



Satcon has installed many of its PV inverters on the field. What does this mean for installations and inverters now that the company has closed shop?

When manufacturers go bust

Inverters: It's been a while since Satcon Technology Corporation, a Boston-based large-scale photovoltaic inverter manufacturer, filed for voluntary bankruptcy. Their inverters however still remain on the field posing the questions of who looks after them when the manufacturer closes shop.

Satcon's aim in October 2012 was to reorganize its structure, improve its balance sheet and emerge from its financial troubles to continue providing its customers products and services they need. Unfortunately this did not materialize. Instead, in February 2013, after a few months of failing to receive a bid that satisfied the company's lender Silicon Valley Bank, Satcon's official closure was announced.

A vital question has emerged since then: How can solar park owners and operators ensure that their inverters will continue receiving operation and maintenance (O&M) services after the inverter manufacturer disappears from the market? Is it a straightforward process to find a service provider that can replace the old one and offer them the O&M quality they need? Michael Levi who worked for years

as an executive at Satcon tells **pv magazine**, "There was a shift in the approach to services at Satcon about one and a half years ago". This was driven by the fact that Satcon had widely distributed customer bases developed around large PV installations. Satcon's official website still informs customers that its inverters come with a standard 5 year unlimited hourly usage warranty covering service parts



Photos: Photon Energy

When inverters in the field are not maintained regularly, there is a possibility that they encounter serious problems that can jeopardize the entire PV system.

and labor employed in accordance with the company's Inverter Service Schedule. Many customers though, Levi says, purchased additional warranties which extended the initial 5 year warranty up to 20 years. "We had 24, 48 and 72 hour response resolution commitments included in our services," Levi explains. "In order to be able to offer customers such services, the requirement is to have technicians who are capable of responding very quickly," he adds. This was difficult because it required Satcon to fly technicians around very quickly and at high costs. Thus, Levi explains, another commonly adopted model was implemented. Partnerships with service providers distributed geographically alongside installations were made. Each of these service

providers had a network of technicians who were able to reach solar installations quickly and cost efficiently.

However, a critical point to necessity of this model was Satcon's need to provide the right training to service providers. "Servicing inverters is a delicate and very technically specific skill. Often a specific set of tools and knowledge is required. So we had to make sure the knowledge and the intellectual property required by service providers were catered to," Levi adds. Developing partnerships with O&M providers and training them to address Satcon inverter issues allowed Satcon to reap both performance and cost optimization benefits.

Two questions inverter companies who adopt this model have to answer are: How

many service providers need to be deployed and where exactly do they need to be stationed? The obvious solution would be to build the service centers around the customer base. However Satcon, as Levi tells **pv magazine**, did not wait for the solar parks to be first developed and then deploy service providers.

"We were often dealing with very large, utility-scale projects built around big sites and we had major responsibility in these installations; spanning from design of projects to development, completion and maintenance. So, we did not seek service providers after the sale. Neither did we try to find small service providers in different geographies. Rather we developed a network of providers before sales and trained these providers in

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Photo: Satcon Technology Corporation



A very common mistake made by PV park owners and operators is to save on maintenance measures.

our U.S. and Europe facilities according to our standards. In North America we had three such providers. In Europe we maintained geography-based servicing as we had a fairly well distributed fleet with partnerships in the Czech Republic and Greece,” Levi elaborates. One of the three Satcon service providers in North America was Trylon, an Ontario-based company, which was recently authorized by Satcon’s liquidation trustee to take over inverter field services for the fallen manufacturer. Levi now works for Trylon.

Since Satcon converted its bankruptcy to the Chapter 7 liquidation law, the bankruptcy court appointed a trustee to look for the best way to sell the assets. The trustee also decides upon Satcon’s operations and services. Satcon’s warranty obligations are part of the liquidation proceedings and there is a chance these will continue to be fulfilled. The liquidation process is still ongoing and will probably be concluded in the coming weeks bringing an end to the current uncertainties.

