Powered for Performance

L&T Construction
Power Transmission & Distribution
An eye on the morrow and beyond. A firm footing in past experiences. A contemporary outlook that nurtures growth and development. These are characteristic of Larsen & Toubro (L&T) and its distinct leadership qualities.

L&T Construction, the construction arm of Larsen & Toubro is the largest construction organisation in India and is ranked 27th among the world’s 225 top contractors (as per ENR, USA - August 2012). L&T Construction’s leading edge capabilities cover every discipline of construction: civil, mechanical, electrical and instrumentation engineering and services extend to all core sector industries and infrastructure projects with single source responsibility.

L&T Construction is equipped with the requisite expertise and wide ranging experience to undertake Engineering Procurement and Construction (EPC) projects with single source responsibility.

The Power Transmission & Distribution Independent Company (PT&D), one of the restructured companies of L&T Construction is a powerful player in the field of power transmission and distribution. PT&D offers integrated solutions and end-to-end services ranging from design, manufacture, supply and construction to commissioning in the field of overhead high voltage transmission lines, substations, distribution projects and industrial electrification in the domestic and international markets.
PT&D provides comprehensive system engineering including integrated project electrification works for a wide range of industrial and infrastructure projects involving:

- Turnkey execution of EHV air/gas insulated substations
- Power quality improvement works
- Electrical works for infrastructure projects
- Industrial electrification and Instrumentation
- E-BoP and I-BoP for power plants

The industry leadership of L&T is reflected in its over 70 years of expertise spanning across wide ranging strengths and capabilities:

- In-house engineering
- Project management
- Sourcing and selection of vital equipment
- Quality assurance and quality control
- Inspection, testing and commissioning
- World class safety

With solutions ranging from complex energy management systems to sophisticated power, lighting and environmental control systems for project electrification including the modern building management services, L&T offers total solutions to deliver the ever-increasing levels of speed, sophistication and safety.

L&T is the employer of choice for its innovative solutions and best practices and 24x7 trouble free operation of sophisticated electrical equipment for mission critical operations in process plants, modern intelligent office buildings, commercial complexes, health care institutions meeting specific requirements of its clients.
Engineering Design Research Centre (EDRC), the design arm of PT&D provides comprehensive design, detailed engineering and consultancy services for UHV/EHV, AIS/GIS substations / distribution stations and all types of industrial projects. EDRC is ISO 9001:2000 certified and it has over 250 engineers in electrical, instrumentation, structural and civil disciplines to provide accurate, faster and cost effective solutions to customers.

EDRC has carried out detailed engineering for over 200 projects in the voltage range of 33 kV to 765 kV comprising of:
- Indoor gas insulated substations
- Outdoor UHV/EHV substations
- Power evacuation switchyards
- Distribution substations
- Industrial electrification including instrumentation

It has gained extensive expertise and specialization in:
- Control, protection and substation automation
- Field bus based automation for process plants
- HAZOP solution studies and safety instrumented system

Distinctive feature which sets apart L&T from the rest includes:
- State-of-the-art simulation laboratory (with latest IEC 61850 protocol) in Kancheepuram to provide hands on experience on control and protection
- Continuous up-gradation of engineering skills and knowledge through in-house training programmes
- Technology tie-ups/interaction with leading educational institutions and R&D organizations for special studies
- Substation engineering design using of latest IT tools/softwares viz., ETAP, PSCAD and CYME CO-ORD
EHV air/gas insulated substations

With India’s Power system poised for accelerated growth, 1200 kV AC has been adopted as the next transmission voltage level in the country.

As one of the prime players in the power transmission and distribution field, L&T is making significant contribution in pioneering total solutions for ultra high voltage substations.

L&T commissioned India’s first 765 kV AIS substation for Uttar Pradesh Power Transmission Corporation Limited at Unnao and is also executing the country’s first GIS substation at Pune. L&T charged a first-of-its-kind 1200 kV AIS bulk power transformer for PGCIL’s Bina test station. The Company has executed many gas-insulated substations in India and abroad and gained specialization and industry expertise in this area. Services include:

• Complete system design for EHV switchyard
• Design and manufacture of switchyard structures
• Sourcing, selection, inspection, installation, testing and commissioning of electrical equipment for EHV switchyards and industrial plants
• Turnkey installation of Gas Insulated Substation (GIS) for all industrial projects
• Submarine cabling works

Powered by Engineering
Powering Breakthroughs

By virtue of its rich experience and expertise in executing high-voltage substations, PT&D has set world-class standards and new benchmarks in the industry. Major substation project milestones include:

- **765 kV substation bays**
  - 42 bays commissioned, 111 under execution

- **500 MVA, 765 kV transformers**
  - 71 transformers commissioned, 22 under execution

