ENVIRONMENTAL MANAGEMENT SERVICES
AT L&T GLOBAL PRIORITIES ARE OUR PRIORITIES
Climate change, energy production and nature conservation are all areas that need prioritising for society to adapt to the challenges posed by globalization. We establish strategies and deliver solutions that focus on reducing CO₂ emissions and adapting to climate change – helping society to meet these challenges.

L&T INFRASTRUCTURE ENGINEERING LTD. (L&T IEL)
Formerly known as L&T-RAMBØLL Consulting Engineers Ltd.) is a leading multi-disciplinary Indian consultancy firm formed in 1998 by Larsen & Toubro Limited (L&T); the largest Indian Engineering and Construction Conglomerate with over seven decades of experience. L&T IEL, with more than a decade of experience, has made a distinctive mark by creating new standards in providing sustainable solutions.

L&T IEL has complete access to the technology, to serve the needs of the developing world. We offer a diverse array of talents together with practical experience. We assure our Clients a professional approach by innovation and evolving optimal solutions.

L&T IEL is committed to achieve and sustain excellence in consultancy services to customers worldwide through an in-house Quality Management System certified by LRQA as conforming to ISO 9001: 2008. Today, L&T IEL is distinguished from others not limited to its lineage but for its relentless quest for quality - a unique tradition of placing Client’s needs above all.

SECTORAL SERVICES PROVIDED FOR
- Environment
- Ports & Marine Projects
- Bridges
- Roads & Highways
- Airports
- Railways
- Urban & Transport Planning
- Power & Non-Conventional Energy
- Advisory Services

ENVIRONMENTAL SERVICES FOR VARIOUS SECTORS
- Ports & Marine Projects
- Power Plants
- Desalination Plants
- Industrial Projects/Investment Regions
- Special Economic Zones (SEZs)
- Utilities (Intake/Outfall/Jetties/marine Terminals)
- Roads
- Airports

WHY L&T IEL?
- NABET Accredited Consultant
- Well equipped & fully computerized corporate & city offices at Hyderabad & Delhi
- Wide range of Professionals
- Strategic tie-ups with associates or specialised services
- International quality service through focused & optimal solutions
- In-house Quality Management System
- ISO 9001 : 2008 Certified
Environment and social studies form a vital component of the projects carried out by L&T IEL and are handled by in-house experts and specialists. L&T IEL Hyderabad has a full team of professionals (coordinators and experts). The skills of these coordinators and experts are continuously enhanced to suit the latest requirements of the market. Services of an eminent panel of expert consultants (Empanelled consultants) are also available to L&T IEL Hyderabad.

While many others target the environmental works for meeting regulatory compliance under National and State regulations, other than breaking the legal hurdles in their growth plans at L&T IEL, we are focusing on genuine Environmental Management solutions. This stage is improving further due to regulatory pressure and higher standards of documentation as set by the QCI-NABET. The nearest example that we can quote is the Environmental Management and Monitoring Plan (EMMP) prepared for Cochin Port Trust for improving the identity as Green port after ensuring a stronger commitment towards sustainable initiatives.

**L&T IEL has been accredited by QCI-NABET for Eight sectors which are:**

- Thermal Power Plants
- River Valley, Hydel Drainage & Irrigation Projects
- Industrial Estates/Parks/Complexes/Areas, EPZs, SEZs, Biotech Parks/Leather Complexes
- Offshore and onshore oil and gas exploration, development & production
- Synthetic organic chemicals industry
- Highways, Railways, Transport Terminals, Mass Rapid Transport Systems
- Airports & Helipads
- Ports, Harbours, Jetties, Marine Terminals, Breakwaters & Dredging

The quality improvements as a part of Quality Council of India - National Accreditation Board for Education and Training (QCI-NABET) and their accreditation are expected to add additional business both in terms of higher returns and business opportunities. Unlike ISO Certification, the stringent NABET certification is actually removing all odd consultants leading to the precipitation of very few qualified consultants in the market. The process is expected to take a couple of more years.
Environmental Management Services

L&T IEL offers consultancy services for a wide range of infrastructure projects. Since all developmental activities invariably impact the environmental resources, L&T IEL recognizes this aspect and is fully committed to the goal of ‘sustainable development’. L&T IEL ensures that environmental management is an integral part of its services and offers a wide range of environmental services:

