



115 kV GIS Substation, Saudi Arabia



220 kV Indoor Substation at Tuticorin, India



400 kV Switchyard at Uppal, India

Notable Projects

Substations

- 132 kV Substation, Nepal
- 132/33/11 kV Substations, Bhutan
- 33 kV GIS Substations at AL Ain, UAE
- 33 kV Substations, Abu Dhabi
- 33 kV GIS Substations at Ras AL Khaimah, UAE
- 33 kV Substations at Ras AL Khaimah, UAE
- 230/115 kV GIS Substation Power Supply to Saudi Aramco's
- Four New 33/11 kV Primary S/S with associated
- 33 kV Cables for ADWEA at Abu Dhabi
- 400 kV Switchyard at Hoody, India
- 400 kV Substation at Hyderabad, India
- 400/220 kV Substations at Sasaram, India
- 400 kV Switchyard Extension at Kahalgaon, India
- 400 kV Switchyard at 445 MW Gas Based CCPP, Devarapalli, India
- 400 kV Switchyard at 388 MW Gas based CCPP, Vemagiri, India
- 220 kV Multi bus switchyards for KEB at Tiptur, Itagi, Narendra, Sirsi and Bellary, India
- 230 kV Switchyard for Pillai Perumal Nallur, India
- 220/132 kV Substations at Tanakpur, India
- 220 kV Switchyard (RCC structure) at Patalganga, India
- 220/132 kV Substations at Ara, India
- 220/132 kV Substations at Haryana, India
- 132/33/11 kV Substations at Haryana, India
- 132 kV Switchyard at Renusagar, India
- 132 kV Switchyards at Shikohabad and Mitawali, India
- 110 kV Switchyard at Verna, India
- 110 kV Switchyard at Bangalore, India
- 66 kV Switchyard at Samakhiali, India
- 33/11 kV Outdoor Distribution Substations at Orissa, India

Transmission Lines

- 33 kV D/C Towers, UAE
- 275/132 kV Multi-Circuit Towers, Malaysia
- 33 kV D/C Overhead Transmission Line, Abu Dhabi
- 132 kV S/C & D/C Compact Overhead line, Malaysia
- 132 kV S/C Overhead Transmission Line, Nepal
- 220 kV D/C Overhead Transmission Line, Abu Dhabi
- 132 kV D/C Towers, Sri Lanka
- 66 kV S/C Overhead Transmission Line, Mozambique
- 220 kV D/C Overhead Transmission Line, Sri Lanka
- 400 kV D/C Overhead Transmission Line, Tala, Bhutan
- 132 kV D/C Overhead Transmission Line, Salalah, Oman
- 275 kV S/C Overhead Transmission Line, Australia
- 220 kV S/C Overhead Transmission Line, Bhutan
- 66 kV Overhead Transmission Line, Brunei
- 220/33 kV Overhead Transmission Line Network, Dhabiya
- 220/33 kV Grid to 220/33 kV Mobile Substation, Abu Dhabi
- 400 kV Overhead Transmission Line Fujairah - Al Dhaid UAE
- 132 kV S/C, Design and Testing of Mono Pole Structures for Malaysia
- 220 kV D/C Overhead Transmission Line setup for State Electricity Boards, India
- 400 kV D/C Overhead Transmission Line from Jabalpur to Itarsi, India
- 220/66 kV D/C Narrow Base Towers for KEB, India
- 230 kV S/C Overhead Transmission Line From Neyveli, India
- 220 kV S/C & D/C Towers - Tamilnadu Electricity Board, India
- 400 kV D/C Transmission Line from Baspa-II to Jhakri, India
- 120m height, Lightning protection cum monitoring tower for ISRO at Sriharikota, India



Our Engineering Design and Research Centre at Chennai, India (Outstanding Concrete Structure, fib Award 2002)



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220 kV D/C TL Tower, Abu Dhabi



