Operations & Maintenance for Maximum Energy Yield

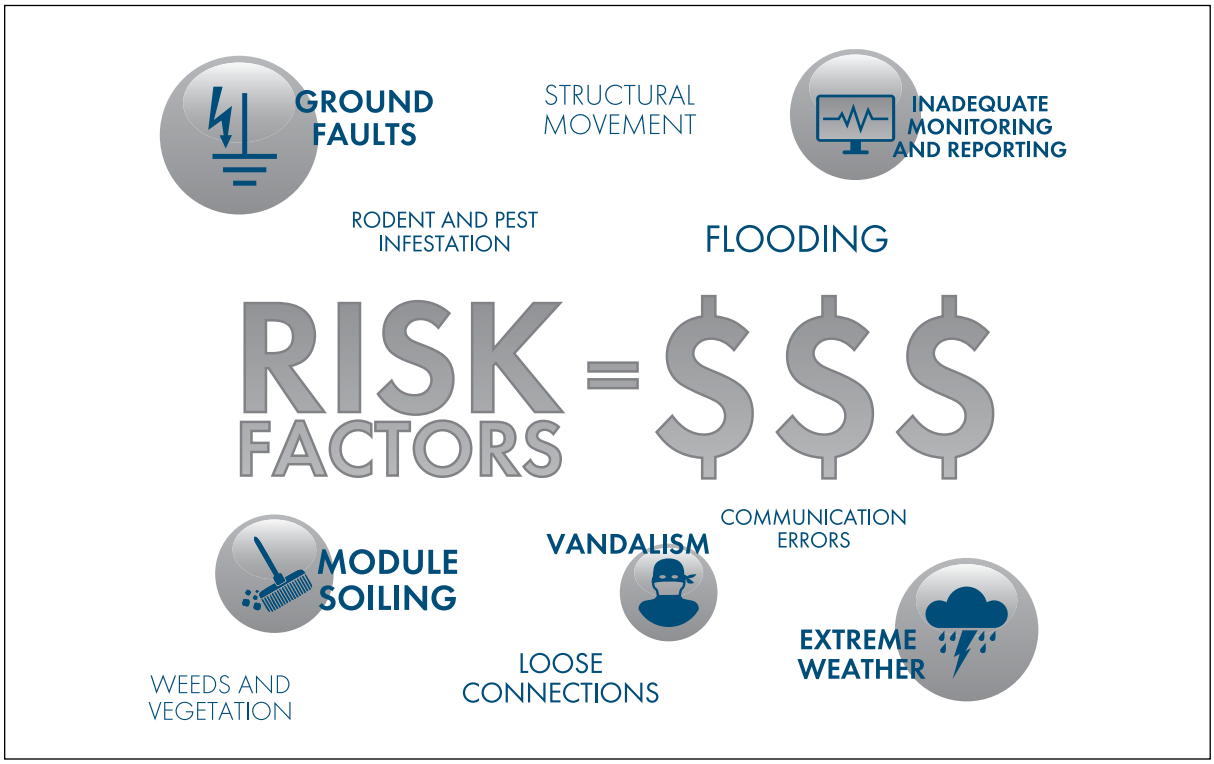
Plant-wide operations and maintenance (O&M) has emerged as a necessary component of a healthy, productive and profitable PV system. In fact, a properly maintained solar plant can increase energy yield by up to 30 percent. GTM Research estimates that the global operations and maintenance market for plants larger than 1 megawatt will triple by 2017 to reach 150 gigawatts.

O&M plans can be assessed based on key differentiators that minimize unnecessary operational expenses while maximizing lifetime energy yield. These include risk mitigation, monitoring capabilities, scalability, and experience and expertise of the service provider.

