

Renewable Energy from SolarEdge Helps Toyota Drive CO₂ Reduction Program

Multi-roof solar energy system in Thailand contributing toward a more sustainable future

The Challenge

Introduced in October 2015, the Toyota Environmental Challenge 2050 aims to help achieve a sustainable society by reducing emissions to zero for vehicles, production and more by 2050. The plan's stated Challenge #3 seeks zero CO₂ emissions in the vehicle design and manufacturing process.

Solar energy is highlighted as one of the key renewable energy sources that can make this happen. To help meet the company's sustainability goals, Toyota Daihatsu Engineering & Manufacturing Co., Ltd, the Toyota Research & Development center and regional headquarters for Asia Pacific, based in Thailand, elected to power its eight building complex with solar energy.

More and more companies in Thailand and all over the world are moving to on-grid PV systems to achieve self-consumption, driven by corporate and government emissions reduction programs.

The Solution

Dedicated teams from Toyota defined three primary goals for the new PV systems: 1) outstanding safety standards, 2) harvest the extract maximum amount of energy possible, and 3) quick and easy O&M.

Various PV system technologies were evaluated according to these and other criteria by Toyota. Discussions with SolarEdge's local distributor in Thailand, Solomon Technology, convinced the teams from Toyota that a SolarEdge DC optimized inverter system was the optimal choice. Solomon worked with leading EPC, Gunkul, to map out the system which would span eight roofs and have a capacity of 3.4MW.

As a DC optimized system, SolarEdge delivers higher power output for Toyota compared to a system based on traditional string inverters. The PV modules are connected to SolarEdge power optimizers, turning them into smart modules. With SolarEdge's maximum power point tracking (MPPT) technology, each module produces at its maximum energy capacity - regardless of the performance of the other modules in the string. This eliminates mismatch-related power losses and increases the amount of energy produced by the entire system. Also, with SolarEdge, module strings can be longer which can reduce the total amount of strings, inverters and cabling required - reducing BoS costs.



Monitoring and Managing More Than 9600 Modules Over 8 Roofs with One Screen

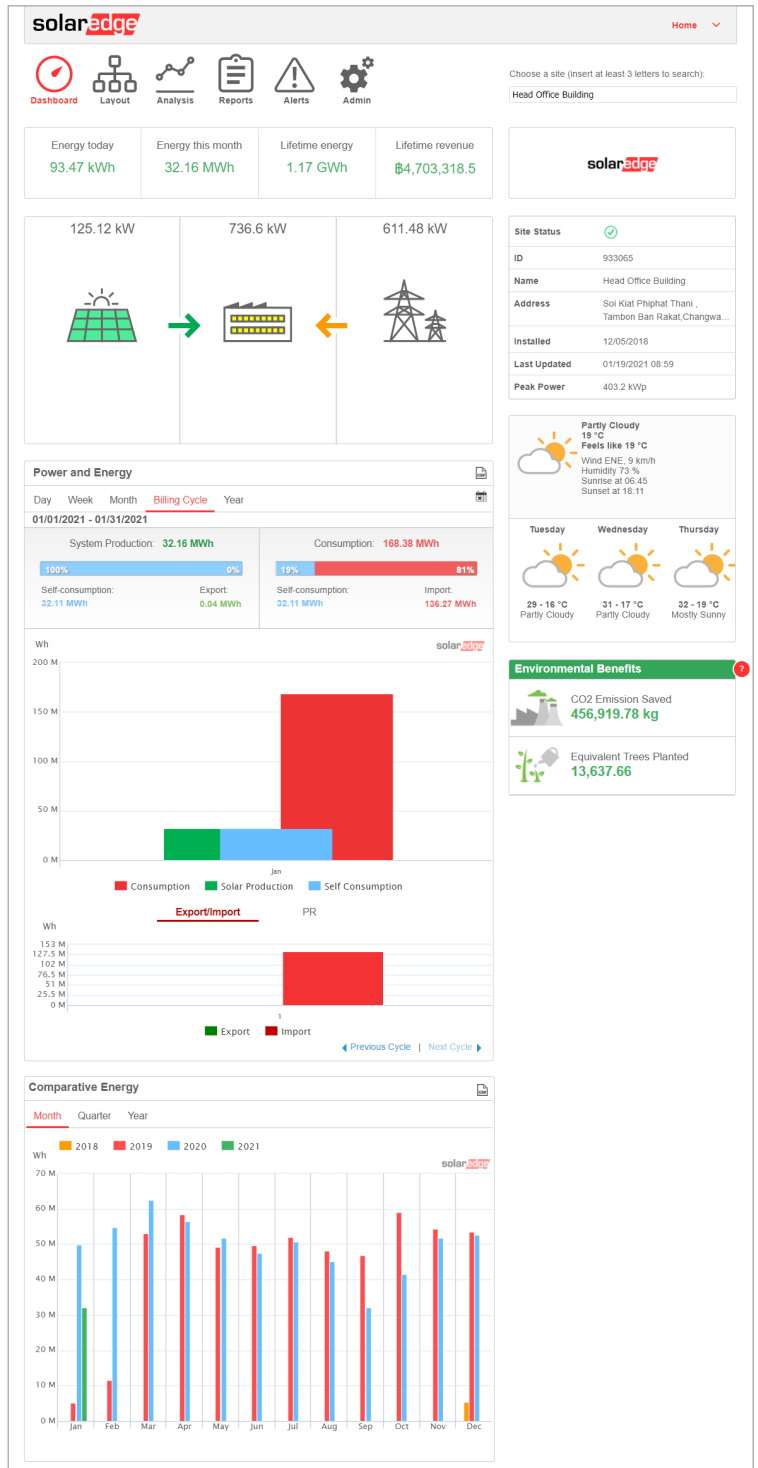
With the SolarEdge system, Toyota always knows how much energy it is saving and how this translates to reduced CO₂ emissions. SolarEdge module-level monitoring, enabled by the system's power optimizers, sends real-time data to the SolarEdge monitoring platform, providing both Toyota and Gunkul with PV system production and consumption data - as well as grid-import data - viewable from a mobile device or PC. This includes comprehensive analytics tracking and reports of energy yield, system uptime, performance ratio, and financial performance.

