

Repowering Genesee 1 & Genesee 2



Located west of Edmonton near Warburg, AB, the Genesee Generating Station provides over 1,300 MW (gross) of baseload generation.

Project Background

Capital Power is committed to creating dependable, cost-effective and innovative electricity solutions to power a sustainable future. We're taking steps to transition the way we generate power by growing our fleet of renewables (wind, solar), expanding the use of natural gas and deploying world-leading carbon conversion technology.

The Genesee Generating Station is a vital facility for delivering competitive, reliable and responsible baseload power for the future. Our Genesee operations continue to evolve as part of our commitment to economic and environmental sustainability.

Capital Power is seeking regulatory approval to repower Genesee Units 1 and 2 to natural gas combined cycle (NGCC) units as a longer-term option for baseload power generation. The repowered assets will utilize best in class NGCC technology, setting a new standard for gas generation efficiency in the province.

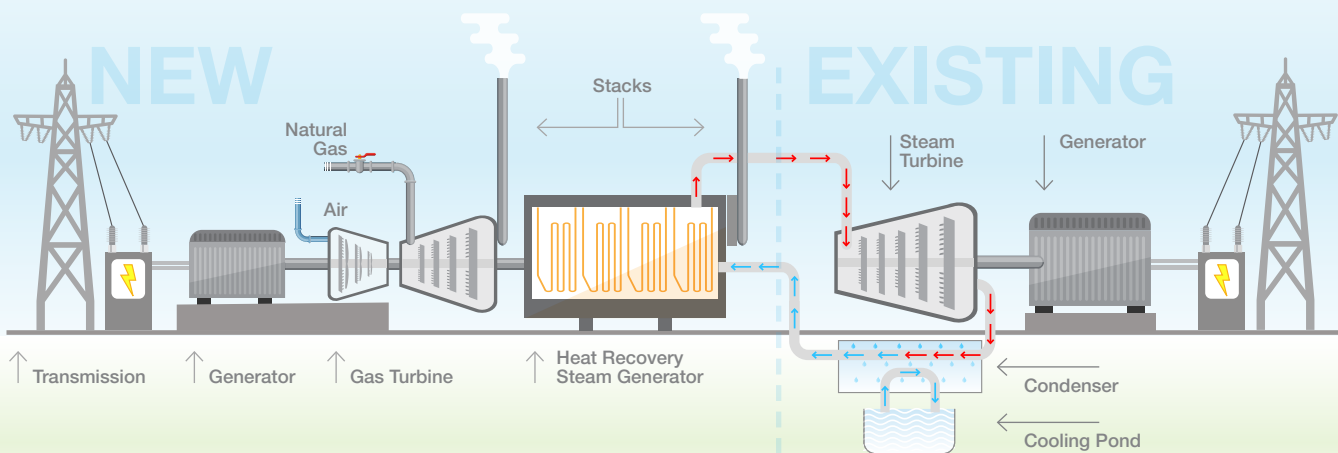
We're leading the way toward a low-carbon future by investing in world-leading efficiency and emissions reduction technologies at our Genesee Generating Station to provide responsible energy for tomorrow.

Project Overview

The units are repowered by installing a new gas-fired combustion turbine and a heat recovery steam generator, while reusing the existing steam turbine generator. The existing boiler and coal equipment will no longer be operated.

A high-level schematic of the repowered unit is shown below.

Genesee Unit 1 and 2 Natural Gas Combined Cycle Configuration



New equipment to be installed and integrated for each of Genesee Units 1 and 2:

- Combustion Turbine Generator with stack (approx. 61 metres or 200ft)
- Heat Recovery Steam Generator (HRSG) with stack (approx. 61 metres or 200ft)
- High Energy Piping
- Selective Catalytic Reduction (SCR) for NO_x control
- Fuel Gas System to connect to existing natural gas supply
- Power transmission and distribution system for the Combustion Turbine
- Other related equipment

Existing Genesee Units 1 and 2 equipment to be reused:

- Steam Turbine Generator
- Condenser
- Circulating Water System
- Compressed Air System
- Water treatment plant and make-up water system
- Power Transmission and Distribution System for the Steam Turbine
- Other related equipment

Generation Capacity

Each of the two repowered units will increase its gross generation capacity from 430 megawatts (MW) to a gross generation capacity potential of 732 MW. The internal power requirement of each repowered unit is 16 MWs, bringing the total net generation potential capacity to 716 MW from each unit. The work proposed for this project will occur within the existing footprint of the Genesee Generating Station.

Air Emissions

There are significant environmental benefits associated with the project including emissions reductions associated with coal-fired power generation, which include carbon dioxide (CO₂), sulfur dioxide (SO₂), nitrogen oxide (NO_x), particulate and mercury emissions. In addition to benefits related to air emissions reductions, the carbon emissions intensity of using natural gas as a fuel source will decrease CO₂ by approximately 60% when compared to emissions when the units are running on coal. After repowering and taking into account the higher generation capacity of the repowered units, the overall emissions will be significantly less.