Importance of Identifying and Mitigating Risk

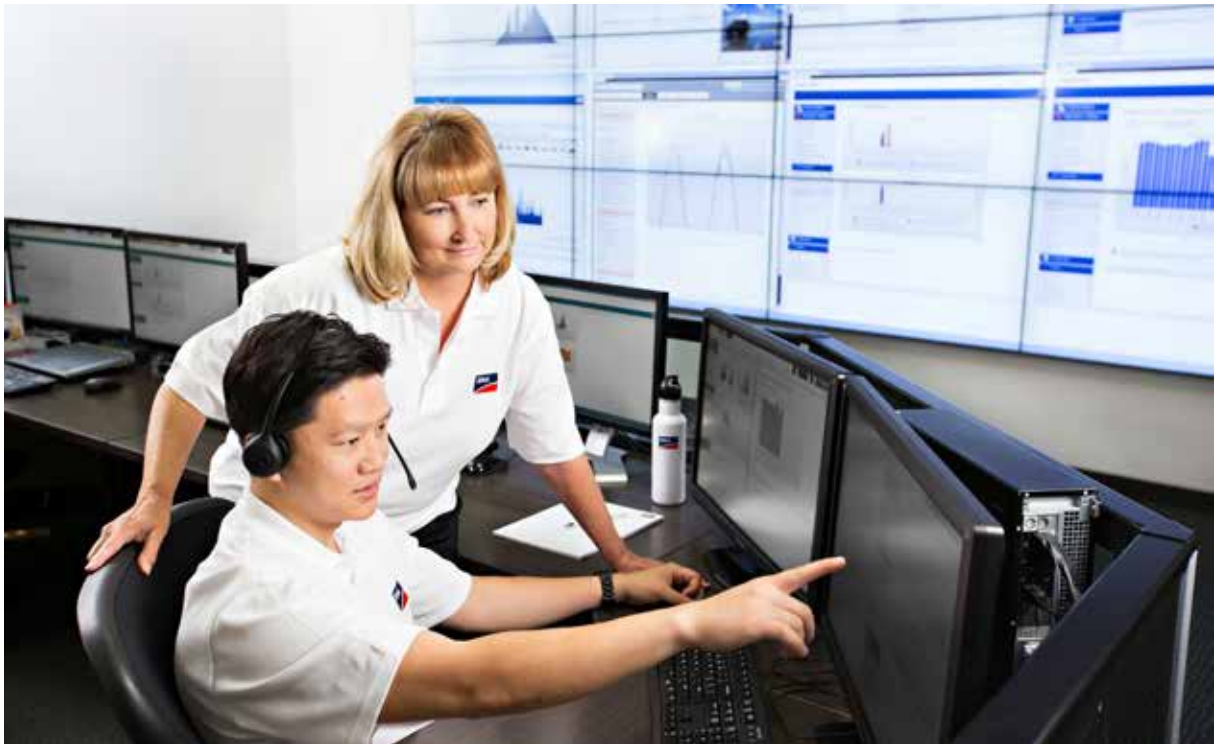
Mitigating risk is the overarching goal of any successful O&M plan. Potential risks include module soiling, compromised wiring, shading caused by overgrowth, and many more. Each of these can reduce performance, seriously affecting system operation and production and creating monetary consequences that can negatively impact or destroy profitability.

Risk can be reduced by future-proofing every aspect of the PV plant, resulting in maximized plant performance and value for the system owner. Potential issues must be identified and addressed before they can impact an owner's bottom line, whether that means controlling a rodent problem, clearing vegetation or cleaning the array.



Advantages of Real-Time Remote Monitoring

System monitoring is vital to any O&M plan and it's important to recognize the difference between simply monitoring a PV plant's performance and actively managing a solar asset using the most advanced technology available. The latter utilizes analytics and service team expertise to diagnose and remotely resolve challenges in a proactive timeframe before they turn into larger complications.

