

1 Executive Summary

From 1 September 2005 until 30 November 2008 the project “Solar Water Heaters – Training of Experts & Professionals and Improvement of Technology & Production” was carried out in Albania.

The project was subdivided in 12 work packages, which consisted of four main topics:

- Market Analyses
- Training on solar thermal systems and their different applications
- Technical improvement, demonstration and quality assurance of solar thermal systems
- Awareness and public relation activities

1.1 Work carried out and main results

In order to increase the knowledge on solar thermal systems, at the beginning the project focused on training of experts from Albanian companies as well as on experts coming from vocational training centers.

During the project period four technical training seminars and three courses for political decision makers as well as for architects were carried out. In total 125 persons attended these training seminars. For all of these training seminars comprehensive training manuals were prepared and given to the participants.

Market analyses

In addition to the training activities also a market analysis was conducted in the framework of the project. As a first step, two comprehensive questionnaires were prepared and sent out.

Based on 250 questionnaires concerning the solar market in the residential sector, and 150 questionnaires concerning the solar market in hotels, public buildings, industry and other businesses, a comprehensive market analyses report with 141 pages was composed.

Assistance to vocational schools

Within the scope of the project an improvement of the existing curriculum for solar thermal training courses was elaborated in cooperation with the vocational training centres. Based on the requests of the vocational schools a comprehensive training manual and a Powerpoint based slide show in Albanian language was prepared and given to the headmasters of vocational schools. Also three demonstration plants were installed at vocational schools.

The training materials are now used regularly by all vocational schools in order to train installers and metalworkers in solar thermal technology. The installed solar thermal systems are equipped also with monitoring systems and data loggers. With this equipment the students get in addition to the theoretical training also practical training. To have more qualified and well trained staff is one of the essential prerequisites in order to increase the quality of the solar thermal systems produced and installed in Albania. The theoretical and practical training at the vocational schools contribute considerably to this need.

Another important component of the project was to increase the technical quality and performance of solar thermal systems in Albania. As a first step know-how transfer missions for Albanian companies and decision makers took place from 10 – 14 July 2006 in Greece and from 4 – 14 September 2006 in Austria. 7 experts from Albania participated in the technical tours.

The technical tours in Greece and Austria focused on:

- Visits to solar thermal systems of all sizes and for different applications (single family houses, multiple family houses, hotels, district heating and industrial applications)
- Visits to collector and system manufacturers
- Workshops on the system design of pumped solar thermal systems and the possibilities of combinations with other renewable energy sources like biomass.
- Workshops with administrative bodies concerning subsidy schemes and other support mechanisms for renewable energies

Besides the knowledge gained at the know-how transfer missions, the improvements of the Albanian solar thermal plants were based on the results of data monitoring of solar thermal systems and technical consulting of the companies.

In order to gain knowledge on the long-term performance of solar thermal systems, six systems were chosen for data monitoring. All six plants were equipped with a data monitoring system. The data were recorded and analyzed from February 2006 until August 2008.

Based on the monitoring results and three series of company visits the solar thermal systems were optimized and improved. Three companies, active in the field of solar thermal systems in Albania were visited. The consultancy of AEE INTEC comprised advice in the improvement of solar collectors, hot water storages as well as on the overall system design.

Besides these activities, the Greek project partner CRES provided a report on Greek thermosyphon systems. This information also served as a basis for the improvement of the Albanian systems.

After the improvement phase 7 demonstration systems were installed. Since these plants were subsidized from project sources, these plants were installed at social institutions.

The main results of the system monitoring and the system improvements can be summarized as follows: The annual solar radiation on the collector area in Albania was recorded between 1480 and 1670 kWh/m². The solar yields of the improved solar thermal systems per m² collector area were recorded between 390 and 530 kWh/m². The resulting annual energy savings, based on oil equivalent, are between 80 - 110 litre/m² collector area. Thus between 220 and 300 kg CO₂ emissions per m² collector area could be avoided (Emission factor: 2.73 kg CO₂/litre oil)

To ensure the quality of solar thermal systems in Albania the implementation of a national labeling scheme and the foundation of an “Albanian Solar Test Centre” at the area of the Harry Fultz Institute in Tirana was another important topic of the project.

