Implementation of photovoltaic technologies, a great solution to energetic situation in Albania

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Abstract

Much of the world's people suffer lack of electricity and the possibility to have it through the traditional supply network is small. Let us not forget that developing countries are dominated by the predominantly rural and poor. Low energy consumption and economic detention minimize the possibility of expanding the grid. Local photovoltaic systems are the right solution for obtaining cost-beneficial electricity. Good knowledge of the solar resource, geographic diversity of climate, and use customer needs, create a proper infrastructure of individual photovoltaic system (PV). The main objective is the perfection of the individual service photovoltaic energy systems through a combination of radiation data, laboratory tests, field measurements and interviews with users and the basic elements in the industry.

Keywords*: Renewable energy, Albanian territory, Solar sources, Infrastructure, Service.*

1. Renewables, the essence of support of developing countries

Much of the world's people suffer lack of electricity and the possibility to have it through the traditional supply network is small. Let us not forget that developing countries are dominated by the predominantly rural and poor. Low energy consumption and economic detention minimize the possibility of expanding the electrical grid. Local photovoltaic systems are the right solution for obtaining cost-beneficial electricity.

Africa, about 95% of the days of the year is sunny, taking advantage of an annual energy of more than 2300kWh/m2. Ironically only a small fraction of this energy is exploited. In rural and peri-urban areas of Africa the total level of exploitation runs in less than 15%. Good knowledge of the solar resource, geographic diversity of climate, and use customer needs, create a proper infrastructure of individual photovoltaic system (PV). The main objective is the perfection of the individual service photovoltaic energy systems through a combination of radiation data, laboratory tests, field measurements and interviews with users and the basic elements in the industry.

2. Introduction of photovoltaic systems in Albania-The need for projects and collaboration

Albania, as part of Mediterranean Europe is a country in process development, with a number of problems to cope with transition. The main problem and more troubling remains the power interruption. This kind of phenomenon creates concerns that are reflected in the business and in everyday family life. On the other hand, our country's natural resources reflect a different situation, very optimistic for the future especially for photovoltaic systems in solving this vital problem.

Introducing PV technologies will ease the situation and minimize burdens on the national electricity system. Using solar energy to electrical energy production is interesting in partial fulfillment of the needs in this regard both in terms wider family, multi-storey buildings, the objective needs of the community to the services in its interest.

According to estimates of the amount of energy derived from regenerative energy these systems is about 1000-1500 watts in a daily average. In this case about 15% met the consumption needs of each family. If this is combined with the use of wind systems, or if other system prospered PV panels, needs will be fulfilled almost 100%. This system would be useful especially for rural areas where lack of electricity has great length and power consumption is lower.

Albania has a tremendous potential of solar radiation. Throughout the year recorded over 280 sunny days or on 3700Wh/m2, at an angle 40 from the south, according to the meteorological station of Tirana. Today in Albania live about 750,000 households with average consumption of 1-2 kW per day just for lighting (or 10-15% of daily energy consumption). Changing the system of lamps lighting from common ones in the new economic, through the PV, will be accompanied by rapidly changing electrical situation in the country, improvement of environmental conditions that are more and more polluted by the release of CO_2 in atmosphere by using oil-based generators, but the noise reduction in cities. In Bangladesh, only one such device for any home connected to the network, 20% met the

consumption needs of families. In economic terms household bills reduce 20-35%, while the network load will be smaller. Implementation of such systems can be quite profitable in medical centers and schools in town and villages. To date the use of solar energy is concentrated in hot water, reducing household expenditures in terms of energy.

It must be noted that the quantities of hours of sunshine are different in different periods of the year.

But the goal is to present the idea of harnessing solar energy not only for water heating, but for its conversion into electricity. Thus individuals, families, individual houses in villages or towns, or residents in high-rise buildings (approximately 30-60 families), will meet the basic needs of electricity, especially for household use with low power: refrigerator (80-200W), radio (4-20Wat), television (10-65Wat), satellite receiver (10-20Wat), tape (5-45Wat), video (15-35Wat), computer (50-250W), blower (5-25Wat), uptake (15-45Wat etc.) [1]. Takes place leading to the completion of lighting needs, when it cuts highlight the fragility of power in certain periods of the year, when the price of this energy is going to increase and when the customer is interested to pay a smaller bill. Without mentioning the cases of patients who have needs for service, pupils and students to learn, a range of institutions and offices in downtown or suburbs to work. Many countries with limited opportunities for solar energy that Albania, started long use of this energy and converting it into electricity. Our country has a favorable geographic position and climate for the realization of such a project.

Table 1, shows hours of sunshine a day for some cities based on average annual duration of sunshine hours. Albania has a large number of sunny hours per year, ranging from 2000 hours in areas of northeast, in the 2600-2800 hours in the coastal zone, western southern lowlands of the country.

Without forgetting the fact, that in these areas is con-centrated 70-80% of the population, respectively greater demand for energy consumption.

Detailed elaboration of this kind in our country, select a range of tangible economic problems, both for the customer if the state itself.

