

*Engineering Services to Power  
Industrial Plant Electric System  
Protection and Automation*

*Power System Design  
Engineering and Consultancy*

*Power System Study Network  
Analysis and Solutions*



**ELCON ENGINEERS**  
**Private Limited**

**Power System Consultants and Engineers**

501-2-3, Onyx Business Centre,  
Akshar Chowk, O. P. Road,  
Vadodara 390 020, Gujarat, INDIA  
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e-mail : eepl@elconengineers.com

[www.elconengineers.com](http://www.elconengineers.com)

## About Company

- Established in 1982 as Elcon Engineers as a Sole Proprietary Company with an intention to render Testing and Commissioning Services of Electrical Power Distribution System Equipment including Relay Testing as the primary activity
- Subsequently, services of providing Electrical System Design, Detailed Engineering, Consultancy, Power System Study, Analysis and Solutions were rendered manually effective from 1986.
- The Company converted to **Elcon Engineers Private Limited** on December 20, 1998 in order to keep up with the growth in Industrial Plants, thereby covering the software based services for Electrical field of Captive Power Generation, Grid Support and Distribution Network.
- The Company offered vital and reliable Power and Protection System Study Design Analysis Solutions Testing and Commissioning includes Relay and Scheme Testing Services to the Industries for the Captive Power Generation, Outdoor Switchyard and Distribution Network. The services cover the Captive Power Plant from 1MW to 125MW, Outdoor Switchyard from 33kV to 220kV and Indoor Distribution System from 433V to 33kV.
- We also provide Power System Study Retrofit and Refurbishment services with total support of application, supply, testing and configuration of numerical relays manufactured by OEM and allied power system equipment on Engineering Procurement and Construction EPC basis.
- ETAP Power Station Software developed by OTI-USA for Power System Study and Analysis, Manual and Automated Software Based Test Set up of Doble-USA and ISA-Italy for Relay and Scheme Testing services are our Main Tools.
- The Company has a Repeat Work Orders Rapport from many Customers since 1986 as we take our role very seriously thus Value our Reliable and Prompt Services.

**Ensuring Power System Reliability**

## Founder

<b>Name</b>	: <b>Arvind Mehta</b>
<b>Designation</b>	: Chairman and Managing Director (CMD)
<b>Education</b>	: Qualified B.E. (Electrical) from M.S. University of Baroda, Faculty of Technology and Engineering, passed in the year 1973 with first class distinction and stood Second in order of merit in the University.
<b>Member of</b>	: IEEE(PES), ERDA, SPE, CBIP AND CIGRE
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<b>E-Mail</b>	: amehta@elconengineers.com

### Specialization

Specialization is in the field of Power System Study, Design, Analysis and providing solutions for Industrial Plant having Captive Power Generation from 1MW to 125MW, Grid support of Outdoor Switchyard from 33kV to 220kV and Indoor Distribution System from 33kV to 433V.

Specialization is also in the field of Protective Relay and Scheme Testing including Testing and Commissioning of Electrical System, modernization by providing Numerical Protective Relaying System including selection, application, setting and configuration for Generator, Transformer, Motor and Feeder Protection and Transient Stability Study and Grid Islanding Protection system.

Independently handled the entire two projects of National Fertilisers Ltd, Bhatinda and Panipat having 425 indoor HT switchgears of rating 11kV and 3.3kV includes supply, unloading at site, installation, testing and commissioning in 24 months time with National and International Vendors when working with Jyoti Ltd.

Independently handled the entire 2X120 MW power project of NEB of States of Malaiya at PasirGudang Thermal Power Plant fed to grid at 132kV system from concept to commissioning and completed the project in 22 months time with National and International Vendors when working with Tata Consulting Engineers.

Since the inception of Company all the jobs listed in resume were executed under my technical guidelines and close supervision.

System integration of Grid and Captive Power Plants to improve the Electrical system performance, design – basic and detail engineering of large Industrial Plants, water Supply System, CPP and switchyards is the core business since inception.

## Job Experience

✚ From 1973 to 1978 with M/s. Jyoti Limited, Baroda a company manufacturing electrical products for Industries and utilities mainly high voltage switchgears and rotating machines. Worked as an Engineer for the erection, testing and commissioning of the equipment viz. H.T. Switchgears upto 33 kV, outdoor switchyards upto 132kV, Power and Motor control centres, Power and Distribution transformers. Specialized in testing and commissioning of power system protection systems and relay testing and calibration.

