DOWNLOAD PDF 1 MW SOLAR POWER PLANT DESIGN

Chapter 1 : What should be the value of DC to design 1 MW AC Solar PV plant? | Sunintown

Design & Estimation of 1MW utility Scale Solar PV Power Plant: Technical & Financial (UPDATED) up a 1/ MW/KW Solar Power Plant. This Detailed Project Report.

It is an assembly of photovoltaic PV cells, also known as solar cells. To achieve a required voltage and current, a group of PV modules also called PV panels are wired into large array that called PV array. A PV module is the essential component of any PV system that converts sunlight directly into direct current DC electricity. It is charge controller that is used in the solar application and also called solar battery charger. Its function is to regulate the voltage and current from the solar arrays to the battery in order to prevent overcharging and also over discharging. There are many technologies have been included into the design of solar charge controller. For example, MPPT charge controller included maximum power point tracking algorithm to optimize the production of PV cell or module. Solar charge controller â€" regulates the voltage and current coming from the PV panels going to battery and prevents battery overcharging and prolongs the battery life. Inverter is a critical component used in any PV system where alternative current AC power output is needed. It converts direct current DC power output from the solar arrays or wind turbine into clean AC electricity for AC appliances. Inverter can be used in many applications. In PV or solar applications, inverter may also be called solar inverter. In stand-alone photovoltaic system, the electrical energy produced by the PV array cannot always be used when it is produced because the demand for energy does not always coincide with its production. Electrical storage batteries are commonly used in PV system. The primary functions of a storage battery in a PV system are: Energy Storage Capacity and Autonomy: Voltage and Current Stabilization: DC-DC converters are power electronic circuits that convert a dc voltage to a different dc voltage level, often providing a regulated output. It is widely used in DC power supplies and DC motor drives for the purpose of converting unregulated DC input into a controlled DC output at a desired voltage level. MPPT uses the same converter for a different purpose, regulating the input voltage at the PV MPP and providing load matching for the maximum power transfer. There are a number of different topologies for DC DC converters. Load is electrical appliances that connected to solar PV system such as lights, radio, TV, computer, refrigerator, etc. Determine Power Consumption Demands The first step in designing a solar PV system is to find out the total power and energy consumption of all loads that need to be supplied by the solar PV system as follows: Add the Watt-hours needed for all appliances together to get the total Watt-hours per day which must be delivered to the appliances. Multiply the total appliances Watt-hours per day times 1. To find out the sizing of PV module, the total peak watt produced needs. The peak watt We produced depends on size of the PV module and climate of site location. For Example Thailand, the panel generation factor is 3. To determine the sizing of PV modules, calculate as follows. Increase any fractional part of result to the next highest full number and that will be the number of PV modules required. Result of the calculation is the minimum number of PV panels. If more PV modules are installed, the system will perform better and battery life will be improved. If fewer PV modules are used, the system may not work at all during cloudy periods and battery life will be shortened. Inverter sizing An inverter is used in the system where AC power output is needed. The input rating of the inverter should never be lower than the total watt of appliances. The inverter must have the same nominal voltage as your battery. For stand-alone systems, the inverter must be large enough to handle the total amount of Watts you will be using at one time. In case of appliance type is motor or compressor then inverter size should be minimum 3 times the capacity of those appliances and must be added to the inverter capacity to handle surge current during starting. For grid tie systems or grid connected systems, the input rating of the inverter should be same as PV array rating to allow for safe and efficient operation. Battery sizing The battery type recommended for using in solar PV system is deep cycle battery. Deep cycle battery is specifically designed for to be discharged to low energy level and rapid recharged or cycle charged and discharged day after day for years. The battery should be large enough to store sufficient energy to operate the appliances at night and cloudy days. To find out the size of battery, calculate as follows: Calculate total Watt-hours per day used by appliances. Divide the total Watt-hours per day used by 0. Divide the answer

obtained in item 4. Multiply the answer obtained in item 4. Ampere-hour capacity of deep cycle battery. Select the solar charge controller to match the voltage of PV array and batteries and then identify which type of solar charge controller is rightfor your application. Make sure that solar charge controller has enough capacity to handle the current from PV array For the series charge controller type, the sizing of controller depends on the total PV input current which is delivered to the controller and also depends on PV panel configuration series or parallel configuration. According to standard practice, the sizing of solar charge controller is to take the short circuit current Isc of the PV array, and multiply it by 1.

