T@W Good Practice Form

Setting

Title:	Cogeneration System
Country:	Portugal
Location:	Vialonga – Vila Franca de Xira
Start date:	February 2004
End date:	October 2004
Technology keyword(s):	Combined heat & power
Host sector:	Beer and drink industry

General description

Summary:

The creation of Powercer took place, in 2003, as a result of a process initiated by the Sociedade Central de Cervejas e Bebidas, which aimed at the improvement of the economic conditions related with the steam consumption of the plant. The first step was the elaboration of an outsourcing contract for the construction and exploitation of a new cogeneration system. For this, the Sociedade Central de Cervejas e Bebidas started negotiations with several entities, selecting Galp Power and Finerge as promoters of the project's development. The Galp Power and Finerge created the Powercer society.

Through a public tender the cogeneration system was installed, integrating the existing boilers, in a management system to produce the steam needed.

Due to the high efficiency of the cogeneration system the old boilers work in stand-by, they are used only to support the CHP system to cover the peaks.

Currently the production management is held by Powercer.

Aims:

In the industries that produce beers and drinks the production of steam, needed in the manufacturing process, represents an important share of the plant energy consumption. The Sociedade Central de Cervejas e Bebidas industry consumes, each year, around 165,000 ton of steam.

To decrease this energy consumption, the industry needed to install a new steam production system with a high energetic efficiency that allowed:

- To decrease the costs related to the steam production
- To strengthen the reliability of the steam production system
- To contribute to the improvement of the technologies

The solution was the installation of a cogeneration system that produces heat (used to produce steam) and electricity (to cover the plant electricity needs and sell the remainder to the network).

Summary of Results:

The cogeneration system gives the plant a significant reduction in the steam invoice and also important improvements in the costs related with the maintenance and manufacturing process. At a technical level, with this system the plant has increased the reliability of the production, since the old boilers can work as a support of the cogeneration system.

Regarding the economic side, due to the better energetic efficiency of the CHP system, the plant decreased its energetic invoice and because the electricity produced is almost all sold to the national grid, the plant earns some money since this electricity is sold at a higher price that it is bought.

At an environmental level, the system emits less than the conventional systems to produce the same amount of electricity and the same amount of heat.

Planning Time:	Conception to end of building in years (not mandatory)
Planning issues:	(not mandatory)
Operation Time:	(not mandatory)
Feasibility Study:	(not mandatory)

Technical details

Technical details:

The main equipment of the Powercer cogeneration system is comprised of one gas turbine, which the input is natural gas, with a power around 7,300 kW, and a recovering boiler to produce saturated steam (12 bar).

The gas turbine produces electricity through the burning of natural gas in its combustion chambers at low NOx content. Only a few amount of the electricity produced is consumed in the plant, the most relevant part is sold to the electricity grid.

The steam is produced in the recovering boiler using the thermal energy of the gas turbine exhaust gases. The boiler receives the exhaust gases flow and transfers its energy to the water in the tubes of the heat exchanger.

The boiler has an additional burning system which the input is natural gas and that it used when the energy given by the turbine exhaust gases is not enough. Without the use of this additional system the boiler produces 14 ton/hour of steam, but it can produce a maximum of 30 ton/hour. The plant has conventional boilers to use when the steam needs are greater that this maximum value.

The cogeneration system has a good energetic efficiency, due to the production of electricity and heat, at same time, and also due to the correct equipment use.

