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ESSEN

CASE STUDY

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Drake & Scull

Industry major enables solar power generation installation mandates through a RFID-based SOLAR PANEL TRACKING SYSTEM

Identification of individual solar panels through their unique I-V curve

Adherence to mandatory MNRE standards

Inspection through RFID prevents subsidy frauds

Identifies defective panels enabling better maintenance

INSIDE:

TECHNOLOGY

Solution:
EPC Gen2 compliant inventory tracking solution

Tag Type:
*µ*Metallica™ UHF Passive

Reader/Antenna:
HandyScanna™

Method:
Single Tracking via hand-held Reader/Antenna device

Integration Platform:
RFID Middleware:
Xtenna™ WebToolkit
Xtenna™ Studio
Application: Essen RFID's Solar Panel Tracking System
Database: SQL Server 2005 Exp. ed.

Tag Manufacturer/Supplier:
Essen RFID, with US based chip inlay

Reader/Antenna Manufacturer:
Essen RFID, with US based module

Systems Integrator:
Essen RFID

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Xtenna™ Integrated RFID Antenna/Reader

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KEY REQUIREMENTS:

Drake & Scull International is a company in the renewable energy sector using natural heat resources to develop geothermal and solar based projects. The Indian government encourages such projects through various incentives including tax benefits and other subsidies.

The company supplies solar panels to local power generation companies. Since the unit cost of power produced through solar energy is quite high, the government provides a subsidy per watt of solar energy to the local power generation company, provided there is adherence to standard guidelines set by the Ministry of New and Renewable Energy (MNRE), Government of India.

Main challenges are:

- Tracking defective solar panel modules.
- Tracking manufacturer information.
- Preventing reuse of same panels at multiple locations in order to inflate numbers and increase subsidy.
- Analyzing solar panel performance.
- Ensuring adherence to MNRE Standards.

SOLUTION:

Solar power generation companies in India are required to follow MNRE guidelines in order to receive subsidies from the government. However, there is scope for misusing this benefit by moving solar panels from one array to another during periodic inspections, in order to get multiple subsidy for the same solar panel at different project sites. Essen RFID provided a solution for efficiently tracking solar panels through RFID tagging, in order to prevent this from happening.

IMPLEMENTATION:

The Solar Panel Tracking System requires μMETALLICA™ tags to be affixed to each solar panel. A HandyScanna™ hand-held device is used for tracking the panels.

The system uses SQL Server as a back-end database, while the HandyScanna™ device operates through Essen RFID's mobile based application.

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WORKING:

RFID tagging is deployed for effective tracking of solar panels. μMETALLICA™ RFID tags are affixed to each solar panel to uniquely identify each one of them from the other in a fool-proof manner.

Working Process Flow:

1. Drake & Scull, manufacturers of solar panels, provide detailed data for each solar panel.
2. Each panel is affixed with a RFID tag. The tags are capable of withstanding harsh environmental conditions and are suitable for being mounted on the surface of solar panels.
3. Information about each solar panel as per MNRE standards is written into the database and uniquely associated with each RFID tag. The tags are registered into the database and can uniquely identify each solar panel.

> **MNRE Guidelines:**
>
> Each PV module must use a RF identification tag (RFID), which must contain the following information:
>
> - 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;
> - Peak wattage, Im, Vm 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.

4. Every solar panel has a power curve i.e. I-V curve, that is unique to each panel. This enables tag data to be read to compare the intrinsic data of each panel, instead of only relying on outer label numbers.
5. Solar panels fitted with RFID tags are sold to solar power generation companies, who mount the panels on arrays at various site locations.
6. During inspections, a HandyScanna™ hand-held device is used to read the tags and extract tag data, which is matched with the information stored in the system database.

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7. A supervisor on inspection uses the HandyScanna™ to read the tag on the solar panel and identify its details. Tag reading displays the unique I-V curve of each panel and uniquely identifies it in the database.
8. If the system displays a particular panel as having been already read on another array at another location site of the power project, an alert is displayed on the HandyScanna™ device and reported to the system.
9. The I-V curve identity is also helpful in ascertaining if a particular solar panel has become defective or is producing less power, and this information is displayed on the HandyScanna™ device.

BENEFITS:

- Accurately identifies individual solar panels.
- Brings about transparency in the process of inspection and subsidy grants.
- Prevents fraud in subsidy funding.
- Follows mandatory MNRE standards.
- Identifies defective solar panel modules.
- Tracks manufacturing information and batch numbers to enable improved customer support.
- Performance reports enable information to be used for other projects, benefitting the development of the solar power industry.

LINKS:

Hardware:

Handy™ Scanna

Tags:

µMETALLICA™

Software:

Xtenna WebToolkit™

Xtenna Studio™

Reference Example:

http://www.essenrfid.com/Mailer/inventory-flash-demo.pdf