

Is your array producing to expectations?



Traditional photovoltaic solar (PV) installations can be limited in their power output due to inefficiencies in power-point tracking technology, module mismatch and lack of visibility into individual system components. Rooftop PV systems are also affected by system degradation over time, rapidly changing light or temperature conditions, clouds and by partial shading from HVAC enclosures, vent pipes or other obstructions. Current methods of module wiring do not allow for complete deactivation of the array for maintenance or fire hazard.

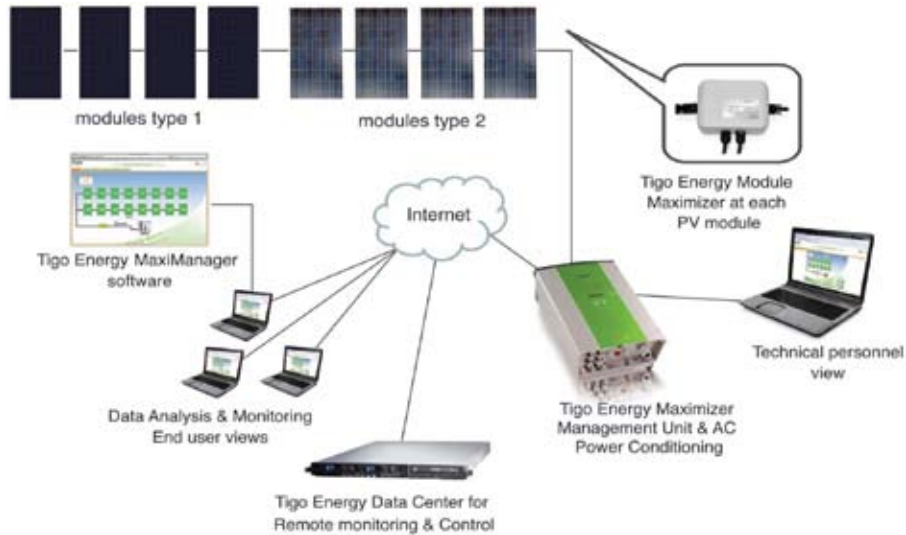
TIGO EnergyTM Maximizer System Benefits:

- **accelerate system payback without increasing the initial system cost;**
- **maximize the power output of individual modules in any environment;**
- **reconsider previously unfavorable projects rejected because of shade or orientation;**
- **maintain best-in-class conversion efficiency;**
- **manage the system with module-level data to minimize operational costs and keep the system at peak performance throughout its lifetime;**
- **introduce an unprecedented level of safety for new and existing PV solar installations;**
- **simplify the balance-of-system design, especially for high Voc or thin-film modules.**



Complete System Solution – maximize system architecture

The Tigo Energy Maximizer System (patent pending) is designed to optimize system architecture in order to take advantage of the highest efficiency modules (solar panels) and inverters available today. The unique isolation bus allows for panels to be replaced with any available technology – no need to match and stockpile specific part numbers. Combinations of modules and inverters previously unavailable are now possible – no need to be limited to specific string sizes, allowing for more flexibility in placement on residential and commercial rooftops. Existing systems may be retrofitted with the Tigo Energy Maximizer solution without modification to the existing wiring or inverter.



