



building renewables **infrastructure**



# The Indian CONSTRUCTION GIANT

L&T Construction, India's largest construction organization and ranked among the world's top contractors, has been transforming cityscapes and landscapes with structures of immense size and grandeur for several decades. The organization's capabilities span the entire gamut of construction – civil, mechanical, electrical, and instrumentation engineering – and its services extend to all core sector industries and infrastructure projects.

Several of the country's prized landmarks – edifices, structures, airports, industrial projects, flyovers, viaducts, water and power infrastructure projects – carry L&T's signature of excellence in construction. Today, more and more structures beyond India's boundaries are standing tall, thanks to L&T Construction.

L&T Construction straddles eight related businesses:

- Buildings & Factories
- Heavy Civil Infrastructure
- Transportation Infrastructure
- Power Transmission & Distribution
- Renewables
- Water & Effluent Treatment
- Minerals & Metals
- L&T GeoStructure

## Over eight decades of **UNDISPUTED LEADERSHIP**

Larsen & Toubro is an Indian multinational engaged in EPC projects, hi-tech manufacturing, and services. It operates in over 50 countries worldwide. A strong, customer-focused approach and the constant quest for top-class quality have enabled L&T to attain and sustain leadership in its major lines of business for over eight decades.

EPC PROJECTS	
CONSTRUCTION	ENERGY
HI-TECH MANUFACTURING	
HEAVY ENGINEERING	DEFENCE
SERVICES	
IT SERVICES	TECHNOLOGY SERVICES
DIGITAL SERVICES & E-COMMERCE	
FINANCIAL SERVICES	
OTHERS	
REALTY	SMART WORLD & COMMUNICATION
CONSTRUCTION & MINING MACHINERY	
RUBBER PROCESSING MACHINERY	VALVES

## Building landmarks, setting benchmarks\*

- **12** International Airports
- **330,000+** IT Seats
- **84,000+** Dwelling Units
- **95+** Manufacturing Facilities
- **27,000+** Hospital Beds
- **500,000+** km of Water & Wastewater Networks
- **12,400** MLD of Water & Wastewater Treatment Plants
- **1.1 million+** Hectares of Land Being Irrigated
- **935** EHV Substations
- **48,355 ckm** of Transmission Lines
- **100,000+** Habitations Electrified
- **20+** GWp Portfolio of Solar Plants
- **436** km of Metro Rail Corridors
- **468** km of High-Speed Rail
- **23,528** Lane km of Roads, Interchanges, & City Infra
- **12 million** Sq. m. of Runways
- **12** Nuclear Power Projects
- **6,129** Tkm of Railway Track Laying
- **21,872** Tkm of Railway Electrification
- **47 million** tonnes of Hot Metal (Iron) Making
- **21** Blast Furnaces
- India's Largest City Surveillance Project: **6,000** cameras at **1,500** locations at Mumbai

\*The track record information published here is as of May 2024



209 MWp/190 MW Solar Tracker Project, Karnataka

# INDIA'S LARGEST SOLAR EPC PLAYER

Conventional energy is finite. To light up tomorrow's world you need imaginative, innovative solutions. L&T Construction has developed the capability to provide solutions for every challenge under the sun.

L&T is one of the leading players in Renewables Business. It has a track record that includes execution of some of the largest solar plants in the country. L&T has proven EPC capabilities in offering economically viable and technically superior solutions for solar power plants. The comprehensive range of design and construction services includes:

## SEGMENTS

- Utility Scale Solar PV
- Floating Solar
- Micro-grids and Mega Rooftops

## SOLUTIONS

- Mobisol
- L&T Tracker
- Automated Module Cleaning System

## PRODUCTS

- Battery Energy Storage Systems (BESS)
- Solar Pumps
- Battery Energy Storage Container Solutions

22 MWp Solar PV power plant at Rajasthan



324 MWp Fixed Tilt Solar PV Project at Rewa Ultra Mega Solar Park (RUMS), Madhya Pradesh



2x11 MWp with 16 MW/8MWh Battery Energy Storage System, Andaman



125 MWe CSP project Rajasthan



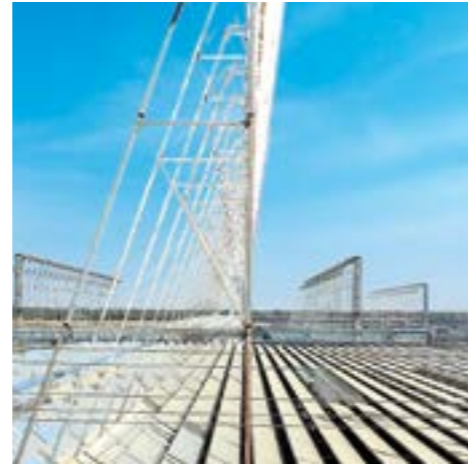
7.5 MWp solar rooftop PV system at Beas, Punjab