Independently handled following projects work

- ✓ National Fertilisers Ltd. Bhatinda  
Installation, testing and commissioning of 45 nos.11kV and 180nos. 3.3kV MV switchgears carried out under renowned Consultants Engineers India Ltd, Tata Consulting Engineers and Toyo Engineering Japan.
- ✓ National Fertilisers Ltd. Panipat  
Installation, testing and commissioning of 45 nos.11kV and 180nos. 3.3kV MV switchgears carried out under renowned Consultants Engineers India Ltd, Tata Consulting Engineers and Toyo Engineering Japan.
- ✓ Indian Petrochemicals Corporation Ltd. Baroda  
Installation, testing and commissioning of 20 nos. 33kV,110nos. 11kV and 125nos. 6.6kV/3.3kV MV switchgears carried out under Consultants - Engineers India Ltd and Tata Consulting Engineers.
- ✓ Indian Oil And Corporation Ltd. Gujarat Refinery, Baroda  
Installation, testing and commissioning of 75nos. 11kV and 165nos. 6.6kV/3.3kV MV switchgears carried out under renowned Consultants - Engineers India Ltd. Also carried out 132kV and 66kV outdoor switchyard on EPC (Engineering, procurement and Construction) basis.
- ✓ Rajasthan Canal Project, Bikaner  
Testing and commissioning of 11kV and 3.3kV MV switchgears at three pumping stations namely KHAR – MULKISAR AND RAJYASAR now known as Indira Gandhi Canal Project carried out under the supervision of M.N.Dasturand Co. being Consultant to water projects.
- ✓ New Shorrock Mills Limited, Nadiad  
Removal of 10nos. 11kV bulk oil circuit breaker panel of JandP, making foundation good for 10nos. 11kV MOCB of JYOTI, Installation, Testing and Commissioning of the same in 60 hours shutdown
- ✓ Gujarat State Fertilisers Company Ltd. Baroda And Gujarat Narmada Valley Fertilisers Company Ltd. Bharuch  
Maintenance, overhauling and testing of 120nos. 11kV MOCB panels and 275nos. 3.3kV MOCB/VCB panels includes complete relay, primary current injection and scheme testing. Also checking of all interlocks and control circuits.
- ✓ Madras Refineries Limited, Manali – Madras  
Now Chennai Petroleum and Refineries Ltd  
Maintenance, overhauling and testing of 65nos. 11kV MOCB panels and 137nos. 6.6kV/3.3kV MOCB/VCB/VC panels includes complete relay, primary current injection and scheme testing. Also checking of all interlocks and control circuits.



✚ From 1978 to 1982 with M/s. Tata Consulting Engineers, Bangalore and Bombay a renowned International Consultant for Power Plants and Industrial Plants for the design, engineering and consultancy of electrical power and distribution system including control and protection engineering for industrial plants upto 220kV outdoor switchyard, power plants upto 220 MW and captive power plants upto 25MW

Independently handled following projects work.

- ✓ Bhadrachalam Paper Boards Ltd. Bhadrachalam  
Supervision of Erection, Testing and Commissioning of 33kV Outdoor switchyard having 2X7.5MVA transformers, 11kV 66nos. MOCB, 3.3kV 123nos. ACB panels and 225 433v PMCC panels, Distribution Transformers of 1600/2000/2500 KVA.
- ✓ Boingaigaon Refinery And Petrochemicals Ltd.  
BOINGAIGAON 3X16 MW Thermal Power Plant  
Electrical system components design and engineering including control and protection engineering complete in all respect for 3X16 MW Thermal Power Plant. Also carried out supervision of Pre commissioning checks and tests and commissioning of all the three units electrical system.
- ✓ National Electricity Board Of States Of Malaya,  
Kaulalumpur 2x120 Mw Thermal Power Plant–PasirGudang  
Electrical system components design and engineering including control and protection engineering complete in all respect for 2X120 MW Thermal Power Plant at PASIR GUDANG, NEB KAULALUMPUR, MALAYSIA. Also carried out supervision of Pre commissioning checks and tests and commissioning of entire plant electrical system.
- ✓ Panipat Thermal Power Station, HSEB, Panipat  
2X110 MW Thermal Power Plant  
Electrical systems design of control and protection engineering complete in all respect for 2X110 MW Thermal Power Plant. The job also includes relay co-ordination and providing settings for system as well as unit protections like Lines, Generators, motors and transformers.

