PEMBINA institute

REPORT HIGHLIGHTS

Zeroing In

Pathways to an affordable net-zero grid in Alberta

Photo: Pembina Institute

Alberta is at an inflection point in the evolution of its electricity grid: decisions made today will dictate the configuration and affordability of its grid for decades to come. And, in the global low-carbon economy, a decarbonized grid is key to unlocking economic opportunities.

The latest analysis from the Pembina Institute finds decarbonizing Alberta's grid reduces energy costs and allows Alberta to become a net exporter of clean electricity. *Zeroing In: Pathways to an affordable net-zero grid in Alberta* develops six potential scenarios demonstrating how Alberta can decarbonize its grid by 2035 in a cost-effective and reliable manner.

Our research shows that significant decarbonization can be achieved between 2022 and 2035 and would be $28 billion cheaper than predicted in the Alberta Electric System Operator's (AESO) Net-Zero Emissions Pathways and also $22 billion cheaper than the non-net-zero reference case forecast in the AESO's 2021 Long-term Outlook (LTO) (Figure 1). A decarbonized grid would also help save Albertans hundreds of dollars per household in annual electricity costs, as wind and solar would lower the price of power and protect consumers from the volatility of global fossil fuel prices.

Alberta has a clean energy advantage, with an abundance of renewable resources readily available for electricity generation. Non-emitting generation, especially wind and solar, are the largest sources of electricity supply in all six of our scenarios (Figure 2). By 2035, wind, solar and existing hydroelectric could supply 45-58% of the

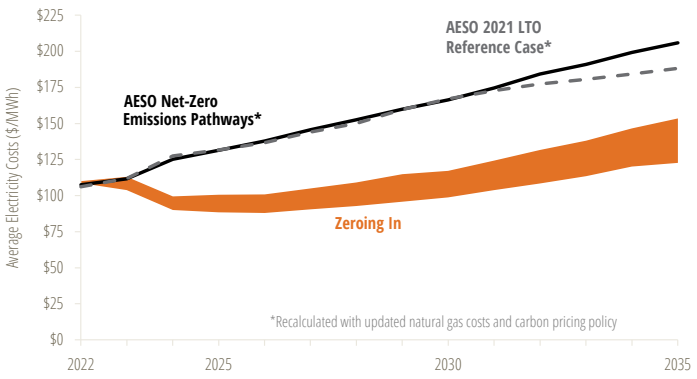

Figure 1. Comparison of modelled annual electricity system costs with previous AESO analyses

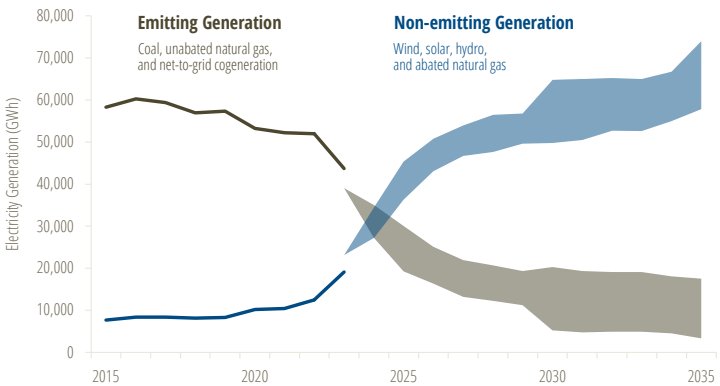

Figure 2. Historical electricity generation (2015-2023) with modelled range to 2035

province's electricity demand. During this time, Alberta would increase its wind and solar fleet by three to five times their current combined installed capacity, creating significant opportunities for employment in the clean energy sector.

Alberta is already seeing rapid decarbonization of its electricity grid faster than anyone has predicted. It is completing its 2030 coal phase-out by the end of this year —six years ahead of schedule — while also becoming the renewable energy capital of Canada, with billions of dollars flowing into new wind and solar projects. More than three-quarters of solar and wind generation capacity built in Canada last year was in Alberta. This underscores the unique economic opportunity for Alberta in growing its energy exports and leading the nation on wind and solar development.

All our scenarios show Alberta — which historically and currently imports more electricity than it exports — as a net exporter of electricity by 2025 (Figure 3). We find that electricity exports soar with growth of renewables and increasing provincial export capacity, achieved through expansion of transmission connections to other jurisdictions (interties). With many countries, including Canada and the U.S., making commitments to achieve net-zero or clean grids by 2035, it is critical that Alberta commit to achieving a net-zero grid by 2035. This, in combination with establishing regulatory requirements or market policies, initiatives and supports, is needed to provide policy certainty to generators, attract investments to Alberta, and enable the lowest-cost outcomes for ratepayers.

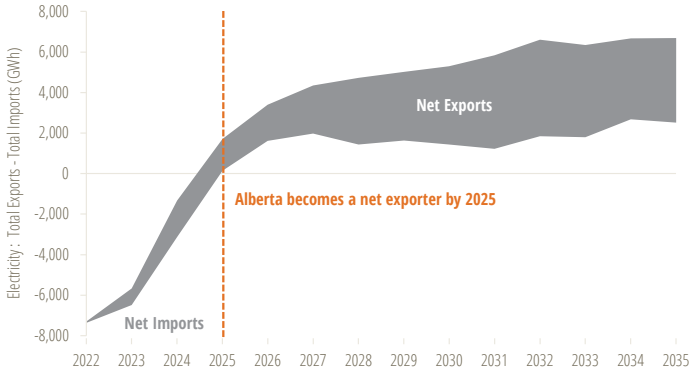

Figure 3. Modelled range of net electricity exports, 2022-2035

The path forward

In order to leverage Alberta's renewable energy advantage and to advance an affordable, reliable and clean electricity grid, we recommend:

- Alberta commit to a provincial net-zero grid by 2035 and develop a made-in-Alberta plan to achieve it.
- Alberta and the federal government support and remove barriers to the rapid and responsible deployment of low-cost proven technologies such as renewables, battery energy storage, and energy efficiency; and help de-risk urgent strategic investments in carbon capture and longer-term energy storage.
- Alberta and the federal government put effective measures in place to decarbonize industrial cogeneration.
- Provincial (and U.S. state) governments collaborate on expanding interties, and the federal government provide financial support to enable these large inter-jurisdictional projects to proceed.
- The federal government develop and implement a robust Clean Electricity Regulation (CER) and enhance industrial carbon pricing.
- Federal and provincial governments work with industry and stakeholders to ensure equitable opportunity for economic development and employment in the clean economy.

Read our full report, *Zeroing In: Pathways to an affordable net-zero grid in Alberta*

PEMBINA institute

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June 2023

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