

**PARAMETRIC ANALYSIS OF MONO CRYSTALLINE PV-CELL****Fawad Ali*, Dr. Muhammad Alam Zaib**

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DOI: 10.5281/zenodo.3237499**KEYWORDS:** Photo Voltaic PV Cell.**ABSTRACT**

With the exhaustion of non-renewable energy sources, discovering savvy and productive interchange vitality assets is a noteworthy theme of research now days. Distinctive sustainable power source assets are under thought with sunlight based vitality being one of them. The primary accentuation is on growing new innovations for tackling sun's vitality proficiently. Sun oriented Photo Voltaic (PV) cell is one such innovation that chips away at the rule of photovoltaic impact, with the electric yield created by PV cell is straightforwardly impacted by the measure of light achieving the surface of cell, along these lines any interference that confines the light achieving the surface of cell influences the execution of cell contrarily. ID of those parameters which go about as deterrent amongst light and sun powered cell surface and abatement the proficiency of cell is critical before finding a way to kill them. Among a wide range of parameters the ebb and flow examine centre around the parameter that are straightforwardly impacted by natural in which these PV cells are introduced i.e. Light Intensity. In this examination tests were directed by utilizing different light intensities in changing amounts to watch their impact on PV cell yield. Results were gathered and contrasted with locate the most affecting residue on the wastefulness of the PV cells. The last outcomes plainly demonstrate an unfriendly impact of light intensity on PV cell. A huge change in productivity is likewise recorded with various light intensity levels.

INTRODUCTION

Most of the force to be reckoned with's necessities are as yet satisfied by petroleum products. The regularly expanding costs of non-renewable energy sources and their inescapable consumption alongside the harm that the use of these fills is causing to the earth have squeezed for request and the need to create elective vitality sources. Since late 90s numerous nations have begun changing to different means for delivering power with atomic vitality being the most quickly developing vitality source. In any case, with occurrences, for example, Chernobyl catastrophe and Fukushima fiasco there have developing concerns seeing utilization of atomic vitality as an elective vitality source. As of late numerous nations have ventured forward and started putting extensively in sustainable power sources. Morocco as of late finished its first period of the mega solar power plant named "Noor 1" which creates 160 MW with a definitive objective of 580 MW toward the finish of its fruition [1]. On 8 May 2016, Germany inexhaustible power age hit its pinnacle; the nation's sun based, wind, hydro and biomass plants were providing around 55 GW of the 63 GW being expended, or 87%. This prompted control costs being negative – the business clients were being paid to expend power [2].

Following the worldwide pattern of creating sustainable power sources, Pakistan too has started to put accentuation on sustainable power source. Pakistan has awesome potential for sun oriented vitality. On 29th May 2012, Pakistan initiated its first on-network sun based power plant in Islamabad with help of Japan International Cooperation Agency under Coolio Earth organization [3].

In May 2015, Quaid-e-Azam sunlight based stop started its activity with a limit of 100 MW which is relied upon to ascend to 1000 MW once the task is finished before the finish of 2016[4]. Punjab Vocational Training Council began the undertaking of preparing 2000 individuals in get together and establishment of sun powered board. A significant number of these individuals will be from zones where there are expanded power lacks [5].

Sun oriented vitality is inexhaustible and free. Sunlight based vitality innovations utilize the sun's vitality and light to give warm, light, high temp water, power, and notwithstanding cooling, for homes, organizations, and



Global Journal of Engineering Science and Research Management

industry. There are an assortment of advancements that have been created to exploit sun based vitality. Sun oriented Energy Technologies [6]:

The points and destinations of this undertaking can be recognized as takes after:

To discover the impact of Light Intensity on the execution of a sun based photovoltaic cell.

EXPERIMENTAL SETUP

The exploratory setup utilized for this examination is indicated is Fig.1 involves halogen knobs every one of 500 watt, PV-Cell, Humidifier, Thermocouples, pyrano-meter and multimeter.



Fig. 1: Halogen Bulbs Using as a Solar Simulator and PV Panel

RESULT AND DISCUSSION

Just performing tests and getting comes about isn't sufficient. The outcomes got amid test should be deciphered and contrasted and some standard and with each other before coming to any strong, dependable conclusion.

Amid our examination, numerous tests were performed by changing light power and the outcome acquired were analysed by making charts in MS-Excel.

TESTING FOR LIGHT INTENSITIES

Diverse tests were directed on the sun powered board under various Light intensities conditions. After that consolidated and the outcomes were gathered. For output Solar mono-crystalline P-V Cell is examined under different light intensities and the data obtained is managed in the form a table and after it graphs was drawn from these tables.



