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The Analysis Of Performance The Production Of Energy By Using Photovoltaic System By Establishing The Panel Of Suncell In Different Locations To Get In Maximum Energy

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***Abstract*— This study has been carried out in Afyonkarahisar –Dazkırı region which dealing with setting up the network to obtain the performance production of electricity by using penal of sun cell establishing according 15 (angle) location of deflection penal of sun on the ceiling to be able to get 100 Wp power from one building by using PV software program. The data's of the average of the sun a day, month and average temperature of weather of Dazkırı from State general director of meteorology of Turkey Republics. In addition to use the data of average of sun day and month by mean of MATLAB software. By this way the maximum production of panel cell has obtained by adding important factors. It has obtained maximum of electricity by using the photovoltaic system with 35^{o}. The adjustment of panel according to the month provides 4,8 % ratio increasing in performance. If the panel location adjusts according to seasons the performance would be increased by 3,4 % ratio. The changing of the panel is not easy in practice. According to the calculation of electricity flow which has produced with different angles.(locations).**

Keywords—component; **Renewable energy, photovltaic system , MATLAB software, panel of sun, average of temperature.**

I. INTRODUCTION

Photovoltaic's (PV)system has been observed in 1893 first by Becquerel, the voltage between electrodes immersed in electrolyte, which depends on the light falling on the electrolyte [1]. Although the use of so much far, the rapid growth of photovoltaic systems has taken place in the last quarter century. As the result of oil crisis in 1970, the energy costs of energy had raised with high ratio, so the demand to photovoltaic became necessary. In addition, fossil energy of using fuel production results in environmental pollution, has been found to lead to environmental disasters such as global warming and seasonal changes. For these reasons humans have turned its attention to renewable energy sources.
Solar energy is high potential energy which is raw energy which takes part among the most widely used as renewable energy sources due to being free. Due to the increased use of photovoltaic systems in the last quarter of a century; the production technology of the semiconductor material that forms the main structure of the development of photovoltaic systems is carried out [2]. In the present PV systems are get progressive as parallel with low cost of many years ago and much higher quality [3]. The cost of PV cells in 1974 to about $ 200 / watt, while 2000's the cost has been dropped to 2 $ / watt [4]. PV modules which were produced in the first years consisted only with a combination of small battery cells. Today is produced as a single piece with the modern technology and can be used almost thirty years without need to get maintenance. By taking in consider the thanks to the long life of the panels which is used costs remain at low levels. Since the usage of per year for long period can be at low cost level [5,6].

The work which has implemented in this study; the network will be settled system on the roof of building in Afyonkarahisar the Dazkırı region with the board of 100Wp power mains connection with monocrystalline solar panels of 15 have produced with different slope as monthly and annual energy production by making calculations with pvsyst package to provide the determination of the angle at which the maximum energy production has been obtained. The production of renewable energy monthly has been achieved by determining the angle at essential how much energy is realized, by changing the terms of the production of photovoltaic systems as monthly and seasonally .

II. MATERIALS AND METHODS

Most of the variables affecting energy production of photovoltaic panels; sunshine duration , the values of average temperature and sunlight. To increase the efficiency of work performed must be determined the variables very well. Last decade, the average time

between taking the sun and average temperature data for the years 2004-2014 was calculated Turkish State Meteorological Service. The average monthly sunshine duration is shown in Figure 2.1.

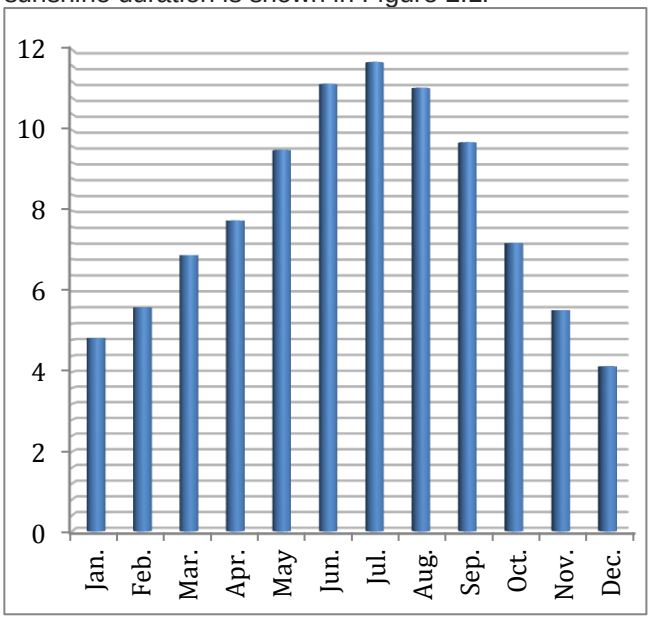

Figure 2.1. The average monthly sunshine duration (hours).

