Case Study

Remote Monitoring and Maintenance Give Taiwan-based EPC the Edge for 3-Roof Solar System

The Challenge

P&D Polyester Industrial Company Ltd is a Taiwan-based manufacturer of plastic materials. Located in the Tongluo Industrial Area in Miaoli County, the P&D factory is used both for production and storage. In 2020, the company decided to capitalize on its unused rooftop space and came to a monthly rental agreement with Rongfa Solar Enterprise under which Rongfa would install a 499.8kW PV system on the roof and own it for 20 years. The clean electricity would be sold to the local utility company, Tai-Power, generating steady revenue for the 20 year time period.

In addition to the monthly rent, having PV modules on the roof would decrease the factory's indoor temperature, further helping P&D save on its electricity bills.

Solar Diamond Technology Corp, an EPC based in Miaoli County which owns Rongfa Solar Enterprise, was looking for a solar energy solution that could help them meet the roof's design challenges. The factory has three buildings, and the rooftops are complex with different heights, facets and angles. It would be extremely difficult to design a PV system to meets these challenges using a traditional string inverter topology.

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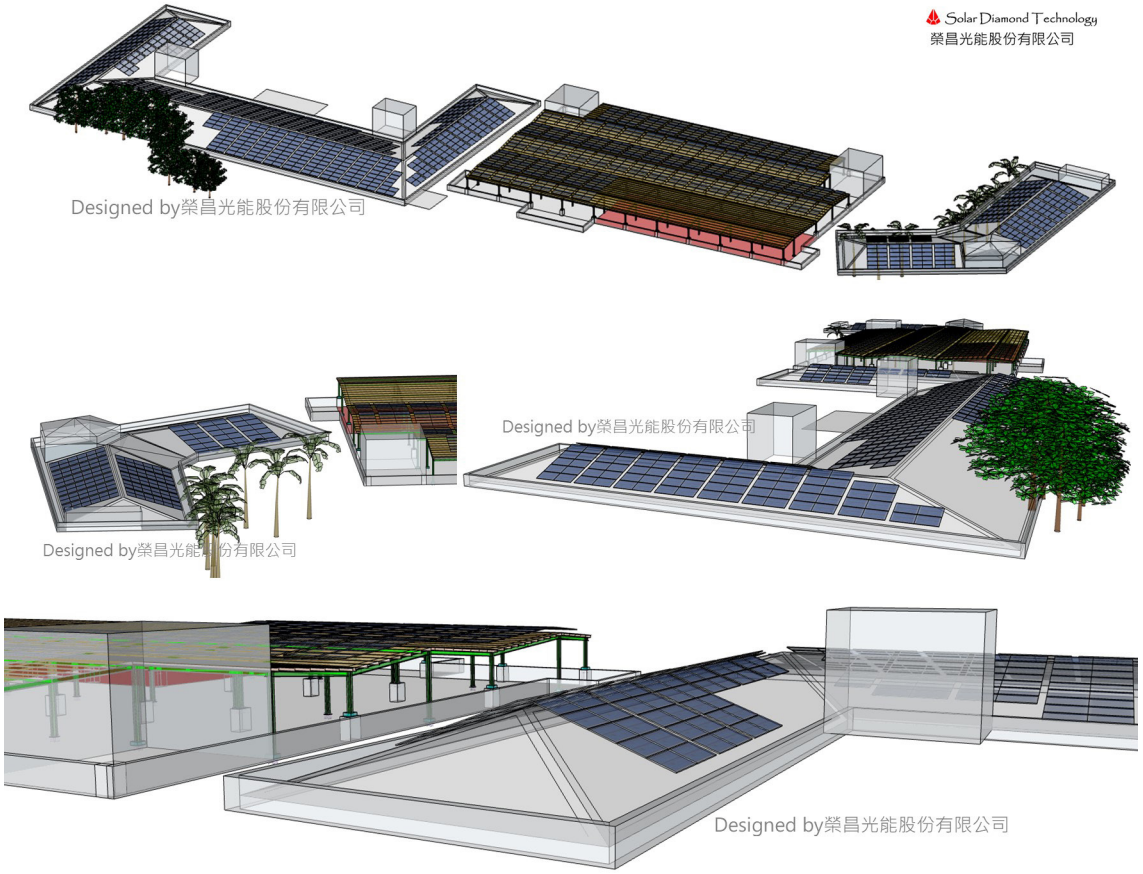

3D system modeling designed by Solar Diamond, which shows complex roofs of the factory.

Solar Diamond was also interested in decreasing their long-term O&M costs and streamlining the O&M process, as they were required to generate a monthly performance report for Rongfa.

The Solution

After evaluating traditional PV systems, Solar Diamond decided on a DC-optimized smart energy solution from SolarEdge. This included Three Phase Inverters with Synergy Technology, Power Optimizers attached to every module, and a module-level Monitoring Platform.

MPPT Means More Energy Regardless of Roof Design or Module Mismatch

The SolarEdge system uses Maximum Power Point Tracking (MPPT) to overcome roof design limitations. Unique Power Optimizers are attached to every module, applying MPPT algorithms to adjust voltage and current in order to optimize system performance, regardless of roof shading or angle. In a traditional PV system, one underperforming solar PV module will reduce the performance of every other module in the same string. In the SolarEdge system with MPPT, each pair of modules operates independently - any underperformance of a single unit does not impact the efficiency of the other modules.

