

## **What is difference between on-grid and off-grid solar system**

by Anand Kumar Ashodhiya - Tuesday, October 16, 2018

<http://dayrisesolar.com/what-is-difference-between-on-grid-and-off-grid-solar-system/>

Before we get into depth about “what is difference between on-grid and off-grid solar system”, we must first understand how does Solar panels work?

### **How does Solar Panels Work?**

Solar Panels, solar modules or solar photo-voltaic PV modules actually work by absorbing sunlight with photo-voltaic cells, generating direct current (DC) electricity and then converting it to usable alternating current (AC) electricity with the help of smart solar inverter technology. AC energy or electricity then flows through the home's electrical panel via Array Junction Box (AJB) and Distribution Junction Box (DJB) for further distribution to the load accordingly.

Solar energy or solar [power](#) is perhaps the cleanest, most reliable form of renewable energy available to the mankind, and it can be used in several forms to help power your home or business. Solar-powered photo-voltaic (PV) panels convert the sunlight into electricity by stimulating electrons in silicon cells using the photons of light from the sun.

### **What is the difference between On-grid and off-grid solar power**

Now it is easier to understand “What is the difference between On-grid and off-grid solar power?” On-grid solar power means your [solar power](#) plant or solar panels system is tied to your local utility company's [system](#) which is called as “grid” or “mains electricity”. Each and every state in India has its own Electricity Distribution Corporations / Companies like state of Haryana has [Uttar Haryana Bijli Vitaran Nigam \(UHBVN\)](#) and Dakshin Haryana Bijli Vitaran Nigam (DHBVN). Most of the residence / Institutional / NGOs / NPOs / Industries use [Grid Connected Rooftop Solar Power Plant](#) System so that their load runs on solar throughout day time while extra units / electricity produced by the system is fed in the grid through Bi-Directional Net Meter. Extra Units or electricity fed in the day time can be utilized by the user during night through Bi-Directional Net Meter. This system is helpful to [curtail your electricity bills up to 90% for almost 25 years](#). Let us understand this by a simple example of 5 kWp Grid Connected solar power plant installed at a User's rooftop is expected to produce 4-5 units per kilowatt per day. Thus a 5 kWp solar plant will produce at least 20 units per day. So in this example, user's consumption may be 10 units during day time and similar amount of units at night. So, after providing 10 units to the user's load, remaining 10 units are fed in the Grid during day time and same is received back during night time. At the end, we can summarize that user had produced his own 20 units by the solar system and utilized his whole 20 units (10 during and 10 at night) by the help of On-Grid Inverter and Bidirectional Net Meter. We may note here, that On-Grid system requires availability of Mains electricity to enable feeding in excess units in the Grid. In case of Grid failure, On-Grid solar power plant would also stop working due to International Safety and Security measures for Grid workforce. So we can say, on-grid [solar power](#) plant is installed in such areas where grid availability is almost 24 hours to enable excess generation to be

fed in the grid.

### **On-Grid v/s Off-Grid**

Now we can define that On-Grid Systems are solar pv systems that only generate power when the utility power grid is available. They must connect to the grid to function. They can send excess power generated back to the grid when you are overproducing so you credit it for later use. On-Grid solar system can be installed in most of the Metropolitan Cities, Urban and Sub-Urban cities of India where grid availability is almost 24 hours.

Grid tied Solar PV systems consist of solar panels, Solar String inverter. These systems do not utilize batteries since Grid is used as storage of excess electricity produced by the system. The solar panels generate electricity from sunlight and feed it to the solar string inverter which converts the DC voltage coming from the solar panels directly into AC power to match the grid.

When daylight sun-rays fall on solar panels they produce Direct Current (DC) electricity which is converted into 240 V AC power by solar string inverters to power up your load, excess power, if any is fed in the grid by help of two-way energy meter (bidirectional net meter). Some electricity companies will meter the electricity fed into the grid by your solar power plant system and provide a credit on your bill in the form of Solar Generation Incentives. Accumulated credited units can be consumed by the user within one financial year to avoid lapse.

A grid-connected photo-voltaic power system or grid-connected PV power system is electricity generating solar PV power system that is connected to the utility grid. A grid-connected PV system consists of solar panels, String Solar inverters, and grid Bidirectional Net Meters for connection with the Grid or main electricity.

On the other hand, off- grid solar power plant system is a system designed to help people's own electrical system function without the support of remote infrastructure, such as an electrical grid. In electricity, off-grid solar power plant system can work as stand-alone power system or mini-grid typically to provide a electricity to users or smaller community who either do not have access or have very limited access to the main grid with electricity like most of the rural areas in India.

Off.-grid solar power plant systems can refer to living in a self-sufficient manner without relying upon local electricity distribution companies DISCOM Utility. Off-grid rooftop solar power plants are autonomous; they do not rely on electrical power grid, or similar utility services.

On-grid inverters collect DC power from solar panels, convert it into AC, and send it into the load as well as into grid for credit / later use. On-Grid solar power plants are simple and easier to install since there are only two main components i.e. string inverter and solar panels. On the other hand an off-grid inverter needs a battery bank to function.

Off-Grid solar power plant is sufficient to power your house with a solar energy system. House hold appliances and lights that use AC (alternating current) electricity will require an inverter to do the job conversion from DC to AC.



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