

## ADVANCING CANADA'S DECARBONIZATION EFFORTS THROUGH INNOVATIVE TECHNOLOGY

Submitted by | **SIEMENS ENERGY**

**Summary:** Siemens Energy is committed to decarbonizing the energy sector worldwide and is proud to support Canada's decarbonization efforts by supplying its innovative gas turbine technology and long-term services for the 900 MW Cascade Power Plant. The project, located in Edson, Alberta, is projected to reduce Alberta's carbon emissions from energy production by up to five percent once operational by switching from coal to natural gas. The project is expected to result in one of the largest emissions reduction opportunities in the country's electricity sector. This is significant as Alberta contributes more than 50 percent of Canada's greenhouse gas emissions. Decarbonization and energy efficiency go hand-in-hand and the Cascade Power Plant is designed to produce highly efficient electricity that will supply approximately eight percent of the province's average electricity demand.



The roadmap to lowering Canadian carbon emissions is a combination of efforts by both private and public sector players as well as end users. No single solution will answer the question of how to limit global temperature increases, but significant decarbonization of power generation is a step in the right direction.



Upgrading technologies to more efficient methods of power generation is one such decarbonization effort happening in regions around the world, including right here at home in the province of Alberta.

### FROM COAL TO CO<sub>2</sub> REDUCTIONS

In 2014, 55 percent of Alberta's total electricity was produced from 18 coal-fired generators.<sup>1</sup> Currently responsible for more than half of Canada's total greenhouse gas (GHG) emissions, the province has set a goal of phasing out all coal-fired power by 2030.

According to the World Energy Council, "Significantly fewer emissions are produced when burning natural gas (50 g CO<sub>2</sub>/MJth) than coal (100 g CO<sub>2</sub>/MJth)."<sup>2</sup>

In a move to capitalize on these lower GHG emissions from natural gas, the company Kineticor Resource Corp. is leading the way in the construction of a 900 MW Cascade Power Plant southwest of Edson, Alberta.

A reliable energy supply is important in enabling strong economic growth, and this combined cycle power generation facility is designed to produce low emissions—while also delivering highly efficient electricity expected to supply over eight percent of the province's average electricity demand.

Once operational, this innovative power plant will reduce Alberta's carbon emissions from energy production by up to five percent.

"The Cascade Power Plant project will benefit Alberta by not only substantially reducing emissions, but also by providing jobs and other

economic benefits to the region,” said Jochen Eickholt, Member of the Executive Board of Siemens Energy.

This 52-hectare site ideally located near gas production facilities was given the go-ahead in August 2020 and is expected to create 600 peak jobs and 25 long-term positions.

## THE NEED FOR HIGH-EFFICIENCY TURBINES

A leader in clean power projects, Kinetikor develops, owns, and operates power generation facilities across North America that deliver reliable energy, providing environmental and economic benefits to communities and stakeholders.

Kinetikor’s portfolio includes over 1,000 MW of power generation facilities in various stages of operation and development, including Alberta’s 32 MW Pipestone Power Project.

The Cascade facility will use modern, highly efficient industrial turbines in a single shaft configuration fueled by natural gas to generate 900 MW of power.

Siemens Energy will provide two highly efficient SGT6-8000H gas turbines in single shaft combined cycle configuration, steam turbines and heat recovery steam generators as well as long-term services. Delivery of the equipment will begin in December 2021 with installation and commissioning expected to be completed in the fall of 2023.

Natural gas combined cycle power generation is a high-efficiency form of power which uses both gas and steam technology. The combination of these two sources means that up to 50 percent more power can be generated from the same amount of fuel used in a traditional simple cycle configuration.

In a combined system, heat generated by the gas turbine can be recovered rather than wasted—

and then converted in a Heat Recovery Steam Generator into high-pressure steam used by the steam turbine. Getting additional power while using the same quantity of fuel not only saves costs for the facility operator, but also contributes to lowered GHG emissions because of increased fuel efficiency.

## INTEGRATION INTO ALBERTA’S ENERGY MIX

Designed for short start-up times, the SGT6-8000H can turn on and off quickly—a feature that supports Alberta’s renewable energy projects.

This type of quick-ramping technology means that variable generation resources like wind or solar power—those dependent on environmental conditions or time of day—can be better integrated into the power grid.

Rather than risking over generation when mid-day solar production is at its peak, for example, the Cascade plant will be able to shut down quickly—and then start up once renewable generation has decreased.

And with more than 70,000 MWh of annual solar generation<sup>3</sup> and a wind energy installed capacity of 1,685 MW in the province,<sup>4</sup> this integration is critical to meeting Alberta’s decarbonization goals and grid stability.