Afyonkarahisar will take place the system on a monthly basis when the daily average temperature of Dazkırı examined; 4 to 6 hours of sun in the winter time, this period is increased to 10 to 12 hours in summer months. In this period are a direct effect on the energy production of photovoltaic panels. The production of energy from photovoltaic systems while low groove in the winter sun low in the summer sun while energy production is increasing with the increase. Daily monthly average temperatures are shown in Figure 2.2.

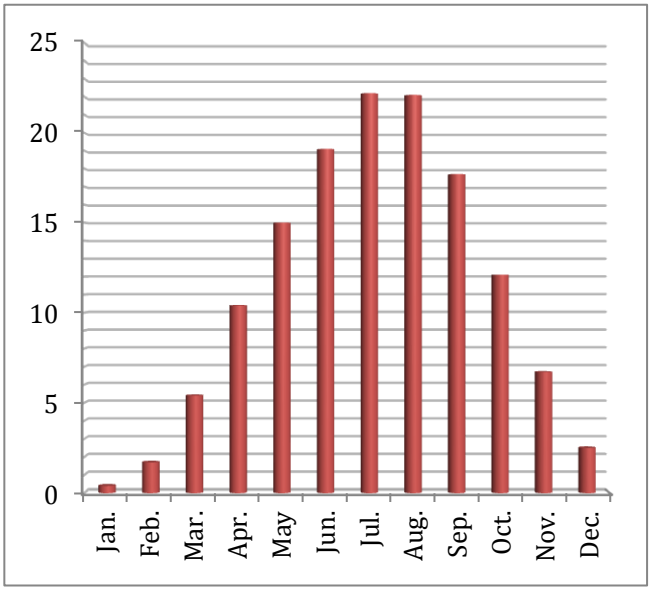

Figure 2.2. The average daily temperature on a monthly basis.

There is an inverse relationship between temperature and energy output of photovoltaic systems. Reduction in photovoltaic energy production occur with increasing temperature. Figure 2.3 MATLAB prepared Dazkırı of town on a monthly basis

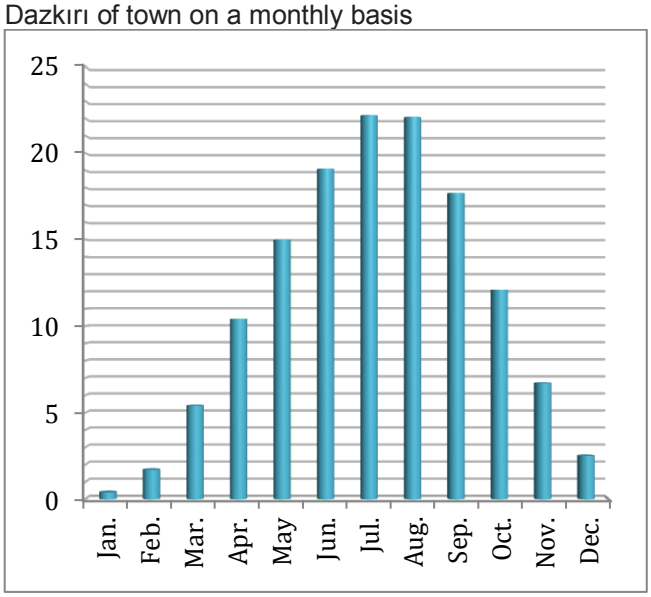

Figure 2.3. Dazkırı of monthly average daily solar radiation values.

Production of photovoltaic energy systems of the biggest factors is the value of solar radiation. The rise of the value of solar radiation significantly increases the energy production of photovoltaic systems. When the MATLAB programme has used for Dazkiri district is prepared Dazkırı according to monthly average daily solar radiation in the winter months 2-3 kW / summer while the value of m^2day 6-7 kW / reaches its m^2day value. Thus, energy production is increasing in summer.

