

FEATURED TALKS

We provide all types of products and solutions to Solar PV plants/rooftops for Performance Monitoring, Controlling, Analysis and Reporting at an affordable price using in-house developed Hardware, Firmware and Software. Our Software product is hardware agnostic; it can work with 3rd party Datalogger.

Ashoka D. M.

CEO AND MANAGING DIRECTOR, ENERMAN TECHNOLOGIES PVT LTD

What have been some key business highlights for EnerMAN Technologies in the past year?

Despite COVID-19's impact on our business, we have successfully installed our IoT SCADA (ETI-SOL) products in the countries - Sri Lanka, Nepal, Dubai, Rwanda and Poland through online support. We have also installed our IoT SCADA product in some of the prestigious Govt organizations like BHEL, BEL, NTPC, HAL, MES, NFC, AIIMS & IISc.

ETI-SOL is deployed over 250+MWp capacity in 45+ PV Plants/rooftops in 2021.

The total deployment to date crossed 1,200MWp (1.2GWp).

Please tell us how important is real time remote monitoring of solar plants?

The performance of Solar Power Plants needs to be monitored in real time to ensure the maximum yield of the Solar PV Plant and notify the breakdown of equipment. To ensure that all the equipment at Solar Plant is performing as per the design, to get energy generation as expected to achieve the desired ROI. Real time Remote Monitoring is essential to maximise the plant performance, which provides equipment ranking, performance reports and guidelines to the onsite O&M team to schedule maintenance activities, spare parts management, and module cleaning activities.



How important is IoT as a technology in the solar industry? Could you explain your IoT-based monitoring solutions offerings in brief?

IoT technologies help in digitizing Solar PV plants (Digital Twin) and get real time data to cloud platforms or Servers at HQ. The expert team at HQ can analyse the Solar plant and equipment performance data and come up with guidelines to improve the plant performance, reduce the breakdowns, spare management, Energy scheduling and inputs to new plant design for optimal performance of Solar PV plants.

We provide all types of products and solutions to Solar PV plants/rooftops for Performance Monitoring, Controlling, Analysis and Reporting at an affordable price using in-house developed Hardware, Firmware and Software. Our Software product is hardware agnostic; it can work with 3rd party Datalogger.

ETI-SOL is a cloud-based software product that collects data from the field IoT devices for Monitoring, Controlling, Analysis and Reporting of Solar PV plants/rooftops.

ETI-EDGE is a software product that can be installed in Local PCs/Servers at PV plants/Rooftops and can collect data from the data loggers connected to the PV Plant equipment to Monitor, Control, Analyse and Report the Solar PV plant's performance.

ETI-PPC is a Power Plant Controller Software product that can be installed in Local PCs/Servers at PV plants/Rooftops. Interfaces with Solar plants equipment and controls active and reactive power and power output based on the set rules/SLDC guidelines.

ETI-CONNECT is a CMS Software product that can interface ETI-SOL/ETI-EDGE and with a third-party Plant, SCADA using REST API or FTP data access.

ETI-LOG is an IIoT Datalogger, which collects the data through RS 485 (RTU/TCP) from PV plants' end equipment and sends data to Local PC/Servers or to the cloud Servers through RS485 (RTU/TCP) or RF or Wi-Fi. We will ensure that there is no data loss through local storage in our ETI-LOG IoT data logger during any communication issues at the plant.

What are some of the recent technology advancements EnerMAN Technologies have made?

We have developed a software product, ETI-SLDC, which can be installed on local PCs/Servers to collect data from the Solar PV plant's equipment and can send important processed clean data to SLDC in a few seconds as per SLDC guidelines.

We have developed another software product, ETI-ZES, which will ensure Zero exports from Solar PV plants / Rooftops to Grid, as per DISCOM policy guidelines, to avoid penalty. This product collects the data from Solar PV plants' end-equipment and controls/limits the out-power of Solar Inverters based on its load/consumption.

What are your business development and growth plans for 2022?

We are planning to expand the entry of our products to more countries in Asia Pacific, Africa and the Middle East, and increase our product deployment by 100% in 2022.

“THE PERFORMANCE OF SOLAR POWER PLANTS NEEDS TO BE MONITORED IN REAL TIME TO ENSURE THE MAXIMUM YIELD OF THE SOLAR PV PLANT AND NOTIFY THE BREAKDOWN OF EQUIPMENT.”

FEATURED TALKS

We are proud to say BEPL has left no stone unturned. You name it and we have it. We at BEPL are one of the leading and Government approved Solar Power Plant Integrators in both Rooftop and Ground Mounted Projects.

Sanjeev Bandaru

MANAGING DIRECTOR, BANDARU ENERGIES

Please give us a brief introduction to your esteemed company and the services it provides.

BEPL aims to provide you with Free Electricity for Life and is happy to encourage green energy and reduce carbon footprints. Let us join hands to make the world a cleaner greener place to live. Think Green and Clean.

We are proud to say BEPL has left no stone unturned. You name it and we have it. We at BEPL are one of the leading and Government approved Solar Power Plant Integrators in both Rooftop and Ground Mounted Projects.

We are expertise in executing several Solar projects across Andhra Pradesh & Telangana since 2013.

BEPL has certifications of MSME, TSREDCO, NSIC, NREDCAP etc.

We at BEPL have end-to-end solutions to set up solar power plants with various methods of structuring, designing and executing rooftop and ground mounted plants complying with statutory requirements.

BEPL has executed projects varying from 1 KWp and 10,000 KWp on Turn Key Basis at various locations.

BEPL has executed one of the biggest rooftop Solar Power Plant at a Single location in South India. Our customers segment is Industrial / Residential / Commercial.



Tell us about some of the certifications you have received.

- Best Rooftop Solar EPC Company in the State Commercial Segment by Solar Quarter (20/02/2020)
- Best EPC by Polycab India Limited - 2020 & 2021.
- Bharat World Record - 45 days completion of 5MW Industrial segment.
- Indian Book of Records - Fastest Installation Commissioning 5 MWp Ground Mount Solar Power Plant.
- ISO 9001-2015 QMS Certificate.
- NSIC Certificate no.0036936 dt.09.06.2021

What are the types of projects you have executed? Please tell us about some of the major projects as well.

- One of the biggest Rooftop Solar Plant in South India.
- Biggest Rooftop Plant in Hyderabad city.
- 5MW utility Project commissioned in 45 days.

What is your view on the Indian O&M industry in the near future?

Total Commercial & Industrial segment Solar installations stand at 11.5GW value, and hardly only very few of the installations are under O&M. (O&M is very critical, leading to higher generation yields) which is of utmost importance to do justice to the environment and viabilities of solar plants in commercial perspective.

At BEPL, we not only focus on preventive measures but also focus on optimum yield, by Robotic cleaning, anti-dust coating and string level-based monitoring to attain record high yields.

Technology Adaption & Automation are the key factors to update in the Solar O&M Industry for effective operation and maintenance.

What are your plans for the year 2022?

We have an ambitious target of adding 25MWp in the financial year 2022 - 2023 to our portfolio, cumulative of Rooftop and Ground Mounted Projects.

Solar Robotic cleaning equipment.

E-mobility will play a major role with a great future ahead in this segment. BEPL is very much keen on expanding its arms to E-mobility via DC Charging infrastructures.



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WE AT BEPL HAVE END-TO-END SOLUTIONS TO SET UP SOLAR POWER PLANTS WITH VARIOUS METHODS OF STRUCTURING, DESIGNING AND EXECUTING ROOFTOP AND GROUND MOUNTED PLANTS COMPLYING WITH STATUTORY REQUIREMENTS.”

FEATURED TALKS

We have recently developed the most advanced & next generation 2.5 MW Solar Central Inverter which is outdoor type & suitable for 1500 V DC Solar PV system: Darshan N Shah, President - Sales & Marketing, Hitachi Hi-REL

Darshan N Shah

PRESIDENT - SALES & MARKETING, HITACHI HI-REL

SolarQuarter had an exclusive conversation with Mr. Darshan N Shah, President - Sales & Marketing, Hitachi Hi-REL and got great insights into the company's recent business developments. He spoke about the USPs of Hitachi's grid tied inverters along with inverter capacity the company has supplied till now and their future targets. He also gave us insights into their newly developed Solar Central Inverter and their high level R&D focus.

Please tell us how has the business been this year for your company? Any major developments?

A very pertinent question to begin with. As we know the whole world is experiencing the most unprecedented times of this era & almost every business across the globe is significantly affected due to disruption in their operation caused by widespread of contagious Coronavirus disease. On the brighter side, India as a country has been dealing very well with the situation both in terms of timely evasive actions to restrict the widespread of the virus & also in terms of facilitating the businesses to improve operation continuity to produce in turn the improved results qtr on qtr. It is my pleasure to share with you that We as Hitachi Hirel are also truly in synch with the country & have produced good results in terms of both top-line as well as bottom-line in last year as well as in this financial year, till now. Key factors besides our success are our recognition as one of the pioneers in the power electronics domain with an operational overall experience of almost 4 decades, our brand Hitachi which as the group is amongst Global fortune 500 companies & our diversified product range in terms of industrial UPS, IT & Infra UPS, medium & low voltage variable frequency drives, grid tied solar inverters, air compressors and railway inverters which helps us to remain present with diversified business segments & ensure the business sustainability. In this financial year, we had major breakthrough in terms of acquiring new customers across our product segments & which has really helped us to consolidate our market share in product groups like Variable frequency drives, industrial UPS & also in Solar.

What are some of the main highlights and USPs of your grid tied solar inverters?

The solar inverter is one of the extremely important components in a solar power plant that convert the DC power obtained from the Array of PV panels into AC power to be fed to the grid for onward transmission. These inverters should also essentially ensure that the maximum possible power is being fed to the grid at any given time & for that, it is important to accurately track the maximum Powerpoint as being generated by the array of PV panels & efficiently invert the same to AC power. This is where the Hitachi Solar inverters score over the competition with the help of technology which we inherited from our principle in Japan which offers a very wide MPPT range. This technology also offers the other USPs Like output current harmonics less than 3%, high efficiency levels above 98%, Compatibility to a wider ambient temperature range of -25 degrees to + 60degree Celsius & many more. Our wider product basket both for Central Inverters as well as for String Inverters is also one of our USPs. We have Central Inverters which range from 250 kW to 2.5 MW and String Inverters which range from 1.1 kW to 255 kW. Another important factor from the perspective of the customer is the uptime of the inverter & with the Quality & reliability of our product supported by strong after sales service support, we have been able to maintain an uptime of more than 99.5%.

What is the inverter capacity you have supplied in India till now? What is the target for the next year?

We started the solar inverter business in 2012 here in India and so far we have supplied & installed more than 3 GW grid tied central and string solar inverters.

We are targeting to leverage our existing installation base by almost 50% to 4.5 GW (from the existing level of 3 GW) in the span of the next 2 years.

How has the performance of your inverters been in terms of customer feedback and satisfaction? How do you strive for constant improvement?

Today Hitachi Hi-Rel is being viewed as one of the most trustworthy partners for Solar Inverter Solutions as they are delivering considerably high output & also consolidate the reliability of the plant operations with an uptime of more than 99.5%. With respect to the customer feedback, there are plentiful positive responses from the renowned power generating companies, Solar developers & EPCs of India acknowledging that they are fully satisfied with the product & prompt service support being offered by the Hitachi Team. We have a mechanism to seek constant feedback from the customers & also to measure their satisfaction index which is being reviewed at the highest level.



Innovation through research & development has been rooted in Hitachi Hi-REL's DNA. Tell us about some of the recent initiatives taken under R&D.

Yes, R&D has always been our prime focus & we always intend to leverage it to drive both Innovation and Growth. As a part of continuous technical advancement, we have recently developed the most advanced & next generation 2.5 MW Solar Central Inverter which is outdoor type & suitable for 1500 V DC Solar PV system, This product offers the considerably maximum power generation & lowest ever footprint in this segment. It also offers unique heat dissipation & management system which leads to negligible auxiliary power consumption. This product also offers a wider MPPT range. Key benefits to the customer are

- 25 Years' service reliability
- huge benefit in both CAPAX and OPEX during the complete life cycle of inverter &
- advanced remote operation features to help operators to control overall power management.

How do you see inverters and related technology evolving in the coming years in India? How is Hitachi planning to evolve with the same?

Inverter & related Technologies seem to be ever changing. Just before a decade, we had 250kW - 750kW inverters with a very large footprint significantly affecting the cost & progressively in last one decade, we have transitioned in terms of power rating > 750kW, voltage rating up to 1500V DC & also towards significantly lower footprints, facilitating significant per KW cost reduction. The market is expected to move to still higher ratings in terms of both Power & Voltage & we are gearing up ourselves to meet this market requirement which is likely to emerge in the next 2 or 3 years. We shall also be working on integrating AI technology as one of the inbuilt features with our inverters. Also, we are looking at adding battery PCS and hybrid inverters to our product family. Hence, we are continuously on innovation drive in solar inverter technology to meet the present and upcoming demands of the Global Solar market.



“ WE STARTED THE SOLAR INVERTER BUSINESS IN 2012 HERE IN INDIA AND SO FAR WE HAVE SUPPLIED & INSTALLED MORE THAN 3 GW GRID TIED CENTRAL AND STRING SOLAR INVERTERS.”



FEATURED TALKS

To provide high-quality services we have 2 bonded warehouses in Chennai and Mumbai it will equip with ready inverters. Along with this we also have 8 warehouses across India equipped with ready inverters and a complete set of spare parts.

