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The Comparision of Energy Production of Monocrystalline And Policrystalline Solar Panel By Using The wirelessly And Measurement of Energy

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Abstract: *Today, electrical energy demand is increasing day by day. I need a situation like this, the signs of the development of the electric energy country came into being. Parallel does not increase. Electric energy production is growing as demand for electricity increases. In order to be able to be prevented by this condition, we can make the most of electricity energy. It uses a variety of methods to optimally consume consumed electricity. This study examines the energy production of solar panels at the forefront of renewable energy sources. In addition, remote measurement and control has been performed on the produced energy. For this, there are two types of solar panels widely used in the market, monocrystalline and polycrystalline solar panels are preferred. Two solar panels convert the sunlight into electricity. But the amount of electricity they produce is different. The most important reason for this cannot be used in production. For Ardunio preferred. Remote control was provided by adding a wireless modem to Ardunio's skirt card. The control and measurement distance remained the same with the modem limit. When reaching a distance of 1 kilometer in open areas, this distance is 300 meters in closed areas. If monocrystalline and polycrystalline solar panels are produced, if voltages and currents are produced, they are measured by sensors and then converted into digital data. This data is also shown on the designed website.*

Keywords : *Monocrystalline solar panel, Polycrystalline solar panel, Ardunio, Wifi control.*

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I. Introduction

This study is aimed to provide the students of Afyon Kocatepe University Dazkırı Vocational School by practical knowledge about solar panels. The solar energy is taking the first place in the top of renewable energy sources list. It has been observed that the most efficient training method in Vocational School of Students can be carried out by applied education. Therefore, the aim of the study is to give importance to individual and practical applications. In this study, monocrystalline and polycrystalline solar panels has been compared with the two most popular types of solar panels in the world which were chosen. The solar panels production of energy are at 20 watts power. All the energy produced is used by consumers at 20 watts of power. The aim here is to compare the energy production of two types of solar panels in the same environment. Voltage and current sensors are used for measurement of energy.

The data's which are collecting from the sensors is converted into digitalis in Ardunio. An Ethernet card has been added to the Arduino. The wireless card is connected to the Ethernet card. It is observed that the computer, tablet and phone which are being Wifi receiver for all given data through the internet. The photovoltaic pillars, also known as solar batteries, are equipment that convert sunlight from their surfaces into electricity. Solar batteries, which can be shaped in different geometric with respect to constructions shape which based on the photovoltaic principle. As soon as they receive the sunlight, they prepare the ground for an electrical voltage. Depending on the required power ratio, the connected modules can be connected in serial connection or parallel connection. The solar batteries are able to convert up to twenty percent of the light falling on them to potential electricity, and many Solar batteries are connected to each other to increase the power. These connections can be in the form and serial or parallel. Photovoltaic cell structures which is used in this era by utilizing the modern technology are made of semiconductor elements such as rectifier diodes and solar cells. Semiconductor elements can be conductive when it is desired, and can be made insulator.

In this way it is possible to pass or cut the electric current. The used elements such as gallium-silicon cadmium in the production are semiconductor materials. N-type semiconductors and P-type semiconductors can be combined in the form of PNP NPN in transistors to be able to use them in different tasks. Photovoltaic cells can be connected in series and parallel as required to obtain current and voltage at the desired level. Many researches have been done on solar panels [1-20].

One of the most important structures of solar energy systems is solar panels, and accumulators are used to store the electric energy which obtained from solar panels. The energy obtained so far is direct current DC electric energy. In the house, the inverter element is needed to convert this electricity to 220 volt AC flux.

II. Materıals And Method

The purpose of this research is to provide students in the Electricity Department of Afyon Kocatepe University Dazkırı Vocational School with the practical knowledge and application about solar panels. The system shown in Figure 1.1 is shown.

Figure 2.1. Solar energy experiment set

Two types of solar panels, monocrystalline and polycrystalline, are used in the solar energy experiment set system. Since the production methods of solar panels are different, reactions to solar rays are different. Thus, it has been determined which solar panel is more efficient in Afyonkarahisar Province. Figure 1.2 shows the solar panels used in the system.

Figure 2.2. Solar panels used in the system

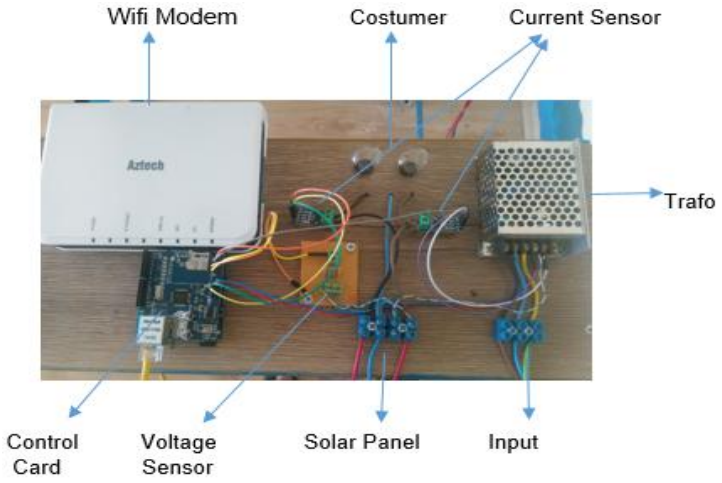
The technical information of the solar panels used in the system is shown in table 1.