A. PVsyst Program

Pvsyst program; architect, developed to meet the needs of engineers and researchers. Sizing of photovoltaic systems are used as very effective in the simulation and performance evaluation. Meteorological data can be entered from outside the program more efficient results . Simulation different tilt angles and different photovoltaic technologies, carrying out economic analyzes are performed. In Table 2.1 photovoltaic panels and inverters used in the system 's technical data are shopping.

Photovoltaic Panels		İnverter	
Producer	Mitshubishi	Producer	Siemens
Model	PV-MF100EC4	Model	Sinvert PVM12UL
Power	100Wp	Power	60 W
Efficiency	%11	Efficiency	%98,1
V_{DC}	20,80 V	Min MPP	125 V
I_{SC}	6,88 A	Maks MPP	450 V
V_{mpp}	16,70 V	Maks PV Voltage	500 V
I_{mpp}	5,99 A	Input Voltage	480 V
Length and Width	1425 x 646	Height and Depth	280 x 944

III. RESULT

In Afyonkarahisar Dazkırı, the roof of a building which planned to establash –the connected photovoltaic system setting up of the monthly amount of energy is produced by a total of 15 different angles starting from 0° to 70° angle with interval 5° has been calculated. Produced maximum energy seems to take place every month at different angles. Table 3.1 shows the maximum monthly amount of energy produced at different angles.

Month	0°	5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	55°	60°	65°	70°
Jan.	1535	1720	1894	2052	2195	2323	2434	2528	2605	2666	2709	**2736**	2476	2740	2716
Feb.	1884	2043	2188	2317	2431	2528	2607	2671	2718	2750	**2765**	2764	2748	2716	2668
Mar.	3365	3260	3386	3490	3573	3636	3679	3700	3701	**3682**	3643	3583	3503	3403	3283
Apr.	3780	3875	3947	3996	4024	**4031**	4018	3982	3927	3850	3754	3634	3493	3330	3145
May	4593	4597	**4665**	4610	4617	4653	3679	4390	4271	4131	3968	3780	3566	3433	3078
Jun.	**4724**	4723	4702	4659	4589	4492	4375	4243	4098	3930	3735	3515	3270	3012	2742
Jul.	5001	**5024**	5022	4911	4932	4845	4731	4608	4471	4299	4100	3871	3615	3333	3046
Aug.	4527	4615	4677	4709	**4716**	4696	4654	4595	4511	4400	4261	4096	3903	3683	3433
Sep.	3597	3769	3915	4035	4131	4201	4246	**4267**	4264	4236	4184	4107	4006	3879	3727
Oct.	2708	3929	3129	3305	3458	3587	3693	3774	3834	3871	**3885**	3878	3848	3796	3820
Nov.	1835	2056	2262	2447	2613	2760	2886	2992	3078	3145	3193	3221	**3231**	3221	3194
Dec.	1289	1459	1620	1767	1900	2020	2124	2215	2284	2349	2394	2425	2439	**2440**	2425

In terms of photovoltaic systems make much impact on energy production. During the winter months was realized in summer among the highest energy production varies between 45° and 55° and 10°-0° this rate. This is the change in solar radiation and sunshine duration varies depending on the angle of incidence worldwide. The highest monthly production of photovoltaic energy systems in Figure 3.1 (wh / month) are shown.

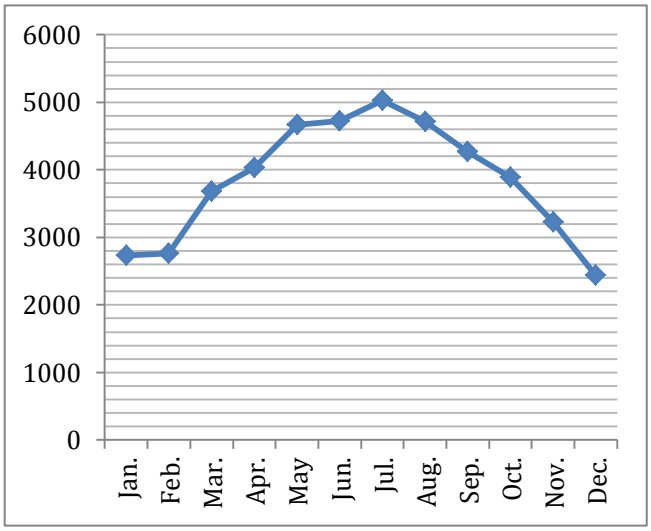

Figure 3.1. The highest energy production of the photovoltaic system on a monthly basis (when / month) .

