



Fuel-Blending and CHP Engine Installation

Stationary Power Generation Installation and Retrofit



Martin Machinery, LLC—now Martin Energy Group—is a genset reseller also specializing in microgrids, CHP systems, and anaerobic digesters. Having worked with them in the past, Peaker Services, Inc. was brought on by Martin Machinery to install and assist in engineering.

New Belgium Brewing Company is renowned worldwide for their thoughtfully crafted and delicious sour beer. Since their founding in 1991, New Belgium has used their passion for the world, the beer in it, and the people who enjoy it to create some of the most recognizable and available craft beers in the US.

Location:

New Belgium Brewing Co.
Fort Collins, Colorado

Type of Installation:

Water Treatment Biogas Power

Power Source:

Guascor SFGLD-240 (1)
Guascor SFGLD-480 V16 (1)

Unique Obstacle:

Using varying BTU biogas to fuel CHP for brewing process.

System/Products Used:

Guascor SFGLD-480 V16
Woodward E3 Full Authority control system
Peaker fuel-blending system
IC-920 & 922
F-Series throttle body
ProAct throttle body
TecJet gas valves
Deltac gaseous fuel mixer
easYgen control system

Results:

Sustainable natural gas and biogas fueled campus
Improved efficiency
Lower emissions
Brewing process aided by CHP
New system provides approx. 15% of energy

Energy Growing Pains Solved with Sustainable Biogas CHP System

Customer Goal & Challenge:

New Belgium Brewing Company generated power from a wastewater treatment facility on their campus in Fort Collins, Colorado. At first the facility flared biogas generated in its single digester during treatment. In keeping with their own sustainability values, New Belgium decided to capture the biogas instead. The biogas was then used as fuel by a 262 kWh Guascor generator, providing the plant with power.

The resulting expansion of the company meant that the power was not nearly enough to meet their needs. The generator was proved unreliable, having control problems and needing major engine repairs twice. Due to this, New Belgium was unqualified for utility rate curtailment, one of the major advantages of running such a system.

Martin Machinery LLC was hired to provide New Belgium an additional biogas genset for the facility.

Due to Peaker Service’s biogas, fuel-blending, control systems, and engine experience, Martin Machinery chose Peaker to assist in the design of a new power generation system. This system would qualify New Belgium for rate curtailment, burn biogas faster than the collection rate, improve greenhouse gas



Single digester & flare at water treatment facility.

emissions, and eliminate engine downtime. Additionally, New Belgium also wanted to utilize the heat of the engines to assist in its brewing process.

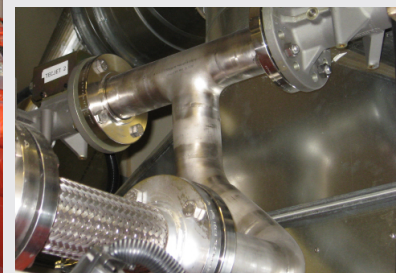
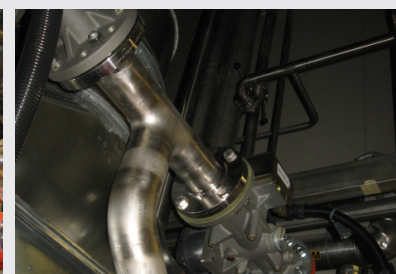
Solutions:

A new Guascor engine was installed to support the SFGLD-240—an SFGLD-480 V16 rated at 500kWh. The engine starts on natural gas, switching to biogas automatically when the capacity of held biogas is nearly reached.

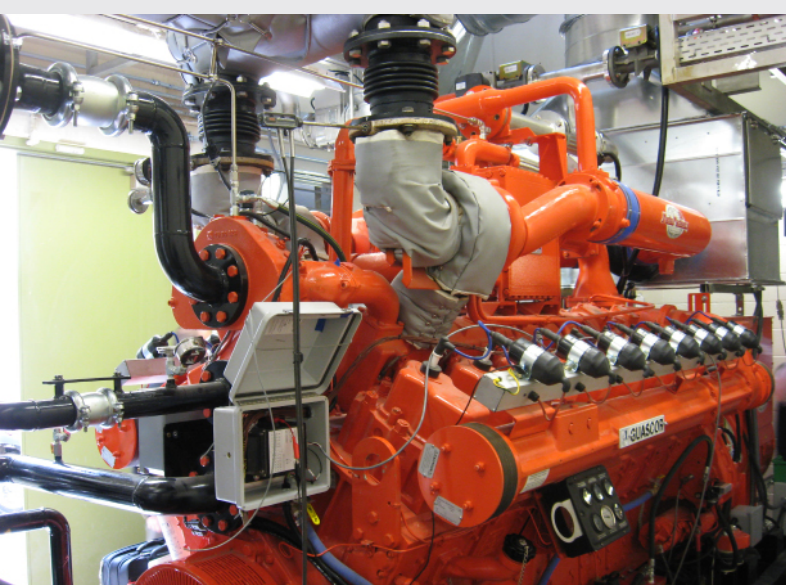
Two TecJet gas valves were installed on the SFGLD-480, allowing it to use utility provided natural gas as well. An IC-922 provides the ignition energy, while a ProAct throttle body controls engine load and speed.