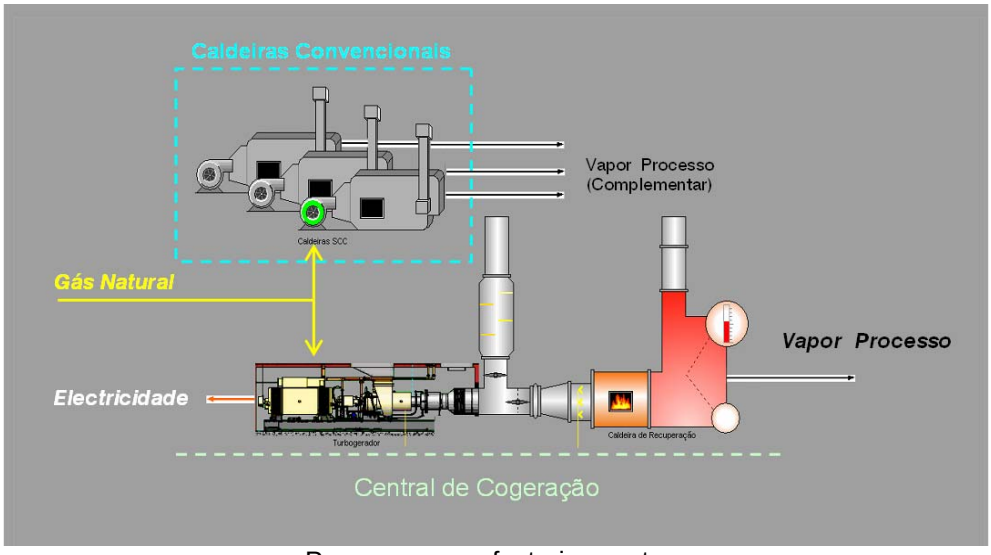
Equipment summary data:

Gas Turbine

Supplier: TURBOMACH
Turbine type: TAURUS 70
Electrical Power: 7.2 MW / 9 MVA
Electrical efficiency: 33.1%
Electrical Voltage: 10 kVA
Frequency: 50Hz

Recovering Boiler

Builder: GEA Iberica
Production Type: Saturated Steam
Steam Nominal Pressure: 12 bar
Maximum Steam Production: 30ton/hour



Powercer manufacturing system

Energy data

Energy data:

The cogeneration system consumes around 16,000,000 m^3 of natural gas and produces, each year, 142,000 tons of steam and 40,500 MWh of electricity. The plant sold 39,800 MWh of electricity to the national grid, per year.

Regarding the old boilers, used only to support the cogeneration systems in the peak consumptions, the annual consumption of natural gas is 1,680,000 m^3, and the production of steam is around 23,200 tons/year.

With the installation of the cogeneration system the plant saves, each year, about 15% of the energy consumption.

Energy saved/generated: In common units, GJ/y (not mandatory)
Monitoring: Methodology used (who did it)

Environmental data

Environmental data:

With the installation of a cogeneration system the plant emits less greenhouse emissions.

Project GHG-emissions:	In common units, tonnes CO_2equivalent/year
GHG-emission reductions:	24,000 tonnes CO_2equivalent/year
"EAU, CER, ERU, AAU":	Number of units…
Methodology:	(if applicable) approved baseline methodology or study done – reference to this
Baseline	Text description
Monitoring:	Methodology used (who did it)

Contribution to Sustainable Development:

To have sustainable development it is necessary to link the economical and social development with the environment protection.

With the installation of a cogeneration system the plant has benefits at economic and environmental level. Regarding the environmental level, with this system the plant emits less greenhouses gases and reduces the energy consumption.

Regarding the economical level, the CHP systems allows the plant to reduce the energy invoice, that means reducing the costs and due to the "in house" energy production they have eliminated almost all the costs associated with the energy transportation and distribution.

Economic data:

Economic data:

As described in the previous paragraph, the installation of a cogeneration system gives economical profits to the plant, due to the energy invoice reduction and also due to the "in house" energy production.

Financing:	Source of financing (public, commercial, etc)
Capital cost:	Select a currency (not mandatory)
Operational Costs:	Select a currency (not mandatory)
Payback:	6
Energy Production costs:	Select a currency (not mandatory)
Other savings:	Select a currency (not mandatory)

Additional Information

Photo Library

Pictures:

Powercer Gas turbine

Contact information (to be duplicated for each contact for this project):

Type of Organisation:	Project management
(e.g. technology supplier, service provider, host company, financing body, project management)	
Technology keyword(s) specific to this organisation:	
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