



**Gr. Sarantis S.A.**



### **Summary:**

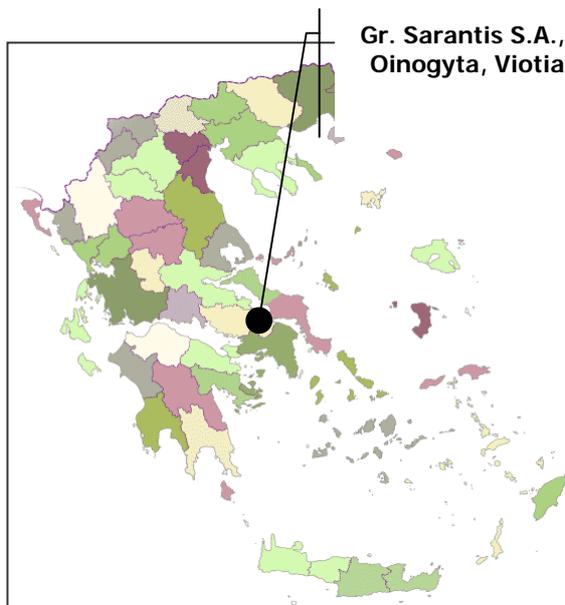
<b>Country</b>	Greece	<b>Collector area</b>	2.700 m <sup>2</sup>
<b>Location</b>	Oinofyta, Viotia	<b>Collector type</b>	Selective flat plate solar collectors
<b>Building</b>	Warehouse of cosmetic Company Gr. Sarantis S.A.	<b>Cooling capacity</b>	700 kw
		<b>Heating capacity</b>	1500 kw
<b>Technology</b>	Solar Air-Conditioning		

**Main positive points :** Financial contribution to the company  
 Contribution to the National energy balance sheet  
 Contribution to the environment

### **Building description:**

This project is called "PHOTONIO" and is related with the installation of central air conditioning system using solar energy for the heating or cooling of the new buildings and warehouses of the cosmetic company Sarantis S.A..

This installation uses flat plate solar collectors (instead of the vacuum tube collectors used in the past for small demonstration projects) for central air-conditioning (cooling - heating) at the new facilities of the **cosmetics company "Gr. SARANTIS S.A." in Viotia Greece**. The air-conditioned space is 22,000 m<sup>2</sup> (130,000 m<sup>3</sup>). A park of 2,700m<sup>2</sup> selective flat plate solar collectors was manufactured in Greece by SOLE S.A. and installed for this purpose.





**Figure 1:** Solar station "PHOTONIO", Sarantis S.A.

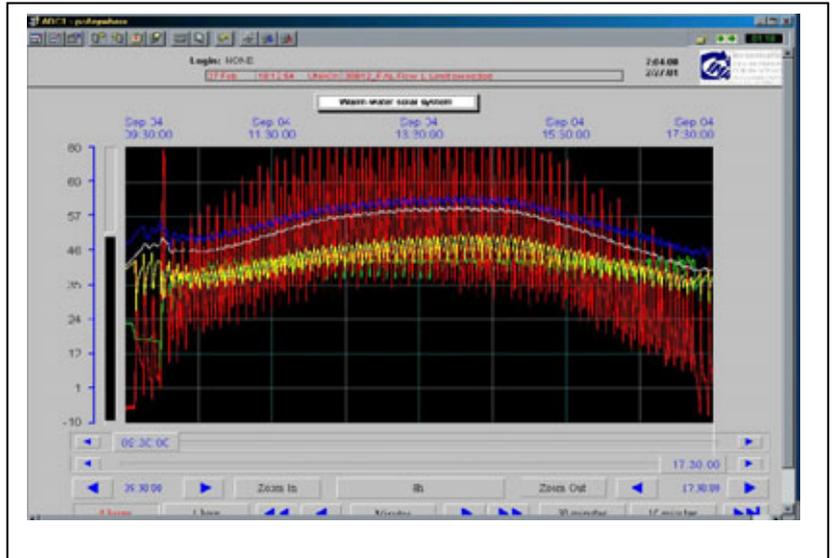


**Figure 2:** Solar adsorption chiller, Sarantis S.A.

## Cooling requirements:

The total cooling needs of the building are about 2.700.000 Kwh annually.

PRINTOUT: see on the right a printout of the daily energy production of the solar system.



## Air conditioning system description:

Technology used, description of the different parts of the system (machine, buffer, solar collectors...)

The solar collectors supply two adsorption chillers with hot water of temperature 70-75 °C and they operate with a coefficient performance of 60%.

