



**CEM ENGINEERING**  
*Building A More Functional World*



# POWER & UTILITIES

Make your **energy transition** project  
the most **successful** it can be.

# Client-Focused Energy Transition Project Delivery

We know the world is changing, and pushes toward clean and renewable energy sources have left many companies working on custom clean energy capital projects. The problem is, many engineering firms are unprepared to tackle these projects, leaving deadlines missed, investors frustrated, and capital wasted on engineering that was never going to work.

We believe every clean energy system should meet its full potential and we've spent the last 20 years specializing in molecule-based energy transition, completing over 50 projects and commissioning over 415 megawatts of energy. With foundational experience in cogeneration and energy management projects, CEM has become a leader in Canada's energy transition.

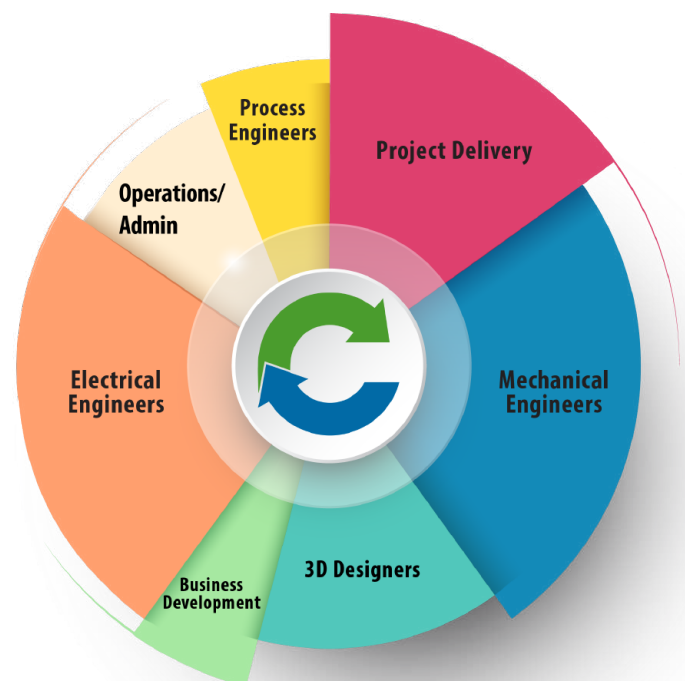
Here's how we do it:

1. **Discovery** – We meet with you to understand the project and draft a comprehensive proposal to align on a plan for the project.
2. **Development** – Our team works through the initial steps of the project design to get an accurate expectation of scope and cost.
3. **Implementation** – We work with you through procurement, design, construction and commissioning to get the project across the finish line.
4. **Operation** – Your project is complete and operating to your expectations.

## Your Partner

Born from a desire to optimize heat and power generation, our expertise spans cogeneration, power generation, boilers, and district energy systems. We understand that the success of a project is heavily influenced by its initial stages. Being engaged early on as your partner, we are committed to supporting you throughout your entire project journey. This close collaboration ensures that we are aligned with your vision, enabling us to deliver a successful clean energy project.

Our team can provide all process, piping, electrical and structural services required for the complete life cycle of a utility plant from permitting & design through to construction, commissioning, testing and maintenance. We are dedicated to partnering with you, ensuring your project not only meets, but exceeds generation targets.



# Featured Cogeneration Projects



## Manufacturing, Toronto, ON

This project consists mainly of a 15.7 MW Gas Turbine Generator (Solar Titan 130), a 120,000 lb/hr Heat Recovery Steam Generator equipped with duct burners and fresh air firing, and exhaust heat recovery for the tissue drying process. The auxiliary equipment includes a Fuel Gas Booster Compressor (FGBC), an emergency diesel genset, a 15 MVA transformer and a 27.6 kv switchgear.

CEM participated in every step of project development on this project, from its inception to post-completion support. Support tasks included feasibility studies (capital expenditure budgets and business case performance), financial incentive application support, permitting, technical coordination with local utilities, detailed engineering, commissioning and construction support permits and licenses for the project, and provide oversight and support for the General Contractor.



