



Renewables: operation, monitoring and maintenance contracts

Who should read this note?

This guidance note is for **public sector and community organisations** who **own or are developing renewable electricity generating stations**. Generating stations provide power to an asset, export power to the grid, or do both. They may be standalone or building-integrated technologies, such as ground-mounted and roof-mounted solar arrays or wind turbines.

Pre-requisites:

Please read the following guidance for owners of renewable electricity generating stations:

- [Managing standalone renewable generation: guidance](#)
- [Monitoring and maximising the performance of roof-top solar arrays: guidance and tools](#)
- [Performance management tool: renewable electricity generating stations](#)

Purpose of this note:

This note explains the key **operation, monitoring and maintenance (OM&M or O&M) contractual terms and conditions** which may impact the Annual Availability¹ (AA) of a generating station and affect the owner's ability to manage its performance. The note is particularly useful when developing a business case, designing a procurement, specifying design or when selecting a contractor.

In addition to any proprietary monitoring system, **the Energy Service recommends installation of a half-hourly meter at each generating station**. This meter must be able to measure, record, store and transmit half-hourly data to a Data Collector and or Energy Management System. Metering must comply with Office for Product Safety and Standards. Schedule 4: UK nationally approved electricity meters.

¹ Annual Availability is the percentage of hours in a year a generating station is available to generate should environmental conditions allow.



Commercial asset management techniques, such as installing half-hourly generation meters, and verifying contractor reporting, enable owners to maximise availability of these valuable assets to ensure they deliver to design.

Background to the note:

The combined total capacity of public sector renewable generating stations has grown significantly over the last decade. Most organisations have at least **1 Megawatt** of electricity generating capacity, which at the time of writing, has the potential to save approximately **£335k** in energy bills

Successful operation is the responsibility of an owner, but the owner is somewhat **reliant on the terms of the OM&M contract**.

Traditionally, **large generators** have benefitted from high-specification SCADA monitoring and control systems incorporating fiscal meter data, while small or micro assets have been monitored by limited proprietary platforms. In general, the public sector has not employed asset managers with owners relying on unverified reports from their OM&M contractors.

Generally, **Rooftop solar photovoltaics** (PV) have been installed, building-by-building, over several years. This has resulted in separate OM&M contracts with multiple providers, some of which may have expired. In addition, there may be monitoring-only contracts on disparate platforms, not all of which are accessible to the owners.

To realise the value of generating stations, owners must actively manage the performance and **ensure the terms of OM&M contracts** are sufficient to **support maximum availability**. All generating stations should be operated and maintained in line with industry guidance, such as:

[Solar-Energy-UK-Rooftop-OM-best-practice-Second-edition.pdf](#)

[A note on REFIT Measurement and Verification: The terms of REFIT M&V are designed to report energy consumption and carbon savings due to technical performance measures implemented across a portfolio of premises. We recommend a more granular approach is taken to generation performance monitoring and benchmarking. An owner's specific requirements can be set out within the Invitation to Tender (ITT) and restated within the REFIT Investment Grade Proposal.]

The following table below provides high-level guidance for owners contracting with an OM&M, O&M or monitoring provider.



Operation, monitoring and maintenance - contract considerations for owners:

Topic	OM&M or O&M contract	Monitoring-only contract
<p>Spare parts management: minor and major components</p>	<p>Having strategic spares available for immediate use will reduce avoidable downtime and consequent loss of generation. Spares do not necessarily need to be stored on site, as long as they are stored and reserved for the site by the OM&M contractor. If they are stored on site, this can reduce downtime further, though consideration will need to be given to providing a safe and appropriate storage facility with 24-hour access by the OM&M contractor.</p> <p>The owner should consider lead times for all unreserved spares and incorporate the risk of consequent downtime into their performance management plan. Bear in mind lead times change according to market conditions.</p> <p>There will be a cost to reserving spares. A cost-benefit analysis should form the basis of a decision on whether or not to reserve spares. This must include the predicted cost of downtime to the owner, i.e., <i>import kWh tariff X kWhs of lost generation.</i></p>	<p>Refer to O&M contractor terms.</p>
<p>Warranties</p>	<p>Terms and conditions of plant warranties should be noted by the owner and cross-referenced with the OM&M contract to ensure adherence to warranty terms during operation. Adherence to terms will need to be evidenced if a claim is made against a warranty. Expiry dates should be noted and the 'Spare Parts' consideration reviewed in anticipation of warranty expiry dates.</p>	<p>This consideration is taken by the owner in its entirety.</p>
<p>Operational insurance</p>	<p>Terms of a generating station's insurance policy should be supported by the terms of the O&M contract. In the event of a claim, the owner may need to evidence compliance. Pay particular notice to statutory safety testing.</p>	<p>This consideration is taken by the owner in its entirety.</p>
<p>Annual Availability (AA) guarantee</p>	<p>An OM&M contract for a standalone generating station, or a portfolio of smaller aggregated stations, will usually guarantee an AA of ~95%. The terms of contract will</p>	<p>This consideration is taken by the owner in</p>



