



**POWER GENERATION
FROM WASTE HEAT**
ORGANIC RANKINE CYCLE TECHNOLOGY

WHY ORC TECHNOLOGY



ZERO EMISSIONS

Zuccato Energia systems are impeccably **eco-friendly**. They **recover** otherwise **wasted resources**, such as residual heat and processing waste to **produce clean electric energy** and a significant energy saving.

The entire process has **zero emissions** in the atmosphere, it uses an **HFC working fluid** and a thermal transfer fluid both completely **“ozone-friendly”, non-toxic, fully eco-compatible**.



SAVE MONEY

It allows to **cover the self-consumption of the entire plant** with consequent economic savings on energy consumption, which can be reinvested in the company's core business.



LESS MAINTENANCE AND ZERO SUPERVISION

The low operational pressures of ORC technology give great **operational safety**. **Full-scale automatization** removes the need to employ specialized personnel for operation and an integrated **remote control system** grants the client **full remote monitoring and management capabilities**.

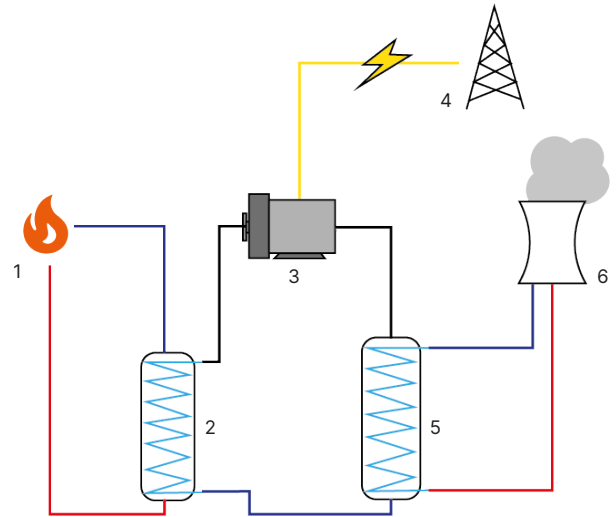


LONG DURATION (20 years)

ORC system has features such as **compactness** and CNC machined steel body with aluminium alloy impeller. Different elements allow a long duration as the completely **dry working fluid**.

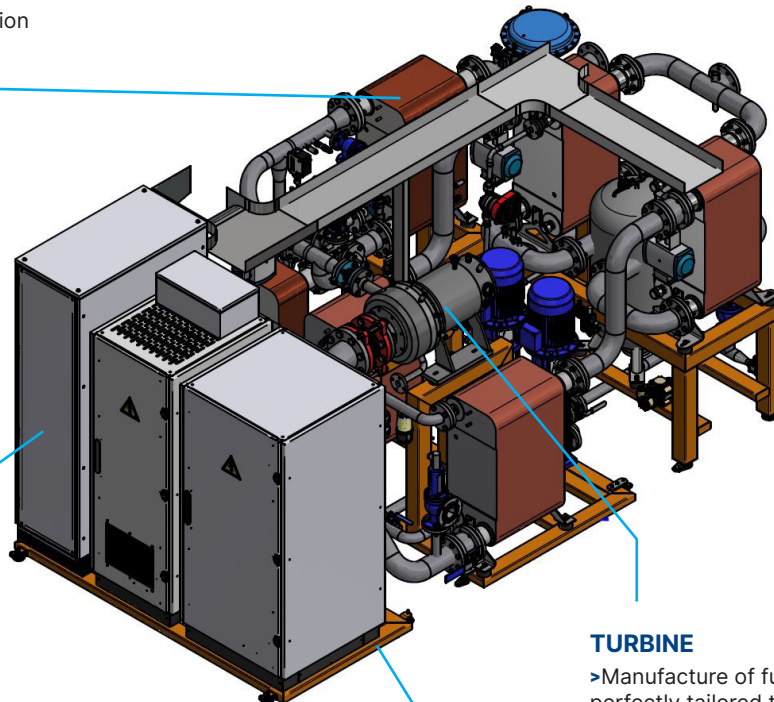
HOW IT WORK

Heat from a **heat source evaporates** (1), through an **evaporator heat exchanger** (2), a low-boiling-point working fluid which expands spinning a **turbine** (3) attached to an **alternator generating electric power** (4). The **working fluid** is then **condensed** in a condenser **heat exchanger** (5) and residual heat is dissipated by using an **external cooling system** (6) such as an evaporative cooling tower or a dry cooler.