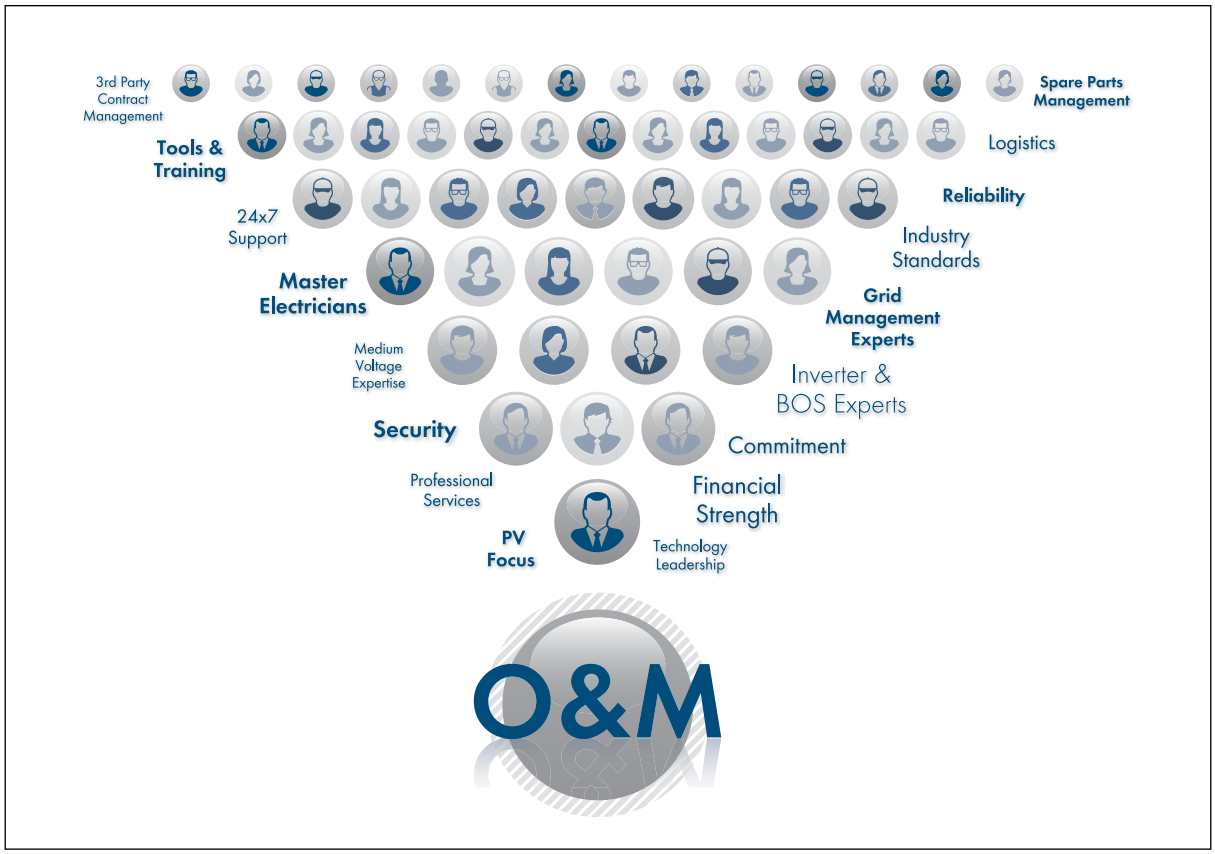


The most comprehensive solution is 24/7, real-time remote monitoring, which offers a wealth of advantages that maximize performance while minimizing downtime. These include:

- Performance profile analysis to ensure maximum power generation
- Quick reaction to alarms and assessment of on-site service personnel needs
- Automated ticket creation and dispatch of field service engineers as necessary
- Thorough reporting on performance, uptime and financial information
- Management of preventative maintenance schedules and timely completion
- Rapid response to utility and grid operator needs
- Tracking and reporting on warranty claims

Scalable Services for All Applications

Comprehensive O&M services cater to the needs of a variety of PV plants within a system owner's diverse portfolio, addressing both commercial and utility-scale PV plants and adapting to suit a given system owner's business model. Some systems may require a preventative O&M plan that covers the essentials while others may benefit more from a bumper-to-bumper package that addresses all performance-related factors. In essence, O&M services should be tailored to ensure the long-term growth of the organization and profitability of the individual project.



Experience and Expertise are Paramount

Much like the inverter, module and BOS segments, the O&M sector will experience an influx of competition as it grows. However, the field can be narrowed based on two important distinctions: experience and expertise. Myriad factors should be considered when selecting a service partner, including the company's installed base, size of service team, length of time in the PV business and bankability, among many more.

An O&M provider should also have a diverse team of subject-matter experts to support plant owners, particularly when it comes to components such as the inverter. The inverter is the brain of the large-scale PV system, with all plant-wide faults and alarms communicated through it. Therefore, it's imperative to partner with an O&M provider who has extensive experience and expertise with these technologically complex devices.

SMA is not only the global leader in solar technology, but also the top-ranked service provider by third-party analysis. Since launching its plant-wide O&M service in 2013, SMA has been trusted with countless commercial and utility contracts. SMA has successfully built upon its experience as the largest servicer of PV inverters in the world with more than 35 GW installed globally, offering a field-proven O&M team to represent the needs of PV plant owners.

Economic Benefit of Deploying Quality Operations and Maintenance

While professional design, top quality components and precise installation go a long way toward the lasting success of a PV plant, properly accounting for start-up, O&M, and availability services is vital to ensuring maximum production and superior financial returns. In addition to the increased energy yield O&M provides, SMA offers bundled service packages for value pricing. Fixed cost budgeting is key to a secure service strategy and SMA offers a variety of core services to meet any solar asset management needs. The system owner benefits from a single-source service provider, attractive discount rates and predictable costs that fit within any business model.

To ensure maximum ROI, it is important to have a watchful and proactive eye on your investment. Additional financial savings can be realized via SMA's Solar Monitoring Center, which significantly reduces O&M costs by remotely resolving the majority of support calls or alerts. Moreover, SMA's bankability secures the investment throughout the lifetime of the plant.

SMA is the Preferred, Top-Ranked Service Provider Worldwide

SMA has earned the business of hundreds of megawatts of utility-scale projects in North America alone, including the two largest PV systems in Canada, totaling 270 MW. With more than 850 service experts and over 90 service hubs worldwide, SMA is uniquely positioned to care for these systems throughout the duration of their operational lifetimes.

SMA has been voted best service/warranty globally by IMS Research, which stated:

"The survey highlighted the importance of warranty and after sales service plans for customers, with more than 90 percent of respondents indicating that they are 'important for most projects' or 'critical for all projects.' PV inverter suppliers were ranked as to which suppliers offer the most attractive warranty and service plans. Once again, SMA Solar Technology ranked first with more than 35 percent of the votes."

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