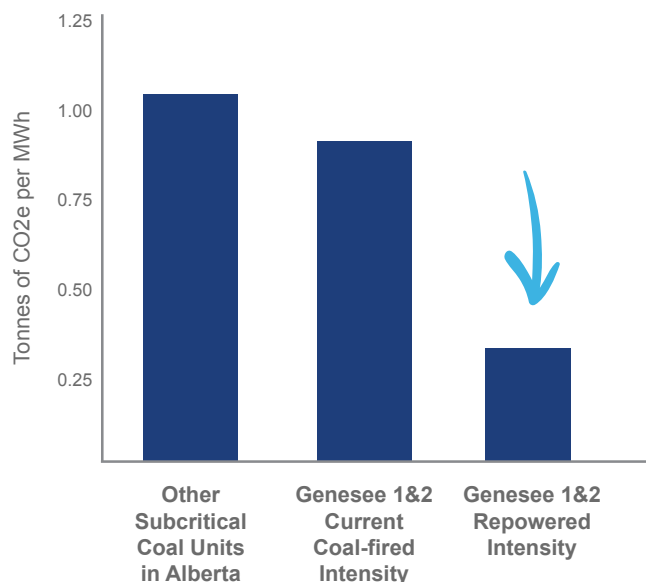
Water Use

The existing cooling system will continue to be used. The system draws water from the North Saskatchewan River and recycles it through the cooling pond. Even when taking into account the higher generation capacity of the repowered units, the use of NGCC technology will mean water usage is reduced by as much as half compared to our current operations.

Natural Gas Supply

The recently commissioned ATCO Pipeline that was built for the Dual Fuel project will supply natural gas for the repowering project. This 59 km pipeline is designed to carry enough capacity to fuel all three units at Genesee with natural gas and no additional gas supply infrastructure will be required for the repowering project.

Decreasing Carbon Emissions



Carbon emissions intensity of the units will decrease by 60% from approximately 0.93 tonnes of CO₂e per MWh under today's operations when burning coal, to 0.36 tonnes CO₂e per MWh after the repowering project is complete.

Genesee Dual Fuel Capacity

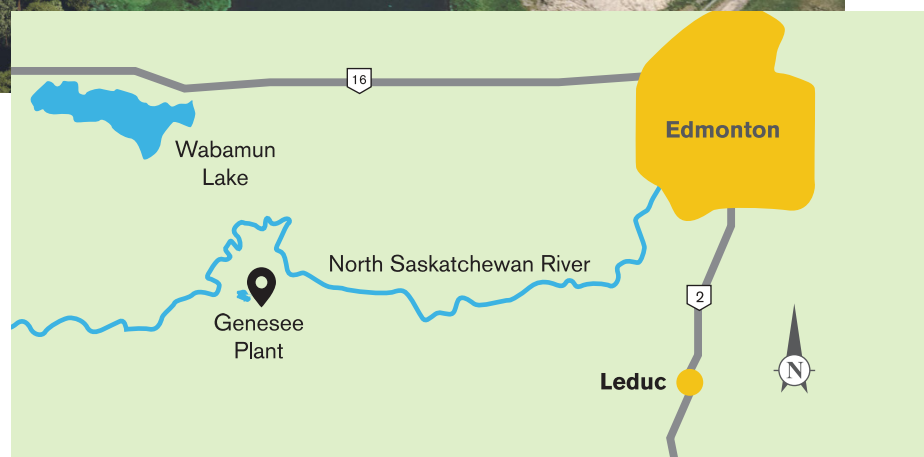
Capital Power has received approval from the Alberta Utilities Commission (AUC) for the Genesee Dual Fuel project, which would allow Capital Power to maximize the flexibility of the three units at Genesee to use both natural gas and coal as fuel for power generation. Capital Power expects the technical work for the dual fuel capability to be undertaken in 2021 on Genesee Units 2 and 3. Based on a successful outcome of the regulatory process for the NGCC repowering project, Genesee 1 would move directly to becoming a dedicated NGCC unit by 2023; Genesee Unit 2 would become a dedicated NGCC unit by 2024. There are currently no plans to repower Genesee Unit 3, and this 466 MW unit will continue its transition to a dual fuel capability, with the ability to generate power with either 100% coal or 100% natural gas by 2021. Capital Power continues to plan a full phase out of coal by 2029.



General location of Genesee 1 and 2 NGCC infrastructure.

Location

The repowering project will be located entirely within the boundaries of the existing Genesee Generating Station, located approximately 50 kilometres west of Edmonton (Section 25, Township 50, Range 3, west of the 5th Meridian) within Leduc County, AB.