Table-1: Power Output for 500 W/m² of Light Intensity level

Time	Temperature	voltage	time	Temperature	voltage
min	°C	volt	min	°C	volt
0	15.7	21.2	16	48.8	19.1
1	21.7	21	17	49.5	19
2	25.9	20.8	18	50.1	19
3	29	20.6	19	50.8	18.9
4	31.5	20.4	20	51.3	18.9
5	33.9	20.2	21	51.8	18.8
6	36	20.1	22	52.2	18.8
7	38	20	23	52.7	18.8
8	39.8	19.8	24	53.2	18.7
9	41.3	19.7	25	53.5	18.7
10	42.5	19.6	26	53.8	18.6
11	43.7	19.5	27	54	18.6
12	44.9	19.4	28	54.2	18.6
13	46	19.3	29	54.5	18.6
14	46.9	19.2	30	54.6	18.6
15	47.9	19.2	16	48.8	19.1

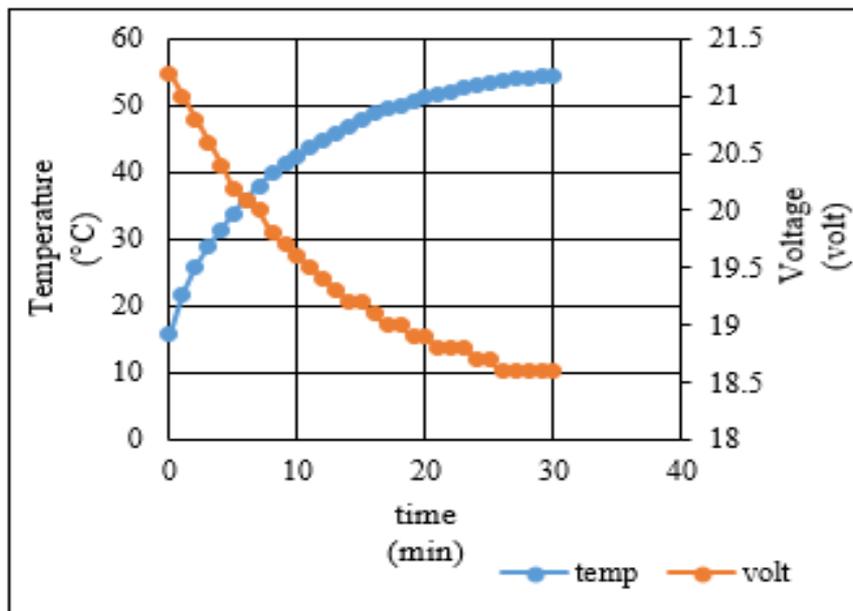


Fig. 2: Variation of Temperature and Voltage w.r.t Time for 500 W/m²

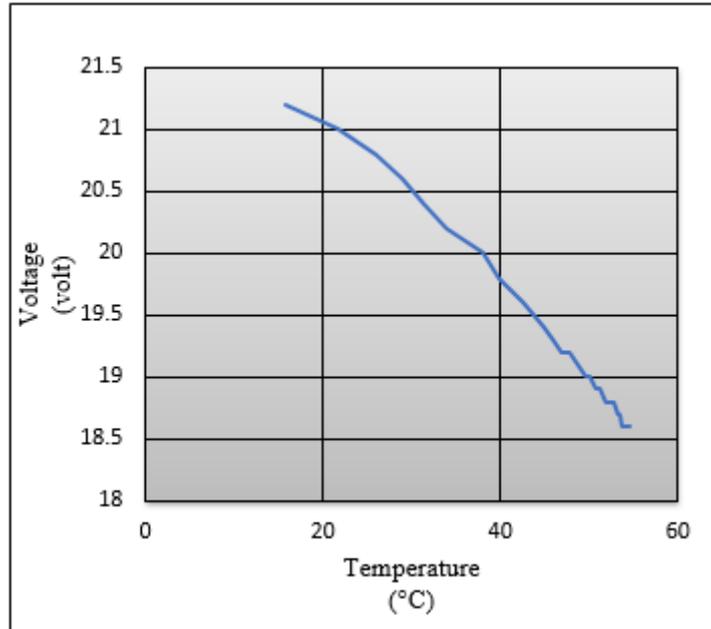


Fig. 3: Variation of Voltage w.r.t Temperature for 500 W/m²

Table-2: Power Output for 1000 W/m² of Light Intensity level

Time	Temperature	voltage	time	Temperature	voltage
min	°C	volt	min	°C	volt
0	18.5	21.6	14	61.2	18.9
1	27.2	21.2	15	62.2	18.8
2	33.5	21.2	16	63.2	18.7
3	37.9	20.7	17	64.2	18.7
4	41.7	20.4	18	65	18.7
5	44.6	20.2	19	65.6	18.5
6	47.2	20	20	66.5	18.5
7	49.6	19.8	21	67.2	18.4
8	51.7	19.6	22	67.8	18.4
9	53.7	19.5	23	68.2	18.3
10	55.3	19.3	24	69	18.3
11	57	19.2	25	69.9	18.3
12	58.4	19.1	26	70.5	18.2
13	59.9	19	14	61.2	18.9

