

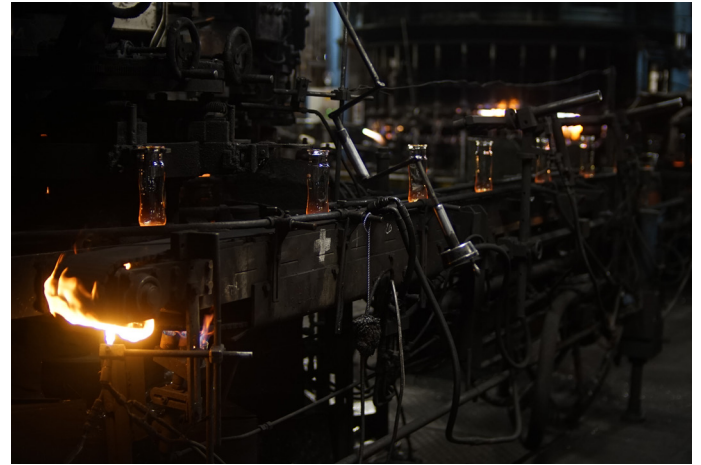
GLASSWORK

Vetreteria di Borgonovo Spa, Italy



The factory Vetreteria di Borgonovo glasswork in Piacenza covers 52,000 m² and produces about 45,000 tonnes of glass per year using **two modern melting furnaces**.

The basic idea is to **recover the thermal power of the flue gas** after ceramic candle filter in order to decrease the temperature and to **produce electricity**.



Entire plant



Adibetic cooler of the plant

In this way, thanks to the recovery, the customer avoided waste heat and improves the flue gas system by not having to add false air for cooling the flue gas after the filter, which would be mandatory to avoid damages to the ventilation system.

In this way, an additional advantage of the installation is **lower electrical consumption** of the fans that were used for the expulsion of flue gas.

To control and manage the recovery there is a bypass with adjustable shutters in order to direct the flue gas according to the recovery and operation required by ORC and the client plant.

The installed module is a **ZE-200-LT** and has a **nominal power of 200 kW** which absorbs about **1,400 thermal kW** from the exhaust in form of water throughout an **intermediate heat exchanger**.

For the condensation stage the client has chosen an **adiabatic cooler system** to allow operation even in cases of higher ambient temperatures. Due to its characteristics, the system is very constant thanks to the low variability of production and furnace operation characteristics of glass factories.

ENVIRONMENT FRIENDLY

The electricity production is zero emissions, **the glasswork can avoid:**

246 

376 ton/y

TOE (Tonne Oil Equivalent)
SAVED PER YEAR

CO₂

TECHNICAL INFORMATION



The system is mounted on a **self-supporting frame (skid)** which includes **heat exchangers, turbogenerator and control panel**.

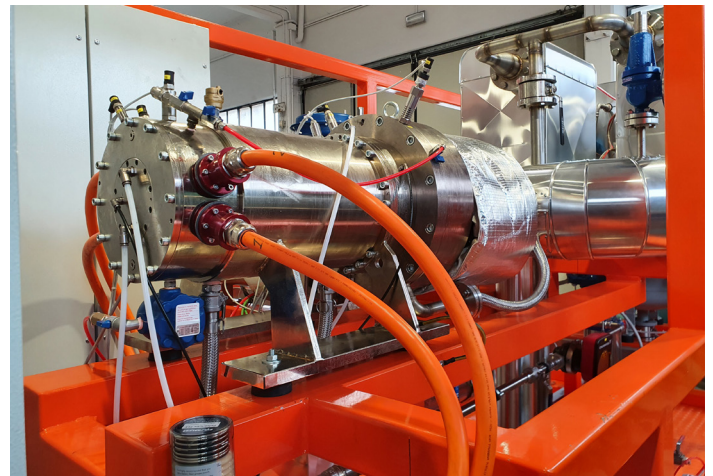
In this case the skid is positioned on a special external structure inside a **customized container**. The module is **fully automatic** and don't need a technical operator as it is managed entirely remotely.

ORC FACTS

Thermal power input	1,400 kWt
Electric power output	200 kW
System Efficiency	14.30 %
Flue gas inlet/outlet temperature	420 / 200 °C
Vector fluid	Pressurized water
Vector fluid input temperature	160°C
Vector fluid output temperature	145°C
Vector fluid nominal flowrate	21.65 kg/s
Working fluid type	HFC mixture, non flammable, environmental friendly
Operating temperature range	60°C < T < 165°C
Operating pressure	≤ 20 bar

TURBINE

Type	Single stage, radial flow turbine with fixed nozzles; directly coupled to generator
Working fluid temperature	145°C input / ~ 100°C output
Stage pressure	PS16 (tested up to 24 bar)
Materials	CNC Machined steel body / Aluminium alloy impeller



BUSINESS PLAN

Pay back Time: 2.95 year

ROI: 33.89%

WE ARE INSTALLING OUR PLANT IN SOUTH CAROLINA
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