Chapter 2 : Solar Power Plant Details & Price 1kW-1mW | KENBROOK SOLAR

Concept/Objectives 0% % Completely Indigenous Import Complete plant Prototype â€¢ 1MW Solar Thermal Power Plant - Design & Development of a 1 MW plant. - Generation of Electricity for supply to the grid.

A site in West Bengal is taken virtually to estimate the solar intensity of the site which is most important for calculation of such type of report. A financial overview with a possible income datasheet included in the project report Please give your feedback via email to this email address: Aim of the project 2. Global market price trends of solar panel 4. Aim of the project Aim of this paper is to give an overview of a 1MW solar PV power plant utility scale. How the project will work? Using solar pv modules, solar power generates in DC which is converted into AC power and then using a power transformer the generated and modified AC power will be fed to the grid. No battery storage introduced here because the plant will only functions in the daylight and here the generated power will be sold to the grid. The benefits and the installation cost details are highlighted in the next article. Central inverters 4 1 cr 3. Protective gears arrangment 10 lacs 5. Land bank 5 lacs approx. Erection of project 10 lacs 8. Total project cost i. For China Tech 5. Daily units generated units 2. Total income over the year 2. Output voltage of each string And in each group, the 54 strings are connected in parallel to increase the current. DC output power calculation: Output power of each string The data presented may change due to further improvements in the product. These I-V curves indicate the effect of temperature and light intensity on module Performance. The inverters are customized efficiency level. Optimized and accurate and configured to meet end user needs system control and a maximum power and are available with short delivery times. This avoids the are engineered to provide a long and need for each central inverter to have reliable service life of at least 20 years. However, in systems where Compact and modular design the DC side needs to be grounded, The inverters are designed for fast and an inverter dedicated winding within a easy installation. The industrial design transformer, or a separate transformer, and modular platform provides a wide must be used always. May need optional cabinet heating. Above m special requirements. Specifications subject to change without notice. Integrated DC input extension cabinets Junction box with monitoring 21 Protection and safety measurements A schematic of the protection system 22 The main protections and protective gears are named here. DC Side Protection 1. For string protection B. Panel mount fuse holder C. In-line fuse holders D. Dead front fuse covers 3. Surge protection devices 4. Load break disconnect switches B. High power switches 5. Air and liquid cooled solutions 6. Wire management solutions A. Finger-safe power distribution blocks B. Finger-safe comb wiring bar 7. Ground-fault protection 23 AC Side Protection 1. So, in this point of view a compact system with well service provider need to be pointed out. PV system info Site name: Terrain horizon and day length Left: Path of the Sun over a year. Terrain horizon drawn by grey filling and module horizon blue filling may have shading effect on solar radiation. Black dots show True Solar Time. Blue labels show Local Clock Time. Change of the day length and solar zenith angle during a year. The local day length time when the Sun is above the horizon is shorter compared to the astronomical day length, if obstructed by higher terrain horizon. Esm Monthly sum of specific electricity prod. Global in-plane irradiation input - - Global irradiation reduced by terrain shading 0 0. Global irradiation reduced by reflectivity Conversion to DC in the modules Other DC losses Transformer and AC cabling losses Reduced availability Reduction of global in-plane irradiation due to obstruction of terrain horizon and PV modules, 3. Proportion of global irradiation that is reflected by surface of PV modules typically glass , 4. This step considers euro efficiency to approximate average losses in the inverter, 7. Losses in AC section and transformer where applicable depend on the system architecture, 8. Availability parameter assumes losses due to downtime caused by maintenance or failures. Losses at steps 2 to 4 are numerically modeled by pvPlanner. The simulation models have inherent uncertainties that are not discussed in this report. Read more about simulation methods and related uncertainties to evaluate possible risks at http: Primary data layers include solar radiation, air temperature and terrain elevation, horizon. Air temperature at 2 m: The data are spatially enhanced to 1 km resolution to reflect variability induced by high resolution terrain. This estimation assumes year having days. Occasional deviations in calculations may occur as a result of mathematical rounding and cannot be

