

289. Solarization of Sensitive Load of Electrical Department MUET SZAB Campus

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Abstract

Pakistan is currently facing the worst crisis of its history, now days the major problem is shortage of electricity which is overcome by two major sources present in Pakistan in very large quantities (renewable) such as bio mass, wind, solar and (non-renewable) coal, gas, Diesel, nuclear energy etc. So, it is more economical for Pakistan to use renewable energy but when we look into our scenario for renewable energy that solar energy and wind energy is only present in day time. It is no doubt that renewable energy is variable but renewable energy is not variable on same time then we select such a power plant where the possibility of the usage of combined cycle through renewable. Generation through renewable energy in Pakistan is more economical if we care about some factor such as Operation, maintenance, metering, management, fault recovery and daily basis report of each Grid Station. In our thesis we want to solarize the sensitive load of Electrical department of MUET SZAB CAMPUS due to following factor. We are dependent on WAPDA or Diesel Generator so the main problem is discontinuity of electricity, High & Low voltages, tripping, costly units of sepco heavy, cost of diesel generator and heavy cost of sub stations which are being installed in the campus. The major problem which occurs due to interruption of supply.

One's disturbance of class's damage sensitive equipment so according to above problem the renewable energy sources are suitable in this campus particularly electrical department. In the Khairpur Mir's 290 days are sunny days and solar radiation is so strong reaches up to 6.2 and temperature goes to 53c. So, our main motive to solarize the sensitive load of Electrical Department of MUET Shaheed Z.A Bhutto campus Khairpur Mir's. The main objective of our project is to give a comparative analysis between the WAPDA and solar energy (renewable energy) Load analysis, load calculation, comparison of costs, saving per year, load graph calculated by using PV Software. In the solar system, we only provide initial cost. After the installation, there is no running cost, continuity supply of electricity and protect our equipment. In this estimation of installation cost of solar power plant, cost of generation, performance ratio and capacity utilization factor comparing it with SEPCO units or diesel generator units with solar system. In winter, we can export electricity to other department, it is also beneficial to reduce the overall cost.

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1. Introduction

Growing consumption of energy has also resulted in the country becoming increasingly dependent on fossil fuels such as oil, coal and natural gas. Rising prices of oil, gas and coal and potential of shortages in future leads to concern about security. Increased use of fossil fuel has also caused environmental problems both locally and globally. Energy is the basic necessity of life. Pakistan is currently facing the worse crisis of its history, now days the major problem is shortage of electricity which is overcome by two major sources present in Pakistan in very large quantities (renewable) such as bio mass, wind, solar and (non-renewable) coal, gas, Diesel, nuclear energy etc. It is more beneficial for Pakistan to use renewable form of energy.

The renewable sources are natural resources that can be replenished in a short period of time. There are many sources of energy that are renewable and considered to be environmentally friendly and harness natural process. These sources of energy provide an alternative cleaner source of energy. Their initial cost is high. They have low maintenance. Conversely, solar energy is available almost everywhere in the world and is not being fully used. There are no reasons to use solar energy as the main source of power because of firstly is personal and national security and also reduce the pollution secondly due to

increasing cost of nuclear plants. so solar system leads to reduce energy cost and meet the increasing demand of consumer.

There is abundance of information regarding the use of solar energy all around the world some countries and governments have fully adopted the use of solar energy and have set goals on making renewable energy resources their main source of power. solar energy producing technology has improved and use of solar power is becoming more affordable and heavily considered by countries around the world. Solar power technology can be traced back to the 1800s. In 1839, French physics Becquerel discovered the photovoltaic effect latter on in 1941 Russell ohl invented the solar cell and the technology continues to evolve and improve .as for conventional form of power requires the transport but solar panels can be installed and generate power at the location of panel thus eliminating the need to transport the power. As this technology improves it has gradually becoming more affordable and is being used around the world. There are many advantages using solar power over wind generated power. wind turbines generate a lot of noise, requires maintenance. comparing with hydal, the hydal requires dams which are extremely costly to construct .so soar system becomes more Beneficial's than other power producing.

In this research work is to solarize to the sensitive loads at electrical engineering MUET SZAB Campus Khairpur Mir's. Here the solar radiations are available all the day. our motive is solar because of our equipment are sensitive so the low voltages causes the problems. our classed are disturbed. here we firstly calculate the load, after with the help of PV SYST software we conclude the results.

Methodology:

PVSYST Software

Objectives

- Understand the effect of solar irradiation on PV production
- Understand the PV module (one diode model) for any technology
- Characterize the component of a PV system and their modeling implementation in PV SYST
- Use the program PV SYST for the designing and optimization of gird connected PV SYSTEM
- Analyze system layout and shading issues
- Designing utility scale ground mount PV system with fixed and tracking planes
- Establish economic balances

The PV SYST software uses extensive knowledge of PV technology, metrological irradiation resources and PV components. However, it cannot replace the user's expertise. It is a tool that facilitates the aquitism of a deeper understanding PV system and the optimization of their design. This training therefore includes an important section about theoretical concepts. This course does not provide it information about the PV industry, its standards and regulation nor does it cover such topics as administrative or bureaucratic constraints, the commercial, economic or legal aspect of project's design. This is layout of photovoltaic system software here we select other department or cafeteria to export excess amount of energy.