Levi did not want to comment on the liquidation process. However he tells **pv magazine** that Trylon acted immediately to ensure it got authorized by the trustee to take over Satcon’s inverter services. Trylon, Levi adds, has two clear advantages: a solid knowledge base and access to Satcon inverter spare parts.

Spare parts of inverters, whether or not the manufacturers still exist in the market, are basic requirements for inverter O&M. Some components are common for all inverters and can be found in the market. These are known as “shop components”. But a certain percentage of components are highly customized, better known as “specific components.” “Access to the supply chain of specific components is absolutely critical for service providers,” Levi adds. Photon Energy Group gathered momentum and acted quickly by employing a number of former managerial and technical Satcon staff in an effort to get access to Satcon’s intellectual property and know-how.

One of Satcon’s former staff working now for the Photon Group is Pavel Laurinec, an electrical engineer who is highly specialized in Satcon inverter know-how. Laurinec agrees with Levi in the opinion that a crucial move for O&M providers is that they must gain access to the intellectual property of a bankrupt inverter manufacturer. Additionally having access to spare inverter components would yield an advantage as well. Photon Energy, as Laurinec tells **pv magazine**, has access to both.

Replacing the old inverter

Inverters are not cheap and replacing them is not the first option to consider. Rather, fixing them is. But given there is no granted access to necessary spare components or an inverter cannot be fixed at all, replacing the old inverter with a new one would be the only way.

Nevertheless this is not as easy as it sounds and is definitely not a straightforward task either. There is a very high

possibility that some sort of technical modification on the new inverter would be necessary. "Every installation has its own technical characteristics and replacing an old inverter with a new one will most often require some technical modifications to be done so that the new inverter has similar technical characteristics as the one replaced," Levi explains. This ensures that the new inverter can communicate and work effectively with the installation.

Laurinec agrees on this point and also highlights, "The country where the installation is matters too because you might need to replace the transformer due to the differences in the voltage output of the unit. Satcon inverters' output voltages are 265 volts and this is not a European standard. So in this case you have to replace the medium voltage of the transformer in the substation unit."

Preventative maintenance

There are a couple of important aspects to cover with O&M services: repair and preventative maintenance. An installer who works with PV parks in Greece tells **pv magazine** that there are some instances

where developers rush to finish projects under tight deadlines. This can lead to a slipshod installation job, which in turn will require inverter servicing sooner rather than later. Laurinec elaborates that such carelessness is one of the reasons inverters break down often in the first couple of months after commissioning. He adds that after such a first round of servicing, the frequency of breaking down really depends on how maintenance is carried on in the months after.

Maintenance, as Laurinec suggests, should include checking all electrical connections at least once a year. Additionally inverters need to be cleaned too. Special attention needs to be paid to air filters and power cables that ought to be thoroughly checked a few times a year. Unfortunately, Laurinec adds, a very common mistake made is to save on such maintenance measures.

The risk here is that their installation ends up going offline as a result of the inverter breaking down. The best strategy, Laurinec suggests, is to adopt regular preventative O&M services that are undertaken by technicians who have expert knowledge on the machines they

service. Specifically for Satcon inverters, O&M service based on generic inverter knowledge and manuals provided by manufacturers is not possible. Satcon machines are highly sophisticated and require specifically trained engineers who have access to software packages and other knowledge necessary to fulfill the repairs or maintenance needed.

Peter Deege, Chief Commercial Officer at Photon Energy Group and former general manager for Satcon adds, "There is a difference between superficial maintenance and proper maintenance. The first option makes the installation look good, the second is actually preventing an installation from malfunction, preventing downtime. Unfortunately it is very difficult for owners of installations to judge what they are getting. I recommend owners select quality by asking for references and visiting the servicing company."

Furthermore Levi argues that the majority of PV park owners and operators underestimate the value of O&M. The preventative maintenance model not only brings costs down by curbing offline time, but also by increasing performance when the PV site is online. ♦ Ilias Tsagias

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