✚ From 1982 to till date as Chief Executive Officer of M/s. Elcon Engineers Private Limited, Vadodara a Company providing vital engineering services and solutions for the Industries in following areas and the Clientele as shown below.

- ✓ Outdoor switchyard ranging from 33kV, 66kV, 132kV and 220kV
- ✓ Indoor substations ranging from 33kV, 11kV, 6.6kV, 3.3kV and 0.433kV
- ✓ Captive power plant upto 125MW based on gas and steam
- ✓ Wind farm power evacuation upto 330MW
- ✓ Water supply scheme and large irrigation pumping system

## Brief Details of Key Persons

### **Mrunal Mehta** **Director - Business Development**

He is successfully running the organization as Head - Business Development since past 1998

He is experienced in testing at site, pre commissioning checks and commissioning of electrical system for industrial plants, CPP and switchyards. He has specialization in Service sales, Vendor Development, Resource Development and Customer Relationship.

Core area now is global business development pertaining to Power System Study using ETAP and EMTP-RV Software, Power System Design Engineering Consultancy and solutions on EPC Basis. Handling business development with local as well as global channel partners and associates. He played pivotal role for venturing in to an MOU with OTI, California for Registering Elcon as Solution Provider for ETAP in India. He also attended the ETAP Global Partner Meet held in USA in July-2014 in order to explore the Global business and for upgrading with the upcoming technology.

He also played the Pivotal role for venturing in to Master Service Agreement with Aditya Birla Management Corporation Private Limited, Talaja which registers us as a Power System Consultants for all ABG units (About 88 Units) in India and Abroad.

### **Rohan Mehta** **Head - Engineering**

He is working with Elcon Engineers Private Limited since past 2010 and leading the department of Power System Study, Design Engineering and Consultancy. Having affluent hands-on experience of Simulation based studies like Load Flow and Short Circuit Analysis, Motor Starting and Re-acceleration Analysis, Transient Stability Analysis and Grid Islanding Schemes, Protection System Analysis and Relay co-ordination studies, Arc Flash Analysis and Ground Grid Assessment Studies using a Power System Simulator known as Electrical Transient Analyzer Program (ETAP) developed by Operation Technology, Inc. California, USA.

Specialization is in the conducting various simulation based studies, Preparation of Executive summary report narrating all observation and recommendations in support with detail engineering, calculations and technical justifications. Also having rich experience of Design, Engineering, Settings and Calculations for Unit Protective Relay settings for Generator, Power Transformers, Line, Grid Islanding Scheme and Cable Differential.

**Sumit Mehta**  
**Head – Sales and Services**

He is working with Elcon Engineers Private Limited since past 2007 and leading the department of Power System Execution, Testing and Commissioning. Having vast hands on site experience on Protective Relay Testing including the relays used for the protection of Generator, Overhead Lines, Power and Distribution Transformers and HT Power Cables. Also having rich experience for Protective relays configuration and setting, Testing of Unit Protection schemes, Power and Distribution Transformer and Circuit Breaker and Testing and Simulation of power and control Circuit of protection system. Specialization is in the field of Numerical Protective relay applications and Retrofitting solution sing Numerical protection relays.

Currently working on Sales and Services for Protection and Automation Products and Solutions of SEL, USA Make.

**Nikhil Durgapal**  
**Sr. Manager - Engineering**

Design Engineering, Procurement and Commissioning support for Switchyards, E&I packages related to Cement Plant, Coal Handling Plant, Oil & Gas and Solar Power Projects. Experienced in complete plant electrical design starting from preparing Engineering deliverables list, Technical specs, Technical Bid Evaluation for order finalization, Vendor Drawing Review, Interaction with Clients, Contractor scope of work & order finalization, Interdisciplinary review & support to Commissioning team or site visit as per the requirement. Also involved in field engineering activities i.e. Equipment layout, Earthing & lightning protection layout, bulk material quantity estimation and E-SCADA architecture-communication details.

Worked in L&T (C&A), Mumbai as Sr. Project Engineer in the year 2011-14

Worked in Petrofac, Mumbai as Sr. Electrical Engineer in the year 2014-16

Worked in Belectric India, Mumbai as Design Manager in the year 2016-19

He is working with EEPL as Sr. Manager Engineering since 2019

**Kunjan Dalwadi**  
**Manager - Execution**

He is working with Elcon Engineers Private Limited since past 2014 having vast hands on site experience in Testing and Commissioning, Numerical relays configuration and setting, Testing of Unit Protection schemes and Testing and Simulation of power and control Circuit of protection system. Specialization is in the field of Numerical Protective relay applications and Retrofitting solution sing Numerical Protection relays.

