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Energy in Minds!

Integrated Project

Priority 6.1.3 Concerto

WP2.1b-D2

Full-Year Energy Monitoring of Completed Installations Solar Thermal Systems

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Dissemination Level		
PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	



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Participants	ID	
WP-leader:	2	AEE
Participants:	4	FWS
	5	C-Zlin
	7	Ekosolaris
	8	GHA
	9	C-NSU
	11	E-Initiative

Introduction

The number of solar thermal systems will be increased significantly! Depending on the current use of solar thermal systems in the partner regions an increase between 9% and 15 % is anticipated. In every region the installed solar collector area per inhabitant after energy in minds, will be at least double than average in the country. Besides small and large scale Combisystems, other innovative solar technologies like the combination of solar thermal systems and district heating, solar air systems and solar systems with seasonal storage will also be tested and demonstrated within the project

WP. 2.1b D2 reports of full-year-monitoring of the completed installations.

Deliverable result

1. Energy Region Weiz-Gleisdorf

Andreas Höfler

The solar thermal system at the Höfler family was installed in the low energy building with an energy demand of 55 kWh/m²a. The system consists of 16 m² with a collector angle of 33° and a 1600 litre buffer store. The space heating for the building is distributed with a floor heating system.



Peter Graf

The solar thermal system at the Graf family consists of 19 m² with a 1200 litre buffer store. The space heating for the building is distributed with radiators. The system was installed in February 2006. The monitoring data of the solar thermal system measured 6197.5 kWh from the installation until the end of March 2007.



Strahlhofer

The solar thermal system at the Strahlhofer family consists of 16 m² with a 1000 litre buffer store. The space heating for the building is distributed with a floor heating. The system was installed in April 2006. The monitoring data of the solar thermal system measured 4782.5 kWh from the installation until the end of March 2007.

During the second reporting period another 16 solar thermal systems were installed, where also monitoring data has been delivered to the project team

Name		Collector area	Measured kWh	Operation since
Christof	Stark	7 m ²	n.a.	
Michael	Hausmann	19.5 m ²	n.a.	
Gerhard	Schrank	18 m ²	4026	June 2006
Andrea	Breisler	22 m ²	n.a.	
Peter	Graf	19 m ²	6197.5	July 2006
Herbert	Gruber	22 m ²	2264.8	May 2006
Werner	Höfler		n.a.	
Petra	Terler	16 m ²	6814.7	Sept. 2006
Herbert	Knoll	21.6 m ²	1444.8	Sept. 2006
Josef	Wünscher	16 m ²	1141.9	Oct. 2006
Manfred	Raith	18 m ²	3360.377	Oct. 2006
Alexander	Bauernhofer		1706.2	k.a.
Franz	Ramminger	20 m ²	1031.8	Oct. 2006
Hans	Hofer	21.44 m ²	3870	Sept. 2007
Gemeinde	Naas	22 m ²	606.7	Jan 2007
Robert	Mitteregger	20 m ²	1518	Dec. 2006

2. Zlin

A large-scale solar thermal system with the collector area of 60 m² (= 30 flat collectors 2 m² each, designed heat output 41 kW_{th} and energy production 23 MWh/year) on the flat roof of Technicke sluzby Zlin Ltd. was installed in May 2006. The system is dimensioned to cover approx. 70 % of DHW needed in that industrial premises, i.e. approx. 3000 litres a day of 60°C hot water, to be mixed with the cold water mainly for washing workers and cars.

Measurements after the first 12 months of operation (July 2006 – June 2007) recorded by the ST control system give the actual energy gains 26.105 kWh. However, this result can be influenced by the extraordinary warm and sunny autumn 2006 / winter 2007.



A tender for installation of approx. 200 m² ST system combined with a heat pump for the city bath was issued in autumn 2006, with the deadline repeatedly postponed. Still the system is planned for installation in 2007, but most probably in autumn.



During the 2nd reporting period, 10 new low-energy houses constructed within E.I.M. in locality Louky - Zalusti are equipped with ST systems for DHW preparation. The “starting” system for each house comprise 2 m² solar collector and 200 l buffer tank. However, it is supposed that after getting the first experience the home owners will increase the output of their ST systems, for which the construction on the flat roof and internal boiler room have been designed.

On existing family houses 2 ST systems have been installed in April – May 2007, each with 6 m² collector area and 350 l buffer tank, see pictures below (left system installed by family Frkal, right by family Kutalek). Both systems are designed for the heat output 4,2 kW_{th} and the yearly heat production 2100 kWh. Actual measurements are not yet available.



3. Neckarsulm

In the building administration department of the city of Neckarsulm ("Bauverwaltungsamt") people are permanently given advices concerning subsidies for solar thermal systems. In this department the applications are made for the financial subsidy and dealt with.

During the last year 24 applications were made for solar thermal systems within the demo area. With an average collector area of about 6,2 m² there is a total collector area of 148 m² installed on private houses.

Although there is an increase of applications in comparison to the first 12 months, less solar thermal systems were realized than originally planned (200 m²). Since the beginning of Concerto there is a total collector area of 276 m² installed on private houses in the demo area. Evaluating the total number of systems installed PV-systems seem to be more successful than solar thermal systems.