considered as a defect of algorithms. More information about the applied data and algorithms can be found at: Service provider GeoModel Solar s. Mode of use This report shows solar power estimation in the start-up phase of a PV system. The estimates are accurate enough for small and medium-size PV systems. For large projects planning and financing, more information may be needed: Statistical distribution and uncertainty of solar radiation 2. Detailed specification of a PV system 3. Interannual variability and P90 uncertainty of PV production 4. Lifetime energy production considering performance degradation of PV components. More information about full PV yield assessment can be found at: Disclaimer and legal information Considering the nature of climate fluctuations, interannual and long-term changes, as well as the uncertainty of measurements and calculations, GeoModel Solar s. The maximum possible has been done for the assessment of climate conditions based on the best available data, software and knowledge. Contact information This report has been generated by Mr.

Chapter 3 : A Report on Design Estimation of 1MW Solar PV Plant (Utility Scale) | amrit mandal - www.nxg

Technical Assistance: Solar Power Analysis and Design Specii¬•cations engineering issues of building a solar plant on a former landfill. 1 MW of solar PV.

The installation of net-metering at the site will connect it to grid via Sate Electricity Board or Distribution Companies. This will boost solar or green power generation across the state and encourage people to install solar Power Plants systems on their rooftops. Different types of Solar Power Plants: The basic work of Solar Power plant is to generate electricity from Solar Panels. Basically there are three type of Solar Power Plants: And surplus power feed in to the battery bank provide with the solar power plant. This type of solar power are recommended where power cut are the major problem. In the first priority this system also will run your home appliances or connect load Without any limit. And if your connected load is less, its will supply surplus power to the grid. This type of systems are recommended to reduce electricity bills only. And you will be get benefited for free electricity for next 25 plus years. If you are planing to install solar for your home or small business and your instillation size is less than kW, you have the one and only way to get it installed is CAPEX model. After that you just need to pay per unit on monthly basis. The PPA rates Rs. If you want to install solar power plant for your institute, business or industry and your installation size is above kW. You can go for OPEX model. Maybe someone else will be happy to build a solar plant on your roof or nearby and sell you the power through a Power Purchase Agreement PPA. This model works typically for industrial and commercial consumers, and Indian companies have started offering it to residential customers in some cities. A PPA is a formal agreement between an electricity consumer in this case, you and the electricity generator usually an investor that specifies terms and conditions of electricity purchase. Details usually include the length of the PPA typically 25 years , the price tariff for the power from the solar plant and annual escalations if any. This is also called the OPEX model. We have decided to create a 1MW estimate series.

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Chapter 4 : Electrical World: Analysis of One MW Photovoltaic Solar Power Plant Design

Solar Power Plant Design and Interconnection â€¢ 60 MW Solar One plant installed in Nevada in systems for large solar power plants.

Back to blog Solar power plant A solar power plant is based on the transformation of solar energy or sunlight into electricity. It is done directly through photovoltaic cells or indirectly with the help of concentrated solar power. In this context, it is important to note that solar power in India is one of the rapidly developing industries. Hybrid solar plants are increasingly getting a more significant amount of attention in India. Hence, it is imperative to take a peek at the top 10 largest solar power plants in India. Ananthapur Ultra Mega Solar Park: It is located in Andhra Pradesh and produces around 2, Kamuthi Solar Power Project: It is one of the largest solar power installations in Tamil Nadu as well as in India. Dhirubhai Ambani Solar Park: It is one of the largest producers of solar power in the state of Rajasthan. Canal Solar Power Project: This project is located near the Narmada Canal. The Welspun Solar MP project: This project is one of the most significant solar power projects in the state of Madhya Pradesh. The Sakri solar plant in Dhule district in Maharashtra is the largest solar power plant in Central India. It produces around MW of solar power. The Adani Solar Power Project: It is expected to generate around MW of power. The Pavagada Solar Park: It is located in Karnataka and generates around MW of solar power. It is the only floating solar power project situated on the Banasura Dam. The types of solar power plant The primary function of a solar power plant is to generate electricity from solar plants. It is important to note that the solar panels create Direct Current from the solar energy. Moreover, the solar inverter converts the DC power into AC. There are three types of solar power plants as listed below: In an on-grid system, if your connected load exceeds the capacity of the installed solar power plant, it would automatically use the voltage from the main grid. Off-Grid Solar Plants It is also known as a battery based solar power plant. The priority of this system is to meet the requirements of the home-load. In case, the connected pressure exceeds the capacity of the solar plant installed it would use the power from the main grid. Hybrid Solar Plants It is a combination of the above-mention solar systems. It is a combination of on-grid and off-grid solar plant. It is also known as a grid-connected system that can feed excess power to the government grid. Ways to get a solar plant installed There exist two methods with the help of which the solar plants can be installed. In this process, you have to pay the complete cost of the solar power system to the company which is associated with the installation process. Moreover, if you opt for this process, you be the owner of the system, and as an incentive, you would get free electricity for 25 years. After that, you need to pay PPA rates of Rs. It would be built in two phases out of which the first phase would comprise of MW of power. It would span across an area of acres. The remaining capacity would be implemented with the usage of various models. A solar PV system is a power station which is associated with the generation of electricity from the sunlight. What is the cost of setting up a MW solar plant in India? The approximate cost would be around 6 to 7 crore. One can also get some reduction as there are a large number of companies out there. What is the average cost of grid-connected rooftop solar systems? The average price of grid-connected rooftop solar systems is about Rs. If you too are interested in the installation of solar plants, stay tuned to our blog for more updates. Go green and save!