Improved IRR through increased power output

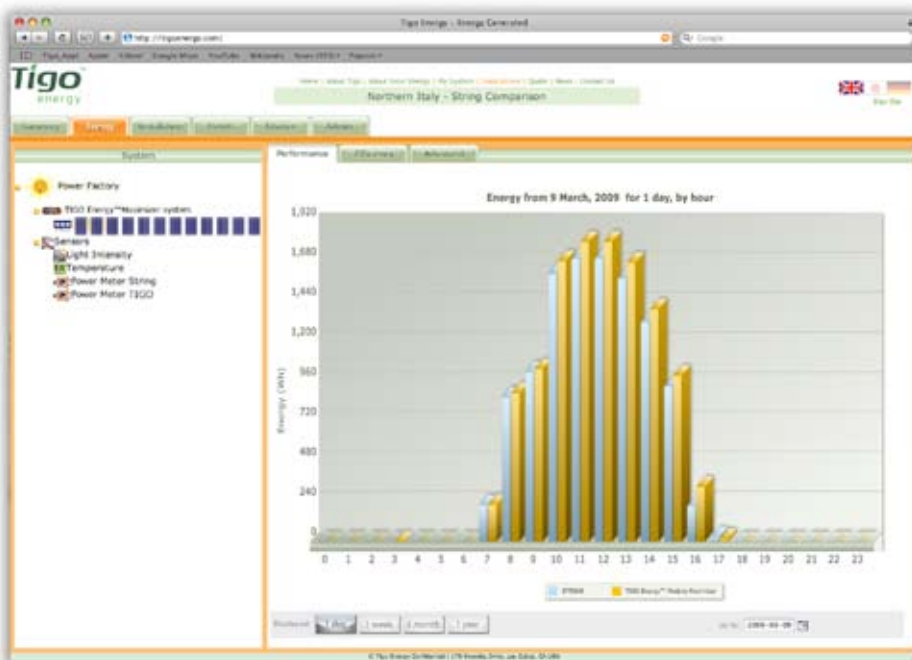
In well-designed commercial systems, Tigo Energy Maximizer systems will typically return 4 to 8% incremental power output throughout the life of the system. Financial estimates indicate that an increase of 6% harvest can increase the project IRR by 20 basis points, often providing 30 – 40% increase in returns. And because the Tigo Energy Maximizer system is a distribution of existing electronics;

residential, commercial and utility scale projects can achieve these gains for little or no additional initial capital expense. Additional up-front cost savings are achieved by reducing BOS costs associated with thin-film installations. Projects that were previously not viable with traditional design constraints can now be placed into profitable operation. Operational efficiencies can also be increased

as the software control algorithms keep the system at maximum uptime while alerting the operator to specific events that require maintenance action.

Improved Opex through MaxiManager software applications

Tigo Energy MaxiManager software gives the system owner unprecedented access to the module (solar panel) level for performance monitoring and analytics – user-configurable interfaces allow the owner or project manager to view power output and component performance in near real time. This enables a true understanding of not only “how” but “why” the system is performing at its current output. Cleaning schedules, warranty replacements, and conservation programs can be planned more accurately. The MaxiManager software can also create customized reports for historical data to enable the system owner to see trends in energy generation during different times of the year and varying weather conditions. The MaxiManager applications can be accessed through a secure site via any web-enabled computer - even when the system owner is not in the office they can instantly view their system status.



Improved Disconnect Safety through Tigo Energy PV-Safe (patent pending)

During everyday operation, commercial rooftop solar is an extremely safe and reliable technology. But as with any electricity system, in the unlikely event of roof-top maintenance or a fire emergency, it is important that the system can be deactivated. Today's solar PV systems can be disconnected from the grid, but if the sun is shining there will still be high-voltage (usually in excess of 480V) through the panels. This can pose an unexpected danger to those working or fire fighting on a building with solar. The Tigo Energy Maximizer system includes a unique technology (patent pending) which enables each module to be electrically removed from the high voltage DC cabling. This function can be activated with an onsite safety button or via a remote management console.

