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## NEWSLETTER

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THE ENERGY IN ALBANIA



Qendra e Eficiencës së Energjisë Shqiptari-E  
Albania-EU Energy Efficiency Centre



## THE ENERGY IN ALBANIA (NEWSLETTER)

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### RESULTS FROM MONITORING OF 4 EXISTING SOLAR WATER HEATING SYSTEMS IN ALBANIA

#### 1. Background & Potential of Solar Energy

The geographic position of Albania and its Mediterranean climate provide favourable conditions for the successful development of solar energy. The high intensity of solar radiation and its duration, temperature, air humidity, etc., will contribute to this. Benefiting from abundant sunshine and large number of sunny days, the solar energy market should be developed in Albania and so, the solar energy should be successfully used to provide the hot water for sanitary needs in different sectors such as residential, hotels, hospitals, and for technological needs in the industry (food or textile). Under such circumstances, the Albania-EU Energy Efficiency Centre (EEC) in collaboration with Institute for Sustainable Technologies (AEE INTEC) in Gleisdorf - Austria, SWT Technologie in Stuttgart - Germany and Centre for Renewable Energy Sources (CRES) in Athens - Greece and financially supported by Austrian Development Agency - Vienna Office, in the framework of the project “Solar Water Heaters - Training of Experts & Professionals and Improvement of Technology & Production in Albania”, is carrying out a set of activities to support the solution of the above-mentioned issues. The overall objectives of this project are to enhance the productive and the educational sector in sustainable (solar thermal) energy, to strengthen local SME’s as well as to create job opportunities based on environmental friendly energy products. Furthermore, the

project aims to improve the existing local production of solar thermal systems in order to allow for wide spread market penetration in Albania. Under the Work Package 3, Measuring at 4 Existing Solar Systems, it is aimed to gain knowledge on the long-term performance of the existing solar thermal systems installed so far in Albania.

## 2. Monitoring Process & Preparation

According to the work plan, 4 already existing Solar Water Heating (SWH) systems were chosen by EEC for the monitoring process. It was decided to select at least one system per company, to ensure a broad involvement of the Albanian companies working in the field of solar thermal energy. This enables the project team to give a feed-back to all Albanian companies concerning the performance of the SWH systems produced by them. A monitoring concept was presented by AEE INTEC and discussed at the steering committee meeting in November 2005. The necessary monitoring equipment was purchased and the installation of the equipment and commissioning was carried out in cooperation of AEE INTEC & EEC experts and installers of the Albanian companies "EUROPA A.P." in Durres and "Termo Tirana" in Tirana. The monitoring system, installed at the beginning of February 2006, for each of the four SWH systems consists of the following components:

- Tritec data logger Sic 100,
- Solar radiation measurement,
- Temperature measurement for cold water,
- Temperature measurement for hot water,
- Water flow meter,
- Electricity meter.

The installed monitoring system allows storing the recorded data, so that the download of the data can be done once a month. The monitoring system is connected to the electric grid, but because of the frequent power cuts in Albania also a buffer battery was installed to ensure the data monitoring also during these periods. For each of the SWH systems detailed data record sheets were elaborated. These record sheets include photos and a hydraulic scheme of the SWH system as well as the monitoring results. The monitoring of the systems was continued during all the period and the recorded data as well as the analyses of the performance of the systems were supplemented to the record sheets. Furthermore the Albanian companies were informed about the results.

## 3. Monitoring Results

The data of all four SWH systems are recorded, analysed and documented continuously by EEC and AEE INTEC. During the monitoring process, the solar radiation as well as the cold water temperatures and the hot water temperatures in the storage tank are measured for every 30 minutes of each day. In addition, the data are processed in four figures, one respectively for each week. The detailed documentation of the records and analyses of the data for each month and for each SWH system are kept at EEC's premises. The monitoring process has started on February 2006 and will be completed on September 2008. Based on the monitoring data for the period March - May 2006 and their analyses, during the period June - July 2006, EEC and AEE INTEC experts have improved the monitoring scheme and changed several tem-

perature sensors positioning. The energy balance and the performance of the four Solar Water Heating systems are calculated based on the recorded data.

In this paper, only the data for SWH System No. 4 will be presented and discussed. The following photos and graphs illustrate all the results attained, for July 2007, from the monitoring of SWH System No. 4 in Durres. The following **Figure 1 & 2** shows the photo, the hydraulic scheme as well as the monitoring equipments of SWH System No. 4. In the **Figure 3 & 4** are shown, respectively, the solar radiation as well as the cold water & hot water temperatures in the storage tank for first two weeks of July 2007.



