

## Improving Solar Farm Operating Performance and Return on Assets

By Ralph Rio

[Larsen & Toubro](#) (L&T) provides technology, engineering, construction, manufacturing, and financial services for projects in the hydrocarbon, infrastructure, power, process manufacturing and defense industries. Its L&T

Effective plant management requires visibility into operations and maintenance, including dashboards for KPIs and analytics. L&T Solar achieved this while controlling project risk with the LTI OPERA platform. ROA improved with higher revenue and lower costs.

Solar division designs and builds solar power plants with a range of capacities and has gained expertise in a variety of solar technologies. ARC Advisory Group recently had the opportunity to interview Mr. Milan Kumar, Head, Engineering & Services, L&T Solar, which applied [LTI OPERA](#) framework for operating and maintaining distributed industrial assets in 19 projects.

### Solar Power Plant Management

With few moving parts compared to other forms of power generation, a solar farm may appear to be easy to operate. But, those solar panels employ a complex set of physical and electrical characteristics for converting



**125 MW CSP Project on 600 Acres in Rajasthan, India**

sunlight into electric power and transferring that power to the grid. This applies to both photovoltaic (PV) panels that convert sunlight directly into power, and concentrating solar power (CSP) systems that focus sunlight to heat water into steam that is usually sent to a turbine for power generation.

Achieving high performance in meeting service level agreement (SLA) requires data acquisition, monitoring KPIs, and managing of power output and quality. To achieve the needed visibility into current conditions and supervisory control, L&T Solar turned to sophisticated software from another division of parent company, LTI (formerly known as L&T Infotech).

## Solar Plant Control and Data Acquisition

L&T Solar designs and deploys a SCADA system for controlling and operating solar farms. This system obtains process parameters, alarms, and events, and other real-time data needed to effectively monitor and control the solar panels.

LTI's OPERA gateway transfers the data from the SCADA system, and uploads it to the OPERA application in the cloud for analysis, reporting, and monitoring SLA metrics. L&T Solar engaged with LTI, and leveraged its information technology skills to implement OPERA with cloud computing in multiple solar farms.



**20 MW Solar PV Power Project, Gujarat, India Covering 149 Acres**

## Visibility and Performance Management

OPERA (Operational Analytics), a cloud-based platform, ingests, manages, analyzes, and visualizes the data. The typical application is a decision support system enabling real-time analysis that provides greater transparency for operating and maintaining a plant. OPERA provides a means to improve the efficiency and productivity of distributed assets with a fact-based, central view of performance.

OPERA identifies specific operational efficiencies like improvements in capacity utilization, forecasting plant generation, and efficient chemicals usage. It is integrated with an alert and service management tool, providing operators, plant managers, contractors and investors a unified view of operations. Typical applications include operations in solar power, water distribution, and wastewater treatment plants.

## Benefits with OPERA

“OPERA for Solar Plant uncovers insights that allow us to engage in new ways and make decisions with confidence,” said Mr. Kumar. “Integration of information technology, IoT and PV paves the way for more efficient plant performance and lower cost of ownership throughout the power plant lifecycle.”

Mr. Kumar identified several key benefits that LTI OPERA can (and has) delivered in demanding solar plant environments:

**Reduced project risk:** OPERA comes with libraries and analytics that are easily customized for solar applications. This capability reduces project risk for delivery on time, on budget, and within specifications.

**Predictive maintenance:** The analytical tools provided with OPERA are a good fit for predictive maintenance (PdM) applications. Unplanned downtime has a significant impact on SLAs, and PdM mitigates much of this risk. Also, replacing preventive maintenance with PdM typically reduces maintenance costs by 50 percent, since the maintenance is performed when it is truly needed, rather than when anticipated. A specific example applies to cleaning solar panels - a non-trivial expense for these huge solar farms with acres of glass.

Today, OPERA alerts go to a person in operations where supervisors do triage to determine next steps. The plan is to integrate the alerts with the enterprise asset management system to automatically generate a work order for scheduling by the maintenance planner.

**Higher profitability:** OPERA contains pre-built dashboards and alerts used to improve the operational performance of solar panels. Applying OPERA in solar farms has improved the capacity utilization factor, which has a direct impact on revenue generation. At the same time, the improved

asset management helped reduce operating expenditures by up to 10 percent OPEX. Together, the improved revenue and lower cost has a significant impact on business performance and return on assets (ROA).

### **Lessons Learned**

For application development, Mr. Kumar recommended that the data be well organized upfront, including hierarchy, transport, and security. Making changes later involves significant rework and potential project delay. Changes will occur, and this business process needs consistent and well-communicated governance. Also, Mr. Kumar stressed that the operators must be properly trained – a key step that, if overlooked, often devolves operations into ad hoc decisions and manual workarounds.

### **About LTI**

[LTI](#), a global technology consulting and solution company with operations in 27 countries, helps its more than 250 clients succeed in converging the physical and digital worlds. Founded as a subsidiary of the Larsen & Toubro Group, LTI celebrates its 20<sup>th</sup> anniversary in 2017. The company brings real-world experience and expertise with the Mosaic platform for mobile, social analytics, IoT and, cloud to help clients with their digital transformation. LTI offers enterprises a suite of proven [IoT solutions](#) and IoT mobile applications based on the Mosaic platform.

### **About L&T Solar Energy**

L&T Solar Energy, a strategic business unit of L&T's Construction division, delivers turnkey EPC services for utility-scale PV and CSP plants, decentralized solar PV systems, micro-grids, smart-grids, and CSP power plants. Currently, L&T Solar has a portfolio of 800MW and larger solar projects completed or in-process in India. It also manages 235MW of PV solar power plant assets.

### **Conclusion**

Using an established software platform, like LTI OPERA, for an IT project can help significantly reduce risk for completing large projects such as solar farms on time, on budget, and within specifications.

Increasingly, these types of projects involve software applications that use a variety of technologies. For the typical industrial organization, attempting development with internal resources is often impractical because of the needed range and depth of expertise. Global service providers, such as LTI, can “map in” the appropriate technical resources as needed during a project to help speed time to benefit.

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