Power	20 Watt	20 Watt
Maximum Voltage	18,68 Volt	18,85 Volt
Maximum Current	1,12 Amper	1,08 Amper
Open Circuit Current	22,51 Volt	22,14 Volt
Short Circuit Current	1,12 Amper	1,16 Amper
Weight	2,1 kg	2,3 kg

A. Consumer

20 Watt receiver was used to use all of the electricity generated in the solar panel.

B. Control Card



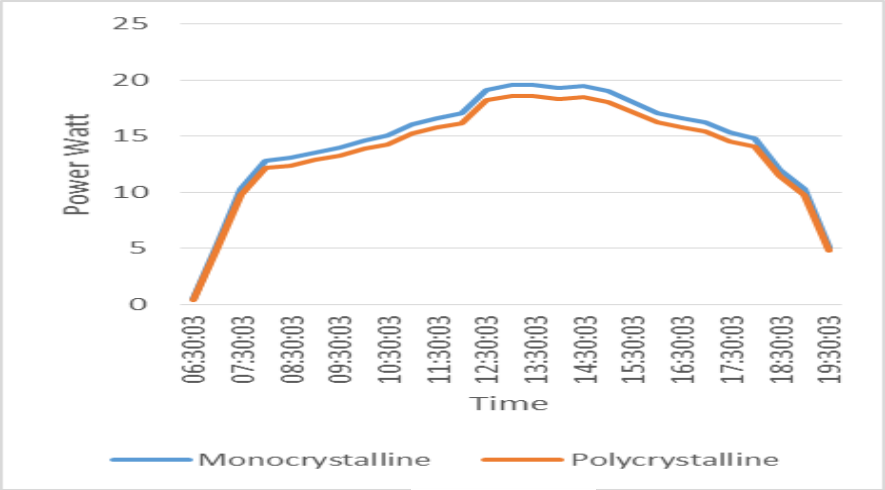
III. Indentations And Equations

At the end of the study, the forces produced by the two different solar panels started at 6:30 am and were measured every 30 minutes. The measurement result is displayed on the table.

Monocrystalline	Polycrystalline	Time
0,4184	0,39748	06:30:03
5,0255	4,774225	07:00:03
10,255	9,74225	07:30:03
12,8569	12,214055	08:00:03
13,055	12,40225	08:30:03
13,58	12,901	09:00:03
14	13,3	09:30:03
14,5896	13,86012	10:00:03
15,0286	14,27717	10:30:03
16,0258	15,22451	11:00:03
16,5899	15,760405	11:30:03
17,0258	16,17451	12:00:03
19,1418	18,18471	12:30:03
19,5602	18,58219	13:00:03
19,5602	18,58219	13:30:03
19,2987	18,333765	14:00:03
19,5079	18,532505	14:30:03
19	18,05	15:00:03
18,0589	17,155955	15:30:03
17,055	16,20225	16:00:03
16,589	15,75955	16:30:03
16,2588	15,44586	17:00:03
15,2977	14,532815	17:30:03

14,786	14,0467	18:00:03
12,025	11,42375	18:30:03
10,289	9,77455	19:00:03
5,0258	4,77451	19:30:03
389,9045	370,409275	20:00:03
194,95225	185,2046375	20:30:03

The graph in Figure 3.1 has been derived using the measurement result table. As graphically understood, the power curve of two solar panels is very close to each other.

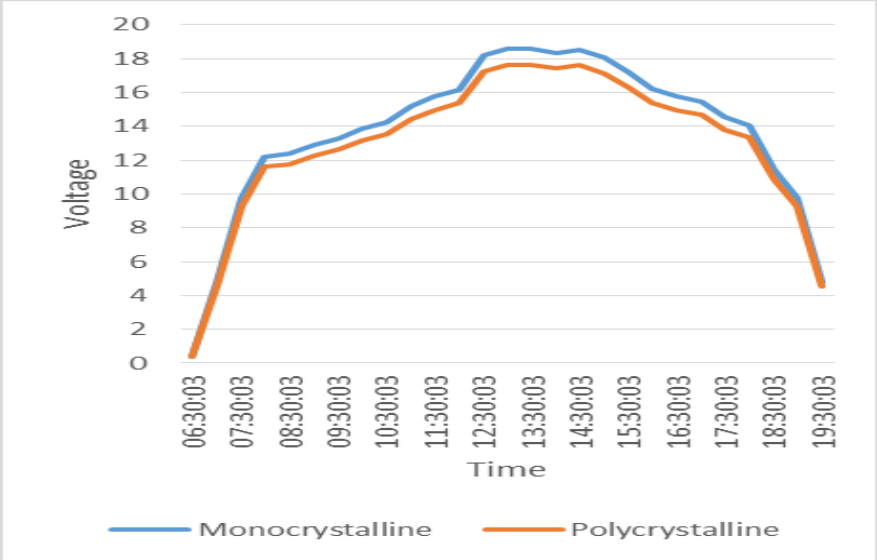


Figıre 3.1. power time curve

The following chart shows the voltages produced by the solar panels every half hour.

