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**Intern’s Details**

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| **Name** | Arunabha Sarkar |
| **Email-ID** | arunabha.sarkar1999@gmail.com |
| **Smart Task No.** | 1 |
| **Project Topic** | Solar PV – Simulation and Designing |

**Smart Task (Solution)**

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| 1. **Task Q1 :** What are the different types of renewable energy? Elaborate the most commercially feasible options. |
| **Task Q1 Solution :**    **According to today’s scenerio , there are mainly 5 types of renewable energy resources available in nature :**   1. **Wind energy** 2. **Tidal energy** 3. **Solar energy** 4. **Biomass energy** 5. **Geothermal energy**   **Now coming to the point of commercial feasibility , the solar energy is most feasible among them . As the solar energy is available in the nature and it is a renewable resource . The main process is that by using solar cells the solar radiations are being stored and these stored radiations are then passed through a inteverter to convert it from Dc to Ac and the electricity can be utilized in household purposes . It is very much cost friendly project and we can save a lot of money of electricity can be saved. That’s why it is very ,much economical.** |

500 Words (Max.)

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| **Task Q2 :**  Explain the process flow of Solar PV Power Plant, What are the different types of machines used in the project, explain their functions. |
| **Task Q3 Solution :**  **Solar PV power plant works on the process of how the solar radiations comes to earth surface and effect the solar cells**. **Solar panels constitute the most important element of the whole plant as they convert sunlight into electricity. Actually the solar radiation strickes the solar pv pannel and eject the electrons from it that creates the current electricity . Though the process involves many process and parts .**  **The different types of machines used in the project are :**   1. **Solar panels :** Solar panels constitute the most important element of the whole plant as they convert sunlight into electricity. The construction of solar panels makes use of lead-free, optically transparent, anti-reflective glass, which can withstand the tested shot of an ice ball with 35mm diameter at a speed of 30 m/s. 2. **Supporting structure :** The solar panels are mounted on supporting structures and connected to successive chains. Supporting structures are made from aluminum profiles and stainless steel fasteners. 3. **Inverter system :** The inverters are the “brain” of the whole PV plant. Inverters efficiently convert direct current (DC) from the solar panels into alternate current (AC) and, with the help of a transformer, to increase voltage and transmit electricity to the grid. 4. **Monitoring system :** The monitoring system controls the working parameters of the entire PV solar plant and its, helps to identify malfunctions and deviations from established patterns, and allows for a better risk management. |

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| **Task Q3 :**  What is Solar Resource Assessment? How is it done on a particular site? |
| **Task Q3 Solution :**  **Solar resource assessment is a system which involves the assessment of that particular place is suitable or not for the installation of solar pv cells because all place is not suitable as the radiation at places is not of that level . Solar resource assessment is a necessary step in PV plant design that allows understanding the feasibility of a plant in a given location**.   * **For that particular site , we have to determine some certain parameters .** **Solar resource assessment generally involves collecting meteorological data from the site such as weather data, the amount of sunlight received in the location, wind speed, air temperature, etc. There are two methods in which the assessment is done: Onsite ground measurements and collecting satellite data.** |

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| **Task Q4 :**  Explain the losses that occur in the Solar PV Project, Explain in steps from radiation to generation. |
| **Task Q4 Solution :**  **The losses that are mainly occurred in Solar PV project are :**   1. **Loss of Solar Pannels : The main function of solar pannels to convert the solar energy into DC electrical energy which is used for home appliances and other purpose, but the scenerio is that**  **it is able to convert a small percentage, say 18%,**[**efficiency of solar panel**](https://www.adityagreens.com/blog/how-to-measure-the-efficiency-of-your-solar-roof)**, of the solar power into electrical power.** 2. **Battery Loss : The battery provides energy by converting the stored chemical energy into DC electrical energy and there occurs a loss in this conversion. If your battery is 85% efficient then it will convert 85% of its stored chemical energy into DC electrical energy.** 3. **Inverter loss : The basic**[**function of the inverter**](https://www.adityagreens.com/blog/understanding-the-functioning-of-the-inverter)**is to convert a DC electrical energy into AC electrical energy but also some loss is involved in it.**  * **Mainly the generation of solar electricity is dependent on the amount of solar radiation strikes the solar PV cells . Moreover the radiation is not same everywhere . A PV cell (can be called as a solar cell) is a semiconductor device that converts the sunlight energy into electricity without going through any energy conversion steps.This conversion takes place by photovoltaic effect and hence they are called Photovoltaic (PV) cells. It generates voltage and current at its terminals when sunlight incident on it.** **The more is the power generated, if higher is the light intensity. If the area of the cell is more, the power generated is also more. And the optimum power is generated by it when light falling is perpendicular to the front side of the cell.The solar cells are made with silicon semiconductor material and is treated with phosphorous and boron to make a thin silicon wafer. The wafer layers are then aligned together to make the solar cells, once they are doped.Irrespective of the technology and material used, every solar cell has two terminals (positive and negative terminals) so as to take the electric current from it. Typically, a solar cell consists of front contact at the top, PN junction in the middle and back contact at the bottom.Basically, the sunlight consists of bundles of photons, where each photon has a finite amount of energy. To generate the electricity from a solar cell, these photons must be absorbed by it. The energy of the photon and also the band-gap energy of semiconductor material decide the absorption of a photon.Here is the term Electron-volt (eV) which is the unit of energy that expresses the photon energy and the band-gap energy of a semiconductor material.** |

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| **Task Q5 :**  List down with proper meaning 20 news terms or words you learned while doing module-1, related to Solar PV*.* |
| **Task Q5 Solution :**  **The words :**   1. **Solar** 2. **Pannel** 3. **Radiation** 4. **Intensity** 5. **PV cells** 6. **Resource** 7. **Assessment** 8. **Semiconducter** 9. **Inverter** 10. **Losses** 11. **Monitoring** 12. **Supporting** 13. **System** 14. **DC** 15. **AC** 16. **Convert** 17. **Optimum power** 18. **Band Gap** 19. **photon** 20. **Generation** |

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| **Task Q 6:**  Are you satisfied with your knowledge of Basics of Solar PV? If yes then summarize your understanding. |
| **Task Q6 Solution :**    **Yes , satisfied.**   * **Solar 1st module is very interesting and we have learned how to manage solar pv system and the generation of electricity from it** |

*Please add /delete blocks for if needed.*