Singaravelan Natarajan
SERVICE HEAD, SUNGROW

Tell us how has the year 2021 been for Sungrow in terms of business, service, and support?

In 2021 related business 3GW supplied in India and we are placing no1 position in terms of PV business.

Related to services we are the biggest service team in the PV inverter in India. We received the best quality services OEM in India 2021 organised by SolarQuarter. We have 40+ service engineers including off-rope employees.

Related to support we have been placed onsite local engineers according to installed base in which customers are getting benefited on energy generation loss due to less downtime with immediate support and we keep increasing our manpower's as our sales been getting added nearly 3gwGW every recent year and we also have dedicated hotline services for the telephonic support to resolve the minor issues if the fault severe we will arrange the engineer immediately.

With 17 years of experience in service, how has your experience been in Sungrow? What are the differentiating factors of Sungrow's services?

With 17 years of experience, I could see that the company's motto is providing service to customers without losing any generation irrespective of any fault related to the product's internal or external cause as a priority.

Sungrow has got its own strategic partnership with customers on a long-term business to establish a dedicated service network with all the spares.

What are some of the types of Sungrow's inverter solutions? And what are some service facilities provided with them?

For the utility, we have products from 200kW to 8.8MW, for the C&I market we have from 33kW to 100kW and for the residential ranges from 3kW to 20kW.

To provide high-quality services we have 2 bonded warehouses in Chennai and Mumbai it will equip with ready inverters. Along with this we also have 8 warehouses across India equipped with ready inverters and a complete set of spare parts. Adding to this onsite service engineer also have equipped with some critical spare parts so that we can ensure the uptime as much as possible.

We also providing some critical parts along with the supply based on the location and service criticality.

“SUNGROW HAS GOT ITS OWN STRATEGIC PARTNERSHIP WITH CUSTOMERS ON A LONG-TERM BUSINESS TO ESTABLISH A DEDICATED SERVICE NETWORK WITH ALL THE SPARES.”

Sungrow has been the World's Most Bankable Inverter Brand for 3 consecutive years now. What have been the contributing factors for this achievement and what has been the role of good quality service in it?

The product quality, onsite product performance, customer acceptance, adhering to the timeline and commitments and the service support provided to the customer. Based on the above parameters the company is growing big and getting customer trust which is making most bankable inverter brands across the globe.

What is Sungrow looking forward to in 2022?

Keep customers happy by providing reliable products with the service support as expected and try to keep the customer services at topmost priority not only in service including all the product-oriented processes from manufacturing to commissioning of the product and service.



FEATURED TALKS

Trina Solar has been in business for more than 20 years and has developed enormous production capacity at our factories. Developers in India also choose Trina Solar because they know that we have the production capacity to deliver the large volumes of modules required.

Todd Li

PRESIDENT, TRINA SOLAR (ASIA PACIFIC REGION)

How is the Indian PV module market different as compared to other countries?

India is a very large and fast-growing market for solar, especially in the utility as well as the commercial and industrial segments.

In the first nine months of 2021, India added 7.4 gigawatts of solar as a compared to 1.73GW in the same period last year, representing a 335% increase. This is according to research by Mercom India Research. The growth in the market has all been in the utility, industrial and commercial segments.

The residential rooftop segment is very small by comparison and has yet to take off despite the fact there are residential rooftop solutions out there in the market. In other markets, such as Australia, the residential rooftop is a very big market segment.

How are Trina Solar modules best suited to tackle Indian requirements and dynamics?

Trina Solar has been very successful in India because our modules are at the cutting edge of technology, so we can provide high-power modules with high efficiency.

Our latest technology, the Vertex module series, is based on 210mm diameter wafers, a larger size solar cell than earlier generation cells that are 166mm and 182mm in diameter. The larger cell delivers higher power coupled with high efficiency.

Vertex modules also incorporate other leading technologies, such as non-destructive cutting, so each cell has smooth edges and maintains similar mechanical loading properties as non-cut cells.

Our modules also use multi-busbar to increase light absorption as well as high density interconnection technology to reduce the space between each cell.

We have already sold large volumes of 550W Vertex modules in India and now our 670W Vertex modules have been approved for sale in India. We are taking customer orders now.

Vertex's high power and high efficiency mean developers need fewer modules to achieve the total power output earmarked for the project. Fewer modules in turn mean less land, trenching, cabling, wiring, etc required for the project; delivering a lower balance of system (BOS) cost. Each modules' high power output and efficiency, meanwhile, translates to a lower levelized cost of energy (LCOE).

Trina Solar has been in business for more than 20 years and has developed enormous production capacity at our factories.

Developers in India also choose Trina Solar because they know that we have the production capacity to deliver the large volumes of modules required. This is an issue for some of our competitors. They simply don't have the production capacity to deliver the large volumes of modules required and are also unable to meet the tight delivery deadline. One of the unique dynamics of doing business in India is you need to be flexible enough to meet the customer's tight deadline.

What have been some recent trends in the module industry in India? How has Trina Solar adapted to the same?

The 670W Vertex modules, like others in the Vertex range, have a choice of mono-facial and bifacial.

Bifacial modules coupled with trackers are now very popular among those developing utility-scale projects in southern and western India. Trina Solar is unique because it is the only solar module manufacturer in the industry that also provides a truly compatible module and tracker solution.

Besides the growing popularity of trackers, another trend we have seen is that Vertex 550W, and now Vertex 670W modules, are proving very popular with developers of commercial and industrial (C&I) rooftop projects. When we first introduced the Vertex series to India, we pitched it primarily to developers of utility-scale projects seeking modules with the higher power. But developers of C&I rooftop projects also want high power modules, so they can maximize the power output from the limited roof space available.

“TRINA SOLAR HAS BEEN IN BUSINESS FOR MORE THAN 20 YEARS AND HAS DEVELOPED ENORMOUS PRODUCTION CAPACITY AT OUR FACTORIES.”



How important is technology at Trina Solar? What are some strong technological features embedded in your modules that make them unique?

Trina Solar invests heavily each year in research and development, so as to maintain our competitive advantage. We were the pioneers of 210mm diameter wafers used in the solar industry and now this size wafer is the new industry standard globally.

We helped make 210mm wafers the new industry standard by establishing the 600W+ Photovoltaic Open Innovation Ecological Alliance. The alliance has attracted companies and organizations from upstream and downstream of the industry chain, leading the industry to move toward a new era of high-efficiency 210 modules.

In February 2020, we released our 500W Vertex Series of ultra-high-power modules to the world and then quickly upgraded the power of the Vertex Series to 600W+ within a few months. In the era of parity, the end market is focusing more on cost and return on investment.

TrinaTracker product represents an important area of technology too. We have optimized the trackers' performance in terms of the longer string length. We can accommodate these longer strings on longer and wider tracker structures and



TRINA SOLAR HAS BEEN VERY SUCCESSFUL IN INDIA BECAUSE OUR MODULES ARE AT THE CUTTING EDGE OF TECHNOLOGY, SO WE CAN PROVIDE HIGH-POWER MODULES WITH HIGH EFFICIENCY."

this means we can have up to 40 modules in a string, unlocking savings not only on the tracker cost on motors and piles but also savings on downstream electrical BOS costs with fewer string cables, combiner boxes, trenches and so on.

Everybody in India wants to increase the energy output of their projects to achieve a lower LCOE.

The combination of trackers and bifacial PV typically deliver a 15-20% boost to yield and accordingly unlock a reduction of 5-8% for LCOE as compared to fixed-tilt.

Customers in India have always been very price-conscious. They need to maximize their return on investment.

What is Trina Solar's growth plan for 2022?

In the future larger wafers, more efficient cells and durable and reliable modules will be the direction of all PV technology. Thanks to the rapid development in recent years of large wafer-based solar cell technology, this has become a clear trend.

Since 2020, Trina Solar has taken the lead in developing the innovative 210 series ultra-high power modules, a new generation of PV products that combine high reliability, high power generation and high value. With its outstanding brand value and product reliability, Trina Solar has scored 100% in the BloombergNEF bankability survey for six consecutive years so far.

It is important to note that carbon neutrality is the most important driving force for the development of the renewable energy industry. Trina Solar will continue to maintain vigorous growth through innovation. Trina Solar has put in place a 1+3+N multi-tiered business ecosystem that provides vertical solutions including products, systems and smart energy to help achieve carbon neutrality and the development of clean energy worldwide.

As of June 30, 2021, Trina Solar's photovoltaic modules shipped worldwide can produce 103.95 billion-kilowatt hours of clean energy over their lifetime, reducing carbon dioxide emissions by a total of 103.64 million tons, equivalent to planting 5.7 billion trees.



Arctech in India: Think Globally, Act Locally

“India is like the second home base for Arctech,” said Gail Chen the General Manager of East Asia and India at Arctech. The team is celebrating its fifth anniversary and its success of being the top Solar Tracker Supplier regarding cumulative shipments in India as of June 2021, reported by The Market Share Leaderboard of Mercom.

India is under the spotlight as one of the largest and most ambitious renewable capacity expansion programs in the world. In 2019 at UN Climate Summit, the country announced that it will be more than doubling its renewable energy target from 175GW to 450GW by 2022.

The company built its India office 5 years ago as it anticipated an immense growth in solar development in the country. Now the team of 30 has provided engineering and manufacturing support for Arctech’s local operation, with a possibility of supporting the global supply chain, as an extension of the manufacturing bases in China. To deepen its localization strategy, the company also intends to source materials for its tracking systems from within India in the foreseeable future.

Leveraging the rich experience in international projects and the solid local market knowledge, the Arctech Indian team members are capable to provide a white-glove solution from project solution customizing, installation and debugging to after sales service.

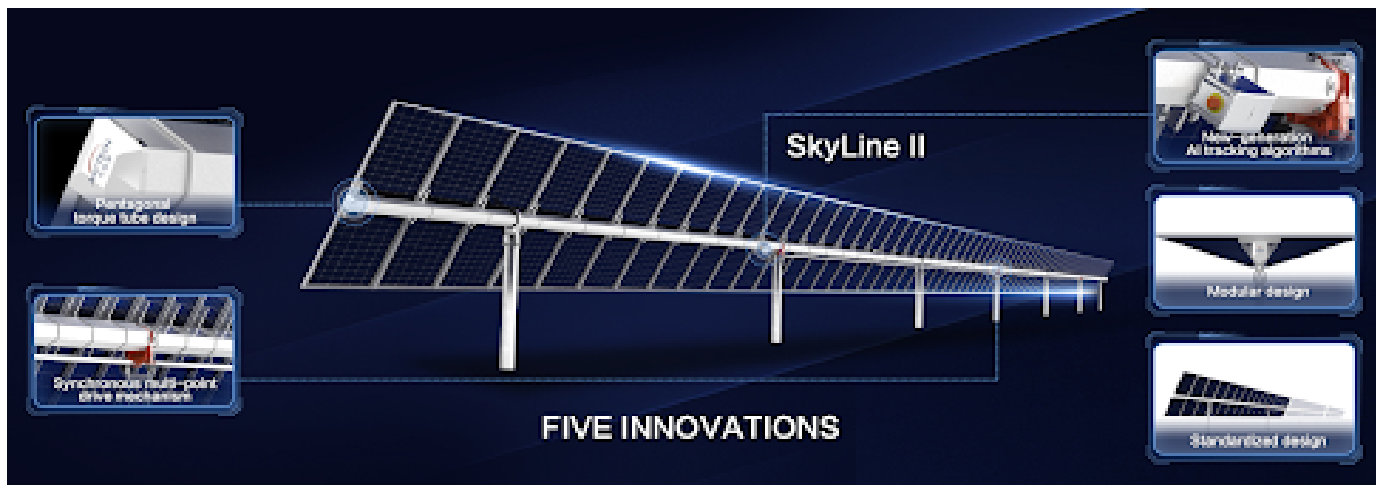
The company had its first Indian project in 2015. The delivery of its 420MW solar structure to Tamil Nadu, India, the 780MW DC project marked the company’s first success in the country. It was followed by the 172 MWp Solar Power Plant in the state of Telangana, India. Now Arctech has developed a solid customer base with International well-acclaimed partners including Renew Power, O2 Power, NTPC, Ayana, L&T, SWL, Vikram among others.

Last year, despite the pandemic disruption in India, Arctech struck a deal with one leading Indian developer to supply 1.7 GW of 1P SkyLine trackers to two projects in Rajasthan. In particular, the 860MW AEML solar power plant is the largest bifacial tracker power generation project in India.

Wood Mackenzie’s new report shows that Arctech maintained strong momentum in India 2020. According to the report, Arctech topped the ranking in the Asian Pacific region with a 35% market share, aided by the unparalleled leadership in the Indian solar market. The company maintained the position as the number 1 tracker supplier in the region for three consecutive years.

As the company launched SkyLine II, the latest offering of the famous “Sky series” tracker, the team is gear up to unleash the potential of the untapped market.

“ NOW THE TEAM OF 30 HAS PROVIDED ENGINEERING AND MANUFACTURING SUPPORT FOR ARCTECH’S LOCAL OPERATION, WITH A POSSIBILITY OF SUPPORTING THE GLOBAL SUPPLY CHAIN, AS AN EXTENSION OF THE MANUFACTURING BASES IN



“The Indian government had an initial target of 20 GW solar capacity for 2022, which was achieved four years ahead of schedule, so we are pretty much catching the wave here. The Indian solar market landscape is gradually shifting from purely price-orientated to LCOE-focused. The market sentiment is becoming increasingly rational and that’s a good thing for us who have been dedicated to introduce the most advanced mounted structure solution to this market for years. We will continuously be enhancing our presence and help expediting the energy transformation for this nation.” Remarked by Gail.