Transmission

Repowered combustion turbine generators will require a new substation/switchyard that will be built west of the existing 500kV substation on Capital Power owned land. As Genesee is already connected to the 500kv system, no material transmission upgrades are anticipated. Capital Power will engage with the Alberta Electric System Operator (AESO) and Alberta Utilities Commission (AUC) to ensure all regulatory approvals are obtained.

Power House

The combustion turbines and heat recovery steam generators (HRSG) for both units will be built directly west of the existing building within the existing Genesee lands. An open-air structure will be built over each HRSG and certain electrical equipment to provide weather protection. Each new combustion turbine will have a 61 metre (200 ft) tall bypass stack for operations. In addition, each new HRSG will have a 61 metre (200ft) stack, which will be used in the combined cycle operation. Once the construction of the tie-in between the combustion turbine and the HRSG and steam turbine is completed, the stack that currently serves Genesee Units 1 and 2 will no longer be used.

Environmental and Noise Impact Assessments

Although the project is expected to result in reduced air, water and noise emissions, Capital Power requires approval from various regulatory agencies prior to repowering Genesee Units 1 and 2 and is in the process of preparing applications to Alberta Environment and Parks (AEP) and the AUC. Capital Power will be requesting an amendment to Genesee's *Environmental Protection and Enhancement Act* (EPEA) Approval as well as amendments to the AUC Power Plant Approval and has retained Golder Associates (Golder) to assist in the preparation of the applications.

Applications to AEP and the AUC will be in accordance with all regulatory requirements. Golder is conducting an air dispersion modelling study that will assess the potential effects of the repowering units' emissions on air quality. This study will be included as part of the EPEA amendment application, which will follow the requirements of AEP's Guide to Content for Industrial Approval Applications. Golder is also preparing a Noise Impact Assessment (NIA) according to the requirements of *AUC Rule 012 – Noise Control* that will be submitted as part of Capital Power's application to the AUC.

Terrestrial baseline studies, such as wildlife, wetland and plant inventories are not required as the project will be situated within the development footprint of the Genesee site.

Capital Power expects to submit regulatory applications for the project to AEP and the AUC in fall 2020. The project is also subject to review by the AESO and the AUC for approval of the interconnection to the Alberta transmission grid.

Located entirely within the footprint of the existing Genesee operation, the project will result in one of Alberta's most advanced power generation facilities.

Environmental Performance

The repowering of Genesee Units 1 and 2 will feature a number of environmental attributes:

- No additional diversion of water from the North Saskatchewan River is required for the project. Existing water licenses under Genesee's existing approvals will not change. Overall water usage for Genesee Units 1 and 2 will be reduced with the new technology by at least half, potentially lower depending on unit capacity.
- Advanced NGCC turbine technology ensures greater efficiency and will help Alberta continue to reduce greenhouse gas (GHG) emissions.
- Carbon emissions intensity of the units will decrease by approximately 60%, from approximately 0.93 tonnes of CO₂e per MWh when burning coal to 0.36 tonnes CO₂e per MWh, once repowered. This decrease, even with the addition of more generation capacity, will result in lower carbon emissions overall.
- SO₂ and fine particulate matter (PM_{2.5}) emissions become negligible.
- Mercury emissions associated with coal combustion are eliminated.
- NO_x emissions intensity would decrease by over 80%.
- The repowered units will use selective catalytic reduction (SCR) technology to minimize NO_x emissions.
- The facility will be constructed within the existing footprint of the Genesee Station and will utilize existing infrastructure (i.e. transmission and water intake/discharge structures).

CO₂e explained

CO₂e, or carbon dioxide equivalent, is used to describe emissions impact of different greenhouse gases on a common basis to CO₂ emissions.

Proposed Repowering Schedule

Capital Power anticipates submitting regulatory applications for the Project in late 2020. Separate applications will be made to the AUC and AEP. Prior to construction, we will apply to Leduc County for building and other development permits. Pending a successful outcome of the regulatory review, we expect construction to begin in August 2021, with an anticipated in-service date in late 2023 for the repowered Genesee Unit 1 and 2024 for Genesee Unit 2.

Participant Involvement Process

Capital Power is committed to sharing information on the Project and receiving input from our neighbours and stakeholders. Capital Power has commenced this process by developing several opportunities for information exchanges. These include:

- Project information mailed to stakeholders within 2,000 metres of the site.
- Project information on Capital Power's website (www.capitalpower.com).
- A telephone question and answer session scheduled for September 22, 2020 to discuss the project directly with project team members.
- An opportunity for all interested stakeholders to provide comments to Capital Power by phone, e-mail and mail.
- Information to Indigenous communities in the broader region.

Capital Power's work on the Participant Involvement Process will be documented in a report filed as part of our application with the AUC.