When analyzed monthly energy production; Energy production on a monthly basis during the winter of 3000 waat / h in summer 5000, while the ratio waat / hour. Energy production is increasing approximately 67% during the summer months. The exact cause of the increase is so high; the increase is a rise in the value of solar radiation and sunshine duration of sunshine duration. In Figure 3.2, which has produced 15 different angles of the annual energy production of photovoltaic systems (wh / year) it is shown.

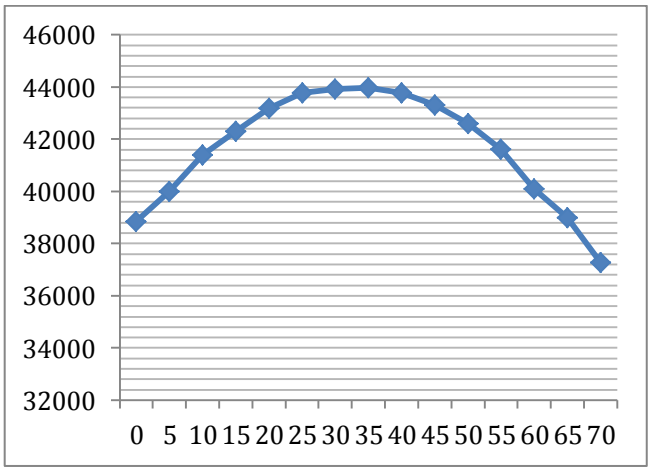

Figure 3.2. Annual energy production of a photovoltaic system that has produced 15 different angles (when / year).

When looking at different angles annual energy production; the lowest production when 37 277 / year

with a maximum of 70° takes place when energy production is 43 965 / year with 35° has also occurred. Instead of 70° to 35° installation of photovoltaic systems shall be made with an energy gain of 17%. Figure 3.3 annual energy production of the photovoltaic system (when / year) are shown.

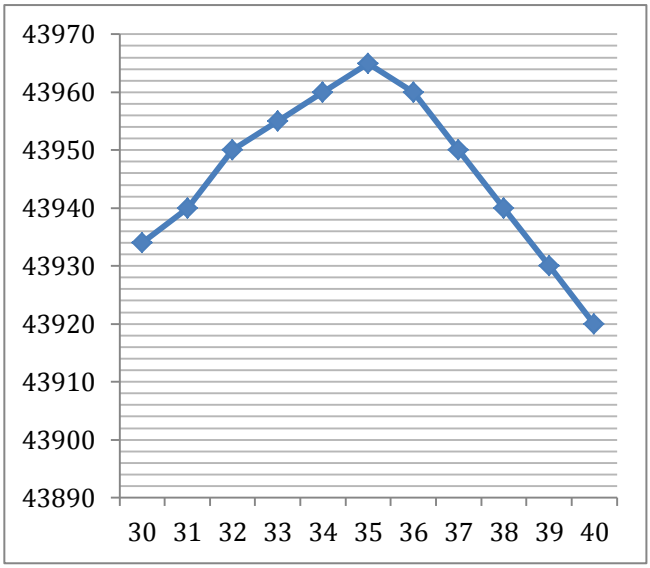

Figure 3.3. The annual energy production of a photovoltaic system (when / year).

Dazkırı is located in the northern latitudes 37°. Open the literature as the most effective system of photovoltaic system is installed it is equal to the latitude of the place. In Dazkırı 35° angle was found to be the most effective and efficient photovoltaic system

IV. Conclusion

The increasingly damaging environmental depletion and pollution of fossil fuels has led people to create and use of renewable energy sources. Renewable energy sources in our country this isnot used for energy production in as much as developed countries. These resource are endless and easily accessible like solar energy. Also these are most important of these resources. The reason of chossing these kind of resource, releated to solar cells which can to be converted directly into electrical energy. The most important reason for not using the system the costs especially in our countrybecause it is higher than that of fossil fuels, which will be established with respect to this study.

By the means of this study the most effective and efficient operation of photovoltaic systems may be installed with an optimal oblique angle has been was calculated. Optimal angle of the photovoltaic system has been identified in Dazkırı as 35 degrees. The angle of the photovoltaic system is provided with a 4.8% change in energy savings each month. Changes in the seasonality of the slope of the photovoltaic system energy savings about rate of 3.4%.

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