Performance Assessment of Solar Plants from O&M perspective

Avi Solar Energy Pvt Limited was founded in 2010 with its headquarters in Bangalore and with a vision to contribute to Environment and Society by harvesting energy from sunlight. Avi Solar entered into solar O&M services as well as into solar EPC business in 2015 and in its last 5 years journey, Avi Solar has provided its O&M services to more than 2.2GW solar power plants (both Ground Mounted and Roof Top) cumulatively, successfully executed 22+MW of EPC works and also provided its project management consultancy to 21MW Solar power plants.

With 2.2GW Solar O&M Asset Management experience, we have observed that among many performance indicators the Performance Ratio (PR) as a Key performance Indicator of Solar Plant performance is well understood. PR is the ratio of the Actual Energy generated to the theoretical energy output for the available plant capacity.

The nominal or theoretical energy output is a product of incident solar irradiation on the entire generator surface and the Module efficiencies as per the manufacturer datasheet.

Alternatively, $PR = \frac{\text{Energy generated in kWh}}{[\text{Peak Sun hours available}(\text{hours}) * \text{DC Capacity of the Plant in kWp}]}$

Energy generated is measured at the Availability Based Tariff (ABT) meter, the point where the Energy generated is recorded, while transmitting to the grid.

The Peak Sun hours daily represents the summation of the Irradiance available minute-wise against a maximum normal surface Irradiance of 1000W/m² available at sea level on a sunny day. The irradiance is measured by a pyranometer of high sensitivity.

As an example, if 360,000W/m² is the summed-up irradiance value measured by the pyranometer for the working hours of the plant then the Peak Sun hours for the day is $360000(\text{W/m}^2) / (1000\text{W/m}^2 * 60)$

6.0 hours The PR value can be realistic if all the measurements are accurate. However, this may not be the case over the years as plants age and the instruments have drift and the Solar panels' health is under question too.

From an O&M perspective, the performance monitoring must be continuous and accurately assessed as there are factors affecting the performance daily viz. Soiling, Weather parameters (temperature, humidity), and the quality of maintenance.

While environmental factors cannot be controlled all along and can impact the PRs, the following Maintenance aspects, if overlooked, can have bearing on the PRs

- Calibration of the meters, instruments are the key to accurate measurements of the energy generated, Irradiance etc. and thereby a true PR.
- The aggregated line losses between the Inverter and ABT meter are to be monitored daily to be sure that they are below a reasonable threshold, usually 2%. The energy generated /recorded will be lower than expected if line losses are more.
- Modules degrade over the years; Based on degradation rate Solar Plant Developers normalize the target PRs, year on year. However, energy leaks due to unfixed Junction box issues, allowing damaged modules, melted MC4 connectors on the field can be detrimental to plant performance and impact the PRs.
- Usage of handheld Thermal guns to locate hot spots - these can be complementary to drone thermography done once yearly to map all modules which are having single or multiple hotspots - mostly, a point of failure later. Periodical visual checks of the front & rear of the module are necessary.
- Pyranometer mounting and tilt angle alignment to the module tilt angle. While cleaning the pyranometer, care should be taken not to scratch the dome or disturb the tilt angle. Any scratches to the dome affect the path of direct sunlight or tilt angle disturbance can affect irradiance measurements and thereby impact the true PR of the plant.



AVI SOLAR
Inspired by Nature, Powered By Sun

**India's Leading Independent Solar O&M Service Provider
with 2.2GW Solar O&M Experience across 11 States in India**

sales@avisolar.com / www.avisolar.com

Further to serving as a leading manufacturer of solar PV modules, we also provide forward integration with our solar solutions across the value chain.

Contendre Greenery Pvt. Ltd. also known as Contendre Solar is an ISO Certified Solar Manufacturing and Solutions Company with a State-of-the-Art, MNRE Approved (ALMM) fully automated solar module manufacturing facility located at Bhiwandi in the state of Maharashtra, is the next-gen venture of Contendre Group. Established in 1984, Contendre Group commenced its journey with the textile sector in Bhiwandi. In 2010, as a part of its diversification plan, the Group forayed into the construction and real estate sector. With the next generation jumping in and being passionate about promoting the idea of a clean and green energy future, the group launched 'Contendre Solar' in 2019, announcing their entry into the renewable energy sector with Solar as an initiation point.

Contendre Solar has been established with the idea of providing non-polluting renewable energy to all. We strongly believe that every responsible individual or a corporate body who strives to minimise their carbon footprint should have easy access to cost-effective, high-quality and high-performance solutions. Increasing global awareness towards sustainability has intensified our commitment towards our ultimate goal for a cleaner, greener and better tomorrow. Our pursuits led us to set up the most advanced solar photovoltaic modules manufacturing unit at Bhiwandi, Thane, from where we cater to the

solar needs of our clients across the world. With our state-of-the-art production facility, advanced European machinery & equipment and our experienced and very well-motivated workforce, we can offer our clients the best in class, the full spectrum of photovoltaic solar products 'Made in India'.

Further to serving as a leading manufacturer of solar PV modules, we also provide forward integration with our solar solutions across the value chain. We provide tailor-made power solutions to satisfy the specific requirements of each and every customer. For us quality is not just the quantitative measure of perfection, it includes customer satisfaction too. All our services and products are constantly fine-tuned to make them prompt and professional.

“ OUR PURSUITS LED US TO SET UP THE MOST ADVANCED SOLAR PHOTOVOLTAIC MODULES MANUFACTURING UNIT AT BHIWANDI, THANE, FROM WHERE WE CATER TO THE SOLAR NEEDS OF OUR CLIENTS ACROSS THE WORLD.”



Business Concept

Contendre Solar has always believed in providing a seamless and hassle-free buying experience to our customers. Serving to which, we offer a wide range of products for the customers to choose from as per their requirements.

Contendre Solar manufactures highly reliable & efficient solar PV modules based on both polycrystalline as well as Monocrystalline silicon technology, currently ranging from 40Wp upto 415Wp. Our state-of-the-art manufacturing unit merged with stringent quality standards better than the industry standards guarantee the quality and long durability of our products.

Though Solar Modules are our primary product, our product range does not limit to them. We also provide our customers with a supporting range of products like Inverters, Solar Kits with the entire system BOS, etc for an easy single point purchase. Apart from our B-to-B product selling we also extend a wide range of services to the end consumers. Our services include solar installation, solar system design, solar equipment supply, solar consulting services, long term operation and maintenance, etc and with us having the in-house manufacturing for most of the critical components needed in solar installations, we can provide our clients with a single point responsibility allowing them to have a hassle-free project installation and life.

Quality has always been the first and topmost priority for Contendre Solar. Adhering to which the company has been ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 certified and all our products certified as per the latest IEC and BIS standards.

Contendre Greenergy Pvt. Ltd. is a family-owned next-gen startup company co-founded by two brothers Mr. Yash Sheth and Mr. Dharmin Sheth and backed by Contendre Group. Contendre Solar follows a unique organizational structure keeping its customers in mind and at the topmost priority.

Contendre follows a flat organization structure rather than going for a standard multilevel corporate structure making it easy for the customer to reach us and to provide a quick response to our customer's feedback and queries giving us a competitive edge over other companies and helping us grow much faster.



Customers & Projects

Contendre solar has been fortunate enough to supply its products and services across the globe and that too in all the different scales and sectors. Be it power plants, government projects, private industries, or domestic residences, Contendre has served all. Catering to the demand for Contendre Solar products and services in the market and to the government's initiative towards 'Make in India' we are executing an expansion of our company in all the aspects, be it our production capacity, our team size, our product range or anything and everything of our company. Contendre Solar will grow 3 folds by the end of the next financial year.

“

IN 2010, AS A PART OF ITS DIVERSIFICATION PLAN, THE GROUP FORAYED INTO THE CONSTRUCTION AND REAL ESTATE SECTOR. WITH THE NEXT GENERATION JUMPING IN AND BEING PASSIONATE ABOUT PROMOTING THE IDEA OF A CLEAN AND GREEN ENERGY FUTURE, THE GROUP LAUNCHED 'CONTENDRE SOLAR' IN 2019, ANNOUNCING THEIR ENTRY INTO THE RENEWABLE ENERGY SECTOR WITH SOLAR AS AN INITIATION POINT."



LONGi leads the solar PV industry to new heights with product innovations and optimized LCOE with breakthrough monocrystalline technologies.

LONGi, founded in 2000, is a world-leading solar technology company. The company has had a long-term, unswerving commitment to monocrystalline technology. LONGi has more than 60,000 employees, 30 branches, and 15 manufacturing bases around the world.

LONGi produces monocrystalline silicon wafers, cells and modules, delivering solutions for distributed and ground mount power station systems, promoting the development of the global PV industry and driving energy transformation. On March 31, 2021, LONGi established the Hydrogen BU, promoting hydrogen energy industrialization.

Business branches have been set up in countries including the USA, Japan, Germany, India, Australia, UAE and Thailand etc. with its business covering more than 150 countries.

In 2020, LONGi's annual production capacity was 85 GW for wafers and 50 GW for modules. In 2021, LONGi plans to increase the capacity for wafers and modules to 105 GW and 65 GW.

In 2020, LONGi ranked first in terms of the shipment of both wafers and modules. The annual shipment was 58.15GW for monocrystalline wafers and 24.53 GW for modules, and the global market share of modules is 19% in the year.

Vision:

The World's Most Valuable Solar Technology Company

Mission:

Utilizing Solar Energy Powering into Green World

LONGi leads the solar PV industry to new heights with product innovations and optimized LCOE with breakthrough monocrystalline technologies. LONGi is recognized as the world's leading solar technology company with the highest market value. Innovation and sustainable development are two of LONGi's core values.

Company's Products & Services

LONGi Hi-MO series modules, Unlock More Application Scenarios.

Hi-MO4, Higher Power, Lower LCOE

- Backside power generation gain
- Good electrical performance under shaded conditions
- Resistant to hot spots
- Optimized for high temperature and high radiation environments

Hi-MO 4m, Maximize Power Density and Flexibility

- M6 gallium doped silicon wafer
- Standard size, flexible applications
- Symmetric design, aesthetic outlook

Hi-MO 5, Delivering True Value

- M10 wafer with gallium-doped technology
- P-mono PERC cell technology
- Half-cut cell with multi-busbars

Hi-MO N, Propelling the Transformation with N-type Energy

- HPC cell technology
- Optimal module size
- Smart soldering without cracks

Business Competitiveness

- The World Leading Mono Silicon Wafer Manufacturer. LONGi took the industry lead in standardizing wafer size and achieving 100% diamond wire cutting of mono silicon wafer
- Leading Capacity and Shipment. In 2020, LONGi became the 1st solar technology company to ship more than 20GW of modules in one year.
- LONGi Innovation set up the Benchmark For The Entire Industry
- LONGi Lifecycle Quality Runs Through Every Stage



SPECIFICALLY, LONGI HAS INTRODUCED SEVERAL ADVANCED DIGITAL MANAGEMENT PLATFORMS THAT ARE PRESENT THROUGHOUT THE WHOLE QUALITY CONTROL PROCESS, MAKING THE IMPLEMENTATION AND TRACEABILITY OF MANAGEMENT STANDARDS MORE EFFICIENT AND TRANSPARENT."

Quality Policy Of The Company:

Reliable manufacturing: comprehensive quality control ensuring lean manufacturing

Quality control systems, including ISO9001, ISO45001, ISO14000 and IEC TS 62941, are observed to comprehensively control LONGi's manufacturing quality. The company has also established a comprehensive quality control system covering raw material control, manufacturing process and end-product reliability monitoring. Specifically, LONGi has introduced several advanced digital management platforms that are present

throughout the whole quality control process, making the implementation and traceability of management standards more efficient and transparent. With LONGi module factories being based around the world, the process has allowed consistent control of materials, quality and testing standards to ensure that all modules are manufactured to the same standard and quality, regardless of location.

In LONGi's automated and intelligent workshops, by delicacy management, there are 22 manufacturing procedures, 153 items under quality inspection to ensure standardization of the production process, ensuring that every module produced by the company is of the same excellent quality.

Service Pledge:

During SNEC 2021, LONGi launched LONGi Lifecycle Quality, the first such standard for the solar PV industry, aiming to provide global customers with access to the highest levels of quality and reliability throughout the lifecycle of the company's product portfolio. From module design, through mass production to post-sales support, LONGi adheres to its core concept of 'Customer Value First' and ensures that quality practices are incorporated at every stage of production and application.



More details refers to: <https://www.longi.com/en/news/longi-lifecycle-20210720/>

Guarantee of Product Quality and Performance



We have about 20 people supporting India & Srilanka Business and which is headed by Managing Director - Mr. Pradeepkumar M.

Customers & Projects.

All major developers including Adani, Renew, Tata Power Solar, Juniper, Amplus, Hero Future energies, Azure Power, Mahindra Susten, Fourth partner, Dexler Energy, Harsha Abakus, Gensol, and other leading C&I and Roof top customer for their group captive projects.

Many of Bifacial module based projects with leading and largest Indian Developers and EPCs.

“ LONGI IS RECOGNIZED AS THE WORLD'S LEADING SOLAR TECHNOLOGY COMPANY WITH THE HIGHEST MARKET VALUE. INNOVATION AND SUSTAINABLE DEVELOPMENT ARE TWO OF LONGI'S CORE VALUES.”



PIXON envisions to globally provide efficient solar energy products and solutions.