## Organogram

<b>Arvind Mehta Chairman and Managing Director</b>			
<b>Mrunal Mehta Director Business Development</b>	<b>Rohan Mehta Head Engineering</b>	<b>Sumit Mehta Head Execution and Sales &amp; Services</b>	
Executive Officer	Sr. Manager	Manager	Manager
One Team Consist of	Four Teams Each Consist of	Four Teams Each Consist of	One Team Consist of
Market Representative	Project Incharge	Site Incharge	Sales and Application Engineer
Market Representative	System Study Engineer	Testing Engineer	Sales and Application Engineer
-	System Study Engineer	Asst. Testing Engineer	-
-	CAD Engineer	Technician	-



## Achievements

- 1982** - The Firm ELCON ENGINEERS was established
- 1986** - Commence Services of providing Electrical System Design, Detail Engineering, Consultancy, Power System Study, Analysis and Solutions rendered manually
- 1994** - Inaugurate ETAP Power Station Software developed by OTI-USA for Power System Study and Analysis
- 1998** - The Company converted to **ELCON ENGINEERS PRIVATE LIMITED**
- 2000** - Inaugurate ISA–Italy for Relay and Scheme Testing services are our Main Tools
- 2008** - Inaugurate Manual and Automated Software Based Test Set up of Doble–USA
- 2009** - Commence Power System Study Retrofit and Refurbishment services with total support of application, supply, testing and configuration of numerical relays manufactured by OEM and allied power system equipment on Engineering Procurement and Construction EPC basis
- 2010** - Established in Oman as **GULF ELECTRICAL SERVICES L.L.C.** (GES)
- 2011** - Four Individual User Licensed copy of ETAP Power Station Software for Power System Study and Analysis. Also ETAP Solution Partner Agreement done with Operation Technology, Inc. (Agreement Number: SP-10-27)
- 2012** - Exploring establishment in African and South East Asian Countries with Channel Partners for providing System Study Services
- 2019** - Independent Sales Representative and System Integrator of SEL Products

## Infrastructure

- Four Licensed copies of **ETAP (Electrical Transient Analyser Program) Power Station Software** developed by OTI - USA for Electrical System Design and Power System Study and Analysis.



- **3- $\phi$  Power System Simulator F6150** Manual and Automated Software based Test Set up of **Doble** - USA



- **Microprocessor Controlled Relay Test Set** - Three nos. ISA - Italy and Programa - Sweden for Testing, Commissioning, Relay and Scheme Testing



### Engineering for a Better Tomorrow

**A Leading Electrical Consulting and Engineering firm providing State-of-the-Art Technology and Cost-Effective Solutions**

#### Power System Design Engineering, Consultancy And Start-up

- ❖ Outdoor Switchyards up to 220kV Electrical, Civil, Structural and Sub-station Automation
- ❖ Captive Power Plants Electrical and Automation includes Energy Management System
- ❖ Electrical Distribution Network Sub-stations and Automation includes Energy Management System
- ❖ As Owner's Consultant for Review of Design, Engineering, Calculations and Drawings, Technical Bid Analysis, Vendor Drawings Review, Inspection and Expediting
- ❖ Rationalization of Electrical Systems for Reliability
- ❖ Start-up of Electrical Power System and Testing and Commissioning of Equipments and Plant

### System Study for Reliability

**A Leading Electrical Consulting and Engineering firm providing Power System Study and Execution for Reliability**

#### Power System Study Network Analysis And Solutions

- ❖ Load Flow, Short Circuit, Motor Starting, Relay Coordination, Transient and Steady State Stability Study, Branch Switching Stability Study, Grid Islanding System, Load Shedding Logics and Auto Synchronization
- ❖ Arc Flash Analysis, Fast Bus Transfer Schemes and Harmonic Analysis
- ❖ Unit Protection Scheme Design, Relay Settings Calculations and Algorithms
- ❖ Retrofit of Electro Mechanical Protective Relays with Numerical Relays includes Control and Relay Panels for Generators and Switchyard on EPC
- ❖ Grid Islanding, Real Time based Intelligent Load Shedding and Auto Synchronization Systems on EPC
- ❖ Protective Relays, Schemes Testing and Commissioning including setting and configuration for all types of Relays

