



penelope bacchus

Promoting Energy efficiency to Local Organisations
through dissemination Partnerships in Europe

Best Actions for Collaboration in Countries
for a High efficient Use of energy in Structural funds

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A solar-powered nursery in Rennes - Municipality of Rennes - France

Heat production using thermal solar panels providing domestic water for multifamily housing

Target Groups	Sector	Field
<ul style="list-style-type: none"> - Local authority - Regional authorities 	<ul style="list-style-type: none"> - Energy supply - Buildings (including municipal properties) 	<ul style="list-style-type: none"> - RES - Equipment / appliances

ANALYSIS

AN EXPERIMENTAL INSTALLATION PROVIDING HEATING FOR A NURSERY

The nursery building accommodates 64 children aged three and under. It comprises four play rooms, and eight dormitories plus annexes (kitchen, offices).

The purpose of the solar energy installation, which has been operating since November 1993, is to provide the nursery with heating and hot water. The installation tops up the solar energy it receives with energy from the local electricity grid.

Needs and dimensions of the building:

- Floor space: 1,000 square metres,
- Volume to be heated: 2,500 cubic metres,
- Net heating requirements: 73,700 kWh,
- Heat consumption: 86,700 kWh,
- Net domestic water requirements: 4,500 kWh,
- Domestic water consumption: 6,500 kWh.

SOURCES OF HEAT:

- Solar energy: 80 sq.m of roof-mounted solar panels. The temperatures circulating in the system vary between 25 and 75°C. As well as capturing heat, the panels also provide the nursery with protection from the sun during the summer;
- Energy from the local grid directly powering the boiler via a domestic hot water system (90°C).

THE HEATING SYSTEM:

The nursery is fitted with a floor heating system. This system covers the entire area of the nursery and provides a constant ambient temperature of 15°C. It is powered both by the solar panels via an exchanger and by the local power grid, in accordance with heating requirements and hours of sunlight.

DOMESTIC HOT WATER:

The hot water used by the nursery is pre-heated in a 500-litre water tank. Additional heating is supplied by a 300-litre semi-instantaneous hot water heater connected to the local grid to ensure water temperature of 55°C.

Excess energy produced is used for pre-heating domestic hot water in the multifamily housing adjacent to the nursery (45 houses).

HEATING CONTROL:

Heating levels are adjusted by a remote management system operated by the municipal authorities. The system can be programmed and tested remotely. The control system uses information provided by ambient temperature sensors to calculate power-up times and to correct excess or insufficient heating levels during daytime hours. Heating control keeps the temperature at a constant 21°C.

At present, the solar panels provide 35% of the nursery's heating requirements (32,000 kWh/year). Solar power produces 80% of domestic hot water in the months from May to September, and 50% during the rest of the year.



COST AND BENEFITS

- Energy savings: 32,000 kWh
- Reduction in CO2 emission: 10 T/year
- Financial savings: €1,200/year
- Funding:
 - ADEME: €15,500
 - European community: €27,000
 - Rennes municipal council: €55,000

PARTNERSHIP

- ADEME, Brittany office (partial funding of solar installation): 16%
- European community: 28%
- Rennes municipal council: 56%

RECOMMENDATIONS

- Need to service and maintain the installation on a regular basis to keep its output up to standard.
- Permanent monitoring for optimum operation of the solar panels using simple checking procedures.

TO KNOW MORE

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USEFUL INFORMATION

List of Internet sites

[Information on the solar-powered nursery \(Rennes\) /](#)

http://www.ademe.fr/bretagne/actions_phares/energies_renouvelables/solaire.asp

THIS CASE HAS BEEN REALISED BY

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