Company History:

The organization is outfitted with the cutting edge turnkey producing capacity of 400 MW limit. The organization is also likewise supported with a solid monetary foundation of its parent organization - the Marwadi Shares and Finance Limited. The mix of a youthful group, under the direction of experienced players, makes PIXON flexible for inventive activities and advanced developments. PIXON envisions to globally provide efficient solar energy products and solutions. Thus, contributing to and enhancing Global Climate Sustainability.

PIXON manifests into solar products and creating quality solutions for the customers. The organization is very exceptional with the best-in-class turnkey manufacturing facility of 400MW limit. The Modules radiate excellence through quality and high return. PIXON offers exceptionally productive modules tried in our in-house PV Module Test Lab. The top-notch scope of solar modules is designed in India utilizing European innovation and technology.

PIXON also gives turnkey Engineering, Procurement, and Construction Services for the installation activities. PIXON has an in-house, all-around prepared, and devoted EPC group for the execution of solar energy projects. Additionally, they also provide Ground Mounted Solar solutions, Rooftop Solar solutions, Floating Solar solutions. Lastly, we are into assembling EVA films. PIXON houses a cleanroom environment facility to an 800 MW manufacturing line for EVA films.

Vision Statement:

To be a global leader in Solar Industry by providing efficient Solar Energy Solutions.

Mission Statement:

To contribute and enhance Global Climate Sustainability, by promoting and providing solar energy solutions. To promote the transition towards solar energy and thus reduce carbon footprint globally, fostering the betterment of our Earth's ecosystem. To constantly improvise and explore new technologies and their economical deployment to harness solar energy.

Business Goals & Objectives:

PIXON anticipates further developments in their supply chain across India through their upcoming production lines for aluminum strips, junction boxes, back sheets, and so forth. PIXON is additionally anticipating the arrangement of a certified Quality research center for stability and certification purposes.

Company's Products & Services

The products are categorized majorly into 3 categories:-

Solar Modules

PIXON's premium range of solar modules is engineered in India using European technology. The modules exude excellence through quality high yield. PIXON also offers highly efficient modules tested in our in-house PV Module Test Lab which are as follows:-

- Mono-Crystalline Perc Modules.
- Poly- Crystalline Modules.
- Poly- Crystalline DCR Modules.
- Poly- Crystalline Half-Cut Cell Modules.
- Mono-Crystalline Perc Half-Cut Cell Modules.

EVA Films

EVA Films are divided into two sub-categories which are as follows:-

PIX FAST CURE:-

PIXON PIX Fast Cure EVA films ensure that the solar cells are protected and solar modules provide a better performance, even while facing the utmost harsh weather conditions.

PIX ULTRA-FAST CURE:-

PIXON's PID-free EVA films are suitable for all of the types of solar cells and back sheets with a cycling time of fewer than 10 minutes that speeds up your module production to provide increased yield.

EPC Solutions

PIXON provides turnkey Engineering, Procurement Construction Services for the installation of solar projects. They have an in-house, well-trained, and dedicated EPC team for the execution of solar projects - from small solar projects to large-scale utility-based projects.

- Ground Mounted Solar Solutions
- Rooftop Solar Solutions
- Floating Solar Solutions

Quality Policy Of The Company:

PIXON has a varied range of products and services for which they have different certifications and standards which ensures the organization's capabilities and effectiveness to complete the specific work assignments and obligations. The following is a rundown of accreditations that PIXON contains which are as follows:-

- IEC (International Electrotechnical Commission)
- BIS: Bureau of Indian Standards
- US Certification
- ISO Certification
- CE Mark Testing Certification
- CLASS II





RP Infra Services - The Next Generation Contingent Workforce For Your Solar Projects

Introduction

Based in Chennai, RP Infra Services (RPIS) is a boutique solar staffing company serving the bay area since 2018. Set up by Mr. Ramesh Kathiresan it is run by an all-women team.

RPIS focuses on providing an exclusive and high-quality solar contingent workforce- PAN India. We focus on serving the needs of clients, bringing the finest professional staffing in the areas of Construction Engineers, Project Executors, the labour workforce and so on, the best in the renewable industry.

We take care of PF, ESI, Professional tax and all other Government Statutory. We Train and conduct induction programs for all staff before joining the company which helps in getting on to their job from the first day.

With us, you can -

- Hire 2X Faster
- Hire Experienced Best Solar Talent
- Hire on Project Based
- Deputation Training
- PAN India Presence

Vision Statement:

RPIS aspires to become India's leading hub of manpower sourcing in the renewable energy sector.

Mission Statement:

Empowering solar projects across India with the finest workforce at the right time with efficient recruitment solutions

Business Goals & Objectives:

RPIS has been immensely successful in creating a global network of a highly adept and smart workforce that can help a company achieve its mission-critical projects and goals. Keeping pace with projects and being on the lookout for extremely talented individuals has become ever more challenging. Here is where RP Infra Services comes into play to bring the best-suited talent for your company d. Business Strategy: Project Resource Curve Compatibility: Distribution of resource units according to the requirement at apt stages of the project from start till end.

Resource Surge /Peak Assistance: Sudden increase in resource demand will be dealt with utmost care.

Cost-efficient Solutions: Since RPIS takes care of the employee's salary and other backend processes the client can enjoy cost-efficiency

Wide Resource Spectrum: Wide Array of resources from an internal database and other platforms.

Company's Products & Services

- Contract Hires
- One Time Placements
- Temp to permanent
- Freelancers

Business Competitiveness

- RPIS has a highly skilled set of talents.
- Our recruiters are skilled in identifying top talent and matching them with the client's needs.
- The Contract renewal rate for our consultant is 90%.
- 60% of our consultants are converted to full-time employees.
- Deputation Training
- PAN India Presence

Quality Policy Of The Company:

ISO 9001:2015 Certified & AIAO- BAR Accredited.

Service Pledge

- Consultative Approach
- Ready to Go On Payroll Staff
- Sourcing and Training
- Consistent Service
- Performance Improvement Plan
- On Ground Problem Solvers

Customers & Projects

Our Clientele includes esteemed customers like L&T, Juniper Green Energy, Kanoda Energy, Game Change Solar, Solar Square amongst many others.

Ambitious projects

We are proud to supply manpower to more than 750 + MW solar and wind projects.



World's First Solar Rooftop Integrator Providing Assured Buy Back Value For Its Solar Rooftop Systems

According to research, India is one of the top ten countries in the world that uses solar energy to its maximum potential. The country has made tremendous progress toward alternative energy sources such as solar and has set a lofty goal of installing 175 GW of renewable energy by 2022. India is one of the world's fastest-growing economies, and increasing commercialization has resulted in a higher carbon footprint for the country. Adopting alternative energy sources such as solar appears to be the only solution. According to a new analysis by Bridge to India, India is on track to meet its solar objective in 2019, with 14 GW estimated to be installed.

Shree Solar Rooftop Solution is India's newest solar rooftop systems integrator and a Premium Quality Rooftop Solar Panels Supplier, designing and delivering home technology solutions around the country. It has a substantial position in the solar power market and delivers end-to-end solar power generation on rooftops for a variety of domains, including residential, commercial, and industrial. Rooftop solar plants are a good alternative because a 1 KW rooftop framework may generate roughly 1500-1600 units of electricity per year, and the investment can be repaid in as little as 5-6 years.

Shree Solar Rooftop, as one of India's greatest firms, tries to give the highest level of customer satisfaction while also providing ongoing support and maintenance. Their objective is to create high-quality solar products that achieve maximum efficiency and product longevity while maintaining high reliability. Shree Solar Rooftop's team of young and dynamic professionals works in close collaboration to provide tailored solutions to their customers, with a delivery-focused approach and excellence at the forefront of their endeavor. Residential solar rooftop solutions, Industrial solar rooftop systems, and Business solar rooftop systems are all available.

Shree Solar Rooftop offers a wide range of services, including site surveys, PV design, installation, commissioning, and maintenance. The factors of differentiation that set Shree Solar Rooftop apart from the competition begin with the following

- Top-notch quality products, which are certified and ensure long-term viability.
- Shree Solar Rooftop has a large network of technicians who can help consumers right at their homes.
- Starting with surveys, they provide transparent services 24 hours a day, seven days a week, and keep clients informed of progress and accomplishments until the installation is completed.
- They are distinguished from other solar rooftop system companies by their legal assurances, and they have an in-house legal staff to ensure that all documentation and contractual agreements, and warranties are mutually agreed upon and enforceable on both parties.
- The installation procedure is facilitated together with educating the end-user on his rights and ownership, ensuring that he is never tricked or duped. As a result, they have a win-win situation. Because solar on the roof consumes less electricity from the grid, it helps you save a lot of money on your energy costs. Because the cost of electricity from the grid is likely to climb in the next years, your savings should rise as well. With a linear power warranty, you may expect long-term cost savings by avoiding the cost of pricey grid electricity. Aside from that, the cost of fuel is rising, as is pollution from automobiles, therefore electric vehicles appear to be the way of the future, with solar charging and lower electricity bills.

Visit to learn more - <https://www.shreesolarrooftops.com/>
Contact - info@shreesolarrooftopsolutions.com



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SHREE SOLAR
ROOFTOP'S TEAM OF
YOUNG AND DYNAMIC
PROFESSIONALS
WORKS IN CLOSE
COLLABORATION TO
PROVIDE TAILORED
SOLUTIONS TO THEIR
CUSTOMERS, WITH A
DELIVERY-FOCUSED
APPROACH AND
EXCELLENCE AT THE
FOREFRONT OF THEIR
ENDEAVOR.”

Sineng Electric is committed to the concept of market oriented and innovation driven development.

Sineng Electric Co., Ltd. (stock code: 300827) is a national high-tech enterprise focusing on power electronic products R&D, manufacturing and sale, covering its business in PV inverter, energy storage system, power quality control, plant development and other fields, committed to promoting the construction of a cleaner, safer and better future on the basis of the world's leading green technology solutions.

Sineng Electric is committed to the concept of market oriented and innovation driven development. With comprehensive construction of the production, education and research system, now the company has three R&D centers in Shenzhen, Wuxi and Chengdu, China, as well as three manufacturing facilities in Wuxi, China, Wuzhong, China, and Bangalore, India. Sineng Electric has been awarded many honors such as one of the first batch of national green factories, a National Level Little Giant Enterprise, a CNAS National Laboratory, an Enterprise Academician Workstation, a Post-Doctoral Research Workstation, a National Single Champion Manufacturing Product, etc.

Over the years, Sineng Electric has always been adhering to Endless Energy for Limitless Green, deeply engaged in power electronics energy conversion and control, empowering global sustainable development with innovative technologies, excellent products and solutions. In the field of PV, Sineng Electric provides all-scenario power generation solutions, covering 8kW~6800kW central, string and central distributed inverters, which are widely adopted in ground mounted, water mounted, complex terrain, C&I rooftop and residential projects to meet the diverse demands of customers. In the field of energy storage, Sineng Electric provides all-scenario ESS solutions, including 1000V/1500V central and string PCS as well as system integration products, applicable to multiple scenarios such as power generation side, power grid side, user side and micro-grid. In the field of power quality control, Sineng Electric provides all-scenario power quality management solutions, including a full range of active power filters, static var generators, smart power quality correction devices and other products, which are employed in various industries like communications, medical, rail transit, petroleum and petrochemical, metallurgy, tobacco, etc.

Adhering to the philosophy of "Sincerity, Unity and Progress", Sineng Electric has been working relentlessly to ensure state-of-the-art power electronics products and solutions. Sineng Electric is always committed to providing the world with green energy and advanced power electronics products, thus leading the market of power electronics and renewable energy products.

Centered around enhancing customer values, Sineng Electric insists on product and technology innovation, constantly improving the internationalization strategy. With the business covering Asia-pacific, Middle East, South America, Europe and other markets, Sineng Electric plays an active role in global competition, striving to build a world-class green technology enterprise and make more contributions towards a better earth.

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SINENG ELECTRIC IS ALWAYS COMMITTED TO PROVIDING THE WORLD WITH GREEN ENERGY AND ADVANCED POWER ELECTRONICS PRODUCTS, THUS LEADING THE MARKET OF POWER ELECTRONICS AND RENEWABLE ENERGY PRODUCTS."



Trina Solar - The Shining Star Of The Global Solar Industry

Trina Solar, which was founded in 1997, is the world-leading PV and smart energy total solutions provider. The company engages in PV products R&D, manufacture and sales; PV projects development, EPC, O&M, smart micro-grid, and multi-energy complementary systems development and sales, as well as energy cloud-platform operation. The company promotes global sustainable development, for which it delivers PV products, applications, and services. In 2018, Trina Solar first launched the Energy IoT brand and is now aiming to be a global leader in smart energy. As of June 30 2021, Trina Solar delivered more than 77 GW of solar modules worldwide and ranked on the list of "Top 500 Private Enterprises in China". In addition, Trina's downstream business includes solar PV project development, financing, design, construction, operations and management, and one-stop system integration solutions for customers. Trina Solar has connected over 5.5GW of solar power plants to the grid worldwide.

The year 2021 has been a very successful one at Trina Solar with some remarkable and noteworthy achievements.

- **The amalgamation of operating excellence with innovation:**

Trina Solar has set a total of 22 world records in terms of photovoltaic (PV) cell conversion efficiency and module output power. The company achieved a historical breakthrough by winning the "State Technological Invention Award" for its "Key Technology and Application of High-efficiency and Low-cost Crystalline Silicon Solar Cell Surface Interface Manufacturing" program. The highlight is that this award is the first state science and technology award won by China's PV industry.

