SOLARGE

Enlarging Solar Thermal Systems in Multi-Family-Houses, Hotels, Public and Social Buildings in Europe

Project summary

Laurentiushaus
Olching
Germany

Description
Because of not reaching the new EU-building standard two natural gas condensing boilers (each 350 kW) were renewed. Additionally a significant high hot tap water demand in the summer period was identified. These gave the impulse for renewing the boilers and installing three CHP (combined heat and power unit) and a solar thermal system for the nursing home Laurentiushaus.

Building

Type of building	Nursing home
Number of users/dwellings, floors	144 residents 110 dwellings 3 floors
Year of construction	1982
Total effective area (heated)	7,740 m^2
Hot tap water consumption (measured)	1,200 m^3/a,
Whole energy consumption for heating purpose after CSTS implementation	2,250,000 kWh/a

System engineering

Year of construction of CSTS	2005
Type of collectors	Flat plate collectors
Thermal power	48 kW_{therm}
Aperture area of collectors*)	69 m^2
Buffer storage	3.0 m^3
Hot tap water storage	2.75 m^3
Total capacity of boilers (natural gas)	637.5 kW
Type of hot tap water heating	Centralised
Type of heating system	Centralised

Costs

Total cost solar system	41,000 Euro
Cost of CSTS / gross area of collectors	532 Euro/m^2
Subsidies	0 %

Output

Output of solar heat**)	35,000 kWh/a
Reduction of final energy***)	39,000 kWh/a
CO_2-emissions avoided	9.8 t 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

Uwe Reebs, general manager:
„We are glad of using this technology. We are indebted to Ingenieurbüro Ulrich GmbH for their good consultancy and supports. This heating system is our share on the protection of the environment."

Owner
Evangelisches Alten- und Pflegeheim Laurentius Olching
(Protestant nursing home Laurentius in Olching)
Herr Uwe Reebs
Feursstr. 23
D-82140 Olching, Germany
Phone: +49 8142 450133
Fax: +49 8142 17491
Uwe.reebs@diakonieffb.de
www.laurentiushaus.diakonieffb.de