Figure 1. Photo of Solar Water Heating System No. 4 - Production of "EUROPA A.P.", Durres

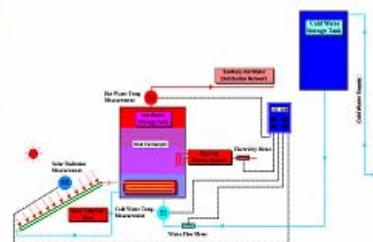


Figure 2. Hydraulic Scheme & Monitoring Equipments of Solar Water Heating System No. 4

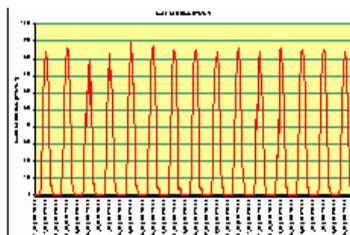


Figure 3. Solar Radiation for First Two Weeks of July 2007

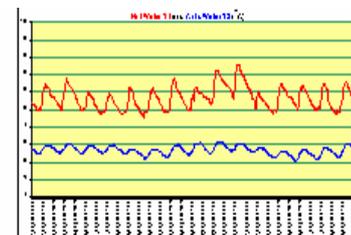


Figure 4. Hot Water and Cold Water Temperatures for First Two Weeks of July 2007

The following **Figure 5** shows the cumulative hot water consumption as well as the energy inputs from the solar collectors and the electrical back-up system for July 2007. The data show that the total energy input to the storage tank was about 262 kWh. 226 kWh was accounted from solar thermal energy and 36 kWh was accounted for electricity. The solar fraction in July 2007 was 88.3%. The following **Figure 6** give an overall view on the solar radiation, the solar energy input to the hot water storage, the electrical back-up energy, the hot water consumption as well as the average hot water temperature for the whole July 2007.

As can be seen in **Figure 6**, in July only for three days the average hot water temperature was below the level of 55 °C, and mainly remained about 55-66 °C. During the second two weeks, in most cases the temperature was well above 55 °C. Through all July, the solar thermal energy (light blue colour) was not sufficient to cover the hot water demand by 100 %, and so, no electrical back-up energy was recorded (blue colour). The solar energy was sufficient to cover the hot water demand by 88.3 %.

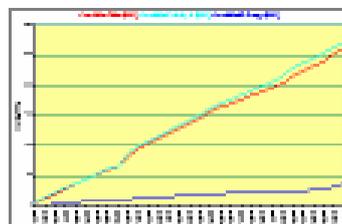


Figure 5. Cumulative Hot Water, Solar Input and Electrical Energy for July 2007

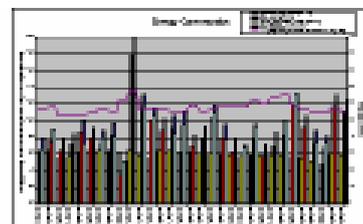


Figure 6. Energy Consumption and Average Temperature of Hot Water for July 2007

The main findings are that there is a significant potential for the optimisation of nearly all systems under the monitoring process. Apart of the Solar System 3, for the other three systems the efficiency was between 51 % and 85 %, which means that there are significant heat losses in the systems. Compared with the previous period March - May 2006, the system efficiency is increased mainly due to the improved monitoring scheme. In the following Table are given the monitoring results for the period April - December 2007.

Monitored System	Solar System No. 4							
	April 2007	May 2007	June 2007	July 2007	Aug. 2007	Sept. 2007	Oct. 2007	Dec. 2007
Hot Water Consumption [kWh]	189.71	199.52	207.89	261.82	260.27	254.51	255.06	455.99
Solar Input [kWh]	181.34	175.62	206.54	270.56	236.77	302.05	267.79	101.89
Electricity back-up [kWh]	63.38	74.11	46.63	35.93	69.12	0.00	45.67	425.39
System Efficiency [%]	77.5	79.9	82.1	85.4	85.1	84.3	81.4	86.5
Heat Losses [%]	22.5	20.1	17.9	14.6	14.9	15.7	18.6	13.5
Solar Fraction [%]	74.1	70.3	81.6	88.3	77.4	100.0	85.4	19.3

Comparing the results it can be seen that the solar fraction has been fluctuating from 74.1 % in April 2007, to 70.3 % in May, to 81.6 % in June, to 88.3 % in July, and then falling to 77.4 % in August. In September, the solar fraction was 100 %, and then falling again to 85.4 % in October and 19.3 % in December. Except for September, for the other months the solar thermal energy was not sufficient to cover the hot water demand by 100 %, and so also the electrical back-up energy was partly consumed to prepare the hot water. The main monitoring results for the Year 2008 are under preparation.

