

Getting the most out of your solar PV systems

Introduction

Experience has shown that there can be significant variations in the performance of PV plants in the UK. Many systems are at risk of underperformance due to a lack of effective measures, processes and infrastructure in place to mitigate, detect, manage and rectify a drop in performance. Consequently, many plants may not be able to fully realise their full environmental and economic benefits.



For example, if there is just one defective module in a 25 kW system with 100 modules, the reduction in production revenues could be anything between £500 – £3,000 over the lifetime of the plant depending on system configuration, Feed-in-Tariff (FIT) rates and specific yield; with the financial implications for larger systems increasing proportionately.



OST has advised on over 6 GW of PV projects in the UK, including 80,000 rooftop systems, at all scales and in both commercial and domestic contexts, throughout their lifecycle; from development and full technical due diligence through to asset management. As part of our work, OST has visited many PV systems that have been under-performing for extended periods, due to minor faults going undetected. Although this loss in energy production can generally be reduced through regular monitoring and operations and

maintenance (O&M) activities, such services come at a cost to the PV project, and their scope may not be sufficient to cover all issues.

Below are some key issues causing loss of revenue for PV system owners.

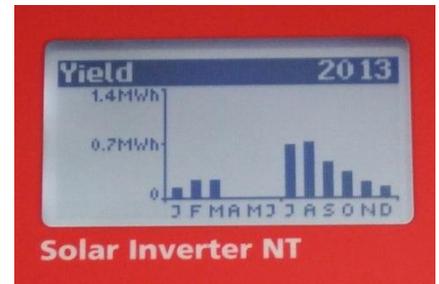
PV condition & performance assessments

PV plants are built with an anticipated lifespan of 20 years or more and are often located in areas with harsh or varied environmental conditions. Latent issues can become apparent years after plant commissioning following expiration of contractor warranties and financial securities. For this reason, in-depth quality and performance assessment is highly recommended, especially prior to financial milestones. Such assessment often pays for itself as the early detection of certain issues may save a project from unpredicted future expenditure.

Monitoring

Many schemes are installed without monitoring systems, since they are perceived as an unnecessary cost. As a result, it is harder for the owner / operator to optimise the performance of the PV system, reducing the lifetime revenue of the project.

A good monitoring system can provide the necessary information and evidence needed to assess system performance, inform O&M operations, and maximise generation.



O&M agreement

An O&M service agreement should be in place to ensure that your PV system operates correctly throughout the project lifetime. Responsive and corrective O&M activities ensure that unplanned failures are repaired quickly and energy production is restored. A minimum level of O&M services is essential for successful PV system operation to help identify unexpected changes in performance and minimise downtime of equipment. For larger sites, more services should be conducted such as in-depth monitoring and analysis.

O&M services are normally managed under an O&M contract with guaranteed minimum performance. It is worth considering whether these performance values should be increased; again, there is an optimum to be found between the price and scope of O&M services.

As the market shifts from building PV systems to maintaining PV systems, there is an opportunity for raising minimum accepted performance values. An independent review of O&M arrangements can provide reassurance that the plan is suitable, offers good protection, and is in line with market standards.

Irradiation and yield forecast

Some uncertainty is unavoidable regarding the performance forecast for a PV system, as this forecast is often based on average meteorological data and a model of the system design, with total generation (yield) normally provided as an estimation. These estimations may lack site-specific details, equipment specification, or may be considered as non-independent.

It is possible to produce a site-specific or portfolio-specific yield forecast, which considers the sunlight (irradiance) received at the site(s), site-specific details like shading and layout, and the equipment specification of the PV system(s) installed.



This detailed yield forecast acts as a robust benchmark for the performance of the PV system(s). For operational PV systems, performance data can be used to refine the yield forecast, and this benchmark will enable greater accuracy in assessing potential performance improvements. Decisions about the most economically sensible choice for performance improvements can then be more precisely evaluated.

How OST Energy can support you

Whether the asset is operating as expected or is showing issues, we help our clients to keep it performing in a safe, reliable and durable way to increase financial gains. If you are not certain that the performance of your PV system is being maximised, OST can help by providing a review of available monitoring systems, processes, O&M agreements, PV system design etc.

At the heart of OST's expertise is the independent identification and evaluation of technical and commercial risk, underpinned by the comprehensive assessment and implementation of practical, cost effective risk management. Our operational services are tailored to the specific needs of the client and project, with special attention given to time restrictions and a cost effective approach.

Our assessments include a suite of desktop and on-site technical analyses. These can be carried out periodically from commissioning to the end of the operational lifecycle, to ensure optimal levels of performance and to mitigate against future issues, or on an ad hoc basis for the investigation of unexpected underperformance.

Our expertise in a wide range of issues enables us to carry out a dynamic investigation programme, including review of historic operational data as well as incorporating a suite of independent onsite and laboratory tests.

Our performance assessments start with the least intrusive studies. Unless an issue is known or immediately identifiable, OST follows a top-down approach: PV system analysis is conducted from the overall performance to subsidiary components in order to locate weaknesses in the system. The course of this sequential methodology will be affected by the preceding results.

We tailor our methodology to each individual project according to client requirements that, in general, can be summarised in 2 phases:

- Phase 1: Desktop (operational data) analysis – Market-leading analytical methods enable OST to understand plant performance using key metrics.
- Phase 2: On-site testing – To reach a firm conclusion on the root cause and / or to evaluate the depth of the issue, OST can offer a suite of more specialised on-site testing.

As a rule, undertaking a performance review and implementing effective monitoring and O&M operations are likely to be financially worthwhile for commercial rooftop PV projects, for portfolios of smaller PV systems, and for large ground-mount plants.

Awards and Recognitions

OST's reputation as one of the world's most experienced technical advisors has led to us working on over 30 GW of renewable energy projects world-wide and maintaining strong long-term global relationships with major investors, lenders and developers.

Our commitment to excellence in our work has been recognised through a series of annual awards from our foundation in 2008 to today, including recently:



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