



Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

**A report from the study visit
in Switzerland
5-7 June 2013**

Sucha Beskidzka 10 June 2013



SWISS
CONTRIBUTION





Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

A report from the study visit in Switzerland 5-7 June 2013

I. Aim of the visit:

Expanding knowledge on solar systems and their use as well as other environment-friendly technologies utilizing solar energy sources

II. Basis for the visit:

Contract no URP/SPPW/2.1.2/KIK/44 concerning the project "Programme for Enhancing the Use of Renewable Energy Sources and Improving the Quality of Air within the Natura 2000 Areas in the Poviát of Sucha Beskidzka" KIK 44

III. Delegation members:

Paweł Dyrz – Project Coordinator,

Marek Mrugacz – Deputy Project Coordinator,

Maria Karcz – Project Administration personnel member

IV. Details of the visit and conclusions



Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

Day 1 - Wednesday – 5 June 2013

1. HSR SPF Rapperswil- Testing Institute for solar collectors (www.solarenergy.ch)

As one of the few such centres in Europe, the Institute is entitled to test solar collectors for their compliance with standard EN 12975 – 1 Solar thermal systems and their components – Solar collectors. The standard includes the tests for:

- a) Durability and reliability of solar collectors
- b) Stagnation temperature of collectors
- c) Heat characteristics of collectors

which are the most important parameters confirming the quality of the collectors produced. Mr Andreas Bohren and the Institute employees presented information on the subject.

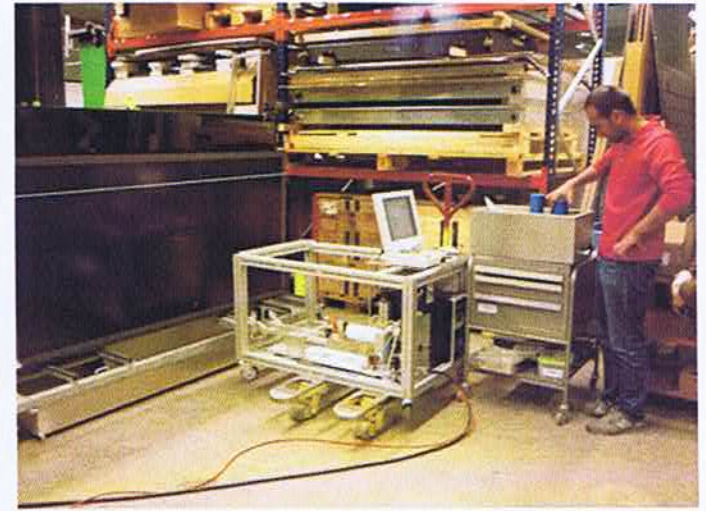
The lecture also included information on the awarding of the SOLAR KEYMARK sign which guarantees high quality of collectors throughout the entire period of their use.

The participants were able to:

- a) Find out about the construction and materials used to produce flat panel and vacuum tube solar collectors, solar pumps and solar system components on the basis of their models
- b) Participate in the preparation and testing for hail when bullets of the diameter of 3 cm were shot at the collector from a special cannon (collector manufactured by a Polish producer). The collector passed the test.
- c) See the testing stations for solar collectors equipped with turn-tables, pyrometers, ventilation
- d) See the new types of solar collectors, e.g. for swimming pool water heating, with a new surface structure and focusing collectors
- e) See solar collectors that did not pass the compliance test
- f) See PV cells and hybrid systems combining the function of a solar collector for DHW preparation and a PV cell

Conclusions:

- a) The visit confirmed our belief that including the requirement for the tests for compliance with the standard and the SOLAR KEYMARK sign in ToR guarantees the purchase of high quality equipment
- b) Solar collectors that do not pass tests are a short-term investment which is bound to fail
- c) Changes in the structure of solar systems are an on-going process depending on the application of solar collectors





Starostwo Powiatowe

w Suchoj Beskidzkiej

Wydział Środowiska

2. Solar collector plant SOLTOP - Elgg (www.soltop.ch)

SOLTOP is the leading producer of solar collectors in Switzerland with extensive experience in the manufacturing and assembly of systems

The participants were able to :

- a) Find out about SOLTOP products
- b) Find out about the structure of solar systems, including tanks
- c) See the process of solar collector production, including the forming, welding, sealing and storing of an absorber
- d) Find out about the solar collector structure solutions that facilitate snow sliding from the collector by eliminating the gasket from the bottom part
- e) No-pressure system of making solar collectors without using membrane vessels
- f) Find out about the new structure of the solar tank enabling the use of solar energy to heat the smaller tank first and then the remaining volume, which is useful in low insulation periods
- g) See a new integrated tank control system

Conclusions

- a) Solar systems may be also made in the no-pressure system without using membrane vessels
- b) Simple modifications of the structure of solar collectors influence their functionality
- c) The experience in and precision of the works performed influences the quality of the elements produced.





Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

Day 2 - Thursday – 6 June 2013

1. Solar system of 120 m² - Zurich HÖNGG

The system for DHW preparation for a multi-family building. The system of multi-family buildings in Switzerland is primarily based on rented flats, so investments in solar systems are financed by housing cooperatives only. The system of solar collector mounting in Switzerland is based on the horizontal assembly of collectors, which is different from Poland due to the size of the snow cover. Moreover, the mounting system is regulated by the local authorities of individual cantons (e.g. solar collectors may not be mounted in a different way than parallel to the building façade and no more than 2 collectors divided by the windows in the roof may be mounted next to each other). In some cantons there are no restrictions with regard to the way of mounting. The glycol installation was made of stainless steel instead of copper in order to reduce the investment costs. According to the user, this material, although cheaper, has the same properties as copper.

The participants were able to:

- a) See the way of mounting the system on the roof and the way of insulating the tubing and tanks
- b) See how green roofs, i.e. the roofs covered with the 20 cm layer of stones and plants, are made

Conclusions:

- a) Just like in Poland, when mounting solar collectors, it is necessary to take into account the guidelines of local bodies, which, unfortunately, may sometimes result in losses in solar energy yield compromising the solar system aesthetic aspects
- b) The system of rented flats encourages only building owners, not tenants, to introduce the solutions based on renewable energy sources
- c) Green roofs benefit aesthetic aspects of and increase the size of green areas in urban areas





Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

2. Exhibition Centre Umwelt – Arena - Spreintebach (www.umweltarena.ch)

The Centre includes the solutions improving the environment quality and lowering the costs related to the building exploitation. The Umwelt- Arena building is an example of energy-efficient construction:

- a) Insulated with about 40 cm of the insulation layer
- b) Using geothermal energy
- c) Using and storing rain water for, among others, toilet flushing
- d) Equipped with systems for biogas production using waste from the canteen
- e) Having a solar system for DHW production
- f) Covered with over 5000 m² of PV cells generating power for the centre; power surplus is sold to the grid

The participants were able to:

- a) See and feel the distribution of temperature and the maintenance costs of the building depending on the technology used (standard building, energy efficient building, passive building). There are lower investment costs for standard buildings but higher exploitation costs. As the standard of construction increases (better insulation materials, thicker insulation layer, better insulation coefficient for walls and windows), the costs of investment rise but the costs of exploitation fall to achieve the level of CHF 0 for passive buildings. The building types were introduced in an interesting way – three separate rooms affected by the same temperature of – 5 °C. In each room we could see the cross-section of walls and measure the temperature inside. There were class A, A+ and A++ household appliances in the passive building. The options of heat recuperation and recovery were presented, e.g. by putting a coil under the shower base.
- b) See the joint system for fish breeding and plant cultivation designed to be used on the roofs of multi-family buildings. Water circulates in a closed circuit transferring nutrients from the fish tank to the field with vegetables.
- c) See a green wall and chandeliers made of PET bottles
- d) See the models of hybrid and electric cars, although we regret we were not able to experience the silence inside an electric car, e.g. OPEL AMPERA, while driving; each car was equipped with energy class A tires limiting the resistance of rotation while maintaining the same fuel consumption. The cars were equipped with various way of energy supply, including a simple 230 V socket.
- e) Find out how the quality of 0w 40 , 5 W 40 and 10W 40 car oil influences its liquidity
- f) See the work of small wind turbines depending on their construction
- g) See PV cells, PV cells combined with the function of water heating, PV cells mounted on a balcony railing in such a way that only after a close examination can they be noticed
- h) Different types of heating based on gas, oil, and pellet wood



Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

Conclusions :

- a) The so-called applied art has a wide application in waste use
- b) Investing into a building heating system brings long-term benefits, passive buildings plus energy-effective buildings are the buildings of the future
- c) The existing buildings cannot be turned into passive buildings but considerable savings may be obtained when they are additionally insulated and windows are changed, especially that the prices of energy carriers will be rising, at least in Poland. These conclusions will be applied in the programme for the thermo-modernisation of 10 poviat buildings
- d) The construction sector nowadays is an enormous area for works related to heat recovery, which is lost and could be utilized to limit the building exploitation costs and reduce emissions
- e) We are hoping that in the future the prices of such energy carriers as oil, electricity will be more affordable for Poles. Fuel oil is cheaper than in Poland although the salaries in Poland are significantly lower than in Switzerland.
- f) Photovoltaics is the future but only if, just like in Switzerland, the citizen will be able to sell surplus energy to the grid.