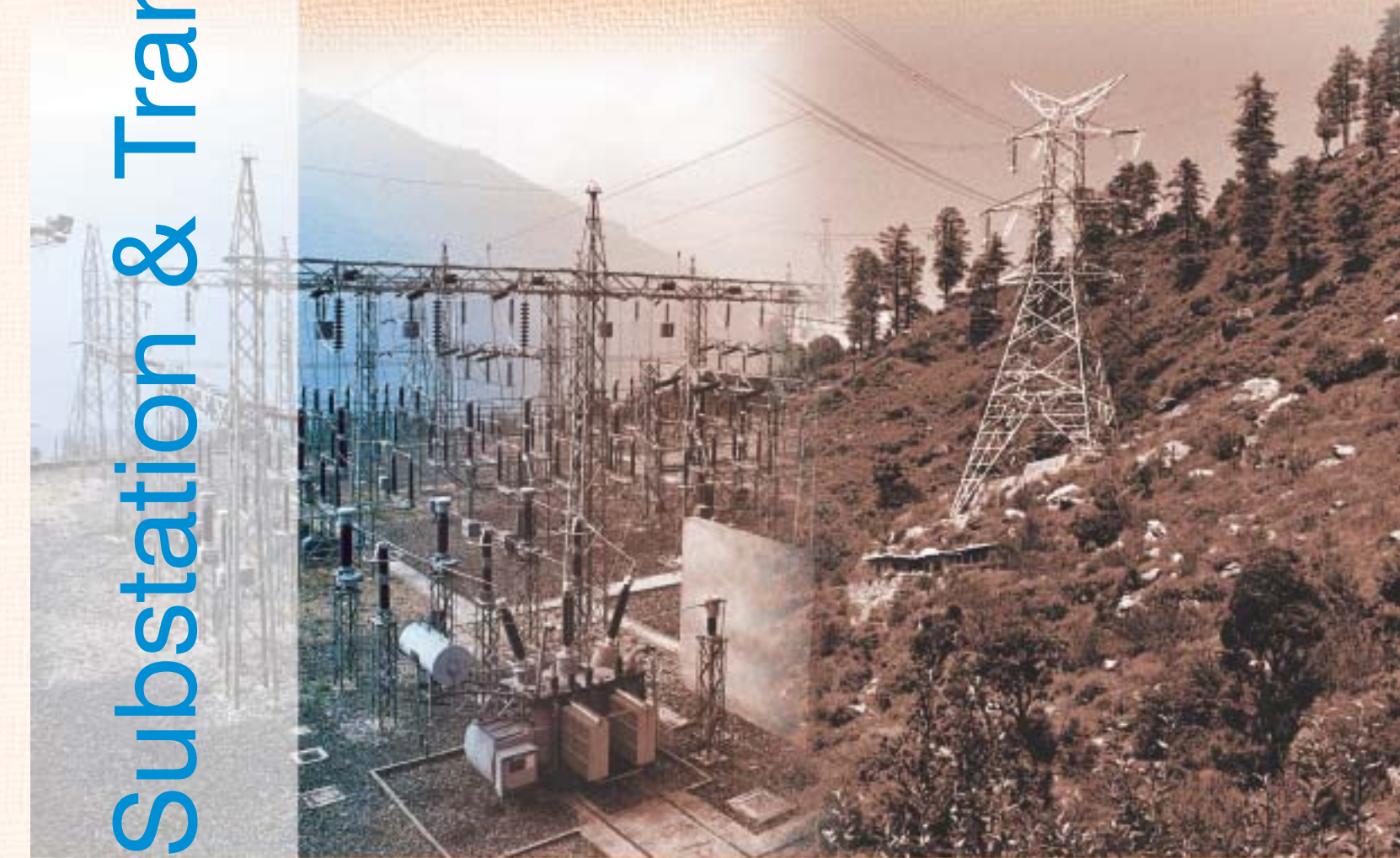
220 kV Indoor Substation at Tuticorin, India



400 kV D/C TL at Fujairah, UAE



Substation & Transmission Line



Your Trusted Design Partner

The Company

Larsen & Toubro Limited (L&T) is one of the largest vertically integrated engineering conglomerates in India with a revenue of over US \$2 Billion. L&T employs 26,000 people across its 130 offices and 30 factories all over the world. A strong customer-focused approach and a constant quest for world-class quality have enabled L&T attain and sustain a leadership position over six decades.

L&T's international presence is on the rise with a global spread of over 30 overseas offices and joint ventures with world leaders.



230 kV GIS Substation at Juaymah, Saudi Arabia



33 kV RCP at Ras Al Khaimah, UAE



Cover page photographs:
132 kV Substation at Bhutan (Left)
400 kV Baspa - Jhakri Transmission Line Tower (Right)

Global Engineering Services

L&T-GES is one of the Strategic Business Units of L&T which provides engineering and design services to worldwide market zones.

Projects designed by L&T-GES are characterised by their engineering elegance combined with ingenuity and quality.