**Environmental Impact Assessment (EIA)**
- Environmental and Social Impact Assessment
- Review of Policy, Legal and administrative Fieldwork
- Preparation of Environmental Management Plan
- Preparation of Rehabilitation and Resettlement Plan
- Compliance to State PCB’s, MoEF and Coastal Zone Management Authority Standards/Rules/Regulations

**Field Surveys/Investigations**
- Co-ordinate Field Surveys and Investigations
- Terrestrial and Environmental Surveys
- Framing specifications for all surveys
- Supervision of surveys

**Environmental Audit**
- Review of Environmental Management System
- Regulatory Setting
- Site Investigations and Monitoring
- Corrective Action Plans

**Risk Assessment Studies**
- Risk Assessment/Analysis
- Preparation of Disaster Management Plan
- HAZOP Studies

**Design of Environmental Management Utilities**
- Preliminary Design and Block Estimation
- Common Effluent treatment Plant (CETP)
- Sewage Treatment Plant (STP)
- Intake and Marine Outfall Systems
- Solid Waste/Hazardous Waste Management Facility
- Greenbelt Plan

**Environmental Management Action Plan (EMAP)**
- Identification of Impacts
- Avoidance of impacts
- Framing of Mitigation Plans
- Devising of Suitable Monitoring Plans
- Supervision Plan

**Assistance to Client**
- Technical assistance for obtaining clearances from statutory authorities
- State PCB’s
- Coastal Zone Management Authorities
- MoEF (GoI)
- Forest Applications and Clearance

**Other Services**
- Consent for Establishment (CFE)
- Consent for Operation (CFO)
- Environmental Review
- Technical Support for NGT cases

Apart from these, L&T IEL also does various other environmental management services such as Environmental Monitoring of Projects during pre-construction, construction & operational phases.
Social Impact Assessment (SIA)

We in L&T IEL believe that all EIA studies are in reality SIA studies as every element in EIA focus on the direct and indirect socioeconomic and other impacts to human beings and their ever deteriorating environmental quality. The real focussed SIA that we do therefore is increasingly felt necessary and getting dominated today to understand the community concerns while planning and implementing infrastructure and industrial projects. We therefore developed proven ground tested potential professional capabilities to address all related issues by:

- Stakeholder Identification and Listing
- Stakeholder Consultation and Documentation
- Community Consultation for Public Hearing
- Social Surveys for Primary Data Collection
- Baseline Socio-economic Analysis
- SIA & Social Management Plan (SMP)
- Land Acquisition, Land Plan and Land Schedules
- Resettlement & Rehabilitation (R&R) Action Plan (RAP)

FIELD SURVEYS AND INVESTIGATIONS

At L&T IEL we are specially talented in formulating RFPs, Terms of Reference (ToR) scope of work, framing specifications for all surveys/supervision of surveys/Co-ordination of HTL/LTL, CRZ Demarcation studies.

TERRESTRIAL ENVIRONMENTAL SURVEYS
- Ambient Air Quality Monitoring
- Noise Level Monitoring
- Soil Sampling
- Water Sampling (Ground water & Surface water)
- Ecology (Flora & Fauna)

MARINE ENVIRONMENTAL SURVEYS
- Marine water quality
- Sediment quality
- Benthic communities
- Pyto plankton & Zoo plankton

SOCIAL SURVEYS
- Population
- Literacy rate
- Occupational Structure
- Medical & educational Facilities
- Economic drivers
- Public opinion
Mathematical Model Studies

L&T IEL is capable of carrying out various mathematical model studies which are an essential tool for predicting the impacts on the environment due to the development of Ports/Harbours/Jetties/Marine Terminals/Outfalls/Breakwaters and Dredging.

