TRIOGEN

Gas Engine
Application
Case Study

ANAEROBIC DIGESTER BIOGAS SITE

ABEN RECYCLING, WANROIJ THE NETHERLANDS

Process room ORC

"The capacity factor of our Triogen ORC over 5 years is 92,6 %. The ORC, is proven technology with proven reliability" *Mr. Jan Aben, Owner Aben Recycling*

In 2003, the brothers Aben founded Aben Recycling B.V. One of their operations is an AD biogas plant located in Wanroij, the Netherlands. In 2004 they began producing electricity with a 230 kW Deutz CHP engine – enough to power more than 500 households. In addition, a portion of the heat from the AD plant was utilized to heat the stables of their pig farm, and for the sanitization of the manure for export.

Through a series of planned upgrades and expansion modifications over the last decade, this AD site has grown into an installed capacity of 5.8 MW, generating electricity for more than 10,000 households.

All the generated heat is fully utilized, resulting in a remarkable efficiency of more than 85 %. The generated heat is used for heating up the onsite digesters as well as a local district heating network (2km) that supplies heat to a neighboring poultry farm.

In 2011, a Triogen ORC was installed to make use of the exhaust thermal energy from one of their biogas engines, providing them with the generation of 155 kWe of electricity from this residual heat stream. The ORC's cooling water of 55 degrees pre-heats the air intake of a belt dryer producing dried potatoes for animal food.

Since the ORC power plant runs unsupervised, this site fully benefits from the additional, fuel free, electrical power output with virtually no effort or extra work.

"The installation of the Triogen ORC was the next step to further optimize our process efficiency. The ORC converts heat from the flue gas into electricity and heat at 55°C for our dryer." *Mr. Jan Aben, Owner Aben Recycling*

Engines

Dryer

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SITE SETUP **	
Site type	Biogas Site
Feedstock	Manure, Co-substrates from i.e. food industry
Heat source	• 1 x Deutz • 1 x Jenbacher 320 • 3 x Jenbacher 420
Installled Engine Power	5,8MW
Heat Use	• Fermentation process • Stable heating • Belt Dryer • Sanitization(sterilization) of manure • Starch extraction • Triogen ORC

Mr. Jan Aben

Digesters

"The maintenance costs have been lower than budgeted; in combination with the high availability of the machine, we were able to have a very good payback period" *Jan Aben, Owner Aben Recycling*

ORC FACTS	
Completion of Commissioning	15th July 2011
Flue gas temp into evaporator	427°C
Flue gas temp out of evaporator	225°C
Heat intake ORC	900 kWth

ORC BENEFITS	
Electricity provided to the grid	
Power	160 kWe
Guaranteed Power to Grid	155 kWe
Production from 15-7-2011 to 09-02-2016	5,751,210 kWh
Electric capacity factor*	92,6%
Heat supplied to Belt Dryer	
Heat use	Pre-heating belt dryer
Water temp to belt dryer	55°C
Return temp water	35°C
Energy provided	700 kWth

Triogen ORC

* % of theoretically possible power production if furnace and ORC would run at maximum capacity every hour of the year without downtime, maintenance etc. For reference, gas engines and large power plants average 90–95%

** See also **http://www.abenbv.nl** for more information.

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February 2016