#### 4. Final Remarks

The project has started in September 2005 and it is expected to be implemented within 36 months. This project can be considered as an important step in introducing to the Albanian residential and industry sectors the issues such as utilization of clean energy, efficient management of energy resources, environment protection and consequently bring steady improvements in the long term. EEC will promote and advocate, through all the country, the utilization of solar thermal systems and the energy conservation in residential, hotelier and industry sectors. The successful implementation of this project is important to the further development of solar thermal market and improvement of energy supply situation in Albania.



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### CAPACITY BUILDING TO ACCESS CARBON FINANCE IN ALBANIA

Albania has ratified the UNFCCC in 1995 and the Kyoto Protocol in 2004. The Ministry of Environment, Forests and Water Administration of Albania (MoEFWA) is the key governmental agency responsible for the implementation of UNFCCC and Kyoto Protocol. In June 2005 the Government of Albania formally notified the Executive Secretary of the UNFCCC

Secretariat and the CDM Executive Board on the nomination of the DNA in Albania and tasked the Climate Change Unit established in 1998 through UNDP/GEF-funded project to support the DNA functions in Albania. Immediately after the Protocol's ratification, Albania was approached by several EU countries for cooperation in the field of CDM.

According to the First National Communication to UNFCCC, Albania is found to be a relatively low net emitter of greenhouse gases (around 7 ml. ton CO<sub>2</sub> for 1994), where Energy Sector shows a significant contribution (44 %) mainly due to the fuel combustion category, followed then by Agriculture (27.12 %), and Land Use Change and Forestry (LUCF) (21.60 %), Waste (4.81 %) and Industrial Processes (2.96 %). At the same time Albania has a relatively low level of CO<sub>2</sub> emissions per capita (1.97 ton/capita is found for 1994). This is because over 90 % of electricity was produced by hydro energy sources. Relatively high emissions per GDP (3,758 ton/million USD) are caused by high levels of energy intensity, low level of productivity, outdated technologies and high level of consumption of electricity by the residential sector. However, country's GHG emissions are projected to grow considerably (according to draft Second National Communication to UNFCCC). In 2020 it is expected to reach the level of 37 mln ton CO<sub>2</sub> eqv. if no measures for gas emissions reduction are taken, while Energy Sector is expected to contribute with app. 50 % of the total GHG emissions, followed by Land Use Change and Forestry (17 %), Waste 5 %, and Industrial Processes (4 %). This increase can be explained by growing demands in the energy and transport sectors. Preliminary estimates done on the basis of the mitigation analysis (Technology Needs Assessment) show the overall aggregate CDM carbon potential of Albania to be around 2,5 Mt CO<sub>2</sub> eqv. per year. Considering the expected range of market prices from 6 • to 9 •/ton of CO<sub>2</sub>, the carbon investment potential can be expected at the level of 15 to 24 million • per year. Since Albania already meets the eligibility criteria to host greenhouse gas (GHG) mitigation projects under the CDM of the Kyoto Protocol, there is an increased interest of bilateral and international organizations and as such a list of on-going and planned activities in this field. Still, Albania's actual engagement with the CDM is so far limited due to barriers which are related to:

- Lack of general awareness;
- Lack of data, information and analysis to identify sectors, industries and type of the GHG reduction projects and technologies, where carbon finance could contribute to a significant share of investment to make such projects economically attractive, while also addressing sustainable development;
- Absence of an operational strong institutional framework and national governance structures to support carbon finance transaction needs.

In 2007, in response to the request of the Government of Albania, a project has been formulated and financially supported by the Austrian Government and UNDP, namely "Capacity building to access carbon finance in Albania". The project aims at addressing, filling the gaps and removing barriers for a proper and effective functioning of the DNA, as well as building capacities to deliver CDM projects in Albania. This project is an integral part of UNDP program on Kyoto Protocol capacity

building in Eastern Europe and CIS. As part of the Project's first output "Creating national legal and institutional framework for carbon finance", the following are already developed and recommended to be considered by the MoEFWA:

- A Proposal of DNA institutional structure;
- National CDM review and approval procedures;
- Procedures and training materials for evaluating sustainable development impacts of CDM projects;
- A draft legal act on "Functioning of the DNA and CDM projects review and approval procedures" which is still under discussion within the MoEFWA; and
- The DNA outreach strategy.

