POWER FROM HEAT
LOCAL POWER GENERATION WITH ORC TECHNOLOGY

+ Increases engine output by up to 10%.
+ Enables local scale biomass CHP.
OUR VISION

Triogen is dedicated to making ORC power generation a common element of combustion engines, similar to the way turbo chargers have over the last 40 years become a standard feature to increase engine efficiency; in addition, we enable local solid biomass based Combined Heat and Power (CHP) generation.

THE COMPANY

Since 2001, Triogen has focused on developing and deploying a compact, modular, highly efficient ORC power plant. We have sold over 40 ORCs in 11 European countries and accumulated over 500,000 operating hours.

THE TECHNOLOGY

Decentralized power plants play a vital role in creating a low carbon economy because they are very efficient and can turn local energy sources (biogas, biomass, landfill gas, mine gas etc.) into electricity and locally needed heat. Organic Rankine Cycle technology (ORC) offers a further boost to the efficiency of smaller power plants: the technology is based upon the traditional water steam cycle used in conventional power plants for the last 150 years. Thanks to replacing water as working fluid with an organic medium, ORC plants realize a much higher efficiency level at small scale than the water steam based cycle. ORCs allow baseload generation to match the demand profile for electricity and heat.

- Triogen uses direct evaporation, there is no need for an intermediate oil or water loop used in other ORCs, thereby reducing complexity and cost.
- By combining the turbine with the generator on a single shaft, there is no need for seals or gearboxes; this feature contributes to the robustness of the system.
- As the Triogen ORCs are compact and modular, they can be combined to match the available heat.
ORC power plants in combination with gas or diesel engines increase the power output of the engine by up to 10% without requiring any additional fuel. For engines in the 1–3 MW range, a single ORC is the best fit, while larger/multiple engines are best served with several ORCs as modules. The ORC can also run in CHP mode making heat available for drying or local district heating.

The ORC has no implication on the operation of the engine. The major suppliers have approved connecting a Triogen ORC to the exhaust of their engines.

Engine/fuel types:

- biogas
- diesel
- landfill gas
- sewage gas
- mine gas
Triogen ORC power plants enable Combined Heat and Power (CHP) generation at a decentralized scale for local district heating networks and/or drying processes, and provide power to the grid. In the above scheme, the ORC unit is combined with a 1.2 MWth furnace consuming 2,500 – 3,000 tons of solid biomass per year. The Triogen ORC has a typical heat intake of 940 kWth at 530°C and provides up to 170 kWe power and 680 kWth heat at 80°C or higher. Triogen focuses on supplying the ORC; in addition, we gladly provide engineering support for the system integration with different burners.

In the Triogen ORC, the flue gas enters straight into the evaporator, eliminating the cost and complexity of an intermediate oil or water loop that other ORC solutions require.
Proven reliability
+ Extensive experience, > 500,000 operating hours in 40 plants across Europe
+ Unsupervised, fully automated operation
+ Standardized serial production

Maximum energy production
+ Market leading efficiency up to 19%
+ CHP mode with heat at 80°C or more
+ Limited sensitivity to ambient temperatures

Great economics
+ Predictable revenue offering 2–5 years payback
+ Attractive pricing
+ Low cost of maintenance

Full range of Services
+ Multiple financing options: risk free, delayed payments, bank lending etc.
+ International partner network
+ Dedicated service team, remote monitoring and analysis
TRIOGEN BV
Nieuwenkampsmaten 6-01 • 7472 DE Goor
P.O. Box 25 • 7470 AA Goor
The Netherlands
Tel: +31(0)547 820900 • Fax: +31(0)547 820919
info@triogen.nl • www.triogen.nl

Triogen works with a network of local distributors. For contact information, please contact Triogen’s office in the Netherlands.

Sample Sites

- 2 Biogas engines (J316)
  - In operation since 2009
- Landfill gas site commissioned in 2011
  - 2 engines (J320) plus 1 landfill gas flare
- Wood chip furnace
  - Heating for offices and industry
- Sawdust furnace
  - Sawmill facility using heat for drying kilns
- 2 Engine gas engines (Tedom Quanto)
  - Installed 2012
- Landfill gas site
  - Commissioned in 2011
  - 2 engines (J320) plus 1 landfill gas flare

Engine Applications
- Biomass application
- Sales contacts/partners