## **A Power System Design Engineering and Consultancy**

### **For the lender**

- Lender's engineer

### **For the owner**

- Owner's consultant

### **For the EPC contractor**

- Detailed engineering consultant

### **Pre-project activities**

- System studies
- Feasibility and detailed project reports

### **Design engineering**

- Basic studies/engineering
- Design calculations and drawings
- Enquiry specifications
- Technical bid analysis
- Vendor drawing review
- Electrical balance of plant

### **Procurement assistance**

- Purchase recommendation

### **Inspection and expediting**

- Stage wise inspection
- Final inspection

### **Commissioning support**

- Start-up and commissioning assistance
- As-built documentation
- Trouble shooting

## **B Power System Study Network Analysis and Solutions**

### **1. Feasibility Study and Concept Design Reports**

We can conduct onsite and offsite Feasibility study and prepare the concept design reports as required basis. Possible scenarios can be as under

- Power Hook-up arrangements
- Nuisance tripping problems
- Tripping of Generator for Grid side disturbances
- Power import and export schemes
- Cable sizing
- Power factor improvements
- Temporary power schemes

### **2. Load flow analysis**

Load Flow study is conducted to examine the adequacy of equipment ratings and evaluation of load demand of plant against the total available Power. Assessment of Voltage profile, Power factor and Thermal profile of network under different operating philosophy of plant and for various load contingencies. Populate Alerts if any Overload or Load mismatch observed. Provide basic guidelines for future expansion of plant if desired.

Simulation of Load flow analysis illustrate Bus voltage and power factor, Current, MW and MVAR flow through each branch of the network and report the total load loss throughout the network.

### **3. Short circuit analysis**

Short circuit study is conducted to ensure the adequacy of Duty of electrical devices under fault condition and also to establish the minimum as well as maximum fault level of the system at various voltage levels for Relay co-ordination duty. Populate Alerts if any violation in rated fault level of equipment observed. Fault calculations are done in compliance with the latest editions of the IEC-60909.

Simulation of Short circuit analysis illustrate the Fault current values for 3-Phase, line-to-ground, line-to-line and line-to-line-to-ground faults on each bus of the network along with possible phase displacement. It also shows the individual contributions from Generators, Utility power source and motors and the AC fault current decrementing curves.

### **4. Motor starting and acceleration analysis**

During the motor starting period, the starting motor appears to the system as small impedance connected to a bus. It draws a large current from the system, about six to eight times the motor rated full load current, which therefore causes voltage drops in the system and imposes disturbances to the normal operation of other system loads. Since the motor acceleration torque is directly dependent on motor terminal voltage, in some cases the starting motor may not be able to reach its rated speed due to extremely low terminal voltage.

This makes it necessary to perform a motor starting analysis for

- 1) To investigate whether the starting motor can be successfully started under various load contingencies
- 2) To see "How seriously the starting of respective motor will impede the normal operation of other loads in the network"

Simulation of Motor starting and acceleration analysis illustrate exclusive load flow results of the instant of starting of motor and depict motor characteristic plots which includes Current drawn by motor, Reactive power requirement, Slip, Motor torque, Load torque, Acceleration torque versus time and also shows impact on Power sources through plots like Terminal voltage, Bus Voltage, Reactive power supply, Real power supply, Current and Power factor versus time.

## **5. Electrical Power Transient and Dynamic Stability Analysis**

Simulation of power system dynamic response and stability limits before, during, and after system transients such as Severe faults, Loss of Generation or Loss of excitation, Loss of load which is significant in the design and operation of the system. The program accurately models dynamic characteristics of a power system, implements the user-defined events and actions, solves the system network equation and machine differential equations interactively to find out system and machine responses in desired time domain. We can use the study results as inputs to determine the Generator Start-up, Transient behavior and Stability assessment of the system, Critical clearing time, Grid islanding settings, Load Shedding, Fast Bus Transfer scheme and Protective device settings.

Simulation of Transient and Dynamic stability analysis illustrate deviations in Power angles, Speed, Real and Reactive power outputs of Generators, System electrical frequency as well as the voltage levels of the buses. Re-acceleration of network Motor loads can also be ensured through simulated results.

## **6. Protection System Protection - Relay co-ordination study**

Adequate System grounding methods, Appropriate Selection of protective relays and Validation of protection schemes are included in Protection analysis. Any major discrepancy of protection system will be identified and where applicable, methods of improvement will be suggested. Evaluation of settings of protective devices used for Overcurrent and Earthfault protection in order to adequately protect the system against short-circuits and overload, optimize the discrimination between fault and abnormalities and set proper time grading are part of Relay co-ordination study. Scheme design

Plotting of Time Current Characteristics (TCC) along with Circuit route from fault location to source with unique relay Id and simulation of sequence of circuit breaker operation for respective fault.