- Sedimentation Studies
- Hydrodynamic Flow Modelling
- Wave Transformation and Tranquility Studies
- Coastline Evolution due to Coastal Structures
- Dredge Spoil disposal studies
- Dispersion of effluent
- Oil Spill Studies

Softwares used

<table>
<thead>
<tr>
<th>Mike Zero suite of software</th>
<th>Telemac Modelling System</th>
<th>CEDAS</th>
<th>SWAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>• DHI Water and Environment, Denmark</td>
<td>• EDF-DRD, France</td>
<td>• Veri-Tech, and USACE Research and Development Center</td>
<td>• Delft University of Technology</td>
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<tr>
<td>• For simulating shallow water hydrodynamics, wave transformation, wave tranquility, sediment transport, pollutant dispersion, etc.</td>
<td>• For 2d and 3d hydrodynamics, wave transformation and tranquility, cohesive and non-cohesive sediment transport, pollutant dispersion, river hydraulics, etc.</td>
<td>• For wave transformation, shoreline evolution, etc.</td>
<td>• For wave generation and transformation</td>
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Environmental Planning & Eco Industrial Development

L&T Infrastructure Engineering Limited with the support from GTZ (now GIZ) has carried out Environmental planning for the AP Special Economic Zone (APSEZ), based on the Eco industrial approach to the extent possible. The degree of pollution (high polluting, low polluting etc) was the main criteria for the Zoning plan. The high polluting industries zones were planned away from residential areas and villages.

**Important Elements of Planning a new industrial park**
- Vision for site development with Environment and climate orientation
- Siting/site selection
- Defining Investment and Employment targets
- Market analysis on potential investments
- Identification of investors
- Environmental impact assessment
- Site Master Planning
- Public endorsement/Public hearing
- Environmental clearances and approvals

**APSEZ MASTER PLAN**

GoAP proposes to develop a Multi-Product SEZ near Pudimadaka, Visakhapatnam District in an area of 5,683 acres. APIIC appointed L&T IEL as consultants to carry out Master Planning & EIA Study for APSEZ. Project obtained MoEF clearance and successfully completed, now it is under operational.

**Site Suitability Assessment**
- Due diligence
- Conceptualization & Site Identification
- Pre-Feasibility & Techno-Economic Feasibility Studies
- Market Study & Demand Assessment

**Environmental Impact Assessment**
- Comprised of 4 stages Viz, Screening, scoping Public consultation & Appraisal
- Base line studies for Ecology and environment
- Prediction of impacts and design of mitigation works
- Risk Assessment & DMP
- Analysis of alternatives
- Preparation of EMP including Monitoring plan for all phases of the project
- Technical Assistance for Approvals

**Site Master Planning**
- Detailed Master Planning
- Detailed Infrastructure Planning
- Cost Estimates
- Phasing Strategies
- Legal Framework & Management Structure
- Bid Process Management
- Assistance in Road Shows & Investor Conferences

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**Master Planning & EIA Study for APSEZ, at Visakhapatnam, A.P**

GoAP proposes to develop a Multi-Product SEZ near Pudimadaka, Visakhapatnam District in an area of 5,683 acres. APIIC appointed L&T IEL as consultants to carry out Master Planning & EIA Study for APSEZ. Project obtained MoEF clearance and successfully completed, now it is under operational.

**Pharma City at Parawada**

GoAP has proposed to set up a "Pharma City" on a 2100 acres of land near Parawada, Visakhapatnam District. L&T IEL was appointed by APIIC to carry out a TEPs, Bid Process Management and REIA study for the project. Project was successfully completed now it is in operational.

**International Leather Complex at Nellore**

For setting up of Krishnapatnam International Leather Complex (KPILC) identified 2 alternative sites in SPSR Nellore District. Site suitability assessment for 2 sites were carried out by L&T IEL considering several parameters that include strong environmental parameters as well. Later carried out site Conceptual Master Plan for the selected site.

“@APIIC, even today the EIA/EMP prepared for AP Special Economic Zone (APSEZ) at Visakhapatnam is the fundamental reference document with regards to all Environmental management issues in SEZ planning” Stated an APIIC official recently.
Where Means Justify the End? Yes a model EIA that can be recommended for University Environment Education

We have recently proved that a genuine EA process will lead to award winning results. Taking all stakeholders into confidence, we have recently concluded an EIA study with a most successful public hearing and all other clearances. A project that was not able to launch since 1962 for various reasons was taken up as a challenge and every obstacles have been turned into opportunities, every criticism was turned to be observations and every complaint was turned to raw data positively benefitting our studies.

