

## SPECIAL FEATURE

# Challenges for the distributed rooftop PV O&M Companies

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**D**istributed solar solutions (Installation of solar within client's premises over rooftop, ground, carports, floating solar etc) is fast becoming the preferred choice for commercial and industrial clients because it offers upfront savings of 20-60% in energy costs, gives visibility and control over long-term energy costs and serves as means to achieve sustainable goals.

Moreover, when compared to other renewable options, distributed solar offers the benefits of ease of deployment, quick execution, no transmission issues, no land acquisition costs and minimal maintenance. It is no wonder that the industry has been expanding at a rapid pace, and over the next 3 years it is expected to grow by 5-6 times to about ~15 GW.

More so, a large proportion of this portfolio is expected to come from OPEX projects where the off taker enters into a long-term power purchase agreement (PPA) with the project developer who in turn finances and owns the solar plant and is responsible to ensure its upkeep and the generation thereupon. The onus of generating desired ROI (return on investment) thus lies upon the developer.

As one of the leading developers in the country with an experience of having executed over 1700 distributed solar projects across 23 states in India and managing a portfolio of over 150 MWp, through the course of our 8 years journey, we have encountered several challenges and taken several measures to overcome them.

### Challenges:

**Shadow – the biggest enemy of a rooftop solar plant :** Shadows that can be caused due to surrounding obstructions such as chimney, pillars, surrounding building, overhead cables, surrounding vegetation, trees etc. Sometimes, in order to adhere by client's requirements and maximise the capacity at their location, the plants are laid over regions of partial shadow. However, the resulting loss of generation due to the shadow effect can be huge and reduce your ROI drastically.

We use state-of-the-art software which tracks sun's move-

ment as per time of the day and also factors in different season and thereupon conduct 3D shadow analysis to design our plants optimally. Chemical treatment can help shunt the pace of growth of vegetation. Also, wherever applicable, regular trimming of trees is undertaken to ensure they do not cast shadows over the solar plant.

**Inadequate off-taker infrastructure:** In many cases the client's infrastructure does not conform to the solar norms. It starts with client's electrical infrastructure which sometimes causes in voltage fluctuations. To overcome the problem, the inverter starts pushing higher voltage which results in frequent tripping of the inverter. Even poor load balancing at the client's end leads to inverter tripping and generation loss. Lastly, grid and load fluctuations affect the life and functioning of string inverters.

The above problem can be avoided by undertaking a comprehensive site-survey and ensuring a detailed load analysis is conducted at the client's facility. Separately, at Fourth Partner Energy, our plant design team is segregated into structure and electrical team with specialist in each team and their designs are required to conform as per a detailed check list.

**Insufficient module cleaning:** Perhaps, one of the simplest yet most ignored factor is timely cleaning of modules. Losses due to soiling (dust and bird droppings) depend upon the environmental conditions, pollution, and cleaning strategy as defined in O&M contract. The frequency of cleaning in areas prone to high dust (such as ceramic factories) should be higher rather than be subjected to some thumb rule as weekly / fortnightly.

One missed cycle of module cleaning, results in around 3%-5% drop in generation and the loss on annual basis can be as high as 15% due to infrequent / ineffective cleaning.

The above problem can be combatted by having robust cleaning contracts. Separately, with the assistance of our in-house plant monitoring app, we monitor plant generation and use generation from plants in close proxy as a metrics to identify plants where generation is not up to mark. We are also testing waterless robotic cleaning which will help

eliminate the use of water and stand to be more efficient than human labour.

**Close proximity of Service Team to solar plants:** During downtimes, the time taken to resolve the problem can play a huge factor in curbing the loss thereof. The resolution time is usually based on proximity of service engineer from the plant (time to travel) and technical prowess.

At Fourth Partner Energy, we maintain dedicated service teams in 10 strategic locations across the length and breadth of India such that the team can reach the plants within 24 hours in case of any technical issue. Also, each engineer is subjected to extensive training to ensure their technical prowess. We also train client's personals to tackle minor regular run of the mill problems.

**Inadequate stocking of spare parts stock at individual sites and lack of standardisation:** One of the challenges that distributed solar plants pose is that they are too small in size to maintain an adequate stock of spare parts. Moreover, they lack standardisation in terms of make of modules and inverters.

While stocking spare parts at the individual sites is not practical, we maintain adequate inventories at our strategically located stockyards in Gurgaon, Pune and Hyderabad to ensure the transit time is minimised as far as possible.

Lastly, it is often wrongly assumed that only routine O&M costs will be incurred for entire contract period. Project owners must budget for refurbishment of projects in order to improve plant conditions and performance.

**Inadequate PF control systems:** Power factor is the ratio between the utilized power and the generated power. If the load is resistive, i.e., when there is no reactive power, the entire power generated is utilized. However, when the load is other than resistive, some generated power is consumed as reactive power and leads to power loss.

Solar power plants always inject active power and the requirement of active power from grid reduces but the overall reactive power remains the same. In places where inadequate PF systems are installed, this phenomenon leads to power losses.

The above inefficiency can be combated by installing adequate capacitor bank into its APFC panel with the correct reactive power requirements.

**Underdeveloped OEM technical support and expertise:** The distributed solar energy industry is growing rapidly, which has attracted many players to enter manufacturing of major components like modules, inverters etc. While a lot of stress is laid upon the quality of components, many developers tend to oversee their service reliability and other aspects such as service network, technical skill, timely software/firmware updates, etc. This results in delays in providing timely service during downtime which can lead to unnecessary losses. This even extends to support on timely replacement of equipment and parts that fall under warranty.

At Fourth Partner Energy, we conduct detailed evaluation of our suppliers and their support capabilities before we onboard them as registered vendors.

**Security and Safety:** Security of plant and components is critical as they may be subject to theft or vandalism. There might be adverse impact due to negligence of staff within the off-taker's premises or due to wildlife surrounding the property. Presence of rats, pigeons, squirrels etc can cause damage to the cables in the plant.

As separate security personnel cannot be assigned to each rooftop asset, off-takers generally assume the responsibility of the safety of the asset, since they already maintain security at their premises. This is usually factored in the PPA.

**Single point DISCOM Termination:** In some states such as Maharashtra and Karnataka, the DISCOM permits only a single termination point for grid level injection. Most rooftop systems are distributed across multiple roofs/areas. This requires the developers to lay cables from each roof to the single point termination which leads to cable losses.

Standardisation of policy across states and make them more developer-friendly is required to overcome this problem.

### Policy support expected:

The following are a few policy measures that can help remove operational hurdles and support the growth of distributed solar industry:

- Credit risk mitigation initiatives like instituting a CIBIL like score for utility payments and disconnection by DISCOMS on defaults will substantially improve the confidence of developers for installing OPEX projects in the premises of off-takers.
- In the recent time, some of the government tenders give unfair benefit to the off-takers where deemed generation due to power outage or DG running is not applicable. This leads to the Developers taking a hit on their P&L due to no fault of theirs. The PPA needs to be amended to include deemed generation for effective pricing and control.
- CEIG and net-metering process needs to be streamlined in order to ensure that plants can generate to their full capacity soon after installation of plant is completed.
- In states such as states such as Maharashtra and Karnataka, DISCOMS should allow for multiple termination within common premises in order to reduce cable losses.
- There is a serious lack of technically skilled labour in the market. Considering the scale at which the solar market is growing and the opportunities it presents for job creation, the government and private institutes should initiate vocational courses where the necessary technical skillsets are imparted and industry-ready labour is churned out. ■