HEAT EXCHANGERS

- > Small size, they occupy up to 10% of the space
- > They can work with minimal temperature differences between cooling fluid and cooled fluid
- > Low load losses
- > Resistance to dirt and corrosion



CONTROL PANEL

> An integrated remote control system grants the client and technical assistance personnel full remote monitoring and management capabilities through LAN, WAN and the Web.

TURBINE

> Manufacture of full-custom turbines and modules perfectly tailored to the available thermal power and temperature specifications.

SKID

> Each module is mounted on a self-supporting, self-contained, flange-to-flange frame ("skid"), which can be containerized for maximum modularity and compactness.

ORC APPLICATION

METALWORKING INDUSTRY



*Example of outdoor solution



*Example of indoor solution

ULH SERIES

Solution to exploit low-temperature thermal sources.

Available in a power range from 30 to 100 kWe.

LT SERIES

Solution for small-scale primary power generation.

Available in a wide range of models ranging from 75 to 550 kWe.

TECHNICAL DETAILS

	ULH	LT
Thermal Energy Input	350 - 1200 kWt	550 - 3500 kWt
Electric Power Output	30 - 100 kWe	75 - 561 kWe
System Efficiency	8,50 - 9,10 %	13,60 - 16,00 %
Interfaces	Hot water	Pressurized water
Vector fluid input temperature	≥ 94-95 °C	≥ 160 °C
Vector fluid output temperature	85-86 °C	140-145 °C
Working fluid	Environment-friendly HFC mix	
Weight (incl. working fluid)	~ 3.100 - 6.500 Kg	~ 4.000 - 21.500 Kg

CASE STUDY 01

REVENUE FROM ELECTRICITY

250.536 €/y

Annual electric power production:
3.131,70 MWh/y

REVENUE FROM INCENTIVES

146.250 €/y

The ORC plant allows saving
585 TOE per year

PAY BACK TIME

3,74 years

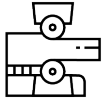
profit of investment - ORC



environment - friendly

585

TOE (tonne oli equivalent)
SAVED



ROLLINGMILL

ITALY

Model: Zuccato Energia ZE-500-LT
Net power production: 481,80 kWe
Electricity Selling Price: 80,00 €/MWh

CASE STUDY 02

REVENUE FROM ELECTRICITY

135.303 €/y

Annual electric power production:
902,02 MWh/y

REVENUE FROM INCENTIVES

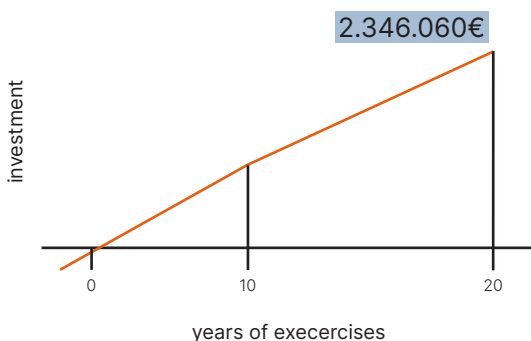
42.000 €/y

The ORC plant allows saving
168 TOE per year

PAY BACK TIME

3,66 years

profit of investment - ORC



environment - friendly

168

TOE (tonne oli equivalent)
SAVED



STEELWORKS

ITALY

Model: Zuccato Energia ZE-175-LT
Net power production: 151,60 kWe
Electricity Selling Price: 150,00 €/MWh

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