

Solar O&M grows up



Operations and maintenance | The European solar industry has followed the lead taken by its counterparts in the US by developing best practice guidelines for the burgeoning O&M business. Stefan Degener, senior director of O&M at First Solar, who led a group to develop the guidelines, speaks to Ben Willis about their significance and aims



Credit: First Solar

The O&M task force has published the first set of best practice guidelines for the industry

As we have heard on the preceding pages, the set of activities grouped together under the O&M moniker has grown from being an afterthought normally carried out by a project's EPC contractor into something altogether more specific – and indeed vital to the long-term performance and profitability of a PV power plant.

Yet those activities have not until now been clearly defined. What's more the number of players in this emerging market has grown rapidly, resulting in a patchwork of different service offerings and standards. For project owners, lenders and other stakeholders this can create confusion and uncertainty around the minimum expectations they should have when negotiating an O&M contract.

It was against this backdrop that in 2015 SolarPower Europe formed an O&M task force, a body charged with creating a quality benchmark for the provision of operations and maintenance services. During Instersolar Europe 2016 in June, the task force published a best practice document, its first significant step towards bringing a greater level of coherence to the O&M business in Europe.

And there appears to be something in the air vis-à-vis O&M across the solar industry more generally. Last year the SunSpec Alliance, National Renewable Energy Laboratory and Sandia Lab in America joined forces to draw up a set of best practice standards for the US market, with similar aims to the SolarPower Europe venture. Other regional solar markets meanwhile have expressed

an interest in following the lead taken by the US and Europe.

First Solar's Stefan Degener here offers insights into the task force's guidelines and explains why the time is right for the O&M business to grow up.

What was the thinking behind the O&M task force and why now?

The O&M market in Europe is extremely fragmented and has been undergoing a consolidation for approximately one and a half years. So following all the other segments of the solar business, O&M started this consolidation process and is still continuing. The idea was to gather interested parties from the industry and think through how we can help the stakeholders to get a better understanding of O&M best practices, with the ultimate goal of setting some kind of standard.

Why is the standardisation process necessary?

In the past we had EPCs or installers just signing pieces of paper, and the scope and content of those were very, very different. Some only understood O&M as green-keeping and looking after projects from outside of the fence, without going into very much detail. And so therefore we had the feeling it would be good to guide people a little bit around what is supposed to be a standardised scope for an O&M contract – what should be in the scope, what should be expected and what are additional services. This is what can be found in this document.

Best practice benchmarking – key points from the O&M Task Force

First Solar has led this group, but to what extent have others from the solar industry been involved?

It wasn't that we did this alone; it was really a joint work. So we broke it into very detailed groups, and every one of these 26 members of the task force contributed to this exercise.

Bearing in the mind fragmentation of the market, presumably that means different companies have different ways of doing things. From a practical point of view, how did you bring all of those different ways of doing things together into something that was coherent?

This is the work of 26 companies, so in a sense it's a kind of compromise setting out minimum requirements, minimum expectations a plant owner or stakeholder should have on O&M. In many cases we give a view on best practices – so how do the best performers in the industry do it – just to showcase what is possible but probably not required from every owner. The 26 companies involved represent I would say an ok average of the industry. But it can be a couple of hundred companies doing O&M right now; many have stepped out, but at the same time you see a few as well just stepping in as independent O&M partners. And that showcases that O&M is really becoming a business and not just something that is needed on the tail of construction.

Give me some examples of some of the things these guidelines have been successful in doing in terms of identifying an optimal way of carrying out a particular aspect of the O&M process.

One thing it does is provide definitions of terms that hadn't been available earlier. This is to allow people to understand what is meant when someone talks about operations when someone talks about warranty claim management and so on. This basis is important as a starter. And we took particular care of safety: in solar PV, most of the time when people work on a site in operational hours, the sites are loaded with current and that can be dangerous, so this is something we paid particular attention to. The current version of this document also outlined some kind of skill set which should be expected from someone working on a PV power plant; the idea is to develop it further and make this a kind of education document or learning document for particular PV plant maintenance personnel.