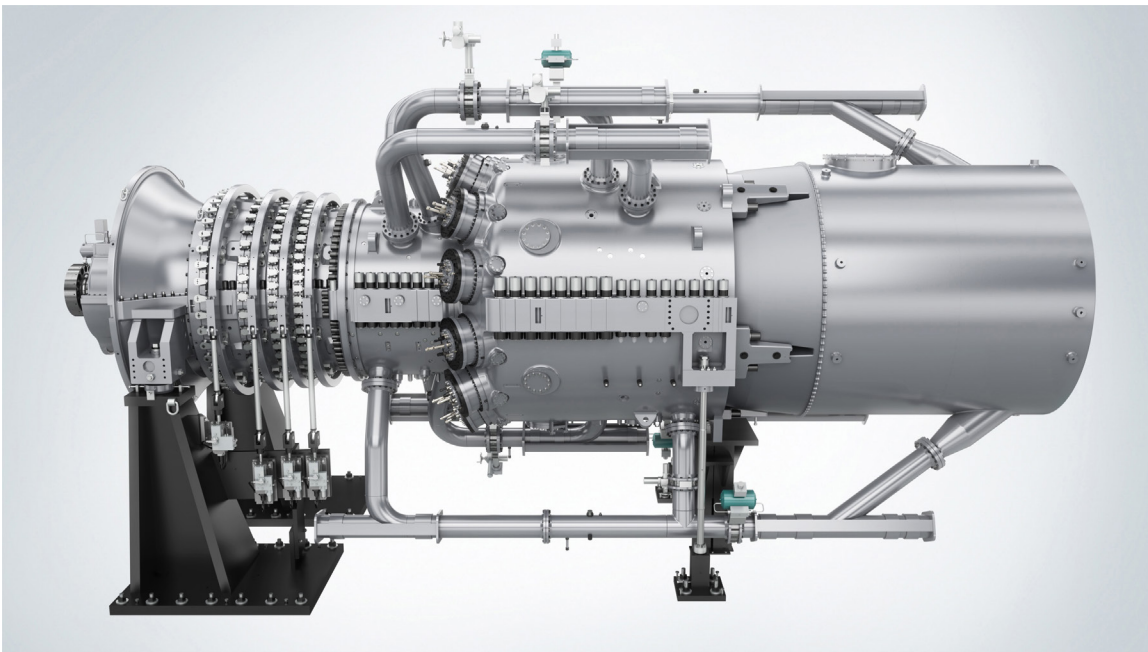
## PARTNERS IN DECARBONIZING CANADA

Siemens Energy’s focus on innovation contributes to lowering Canada’s emissions in several important areas. Efficiency increases are found in leveraging new technologies in many areas, including gas turbines and plant performance optimization. Fuel shifts and a push for hybridization contribute to decarbonization throughout the fuel lifecycle, from pipelines and storage all the way to next generation grid access.

Siemens Energy offers all core technologies for a long-term CO<sub>2</sub>-free energy supply: from power and heat generation by renewable energies or gas-fired power plants, to power transmission and distribution, to efficient electrolysis for hydrogen production.

change, protect the environment, and grow the economy. Making the clean energy transition will not only cut pollution, but it will also protect our air, our water, and our health.”<sup>5</sup>

Similarly, the efficient gas turbines to be installed at the Cascade Power Plant will deliver substantial



“Siemens Energy gas turbine technology is among the most efficient and powerful gas turbines in commercial operation and we are proud to be a part of the Cascade Power Plant project that will greatly impact Alberta’s economy and energy supply.” said Arne Wohlschlegel, CEO of Siemens Energy Canada.

### PHASING OUT COAL; PHASING IN A BETTER FUTURE

Former Minister of Environment and Climate Change Catherine McKenna described the wide-reaching benefits that a shift away from coal will deliver to Canadians: “Phasing out coal is an important part of our plan to tackle climate

CO<sub>2</sub> emissions savings while also guaranteeing a reliable power supply and flexibility in renewable technology integration.

The long-term benefits of implementing new technologies are evident, not only to the energy system through increases in energy efficiency, performance and reliability, but to the well-being of Albertans as well with the significant health and environmental benefits associated with reducing carbon emissions. Through innovative projects such as the Cascade Power Plant, a brighter, healthier road forward is being mapped out for Alberta.

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- <sup>1</sup> “Phase-out of coal-fired emissions in Alberta”, Alberta.ca (2016). Available: <https://open.alberta.ca/dataset/9cc07f29-ae3-4c09-b13f-a7e22b59fef1/resource/3a1ec661-0375-4b7b-9e52-be043e6c269f/download/2016-03-fs-coal-phase-out.pdf>.
  - <sup>2</sup> World Energy Council, “Pathways to Climate Neutrality”, Siemens.com (2020). Available: <https://assets.siemens-energy.com/siemens/assets/api/uuid:b0e63543-9d1b-445f-b751-83966ee696ae/02026-dnk-efd-schwerpunkt-e.pdf>.
  - <sup>3</sup> Solar Alberta (2020). Available: <https://solaralberta.ca>.
  - <sup>4</sup> Canadian Wind Energy Association (2019). Available: <https://canwea.ca/wind-energy/alberta>.
  - <sup>5</sup> Canada’s coal power phase-out reaches another milestone”, Canada.ca (2018). Available: <https://www.canada.ca/en/environment-climate-change/news/2018/12/canadas-coal-power-phase-out-reaches-another-milestone.html>.

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