Comprehensive EIA (C-EIA) carried out for Vizhinjam International Seaport Limited was an amazing experiment with colorful award winning results. Some of the main features of the EA process are:

- Client Involvement and Inputs/complete Transparency Ensured
- Focused Standalone EIA done for All Infra Components
- Involvement of Elected Representatives & Govt.
- Resettlement Action Plan with Best Compensation Packages for All Stakeholders
- Complete and Thorough Stakeholder Identification & Listing/Involvement and Community Participation
- Unique EMP Documentation with Standalone Documents for Important Stakeholders
- Short Period for Getting ‘EC’ from MoEF Because of the Completeness of the Study
- Interwoven CSR Activities to Comprehensively Address All Stakeholder Issues
- Maximum Number of Quality Days Spent at Site by EIA Team
- Best Style of Documentation in Terms of Quality/Formatting/Editing & Illustrations
- Gender Balance – Extensive Female Participation in Consultation and Decision Making
- Well Conducted and Well Attended Public Hearing with Support from Media (Both Print & Visual)
- Enhancement of Master Plan/Engineering Layout Vis-À-Vis EA Process
- Unique in Participation and Hearing of Stakeholders by Expert Appraisal Committee and MoEF
SERVICES PROVIDED

EIA FOR PORT PROJECTS

- Greenfield Port at Gangavaram, A.P
- Kakinada Deep Water Port, A.P
- Karaikal Greenfield Port, Pondi Cherry
- Phase I & II of Krishnapatnam Port
- Subharnareka Greenfield Port
- Vadarevu Greenfield Port, A.P
- Shipyard cum Port Complex at Kattupalli, Tamil Nadu
- Expansion of Dhamra Port, Odhissa
- Expansion of Redi Port, Maharashtra
- Vizhinjam Port, Kerala
- Sutrapada Port, Gujarat
- Ponnani Port, Kerala
- Cochin Port, Kerala
- Shipyard/Captive Jetty, Gujarat
- Valiyathura Fishing Harbour, Kerala

- Preparation of Form-1 & ToR
- Critical review of the Environmental & Social Issues
- Terrestrial and Marine Environmental Surveys
- Socio-Economic survey
- Establishing Baseline Environmental Status
- Prediction and Evaluation of impacts
- Mathematical modelling studies
- Preparation of EMP
- Hazard identification and preparation of Disaster Management Plan
- Risk Analysis and Disaster Management Plan
- Technical Assistance for seeking CRZ/ Environmental Clearance from MoEF & CFE from State PCB
- Preparation of Consent For Establishment Application

EIA FOR POWER PLANTS

- 4000 MW Thermal Power Plant at Mandvi, Gujarat
- 2000 MW gas based power plant at Gujarat
- 10 MTPA Captive Coal Jetty at Dharmthar Creek, Maharashtra
- 30 MW Power Plant and 16 MLD Seawater Desalination Plant at Tuticorin, Tamil Nadu
- 220 MW Barge Mounted Gas Based Power Plant at Kakinada, A.P
- 700 MW Gas Based Power Plant at Vemagiri, A.P
- 4000 MW Thermal Power Plant, Captive Port and 30 MLD Desalination Plant at Cuddalore, Tamil Nadu
- 1980 MW Thermal Power Plant at Krishnapatnam, A.P
- 2x660 MW SEW Power Plant at Devarampadu, A.P
- Captive Jetty and Intake/Outfall Facilities of 2 X 660 MW Coal Based Power Plant at Nagapattinam, Tamil Nadu