Starostwo Powiatowe

w Suchoj Beskidzkiej

Wydział Środowiska

3. 19 solar systems for multi-family buildings – Zurich - www.solarline.ch

Solar systems for DHW preparation were located within a housing estate

The participants noticed that:

- a) All collectors were mounted on the roof and because of the local regulations they were mounted in pairs divided by roof windows
- b) The collectors are oriented to the south and west
- c) The collectors mounted have a relatively large surface, about 2.51. m² ; mounting is vertical
- d) Tubing insulation is excellent
- e) The water removal solution is interesting as water may flow out after the safety valve is opened
- f) The tubing for the glycol part after the safety valve has been made of metal because of possible high temperatures

Conclusions:

- a) It is not always possible to obtain maximum yields from the system as local provisions must be observed
- b) The water removed from the system after the safety valve should flow to the sewage system
- c) The material used for tubing in the glycol part after the safety valve should be able to withstand the temperature of the hot solution without damaging the valve





Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

Day 3 - Friday – 7 June 2013

1. Solar system – Sports and Recreation Centre – Greifensee

The system made on the basis of SOLTOP collectors working in the no-pressure system without membrane vessels; the collection vessel for the solar liquid is placed on the roof. The system was initially designed for DHW preparation, currently it has been expanded to include the function of heating water in the open air pool.

The participants were able to:

- a) See a large solar system working in the no-pressure system
- b) Examine the centre's demand for energy
- c) Confirm their belief that an on-going heat collection is an extremely important aspect of the solar system

Conclusions

- a) An overdimensioned system will not work in the correct way
- b) Pools make a very good storage facility for the collection of energy produced by the solar system (a large volume of water heated up to about 24 °C and not to 50 -70°C, unlike DHW)



SWISS
CONTRIBUTION







2. 15 solar systems for DHW and 6 PV systems – Mönchaltdorf

A visit to a terraced house owned by a renewable energy enthusiast where the solar system is made of SOLTOP components. The user presented the way for energy clearance with the energy recipient, which seems very simple and clear, i.e. all energy produced by PV cells is sold to the grid. The owner uses the energy from the grid and clearance is made on the basis of the difference between the energy produced and consumed.

The participants were able to:

- a) Examine DWH preparation systems with the collector surface of about 7,5 m²
- b) See a PV system with the surface of about 25 m² generating energy for the household and selling its surplus to the grid and a PV system generating power for the household's own needs whose surface is much smaller, i.e. about 10 m²
- c) Examine the figures for yields from the systems obtained on the basis of observations and notes prepared by the owner

Conclusions

- a) Energy obtained from PV cells requires a simple collection system for the energy generated
- b) The weather conditions in Poland (moderate temperatures) are conducive to photovoltaics as too high temperature is inadequate for this kind of appliances