Chapter 5 : Implementing MW Solar Power Plants - Solar Mango â€“ #1 guide for solar

Implementing MW Solar Power Plants - Action Framework Large, ground-connected solar power plants require significant investments. The main monetization from the MW solar power plants is either through the sale of power or savings accrued from captive power generation.

Also the previous report was not so detail, was very basic and meant to the readers who want to get an overview on how a utility scale power plant works. Now, in this report, I discuss about in depth. Hope, this time you get a strong knowledge on designing and estimation of 1MW solar PV power plant. Unlike the previous report, the financial aspect discussed at the end of the paper. And if you have any queries or need clarification, please contact at info renewpowerzone. Designing of PV system is totally based on the practical experience of the author. No shading has been considered at the site during the calculation design. If the shading occurs, then the estimated power generation will not match the actual power generated. It is assumed that the produced power from the PV plant will be fed to the local utility grid. So, while designing the system, no unbalanced load considered in 3 phase configuration. The calculation based on the meteo data collected from NASA website which is very reliable. Now, based on the co-ordinates the values have been presented in this report. So, total design is based on this data. For a different location coordinates , the system design will differ. It is advised not to copy and implement the design without consulting the author or any certified PV professional because this design estimation is valid only for a particular site. If anybody interested in setting up the plant then only contact at the given e-mail ids to get the design file. Here, in this report, while doing the technical assessment, the distance from nearest substation to the 1MW solar PV power plant taken within 1. And in the financial assessment, no wheeling charges have been considered. India is already a leader in wind power generation. In the solar energy sector, some large projects have been proposed, and a 35, km2 area of the Thar Desert has been set aside for solar power projects, sufficient to generate GW to 2, GW. It has paved the way for a competitive environment; open access to existing transmission and distribution network to transmit electricity across regions; de-licensing of generation, captive power and dedicated transmission lines; licensing of distribution and supply companies and the restructuring of State Electricity Boards. The Ministry of Power has mandated to promote cogeneration and renewable sources for Power generation under Nodal agencies and hence it will play a major role in mainstreaming renewable energy sector. The advantage or renewable resources includes their capacity to produce energy without producing carbon-based warming and polluting agents into the atmosphere. The financial cost of its applications is not always cheap but if the environmental costs of using fossil are accounted for, renewable energy wins hands-down. There are also indirect savings on health and its costs as there are no harmful emissions. This Detailed Project Report DPR brings out all technical details and overall costs justifying the selection of the project. For this project, poly-crystalline technology based 3rd generation Solar PV modules will be used. Along with this, highly efficient, photon-tested string inverters going to be integrated to the system. These technologies are the best in the industry. Transformer 2,, From international vendor 4. Protective devices 1,, From international vendor 5. Construction works 4,, 9. Grid evacuation 1,, assumed Assumed because of having no sufficient data First Solar Inverter 1. Schneider Electric Transformer 1. Voltech Switch gear 1. Megawin DC Disconnect 1. Schneider Electric Circuit breaker 1. Though I have discussed about the technical part as well as the financial part in detail, I might have been forgot to add anything more important. At the end, I discussed about some companies for the components. I have chosen these companies because their products are fulfilling my design criteria.

