

On-Grid Solar Deployments: Three Issues to Consider

INDUSTRY BRIEF



By installing a simple, end-to-end IoT solution, you can manage the largest solar grids in the world, even with thousands of individual devices connected to your network, regardless of carrier, cellular protocol, or device location. The key will be collecting and analyzing data to improve the entire solar energy delivery system.

The sun is providing the fastest-growing renewable energy source in the world, increasing global capacity by an average of 40 percent each year. Add to that the fact that it also is the most energy-efficient source of renewable energy available. This growth is not limited to any one country or any one continent. For example, in Africa, the renewable energy market is set to explode, with solar growing at 19% per year. This type of growth is typical across the globe. The task, now, is to feed it and watch it grow. And that will be done with the IoT and the volumes of data produced.

Today, solar companies are moving into a new realm—analyzing data to improve the entire solar energy delivery system. Key to this is reliable, always-on cellular connectivity, fully integrated into an IoT solar solution that enables total grid management—from initial deployment through end-of-life device management.

On-grid solar systems, also known as grid-tiered or solar photovoltaic (PV) systems, generate power only when the utility power grid is available. They must connect to the grid to function but do not require any battery or energy storage. These systems can send excessgenerated power back to the grid so that home or business owners can gain energy credits for later use in the form of feed-in-tariffs (FiT). On-grid systems commercial and residential—are, by far, the most common and widely used solar energy systems (as opposed to off-grid systems).

Implementing an IoT solution can alleviate many of the challenges associated with solar panel management and energy output. But in spite of the many costsaving advantages, IoT solar power management can be an uphill climb even for experienced energy companies. Aside from the mass of connected panels, solar farms tend to be spread out, many times in remote locations.

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Other issues to consider include:



The need for reliable, always-on connectivity



Connecting solar panels to the grid and ensuring functionality of each



Software, and the ability to update it over the air



Supply chain considerations for SIMs, panels, modules



Modules, gateways, and platforms need to be in synchronicity

Security (system, data, energy)

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Remote diagnosis and maintenance



The greater the volume, the potential for vulnerabilities increase

Data analysis to define connectivity metrics

Covering all these aspects of a connected solar installation is beyond the scope of this paper. We will, however, look at three key areas of an on-grid solar deployment: its interplay with cellular connectivity, and how loT can be a transformative power for long-term growth for this sector; SIM supply chain management; and how loT can be used to dramatically cut maintenance costs across the entire solar deployment.

Solar + Cellular: Good Working Partners for Scaling

If you have vast arrays of solar panel installations, or have small deployments but plan on growth, cellular networks hold the key to scaling up solar energy use. Grid oversight, including installation and individual device functionality and maintenance, could mean the difference between monetary success and a losing proposition. The use of cellular connectivity in a solar energy array enables 2G, 3G, low power wide area (LPWA) networks, as well as other LTE protocols, to be used for faster, more reliable connections with low power requirements.

On the other hand, the use of Wi-Fi with on-grid solar systems slows

down scaling processes considerably because solar-specific engineers are required to set up the device and connect it to Wi-Fi. Then, these engineers have to spend additional time inputting Wi-Fi passwords and SSID codes during installation. Imagine you have 10,000 solar panels. How long would that take?

Using cellular networks removes many of these issues because a SIM card can be installed during the manufacturing process and it does not require a complicated set-up process. And with Aeris, this applies locally, regionally, or globally—regardless of carrier, location, or number of devices.

Many solar panel systems rely on constant monitoring of devices, their performance, operational efficiency, and the amount of energy each panel is generating. The key to scalability with on-grid solar solutions, however, is ease of installation—how many panels can you install in a day, in a week, or month—as well as how many you can track and maintain in good working order for the long term.

As the use of on-grid systems continues to expand, companies will move away from Wi-Fi to the more efficient cellular connections, especially with some of the newer, lower cost connectivity options.

Simplifying the SIM Supply Chain for Speed and Efficiencies

The use of on-grid solar systems is expected to boom in the coming years, but this only can happen if solar energy providers with global ambitions can simplify their supply chains. Because of the ubiquitous use of cell phones, many people believe that a SIM card is a SIM card is a SIM card, with no discernable difference between any of them. Solar operators work from a better understanding of the variations of SIM cards and the differing installation processes and functionality they can possess.

Creating and installing on-grid solar systems can be a long and complex procedure. If companies need to install SIM cards with cellular connectivity on each panel at differing locations, engineers might have to deal with installing local settings on the SIM at that point. However, if a carrier-agnostic SIM card is preprovisioned and used, (ready-to-use no matter where in the world they are deployed), businesses can simplify the entire implementation process while saving significant time and money on provisioning, deployment, and manpower needs.



Lowering Maintenance Costs with IoT: Remote Diagnostic and Maintenance



Things have a bad habit of breaking down if not properly maintained. Each year, energy companies spend billions on solar installation maintenance. But there is good news. Solar array maintenance costs are at their lowest point yet, making large-scale solar projects more economically competitive than ever. Recent studies have shown operations and maintenance costs on solar arrays have dropped from about \$20 per kilowatt (kW) per year to around \$7.50 per kW per year.

One of the main reasons for this downward trend in maintenance costs is the result of more companies using the Internet of Things to monitor their devices. Nearly eighty percent of manufacturers surveyed said predictive maintenance was their No. 1 reason for adopting IoT, and enterprises in all industries said maintenance via IoT offered the best opportunities for growth. Predictive and performance monitoring of devices allows companies to quickly identify any issues and then send an engineer to fix the problem panel(s) before it escalates into a serious money drain.

Summary

The Internet of Things is allowing solar companies to better understand their energy deployments, as in having granular oversights on solar arrays and to better manage costs. By installing a simple, end-to-end IoT solution, you can manage the largest solar grids in the world, even with thousands of individual devices connected to your network, regardless of carrier, cellular protocol, or device location.

For more information on these and some of the other issues facing the solar sector, contact Aeris today.

ABOUT AERIS:

Aeris is a technology partner with a proven history of helping companies unlock value through IoT. For more than a decade, we've powered critical projects for some of the most demanding customers of IoT services today. We strive to fundamentally improve their businesses by dramatically reducing costs, accelerating time-to-market, and enabling new revenue streams. Built from the ground up for IoT and road tested at scale, Aeris IoT Services are based on the broadest technology stack in the industry, spanning connectivity up to vertical solutions. As veterans of the industry, we know that implementing an IoT solution can be complex, and we pride ourselves on making it simpler. Visit www.aeris.com/india or follow us on Twitter @AerisM2M to learn how we can inspire you to create new business models and to participate in the revolution of the Internet of Things.

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