- **Extraordinary shipments and worldwide applications of Trina Solar's modules:**

Trina Solar has put its best foot forward and expedited China's progress towards achieving national carbon peak and carbon neutrality goals. Within China itself, the company has made shipments of 210 mm 670 W Vertex ultra-high power modules with the special train "Vertex 670", the first of its kind, to help develop large wind power and PV bases in China. The company launched the "Zero-Carbon Wharf" Demonstration Project for the Expo 2025 Osaka, the world's largest inland floating power plant project in Singapore, and administered Trina Solar technology across rooftops in different countries like Belgium, India, Sri Lanka, and many others, thus winning accolades from various country heads!

- **Establishing further advancements through comprehensive strategic cooperation agreements:**

Trina Solar has signed multiple comprehensive strategic cooperation agreements with many leading partners in the industry. The company has accomplished win-win results by signing such agreements with companies like Sinopec, Maersk, COSCO Shipping, and CET (China Electric Power Equipment and Technology Co., Ltd.), to name a few. Trina Solar truly believes that together with its industry chain partners, the company can make its commitment stronger towards achieving carbon neutrality. These agreements clearly indicate that each party's strengths can be leveraged towards progressing and reconstructing new business and building a new ecology with a model where competition and cooperation can coexist and prosper!

- **Forward is the way to go:**

Other initiatives taken by Trina Solar are:

The company joined the Science Based Targets initiative (SBTi) to contribute towards limiting global temperature rise to 1.5°C.

- The company worked selflessly and assisted the flood-affected areas in Henan, China.
- The company jointly launched the **Global Sustainable Energy Alliance** to establish a new model of sustainable development, to promote China's progress in building a PV-empowered moderately prosperous society in all respects, and to build a global home with PV solutions.

In the year 2021, Trina Solar has been awarded as bankable by all survey respondents in the 2021 PV Module and Inverter Bankability report issued by BloombergNEF. With the release of this report, Trina Solar is now the only module manufacturer to be rated as bankable for six consecutive years by 100% of the industry respondents participating in the annual BloombergNEF survey.

The BloombergNEF report has researched Trina Solar's financial health, a record of its modules in the field, and manufacturer warranties while awarding the company. The BloombergNEF 2021 Module and Inverter Bankability Report also cited the annual photovoltaic module reliability scorecard report issued by the internationally authoritative certification body PV Evolution Labs. The PVEL report affirmed the outstanding performance of Trina Solar's modules in terms of reliability and power generation capacity. The 2021 scorecard marked the 7th consecutive recognition for Trina as "Top Performer" among global module manufacturers.

In 2022, Trina Solar will be celebrating its 25th year of entrepreneurship and will endeavor to move forward by continuing to build a world-class leading enterprise that integrates solar energy, energy storage, hydrogen energy, and intelligent energy internet to create a world of carbon-free new energy.

For more information, please visit www.trinasolar.com.

Vision

Leading global energy transformation with standardized and high-value PV smart energy solutions

Mission:

Solar energy for all

Business Goals & Objectives:

Trina Solar believes in constant innovation and always strives to push the PV industry forward by creating greater grid parity of PV power and popularizing renewable energy. The company's mission and aim are to boost global renewable energy development around the world for the benefit of all of humanity.

Business Strategy:

Trina Solar has always adhered to the six strategies of Innovation, Branding, Globalization, Platformization, Intellectualization, and Industry-Finance Synergy, leading development in terms of innovation level, economic benefits, product quality, and environmental safety. With its outstanding technological innovation capability and leading globalization level, it has accumulated excellent brand reputation and public praise and won numerous domestic and international awards.

Company's Products & Services:

As a global leading provider for PV modules and smart energy solutions, Trina Solar delivers PV products, applications, and services to promote global sustainable development.

Ultra-high power modules significantly reduce project costs

Trina's Vertex module series, using 210 mm silicon wafers, boasts high power, high efficiency, high reliability, and high power generation. The modules can be used in any setting, such as residential or industrial and commercial rooftops, or large-scale power stations. Whether in terms of the supply chain at the manufacturing end, inverter and tracker compatibility at the system's end, or even in terms of customer value aspects such as BOS or LCOE performance, Trina's Vertex series of ultra-high-power modules is ahead of the game: the non-destructive cutting + high-density interconnection + MBB(multi-Bus bar) combination forms a high-efficiency, high-reliability foundation, while low voltage and high string power boost single-string power by over 40%. With clear product value and hugely reduced BOS costs, customers get greater value, and our 600W+ ultra-high-power modules come with mature technical specifications and industry approval. The production capacity of 210 mm Vertex modules is expected to exceed 40 GW in 2021.

High-reliability tracker system solutions

TrinaTracker is Trina Solar's tracker brand, which offers four key advantages—high reliability, low O&M costs, greater yield, and unified module-tracker channels, contributing to the core component of our smart energy integrated solutions. Globally, PV power generation is currently in the final mile towards grid parity. TrinaTracker's Vanguard 600W+ series trackers perfectly match the mainstream 210 ultra-high-power modules up to 600W+ and 550W, massively increasing the energy yield, reducing LCOE, and improving the returns of the PV power station. TrinaTracker's global installation has now exceeded 5 GW with production capacity up to 7 GW in 2021.

Utility projects & EPCM

Trina Solar has been positioned as a world-leading provider of integrated smart PV energy solutions, and it continues to strengthen

our business systems, especially core products such as PV cells and modules; Trina Solar is also furthering the expansion of integrated solutions toward the whole PV system, in order to provide higher-quality services to end-users. Following two decades of hard work, Trina Solar is now a leading global developer of PV power station projects, offering customers one-stop system-integrated solutions comprising development, financing, design, works, and O&M. As of December 2020, the company's global projects had a cumulative on-grid capacity of over 5 GW, with over 7 GW of top-quality project reserves.

Leading the energy transition through storage

Trina Storage, a business unit of Trina Solar, is a global energy storage solution provider dedicated to enabling governments, corporates, societies, and communities to achieve a cleaner, greener, and more sustainable world. Using a sophisticated and advanced solution platform, Trina Storage is ready to solve today's complex renewable energy integration challenges.

As the world's leading provider of PV smart energy and energy solutions, Trina Solar is committed to accelerating the global application of smart energy to create a new world of carbon-free energy.

Business Competitiveness:

In 2014, Trina Solar realized the milestone of shipping over 1GW in one quarter. The company also broke the solar cell efficiency world record 7 times that year. To date, Trina Solar's State Key Laboratory of PV Science and Technology has broken 21 world records on solar cell efficiency and module power. Trina Solar continues to set industry standards and benchmarks for performance and sustainability. The company boasts of robust and rigorous R&D, which facilitates Trina Solar's rapid rate of innovation and has led to over 2000 patent applications, including over 1000 invention patents. With world records of 23.22% with n-type i-TOPCon Solar Cell on Cast-mono substrate in Nov. 2019 and aperture module efficiency of 23.03% for larger-area industrial silicon p-type modules in June 2021, Trina continues to set the standard for solar efficiency. The unmatched level of innovation and technological capabilities of Trina Solar has allowed the company to become a global leader by setting industry benchmarks for both quality and efficiency.





Quality Policy Of The Company:

Photovoltaic projects rely on high quality products that stand the test of time for inputs ranging from engineering design to financing and more. Trina Solar's products have always maintained high reliability and solid performance based on its commitment to the quality-first policy. In the company's upstream business model, Trina Solar tightly controls quality over every step of the manufacturing process, from silicon crystallization to module deployment in the field. The company guarantees the quality of its products with an industry-leading 25-year lifetime warranty.

In its downstream business model, Trina Solar follows strict compliance with national regulations and industry standards, including Chinese National Standards GB 50797 "Photovoltaic Power Station Design Specifications," GB 50794 "Photovoltaic Power Plant Construction Specifications," GB 50866 "Design Code for Photovoltaic Power Station Connection to Power System" and GB 19939 "Photovoltaic system Grid technology requirements," among others. With an innovative solar design team, rigorous procurement procedures and experienced construction and operation team, Trina Solar has more than 15 years' worth of hands-on expertise in PV project development.

Service Pledge:

Trina Solar ensures the highest quality standards for its PV products across the entire supply chain. This mitigates risks and increases return on investment. Because of the company's dedication to delivering high-quality PV products, Bloomberg New Energy Finance (BNEF) named Trina Solar as a top bankable module supplier, five times in a row since 2016. Trina Solar is the only module manufacturer to be rated as fully bankable for five consecutive years by 100% of the experts participating in the BNEF survey.

As part of Trina Solar's commitment to quality and reliability in its own products and across the solar industry, Trina Solar has partnered with third-party testing groups, including TUV Rheinland Group, China General Certification Center, China Quality Certification Center and UL. In 2012, Trina Solar became the first solar PV company to obtain UL's Client Test Data Program certification after undergoing a rigorous inspection and audit process. In 2017, Trina Solar received the first CQC's witnessed Manufacturer's Testing certification in the Solar Industry.

Ownership Structure:

As a solar pioneer, Trina Solar helped change this solar industry, rapidly growing from one of the first PV enterprises in China to become a world leader in solar technology and manufacture. Trina Solar reached a milestone in 2020 when it was listed on the Shanghai Stock Exchange.

Mr. Jifan Gao, Chairman and General Manager of Trina Solar, founded the company in 1997. At Trina Solar, the team is tackling the world's energy challenges. The global community at Trina works passionately to bring smarter solar energy solutions to the world, ranging from modules to balance systems to full power plants for its partners.

Trina Solar has regional headquarters in Switzerland, United States, Japan, Singapore and United Arab Emirates. It has also set up offices and branches in Germany, Spain, Italy, Mexico, Brazil, South Africa, Australia, South Korea, India etc. It has also set up production and manufacturing bases in Thailand and Vietnam, with operations in more than 100 countries and regions. The company is committed to working with installers, distributors, utilities and project developers worldwide to build a sustainable solar energy industry, constantly leading the industry in technological innovation, product quality, environmental protection and corporate social responsibility, bringing clean and reliable solar clean energy to households and to commercial and large public facilities.

Apollo TM is a performance intelligence and health analytics solution

Apollo TM is a performance intelligence and health analytics solution owned by Helios IoT Systems Pvt Ltd. Helios developed Apollo, an IoT-based energy analytics platform for the renewable energy sector with a focus on improving the solar photovoltaic (PV) power plant operations and performance via next-generation data analytics products. We are passionate and concerned about our planet’s health and we believe renewable energy will be the savior to climate change and sustainable energy demand’s problems. We deliver actionable and energy loss insights using an analytics platform to solve complex business problems in the renewable energy sector.

Portfolio Mix: 2.1 GW under Apollo, 4,600+ Assets Analysed Daily, 35,000+ Insights Generated Daily.

Recent Achievements: Awarded as NextGen Product of the year by Nasscom.

Technology Partnership with AVEVA:
<https://www.apolloenergyanalytics.com/knowledge-centre/>

“ WE ARE PASSIONATE AND CONCERNED ABOUT OUR PLANET’S HEALTH AND WE BELIEVE RENEWABLE ENERGY WILL BE THE SAVIOR TO CLIMATE CHANGE AND SUSTAINABLE ENERGY DEMAND’S PROBLEMS.”

• **Product Introduction:**

Apollo™ is a suite of enterprise applications specifically designed to generate actionable closed-loop insights for the renewable energy industry. The applications enable all the eco-systems stakeholders to improve productivity in the O&M and asset management empowered by our patented digital twin technology & industry-leading IoT technology to solve business-critical and complex problems.

Apollo™ has 10 different modules such as Plant Configurator, Remote Operations Center (ROC), Event Analytics, Performance Analytics, Health Insights, Energy Loss Analysis, Operations & Maintenance, Custom Analysis, Power Forecast & Library designed & developed to address wide problems of a solar power plant.

• **Technology Specifications**

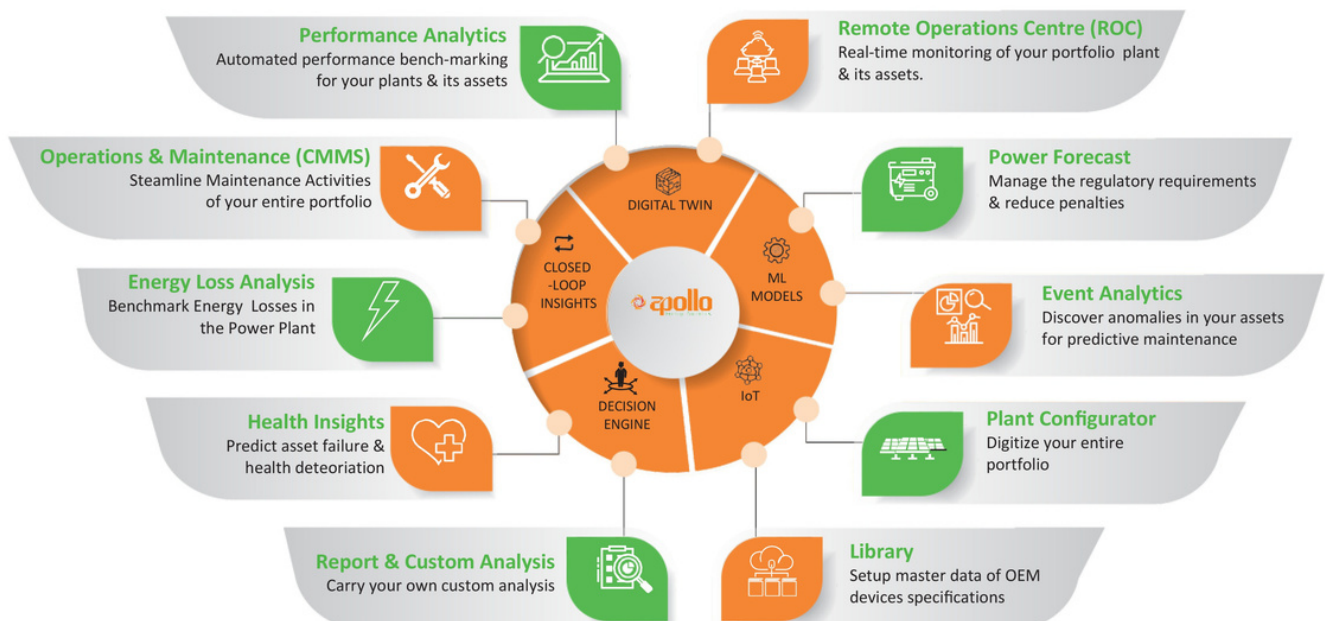
Apollo Energy Analytics solution is powered by: Apollo’s Patented Digital Twin Technology, Proven Machine learning models, IoT-based KPI’s and event discovery, advanced decision-making engine provides closed-loop insights

• **Technology Advancements:**

Apollo Energy Analytics solution will be extended to other renewable energy technology such as BESS & Wind Power to provide a hybrid solution to all our customers. Three will be an adaptation of novel drone & thermography-related technologies to provide end-to-end solutions for the O&M and Asset Management services to the industry. AI/ML-based models for fault failure predictions will be enhanced for critical assets like solar inverters transformers.