## Sunnybrook Health Sciences Centre, Toronto, ON

This Combined Heat and Power/Cogeneration project features an 8 MW Solar Gas Turbine Generator, 90,000 lb/hr Cleaver Brooks Heat Recovery Steam Generator and supplies heat and power resiliency to Sunnybrook Hospital, which hosts the largest trauma program in Ontario. Completed under the SaveOnEnergy/Process and System Upgrade Initiative through the Government of Ontario, this project ensures that Sunnybrook will always remain with power in the event of a grid failure/storm.

CEM completed Detailed Engineering Study, Front End Engineering and Design, Detailed Engineering and Project Management and Commissioning Management services.



## Archer Daniels Midland, Windsor, ON

The project consists of two cogeneration systems each equipped with one combustion turbine generator (GTG) and one heat recovery steam generator (HRSG). Each GTG is derated to 4.6 MW, to produce electricity (total of 9.2 MWe) and steam for use on site. The 4.6 MWe rated GTGs are based on units capable of delivering 5.4 MWe (nominal) of electricity for continuous duty.

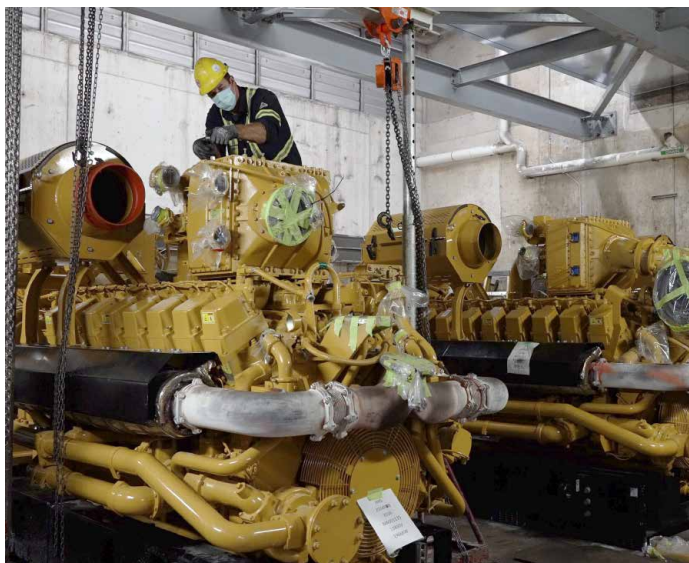
CEM Engineering was involved from the feasibility study stage of the project and engaged as Engineering and Construction Management to deliver the project.



## Enbridge Gas Distribution, Edmonton, AB

Enbridge has implemented a business strategy to generate electricity from their natural gas assets and the CEM project executed with AB Energy Canada delivers the first On-Site Natural Gas Generation (ONGG) project for Enbridge at their South Edmonton Terminal in Alberta. The ONGG facility will supply the peaking power to the Alberta grid and is not connected to any Enbridge operations.

The 20MWe Enbridge ONGG project includes installing six Ecomax 33 Gensets, a Natural Gas Engine, and a Gas Conditioning Skid. The project is supplied by Powell, and the Station Service Transformer and NGRs are specified and supplied by ABE. Separate connections to the AltaLink Bernese substation 6.9 kV bus for each of the Stations.