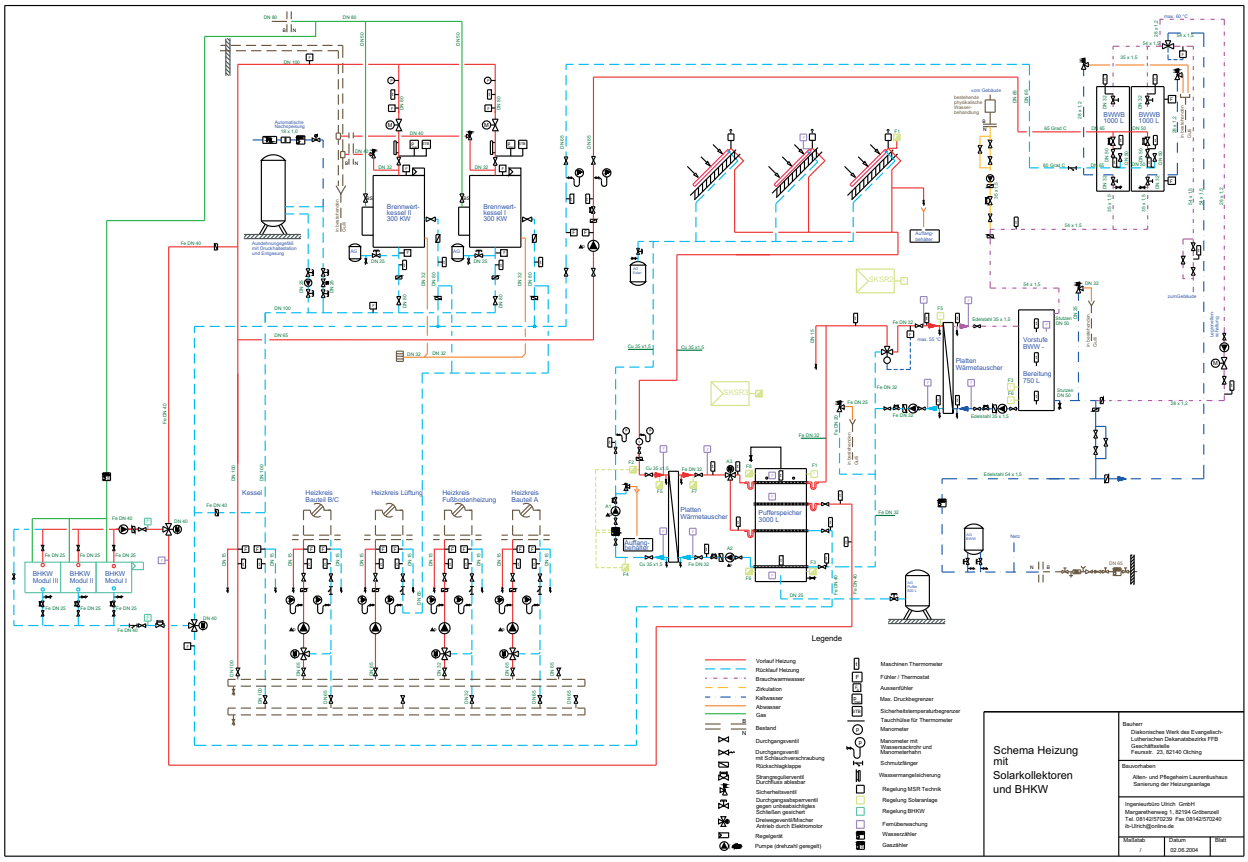
Operator
See owner

SOLARGE

Enlarging Solar Thermal Systems in Multi-Family-Houses, Hotels, Public and Social Buildings in Europe

Technical description

Laurentiushaus
Olching
Germany



Description of the CSTS

Year of construction of CSTS	2005
Thermal power	48 $kW_{therm.}$
Gross area of collectors	77.1 m^2
Aperture area of collectors	69 m^2
Type of collectors	Flat plate collectors
Type of assembly	On roof top
Orientation of collectors	South (0°)
Inclination angle to horizon	28°
Freezing protection	Glycol
Overheating protection	Expansion vessel
Operation mode	Low flow
Use of CSTS for	Hot tap water heating
Buffer storage	3.0 m^3 (1 storage tank, welded in cellar)
Hot tap water storage	2.75 m^3 (2 × 1,000 l and 1 × 750 l)
Control of backup-system/CSTS	Separated control

SOLARGE

Enlarging Solar Thermal Systems in Multi-Family-Houses, Hotels, Public and Social Buildings in Europe

Technical description (2)

Laurentiushaus
Olching
Germany

Hot tap water system	
Type of hot water heating	Centralised
Recirculation system	Yes
For decentralised systems: The installation on the consumer site	./.
Size of storage for hot tap water	2.750 m³
Specification	./.
Space heating system	
Type of heating system	Centralised
Number of boilers	5
Total capacity (power output) of boilers	637.5 kW
Capacity of each boiler and the year of construction	2 × 300 kW (2005) 3 × 12.5 kW (2005)
Energy source	Natural gas
Type of boiler system	Condensing (2), Cogeneration unit (3)
Type of operation	
Operator of the CSTS system	Self-operation
CSTS monitoring	Yes: all data between collectors and hot tap water system
Data accessible via internet	Yes
Scientific monitoring & follow up	No
Maintenance contract	Yes
Visualisation of the solar heat output	No
Yield of CSTS plant	
Output of solar heat	35,000 kWh/a
Origin of data	Calculated
Measuring point	Between collector and storage
Reduction of final energy	39,000 kWh/a
Origin of data	Design
Solar performance guarantee	No
Heat consumption	
Whole energy consumption for heating purposes *after* CSTS implementation	2,250,000 kWh/a
Origin of data	Estimated
Energy used for	Hot tap water production, space heating, kitchen
Whole energy consumption for heating purposes *before* CSTS implementation	2,821,500 kWh/a
Total tap water consumption	n. a. m³/a
Hot tap water consumption	1,200 m³/a,
Hot tap water temperature	60 °C
Cold water temperature	10 °C