• **Targeted/ Benefitted Customer Segment:**

Target Customers: IPP/ Developer, EPC, Investor / Bank, O&M service providers, Solar Asset management Organisations, Government Agency.



BEPL aim to provide you with Free Electricity for Life and are happy to encourage green energy and reduce the carbon footprints.

Bandaru Energies Pvt Ltd.(BEPL) successfully installed & commissioned a 5 Mega Watt (MWp) Solar Power Plant in the shortest time of 45 days at Kurnool, Andhra Pradesh.

Project Introduction

The recent 5 MW Solar Power Plant executed by BEPL is Ground Mounted which is spread over 10 acres of land.

BEPL Scope includes land leveling, removal of shrubs (bushes) and power evacuation for in-house captive consumption for our client M/s. Sree Rayalaseema Hi-Strength Hypo Limited. BEPL aim to provide you with Free Electricity for Life and are happy to encourage green energy and reduce the carbon footprints.

Let us join hands to make the world a cleaner & greener place to live. Think Green and Clean. We are proud to say BEPL has left no stone unturned. You name it and we have it. We at BEPL are one of the leading Government approved Solar Power Plant Integrators in both Rooftop and Ground Mounted Projects.

We are expertise in executing several Solar projects across Andhra Pradesh & Telangana since 2013. BEPL has certifications of MSME, TSREDCO, NSIC, NREDCAP etc. We at BEPL have end-to-end solutions to set up solar power plants with various methods of structuring, designing and executing rooftop and ground mounted plants complying with statutory requirements.

BEPL has executed projects varying from 1 kWp and 10,000 kWp on Turn Key Basis at various Locations. BEPL has executed one of the biggest rooftop Solar Power Plant at a Single location in South India. Our customers segment is Industrial / Residential / Commercial.

Technology Specifications

The important equipment of the Projects PV Solar Panels and Inverters. BEPL has used the renowned brand of TRINA to make Solar Panels and Polycab (Solis) make Inverters for this project.

- The total Units generation per year is 15.25 lakhs Units /MWp/Year
- For the above 5 MWp Project: 76.25 lakhs units per year.
- Carbon reduction / year : 42,30,000 lbs of CO2 per year.
- No. of trees protected in lieu of 5 MWp solar Project: 2,46,000 trees.

CMD Message

The great strength lies, not only in installation but the performance of the plant at its full potential for its entire plant life.

Sri Sanjeev Bandaru, CMD, BEPL

Client message

We are happy to get this Project executed by the BEPL team, we are very satisfied with the Plant's performance and very much delighted for completion in 45 days.

Shri TGV Bharath, CMD of SRHHL



The high quality of Contendre panels is further supported by the very low claims rate and comparatively higher power generation compared to the other modules available in the market.

Contendre Solar is incorporated with the idea of serving each and everyone, be it a government body looking for power supply; installation companies looking for good quality product supply; institutes looking to create a positive impact on the environment; industries looking to save their energy cost or small residences trying to save their electricity cost. We strive hard to serve them all through our wide categories of solar products and services making us a one stop shop for all your solar needs.

Talking particularly about our Solar Modules which is the primary product and for which we are known, they are manufactured based on the 4 base principles that we follow for producing the best quality products.

Consistency:

Contendre’s state-of-the-art fully automated production facility ensures production accuracy and efficiency leading to a consistently high-quality product. The high quality of Contendre panels is further supported by the very low claims rate and comparatively higher power generation compared to the other modules available in the market.

Proven Reliability:

Our modules receive multiple quality checks throughout the entire process and are subject to stringent quality and reliability testing. Each product exceeds industry standards and is backed by an independent 25-year performance warranty and a 10-year product warranty.

Demonstrated Quality:

Our products are manufactured from the highest quality raw materials selected carefully from across the globe and exceed International Electrotechnical Commission (IEC) quality standards and are certified for the same by Third Party Laboratories.

Latest Technology:

We are already up with the advancements in Module technology being proven by our varied range of products like High Wattage modules (PERC technology), High System Voltage modules (1500V), Module Level Power Electronics (MLPE), BIPV Products, etc. But we do not stop here. With our plans to expand 3-fold by the end of next financial year, we will not only be focused on volumetric expansion but also on expansion of our product range by infusing new and better technologies, providing more options to our customers to select their products from.

“
INSTALLATION COMPANIES LOOKING FOR GOOD QUALITY PRODUCT SUPPLY; INSTITUTES LOOKING TO CREATE A POSITIVE IMPACT ON THE ENVIRONMENT



www.contendresolar.com

SOLARIZING YOUR WORLD!

CONTENDRE SOLAR
Solar PV Manufacturing and Solutions company

1Kw to 255Kw

40w to 400w

10 YEARS WARRANTY

25 YEARS WARRANTY

Key Features

- Timely Delivery
- Dedicated after sales Service
- All weather technology
- A reliable investment
- Enduring high performance
- Cost effective

Your Trustworthy Supplier for a Sustainable Investment.

ETi-SOL® - IoT SCADA - A Robust Solar PV Monitoring Solution

EnerMAN achieved a remarkable milestone of 1.2GWp (1200MWp) across the world in deploying IoT SCADA ETi-SOL® in the countries – Sri Lanka, Nepal, Dubai, Rwanda, and Poland apart from India with our Team with thorough knowledge of the industry and product with proficient tech support.

ETi-SOL® is an end-to-end solution, Hardware – Firmware – Software, an inhouse made in India product to cater to the global market at an affordable price

ETi-SOL® Solar PV Monitoring Solutions:

The Home page:

Bird’s Eye View of all your plants in a single Dashboard that can provide plant-wise and portfolio-level KPIs like Generation, PR, Plant Status etc.

The Plant Overview page:

This dashboard gives a heads up on plant performance. Some of the performance metrics are generation, insolation, peak power, total power, PR, CUF, Yield etc.

The Map view page:

Geo-tagging helps locating and fast identification of faults by reducing down-time and minimizing generation loss.

Single Line Diagrams (SLD):

The SLD diagrams provide live monitoring and take quick action if a device turns red due to a fault.

The Device dashboards:

All major devices like Inverter, SCB, Weather Station, MFM of a plant have their own dashboards and can be accessed from this page.

The Analytics Page:

The user can pick and choose any primary parameters across different devices and analyze trends and performances in a graph or table view.

The Report page:

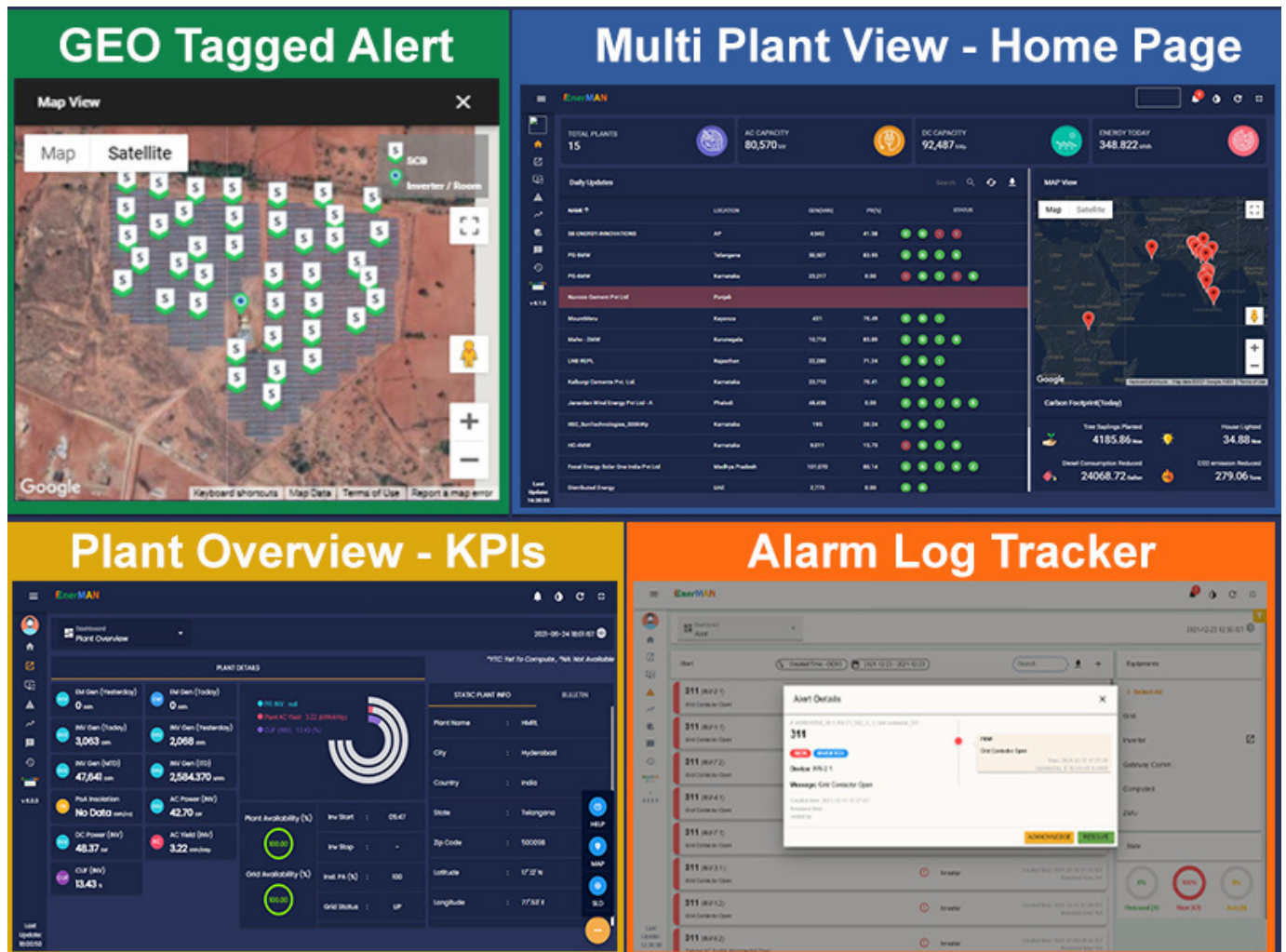
The user can download pre-defined daily, monthly, and yearly reports by the click of a button.

The Alarm Page:

ETi-SOL® works closely with edge device (ETi-LOG) to provide real-time, robust, and accurate alarms and events

ETi-SOL® Edge:

EnerMAN has introduced ETi-SOL® Edge which is a local monitoring solution. One-time investment to the system which does not require internet & cloud storage.



ETi-SOL® Android/iOS App:

Know your plant performance with the new mobile app version of our SCADA.

Presenting our product portfolio

ETi-SLDC:

A software product, which can be installed in local PCs/Servers to collect data from the Solar PV plant's equipment and can send the required data to SLDC in an interval of a few seconds as per SLDC guidelines.

ETi-ZES (Zero Export System):

We have developed another software product, ETi-ZES, which will ensure Zero Export from Solar PV plants / Rooftops to electricity Grid, as per DISCOM policy guidelines, to avoid penalty. This product collects the data from Solar PV plants' end-equipment and controls/limits the out-power of Solar Inverters based on its load/consumption.

ETi-PPC (Power plant controller):

Power plant controller is a reliable and flexible solution that can control different parameters present in Solar PV plants to achieve Utility grid requirements at POI (Point of interconnection). EnerMAN's Power Plant Controller (ETi PPC) is a control system that can manage active power, reactive power, and power factor from Solar Inverter (On-Grid/Off-grid Solar Plant, Solar Hybrid Plants).

ETi-LMS: Load Management System:

An IoT Solution for DG-Sync which is a universal Solution for all Inverter brands (Supports Heterogenous Make) Controls Active Power of Inverters.

ETi-CAST:

Energy Generation & Forecasting solution which is a cloud-based forecasting tool for solar power plants. EnerMAN has a proven track record in providing solutions for Remote Monitoring, Local Monitoring, and Integration with third-party Scada using REST APIs or FTP servers.