Automatic dry cleaning of solar PV modules



Crystalline - Si module technology based grid connected PV



Asia's largest CSP plant 125 MWe solar thermal power plant (600 acres) at Pokhran, Rajasthan



Thin film A-Si technology



Tracker technology



Central inverters



Thin film CdTe technology

# KNITTING A GREEN ZONE

## Grid Connected PV (Utility Scale)

Having a project portfolio of 5 GWp+ of solar projects under construction & commissioned in India & Abroad, L&T provides technologically agnostic, independent and flexible utility solar power projects with a high bankability factor. L&T's solar projects are characterized by speed of execution, superior quality and optimum land requirement.

# COMPLETE SOLUTIONS FOR FLOATING SOLAR SYSTEMS

## L&T commissioned One of the First Floating Solar Projects in India

L&T's Renewables business unit commissioned a first-of-its-kind project to set up a 4 MW Floating Solar Power Plant for Tirupati Smart City Corporation (TSCCL) at the Kailashgiri Reservoir, under the Smart City Mission of India. The scope of work included design, procurement, supply, installation, testing, commissioning, operation, and maintenance for ten years along with grid connection at 33 kV voltage. The company's offerings perfectly adapt to various sizes of floating solar projects with reliable options for end users.



4 MWp Floating Solar PV Project, Tirupati



## BATTERY ENERGY STORAGE SYSTEM

### 24X7 Stable Renewable Power

L&T's Containerized solution for Battery Energy Storage System (BESS) is an all-in-one- design including cutting-edge power electronics, state-of-the-art control systems and advanced battery technologies. With flexible and scalable design options, L&T offers a range of solutions ranging from KW to MW Scale. Further, to provide immediate benefit to the customer, the storage solution is specifically designed for Plug and Play, which helps in reduction of installation time dramatically.

#### Applications

- Energy Time Shift
- Renewable Firming
- Voltage Support
- Frequency Regulation
- Demand Response
- Peak Shifting
- Diesel Abatement
- Supports solar wind hybrid solutions

#### Containerized BESS with

- IP Protection
- Access Control
- Fire Protection
- Temperature Control
- Web SCADA
- EMS Controller

#### Features

- Intelligent Energy Management System
- ON Grid & OFF Grid functionality
- Black Start Possibility
- Balancing between renewable energy sources and load/consumption
- Grid Stabilization
- Reactive Power Adjustment
- Reduction of CO2 emission through renewable integration

# L&T MOBISOL

## Ensuring seamless power supply in a modular format

L&T MobiSol is an integrated containerized system consisting of PV modules, smart inverter technology, battery and/or diesel generator with an intelligent control system. It offers customers reliable and un-interrupted power supply whenever and wherever required typically for townships, islanded resorts, commercial and industrial applications. The advantage of this unique system is that it is rapidly deployable for meeting the power demands at a very low-cost operation due to easy transportation, low maintenance and minor preparatory work at site.



### Product Features

- Modular design with separate cabinet for battery, inverter and other equipment
- Higher IP grade ensuring safety and reliability
- Reduction in CO2 emissions
- Factory testing of the assembled system
- Possibility for 24x7 power supply without any interruption
- Robust roof-top mounting type and collapsible type designed for solar module fixing
- Electrical protection inbuilt
- Easy transportation from one place to another
- Highly flexible and scalable solution from single container solution to +100KW modular container(s) solution



Inside view of CIF Factory



Test lab and Testing Facility



Skilled workforce

## BESS INTEGRATION FACILITY

The BESS Integration facility at Kanchipuram is a state-of-the-art facility for integrating electrical and mechanical components into the containerized system. Along with integration, various tests are carried out on the integrated containers, by replicating the site conditions to ensure smooth operation at sites.