< reported and metered data are sent via remote data transmission to IB Ulrich GmbH

Summary

The solar thermal system is solely providing hot tap water heating. A three cbm buffer storage tank is built in for storing the solar heat. If required the buffer storage tank delivers the heat to a serial 750 litre fresh water storage tank. Further two 1,000 litres stand by tap water storage tanks get the solar heat afterwards. These both storage tanks also heat up the tap water to needed temperatures, if required.

Planner & Engineering company

Ingenieurbüro Ulrich GmbH
Mr. Ulrich
Margarethenweg 1
D-82194 Gröbenzell, Germany
Phone: +49 8142 570239
Fax: +49 8142 570240
Ib-ulrich@online.de

SOLARGE

Enlarging Solar Thermal Systems in Multi-Family-Houses, Hotels, Public and Social Buildings in Europe

Financing & Investment

Laurentiushaus
Olching
Germany

Financing of CSTS	
Form of financing	Purchase
Distribution in percentage	0 %
Costs of solar materials	
Total cost of solar system	41,000 Euro
Detailed costs for	
Collectors	13,600 Euro
Elevation/mounting structure	3,500 Euro
Storage/heat exchanger	9,000 Euro
Backup heater	./. Euro
Control	1,200 Euro
Installation	13,000 Euro
Planning/Engineering	./. Euro
Others	700 Euro
Operation costs of heating system	
Power cost for pumping	./. Euro/a
Maintenance cost	./. Euro/a
Monitoring cost	./. Euro/a
Other operation cost	./. Euro/a
Total operation cost	./. Euro/a
Or: Increase of operation cost after CSTS implementation	325 Euro/a (power costs for pumping, maintenance costs)

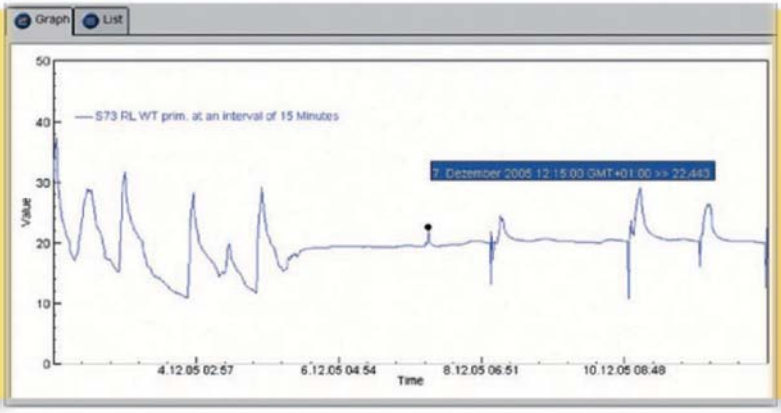
There were no additional subsidies from KfW support programs to get, due to overstate requirements.

SOLARGE

Enlarging Solar Thermal Systems in Multi-Family-Houses, Hotels, Public and Social Buildings in Europe

Development & Experiences

Laurentiushaus
Olching
Germany



Qualitative aspects

This investment is profitable due to the high hot tap water demand during the summer period. The usage all of the offered solar energy lets raise the system efficiency. The installed solar thermal system has achieved the planned targets. An objective cost benefit analysis and the consideration of several model calculations were crucial for realising these aims.

Experiences management

Experience problems or failures?	No
Find solutions to these problems or failures?	./.

Financial effects/project performance

Project economically efficient?	Yes
Fiscal or other financial effects?	Yes: natural gas tax exemption.
Effects on rental fees?	./.

Experiences technical staff

Experience problems or failures?	n. a.
Find solutions to these problems or failures?	n. a.