For more information, email sales@enerman.in or login to www.enerman.in

AUTHOR: ENERMAN TECHNICAL TEAM

“ WE HAVE DEVELOPED ANOTHER SOFTWARE PRODUCT, ETI-ZES, WHICH WILL ENSURE ZERO EXPORT FROM SOLAR PV PLANTS / ROOFTOPS TO ELECTRICITY GRID, AS PER DISCOM POLICY GUIDELINES, TO AVOID PENALTY.”

EnerMAN
Monitor Analyse Notify

ETi-SOL
IoT PV SCADA

Know Your Solar Plant at Your Fingertips

ETi-SOL Mobile APP

- All New Home Page
- In-App Notification & Alerts.
- Complete Portfolio & KPI Monitoring.

Download on the App Store | GET IT ON Google Play

sales@enerman.in | www.enerman.in

EnerMAN
Provides

ONE STOP SOLUTION

- ETi-SOL** ▶ IoT Solar PV SCADA/RMS
- ETi-PPC** ▶ Plant Power Controller
- ETi-SLDC** ▶ Live Data Sharing with SLDC partners
- ETi-LMS** ▶ Load Management System
- ETi-ZES** ▶ Zero Export System
- ETi-CAST** ▶ Energy Generation Forecasting

Inverter | SCB | Weather Station | Transformer | Grid

CMS-Centralised Monitoring System | Robust Alert Mechanism | Advanced Reports & Auto DGR | Data sharing FTP/API interface | Analytics & Performance Metrics

www.enerman.in | sales@enerman.in

LONGi's smart soldering' technology uses integrated segmented ribbons.



LONGi closely monitors PV industry technology trends and market demand, taking customer value as the overriding criterion. The company actively carries out research into and development of innovations, patent applications and process improvements, while promoting product quality optimization and continuous cost reduction, all with a view to accelerating the development of new efficient product technologies in order to maintain its technology leadership position.

- Mono PERC Technology. LONGi's commitment to the promotion of mono PERC technology successfully opened the door to the PV 3.0 era. Since then, the industry trend has undergone significant change, with monocrystalline now dominating with a market share of 90%. It also promoted the industrialization application of mono PERC technology, rapidly improved product efficiency, greatly reduced LCOE. The shipment of mono PERC modules has been the TOP1 for many years.
- Gallium-doped Technology. Compared with the boron-doped option, PERC cells adopting gallium-doped silicon wafers have improved efficiency and performance in anti-LID and LeTID, reducing investment in process and equipment. LONGi promotes the benefit of gallium-doped wafers to the whole industry, contributing to a reduction in degradation.
- Smart Soldering. LONGi's smart soldering' technology uses integrated segmented ribbons. The triangular section maximizes light capture, while the flat section connects cells with a reduced gap. Smart soldering technology reduces the tensile stress of the cell, enabling higher efficiency, reliability.
- Diamond Wire Cutting of Mono Silicon. In 2015, LONGi took the industry lead in achieving 100% diamond wire cutting of mono silicon, increasing cutting speed by 90% and saving the industry over \$4 billion each year, the monetary equivalent of the annual construction of 5 Beijing Olympic Stadiums and National Aquatic Centers.

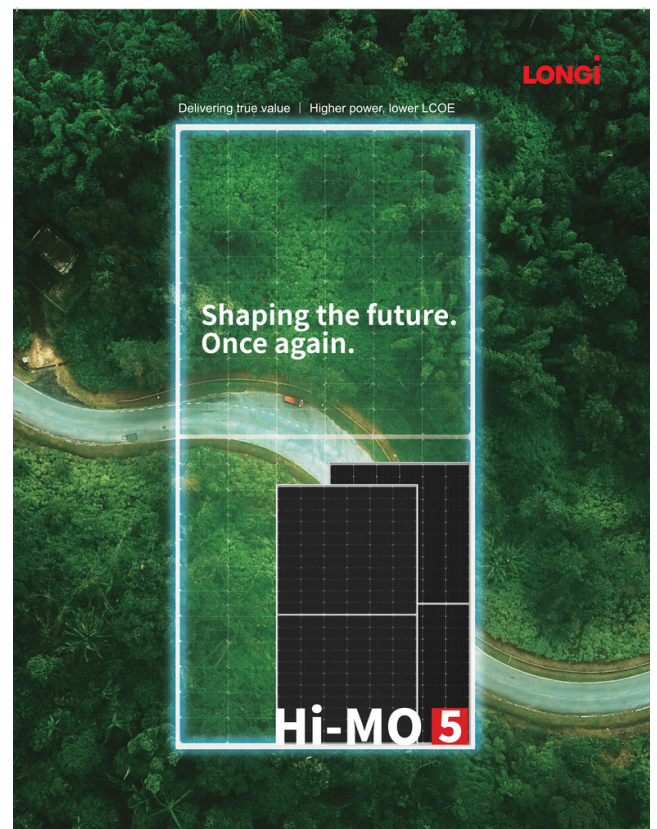
Hi MO5 Series – Mono facial and Bifacial with Power bin from 530 Wp to 545Wp.

In terms of technology innovations, LONGi's technological innovation will quickly be transformed to mass production and be promoted and applied on the consumer side, promoting the continuous reduction of the cost of PV power. From the monocrystalline technology, PERC cell, Bifacial PERC, Half-cut, M6 standard wafer and M10 ultimate size, we all did a great contribution to the PV industry by improving the quality and reliability of solar PV systems. For example, Diamond-wire slicing was introduced into mass production to the PV industry by LONGi, which saved almost 4 billion dollars every year in the PV industry.

It can increase production capacity significantly and also reduce the wafer manufacturing cost. Also, LONGi's bifacial module has been well

accepted by global customers. Until now, over 20GW bifacial modules have been shipped to global customers. Bifacial modules account for 30-40% of the global market share now. A bifacial module can utilize the backside light and generate more power and the double glass structure is more reliable, thus can deliver more value to our customers. We can see this year more and more Indian customers begin to choose bifacial modules. Another key innovation is LONGi's Hi-MO 5 based on M10(182mm) wafer, which also got the 2021 Intersolar award. It is also powerful evidence of technology innovation. Hi-MO5 adopts unique smart soldering technology, which can increase module efficiency by 0.3% and also reduce the stress applied on the cells resulting in better reliability. Over the past few years, we have seen a rapid advancement in technology. I think this trend will continue for the next few years and as the technology improves we will see higher reliability and efficiency.

We are constantly working on new technologies such as P and N-type, mono HIT, BIPV solutions etc – we believe our job is to bring the best product which can be produced on a large scale to satisfy our customer's needs.



PV Diagnostics is a solar-tech consultancy expertising in diagnostics of solar power plants and quality control across the value chain.

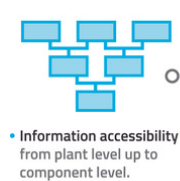
Diagnostics Dashboard

PVD is now integrating plant health check-ups into an online diagnostics dashboard to track the plant's performance. The dashboard is an add-on which represents the on-site testing, their results, observations and our recommendations strategically to benefit site, technical, management and executive teams in drawing meaningful inferences for further planning. This dashboard can be integrated with any existing CMS or monitoring platform.

About PV Diagnostics

PV Diagnostics is a solar-tech consultancy expertising in diagnostics of solar power plants and quality control across the value chain. Starting off as a diagnostics company focussing on performance improvement of solar power plants, we are now working with almost all the major stakeholders in the solar value chain. We have evaluated more than 6 GW of solar assets across the country. We are constantly working towards automation products for plant diagnostics and enabling developers with in-house diagnostics of solar power plants. From a technical standpoint, the target is setting up industry standards for field testing of solar power plants.

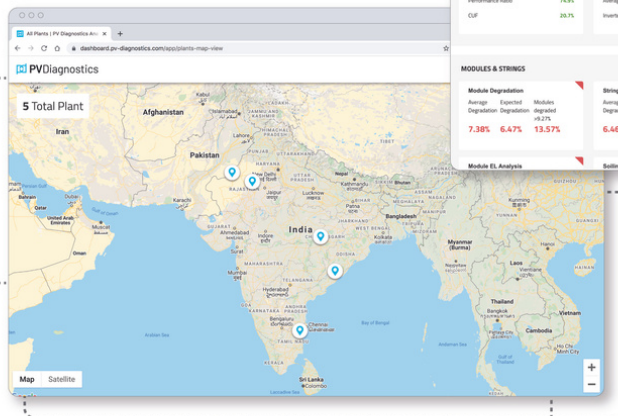
“ WE ARE CONSTANTLY WORKING TOWARDS AUTOMATION PRODUCTS FOR PLANT DIAGNOSTICS AND ENABLING DEVELOPERS WITH IN-HOUSE DIAGNOSTICS OF SOLAR POWER PLANTS. FROM A TECHNICAL STANDPOINT, THE TARGET IS SETTING UP INDUSTRY STANDARDS FOR FIELD TESTING OF SOLAR POWER PLANTS.”



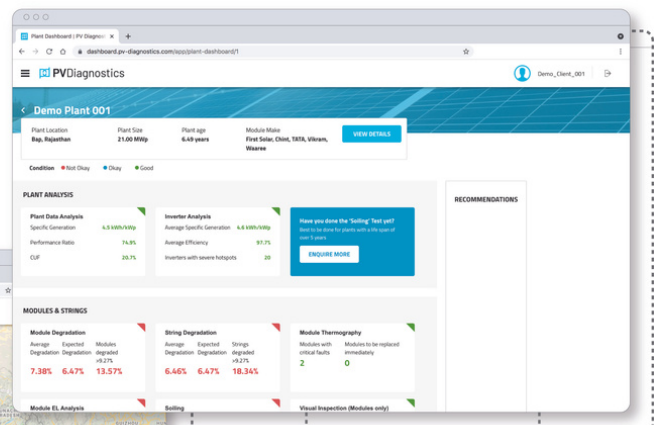
• Information accessibility from plant level up to component level.



• Digital repository for easy access to plant data.



• Seamless integration with any CMS platform.



• Analysis based on ML and physics-based models of data uploaded directly from site.



• Benchmarking and comparison based on different KPIs.

You can book a quick demo of the dashboard – e-mail us at rohit@pv-diagnostics.com or call us at +91 8527531188



You can book a quick demo of the dashboard at rohit@pv-diagnostics.com or call us at +91 85275 31188.

PIXON manifests into solar products and creating quality solutions for the customers

Introduction

PIXON manifests into solar products and creating quality solutions for the customers. The modules radiate excellence through quality and high return. PIXON offers exceptionally productive modules tried in our in-house PV Module Test Lab. The top-notch scope of solar modules is designed in India utilizing European innovation and technology. We essentially produce 5 distinct sorts of Solar modules:-

- Mono-Crystalline PERC Modules.
- Poly-Crystalline Modules
- Poly-Crystalline DCR Modules
- Poly-Crystalline Half-Cut Cell Modules
- Mono-Crystalline PERC Half-Cut Cell Modules.

PIXON also gives turnkey Engineering, Procurement, and Construction Services for the installation activities. They additionally also provide Ground Mounted Solar solutions, Rooftop Solar solutions, and Floating Solar solutions. Lastly, they are also into assembling EVA films. The significant utilization of EVA films is to keep out dampness and different gases.

Featured Products

Mono-Perc Half-Cut cell modules:

PIXON has divulged Mono PERC half-cut-cell modules with yield going from 375Wp to 410 Wp. This module can be utilized in all types of installations like off-grid, residential, commercial and industrial, and utility-scale.

Mono-Perc Half-cut PERC modules offer an efficiency of up to 20.4%. The panel can be utilized in PV frameworks with the greatest voltage of 1,500 V and a working temperature between - 40 degrees Celsius and 85 degrees Celsius. It can withstand a load of snow up to 5,400 Pa and a load of breeze up to 2,400 Pa. Power resilience is +4.99Wp. The solar panel is BIS, IEC, and UL guaranteed. It accompanies a 10-year item guarantee and a 25-year power yield guarantee.



Poly Crystalline PV Module:

PIXON has unveiled Poly Crystalline PV modules with a yield going from 315-340 Wp. This module can be put to good use for the installations of residential, commercial, industrial, off-grid, and utility-based projects.

Poly-crystalline PV module also provides an efficiency of up to 17.43%. These panels can be useful in PV frameworks with a voltage of 1500V DC. These modules also can withstand the snow load of up to 5400 Pa and wind load of up to 2400 Pa. Power resilience is +4.99Wp. The solar module is BIS, IEC guaranteed.

Mono-Crystalline Perc Modules:

PIXON exhibits Mono Crystalline Perc PV Module with a power range of 370-400Wp. The module is ideal for installations at residential, commercial, industrial, utility, and off-grid-based projects.

Mono-crystalline Perc PV module also has an efficiency of up to 20.16%. The maximum system voltage of this module is 1500 V DC. The withstand capacity of snow load is 5400 Pa. and for wind, the load is 2400 Pa. Power resilience is +4.99Wp. These modules are BIS and IEC certified.

Poly-Crystalline DCR Modules:

PIXON unfolds a Poly- Crystalline DCR module along with the power range of 305-335Wp. This module is considered suitable for the installations projects like residential, commercial, industrial, and utility-based, and off-grid.

Poly-Crystalline DCR module range in efficiency up to 16.90%. The highest system voltage is 1500 V DC. It can withstand the snow load up to 5400 Pa. and wind load up to Pa. Power Tolerance is +4.99Wp. The modules are BIS and IEC guaranteed.

Poly-Crystalline Half-Cut Cell Module:

PIXON imparts Poly-Crystalline Half-Cut Cell Module with the module power range of 325-360WP. This module is efficient enough for many installations projects such as residential, industrial, commercial, utility-based, and off-grid.

