'Solar plants should work for 35 years'

Engineering, procurement and construction companies must take special steps to ensure that PV plants operate reliably and efficiently. Japan's ORIX Renewable Energy Management (OREM) is one such company. pv magazine recently caught up with Executive Vice President Kazuhisa Yurita to discuss the current challenges of O&M.

You are currently operating C&I rooftop systems and ground-mount solar stations in Japan. In terms of O&M, what are the differences you experience between the two asset classes?

In the C&I sector, it's approximately 400 assets, but in total is only 150 MW capacity. In the ground-mount sector, we have approximately 100 sites, but at 850 MW. Regardless of sizes and installation form, the access cost pertaining to maintenance is uniform. Therefore, we should take into account the proportion of maintenance costs relative to the total revenue. That also means that in ground-mount installations we proactively exchange spare parts as preventative maintenance, whereas on rooftops, we only practice corrective maintenance, exchanging broken equipment. This is simply because the financial impact of downtime is much bigger than the additional Opex to exercise preventive maintenance for ground-mount installations.

What are the common challenges in terms of O&M?

A big challenge of our 400 rooftop assets is, that during the time of construction we did not have a single policy on how to choose components and how to design the assets. The result is a multitude of unique plants. The challenge today is setting the Opex budget. In practice, we calculate the financial impact of materialized and potential defects,

Photo: ORIX Renewable Energy Management Company

Kazuhisa Yurita has worked in the upstream and downstream sectors of the PV industry, showing more than 14 years of experience. In 2013, he joined ORIX from where he established OREM five years later and has been serving as the new company's Chief Strategy Officer. At ORIX he continues to keep oversight over the companies solar fleet in his role as Head of Asset Management.

then we calculate the cost to fix the problem to see if the feed-in-tariff rate still justifies the cost of the repair. For our C&I fleet, this must be done manually for each site. By contrast, for our ground-mount systems we have automated most of these processes. Not just the monitoring but also the cost-efficiency calculation of maintenance work.

What role does procurement strategy play in this?

For the rooftop segment there was no procurement strategy a couple of years ago and that was a mistake for ORIX. But today, we only procure power conditioners, inverters and dataloggers from selected manufacturers. For us, suppliers must be highly bankable, with a good track record and reputation on reliability and demonstrate a high throughput. Huawei is among the list of suppliers that fulfil these requirements. With solar modules it is bit easier as no such strict procurement regime is necessary.

Why do you think it's important to optimize the O&M strategy of solar arrays?

That is pretty much the key. Making successive improvements in plant design to bring down Capex have been successful in the past. But under a high feed-in tariff regime for 20 years nobody cares about operational and technical asset management. It doesn't matter if you consider the rooftop or ground mount sector. In order to achieve a lower LCOE, we have to extend the lifespan of solar plants. The operational life should be 30 or 35 years, so that solar maintains a competitive edge against other energy sources.

"Under a high feed-in tariff regime for 20 years, nobody cares about operational and technical asset management"

What proportion of your portfolio features power electronics equipment to enable digital O&M?

Within our company I was leading the ground-mount sector nine years ago. So, from this time all the assets are equipped with digitally enabled equipment because I was the one insisting on them. Regarding the rooftop sector: I would say 20% of the assets have advanced digital communication features. If we invest additionally, 60% of the fleet could have these features. For the remainder there would be no economic rationality to retrofit such digital capabilities.

Is it possible to compare and quantify the improvements?

In 2014, we calculated to take JPY 3,300 ($26) per installed kilowatt-peak and year to run proper O&M on a 450 MW ground-mount project in Japan. Today, it will cost JPY 1,000, or a little less than one-third, to do the same job. But instead of letting O&M determine the cost reduction, we decided to take on more add-on services catered to improve profitability and improved the quality of maintenance with drone inspections and the use of AI since 2018. This shift has added to the cost of O&M. Based on the above, yearly O&M cost is JPY 2,100 per kilowatt-peak. Even with the increased O&M cost, the amount of revenue improvement exceeds the invested costs.

Some of Japan's early PV projects will reach the end of their FIT periods soon. Just how important are well refined O&M practices to be able to continue to run these 20-year-old plants?

The easy answer is that for every plant we need to take into consideration the cost and effect of an O&M measure. Without a high FIT the revenue per produced watthour becomes smaller. In that case there are fewer measures that are worthwhile applying. But the basic principle of calculating the loss resulting from a damage and matching that loss against the cost of repair to see if a repair is economically justified remains the same.

Drawing from your experience and practical perspective, what do you think can be done in future to improve digital O&M even further?

What I would suggest adding is artificial intelligence to calculate how much loss is accruing and then match that with cost to fix the problem. We can then make decisions based on the cost-effectiveness. We have currently installed that function to our software. What I would like to add as the next step is to include the CMMS. In this case, the system will learn conditions of each site, automatically changes the maintenance schedule and engineers will make certain actions based on it. Furthermore, I would also like to connect the weather forecast, eventually enabling the system to predict tomorrow's production. In two or three years, the operation will shift toward this direction for sure.