

The system comprises a gas turbine and an alternator TUMA Turbomach ABB, with an output of 4.7 MWe. The electricity produced covers all the electric needs of the central and the remaining is sold to the national grid. A recovery boiler (Figure 2) is installed after the gas turbine and produces about 18 ton/h of saturated steam at 10 bar.

The steam is used to drive 2 absorption chillers and to produce the hot water in 2 heat exchangers (11 MW each). The hot water reaches about 100°C in the heat exchangers. The absorption chillers have a nominal power of 4,8 MW each. The central includes also 3 mechanical compression chillers, with a nominal power of 5,5 MW each, and a support steam boiler with 15 MWt of power (23 t/h of saturated steam at 10bar). This support boiler is used only when the gas turbine is in maintenance or, occasionally, when the capacity of the recovery boiler is not sufficient to cover the demand.



Figure 2 - Gas turbine and Recovery Boiler
(www.climaespaco.pt)



Figure 3 - Absorption chillers
(www.climaespaco.pt)



Figure 4 - Network water
(www.climaespaco.pt)



Figure 5 - Secondary central
(www.climaespaco.pt)

The cold water is produced, in a first instance by the two absorption chillers (Figure 3). The cooling is concluded by the three mechanical compression chillers that enable to have the water with a temperature of about 4°C. In order to optimize the system, the cold water is produced in the night and stored in a reservoir with 15.000 m³. The distribution of cold and hot water is provided by a network of four tubes with more than 10 km (Figure 4). In each building exists a secondary central composed by 2 heat exchangers, one for the circuit of hot water and another one for the cold water circuit. These secondary centrals have also a system to control the water temperature and flow and energy counters (Figure 5).

Currently the system ensures the needs and comfort of more than 3,000 customers, namely:

- 40 buildings on the tertiary sector (retail, offices and hotels), with a total power of 28 MW in cold and 16 MW in heat.
- 14 buildings of equipment with an aggregate power of 18 MW in cold and 13 MW in heat.
- Almost 3,000 of the customers are from the residential sector and small business, located in dozens of buildings with a total power of 22 MW in cold and 43 MW in heat.

Environmental and social benefits

(Estimate of) Greenhouse Gases abated (in metric tons of CO₂-equivalent):

The global value of greenhouse gases that this project can reduce is not known, because it depends of the adhesion, but the owner estimates that it will be possible to reduce 40% of CO₂ emission and 85% of NO_x, if we compare the use of this system with traditional technology solutions.

Figure 6 compares the CO₂ emissions to produce electricity using conventional systems and using ClimaEspaço system.

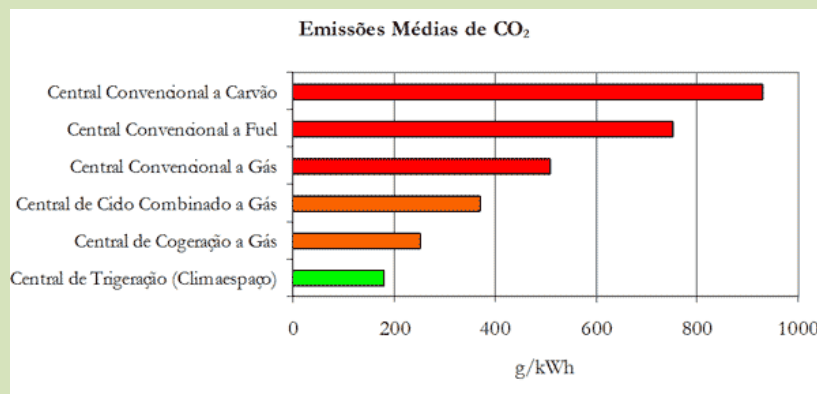


Figure 6 - CO₂ emissions of conventional systems and ClimaEspaço system to produce electricity

Number of reduction units (EAU, CER, ERU, AAU)	N/A
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Socio-economic aspects

What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project?

Comparing this system with a conventional air conditioning system, the urban network of cold and heat offers several advantages, at energy level, since it is more efficient, and also at environmental level by the reduction of pollutants emissions. At economical level the systems provides thermal energy cheaper than a conventional system, as it is possible to verify in the Figure 7.

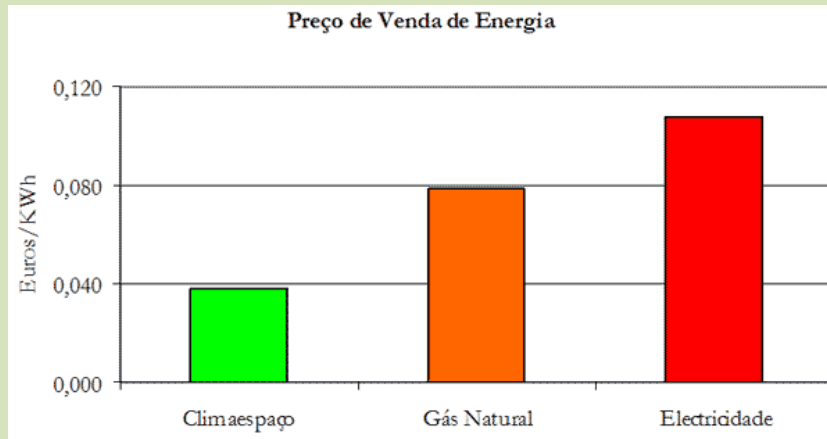


Figure 7 - Comparison of the thermal energy price provided by the present system and by the conventional systems

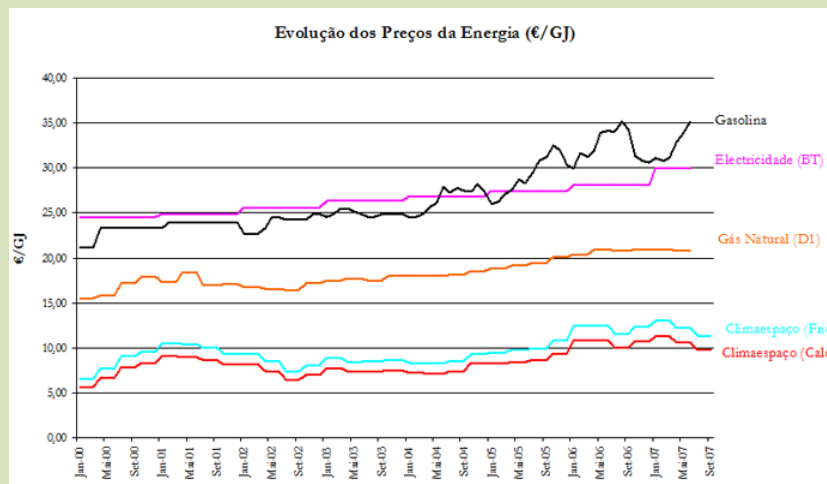


Figure 8 - Price Evolution

On the other hand, this project can be seen as a good practice that could be replicated in other regions of the country.

Economic data	
Capital costs	
Financing scheme	
Financing organisation (if third party)	
Project developer and Host organisation	
Name of the project developer	ClimaEspaço
E-mail and/or web address	http://www.climaespaco.pt/