- **765 kV reactors**
  - 20 reactors commissioned, 24 under execution

- **GIS bays**
  - 765 kV bays - 7 under execution
  - 400 kV bays - 44 commissioned, 106 under execution
  - 220 kV bays - 84 commissioned, 149 under execution
  - 132/66 kV bays - 97 commissioned, 155 under execution

Top: 132/33/11 kV Substation at Masafi in UAE
Right: 400 kV switchyard for Jindal Power Plant at Raigarh
Bottom: 132 kV switchyard at Bhutan
Power quality improvement projects

L&T undertakes power quality improvement projects in the country under various schemes launched by Ministry of Power / Rural Electricity Corporation such as:

- Accelerated Power Development and Reform Programme (APDRP)
- Rajiv Gandhi Grameen Vidyutikaran Yojna (RGGVY)

Continuous improvements in quality of work and safety are the highlight of L&T’s success in APDRP projects. Project-specific quality plans are prepared and works are executed as per the approved Quality Assurance Plan to ensure quality checks at all levels.

With a strong project management team spread across various states, L&T is playing an active role in distribution reform projects. Significant milestones include lighting up of 20 lakh rural households under RGGVY scheme and commissioning of 28000 circuit km of HT lines under 1500 feeders by undertaking more than 120 power quality improvement projects across 16 states.

RANGE OF SERVICES

High Voltage Distribution Networks (HVDS): Construction of new 33/11 kV substations, upgrade of existing 33/11 kV substations and new 33 kV lines on PSC poles/lattice structure

Rural Electrification Works: Village electrification works including service connections to households; Construction of 11 kV/LT lines on steel/PSC poles, with bare conductors/aerial bunched cables; Feeder renovation works and metering

Urban Area Power Quality Improvement Projects: Renovation/upgradation of distribution transformers; construction of 11 kV/LT lines on steel/PSC poles, with bare conductors/aerial bunched cables; Feeder renovation metering covered under R-APDRP (Part B)

Smart Distribution: Demand side management (DSM) through Rural Load Management System (RLMS), pole top automation - Auto recloser and sectionalisers, 11 kV SCADA - RMU automation works and meter data acquisition, 33 kV & 11 kV UG and AB cabling works
L&T provides comprehensive system engineering including integrated project electrification works for a wide range of utilities and urban infrastructure projects. The EPC services include construction of Overhead Transmission Lines, Power Distribution Grids, Electrical Grid Substations, Installation of Transformers, Circuit Breakers, Switchgear, Substation Automation, IPCS Systems, Fibre Optics Communication and all associated instrumentation and interconnection work.

Specialisation includes:
- Electrical and instrumentation works at different airport terminals in India
- Installation of electrification systems for metros, monorails and railway networks
- Optical fibre cabling works in different metros and cities
- Telecommunication infrastructure across the country
- Energy infrastructure and building automation systems for all types of commercial complexes, hotels, hospitals, educational institutes, sports infrastructure

L&T has extensive and time-tested experience in providing successful solutions for landmark airport projects in India and abroad. The airport electrical, illumination and IT system solutions provided by PT&D include:

- HV/LV Intelligent & Remote Controlled Integrated Power Distribution Systems
- DG and Battery, UPS, Power Back Up Emergency Systems
- SCADA Systems
- Intelligent Building Management Systems (BMS) PA, CCTV System
- Distributed Antenna Systems (DAS)
- Trunk Mobile Radio Systems (TMR)
- Display Screen Systems
- Wi-Fi Systems
- Information Kiosks Systems
- Automated Flight Announcement Systems
- Air Field/Ground Lighting & Illumination Systems
- VDGs & SNJ Installations

Specialisation includes:
- Electrical and instrumentation works at different airport terminals in India
- Installation of electrification systems for metros, monorails and railway networks
- Optical fibre cabling works in different metros and cities
- Telecommunication infrastructure across the country
- Energy infrastructure and building automation systems for all types of commercial complexes, hotels, hospitals, educational institutes, sports infrastructure
Industrial electrification and Instrumentation

PT&D offers turnkey instrumentation, telecommunications, IT engineering solutions for refineries / oil & gas pipelines, metallurgical & steel, water, process industries, power (hydro, thermal, wind and nuclear), toll plazas and airports.

Services offered include design validation, detail engineering, procurement, installation, testing and commissioning, handing over including annual maintenance.