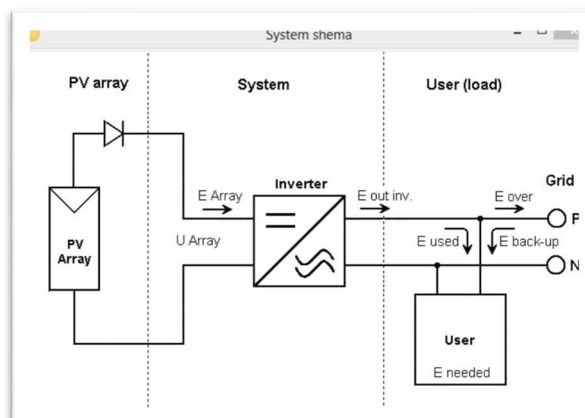


Fig. 1. SCHEMATIC DIAGRAM OF PV SYST

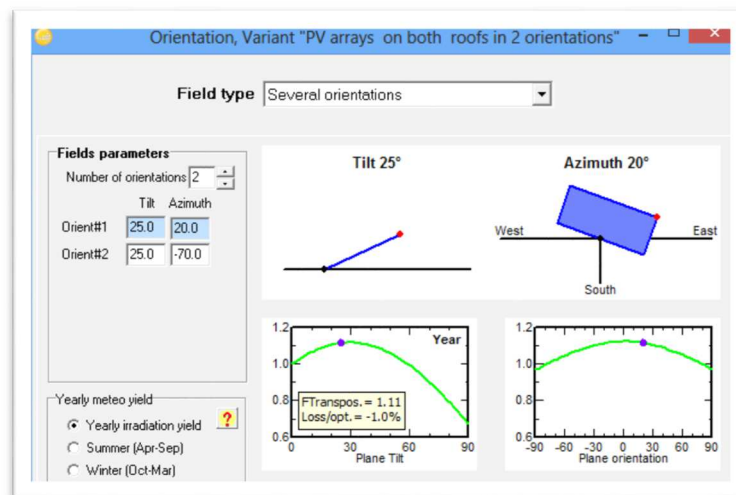


Fig. 2. Solar panel installation and set azimuth angle

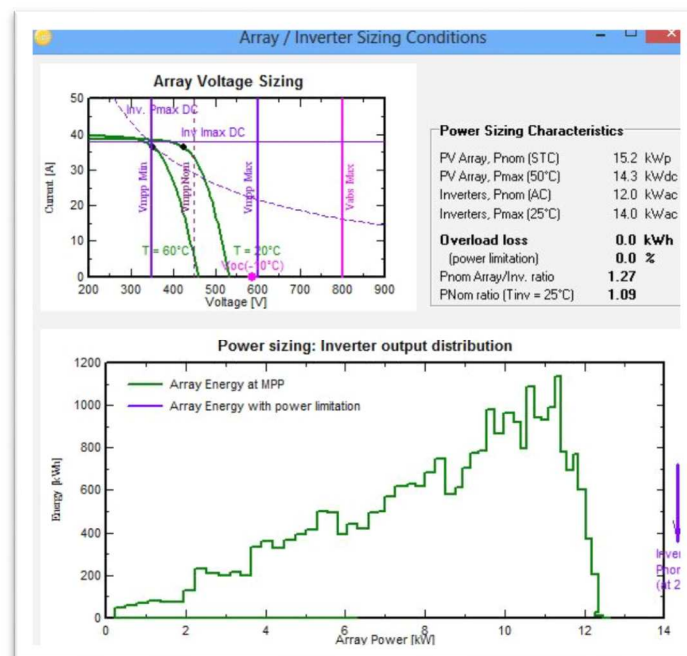


Fig. 3. Inverter PV ARRAY Condition

Conclusion

The total load of electrical department Muet szab campus is 1518.8 but we solarize sensitive load of electrical department which is 23.015 kW.

In this we generate 30 kw energy through solar energy for electrical department which is the most economical against the cost of generator, its fuel and wapda billing.

Following we give some detail that why we choose solar energy against other expenses such as generator and wapda

- Improper timing of wapda
- disturbances of the classes
- Equipment will be damaged
- Low voltages

The overall expenditure of Electrical department is

- From wapda/ year = 354432 units
- From generator/year = 1123280 Pk rupees (including capital cost and maintenance cost of generator)

- Substation (630 KVA) = 12000000 PK rupees (Capital cost)

By keeping above analysis in our observation, we came to conclusion that using solar energy we can make efficient system model for our department which is more economical and beneficial.

The component used in solar energy are given below:

1. Solar panel
2. Inverter
3. Support stand
4. Cables

The capital cost of solar power is = ± 2600000 rupees initial cost and no any other cost

The warranty of solar panels is 25 years.

90% up to 10 years and 80% remaining 15 year.

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