In many European regions have developed and begun implementation of multi-year projects for the introduction and installation of PV in residential environments. One of the goals of these projects is to show that the PV system can normally implemented so attractive in the process of construction and urban plan. But one problem facing PV systems market is the high price and that depending on countries.

There is a schematic representation of this indicator for Albania (Fig.1 and Fig.2).

Here there are some values of solarity in Tirana for 1-year period from January to December 2002 (Table 1).There are given the technical characteristics of four types of photovoltaic panels commonly used today in the world, are making a presentation of opportunities to use them in our country and benefit the customer will have 24 hours without interruption, using this technology [2].

Based on Table 1, we make a calculation of the power produced by four different types of photovoltaic panels for different areas of the country, based on average hours of sunshine.

The average consumption of a family, according to the monthly invoice of electricity consumption, runs about 300-400KW per month, 10-13kw per day or 10,000-13.000W day, we can say that Kyocera panel type provides 10-20% of daily energy needs (just a panel), regarding the continued operation of the equipment mentioned above and little light [3].

Multiplication of PV panels, produced by 20-25 year warranty, makes possible the manufacture and use of an amount of energy several times greater.

The use of photovoltaic panels in recent years has found wide application in many countries worldwide, becoming a separate element in the architecture of buildings and urban structure. We must say also that the field is still quite unknown and perspective for local business and foreign. These prices have values such as PV system is not fully inserted into the urban plan and energy as a result of low levels of PV-s business.

Another reason is the inadequacy of involvement in the process of private enterprises, local authorities and the construction industry here and add the lack of necessary parts in the construction of PV's. Work is focused on photovoltaic adaptation in urban development plan, architectural projects and distribution grid including project developers.

3. Tables, Figures and Graphics

3.1. Tables and Figures

Table 1(2)

Cities	*SK*	*LE*	*TIR*	*DR*	*LU*	*KU*	*FR*	*VL*
Hourly solar aver./day	6.6	7.1	7.1	7.4	7.3	7.2	8.1	7.6

Table 2(2)

JAN	*FEB*	*MAR*	*APR*	*MAY*	*JUN*
123.1	123.6	163.1	190.6	262.4	297.6

JUL	*AUG*	*SEP*	*OCT*	*NOV*	*DEC*
352.8	326.1	253.1	202.3	135.0	113.0

Table 3(2) Some indication on 4 types of PV panels

Panel type:	Power	Pieces	Dimensions:	1-2	3-4	5-8+
UNI-SOLAR	6 W		3.88A, 16.5V (53.8" x 29")	$349	$339	$25
SOLAREX	BP-160W		4.55A, 44.2V (62.7" x 31.1")	$899		
SIEMENS	SP-150W		4.4A, 34.0V (63.76" x 32.05")	$799	$785	$775
KYOCERA	120W		7.1A, 16.9V (56.1" x 25.7")	$589	$579	$559

Tabela 4(2) Introduction of energy values for various types of PV panels Wat months November-March (Wat)

	Nov	**Dec**	**Jan**	**Feb**	**March**
UNI-SOLAR	8640	7232	7878	7910	10438
SOLAREX	21600	18080	19696	19776	26096
SIEMENS	20250	16950	18465	18450	24465
KYOCERA	16200	13560	14772	14832	19572

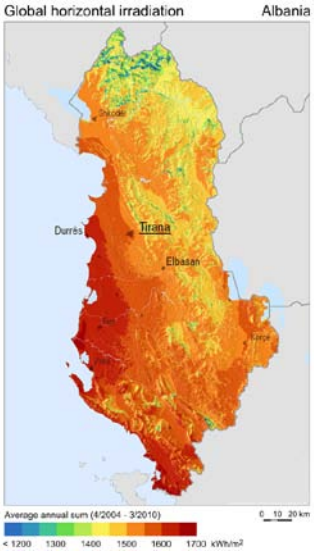


Fig. 3(2) Global horizontal irradiation

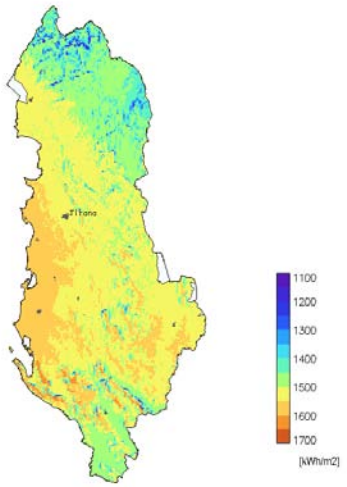


Fig. 1(2) The annual amount of horizontal solar radiation 2001-2008 (angle 32°)

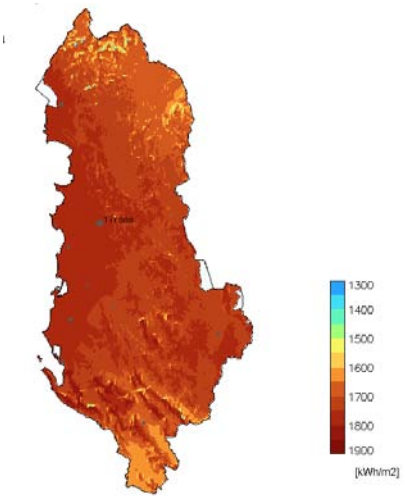


Fig. 2(2) Annual sum of global irradiation from PV module (angle 32°)