And we had a very lengthy discussion as well around the definitions as well as the application of KPIs – key performance indicators. And there are two sets of these: one is the KPIs for the power plant, which are being measured through meters and sensors. But at the same time it's important to develop KPIs for the O&M provider itself, so that the owner has a chance to benchmark or to understand the performance of the O&M provider.

Assuming the industry adopts these guidelines, what difference do you hope they could make in the long term?

The big goal is to get a kind of joint understanding about what O&M means. Today we see when talking to customers that there is a lack of understanding and education. So having these documents being understood by the stakeholders and also by the

DEFINITIONS

A common understanding among stakeholders of the various activities and processes involved in O&M is a key starting point for bringing a more standardised approach across the industry. This is particularly the case for operations tasks, as they have not hitherto been as clearly defined as the more technical maintenance activities. The task force guidelines provide definitions for almost 30 cornerstone O&M terms, from additional services to warranty management, and everything in between.

ENVIRONMENT HEALTH AND SAFETY

O&M providers are usually subcontracted to take on practical responsibility for the safety of personnel working in and around a PV power plant, and for the protection of the environment around it, even though the ultimate legal responsibility for those areas rests with the owner. The guidelines clarify the legal obligations of the various stakeholders and define the duties the asset owner and O&M contractor must undertake in order to remain compliant with health and safety and environmental protection regulations. Minimum requirements in terms of the qualifications of O&M personnel and the personal protective equipment used by workers are also detailed.

PERSONNEL AND TRAINING

Having the right mix of training and qualifications within an O&M team is crucial to ensuring works are performed in a safe and accountable manner. Although not overly prescriptive, this section of the document sets out some of the desired minimum skills and qualifications the technical and specialist personnel in an O&M team should have. It includes out a 'skills matrix', a table that allows companies to chart the existing, required and planned skills of personnel at different levels of an O&M team and across different disciplines.

POWER PLANT OPERATIONS

This section details the key obligations for plant owners and O&M contractors for the successful operation of a plant. It covers processes such as the correct provision and management of key documents, monitoring and data collection requirements, plant monitoring and supervision of the plant by the O&M provider, analysis of plant performance, predictive maintenance, remote plant control, power generation forecasting and reporting by the O&M provider to the asset owner. Other processes covered include ensuring the regulatory compliance of a plant, warranty management and the correct processes for handling insurance claims.

SPARE PARTS MANAGEMENT

It is the responsibility of the O&M provider to ensure spare parts are available as required in a timely manner so as to minimise system downtime. Important considerations for the O&M provider are logistics such as the optimal stocking level of parts, the location and storage of parts in terms of the proximity to the plant and security. The task force provides a sample list of spare parts and a suggested methodology for determining stocking levels, that accounts for factors such as the likelihood and impact of a certain part failing, the probability of degradation over time and the cost of a replacement.





POWER PLANT MAINTENANCE

The task force provides detail on the four main types of plant maintenance and how those should be defined in an O&M agreement:

- **Preventative maintenance:** These activities form the core element of plant maintenance, comprising regular visual and physical inspections, in line with component warranty requirements. It is up to the O&M provider to draw up a detailed maintenance plan and schedule for specific parts.
- **Corrective maintenance:** This covers activities undertaken to restore a PV plant after a failure has been detected. Key points that should be framed in an O&M agreement include a cap on the amount of corrective maintenance the O&M provider can undertake in a year and the maximum time in which the O&M provider must undertake repairs once a fault has been detected.
- **Extraordinary maintenance:** These actions are necessary following major unpredictable events that require substantial remedial work to restore a plant to operation and are generally billed separately under the O&M contract. Best practices in this area include the determination of clear rules around the right of the plant owner to invite quotations from other providers to undertake extraordinary maintenance work and the granting of a 'right to match' option for the O&M provider.
- **Additional services:** An O&M agreement can foresee services that will be carried out by the contractor at the plant owner's request, above and beyond those framed in the preventative maintenance aspect of the contract. They include activities such as module cleaning, pest control, snow removal and perimeter fencing repairs, among many others.

