Aquatic Park A Coruña

Cerceda, Galicia (Spain)

Sports centre | 1,130 sqm installation

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Project Summary

Description
This CSTS has been installed to extend the park operating season by covering a bigger demand of the swimming pool heating. Initially, the operating season was from the last week-end in May until the first week-end in September. With the solar system contribution, the season can be extended from the third in May until the last week in September. According to the calculations carried out by Aiguasol, the solar system may achieve a solar fraction of 68.8 % during the extended season at a temperature higher than 23 ºC and of 93.1 % during the regular season at 21 ºC. The total energy capacity is about 461,989 kWh, a thermal production equivalent to 90 % of a gas boiler.
This is one of the biggest installations within the country and is a remarkable example in the solar thermal field due to its design singularity (pergola construction).

Intelligent Energy Europe

Building

Type of building	Sports centre
Number of users / dwellings, floors	./.
Year of construction	2006
Total effective area (heated)	./.
Hot tap water consumption (measured/estimated)	./.
Whole energy consumption for heating purpose after CSTS implementation	299,594 kWh/a

System engineering

Fernando Antonio Tudó Anta, Council of Cerceda / Person in charge of Investment & Projects Department:

" The CSTS realized by RESOLVA Ingenieros allows to keep the water temperature according to the client´s needs. The project aims to save energy and

Year of construction of CSTS	2006
Type of collectors	Flat plate collectors
Thermal power	715 $kW_{therm.}$
Aperture area of collectors*)	1,020 m2
Buffer storage	50 m^3
Hot tap water storage	./.
Total capacity of boilers with energy source	./.
Type of hot tap water heating	./.
Type of heating system	./.

Costs

Total cost solar system	579,000 Euro
Cost of the CSTS / gross area of collectors	512 Euro/m^2
Subsidies	70 %

Output

Output of solar heat**)	461,989 kWh/a
Reduction of final energy***)	660,644 kWh/a
CO_2-emissions avoided	156 CO_2/a
Solar performance guarantee	No

*) Aperture area = light transmitting area of the front glass
**) measured, between storage and piping to taps (solar system output)
***) related to the measured output mentioned before

achieve energy efficiency and is a pioneer project in Galicia due to its size."

Owner

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Operator

See owner

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Technical description

Description of the CSTS

Year of construction of CSTS	2006
Thermal power	715 $kW_{therm.}$
Gross area of collectors	1,128.4 m^2
Aperture area of collectors	1,021.02 m^2
Type of collectors	Flat plate collectors
Type of assembly	Solar roof / pergola
Orientation of collectors	South (0°)
Inclination angle to horizon	20°
Freezing protection	Glycol, propilenglycol
Overheating protection	Expansion vessel
Operation mode	Low flow
Use of CSTS for	Swimming pool heating
Buffer storage	50 m^3, one storage tank
Hot tap water storage	./.

Summary

The installation consists of 13 rows connected in parallel and delivers 7,077 l/h divided as follows: 6 rows with 16 solar collectors (Q=2.696 l/h), 6 rows with 12 solar collectors (Q=2,022 l/h) and 1 row with 14 solar collectors (Q=2,359 l/h) which sum up a total of 182 solar collectors and a surface of 1,021m². The system nominal solar thermal gradient is 20,5 K with an estimated solar radiation of 1000 W/m^2. The swimming pool's energy demand and system dimensions have been calculated with TRANSYS. The system is composed of 8

Control of backup-system / CSTS	Non existing back-up system, non permitted	pumps: 1 pump for the solar storage (Q = 1,76 kW), 4 primary pumps (2 × Q = 7,5 kW and 2 × Q = 1 kW) and 3 secondary pumps (Q = 0.79 kW, 0.23 kW and 0.27kW).

Hot tap water system

Type of hot water heating	./.
Recirculation system	./.
For decentralised systems: The installation on the consumer site	./.
Size of storage for hot tap water	./.
Specification (if necessary)	./.

Space heating system

Type of heating system	./.
Number of boilers	
Total capacity (power output) of boilers	./.
Capacity of each boiler (year of construction)	./.
Energy source	./.
Type of boiler system	./.

Type of operation

Operator of the CSTS system	Self-operation
CSTS monitoring	Yes: solar radiation, output of solar heat, total water consumption
Data accessible via internet	No
Scientific monitoring / follow up	No
Maintenance contract	No
Visualisation of the solar heat output	No

Yield of CSTS plant

Output of solar heat	461,989 kWh/a
Origin of data	Design (calculated)
Measuring point	Between storage and piping to taps
Reduction of final energy	660,644 kWh/a
Origin of data	Estimated
Solar performance guarantee	No

Heat consumption

Whole energy consumption for heating purposes after CSTS implementation	299,594 kWh/a
Origin of data	not available
Energy used for	Swimming pool heating
Whole energy consumption for heating purposes before CSTS implementation	960,238 kWh/a
Total tap water consumption	./.
Hot tap water consumption	./.
Hot tap water temperature	21–23 °C
Cold water temperature	./.

Engineering, installer

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Financing and investment

Financing of the CSTS	
Form of financing	Purchase, 30 % self-financing
Distribution in percentage	70 % subsidies (The Galician delegation and the Galician assembly have subsidied part of the CSTS.)
Costs of solar materials	
Total cost of solar system	579,000 Euro
Detailed costs for	
Collectors	326,371 Euro
Elevation / mounting structure	94,870 Euro
Storage / heat exchanger	138,087 Euro
Backup heater	./.
Control	Included in Storage / heat exchanger
Installation	Included in Collectors
Planning / Engineering	20,564 Euro
Others: Comissioning (1), General costs (2)	950 Euro (1) 8,250 Euro (2)
Operation costs of heating system	
Increase of the operation cost after CSTS implementation	not available

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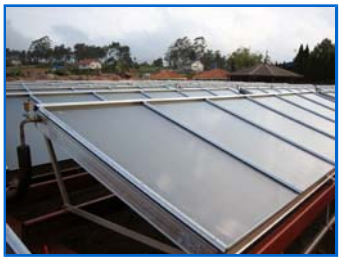
Development & experiences

Qualitative aspects of the CSTS
The CSTS has been installed to extend the park operating season by covering a bigger demand of the swimming pool heating. The planning of the CSTS has been optimised by the use of TRNSYS. It allowed estimating accurately the future performance of the installation.
The engineering company has gained experience on stagnation behaviour for large scale solar collectors (10 m^2). The experience gasined will certainly give the companies involved more opportunities in the solar thermal sector.



Experiences management	
Experienced problems or failures?	Yes: The temperature reached is a bit lower than expected but the CSTS works properly.

Management

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0034 98 860 17 61

Found solutions to these problems or failures?	No	resolva(at) resolvaingenieros.com www.resolvaingenieros.com

Financial effects / project performance

Project economically efficient?	Yes: The investment is profitable in a medium term due to the extension of the swimming season.
Fiscal or other financial effects?	not available
Effects on rental fees?	not available

Experiences technical staff

Experienced problems or failures?	Yes: There was an elevation mistake when the underground storage tank was built. This caused pumping problems.
Found solutions to these problems or failures?	Yes: The pumping system has been redimensioned and some pumps were replaced by more powerful ones.

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