UTILIZATION OF SOLAR ENERGY FOR DIFFERENT LOADS

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Abstract: Solar energy is environmentally friendly technology, a great energy supply and one of the most significant renewable and green energy sources. It plays a substantial role in achieving sustainable development energy solutions. Therefore, the massive amount of solar energy attainable daily makes it a very attractive resource for generating electricity. Both technologies, applications of concentrated solar power or solar photovoltaic, are always under continuous development to fulfill our energy needs. Hence, a large installed capacity of solar energy applications worldwide, in the same context, supports the energy sector and meets the employment market to gain sufficient development. This paper highlights solar energy applications and their role in sustainable development and considers renewable energy's overall employment potential. Thus, it provides insights and analysis on solar energy sustainability, including environmental and economic development. Furthermore, it has identified the contributions of solar energy applications in sustainable development by providing energy needs, creating jobs opportunities and enhancing environmental protection. Finally, the perspective of solar energy technology is drawn up in the application of the energy sector and affords a vision of future development in this domain.

Keywords: Solar energy, Photovoltaic, Renewable sources.

1. Introduction:

The rise in the penetration of the internet across the world has led to a rapid increase in the consumption of energy at the data centers established by leading cloud data service providers. High power consumption by these data centers [DCs] leads to high operational costs and high carbon emissions into the environment. From a sustainability point of view, the ultimate goal is to maximize the productivity and efficiency of these data centers while keeping greenhouse gas emissions to the minimum and maximize data center productivity. This goal can be achieved by better resource utilization and replacing carbon-intensive approaches of energy production with green sources of energy.

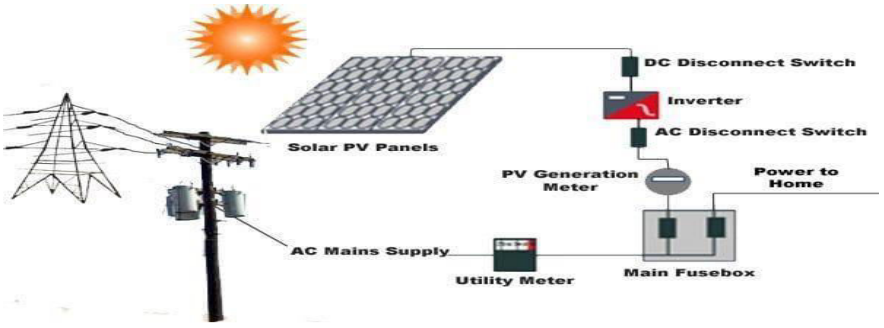


Fig.1. Solar energy generation

Due to the limited intermittent availability of renewable sources of energy, the ideal 'Green' design for the DCs, should incorporate inter-operability with both renewable and non-renewable sources of energy. In this paper, we propose a ren-aware scheduler to schedule computational workload by prioritizing their execution within the duration of green energy availability on the basis of the predicted hourly green energy and workload data of DCs.Our results demonstrate that our ren-aware scheduler can increase the green energy consumption by 51% compared to the conventional randomized scheduler that distributes load without considering green energy and load. It can also reduce the total energy consumption by 25% by putting the DCs to sleep during their idle time, as it saves 4.5 times more idle energy than the randomized scheduler. Additionally, the results also demonstrate how the role of time zones of the DCs and the duration of green energy availability in them is pivotal in our ren- aware scheduler's performance. solar energy, radiation from the Sun capable of producing heat, causing chemical reactions, or

generating electricity. The total amount of solar energy incident on Earth is vastly in excess of the world's current and anticipated energy requirements.If suitably harnessed, this highly diffused source has the potential to satisfy all future energy needs. In the 21st century solar energy is expected to become increasingly attractive as a renewable energy source because of its inexhaustible supply and its nonpolluting character, in stark contrast to the finite fossil fuels coal, petroleum, and natural gas.The Sun is an extremely powerful energy source, and sunlight is by far the largest source of energy received by Earth, but its intensity at Earth's surface is actually quite low. This is essentially because of the enormous radial spreading of radiation from the distant Sun.A relatively minor additional loss is due to Earth's atmosphere and clouds, which absorb or scatter as much as 54 percent of the incoming sunlight. The sunlight that reaches the ground consists of nearly 50 percent visible light, 45 percent infrared radiation, and smaller amounts of ultraviolet and other forms of electromagnetic radiation.