Difficulties have appeared with the monitoring of the solar thermal systems. There is no meter installed automatically with the installation of a solar thermal system comparable with the PV-systems. In fact that the installation of an additional meter would cause an additional investment for the owners there are only calculated CO₂-savings available for most solar thermal systems. These savings will be evaluated in the city performance list.

Name	Collector area	Calculated savings		Operation since
		kWh/m ² a	kWh _{th} /a	
Barreau Heiner u. Marga	11,5	350	4.025	17.04.2007
Keicher Albert	4,5	350	1.575	20.07.2006
Abel Elke u. Peter	4,6	350	1.610	28.09.2006
Vogler Klaus u. Jutta	5,0	350	1.750	04.12.2006
Kazmeier Uwe	4,0	350	1.414	27.09.2006
Seemund Martin u. Katja	6,9	350	2.419	30.01.2007
Bekci Esref	6,1	350	2.121	04.08.2006
Knotz Viktor	4,6	350	1.610	16.10.2006
Lehleiter Renate	19,3	350	6.748	08.11.2006
Sperrfechter Bernhard	4,0	350	1.414	13.12.2006
Klenk Dorothea u. Ralf	5,0	350	1.764	19.06.2006
Krebs Rosa	4,6	350	1.610	21.08.2006
Flohr Helmut	4,6	350	1.610	06.07.2006
Stenger Peter u. Regina	9,6	350	3.346	27.09.2006
Hoffmann Roger	6,4	350	2.240	21.08.2006
Pilingos Evangelos	8,8	350	3.080	02.08.2006
Reiser Thomas u. Eveline	4,6	350	1.610	05.10.2006
Geyer Gerd	3,0	350	1.050	06.12.2006
Kleis Bernhard u. Ingrid	4,6	350	1.610	08.11.2006
Ziegler Silvia u. Gerhard	4,6	350	1.610	05.03.2007
Bogner Oliver u. Nicole	3,0	350	1.050	23.01.2007
Schneider Armin	4,5	350	1.561	15.05.2007
Diebel Michael	7,2	350	2.531	15.05.2007
Betke Andreas	6,9	350	2.415	03.04.2007
Sum	147,9	8.400	51.772	

A large solar thermal system with 260 m² was installed in the “Weserweg”, 74 m² in the “Ruhrweg” in Neckarsulm - Amorbach and put into operation at the beginning of the year 2007. The solar thermal systems supply solar heat to the district heating system with seasonal storage.



The solar thermal systems were installed on private residential buildings. The utility of Neckarsulm is responsible for the operation and maintenance of the system. The transmission station of the solar thermal system was installed in a prefabricated garage on-site.

Name	Collector area	Calculated savings		Operation since
		kWh/m ² a	kWh _{th} /a	
Stadtwerke Neckarsulm	259	300	77.700	Beginning 2007
Stadtwerke Neckarsulm	74	300	22.200	Beginning 2007
Sum	333	600	99.900	

4. Falkenberg

Of 40 approved applications for support, 24 installations are made so far. One year monitoring is reported for four installations. In most cases the solar energy replaces electricity for heat and domestic hot water production.

The average cost per system is about 6.300 €.



Jonas Karlsson

The 9.7 m² flat plate collectors on the Karlsson family house replaces electrical heating. There is a 1000 litre buffer store. The measured production during 2006 has been 4365 kWh.



Erling Hermansson

The Hermansson solar collector installation consists of vacuum tubes. The tubes are mounted on both sides of the roof ridge. The solar collectors are combined with a boiler fuelled with fire wood. The buffer used for solar energy is 500 litres. Calculated annual production is 3570 kWh.

Completed solar collector installations

Name	Collector area m ²		Annual production		Operation since
	Flat plate collectors	Vacuum tubes	Measured kWh	Calculated kWh	
Michael Nylund	7,5		2948		Oct 2005
Jonas Nilsson	9,7		4365		Dec 2005
Magnus Karlsson	8,2		3690		Jan 2005
Marianne Bengtsson		5,1		3570	June 2006
Stellan Dahlberg	9,7			4365	June 2006
Erling Hermansson		4,6		3220	July 2006
Niklas Svenmyr	10,0			4500	Jan 2007
Lars Andersson		4,5		3150	April 2006
Monica Bondeson		6,8		4760	March 2007
Ann-Marie Gustavsson		9,1		6370	July 2007
Per Andersson		6,7		4690	June 2006
Mats Ottosson		6,0	2964		May 2006
Jonas Isaksson	10,0			4500	July 2006
Mats Uno Svensson		6,0		4200	July 2006
Yvonne Johnsson	12,4			5580	Nov 2006
Inger Alexandersson	12,4			8680	Febr 2006
John Carlsson		2,83		2199	April 2007
Joakim Johansson		5,7		3990	Dec 2006
Krister Bengtsson		5,7		3990	Febr 2007
Jan-Eric Jönsson		6,84		4911	April 2007
Bertil Bengtsson	8,4			6031	Jan 2007
Ingegerd Benjaminsson	7,5			2959	March 2007
Ann-Britt Berglund		9,12		6 548	May 2007
Nils-Anders Carlsson		4,5		3360	Jan 2007