Monocrystalline	Polycrystalline	Time
0,39748	0,377606	06:30:03
4,774225	4,53551375	07:00:03
9,74225	9,2551375	07:30:03
12,214055	11,60335225	08:00:03
12,40225	11,7821375	08:30:03
12,901	12,25595	09:00:03
13,3	12,635	09:30:03
13,86012	13,167114	10:00:03
14,27717	13,5633115	10:30:03
15,22451	14,4632845	11:00:03
15,760405	14,97238475	11:30:03
16,17451	15,3657845	12:00:03
18,18471	17,2754745	12:30:03
18,58219	17,6530805	13:00:03
18,58219	17,6530805	13:30:03
18,333765	17,41707675	14:00:03
18,532505	17,60587975	14:30:03
18,05	17,1475	15:00:03
17,155955	16,29815725	15:30:03
16,20225	15,3921375	16:00:03
15,75955	14,9715725	16:30:03
15,44586	14,673567	17:00:03
14,532815	13,80617425	17:30:03
14,0467	13,344365	18:00:03
11,42375	10,8525625	18:30:03
9,77455	9,2858225	19:00:03

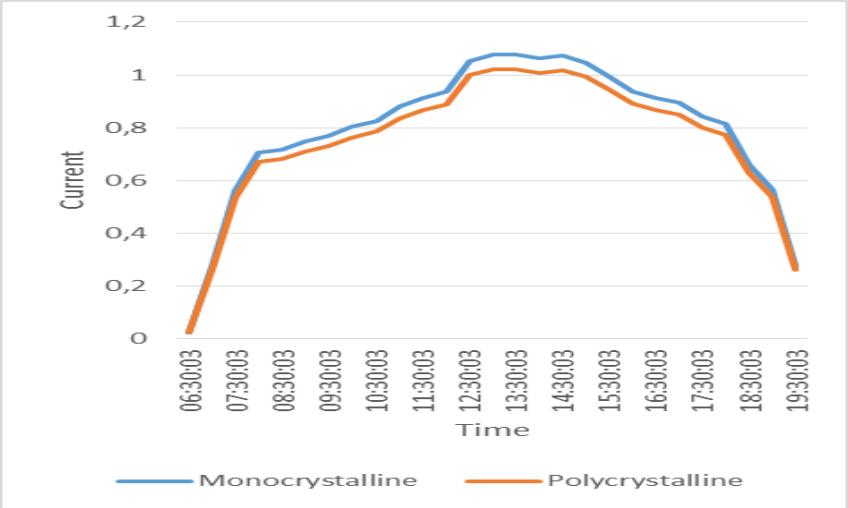
4,77451	4,5357845	19:30:03



Figıre 3.2. Voltage time curve

The graph below shows the currents generated by solar panels every half hour.

Monocrystalline	Polycrystalline	Time
0,023012	0,0218614	06:30:03
0,2764025	0,262582375	07:00:03
0,564025	0,53582375	07:30:03
0,7071295	0,671773025	08:00:03
0,718025	0,68212375	08:30:03
0,7469	0,709555	09:00:03
0,77	0,7315	09:30:03
0,802428	0,7623066	10:00:03
0,826573	0,78524435	10:30:03
0,881419	0,83734805	11:00:03
0,9124445	0,866822275	11:30:03
0,936419	0,88959805	12:00:03
1,052799	1,00015905	12:30:03
1,075811	1,02202045	13:00:03
1,075811	1,02202045	13:30:03
1,0614285	1,008357075	14:00:03
1,0729345	1,019287775	14:30:03
1,045	0,99275	15:00:03
0,9932395	0,943577525	15:30:03
0,938025	0,89112375	16:00:03
0,912395	0,86677525	16:30:03
0,894234	0,8495223	17:00:03
0,8413735	0,799304825	17:30:03
0,81323	0,7725685	18:00:03
0,661375	0,62830625	18:30:03
0,565895	0,53760025	19:00:03
0,276419	0,26259805	19:30:03



Figıre 3.3. Current time curve

IV. Conclusion

Afyon Kocatepe University Dazkırı Vocational School in this study was done with two different solar panels. Monocrystalline and polycrystalline solar panels differ in their reactions to the same sunlight due to differences in the production methods. The study also shows that the monocrystalline solar panel is somewhat more efficient than the polycrystalline solar panel. this variance is very low when measured by price difference. Polycrystalline solar panels are therefore more preferred on the market..

Acknowledgements

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