### Features

- Powered by green energy - 100kWp Solar PV + 12kWp BIPV + 250kWh BESS
- Capacity of 300 MWhr in a single shift basis
- Capable to integrate multiple containers (12nos of 20ft / 6nos of 40ft) in parallel
- State Of The Art testing facility to ensure full fledged fat
- Capable to simulate & test BESS applications like PV smoothing, ancillary services, spinning reserve etc.
- State Of Art testing facility containing PV simulators, grid emulators, load banks, DG & BESS systems





# SOLAR PUMPING SYSTEM

## Multiple benefits for investors

L&T's Solar Pumping System is a state-of-the-art in-house developed technology that offers customized solutions for diverse applications with a wide range of configurations comprising automatic tracking system, early start & late stop: extended operating hours, enhanced and stable water output upto 30%, improved access to power and water, advanced diagnostics & alert management system, easy to operate, safe, simple installation, negligible maintenance & running cost.

### Application

- Irrigation & Sprinklers
- Customized solution for Schools & Education Institutes
- Industrial Water application
- Drinking Water
- Customized Solution for Health Centers & Hospitals
- Solarization of Existing Grid Connected Pumps



# INTEGRATED TRACKER SOLUTIONS

In-house developed tracker mechanism with multiple benefits for developers

L&T's unique design patents in tracker technology deployed in its tracker projects enable maximizes harnessing the power of the Sun. The Horizontal Single Axis Tracker (HSAT) system is one such L&T product that offers multiple benefits for the developers.

### Design Specialization

- In-house developed sturdy modular design
- Flexible row / block arrangement for better land utilization
- Unique safety interlocks for safe operation
- Tracker controller interface with GPS for real time correction
- Standard off the shelves maintenance friendly OEM components
- 1500V DC system compatible
- Suitable for undulated and sloped ground profile

### Aligned to international quality standards

- Wind tunnel testing
- Engineering validation
- Industrial grade type testing ensuring reliability
- Bankability Assessment
- Approved make by renowned IPPs



# i-LSTK INTEGRATED LUMP SUM TURNKEY SOLUTIONS

L&T is committed to playing a significant role in the arena of renewable energy by spearheading the green revolution in India. Over the years, L&T has gained expertise in different solar technologies to design and execute solar power plants including financing assistance for solar projects of different capacities.

**Pre-bid Services:** L&T provides bid management services and load-flow study coordination to key clients and developers interested in bidding for projects under various national and State policy tenders in a pre-bid alliance mode.

**Project Development:** Complete end-to-end solutions are offered including pre-feasibility analysis, economic feasibility analysis, technical assessment, land arrangement, solar farm site evaluation and selection, power purchase agreements and grid connectivity along with permits and regulatory approvals.

**Project Finance:** L&T's project management team offers equity and debt financing support through financing institutions, as well as assistance through in-house financial consultants.

**Engineering:** A core team of in-house design experts uses cutting-edge software to design the layout and choose the best technology for a solar farm. L&T produces optimized designs for lowest LCOE and higher ROE after a thorough study of the long-term energy prediction analysis.

**Procurement:** Access to the best technology solutions is facilitated by L&T's wide experience across a global supply chain and long-term component partnerships it shares with supply partners. L&T's JIT techniques optimize resources and provide ISO and OHSAS-certified facilities for manufacturing structures.

**Construction:** World-class construction management and planning with single-point responsibility give L&T an edge over competition. Timely project completion is ensured within the estimated budget, thus establishing a long-term sustainable solution for the customer in the shortest time.



## OPERATIONS & MAINTENANCE

Post commission, monitoring, operations and maintenance support with tailor-made O&M packages for seamless operation (Turnkey +) is also on offer. Apart from established processes and procedures for proactive and reactive (breakdown) maintenance, L&T offers 24x7 site surveillance support for very large solar farms. Smooth functioning is ensured using a remote monitoring system at L&T's HQ in Chennai, real-time plant technician support and a well-networked communication channel with transmission / grid operator and plant owners.



Grid connected approval



Solar park concept



Facilitation of land



Power distribution



Monitoring systems





# ENGINEERING, RESEARCH & DEVELOPMENT

## Engineering tomorrow's technology, today

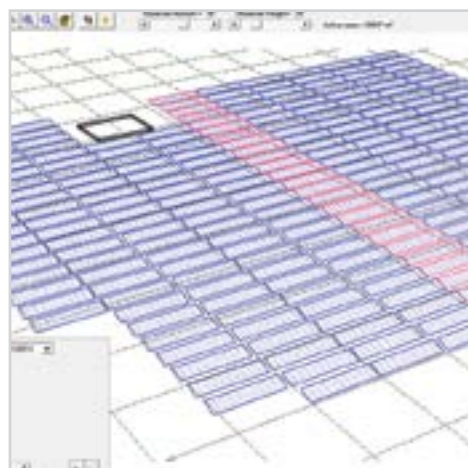
With in-house developed technologies like BESS and 'Mobisol' (L&T's containerized energy solutions), we are forging the future of sustainable energy. L&T's talent pool of design engineers actively incubates various technologies and has derived valuable insights on different aspects of solar power systems. The state-of-the-art design team at Chennai delivers cost-effective solutions using the latest software and the designs are accredited by leading financial institutions and technical agencies. A core team interacts with global technology suppliers in the solar domain to constantly enhance knowledge and optimize design options for Indian conditions. A special team of foundation engineering experts have developed unique structural designs and innovative techniques to hasten the construction process.