Chapter 6 : An Analysis of One MW Photovoltaic Solar Power Plant Design | Open Access Journals

A sample layout engineering design document for a 1 MW solar power project. Slideshare uses cookies to improve functionality and performance, and to provide you with relevant advertising. If you continue browsing the site, you agree to the use of cookies on this website.

The main monetization from the MW solar power plants is either through the sale of power or savings accrued from captive power generation. While availability or ownership of land are important, these are not the most critical factors determining the success of ground mounted solar farms. The framework below provides more details on the key drivers and actionable for implementing MW solar power plants. PPA A solar Power Purchase Agreement PPA is an agreement between a solar power generator developer and an energy consumer or utility off-taker to buy the solar power generated by the developer. In many countries, PPA contractual terms last for 25 years. It is during this time the power purchaser buys energy. Solar Developers are able to competitively price solar power for both public as well as private customers under the terms of the PPA. PPAs usually include terms of agreement i. Tariffs may be overturned by Regulatory Commissions with time Poor financial health of DISCOM might lead to delay in payments to developer Generally speaking, government PPAs are regarded as low er risk as they are backed by the government and are usually signed for the duration of plant life 25 years Challenges associated with 3rd Party PPAs: Identify approximate area available for PV installation including any potential shading. The areas may be either on rooftops or on the ground. A general guideline for solar installations is 5â€”10 watts W per square foot of usable rooftop or other space. Identify potential solar policies applicable for the land: State policies differ from region to region. The tariff rates at which PPAs are signed differ region to region. Hence zero in on a policy that can bag you a PPA that ensures profitable returns. After a winning bid is selected, the contracts must be negotiatedâ€”this is a time-sensitive process. In addition to the PPA between the government agency and the system owner, there will be a lease or easement specifying terms for access to the property both for construction and maintenance. Permitting and Rebate Processing: The system owner developer will usually be responsible for filing permits and rebates in a timely manner. However, the government agency should note filing deadlines for state-level incentives because there may be limited windows or auction processes. Project Implementation and Commissioning: The developer should complete a detailed design based on the term sheet and more precise measurements; it will then procure, install, and commission the solar PV equipment. The commissioning step certifies interconnection with the utility and permits system startup. Once again, this needs to be done within the timing determined by the state incentives. Failure to meet the deadlines may result in forfeiture of benefits, which will likely change the electricity price to the government agency in the contract. The PPAs usually establish realistic developer responsibilities along with a process for determining monetary damages for failure to perform. In selecting a site, the aim is to maximize output and minimize cost. The main constraints that need to be assessed include: Local climate â€” flooding, high winds, snow and extreme temperatures Available area â€” area required for different module technologies, access requirements, pitch angle and minimising inter-row shading. The land required for a 1 MW power plant setup is around 4. This is only a rough benchmark and may vary based on technology and efficiency of panels. The impact of other land users on the site should also be considered. Land for solar power plants is usually located far from populated regions, low cost real estate. Depending on the location, this could be slightly less or more. Topography â€” flat or slightly south facing slopes are preferable for projects in the northern hemisphere. Soil type â€”Flat land with firm soil is better. Inclined land or loose soil could create challenges. Loose Soil could mean a lot of dust. Geotechnical â€” including consideration of groundwater, resistivity, load bearing properties, soil pH levels and seismic risk. It is a good idea to undertake Geotechnical survey. Accessibility â€” proximity to existing roads, extent of new roads required. Grid connection â€” cost, timescales, capacity, proximity and availability. Your location determines the amount of solar insolation sunlight falling on the panel per day. Overall, the location of the rooftop is by far the most important factor that determines the solar power plant output. DNI at a location is the amount of solar energy falling per sqm per day at the location. This is the amount of sunlight