PV PLANT SECURITY

To keep a plant secure, recommended best practices include an additional communication line in high-risk areas. The asset owner is responsible for setting a security protocol in the event of an intrusion, while it is up to the O&M provider to ensure the correct functioning of security equipment. These activities are normally considered as part of the additional services outlined previously.

CONTRACT MANAGEMENT

The O&M provider is normally tasked with some form of contract management responsibility. The task force suggests that as a best practice, the contract manager should function as an initial and triaging portal for all external questions regarding a plant's operation. This would ensure adherence to the contractual responsibilities occurs.

KEY PERFORMANCE INDICATORS:

The task force breaks KPIs down into two categories: PV plant KPIs that allow a plant owner to keep tabs easily on the performance of its asset; and KPIs relating to the O&M contractor. According to the guidelines, the former should cover parameters such as plant availability, performance ratio and energy performance index. The O&M KPIs should encompass a range of quantitative and qualitative factors, including reaction time to alarms, reporting and the overall contractor experience.

CONTRACTUAL COMMITMENTS

It is up to the asset owner to ensure the two halves of the O&M equation – the most likely remote operations services and more localised maintenance activities – are well managed, particularly if being undertaken by different providers. The O&M provider KPIs should provide the basis for the asset owner and O&M contractor to define the latter's level of accountability. These will be translated into appropriate bonus schemes for over-achievement or liquidated damages where agreed standards are not met.

The guidelines are available in full at solarpowereurope.org

players in the market – the O&M service providers – will help to bridge a lot of current communication gaps and execution gaps. Sometimes an owner is not happy with the performance of the plant, but is not able to identify whether it is the equipment, the O&M provider, whether it's the grid operator or where it comes from. So this document really helps people to get on the same level of communication and expectation around O&M principles.

What happens next in terms of disseminating this as well as adapting it over time?

It's now available from the SolarPower Europe website to be downloaded. But this is version 1 and we are expecting feedback; SPE is taking care to send it out particularly to groups of stakeholders – technical advisers, lenders etc. – and collect their feedback. And we are using it in our general communication with the market. We've actually developed a badge, which shows that the companies using this badge are following or are at least aware of these principles. The idea is that by using this badge in your emails or on your invoices or on letters, whatever, you can really communicate to the market – hey, we are part of this group and we are following these minimum best practice guidelines.

There has been some discussion that these guidelines could be a precursor to full certification of the solar O&M business. What is the thinking here and how might such a thing be developed in time?

This will be the next step. So after this badge, that everyone can use voluntarily, the ultimate goal would be that O&M companies need to undergo a kind of qualification audit process – which still needs to be developed by the way – and then get a certain certificate. When you have this the owner can trust that this company is working to mutually agreed and released guidelines to the market. This is a long-term target. What we have now is version 1.0; we want to enhance it, we want to sit together a couple of times a year to think through what can be improved, do we need some localisation into particular markets, can we use this as an education document for installers... So we have lot of ideas going forward to further enhance the usefulness of this work to the market.

If certification like this were to be developed, who would be the obvious body to do this?

I can't refer to a particular name or institution at this point in time. UL was part of our group to develop this, but there's no preference at this point in time. We're just talking about the idea, but going there in real life will mean a huge amount of work; to develop this into real standards, where you have a checklist which can be applied – that won't come in six months, this is a long-term plan.

Could this apply to other markets outside Europe?

Yes, of course – the US already has similar documents. NREL [the National Renewable Energy Laboratory] and SunSpec Alliance released their O&M guidelines in early 2015; this was one of the sparking elements for our idea. And we see interest to apply or to work on something similar definitely from the Middle East, and markets in Asia-Pacific or Africa may apply these. PV is now becoming an industry, a matured player of energy generation. It has been a start-up atmosphere for a long time, but now it's getting to a more structured way of doing things, and this is just a very natural development what we are doing here. ■