Design optimization includes:

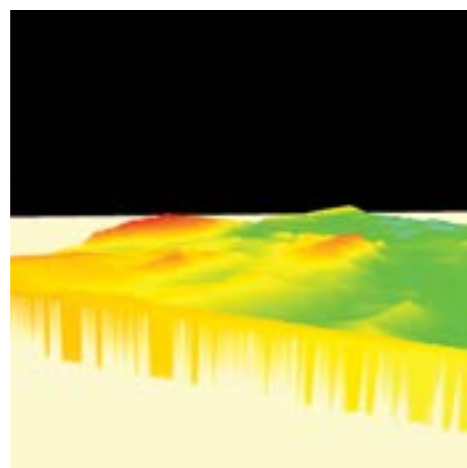
- Selection of solar components for maximum power
- Optimum string and array design
- Shadow analysis for optimization of array layout
- Optimization of cabling, junction boxes and control rooms



2.5 MWp East-West Solar PV Plant



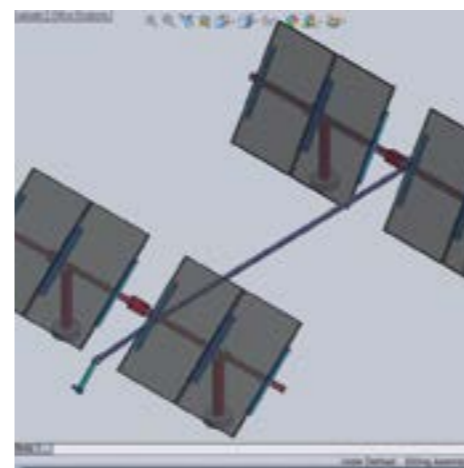
PVSYST



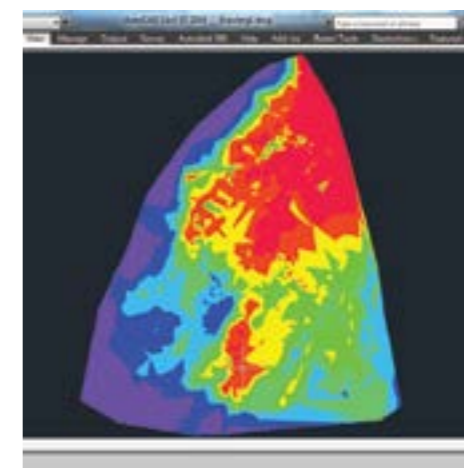
Global Mapper – Terrain Model



Stadd Pro



Solid Works



Civil 3D



Work in Progress at a Solar PV Plant

## PROJECT MANAGEMENT

L&T's project management teams have repeatedly demonstrated their ability by delivering complex projects ahead of time even under critical conditions and stringent timelines. With perfect understanding of the fundamental drivers in the sector, L&T implements world-class project management practices in all its projects and meets the core criteria of shortest gestation time from conceptualization to commissioning. This is evident from the hallmarks of execution in the Indian solar industry. L&T has executed the largest and fastest solar power plant projects in India and has emerged as the No.1 EPC player, providing solutions for various solar technologies. L&T's global sourcing capabilities include:

- GPS enabled advanced monitoring systems for tracking the flow of goods
- JIT techniques for optimization of resources
- Strategic long-term component partnerships with supply partners
- Creating value in projects by awarding contracts to local contractors and logistic companies

## SAFETY AND QUALITY

At L&T, Environment, Health & Safety (EHS) is considered a core value. Systems and procedures have been established for implementing the requisites at all stages of construction and are accredited to the International Standards of ISO 9001, ISO 14001 and OHSAS 18001. L&T continues to maintain its tradition of meeting stringent quality standards and adherence to time schedules across all projects.



Safety orientation



Project managers at work



Hands-on training at Construction Skills Training Institute (CSTI)



CSTI trainees being oriented



Project monitoring



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