Fig.2. Solar panels

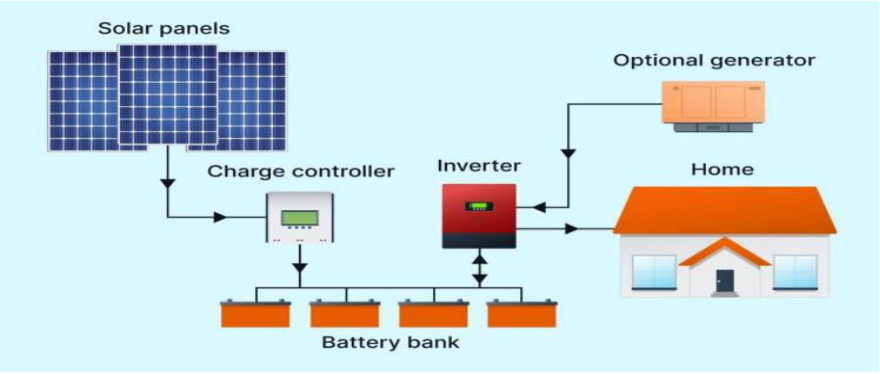


Fig.3. Solar energy storage

2. Literature Review:

The paper discusses solar energy's applications and role in sustainable development. The whole renewable energy employment potential is also included. Thus, it analyzes solar energy sustainability and the evolution of ecologically and economically sustainable industries. It also highlighted how solar energy applications support sustainable development by satisfying energy needs, creating jobs, and protecting the environment. Finally, solar energy technology is used to the energy business, revealing its future expansion [1-2]. Many farms throughout the world have employed irrigation for a long time under various conditions. It increases crop variety and productivity. Traditional irrigation methods utilize a lot of traditional energy since they employ fuel-powered electric motors and generators [3]. Scientists have tried to use solar energy to pump agricultural water. The biggest issue is converting solar heat into mechanical energy. Clever methods have been created to utilize low-temperature energy. This research examines prior solar thermal water pumping systems using standard or unconventional pumps. The study also shows how the system was adjusted to meet different pumping demands [4-5]. Solar-powered hybrid desalination and cooling solutions may reduce greenhouse gas emissions, energy consumption, and efficiency. This document summarizes studies on exploiting solar resources to meet cooling and freshwater demands. Sun desalination methods include multi-effect distillation (MED), single and multi-stage flash (MSF), reverse osmosis (RO), adsorption, absorption, membrane distillation

(MD), and their combination with cooling systems. The study reported system performance parameters such water production, cooling capacity, performance coefficient, and freshwater cost [6-9]. However, direct solar still methods are better for smaller desalination systems, whereas indirect methods are better for medium and big ones. Simple modifications using locally available materials may improve the performance of affordable solar stills. These inexpensive stills may be rapidly and cheaply made to meet daily potable water needs. These inexpensive solar stills are ideal for coastal and island small homes and communities. It can also distill brackish water for riverbank residents. This technology, designed for fluoride-sensitive areas, may also remove fluoride from water. Cheap solar stills may remove arsenic, mercury, cadmium, coli form, viruses, and bacteria [10-12].

4. Methodology:

The methodology, known as the Value of Solar Methodology, takes into consideration the unique nature of solar PV generation in which systems produce electricity on the peak, produce power at the location of use, do not require continuous fuel purchases, and have significant security and environmental advantages over fossil fuels. These characteristics generally increase the value of solar electricity as they allow utilities to avoid the costs of fuel, plant O&M, generation, reserve capacity, transmission, and distribution in their centralized assets. The value of Solar Methodology represents an opportunity for states and utilities across the country to begin to assess the benefits of distributed generation and better plan for energy investments that provide maximum benefits to society.

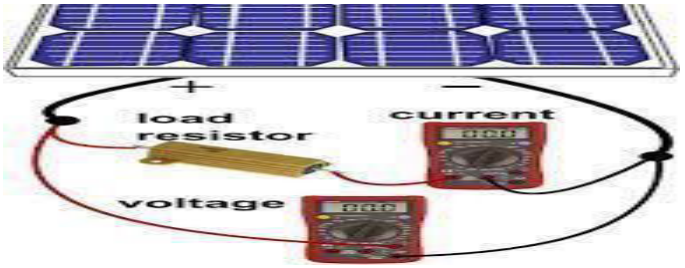


Fig.4. Basic Terminology

The technology similar to a power tower consists of long flat reflectors which are reflecting radiation on one or more pipes containing a heat transfer medium which has the same working as previous technologies. The main advantage of this technology is cost and space utilization being minimum; while the thermal storage technology for linear Fresnel is still under development. The status of plants around the world is shown below: The major attraction of this technology is its low cost of components and lower consumption of land as compared to previous technologies. It also gives the opportunity to indigenize the components but low-cost backlashes with optical efficiency and large thermal storage.