Combining Woodward’s E3 Full Authority system with a Deltec fuel mixer allows for the engine to run on a mixture of biogas and natural gas. This

means that unlike the SFGLD-240, the SFGLD-480 can switch back to utility gas without interruption. As an alternative to using oxygen sensors for emission compliance, the engine management system controls emissions without complications. By monitoring and analyzing the engine power output, it can detect whether the BTU content of the biogas changes, allowing the E3 system to optimize the fuel air ratio for greater combustion efficiency. The easYgen also allows for remote starting of the engines and synchronization of the generators, while interfacing with their existing SCADA system.



Left: Installed Woodward IC-922 Ignition Controller, Guascor SFGLD-480 V16. Right: Two angles of the TecJet gas valves installed on the SFGLD-480 V16.



Completed installation of Guascor SFGLD-480 V16.

To utilize the heat generated by the SFGLD-480, a state-of-the-art heat recovery system was installed. This heat is repurposed not to generate energy as a traditional CHP engine might, but aids New Belgium’s brewing process. Wort—the liquid left after the mashing process—is boiled in a container called a brew kettle. By heating the wort with this otherwise lost heat, New Belgium conserves energy in a unique manner, fueling future beers with brewing waste.

A new, second digester was installed to allow for greater capacity in waste treatment and biogas collection. This allows the SFGLD-240 to remain running on biogas exclusively and creating reliable power generation.

Results:

Combined with their solar array, New Belgium Brewing Company now has energy production power of nearly one megawatt. While this is not enough to take the entire campus fully off the grid, there have been a number of instances where New Belgium was able to generate more power than they were using. This has resulted in New Belgium generating some revenue by feeding this excess energy back to the grid.

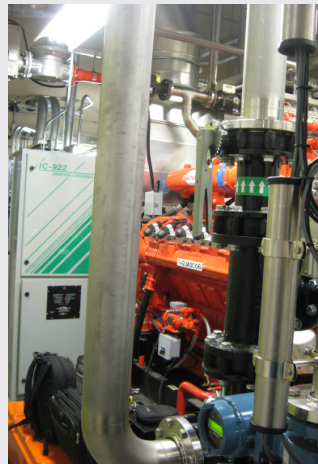
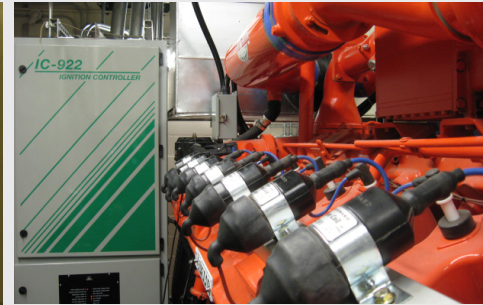
The SFGLD-480 runs sufficiently to outpace biogas collection when necessary. Even as New Belgium has grown and biogas production has risen beyond expectations, the SFGLD-480 still handles the load. Despite being run more often than planned, the generators have been running strong for two years without issues.

The heat recovery system installed proved itself indispensable to New Belgium when their old boiler began to fail. Brewing did not come to a halt, as the SFGLD-480 was used temporarily replacing the boiler. This allowed New Belgium the time to find a sufficient replacement without shutting down production.

Since the installation, New Belgium Brewing Company has seen attention for continued environmentally sustainable business practices. In 2020, New Belgium's iconic ale, Fat Tire, was the first American beer to receive carbon neutral certification by SCS Global Services. New Belgium also was ranked as the 11th top brewing company in the US in 2021 by the Brewer's Association, having grown from a small craft US brewery into a brand recognized worldwide.



Finished installation of second wastewater digester.



Pictured above: easYgen 3100 control system and installed combined heat and power (CHP) system.



Peaker Services, Inc. is an innovator and recognized leader in high-horsepower engine repair and systems integration in North America.

Since its founding in 1971, Peaker Services has expanded beyond power grid applications, servicing rail, marine, and industrial power needs, creating custom solutions at the large and small scale.

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