The test facility for the Solar Test Centre, which was built by SWT in Stuttgart, enables performance testing of solar collectors according to the steady state and the quasi-dynamic performance test method described in EN 12975-2.

Due to co-financing of the test facility by UNDP it was possible to considerably upgrade the equipment compared to the initial design.

Last but not least an awareness and public relation campaign was successfully carried out by EEC. Besides other promotional materials and articles in newspapers, three leaflets with 3.000 copies each were printed in Albanian language. The prepared materials were disseminated by the Albanian solar companies and EEC as well as at the National Trade Fair "Albanian Elite Industries", which took place from 26-29 June 2008 at the Palace of Congresses in Tirana.

1.2 Outcomes and Impact of the Project

In general it can be stated that all works and services are completed as described in the Terms of Reference. In some respect – such as the "Solar Test Centre" – even additional work was carried out.

The outcomes and the impact of the project can be subdivided in three categories as described below.

1.2.1 Improvement of Knowledge and Technology

Based on the training activities and the technical tours, all companies and teachers of the vocational schools attained an in-depth understanding of solar thermal systems for hot water preparation and a perspective on the overall solar thermal applications. Also a wider view regarding the potential contribution of solar thermal systems to the overall energy consumption of the country and the technology's impact on CO₂ reduction was achieved.

As a result of the training activities and the consulting services, all involved companies redesigned and considerably improved their solar thermal systems. The improvement of the systems had also a considerable impact on the sold systems. Compared to the number of systems sold prior to the project and at the end of the project the number of annually sold systems nearly doubled from 560 systems in 2004 to 1093 systems in 2008. The average annual market growth rate for solar thermal systems at the participating companies was 18% during the duration of the project.

Besides the growing Albanian market the company EUROPA AP in 2005 started to export solar collectors to Montenegro and Greece. From 2005 to 2008 the export was increased from 270 m² in 2005 to 390 m² collector area in 2008.

Since a quality labelling scheme and a solar test centre are available now, also further improvements of components and overall systems are expected by the Albanian companies in co-operation with the test centre. Those outcomes shall be evaluated in 2 – 3 years, when the effects will already be evident on the market.

Also, the knowledge concerning system designing was considerably improved during the project. Prior to the project, solar thermal systems were designed by rule of thumb or based on practical experiences. As a result of the training, the representatives of the companies are now able to do a specific design of the solar thermal systems based on computer simulation.

1.2.2 Strengthening of the Industry and the Institutions

In the frame of the project it was possible to strengthen the already existing institutions. With this institutional background, favourable conditions were established in order to strengthen a national solar thermal industry.

Albanian Solar Test Centre

As mentioned above, one very important step concerning the sustainability of solar thermal activities in Albania was the foundation of the "Albanian Solar Test Centre" at the Harry Fultz Institute. This centre will be responsible for carrying out the product tests as a basis for the quality labelling.

Solar Statistics of the International Energy Agency

Due to the contacts established within the project it was possible to integrate the Albanian data on installed solar thermal collectors into the solar thermal statistics, published by the Solar Heating and Cooling Program of the International Energy Agency (IEA). This statistic is published annually. Therefore, this is another step to strengthen the institutional integration of Albania in international networks.

Interaction with Albanian Institutions

In order to ensure the sustainability of the solar thermal activities in Albania it was the intention to involve besides the EU - Energy Efficiency Centre all stakeholders of the country like the National Energy Agency and the Albanian Ministry for Economy, Trade and Energy.

Due to restructuring of the National Energy Agency and Energy Efficiency Centre in March and April 2006 and the corresponding legal uncertainties the project had some start-up problems in the first year.

Another topic which took quite long was to get some involvement of the Albanian Ministry for Economy, Trade and Energy. Due to internal restructuring of the Ministry it was for a long time not possible to find contact person, who felt responsible for the project. With the strong support of the ADA office in Tirana this problem could be solved in 2007.

Based on this experience it is recommended for a successful further implementation of solar thermal systems in Albania to ensure strong and committed Albanian institutions. This commitment would be needed to support the technical and training activities by relevant political framework conditions.