Proposed Project Timeline

Activity	Timing
Stakeholder engagement and consultation	Throughout development
Applications to AEP and AUC	Q4 2020
Construction	Q3 2021
Commissioning Unit 1	Q4 2023
Commissioning Unit 2	Q4 2024

Join us for a virtual Project Q & A Session

WHEN:

Tuesday, September 22 / 3:30pm to 6:30pm MDT

HOW:

By phone. Canada/USA Toll-free: 1-800-319-4610

Due to restrictions associated with the COVID-19 pandemic and Capital Power's commitment to protecting stakeholders and employees, we are not holding an in-person public open house. Instead, Capital Power is hosting a virtual question and answer session for stakeholders to provide project feedback, ask questions and receive answers from the project team.

For more information: Additional information is available at www.capitalpower.com/GeneseeRepowering

Interested stakeholders can also request to receive project information directly by contacting us at the methods below.

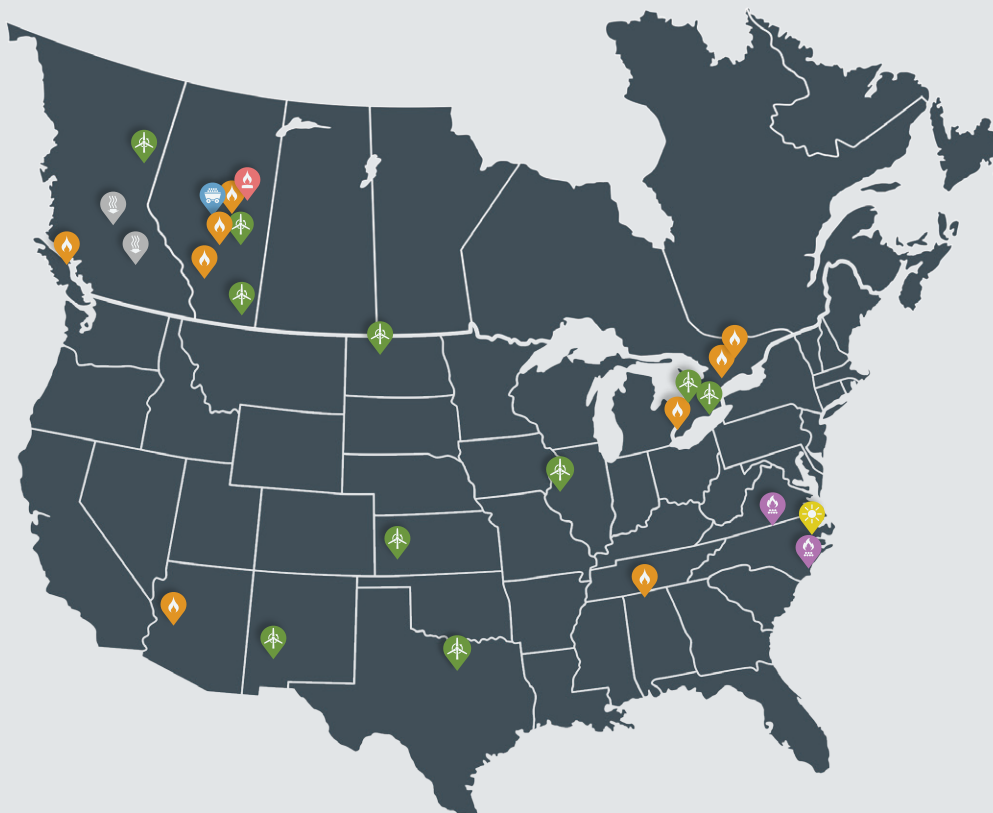
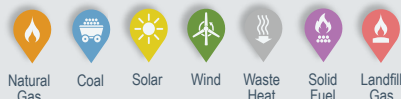
How you can provide input: If you are unable to participate in this question & answer session, contact us anytime with questions or comments about the project:

Telephone: 1-855-703-5005

Email: canadadevelopment@capitalpower.com

Mail: **Genesee Repowering Project**
C/O Stakeholder Engagement
Capital Power
10th Floor EPCOR Tower
10423 101 Street NW
Edmonton, AB T5H 0E9

Delivering Responsible Energy For Tomorrow



Capital Power by the Numbers

Owned Megawatt Total

6,500*

Facilities

28*



Employees

780*



Invests in

Renewables and natural gas, generation efficiency and innovative, low-carbon technology.

ETHISPHERE
WORLD'S MOST
ETHICAL COMPANIES
2019-2020

*as of May 2020

Privacy Policy

Capital Power respects your right to privacy. Any personal information Capital Power collects about you, including your name, address, phone number and email address, will only be used to contact you for the purposes of the consultation process. For further information, please see Capital Power's Privacy Policy at www.capitalpower.com.

Contact Information

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Mailing Address

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