- Terrestrial and Marine Environmental Surveys
- Selection of suitable location for outfall - Mixing Zone & Analysis of thermal discharge
- Hydrodynamic Modelling Studies for identifying Marine Outfall location
- Advection-Dispersion Modelling Studies for monitoring the effect of thermal discharge in Ambient Water
- Establishment of Baseline Environmental status
- Impact Identification, Prediction and Evaluation of impacts
- Risk Analysis and Disaster Management Plan (DMP)
- Preparation of Environmental Management Plan (EMP)
- Technical Assistance for seeking Environmental Clearance (EC) from MoEF.
EIA FOR SEZS/INDUSTRIAL PROJECTS
- APSEZ at Visakhapatnam, A.P
- Ethylene Dichloride Plant near Karaikal
- Chemical Plant in Vapi Industrial Estate, Gujarat
- 2 x 200 MLD Desalination Plant at Nellore, A.P
- EIA for Agrichem Unit in APSEZ, A.P
- Green Industrial Park at Jadcherla, A.P
- Parawada Pharma City, A.P
- Pharma Enclave, Ennore, Tamil Nadu
- Leather Complex near Nellore, A.P
- Two SEZs proposed at Noida and Gurgaon, Delhi
- Kakinada SEZ, A.P
- Textile SEZ at Chintavaram, Nellore, A.P
- 5 MLD desalination Plant at Auroville

SERVICES PROVIDED
- Baseline Environmental Status
- Air Quality Modeling Studies
- HD/AD Modeling Studies
- Conceptual Design of Marine Outfall
- Identification and Prediction of Impacts
- EMP
- Preliminary Risk Assessment & DMP
- Technical assistance for obtaining Environmental Clearance from MoEF
- Social Impact Assessment Studies
- Study of surrounding industrial profile and existing levels of pollution
- Identification of hazards
- Consequence analysis & Identification of risk due to toxic

PRELIMINARY EIA FOR REGIONAL PLANNING PROJECTS
- PCPIR at Mangalore, Karnataka (~250 Sq.Km)
- Paradeep PCPIR, Orissa (~284 Sq.Km)
- Visakhapatnam-Kakinada Coastal Growth Corridor Project, A.P (~603 Sq.Km)

SERVICES PROVIDED
- Initial Environmental and Social Screening
- Establishment of Baseline Environmental Status with available secondary data
- Assessment of Socio-Economic benefits
- Broad Identification of Environmental and Social Impact
- Preparation of EMP
- Preliminary Risk Assessment
- Preparation of DMP

EIA FOR AIRPORT PROJECTS
- Greenfield International Airport at Mopa, Goa
- Taj International Aviation Hub Airport at Noida, Delhi
- Multi Modal International Cargo & Passenger HUB Airport at Nagpur (Mihan), Maharashtra

SERVICES PROVIDED
- Conduct literature review and collect data relevant to the project
- Baseline environmental Surveys
- Identify various pollution loads
- Predict and assess impacts on environmental attributes
- Preparation of EMP & DMP
- Assist in obtaining clearance from SPCB and MoEF

EIA FOR JETTIES / UTILITIES / MARINE FACILITIES
- Marine Terminal/jetty facility for Importing VCM near Chitterapettai Village, Cuddalore, Tamil Nadu
- Effluent Dispersal Study near Vizianagaram, A.P
- EIA for NSL Captive Jetty in Tamil Nadu
- SEW Coal Berth at Vizag, A.P
- Honnavar Barge Loading Facilities, Karnataka
- LNG Terminal at Kakinada, Andhra Pradesh

SERVICES PROVIDED
- Preparation of Form 1 & ToR
- Establishing Baseline Environmental Conditions
- Land use/Land cover study
- Establishing Socio-Economic Conditions
- Identification and Prediction/Assessment of Environmental and Social Impacts – construction and operation phases.
- Preparation of EMP
- Technical Assistance for seeking clearance from MoEF
EIA FOR VIZHINJAM INTERNATIONAL SEAPORT

EIA FOR 4000 MW POWER PLANT AT CUDDALORE

EIA FOR DHAMRA PORT

EIA FOR VEMAGIRI POWER PLANT

INTERNATIONAL CARGO & PASSENGER HUB AIRPORT AT NAGPUR (MIHAN)

EIA FOR APSEZ AT VISAKHAPATNAM
ENVIRONMENTAL PROJECTS CARRIED OUT BY L&T IEL
We are part of L&Ts Sustainability Report has received the latest GRI G4 ‘in accordance- comprehensive’ rating, indicating the highest level of disclosure accorded by Global Reporting Initiative (GRI), the world’s most respected body in the field of sustainability reporting. L&T released its sustainability report in December 2015 - the first Indian company in the engineering & construction sector to publicly disclose its sustainability performance.