Thailand is in the middle of a solar explosion, in migrating away from diminishing reserves of natural gas the country is committed to generating 20% of its electricity from renewables by 2021. That ambitious target will be met with a combined effort of biomass, hydroelectric, and solar power, and of course with the help of RTUs from ABB.

ABB has been active in the power sector of Thailand for more than a century, and manufacturers Power Transformers locally. Thus we’re generating local employment and have a close relationship with our customers. So it isn’t surprising to see ABB equipment being installed in generating stations across the country, and ABB RTUs managing the power delivery in so many of them.

Solar is already an important source of energy in Thailand: in 2014 the country had enough capacity to deliver 1,300MW of solar energy, but in 2015 that’s on track to double as the country plans investments worth more than $20bn. The plan is to get solar generation up to 6,000MW by 2036, making extensive use of ground-breaking, thin-film, photovoltaic panels to harness the 5kW/h of sunlight that falls on the ground every day.

Even the best solar panels can’t harvest all that energy, but as the technology improves the Thai government is committed to making the best use of what’s available. Solar panels on homes and commercial buildings will contribute, creating local micro-generation which feeds into the grid, but the vast majority of solar energy will come from expansive farms generating large quantities of power which has to be gathered, transformed, and transmitted, before it can be used.

Such sites present unique challenges for management and monitoring equipment. The pure scale of a solar farm can prove a challenge to companies more familiar with fitting out coal or oil stations. Networking critical communications across 2.7 square kilometers, as ABB recently had to do for a solar plant in Thailand, requires particular skills and experience, and the right equipment to keep everything operating smoothly.

Being a market leader in harnessing solar energy, having installed 66 full power plants across 14 countries, delivering 1.2GW of energy, ABB provides the full range of electrical components for connecting photovoltaic panels to the grid, from low-voltage inverters to high-capacity batteries for when the sun isn’t shining, and Remote Terminal Units (RTUs) for managing the infrastructure once it’s been deployed.

ABB’s RTU540 provides a compact and powerful solution, with integrated I/O modules increasing flexibility while reducing costs. ABB’s RTU easy to
use engineering software means configuration takes only minutes, including direct measurement of voltage and current, and additional informational feeds from around the site. This was essential for the Thai installation, which had to be completed in 70 days and involved 29 RTUs linked to an ABB MicroSCADA Pro installation, monitoring environmental as well as operational parameters. Environmental monitoring is particularly important to solar stations, where the amount of sunlight falling on the panel must be optimized for efficient generation, while weather predictions are integrated into the short-term planning. ABB RTUs take analog data feeds from sensors around the site, aggregating the data for transmission back to the management system over industry-standard TCP/IP connections.

The work of the RTUs isn’t limited to watching the sunlight and alerting management systems of forthcoming cloud cover – a solar power plant is still a power plant and shares many management tasks with traditional energy sources. Photovoltaic cells create DC power, which is fed into inverters ready to be stepped up for efficient transmission. The inverters at the Thai site output 400V of 3-Phase AC, which is then aggregated and sent into the transformers to be pushed up to 22kV and sent off site. All of which has to be monitored and managed, though dispersed RTUs around the site, making use of robust IEC 61850 communications to ensure reliable management.

ABB RTUs are already being used in solar plants around the world, and that field experience is invaluable in understanding the challenges unique to managing a substation drawing its power from the sun.

The physical size of the installation, and the rapid changes in generated power, all require expertise at which ABB excels. RTU540 has proven its ability to effectively manage solar plants, and will do so in Thailand just as it is doing all over the world.