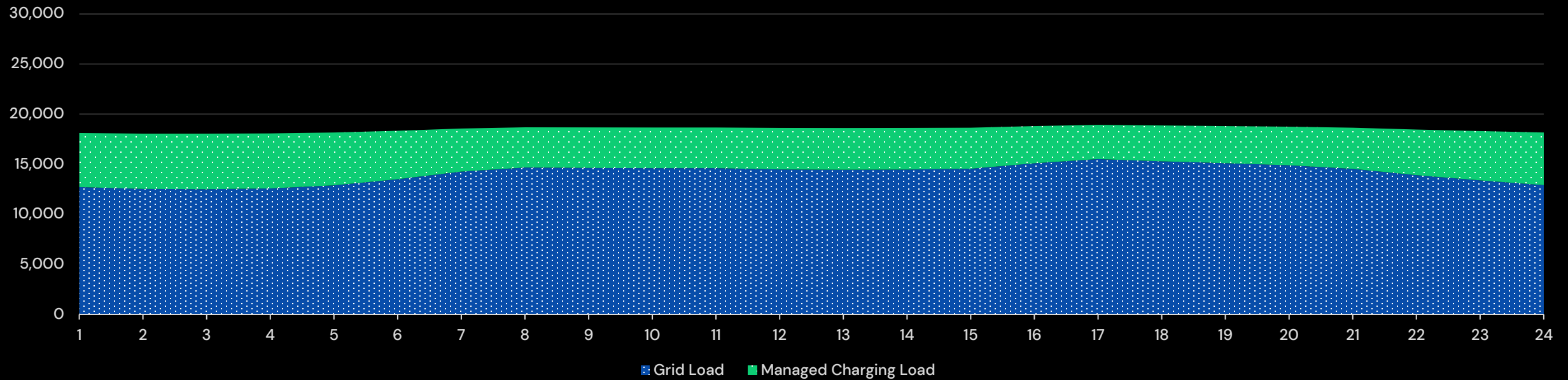
→ **Energy Efficiency – EV Charging**



Unmanaged Power System Load Curve for Alberta 2050

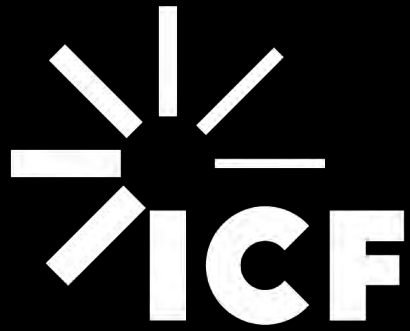


Managed Power System Load Curve for Alberta 2050



→ Thank you.





Get in touch with us:
Joshua Ulliac

Senior Associate
587-997-4271
joshua.ulliac@icf.com

icf.com

 [linkedin.com/company/icf-international/](https://www.linkedin.com/company/icf-international/)

 twitter.com/icf

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