

Future of Solar O&M in India

Changing Landscape, Growing Role of Digitisation and New Opportunities

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1. EXECUTIVE SUMMARY

Solar plants are built to last 20-25 years. After the engineering procurement and construction period is completed, developers need to ensure that the operations and maintenance (O&M) activities are seamless for sustained energy generation over the project lifetime. The report will highlight the emerging opportunities in this space and the growing role of new technologies like automation and artificial intelligence.

2. MARKET OVERVIEW

In the initial years of solar power development in India, O&M was often coupled with EPC and performed by the same vendors, but of late, solar O&M has emerged as a separate market with its own landscape, trends and dynamics. This chapter will cover the following areas:

- ❖ Current size of the solar O&M market
- ❖ Market size by segment
 - Utility-scale
 - Rooftop
 - Canal-top and floating solar
- ❖ Key growth trends and drivers
- ❖ O&M Evolution - Reactive to Predictive Analysis
 - Applications in solar O&M
 - Cost and time savings
- ❖ Emerging Role of Energy Storage
- ❖ Key issues and concerns

3. COST TRENDS

The cost of O&M services has been declining over the past few years and the downward trend is expected to continue. The cost composition itself is changing due to greater automation and use of advanced tools. This chapter will cover the following areas:

- ❖ Solar O&M cost trajectory (2012-18)
- ❖ Cost breakup analysis
 - Vehicles and logistics
 - Equipment and tools (Inverters, cables, modules, civil structures, transmission, etc.)
 - Overheads
 - Personnel/Manpower
 - Digital
 - Others
- ❖ Cost projections (2019-24)
 - Business model evolution
 - Key cost considerations
 - Impact of scale
 - Impact of energy storage
 - Future cost estimates

4. EMERGING O&M BUSINESS MODELS

Globally, there has been a rise of third party solar O&M service providers. As more sophisticated and structured approach emerges in the solar O&M market, third party providers are able to deliver more value to solar investors and owners. This chapter will cover the following areas:

- ❖ Capex-based
- ❖ Profit-sharing
- ❖ Fixed cost
- ❖ O&M extensions
- ❖ Others

5. TERMS OF O&M CONTRACTS

It is important for both developers and O&M service providers to clarify and list out their expectations and accordingly draw up a long-term contract. An effective contract will result in higher plant efficiencies. This chapter will cover the following areas:

- ❖ Time periods
- ❖ Product warranties
- ❖ Performance guarantees/SLAs
- ❖ Penalties
- ❖ Ownership
- ❖ Legal terms

6. GRID MANAGEMENT BY O&M PLAYERS

As the government becomes stricter in its implementation of forecasting, scheduling and deviation settlement mechanism regulations, grid management will become a key component of O&M players. Integration of energy storage on to existing plants will lead to a greater O&M play. This chapter will cover the following areas:

- ❖ Forecasting and scheduling
- ❖ Deviation settlement management
- ❖ Integration of energy storage into existing plants
- ❖ Cost implications
- ❖ Experience so far

7. O&M COMPANY PROFILES

A large number of O&M focused players are coming up, some as hive-offs from existing EPC companies and others as independent specialists. This chapter will have 5-8 profiles of key O&M players in India covering the following:

- ❖ Project portfolio
- ❖ Service offerings
- ❖ Technology tie-ups
- ❖ On-ground experience
- ❖ In-pipeline capacity
- ❖ Etc.

8. DIGITALISATION AND AUTOMATION AT PLANT LEVEL

Digitalisation and automation will play a key role in providing efficient O&M services, thereby changing the current O&M cost composition, which is currently dominated by manpower expenses. New technologies are being adopted for improving asset lifecycle management, predictive maintenance, remote sensing and control, cloud computing, and use of drones for visual imaging. A number of companies have also already started using robotics for cleaning modules. This chapter will cover the following areas:

- ❖ Emerging role, applications and use case for the following
 - Manpower and material management
 - Automated monitoring and big data analytics
 - Robotics, drones and wearables
- ❖ Growing role of artificial intelligence
 - Machine learning applications
 - AI field assistants and predictive analytics
 - Existing use cases
- ❖ Key technology providers

❖ Industry Perspective

(Views of key personnel from the solar O&M industry and technology providers on the growing role of AI, robotics and data analytics)

9. KEY CHALLENGES, BEST PRACTICES AND CASE STUDIES

The lack of attention given to O&M practices is one of the primary challenges that the segment is facing. If the plant is not maintained properly, developers can lose up to 15 per cent of the returns. This chapter will cover the following areas:

- ❖ O&M challenges matrix
- ❖ Best practices (Globally and in India)
- ❖ Case studies (This will cover successes and failures of various technologies, business models and strategies adopted by O&M players)

10. PROJECTED O&M MARKET SIZE (FROM 2019-20 TO 2024-25)

The total addressable market for solar PV O&M is expected to reach 30 GW in 2018-19. It is likely to more than triple by 2022 to exceed 100 GW. In fact, going forward, as the installed base gets larger, O&M revenue may even exceed the development and construction revenue. This chapter will cover the following areas:

- ❖ Impact factors
- ❖ Emerging O&M industry structure
- ❖ Short-term projections
- ❖ Medium-term projections
- ❖ Long-term projections

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