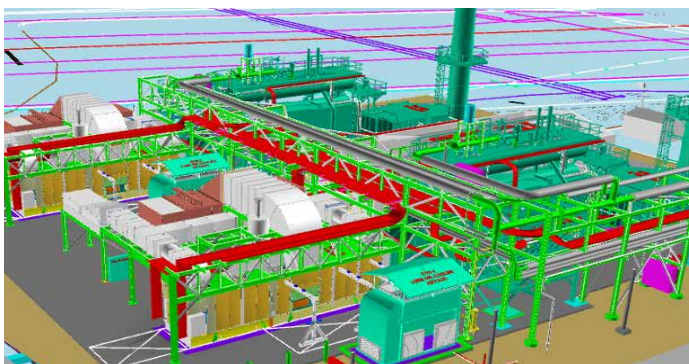


## Hamilton Health Sciences, Hamilton, ON

This project involved replacing 13 Internal Combustion Engines with state-of-the-art high-efficiency generator sets across three (3) hospital sites. The new generator sets provide reliable, sustainable and cost effective power to meet the growing energy demands of the sites. The project also involved the provision of a 50,000 lb/hr rental emergency boiler, as well as a small steam and hot water boiler.

The operational hours of the generator sets have been reduced from over 8,000 hours per year to roughly 1,000 hours per year. This significant decrease in operational time contributes to a dramatic reduction in CO<sub>2</sub> emissions—halving the annual output from 71,000 tonnes to 35,000 tonnes. This translates to an impressive annual reduction of 36,000 tonnes of CO<sub>2</sub>, underscoring the project's commitment to environmental sustainability.

CEM's was involved in the early development stages of this project through to detailed design, construction and commissioning management support.



## Pembina Pipelines, Fox Creek AB

This project consists of two 15 MW Gas Turbine Generators, two Rentech Heat Recovery Steam Generators, a 9 MW Reciprocating Internal Combustion Engine (RICE), a RICE building, a new electrical E-house, a new high voltage substation and new electrical equipment at existing substations.

When complete, it will provide electricity and steam to the host gas processing site and will be a market participant in the Alberta power market.

CEM is currently completing the detailed design.





### 3M Canada, Brockville, ON

This project consists of a 2 MW Internal Combustion Engine based CHP system, with exhaust gas and heat recovery, which are integrated with the Plant's process dryers (without product interruption). This ICE system operates in parallel with Hydro One Networks (via remote trip).

CEM completed all the detailed design, permitting, procurement of CHP package and major electrical and mechanical equipment, construction and commissioning support, and assisted with LTSA negotiation.



### CCC Sulphur Products, Elmira, ON

This project includes the installation of a new 1.0 MW Steam Turbine Generator (STG), Air Cooled Condenser (ACC) and electrical equipment. The plant generates steam in the cooling process of the sulphuric acid production process, and currently exports steam to an industrial neighbour next door with the balance of the steam being vented to atmosphere.

The new STG uses the excess steam to generate electric power to satisfy the plant electric loads, and the new ACC will capture the condensate to satisfy the need to reduce raw water intake. The STG will be able to operate parallel to the grid or in island mode.

CEM's role in the project included detailed engineering, assistance with procurement of major equipment and support during construction and commissioning.



### GreenField Specialty Alcohols, Chatham, ON

This project consists of 4.5 MW Gas Turbine Generator based CHP system, complete with a 77,000 lb/hr Heat Recovery Steam Generator. This CHP system islands frequently and is capable of load shedding.

CEM provided Owner's Engineer services and detailed electrical support, including preparation of key electrical drawings; design modifications to transfer trip system to incorporate second generator; design of generator neutral grounding method; developed protection settings for generator and intertie protection; identified issues/gaps and assisted with coordination between consultant and turbine supplier; design of new metering & SCADA; construction & commissioning support; detailed analysis of nuisance trips; and preparation of detailed as-built drawings.



# Featured Boiler Projects



## York University, Toronto, ON

The project consists of a retrofit 2x Taurus 60's Gas Turbine Generators (7,300 hp) with 7,800 hp versions, complete with new solar control system, demolition of 2 B&W boilers @ 50,000 lb/hr each; demolition of existing Cooling Towers #1 and #2, with a capacity of 5,200 TR; installation of one new water-tube boiler, rated @ 100,000 lb/hr; installation of new 5-cell cooling tower, with a capacity of 6,100 TR, complete with new e-house; upgrade to 13.8 kV Keele Substation.