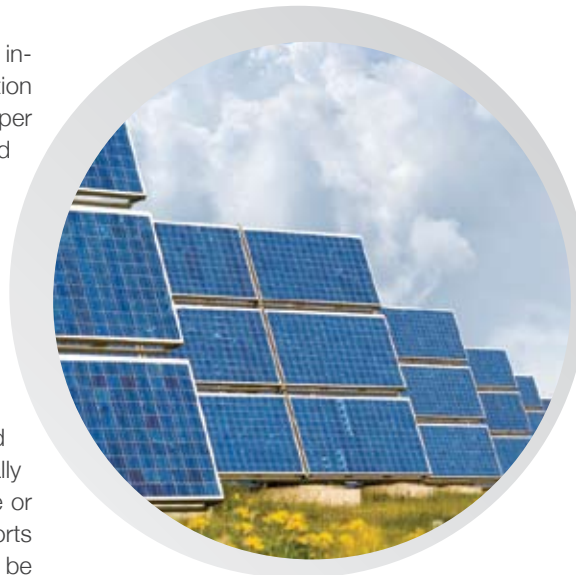


Reliability Standards for Tigo Energy Maximizer System

Tigo Energy designed the system components to ensure that they meet or exceed the reliability standards of today's solar modules. Because the per-module electronics are minimized, reduced physical stress and thermal cycling impact to the module lowers failure rates, and reliability is improved. Tigo Energy's AC Power Conditioner eliminates many of the weakest elements of traditional inverters, which improves system uptime and MTTF. The MaxiManager software can immediately identify the rare cases of failure to ensure that warranty work is performed and the system is returned to optimal production levels.

Benefits to System Installers

Tigo Energy Maximizer Systems allow installers to offer greater energy production to their customers and lower the cost per kilowatt-hour generated. An increased number of residential and commercial rooftops will be viable for PV installation utilizing alternative orientations or slightly shaded areas. System installers will enjoy simplified on-site installation, and reduced BOS (Balance of System) components and costs associated with thin-film installations. The system includes software which monitors and manages the PV system, automatically alerting the installer to any maintenance or system problems that may occur. Reports and long-term production statistics can be generated for analysis and warranty service contracts.



Benefits to System Designers

Tigo Energy Maximizer System greatly reduces the time needed to design systems for "string sizing" for specific inverter types – the isolated bus eliminates the need to match voltages and number of modules per string. This allows greater flexibility on rooftops constrained by space limitations, orientation or tilt angle. For rooftops with obstacles such as chimneys, parapet walls or tree shade, more modules can be placed in service and not affect the fully powered modules nearby. Existing systems can be expanded without the need to closely match modules – different module technologies can be mixed on the same system. Modules can be replaced with the most cost-effective wattage output at any time in the project life cycle.

Benefits to PPA's and Utility-Scale Projects

Tigo Energy Maximizer Systems may typically return 4 to 8% incremental power for new systems, and low-cost retrofit options can significantly improve underperforming systems that are currently in operation. By potentially offsetting today's increased cost-of-capital, the Tigo Energy solution can place non-viable projects into profitable

operation. For retrofits of currently underperforming large-scale projects, Tigo Energy provides the option to install the system at no-cost and participate in the financial upside from the increase in energy production. The monitoring console with module level granularity provides detailed visibility, analytics and diagnostics so that PPA providers can keep the project at peak operation throughout its life cycle.



Can your solar PV system pay for itself faster?



Benefits to Commercial Rooftop Owners

Owners of commercial rooftops want to maximize the available real estate for PV module placement. Tigo Energy Maximizer allows flexible string lengths and placement of modules in areas that were previously sub-optimal. This allows for more kilowatt-hours per square foot and a larger offset of energy bills, especially during peak summer hours when the cost of energy is highest. Businesses that want to promote their commitment to "green" policies can publicize the view of their system on the web and in a lobby display to show their contribution to greenhouse gas reduction.

Benefits to Residential Consumers

Residential Customers can generate 8 to 20% more energy from their Tigo Energy Maximizer system, resulting in faster payback and reduced energy bills. The system may qualify for greater incentives in performance-based rebate programs. The patent pending PV-Safe technology allows individual panels to be disconnected from the array for maintenance or the entire system to be disconnected in case of a fire emergency. Homeowners can view their system production with MaxiManager software from any computer so that they know it is operating at its maximum.



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