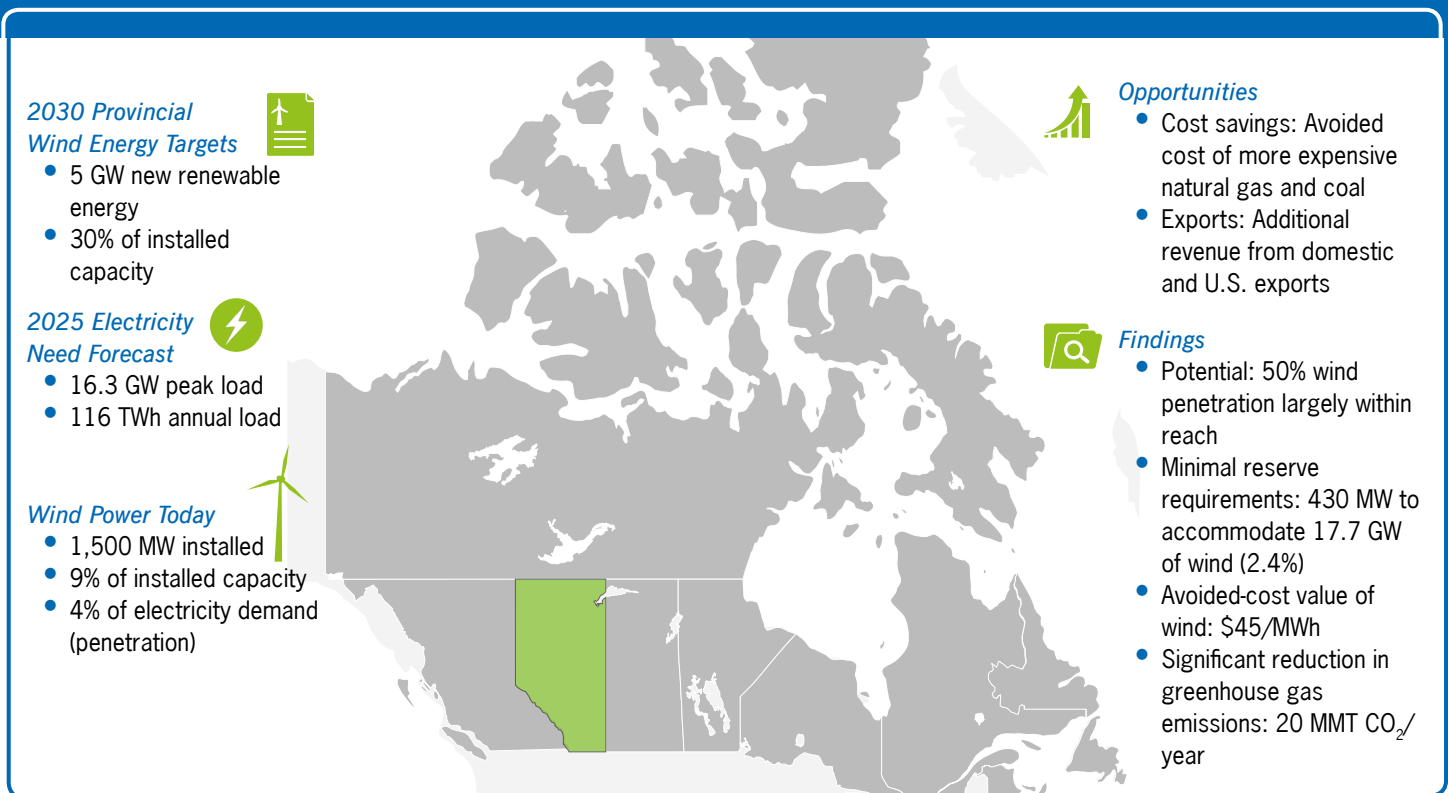


ALBERTA

KEY PAN-CANADIAN WIND INTEGRATION STUDY FINDINGS



Wind Opportunity

Alberta is the birthplace of modern wind energy in Canada. Wind energy is providing some of the lowest priced electricity in Alberta's market – electricity that is clean, renewable, reduces air emissions, and helps to diversify Alberta's electricity supply mix. However, despite nearly two decades of development, the province has only scratched the surface of its wind energy potential. Alberta has indeed an excellent wind energy resource. As one of the most affordable sources of new electricity, Alberta's wind energy is set to play a major role in helping the province transition from a fossil-fuel-based electrical system.

PCWIS Research

The Pan-Canadian Wind Integration Study (PCWIS) assessed the implications of integrating large amounts of wind in the Canadian electrical system. While the benefits of wind energy are widely known, this nearly three-year-long project helps ensure that the benefits of wind energy are most efficiently realized. During the project, the Canada and U.S. power grids were modelled to represent the year 2025.