Completed in 2017, CEM completed all grant applications, schematic design, detailed design, and contract administration services during construction and commissioning.



## Coca-Cola of Canada, Toronto, ON

Four existing aging boilers were removed and replaced by 2 x 500 BHP, 100 PSI steam boilers.

An 800 kWe CHP was also installed at the same time connected to a heat recovery steam generator (HRSG) providing coca cola with the additional steam capacity required to operate its new pasteurizer line. This design also included a steam letdown station from 100 PSI down to 14 PSI to supply both new and existing can lines. This unit was also connected to a load bank to allow islanding operation when site loading didn't meet the minimum CHP requirements.

Completed in 2021, CEM undertook this project on a full turnkey basis.



## Strathcona Paper, Napanee, ON

As one of the only mills in North America to produce medium to heavyweight, 100% recycled, clay-coated paper, Strathcona Paper was in need of replacing on of their aging boilers in order to maintain steam needed to run the Mill.

This project consisted of demolition and replacement of an existing boiler with one (1) 80,000 lb/hr industrial watertube O-type package boiler generating steam at 300 psig, saturated.

Completed in 2021, CEM was involved from preliminary conception all the way through to demolition of the existing boiler, detailed design and construction and commissioning management.



# Featured Global Adjustment Projects



## Timmins and District Hospital, Timmins, ON

This Hybrid Combined Heat and Power (CHP) and Global Adjustment (GA) system consists of Outdoor Containerized Packages with two (2) Tedom MAN M285 CHP generator sets rated at 287 kWe and two (2) SG500 Generac Engine Generator sets rated at 500 kWe each for a combined total of 1.57 MWe. Both Cogen units run in parallel with utility as a part of load displacement and in a GA event both GA Generators run and sync with the Cogens as a part of the peak shaving. This project allows the hospital to both cogenerate and mitigate their Global Adjustment (GA) costs. Based on CEM's experience with this project, CEM is confident in its ability to design, implement, and maintain this type of combined technology project.

This project was completed under the IESO's Save on Energy program, in which TADH received an incentive. CEM not only helped TADH obtain this incentive but is helping them navigate the program requirements and deadlines. CEM Engineering was involved from the feasibility study stage of the project and engaged as EPCM to deliver the project.



## Automobile Manufacturer, Alliston, ON

This EPC project was specifically implemented to reduce Global Adjustment costs. With its implementation, the client should save approximately \$4.2 million/year.

This project features ten (10) new-surplus engine generators that were procured by CEM for the client. With CEM's experience procuring, implementing and commissioning multiple engines, CEM is confident they can complete your project on-time and on-budget.



## SABIC Innovative Plastics, Cobourg, ON

This project was specifically implemented to reduce Global Adjustment costs. With its implementation, SABIC should save approximately \$1.5 million/year. This project features 6 Generac 500 kW natural gas fired gensets.

CEM completed this project on an EPC basis, providing the Engineering, Procurement, and Construction services.



Your projects deserve to meet their potential and it's time to start working with the team who has proven they can guide you to the future of energy.

Connect with us to see how we can help you in any of the following areas:



**HYDROGEN**

Cogeneration  
Power Generation  
Boilers  
District Energy  
Electrical Substations  
Steam Plant Upgrades



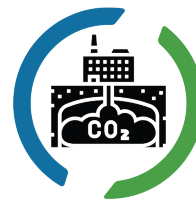
**BIOGAS / RNG**

Anaerobic Digesters  
Landfill Gas Upgrading  
Biogas Upgrading  
RNG Compression  
Virtual Pipelines



**POWER & UTILITIES**

Electrolysis  
Steam Methane Reforming  
Hydrogen Combustion  
Fuel Unloading Stations



**CARBON CAPTURE**

Carbon Capture  
Utilization  
Sequestration



**CARBON REDUCTION**

Energy Management  
Energy Master Planning  
Heat Pumps  
Energy/ Carbon Audits

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