Areas of expertise include:
- PLC/DCS based industrial automation
- SCADA/Telemetry SCADA
- SIL 3 certified Fire & Gas system (PLC to Field level)
- Dual/Triple/Quadruple redundancy requirement
- Wired/Wireless communication
- Networking and Data Centre
- Aviation Fuel Hydrant System
- State of art automated toll plaza system
- IT system for IT parks
- Airport IT System
Top Left: Electrification works for a cement plant in Andhra Pradesh
Top Right: Electrification works at a refinery project in Panipat
Left: Electrification works at CPCL Refinery at Manali in Chennai
Bottom: 170,000 TPA Zinc Smelter Plant at Chanderiya, Rajasthan for HZL

Top: Interior view of Hyderabad International Convention Centre in HITEX, Hyderabad
Right: 8.4 MW HT motor installed in Sinter Plant # 4 for Tata Steel
Bottom Left: Cable tray installations at Jindal Power Plant at Raigarh
Bottom Right: 33kV Control Relay panel in Alain, UAE
E-BoP and I-BoP Services

Being a powerful player in the field of Electrical and Instrumentation Balance of Plant (E-BoP / I-BoP) services with a track record of having executed more than 15,000 MW of power evacuation projects, PT&D brings in much value-added service offerings by providing cost-effective one-stop solutions for total electrical and instrumentation balance of plant (E-BoP and I-BoP) works.


As a market leader in Thermal and Nuclear Power Plant E-BoP services, PT&D executed the entire gamut of works comprising supply, installation, testing and commission on turnkey basis for the NPCIL nuclear power plant at Tarapur (Unit 3 and 4). Major projects under execution include electrification works for NPCIL at Kudankulam, control and instrumentation packages for NPCIL at Kalarpur and various packages for NTPC, SEPCO etc.

### Turnkey E-BoP offerings:

- **BTG Block Covering**
  - Generator Transformer
  - Unit Transformer
  - Station Transformer
  - Isolated Phase Bus Duct
  - Generator Circuit Breaker
  - EHV Switchyard – AIS / GIS
  - Hot Line Washing (HLW) System
  - HV/MV / LV Switchgear and Busducts
  - DC System
  - Cables and Cable Carrier System
  - Illumination System
  - Earthing/Lightning Protection System

---

Footprint of major E-BoP projects under execution

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliance Power</td>
<td>Sasan</td>
<td>6x660 MW</td>
</tr>
<tr>
<td>NPL Rajpura</td>
<td>2x700 MW</td>
<td></td>
</tr>
<tr>
<td>Abhijeet Power</td>
<td>Bihar</td>
<td>2x660 MW</td>
</tr>
<tr>
<td>Mahi Genco</td>
<td>Koradi</td>
<td>3x660 MW</td>
</tr>
<tr>
<td>Athena Power</td>
<td>Chattisgarh</td>
<td>2x660 MW</td>
</tr>
<tr>
<td>Indiabulls</td>
<td>Amravati</td>
<td>5x270 MW</td>
</tr>
<tr>
<td>Indiabulls</td>
<td>Nasik</td>
<td>5x270 MW</td>
</tr>
<tr>
<td>Reliance Power</td>
<td>Sankhul</td>
<td>3x800 MW</td>
</tr>
<tr>
<td>NPCIL Kudankulam</td>
<td>2x1000 MW</td>
<td></td>
</tr>
<tr>
<td>Maha Genco</td>
<td>Koradi</td>
<td>3x660 MW</td>
</tr>
<tr>
<td>DB Power</td>
<td>Rajparg</td>
<td>2x660 MW</td>
</tr>
<tr>
<td>Reliance Power</td>
<td>Sasan</td>
<td>6x660 MW</td>
</tr>
</tbody>
</table>

**Left:** 220/6.3, 6.3 kV 63 MVA Reserve Auxiliary Transformers

**Top:** Electrification at 445 MW Konaseema Combined Cycle Power Plant in Andhra Pradesh

**Right:** Primary heat transfer system for a nuclear power plant

**Bottom:** India’s first and only HLW system commissioned for NPCIL, Tarapur
Turnkey I-BoP offerings:
• BTG and BOP DCS
• HART Management System, Plant Simulator
• Plant Performance Analysis, Diagnostics and Optimization Systems
• Field Instrumentation
• Critical Severe Service Control Valves
• Steam Water Analysis Systems
• Continuous Emission Monitoring Systems
• Rotating Machinery Condition Monitoring System
• Ambient Air Quality Monitoring Systems
• C&I Power Supply Systems (UPS)
• Fire Detection and Alarm System
• Fire Fighting System

Communication System offerings
• Power Plant Telecommunication System comprising of:
  ◊ Wireless Radio Network
  ◊ Plant Wide LAN
  ◊ Public Address System
  ◊ Intrusion Detection System
  ◊ CCTV Systems
  ◊ Telephone Network
• Signal, Power, Control and Fiber Optic Cabling
• Plant Interfacing
• Building Management System
Contacts:
Substation & Distribution Projects: Mr. M.V. Vijayababu - vijaybabu@Lntecc.com
Process Plant Electrification Projects: Mr. V. Tulasiram - vtr@Lntecc.com
Power Plant & Infra Electrification (E-BoP/I-BoP): Mr. D.P. Shinde / Mr. S. Kirupa Sankar - dpshinde@Lntecc.com / sks@Lntecc.com
Instrumentation & Control Systems: Mr. Tapas Ray - tr@Lntecc.com