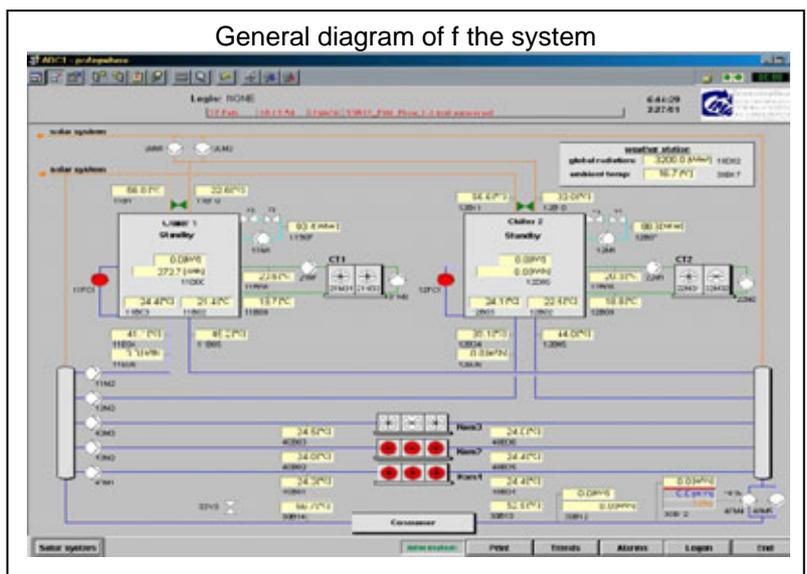
The two adsorption coolers, use the hot water as source of energy and produce cool water of temperature 8-10 °C. The cooling medium is also water (instead of Freon or Ammonia or Lithium bromide)

This is achieved within the condensation and evaporation of the coolant (water) in vacuum. The adsorption chillers don't consist of movable parts and use minimum electric energy for the operation of the vacuum pumps (1.5 kW).

The useful power is 350 kW for each one and 700 kW for the total. For the coverage of the peak load three conventional electric coolers of 350 kW each of them have been installed. Also two boilers of 1200 kW each one substitute the collectors field when there is cloudiness or whenever there is need for air-conditioning during the night.

The boilers use oil fuels that they will be replaced by natural gas in future. During the winter period the solar collectors produce hot water of 55 °C, which is circulated directly to the fan coil units in the building. The same boilers replace the collector field in case of overcast. The cold water (during the summer period) and the hot water (during the winter period) is directed to the local air-conditioning units where they cool or heat respectively the ambient air within physical procedures.

Commencement of operation: 15/08/1999



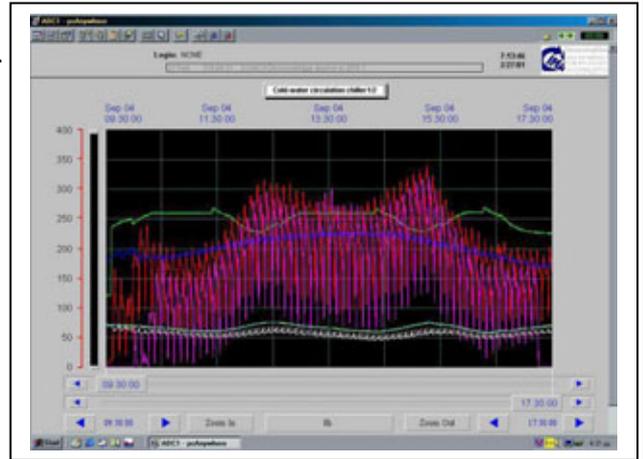
## Technical results:

Solar fraction, collector performance, COP, energy consumption..

Reporting period: 12 months

Solar Energy Output: 1.719.000 kWh  
Cooling: 1,090.000 kWh  
Heating: 629.000 kWh  
Total Energy Load: 2.614.000 kWh

Solar coverage: 65%



## Financial aspects:

Investments costs, subsidies, financing method, operation costs, financial savings

Total cost of the investment: 1.305.943 € (450.000.000 drachmas)  
50% funded by National Operational Programme for Energy (of the Greek Ministry of Development)

The use of flat plate solar collectors, the cost of which is less than 50% of the corresponding vacuum tube collectors, in combination with adsorption chillers.

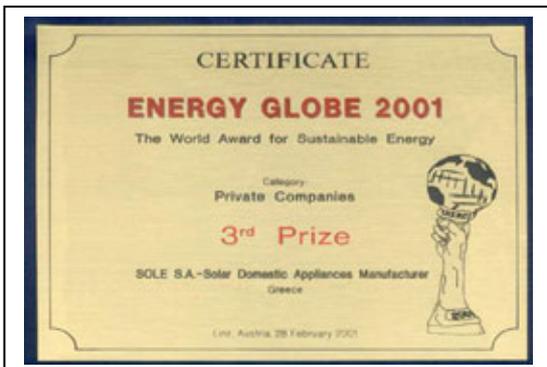
## Environment:

Environmental savings: The amount of energy saved by the solar system would otherwise have to be produced by the electricity company of Greece. The table on the right shows the amount of emissions of pollutants that are avoided due to the energy saving.

CO <sub>2</sub>	5.124.596 Kg
SO <sub>2</sub>	89.268 Kg
CO	1.076 Kg
NO <sub>x</sub>	201.216 Kg
HC	302 Kg
Parts	4.606 Kg

## Opinions:

The owners of the building are really very satisfied by all aspects of their investment, i.e. financial, environmental, etc., They also believe that the whole project contributes to the ecological image of their company to their clients, employees, the government and the public. The project has been awarded by "Energy Globe Award 2001" as the world's third best investment for sustainable energy in the year 2001 and by CRES in Greece (Center of renewable energy sources) as the best investment in Greece for the year 1999.



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## **Contact:**

Address, e-mail or web-site for more information

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## **Conclusion:**

Summary of the major positive points of this installation (to give convincing arguments to go for solar air conditioning)