Currently, coal and gas (85%) dominate Alberta's installed electricity generation capacity, complemented by wind (9%) and hydro (5%).

“Alberta has an excellent wind resource, which would allow the province to surpass its current targets and reach an outstanding wind penetration rate of 50%.”



The 2025 load forecasts (NERC 2013) for Alberta predict 116.2 TWh with a peak at 16.3 GW, which coincides with the province’s peak wind resource.

The PCWIS simulated individual utility-scale wind power plants for total installed capacities ranging from 1,400 MW (5% Business As Usual (BAU) scenario) up to 17,700 MW (35% Targeted Wind Locations (TRGT) scenario) representing 50% of the province’s electricity demand by 2025. Transmission capacity was added to increase the province’s interface capacity with British Columbia and Montana opening export revenue opportunities.

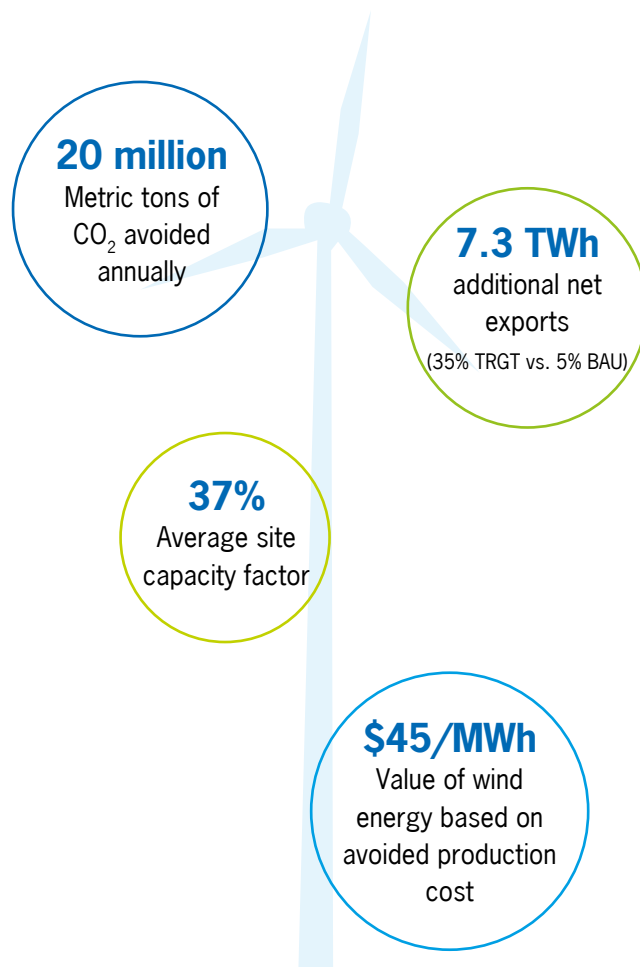
Findings: Wind is Part of the Solution

- Alberta can accommodate up to 17,700 MW of wind (50% of electricity demand) by 2025 far exceeding the province’s target.
- The province’s wind resource is excellent and shows capacity factors* (wind potential) above 37% for the sites considered in the PCWIS.
- The capacity value* (load serving potential) of wind under the 20% Concentrated Wind Locations (CONC) scenario is 9%.
- The additional regulation reserves required to accommodate 17,700 MW of wind are as low as 430 MW, or 2.4%.
- Wind energy has a value (avoided cost) of about \$45/MWh in the 35% TRGT scenario when compared to the 5% BAU scenario.
- Under the 35% TRGT scenario, additional transmission capacity with British Columbia (300 MW) and Montana (235 MW) provides export opportunities to the province, with a simple payback period of a few years.
- Net exports, compared to the 5% BAU scenario, could increase by 3.6-7.3 TWh annually, resulting in tens of millions of dollars of additional revenue for the province.
- High wind penetration allows significant CO₂ emission reductions. Under the 35% TRGT scenario, more than 20 million metric tons of CO₂ are avoided annually in the province.

*Capacity value and wind capacity factor are defined in Section 10 of the full report.

Next Steps

To decarbonize the economy, Canada, the provinces, and countries around the globe are taking steps to produce much more clean energy and use that clean electricity to power sectors that currently run on fossil fuels, like transportation, industry, and how we heat and power our homes and businesses. The PCWIS provides a tremendous amount of information that informs decision-making about the economic and technical implications of increasing the share of wind energy, and paves the path toward Alberta’s 2030 targets.



Download the Report Summary (Section 1 of the full report) at www.canwea.ca (Wind Markets/Wind Integration)