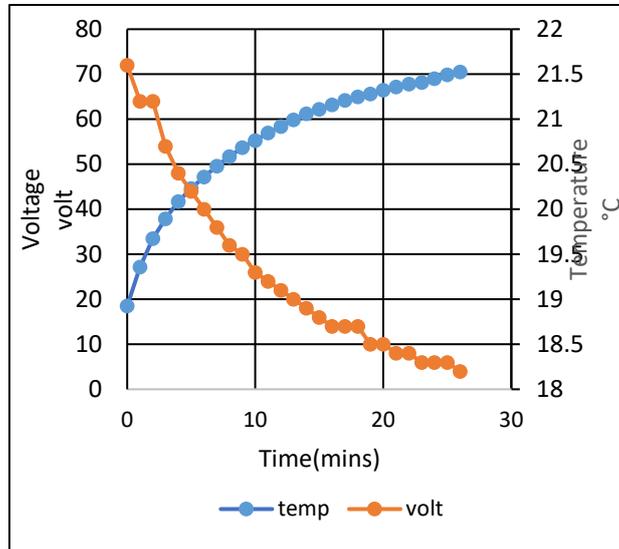


Fig. 4: Variation of Temperature and Voltage w.r.t Time for 1000 W/m²

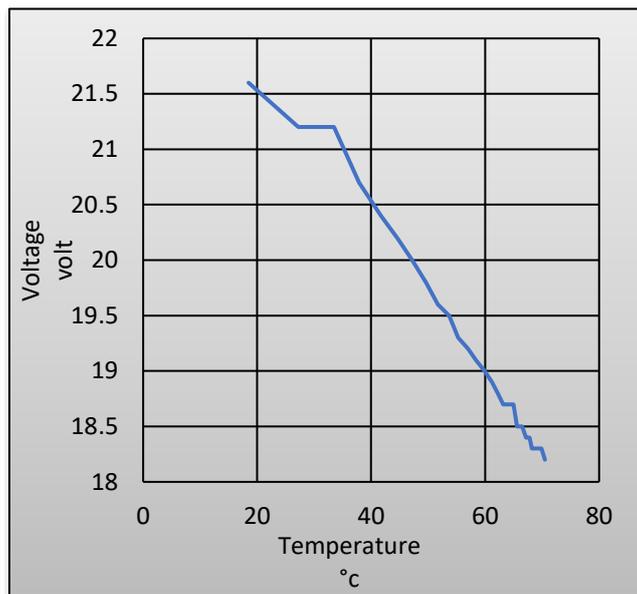


Fig. 5: Variation of Voltage w.r.t Temperature for 1000 W/m²

The impact of power was controlled by changing the light force.

By looking at the outcomes it was discovered that by expanding the light force from 500 W/m² to 600 W/m² there was 14% expansion in control yield of board and by additionally expanding force from 600 W/m² to 700 W/m² the expansion in control yield was 19%.

FUTURE WORK

- 1) This examination was directed on monocrystalline board. A comparable test can be led on polycrystalline sun oriented boards and a near report should be possible between two sorts of board.
- 2) Test can be directed under regular daylight to get more exact outcomes.



REFERENCES

1. Arthur Neslen (2016) “Morocco to switch on first phase of world's largest solar plant”. Accessed at, <https://www.theguardian.com/environment/2016/feb/04/morocco-to-switch-on-first-phase-of-worlds-largest-solar-plant>
2. Michael J. Coren (2016) “Germany had so much renewable energy on Sunday that it had to pay people to use electricity”. Accessed at, <http://qz.com/680661/germany-had-so-much-renewable-energy-on-sunday-that-it-had-to-pay-people-to-use-electricity/> [5.10.16]
3. Japan International Cooperation Agency (2012) “Pakistan gets first on-grid solar power station” Press release, Accessed at, <http://www.jica.go.jp/pakistan/english/office/topics/press120529.html>
4. Anwer Sumra (2015) “Quaid-e-Azam Solar Park: Solar energy's 100MW to arrive in April”, Accessed at, <http://tribune.com.pk/story/859627/quaid-e-azam-solar-park-solar-energys-100mw-to-arrive-in-april/> [27.3.15]
5. Pakistan Renewable Energy Society, (2013) “Training on Solar Panel Assembling and Photovoltaic Installation”, Accessed at, <http://www.pres.org.pk/category/renews/>
6. Renewable Energy World (2015), “Solar Energy Technologies”, Accessed at <http://www.renewableenergyworld.com/solar-energy/tech.html>