The second Project output is related to "Building in-country capacities for identification, implementation of and resource mobilization for the GHG reduction projects eligible for the CDM and other carbon market mechanisms". According to the implementation strategy of the project, two are the key sectors to be explored: energy and forestry. With regard to the Energy Sector the most important by-product of the project is related to the development of the "Baseline study of Albania's power sector for CDM", which objectives are to provide multi-project baseline factor for CDM projects in the power sector, stipulate CDM project developments in the power sector, reduce transaction costs, ensure fairness among various project developers and projects. Besides the above-mentioned study, the following Project Information Notes - PINs (Traditional and Program of Activities) are developed PIN CDM Efficient Lighting Project in Albanian Households, PIN CDM Project Wind Farm in "Karaburun Peninsula", PIN CDM Energy Efficiency Project in the Albanian Electrical Distribution Network, PoACDM Solar Thermal Water Heaters in Service Sector, PoA Small Hydro Power Plants.

With regard to the Forestry Sector, the pre-feasibility study for the CDM-forest sector is to be developed soon, followed by the ToRs for development of the Baseline Study for this important sector too. The ADA/UNDP Project "Building capacities to access carbon financing in Albania" will continue for another year and is expected to end-up with the development of the Carbon Finance Strategy for Albania, which will enable Albania to take advantage of the Carbon Finance mechanisms. As part of the awareness activities under the project, a sub-page of CDM/KP is established and monthly updated, as part of the Climate Change Programme website: [www.ccalb.org](http://www.ccalb.org).



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**National Projects Coordinator**  
**Climate Change Program**  
**Ministry of EFWA**

## **BALKAN POWER CONFERENCE PRESS RELEASE**

Balkan Power Conference is again connecting academic, business and decision maker's world together - this time in Sibenik

- Croatia, with new themes and challenges. The 7th Balkan Power Conference, BPC 2008, which will be held from 10th September - 12th September 2008 in Solaris - Hotel Ivan, Sibenik, Croatia is approaching fast. A provisional program <http://bpc.fe.uni-lj.si/?q=conference08/programme> and all additional information can be found on BPC's web page ([www.balkanpower.org](http://www.balkanpower.org)). We are constantly updating the site with the most current information. We would like to remind you about next important dates:

- Full papers submission: June 15, 2008,
- Notification of acceptance: July 15, 2008,
- Early Bird Registration August 1, 2008.

For SE Europe (not member of EU) we have lower participation fee, which is 275 EUR before 1 of August and 325 EUR after 1 of August. First established in 2001, the Conference has grown in size and scale year after year, covering key industry issues and market developments as well as the latest strategies employed by energy practitioners across Europe. The Conference will continue the tradition of being the meeting place for experts from throughout the industry and across the region. With your help we provide a forum for discussion to share knowledge, experiences and ideas about technical, economic and legislative issues concerning future challenges for Balkan power industry.

The Conference will feature three Panels, devoted to the topics of the conference:

- Regional Market Integration,
- Long-term Security of Supply in Western Balkans,
- Climate Change Mitigation and Energy Policy: Development opportunities in WB.

The Panels will provide unique insights by industry leaders, international organizations, policy making bodies and researchers. The Organizing Committee invites offers of contributions in any of the proposed topic areas for the Balkans region:

- a. Security of energy supply,
- b. Regional energy market developments,
- c. Investment opportunities towards energy independence,
- d. Privatization current overview and future perspectives,
- e. Cross border energy trading and system operation aspects,
- f. Impact of RES on the operation of the electrical networks,
- g. Regulatory incentives for improving the penetration of RES,
- h. RES's role in climate change mitigation and supply security,
- i. Energy efficiency,
- j. CO<sub>2</sub> emissions trading, JI and CDM projects,
- k. Climate change: policy and actions,
- l. Clean coal technologies & CO<sub>2</sub> storage.

Please, upload your papers on our side or post it to e-mail [info@balkanpower.org](mailto:info@balkanpower.org). We are looking forward meeting you in Sibenik - Croatia!



**Borut KOZAN**  
**Chairman of Organizational Committee**  
**Balkan Power Conference 2008**