

JENBACHER J420 GAS ENGINES RUN ON BIOGAS

to deliver innovative cogeneration solution for Thai tapioca starch production facility

»We are very pleased with the project results. The Jenbacher gas engines provide high reliability and performance while operating in challenging conditions with difficult fuel gases.«

Thanthit Yuenyongtechahiran,
Managing Owner, Chok Yuen Yong



Background

The Chok Yuen Yong facility – located approximately 250 km northeast of Bangkok – processes raw cassava roots to produce about 750 tons of tapioca starch each day. The production process – which includes root preparation, washing, peeling, rasping, extraction, separation, drying, and packaging – requires the use of large amounts of heat and power. Furthermore, about 12,000 cubic-meters of high-organic concentration wastewater is generated as a result of each day's starch production process.

Prior to the introduction of a new biogas cogeneration system, the facility procured electrical power from Thailand's national grid and generated steam using heavy fuel oil. The wastewater was treated in a waste stabilization pond using a time-consuming natural waste removal process that created odor problems for nearby communities. To combat rising energy costs and reduce its impact on the environment, the Chok Yuen Yong facility decided to implement an innovative biogas cogeneration solution.

Solution

In 2010, Chok Yuen Yong began work on the new cogeneration plant supported by five of INNIO's Jenbacher J420 gas engines. The engines run on biogas to produce more than enough electric power to supply the factory. The excess electricity produced by the engines – in the range of about 1,000 kW – is supplied to the public grid to further reduce the facility's power costs. And, an efficient heat recovery system converts exhaust gas from the engines into steam that is used in the starch production process. The biogas used to feed the gas engines is produced as the site's wastewater passes through several treatment and purification processes, including an upflow anaerobic sludge blanket digester – also referred to as a UASB methane reactor.

The UASB reactor helps convert the organic content of the facility's wastewater into valuable biogas. Moreover, it produces significantly less odor than the facility's previous wastewater treatment process. Finally, a double-effect 110 refrigeration ton (RT) absorption chiller uses the hot water from the engine along with biogas from the digester plant to generate cooling water for the facility's air conditioning system.

Key Technical Data

Engines installed	5 x J420
Electrical output	7,105 kW
Electrical efficiency	42%
Energy source	Biogas
Commissioned	2 x J420 in 2012 3 x J420 in 2017



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Result

Commissioned in 2012, the project's first phase made use of two Jenbacher J420 gas engines to produce 2,842 kW of electrical output. The second phase of the project added an additional three gas engines that were commissioned in 2017.

In total, the five engines deliver 7,105 kW electrical output. In 2016, Chok Yuen Yong reported two million Euro (2.27+ million US dollar) reduction in energy costs and the project delivers an exceptional 43.33% return on investment. Based on the project's success, the company received the 2017 Thailand energy award by the Department of Alternative Energy Development and Efficiency.

Customer Benefits

The cogeneration project has provided a number of benefits to the Chok Yuen Yong facility, including:

- Highly reliable on-site power production
- Considerably lower electrical and energy costs
- Significantly reduced wastewater related odors

INNIO is a leading energy solution and service provider that empowers industries and communities to make sustainable energy work today. With our product brands Jenbacher and Waukesha and our digital platform myPlant, INNIO offers innovative solutions for the power generation and compression segments that help industries and communities generate and manage energy sustainably while navigating the fast-changing landscape of traditional and green energy sources. We are individual in scope, but global in scale. With our flexible, scalable, and resilient energy solutions and services, we are enabling our customers to manage the energy transition along the energy value chain wherever they are in their transition journey. INNIO is headquartered in Jenbach (Austria), with other primary operations in Waukesha (Wisconsin, U.S.) and Welland (Ontario, Canada). A team of more than 3,500 experts provides life-cycle support to the more than 54,000 delivered engines globally through a service network in more than 80 countries.

INNIO was awarded the Gold Medal from EcoVadis in 2022 for our outstanding sustainability efforts.

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