

Solar Panel Identification and Tracking

What is Solar Panel?

Photovoltaic comes from the words *photo* meaning *light* and *volt*, a measurement of electricity. Sometimes **photovoltaic cells** are called PV cells or solar cells for short. You are probably familiar with photovoltaic cells. Solar-powered toys, calculators, and roadside telephone call boxes all use solar cells to convert sunlight into electricity.

Solar cells are made up of **silicon**, the same substance that makes up sand. Silicon is the second most common substance on earth. Solar cells can supply energy to anything that is powered by batteries or electrical power.

Electricity is produced when sunlight strikes the solar cell, causing the electrons to move around. The action of the electrons starts an electric current. The conversion of sunlight into electricity takes place silently and instantly. There are no mechanical parts to wear out.

You won't see many photovoltaic power plants today. Compared to other ways of making electricity, photovoltaic systems are expensive.

It costs 10-20 cents a kilowatt-hour to produce electricity from solar cells. Most people pay their electric companies about 11 cents a kilowatt-hour for the electricity they use, large industrial consumers pay less. Today, solar systems are mainly used to generate electricity in remote areas that are a long way from electric power lines.

What is Solar Panel Identification and Tracking?

The Jawaharlal Nehru National Solar Mission (JNNSM) under the brand 'Solar India' is to establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible. The Mission has set a target of 20,000MW and stipulates implementation and achievement of the target in 3 phases (first phase up to 2012-13, second phase from 2013 to 2017 and the third phase from 2017 to 2022) for various components, including grid connected solar power.

The successful implementation of the JNNSM requires the identification of resources to overcome the financial, investment, technology, institutional and other related barriers which confront solar power development in India. The penetration of solar power, therefore, requires substantial support. The policy framework of the Mission will facilitate the process of achieving grid parity by 2022.

JNNSM has given guidelines to all, that each PV module used in any solar power project must use a RF identification tag to store all the required information as per the JNNSM guidelines.

Why Solar Identification and Tracking is required?

All grid solar PV power plants must install necessary equipment to continuously measure solar radiation, ambient temperature, wind speed and other weather parameters and simultaneously measure the generation of DC power as well as AC power generated from the plant. They will be required to submit this data to the Ministry on line and/or through a report on regular basis for the entire duration of PPA.

What are the benefits of Solar Identification and Tracking?

- Real-time audit and traceability
- To retrieve the required readings of the Panel instantly as per JNNSM guidelines.
- To draw the I-V Curve instantly, using the readings stored in the tag
- Improved manageability through a single unified Panel registration system across multiple sites;
- Reduced workload on Panel administrators, allowing redeployment to other critical projects;
- Elimination of error prone due to manual audit processes;
- Time intensive line of sight inspections are no longer required
- Decreasing lost and stolen supplies
- Reducing the time staff spends searching for inventory of Panel
- Optimizing the utilization of current Panel inventory

What is the Information mentioned in the RFID TAG used on each Solar Panel?

Each PV module used in any solar power project must use a RF identification tag. The following information must be mentioned in the RFID used on each module (This can be inside or outside the laminate, but must be able to withstand harsh environmental conditions.)

- Name of the manufacturer of PV Module
- Name of the Manufacturer of Solar cells
- Month and year of the manufacture (separately for solar cells and module).
- Country of origin (separately for solar cells and module)
- I-V curve for the module
- Wattage, I_m , V_m and FF for the module
- Unique Serial No and Model No of the module
- Date and year of obtaining IEC PV module qualification certificate
- Name of the test lab issuing IEC certificate
- Other relevant information on traceability of solar cells and module as per ISO 9000

Functional details:

- Each PV Module will be embedded with an RFID tag and the module details are entered into a database along with the unique tracking number.
- Each Tag embedded with the Module will carry details of PV Module and Cell information.
- Required information in the tag can be written and attached to the panel. Using the solar panel Identity application.
- Required information in the tag attached to solar panel can be read Using the Solar Panel application with help of an pre loaded Hand held RFID reader.
- I-V Curve can is drawn by retrieving the data from tag embedded to the panel using hand held RFID reader.