33 kV D/C Transmission Line at Abu Al Abiyad, UAE



66 kV D/C Narrow Base Towers, Karnataka, India



33/11 kV GIS Substation at Al-Ain, UAE

Core Strengths

Through decades of L&T's domain experience, L&T-GES has enriched its strengths in :

- Multi-disciplinary engineering solutions combining electrical, civil, structural and mechanical competencies
- Engineering design and detailing of Extra High Voltage (EHV) Substations and Transmission Lines (TL)

Domain Focus

Outdoor and Indoor Substations (Air / Gas-Insulated)

- Generation Substations
- Transmission Substations
- Distribution Substations

Transmission Lines (Single / Bundled Conductors)

- Single Circuit Towers / Multi-Circuit Towers
- Special Supporting Structures
 - ◆ River-Crossing Towers
 - ◆ Narrow Based Lattice Steel (NBLS) Towers
 - ◆ Polygonal Steel Poles

Services

- Basic Engineering Design
- Engineering Analysis and System Studies
- Detailed Design and Engineering
- Civil, Structural and Geotechnical Services
- Prototype Testing for TL Towers
- Computer Aided Drafting
- TL Route Alignment through Geographical Information System (GIS) techniques

Substations

L&T-GES has the expertise to design and detail substations & switchyards (indoor and outdoor) exposed to varied conditions. We offer design services for complex generation, transmission and distribution substations with configurations such as single bus, main & transfer bus and ring-bus.

We have developed competencies in substation analysis which includes knowledge of international clearance practices, system engineering, short circuit force analysis, electrical system protection, automation & communication engineering and earthing & lightning protection analysis.

Our services include interlocking logic diagrams, cable routing design, cable & termination schedules, architectural layout for control buildings, specialized civil & structural design for supporting structures and HVAC & firefighting system design for control rooms. In addition to conventional engineering services, we also offer Procurement Engineering Support to ensure proper equipment selection.



230 kV Switchyard with Pre-Stressed Concrete Supports, Tadipatri, India

Transmission Lines

L&T-GES offers complete design solutions for transmission lines which include route alignment using Geographical Information Systems (GIS) techniques, optimum tower spotting, tower design and detailing, prototype testing of towers and foundation design for various soil types. L&T-GES has rich experience in designing transmission line towers ranging from 33 kV to 765 kV conforming to International Standards such as DIN-VDE-0210, ASCE, BS and IEC826 design codes in varied terrains such as river crossings, hilly areas and deserts. Our design values include high durability and environmental friendliness.

In addition to design services, we offer structural validation testing services of transmission tower prototypes. Our test team has experience of testing numerous towers with capacities as high as 400 kV. Our record includes testing one of the world's heaviest towers (95 Tons) for Fujairah Union Water and Electricity Authority, UAE.



275/132 kV M/C TL, Malaysia



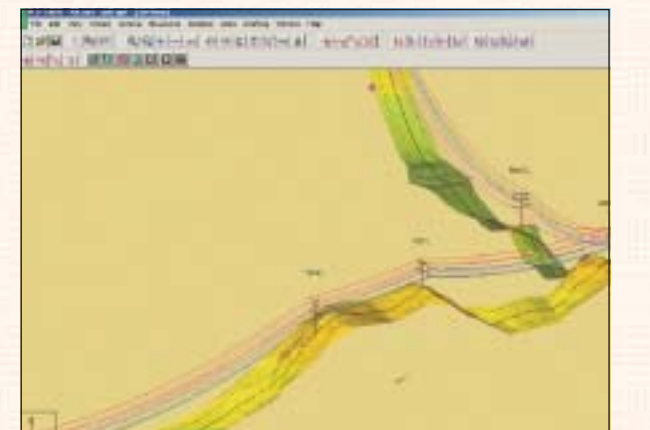
220 kV 'Krishna' river crossing TL tower, India

Computer Aided Engineering

Our engineers utilize international software tools for analysis and design to come up with state-of-the-art solutions. The standard softwares used by L&T-GES include:

PSCAD, ETAP, PLSCADD, PLS-Tower, ArcGIS, PDMS, STAAD, MicroStation and AutoCAD

A dedicated team of in-house software developers work closely with our engineers to tailor-make tools for high productivity. The customized software tools assure speedy delivery and address customer-specific needs.



3D Model Generation for Route Alignment of Transmission Line using Arc GIS & PLSCADD