Also, with SolarEdge, there is less chance that system PID (Potential Induced Degradation) occurs as the voltage running through the module is less than 100V to ensure stable system performance. With traditional string inverters, string voltage can reach 1000V or even 1500V which can cause PID.

Modules connected to SolarEdge Power Optimizers enable much greater design flexibility when it comes to laying out the roof space. In a traditional, non-optimized solution, module placement is limited by the need for equal string lengths, as well as maintaining the same azimuth and tilt of each module. In the SolarEdge system, no such restrictions apply, allowing the layout of the modules to adapt optimally to the roof shape and design, resulting in more modules, more power and better ROI.

Superior Safety for Assets, Workers and First Responders

PV systems are in essence small power plants and can pose safety risks to those who install and maintain them. Fires in commercial buildings where PV systems are installed generally do not originate from the PV system itself. However, according to the fire extinguishing principles of Taiwan's National Fire Agency, firefighters are not recommended to extinguish fires with water if the building has a PV system due to the risk of electrocution. Instead, firefighters are directed to either use foam, cut the DC wires (potentially dangerous) and then use water, or simply let the facility burn until it extinguishes itself which may result in property damage and financial losses.

Because the factory is producing and storing flammable plastic materials using high value machinery, safety is a prime concern for P&D Polyester. Also, representatives from Solar Diamond are required to make routine site visits and perform O&M when needed so working in a safe environment is equally important to them.

The SolarEdge system employs a series of advanced, built-in safety features which make it a good choice for Taiwan installations. SolarEdge's integrated SafeDC is designed to automatically power down the solar array to a touch-safe 1V whenever the inverter or grid is shutdown, protecting the companys' assets as well installers, maintenance staff, and firefighters. The most common cause of PV system fire is arcing; SolarEdge systems include arc fault detection and interruption to mitigate the effects of arcing faults that may pose a fire risk.

How Do You Monitor and Manage 1,538 Modules?

System performance down to the module level is tracked and viewed using the web-based Monitoring Platform. SolarEdge module-level monitoring facilitates O&M by enabling Solar Diamond to identify, pinpoint and troubleshoot issues remotely, often eliminating the need for site visits. This is especially critical for complex rooftops with large numbers of modules - in this case 1,538. When detecting a malfunction or module issue related to soiling, breakage, or a system part not working properly, a system alert is sent to Solar Diamond via email. All alerts are displayed on the same screen with detailed troubleshooting tips and are prioritized based on the level of system impact which can help Solar Diamond decide the urgency of each fault to further simplify the O&M process.

Data provided by the Monitoring Platform includes Inverter output, Power Optimizer voltage, current to module voltage, interactive performance charts, the system site layout, and more.

SolarEdge monitoring system can show system performance data at module level. The color of the module indicates the performance.

SolarEdge's intuitive Monitoring Platform can show voltage data for each module.

Commissioning with Confidence with Synergy

To ensure a seamless installation process, SolarEdge provides full training for its Three Phase Inverter with Synergy Technology. This includes system design overview, Power Optimizer and Inverter installation, and commissioning.

The Inverter's lightweight, modular design allows for easy installation and maintenance. Each unit works independently so if one unit should fail, it would not impact the whole system performance. SolarEdge's Setapp enables fast and easier site commissioning that allows the EPC or Installer to activate and configure the Inverter through their smart phone, saving them considerable time.

Installation at a Glance

- Installation Time: 2020 November
- System Capacity: 499.8kW
- PV Module: GinTung GTEC-325G6S6A *1538
- PV Inverter: SE82.8K*4; SE27.6K*2
- Power Optimizer: P650*769
- Distributor: New Ray Solar Tech Co., Ltd

New Ray Solar Tech Co ., Ltd .

"The SolarEdge system is a Win-Win for both the system owner and the EPC! SolarEdge has a well deserved reputation for exceptional energy and safety. Moreover, SolarEdge's complete approach to Monitoring enables Solar Diamond to run routine system management remotely, including a system checkup. Issues are solved efficiently and precisely with the Monitoring Platform which shows us system performance and power generation efficiency at the system, string, and module level."

Hsien-Chih Kao, CEO of Solar Diamond

Solar Diamond Technology
榮昌光能股份有限公司

The Bottom Line

Taiwan is on its way to becoming a regional renewable energy hub. The Taiwanese government offers attractive FiT incentives for commercial solar installations, depending on system size, location and other factors, and has set a national target of 25% energy supply from renewables by 2025.

Companies such as P&D Polyester Industrial Company Ltd, Solar Diamond Technology Corp, and Ronfa Energy all benefit from the country's clean energy-friendly economic policies together with the superior efficiency, safety and visibility of the SolarEdge smart energy system.

About SolarEdge

SolarEdge is a global leader in smart energy, delivering innovative commercial and residential solutions that power our lives and drive future progress. Leveraging world-class engineering and worldwide experience, SolarEdge developed a ground-breaking intelligent inverter solution that changed the way power is harvested and managed in photovoltaic (PV) systems. As a result of this and other innovations, today SolarEdge is the world's #1 solar inverter company in revenue with millions of systems installed in 133 countries. SolarEdge addresses a broad range of smart energy market segments through its PV, storage, EV charging, battery, UPS, and grid service solutions.

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