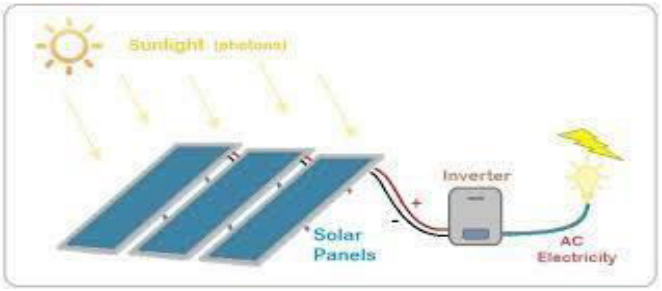
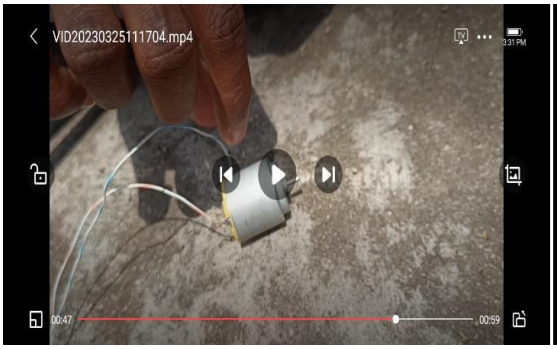


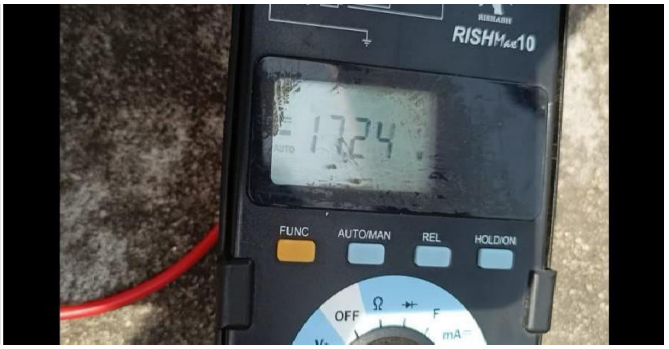
Fig.5. Energy Distribution through controller

The light energy from the sun is converted into electrical energy by using this solar panel. In our project, we are using a monocrystalline solar panel because its efficiency is high. This works extremely well on sunny days and produces an ample amount of electricity but in rainy or windy conditions we definitely have to look for an alternative, so we are providing additional charging facilities.

5. Results and Conclusion

5.1 Photos of experimental setup:





5.2 Implementation:

- The equipment used in the project are solar PV module, Multimeter, D.C motor, Rheostat, connecting wires with allthe hardware setup.
- For this solar photovoltaic module nominal electrical output is at 25degrees Celsius and under STC conditions.

  Maximum system voltage is 750 Volts D.C.

Equipment Required:

S.NO	NAME OF THE EQUIPMENT	RANGE	TYPE	QUANTITY
1.	Solar P.V.module	55 Watts/ 21.0 Volts	MUMJ12	**01**
2.	Digital multimeter	-	Digital	01
3.	Motor	12 Volts	D.C	01
4.	Rheostat	100 Volts/ 2.8 Amps	-	-
5.	Connecting wires	-	-	As required

Summarised Results Or Achievements For The Utilization Of SolarEnergy For Different Loads

S.NO	Activity	Value	Time	ON LOAD
1.	Generation of voltage across panels(Volts)	21.0	11:30AM	-
2.	Generated voltage(Volts)	18.94	11:30AM	3.86
3.	Generation of current through Panels(Amps)	55.0	-	-
4.	Generated current(Amps)	2.76	11:30AM	2.53

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5.4: Conclusion:

- Solar energy is expected to become increasingly attractive as a renewable energy source because of its inexhaustible supply and its non polluting character.
- Here we found the results on different loads (DC Motor, Rheostat, lamp etc.,)with the use of Solar PV module.
- Many technologies can harvest it directly for the use in homes businesses, schools, hospitals and for agriculture purpose. Solar energy can also improve air quality and reduced water use from energy production.

Our proposed method for "UTILIZATION OF SOLAR ENERGY FOR DIFFERENT LOADS" meets the following requirements:

- It can be Renewable
- It is free of Co2
- Low operating costs
- It provides limitless solar energy
- Not require to burn fuel
- Is a clean source
- Minimises the use of number of interconnecting wires or cables.

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