energy falling on a square meter every day in a good location. The higher the DNI, the higher the electricity produced by a solar cell. Some inputs on DNI: While many installations in sunny locations such as California or parts of India are able to generate 4. The approximate solar insolation at your location can be ascertained by entering the latitude and longitude of your location NASA website To be absolutely certain of DNI at a particular site we would have to place sensors on-site that measure the actual insolation received over a period if tune, This is both an expensive and time consuming process. Water availability â€" a reliable supply is required for module cleaning. Soil Testingâ€" Once the site has been selected, it is essential that the soil testing of the land is done. In sandy soil, the pile foundations for the mounting structures will have to go deeper thus escalating the costs. Rocky soil conditions are unsuitable for erecting solar structures and has to be worked on. The conditions of the soil have to be tested and is usually sub- contracted to chosen EPCs or a third-party. Land Levellingâ€" The land may have bushes and other vegetation that will have to be hacked off by dozing. In some situations there may be ups and downs on the land which may require heavy land clearing equipment to complete the job. The areas for cut and fill has to be outlined and equipments like grader, bulldozers and scrapers will be used to prepare the site. Depending on the land, this can add significantly to the total project cost. Similar to soil testing, this is usually sub- contracted to chosen EPCs or a third-party. EPC Selection for a MW Solar Plant EPCs are key players in implementing large solar farms as they put together all the three aspects for a solar farm â€" the design, material procurement and construction. It is hence critical that you choose your EPC with care. The following chain describes the various key components of value addition in a solar EPC operational chain: The EPC might not have all the skill sets in his core team, but should be able to show partnerships that have the capabilities the core team does not. Do not go for lowest cost Do not go for EPCs who are unwilling to involve you in decision making for key aspects of the project Do not go for EPCs who are not willing to introduce you to their key core and extended team members. Key Parameters for EPC Selection Top 5 Criteria The EPC contractor essentially guarantees completion of the plant on time and cost, and also plant performance, thus enabling the project developer to avail finance from their banking partners. Thus a thorough evaluation of the EPC is required before a choice is made.

Chapter 7 : Solar Power Plant in India- Cost of 1MW Solar Plant

Acknowledgement & Project Overview The aim of this project report is to estimate and calculate the approximate design of a 1MW solar PV power plant (utility scale).

It is an assembly of photovoltaic PV cells, also known as solar cells. To achieve a required voltage and current, a group of PV modules also called PV panels are wired into large array that called PV array. A PV module is the essential component of any PV system that converts sunlight directly into direct current DC electricity. It is charge controller that is used in the solar application and also called solar battery charger. Its function is to regulate the voltage and current from the solar arrays to the battery in order to prevent overcharging and also over discharging. There are many technologies have been included into the design of solar charge controller. For example, MPPT charge controller included maximum power point tracking algorithm to optimize the production of PV cell or module. Solar charge controller â€" regulates the voltage and current coming from the PV panels going to battery and prevents battery overcharging and prolongs the battery life. Inverter is a critical component used in any PV system where alternative current AC power output is needed. It converts direct current DC power output from the solar arrays or wind turbine into clean AC electricity for AC appliances. Inverter can be used in many applications. In PV or solar applications, inverter may also be called solar inverter. In stand-alone photovoltaic system, the electrical energy produced by the PV array cannot always be used when it is produced because the demand for energy does not always coincide with its production. Electrical storage batteries are commonly used in PV system. The primary functions of a storage battery in a PV system are: Energy Storage Capacity and Autonomy: Voltage and Current Stabilization: DC-DC converters are power electronic circuits that convert a dc voltage to a different dc voltage level, often providing a regulated output. It is widely used in DC power supplies and DC motor drives for the purpose of converting unregulated DC input into a controlled DC output at a desired voltage level. MPPT uses the same converter for a different purpose, regulating the input voltage at the PV MPP and providing load matching for the maximum power transfer. There are a number of different topologies for DCDC converters. Load is electrical appliances that connected to solar PV system such as lights, radio, TV, computer, refrigerator, etc. Add the Watt-hours needed for all appliances together to get the total Watt-hours per day which must be delivered to the appliances. Multiply the total appliances Watt-hours per day times 1. To find out the sizing of PV module, the total peak watt produced needs. The peak watt We produced depends on size of the PV module and climate of site location. For Example Thailand, the panel generation factor is 3. To determine the sizing of PV modules, calculate as follows. Increase any fractional part of result to the next highest full number and that will be the number of PV modules required. Result of the calculation is the minimum number of PV panels. If more PV modules are installed, the system will perform better and battery life will be improved. If fewer PV modules are used, the system may not work at all during cloudy periods and battery life will be shortened. Inverter sizing An inverter is used in the system where AC power output is needed. The input rating of the inverter should never be lower than the total watt of appliances. The inverter must have the same nominal voltage as your battery. For stand-alone systems, the inverter must be large enough to handle the total amount of Watts you will be using at one time. In case of appliance type is motor or compressor then inverter size should be minimum 3 times the capacity of those appliances and must be added to the inverter capacity to handle surge current during starting. For grid tie systems or grid connected systems, the input rating of the inverter should be same as PV array rating to allow for safe and efficient operation. Battery sizing The battery type recommended for using in solar PV system is deep cycle battery. Deep cycle battery is specifically designed for to be discharged to low energy level and rapid recharged or cycle charged and discharged day after day for years. The battery should be large enough to store sufficient energy to operate the appliances at night and cloudy days. To find out the size of battery, calculate as follows: Calculate total Watt-hours per day used by appliances. Divide the total Watt-hours per day used by 0. Divide the answer obtained in item 4. Multiply the answer obtained in item 4. Ampere-hour capacity of deepcycle battery. Solar charge controller sizing The solar charge controller is typically rated against Amperage and Voltage