Poly- Crystalline half-Cut Cell Modules have an efficiency of up to 18.30%. The maximum system voltage is considered to be 1500 V DC. The withstand capacity for the snow load ranges up to 5400 Pa. and wind load up to 2400 Pa. Power Tolerance is +4.99Wp. The modules are BIS and IEC guaranteed.

“ PIXON OFFERS EXCEPTIONALLY PRODUCTIVE MODULES TRIED IN OUR IN-HOUSE PV MODULE TEST LAB. THE TOP-NOTCH SCOPE OF SOLAR MODULES IS DESIGNED IN INDIA UTILIZING EUROPEAN INNOVATION AND TECHNOLOGY.”

RP INFRA SERVICES- A SERVICE OVERVIEW

Our USP:

RPIS provides customized resources based on the project’s needs and requirements. We ensure that the candidates are well experienced /trained based on the client’s needs, we also suggest ideal candidates and offer tailor-made solutions that make our clients happy.

Featured Service:

All of our resources are multifaceted and come with years of commended performance. The project completion rate of our consultants is 97%, 3% is attributed to unforeseen situations like project shutdown, health issues, relocation, etc. We appreciate the experience that our candidates bring from various industries and we like to leverage it for the mutual benefit of both clients and candidates. We specialize in Civil Construction, Solar Projects, Retail, and Startup hiring.

Our Services-A Brief

RP Infra Services provides top consulting talent quickly and at no additional cost. We take care of all the hassles like pf, payroll, taxes, time tracking, and workman compensation policy. Each candidate of ours is well screened and referenced for our client’s satisfaction.

Full-time employees

We provide the best possible talent for your full-time hiring needs without leaving your pockets empty. We beat all the competition fees and guarantee the best talent.

Temp-to-permanent hires

You need to fill a role but before that, you want to be doubly sure that it’s the right fit. No problem at all, we provide temp-to-hire resources

who can work for you on a short-term contract. If everything goes well they can be hired as a full-time resource.

Consulting services

Whether it’s building attractive websites, designing business cards, company swag, stationery, or some market research project that needs to be done, our freelancers can get it done for you.

All candidates have Rich exposure in Solar Ground Mount Projects/ Rooftop Projects.

What We Have

- Industry Experience
- Experienced/Hands-on people strength
- Robust training and talent acquisition
- Classroom & On-ground training
- Interactive Approach
- Fulfilled Regulatory Compliances
- Domain-based talent basket
- Training Infrastructure & eminent learning faculty
- Global Reach
- Resource gap analysis & OPEX

What We Offer

- Project Resource Curve Compatibility
- Resource Surge/Peak assistance
- Resource Levelling
- Cost-Effective Solution
- Best in Class Talent
- Quick Response Time
- Nil Benched Staffing
- Wide Resource Spectrum

Why Us

- Cost-Effective
- Resource Levelling
- Consultative Approach
- Sourcing and Training
- Consistent Service
- Performance Improvement Plan

Targeted/ Benefitted Customer Segment

RPIS serves the renewable industry especially the Solar EPC Companies and has served clients such as L&T, Juniper Green, GameChange Solar, Solar Square, Kanoda Energy and so on.



Asia’s largest

Rewa Ultra Mega Solar Plant

We are proud to be part of executing India’s largest 750 mw ultra mega solar power plant. More than 100 of RP Infra Engineers deployed in this site for execution and Thanks to L&T for giving us this opportunity!

Your trusted Resource partner !



RP INFRA SERVICES PROVIDES TOP CONSULTING TALENT QUICKLY AND AT NO ADDITIONAL COST. WE TAKE CARE OF ALL THE HASSLES LIKE PF, PAYROLL, TAXES, TIME TRACKING, AND WORKMAN COMPENSATION POLICY."

Sineng Electric is one of the few companies who manufactures both central and string inverters for utility projects.

Reliable Inverter Solution Tailored for 1500V PV Plant

3.125MW Central Inverter

Advanced heat exchange technology, no derating up to 50°C

IP65 protection, adaptable to harsh environments

High power density with small footprint, lower LCOE

Max. efficiency 99%, more power generation

EP-3125-HA-UD

Sineng Electric offers a wide range of smart inverter solutions tailored for customers worldwide, committed to a cleaner future for all.

Sineng Electric is a leading global high-tech enterprise specialized in power electronics products covering its business in power generation, power supply, distribution and power utilization. With advanced R&D, manufacturing, marketing, maintenance and service departments, it provides customers with a full range of solar inverters, energy storage systems and power quality control solutions.

Constant innovation and optimization at each level is the only way to exist in the present competitive environment. In recent years, the market has shifted from small block size to 6.5/12.5MW block size and 1000V to 1500V. Presently, our R&D team is working on a higher voltage solution than 1500V for the future. Storage is also going to happen at a big scale in near future. We have been providing DC/AC and DC/DC coupled PCS and integrated solutions in China and the global market.

Sineng Electric is one of the few companies who manufactures both central and string inverters for utility projects. We launched a wide range of string inverters in order to satisfy the growing demands of global customers. Now the company's string inverter technology is already mature and has been extensively adopted by many customers.

Our string inverters are able to turn customers' attention and that's why we have set up production lines for string inverters in India manufacturing base this year. In 2020, we have added a new string model (SP-275K-INH) in our string inverter product line which gives an ease-to-design array with the larger wafer 210 mm high power module.

The maximum current for each string input of this inverter is 20A. On the other side, Sineng is also working to come up with higher capacity compact central inverter solutions in near future.

Central PCS Solution (EH-2.5/3.15/3.45-HA-UD)

- Max. efficiency 99.0%;
- IP65 protection;

- PQ, VF, SVG, VSG and other functions;
- Off-grid operation and black start etc.

String PCS Solution (EH-0200-HA-M)

- Max. 220kW;
- IP66 + C5 protection;
- Pack level management;
- Independent charging and discharging etc.

DC-DC Converter (EH-0182-HA-M)

- Max. 200kW;
- IP66 + C5 protection;
- Pack level management;
- Independent charging and discharging etc.

Battery Container

- Outdoor design;
- Smaller footprint;
- Liquid cooling system;
- Three level BMS protection etc.

As a technology-driven company, Sineng strives to bring innovative solutions that can offer more competitive advantages in the form of more power generation and BOS saving. Sineng has been and will always be holding on to its mission "high quality is low cost", thus coping with the demands of the evolving market.

High Current Inverter Tailored for High Power Modules

275kW String Inverter

12 MPPTs, optimum mismatch loss

Max. string current 20A, compatible with various modules

Higher DC/AC ratio, lower LCOE

Modular design, smart O&M

SP-275K-INH

TRINA SOLAR'S 210MM VERTEX MODULES ACHIEVE EXCELLENT TEST RESULTS IN THE PVEL PRODUCT QUALIFICATION PROGRAM

At the BloombergNEF Summit held in early December, PV Evolution Labs (PVEL), a world-renowned third-party reliability testing laboratory, shared excellent reliability and performance test results for Trina Solar's 210mm Vertex modules. The selection of ultra-high power Vertex modules that were evaluated by PVEL represent specific bills of materials (BOMs) that were independently witnessed during production. In particular, the tested BOMs showed superior performance in PVEL's Mechanical Stress Sequence (MSS) and Thermal Cycling 600 (TC600) tests, which directly relate to the changes in module sizes. Testing did not produce micro-cracks in the 550W and 670W dual-glass BOMs evaluated by PVEL. The power degradation rates after testing was less than 2%, which meets the Top Performer criteria defined by PVEL for its 2021 PV Module Reliability Scorecard.

PVEL-PQP conducts more stringent test over Trina's Vertex

PVEL is the world's leading PV module reliability testing laboratory, which provides independent performance data for solar project developers, financiers, and asset owners and operators around the world. In 2012, PVEL launched the PQP for stringent testing of PV modules on reliability & quality parameters, that are significantly more rigorous than the IEC standards. All BOMs submitted to PQP for tests must undergo inspection during production and be sealed by PVEL auditors at the factory to ensure that the test results objectively reflect the level of mass-produced modules with the same BOM. With over ten years of experience and accumulated data, PVEL conducts testing as a key reference for a brand's bankability level, enabling efficient solar project development and financing.



TRINA SOLAR'S VERTEX ULTRA-HIGH-POWER MODULES OF LARGER FORMATS MAINTAIN EXCELLENT MECHANICAL LOAD PERFORMANCE AGAINST MICRO-CRACK."

MSS test: No micro-cracks occurred in ultra-high power Vertex modules!

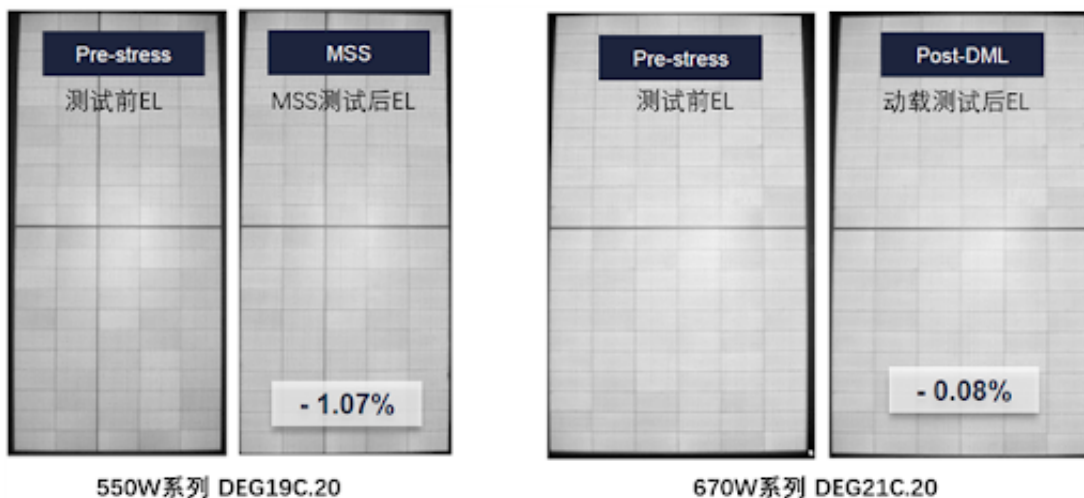
When PV modules are exposed to mechanical loads in the field such as heavy snow or forces caused by strong winds, hail, etc., their components will be pressed and break as a result, which may cause a number of degradation issues that reduce module performance.

PVEL's Mechanical Stress Sequence (MSS) simulates this process. MSS combines tests for static mechanical load (SML), dynamic mechanical load (DML), thermal cycling (TC) and humidity freeze (HF). It is one of the most stringent PQP sequences and PVEL has multiple examples of modules breaking during the test.



Mechanical Stress Sequence (MSS)

Test results demonstrate no micro-cracks occurred in the BOMs tested for Trina Solar's 210mm Vertex dual-glass 550W modules, and the power degradation was only 1.07%. As for the 670W dual-glass module BOM, the SML and DML testing phases have been completed and the interim data again show that the modules have excellent performance, with no micro-cracks and close to zero (-0.08%) power degradation. Trina Solar's Vertex ultra-high-power modules of larger formats maintain excellent mechanical load performance against micro-crack.



A comparison of EL before and after MSS



URON ENERGY DOES IT AGAIN - INSTALLS INDIA'S LARGEST SOLAR ROOFTOP BIFACIAL PLANT ON AN INDUSTRIAL ROOF !



In its Third year from the inception, URON energy has been keeping the goals simple - build a project that lasts a lifetime & set quality benchmark that will be Owner's pride & Neighbors Envy"

One of their recently commissioned projects has a lot to offer as a "First" for not just URON but for India as well.

The project is one of the first & the Largest Solar PV Bifacial Plant installed on an Industrial Roof & one of the first of its kind in the state of Madhya Pradesh. Chosen from an exhaustive list of crème de la crème EPCs, URON not only delivered more than the commitment but the project is one of the most successful & marquee ones that will speak for itself.

Set amidst the Covid 19 lockdowns & multiple challenges on module availability & transportation issues, the project kept going & was executed well within the timelines thanks to URON Energy project team.

The project envisages itself as highest generating project in Central India as a Solar Rooftop PV project on Industrial shade & complies to the Stringent UL Certification for IEC 62446. Undoubtedly, a project that speaks about great workmanship & adherence to stringent Quality Assurance, Material Quality Plans & Standard Operating Procedures.

URON Energy takes pride on how the project became an instant success after its commissioning as it followed the same success pattern as the Client for whom the project is set up. Mr.Urvish Dave stated, " Our client is one of India's Leading Snack food Manufacturer whose success in the food Industry has been a phenomenal one. A Tough competitor for multinational companies in this segment, their aim has always been to improve quality & hygiene

to provide a quality snacking experience across all age groups. Our client is technology agnostic & we ensured we deliver them with the latest technology adoption that creates not just unique value but sets a quality benchmark in terms of highest generation & higher savings as well."

The module mounting system and provision for this plant is extremely unique the material and equipment's adhering and certified to UL, IEC, ASCE, EN, TUV and CE. The plant complies with the Fire, pressure and hazard tested mounting systems complying with the UL2703 and UL1703 standards.

The project is not only the largest but is the only project in India to deploy third generation MLPE technology that houses the latest optimisers for individual & highest capacity solar modules currently available in India.

One of the biggest features for the plant is the hassle-free O&M thanks to Cutting edge technology Robots which not only saves water but makes the entire plant very smart and efficient in generating & producing the green electrons.