Crucial to a PV system spread out over many roofs with more than 9,600 modules is the ability to easily perform Operation and Maintenance (O&M). SolarEdge module-level monitoring can detect system faults with pinpoint accuracy and create automatic alerts for remote troubleshooting to minimize the need for onsite visits from the O&M provider. Without this unique capability, identifying possibly faulty modules would typically require flying a UAV equipped with a thermographic camera over the rooftops, or using a technician with a voltmeter to go through the system module by module.

Enhanced, Integrated PV Safety for People and Assets

System safety was another key reason SolarEdge was chosen for the installation. Leveraging the power optimizers connected to the modules, SolarEdge's SafeDC™ feature reduces DC voltage across the system to a safe 1 volt level when AC power is shut down. This is important for installation, maintenance and in the unlikely event of fire, enabling firefighters to work on the roof without fear of electrocution. Embedded arc fault detection, another SolarEdge safety advantage, provides the ability to detect and terminate specified arcs to further reduce the risk of fire and ensure secure operation.

Teepawat Chandavimol, Energy Business Director for Solomon, Thailand said "Toyota Daihatsu Engineering & Manufacturing (TDEM) is a prototype of a green factory for Toyota R&D in Asia. When our customers understand the technology of SolarEdge which is different from traditional inverters, they fully appreciate the system's module level monitoring, enhanced safety features and lower O&M costs."



SolarEdge monitoring platform data for Head Office Building Site





Installation at a Glance

- System type: Commercial rooftop, on-grid system for self-consumption
 - Installation capacity: 3.4MW
 - **SolarEdge products used:**
 - Power optimizers: 4,848
 - Inverters: 101x27.6kW three phase inverters
 - PV modules: Canadian Solar Inc CS3U-350P in TDEM project site = 9,696
- Accessories
- Commercial gateway (CCG) SE1000-CCG-G-S1, 8 total

The Bottom Line

Forward-thinking corporations and governments are setting renewable energy goals for self-consumption to mitigate the impact of climate change. The multiple rooftop SolarEdge system at Toyota Daihatsu Engineering & Manufacturing Co, Ltd. is a perfect example of this commitment to creating a more sustainable future. It is generating 3.4MW, a significant part of the company's energy needs in Thailand.

This clean smart energy solution will help the company contribute towards "a society where people, cars, and nature can coexist in harmony" as stated in the Toyota Environmental Challenge 2050.

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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