capacities. Select the solar charge controller to match the voltage of PV array and batteries and then identify which type of solar charge controller is right for your application. Make sure that solar charge controller has enough capacity to handle the current from PV array. For the series charge controller type, the sizing of controller depends on the total PV input current which is delivered to the controller and also depends on PV panel configuration series or parallel configuration. According to standard practice, the sizing of solar charge controller is to take the short circuit current Isc of the PV array, and multiply it by 1. As a huge green energy source generated from the sun, PV industry will gain the best opportunity to grow up. We should grasp the opportunity to build the most suitable environmental friendly PV power plant, and welcome a better tomorrow. We study to how to establish photovoltaic solar power plant Design as well as calculation of power production, base on that to find recommendation and techniques to optimized cost of PV solar power plant. To establishment of green and sustainable development of solar PV power plant to reduce a burden of state electricity board.

Chapter 8 : rahul: Solar power plant design 1 mw

Solar Power Plant detail, design, ROI, project report, investment, area requirement, working, technical specification, Govt. subsidy and cost for complete project from 1kW to 1mW solar power plant in India.

This poses a question that why developer should spend extra money on modules if they are not going to be paid beyond a certain limit of energy generated. They have any way done in the AC side of the system PV system designers and developers are tasked with the important decision of selecting the optimal Array-to-Inverter ratio for each inverter in a given project. As an example, a system with a kWdc array feeding a kWac inverter has an Array-to-Inverter Ratio of 1. Until recent years, due to the high cost of modules, PV systems were designed with the aim of maximizing energy production per PV module. This approach typically resulted in oversizing ratios between 1. With falling module prices, project financials have changed in favor of higher Array-to-Inverter ratios. The purpose of this article is to explain why systems are being oversized, the technical considerations relating to oversizing, and the impact of oversizing on the life of the inverter. Just a few short years ago, the main driver of system design was the high cost of PV modules. The goal of designers was to ensure maximum energy harvest from each PV module in the system. By doing so, designers ensured the optimal utilization of this high cost system component. Best design practices were to place modules to avoid shading from obstructions and between racking rows and to size the array to the largest capacity so the inverter spent little to no time power limiting. This is shown in Figure 2. With lower PV module prices, the incremental cost of adding additional DC capacity to a system has greatly decreased. As a result, project financials have shifted in favor of increased Array-to-Inverter ratios. The scales tip even further in favor of oversizing when considering time-of-use TOU utility rate structures, which place the greatest monetary value for energy delivery in the afternoon during summer months. Through oversizing, systems produce greater energy when energy has the greatest value. To be suitable for oversizing analysis, the simulation program must be capable of modeling the power limiting behavior of the inverter. Additionally, the program must be able to provide hourly data values when financial models are built on a time-of-use rate structures. In most cases, oversizing analysis is performed through successive simulations where the inverter size is kept constant while the array size is varied. The project team may also look at the effects of keeping the array size constant while varying the inverter kW rating. The end result is a dataset which shows the effects of Array-to-Inverter ratios on hourly and annual production. How will oversizing practices change in the future? With the continued downward trend of module prices and the potential for an increasing number of utilities transitioning to time-of-use rate structures, combined with future technology to capture energy lost during power limiting or to temporarily overdrive inverters for grid support, indications are that the practice of oversizing only stands to continue.