Fig. 4(2) Images installation of PV systems in Mediterranean

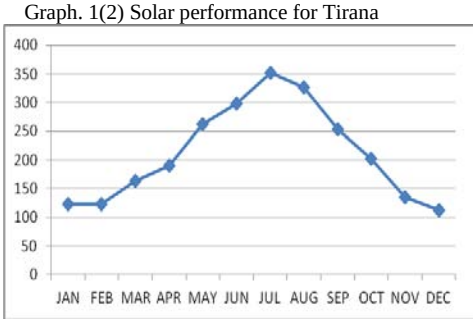
Fig. 5(2) PV panel installed to signal road

Fig. 6(2) Kyocera solar panel

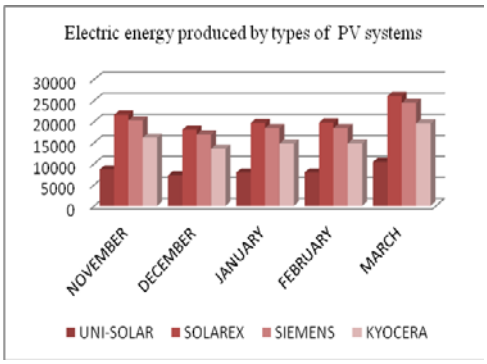
Power: 120 W, 7.1A, 16.9V Produces: 888 Wat in days
Dimensions: (56.1 "x 25.7")
(140.25 cm x 64.25 cm)
Price: $ 589 (one panel)

3.2. Graphics

Graph. 1(2) Solar performance for Tirana



Graph. 2(2) Amount of electricity produced in WAT, for various types of panels (November – March)



The area of Durres

Panel type	Power produced
UNI-SOLAR	64W x **7.4 orë** = **473.6** Wat
SOLAREX	160W x **7.4 orë** = **1184.0** Wat
SIEMENS	150W x **7.4 orë** = **1110.0** Wat
KYOCERA	120W x **7.4 orë** = **888.0** Wat

The area of Tirana

Panel type	Power produced
UNI-SOLAR	64W x **7.1 orë = 454.4** Wat
SOLAREX	160W x **7.1 orë** = **1136.0** Wat
SIEMENS	150W x **7.1 orë** = **1065.0** Wat
KYOCERA	120W x **7.1 orë** = **852.0** Wat

The area of Lushnja

Panel type	Power produced
UNI-SOLAR	64W x **7.3 orë = 467.2**Wat
SOLAREX	160W x **7.3 orë** = **1168**Wat
SIEMENS	150W x **7.3 orë** = **1095**Wat
KYOCERA	120W x **7.3 orë** = **876**Wat

The area of Lezha

Panel type	Power produced
UNI-SOLAR	64W x **7.1 orë = 454.4** Wat
SOLAREX	160W x **7.1 orë** = **1136.0** Wat
SIEMENS	150W x **7.1 orë** = **1065.0** Wat
KYOCERA	120W x **7.1 orë** = **852.0** Wat

The area of Vlora

Panel type	Power produced
UNI-SOLAR	64W x **7.6 orë = 486.4** Wat
SOLAREX	160W x **7.6 orë** = **1216.0** Wat
SIEMENS	150W x **7.6 orë** = **1140.0** Wat
KYOCERA	120W x **7.6 orë** = **912.0** Wat

The area of Kuçova

Panel type	Power produced
UNI-SOLAR	64W x **6.6 orë = 422.4**Wat
SOLAREX	160W x **6.6 orë** = **1056**Wat
SIEMENS	150W x **6.6 orë** = 990Wat
KYOCERA	120W x **6.6 orë** = 792Wat

The area of Shkodra

Panel type	Power produced
UNI-SOLAR	64W x **6.6 orë = 422.4**Wat
SOLAREX	160W x **6.6 orë** = **1056**Wat
SIEMENS	150W x **6.6 orë** = 990Wat
KYOCERA	120W x **6.6 orë** = 792Wat

The area of Fieri

Panel type	Power produced
UNI-SOLAR	64W x **7.2 orë = 460.8**Wat
SOLAREX	160W x **7.2 orë** = **1152**Wat
SIEMENS	150W x **7.2 orë** = **1080**Wat
KYOCERA	120W x **7.2 orë** =**864** Wat

References

[1] Prifti A., (2008). Evaluation of Energetic Potential in Albania, 23rd European Photovoltaic Energy Conference and Exhibition, Feria-Valencia.

[2] Energy Efficiency and Renewable Energy - Consumer's Guide. U.S Energy Department (December 2003).

[3] Electric Solar Producs Catalogue-Kyocera. Kyocera Solar Inc. May 2006.

[4] Photosynthetic active radiation regime in the Western Lowland of Albania. Monthly solar measurement (in hours) in Western Lowland meteorological stations, 2002.