3. Solar system - Nursing and Residential Home – Rämismühle Zell

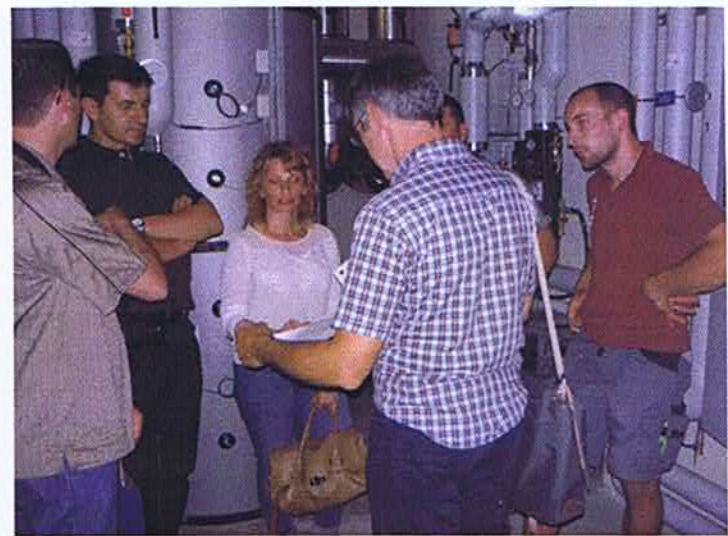
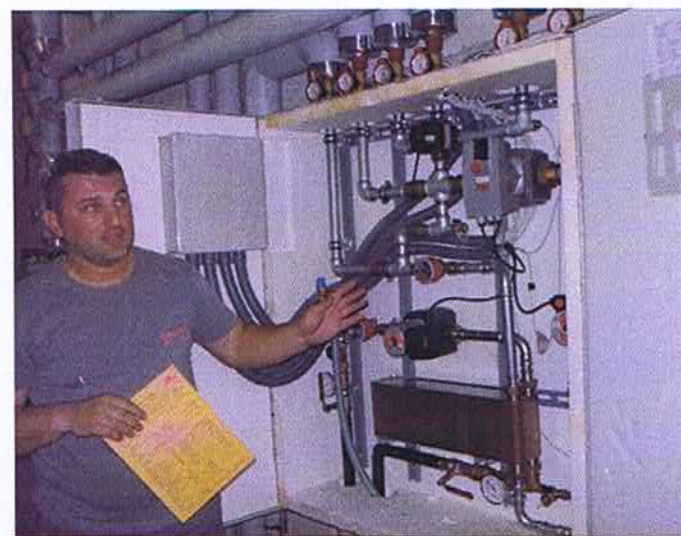
A private building with about 80 residents. The solar system surface has 125 m², it a SOLTOP system mounted on the roof.

The participants were able to:

- a) Examine the operations and construction of the solar system
- b) Observe the activities performed by the maintenance team during the system check-up

Conclusions:

- a) Solar systems should be mounted only on the buildings with an on-going water collection
- b) Solar systems, although do not require operators, should undergo regular check-ups





V. Summary

1. The solutions that we would like to apply in Poland:
 - a) Promotion and application, as widespread as possible, of renewable energy sources and energy efficient and passive buildings. Their application depends, in our opinion, on the financial support provided by funds due to high costs and low salaries.
 - b) More effective insulation of and heat recovery from buildings
 - c) Ability to meet the electricity needs of households using the energy generated by PV cells and simple sale of surplus energy
 - d) Promotion and implementation of the ideas of 'green roofs' that may also be used to breed fish and grow vegetables
 - e) Extensive use of waste in everyday life
 - f) Integration of solar collectors with roofs
 - g) More extensive use of greywater and rain water
2. The activities planned after the study visit:
 - a) Providing information on the website www.solary.powiatsuski.pl and promotion of the use of renewable energy sources
 - b) Establishing the grounds for further pro-environmental activities in the area of renewable energy sources extended by the elements of energy efficiency, biomass use, effective burning of fuels in housing and search for funding sources
 - c) Emphasising the requirement of EN 12975 – 1 standard compliance and SOLAR KEYMARK confirmation to be provided by solar collector producers at the training and meetings with residents
 - d) Discussing the conclusions and observations from the study visit supplemented with photographic documentation at meetings with young people
 - e) Requesting Investment Supervision inspectors to control the works performed
 - f) Increasing supervision over the quality of the works performed, in particular with regard to insulation continuity
3. Additional information is needed in the following areas
 - a) Passive and energy efficient buildings
 - b) Using heat pumps in housing
 - c) Costs and possibilities of turning an existing residential building using renewable energy sources into an energy efficient building as a result of the building renovation process



Starostwo Powiatowe

w Suchej Beskidzkiej

Wydział Środowiska

At the end of the visit, the visit was concluded by Mr Leo Engeler, who, throughout the entire duration of the visit, accompanied us answering numerous questions and explaining thoroughly all the details related to solar systems.

The workshop participants were able to discuss and exchange opinions on the places visited and the examples of systems using solar energy in particular that were presented to them.

We are very grateful for inviting us, covering the costs of and organizing the study visit which enabled us to gain experiences that will be useful in the implementation of our project and bear fruit in the future.

Prepared by: Paweł Dyrz

Photographs: Marek Mrugacz, Maria Karcz



SWISS
CONTRIBUTION