	<p>list exclusions to the AA calculation. These protect the O&M provider against causes of downtime beyond their control.</p> <p>It is important the owner records periods of downtime in an operational diary as they occur. This can be done by reviewing the half-hourly generation data regularly and noting the cause when known. Independent verification of the contractor's AA calculation will reduce errors in the attribution of downtime, improve contractor performance, and protect the owner against underperformance.</p> <p>Maintaining a contingency of spare parts, will reduce the likelihood of downtime being attributed to the owner.</p> <p>Single small or micro generating stations will not usually have a guaranteed AA stipulated in an O&M agreement. It may be worth contracting O&M for a portfolio of assets to benefit from an AA guarantee.</p>	its entirety.
Asset register	<p>An asset register provides a shared understanding of remit and responsibilities of the owner and OM&M contractor. With the exclusion of half-hourly metering, we recommend the OM&M contractor takes responsibility for the communications line to their proprietary monitoring equipment. This avoids failure of comms equipment being attributed to the owner in the AA calculation.</p>	This consideration is taken by the owner in its entirety.
High Voltage (HV) services	<p>If a generating station is operating at high voltage, HV services, such as switching a wind farm on or off on the owner's side of the substation, may be excluded from the OM&M provision. When HV services are procured separately, downtime caused by the HV service provider will be attributed to the owner in the OM&M provider's AA calculation. This is because the OM&M provider has no control over the HV service response time, even though it may be a pre-requisite to their own ability to correct a fault.</p> <p>An HV services provider will have their own monitoring and alert provision. It is recommended they are responsible for the installation, operation and maintenance of the relating telecom system.</p>	
Response times	<p>Guaranteed response times differ according to the seriousness of the event and the spares provision in the contract. Response time (the time between notification of a fault and arrival at site) is usually attributed to the</p>	Monitoring services are portals to view system alarms or



	owner in the AA calculation. The owner is responsible for verifying time allocation is correctly attributed.	flags. It is usually the owner's responsibility to monitor system flags and manage responses, such as contacting the O&M service provider.
Cross-contract compliance: off-taker/power purchase agreement	The owner should cross-reference power purchase terms with OM&M terms. Terms of delivery to grid, or off-taker, should not be breached by the terms of the O&M contract. <i>E.g. fault response times and notification requirements should concur, and it should be clear which party is responsible for which action.</i>	
Cross-contract compliance: permitting	To prevent breach of contracts or statutory operating conditions, the owner should cross-reference terms of the grid connection and other operating permits with the terms of the OM&M contract to ensure they concur. e.g. recording and retention of historical performance data, notifications, terms of operation.	
Reporting	<p>The frequency of contractor reporting depends on the size of the asset/s. Roof-mounted solar may not have a reporting requirement at all, unless contracted at portfolio level. Standalone and portfolio reporting is usually monthly.</p> <p>The scope and contents of monthly reports should enable the owner to verify generation performance against expectation and export against expectation. AA should be reported and clearly attributed as per the contract. Planned and unplanned maintenance should be detailed. Breaches of health and safety protocols and near-misses should be listed.</p>	n/a
Monitoring platform	<p>Monitoring platforms vary in their specifications. Bear in mind they are designed to serve the contractor not the owner. Some contractors will not provide the owner with access to their monitoring platform; most will provide limited access.</p> <p>An owner can monitor performance using a half-hourly generation meter alone, but some access to operational data via a monitoring platform can be useful. A proprietary</p>	



	<p>generation performance monitoring system should have the following capabilities as a minimum:</p> <ul style="list-style-type: none">• The ability to send push notifications via SMS, or email, to an owner’s generic email address.• Live remote monitoring of generation and of faults impacting production, via a mobile or desktop application.• The ability for the owner to record, store, and download the history of faults impacting production.
<p>Battery Storage</p>	<p>Co-located batteries may be subject to a separate OM&M contract. The owner should ensure there is clarity of operational remit between all parties.</p> <p>If the generating station is standalone rather than roof mounted solar PV, we recommend the owner has remote access to battery charge and discharge time interval data. This will enable the owner to verify that the battery storage facility is operating as intended. (Incorrect operation of the battery has a significant financial impact on the owner organisation).</p>



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