

Commercial Roof Top Project With Refusol String Inverter



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Rooftop Solar is a persuasive business model for commercial and industrial building owners in generating clean solar power. This type of installation provides the building owner an opportunity to generate some revenue out of their existing infrastructure. The government offers a FIT (feed in tariff) program as an added advantage for the installation and this particular green incentive has attracted a dramatic growth in the investment capital.

REFUSol offers an exciting business proposition for commercial and industrial electricity consumers in the field of rooftop solar energy. We offer to reduce your electricity bill and generate additional income from your rooftop space – all at absolutely ZERO investment. We will help you invest in a solar PV plant on your rooftop and provide you with competitively priced, secure power from it.

Rooftop PV systems offer a great opportunity for institutions, industries, and all other buildings already using UPS, inverters, batteries and diesel generators to reduce energy costs and to ensure power continuity in the event of grid availability. For every commercial, Residential, Government & Industrial building REFUSol will provide the highest energy generating solution with string inverters.

As a building owner it is critical to understand the complexities of roof top solar development and the success of a project depends on the following vital factors:

- Project Finance and Capital Investment
- Revenue Generation of the installed capacity
- Structural considerations
- Dead-on Technology Selection
- Project Management

- Array Designing
- Installation Expertise
- Operations and Maintenance

Solar projects are capital intensive and promising financing terms are a key constituent to a successful project. REFUSol with its products and its peripherals supports the client to achieve a highly efficient, low-cost system design which will consent the plant to generate a reliable power production over a 20 year term.

REFUSol has carved out its niche presence with an exceedingly reliable inverter and helps the client with the right technology, for the right roof, at the right price.

Every roof is different geographically, geometrically, orientation wise etc. and the ability to extract the maximum power production and revenue generation out of the area depends on the ability to position the technology best suited to the characteristics of the infrastructure.

Apart from hardware excellence, REFUSol supports the clientele with a software design tool. With REFUdesign one can accomplish the finest optimization of the PV modules and the inverters to get the concentrated returns generation. It covers the geographical and the geometrical parameters to achieve the best matrix.

Leading in Photovoltaic String Inverters, REFUSol provides a package inclusive of the



design suggestions which will include the DC & AC sizing along with communication which will lead the project developer in the right direction. The design will provide minimum losses and the complete energy parameters can be monitored on REFUlog – an online monitoring portal. Our inverters provide two modes of communication: Ethernet & RS 485 in the wired technology. We also support Wireless technology with our product REFUconnect. The client can choose the required mode, make the plant online and monitor the desired parameters on REFUlog. REFUSol inverters conceptually are a plug and play system and do not require any installation expertise. It is a highly efficient and a very user friendly system.

Vouching for the German quality, we provide 5 years of warranty with the inverters and provide excellent Sales Support. With an existing Service Hotline the delivery of the solution to the client is provided 24 x 7 x 365.

Therefore, the building owners can create new revenue from their rooftop by generating clean power either for their own consumption or they can achieve a green incentive as per the Government's Feed-in-tariff scheme. High investment returns while mitigating the risks requires unique skills and resources and to provide the same REFUSol would be the right CALL.

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Solar Tracking Increases Energy Yield: Position Sensors For The Photovoltaic And Solar Thermal Industry

Chintan Doshi - FRABA Pte. Ltd.

Solar plants are becoming an integral part of our infrastructure – in the face of rising energy prices and diminishing resources of fossil fuels, they are a popular alternative. Parabolic trough solar farms, for instance, are being installed on uninhabited land in sunny regions – they transform solar energy into heat to power a turbine that generates energy. The efficiency factor of this kind of solar plant can be improved by solar tracking systems which orient the panels or collectors to the changing position of the sun. This function, which is available both for photovoltaics and solar thermal applications, requires precise position data and a measuring solution working reliably even under highly demanding outdoor conditions. The following article presents sensors from POSITAL, a developer and manufacturer of absolute rotary encoders and tilt sensors.

Solar tracking is performed in one or two axes. Single-axis systems require less mechanical effort and fewer sensors – for example, they can be equipped with a single-turn absolute rotary encoder or a tilt sensor with a measuring range of $\pm 50^\circ$ or more. If a gear unit is used, a multi-turn encoder will be necessary. Two-axis tracking systems enable higher efficiency but are also more mechanically demanding. In addition to horizontal (azimuth) orientation, the panels are also oriented along the vertical axis. This requires either two encoders (single or multi-turn, depending on the mechanical requirements) or one encoder and one tilt sensor with a measurement range of at least $\pm 60^\circ$.



Figure 1: Parabolic Trough Tracker

Rotary encoders and tilt sensors for solar tracking systems

IXARC magnetic encoders from POSITAL provide a cost-efficient solution for this application. Featuring robust and contact-free magnet technology, which provides a maximum resolution of 12 bits; these encoders easily withstand the most rugged environmental conditions such as humidity, extreme temperatures, and vibrations. The devices can cover up to 20 bits for revolution measurement. They are optionally available with a radial or axial cable output and as hollow shaft or solid shaft versions. Heavy duty models reach protection ratings up to IP69K. The encoders operate without gear units or batteries and can therefore be manufactured very cost-efficiently. Since the Wiegand and Hall sensing technology requires only one permanent magnet, the components take up a minimum of space – this further reduces material costs.

IXARC optical encoders use a proven opto-electronic scanning method and are

especially suited for high-precision applications. The single-turn sensor provides a resolution of 16 bits per revolution. In addition, a maximum of 16,384 revolutions (14 bits) can be registered in multi-turn mode, thereby covering a 30 bit measuring range. The optical encoders do not require backup batteries or referencing – they instantly provide current, absolute position and revolution values even after power loss. All models are optionally available as stainless steel versions and with protection ratings up to IP68.

An alternative to rotary encoders, TILTIX inclinometers from POSITAL enable easy and low-cost mechanical integration combined with high-precision position data. Mounting fixtures and couplings are not required. They are particularly well-suited for tracking in the elevation axis. TILTIX inclinometers are available as two-axis versions with a $\pm 80^\circ$ measurement range and as a one-axis version for 360° . They provide a 0.01° resolution at a 0.1° measuring accuracy. The sensors feature capacitive cells based on MEMS technology (micro-electro-mechanical systems), and allow users to measure inclination values directly without being mechanically coupled to drive elements. A high sampling rate of up to 100 measurements per second enables an efficient filtering of vibrations and shocks and minimizes the settling time. The highly robust devices feature IP68 or IP69K protection ratings. They are available with SSI, CANopen, DeviceNet, or fieldbus interfaces, or with analog voltage or current signal outputs. "Industrial" and "Heavy Duty" models are available with plastic or aluminum enclosures.