## **7. Branch Switching Stability Analysis Using Electro Magnetic Transient Program**

Switching of certain huge loads like very large Power transformers or Rectifying transformers, Capacitor banks and Series reactors can severely impede the normal operation of running load and generation due to their very high charging (Inrush) current and drastic demand of reactive power at the instant of switching. Switching of such loads takes place typically within time frame of 20-80ms and falls under category of Electromagnetic transients. It is very essential to ascertain the stability of system under such switching events which can be only carried out using Electromagnetic transient simulators like ATP/EMTP/PSCAD.

Simulation of such switching Transients illustrates deviations in Power angles, Speed, Real and Reactive power outputs of Generators, System electrical frequency as well as the voltage levels of the buses.

## **8. Arc Flash Analysis**

The Arc Flash Analysis module incorporates the latest software technology available to investigate a worker's potential exposure to arc flash energy, which may be required for the purpose of injury prevention and determination of appropriate levels of Personal Protective Equipment (PPE). The incident energy and flash protection boundaries are determined based following standards

- National Fire Protection Agency (NFPA) 70E 2012
- IEEE Standards 1584-2002, IEEE 1584a 2009 and IEEE1584b 2011
- CSA Z462

## **9. Ground Grid Design Assessment**

The safety of personnel is compromised by the rise in the ground potential of grounded structures during unbalanced electric power faults. At such times, humans touching grounded structures can be subjected to high voltages. However, the magnitude and duration of the electric current conducted through the human body should not be sufficient to cause ventricular fibrillation.

The Ground Grid Design Assessment calculates required maximum Ground Resistance  $R_g$ , Step and Touch potential values at each point of locations of plant or substation, GPR, Reflection Factor  $K$ , Derating Factor  $D_f$  and Maximum Grid Current. It also populates warning information Report of Potential Profiles and Plots for Absolute/Step/Touch Voltages. Thus safety of personnel is achieved. The Ground Grid Systems module utilizes the following four methods of computation.

- FEM - Finite Element Method
- IEEE 80-1986
- IEEE 80-2000
- IEEE 665-1995

## **10. Power Quality Management – Harmonic Analysis**

Applications of Electronic and semi conducting devices like VFDs, UPS, Rectifiers / Convertors and Invertors are increasing day by day in industrial plant which are dominant source of current and voltage Harmonics. Over the period this influences a spoiled quality of power and as an ultimate result this shall lead to the false overloading of equipments, failure of equipments and burning of motor winding.

The Harmonic Analysis module provides the best tool to accurately model various power system components and devices to include their frequency dependency, nonlinearity, and other characteristics under the presence of harmonic sources. This module has two analytic methods, Harmonic load flow and Harmonic Frequency Scan, which are the most popular and powerful, approaches for power system Harmonic analysis. By using those two methods in combination, different harmonics indices are computed and compared with the limitations as per IEEE-512-1992 standard for Harmonics level in industrial plant. Results of Harmonic analysis can be used to design adequate Harmonic filter for the respective pre-dominant contents.

## **11. Power System Solutions**

Executive summary report which narrates the overall summary of various studies conducted and analysis made out of all study results. This also highlights the immediate observations and recommendations to be implemented for betterment of the system, reliability of power and enhancement of protection system. The possible range of solutions that can be provided typically be as following or as applicable basis

- Implementation of appropriate methodology of System Earthing
- Supply, Installation and Commissioning of Protective Relays, CBCTs, ICTs, NGRs, Capacitor banks, Series reactors and other items on requirement basis
- Design and Detail engineering, Relay selection, Control and Relay panel, Protection setting calculations, Logics and Algorithms of Unit Protection schemes used for protection of Generator, Large Power Transformer or Rectifying Transformer, Grid Islanding, HT Motor and Current Differential used for Lines or Cables as applicable.
- Retrofitting and Refurbishment solution by providing Numerical Protection Relays for Generator, Transformer, Plain feeder, Motor, Current differential and Grid islanding protection schemes on EPC basis
- Intelligent Load Shedding Scheme Logics and Priority load list
- Synchronization scheme logics and synchronizing panel
- Comprehensive solution of Power Management System
- Solutions for Power quality and Power factor improvement on EPC basis

## **C Power System Modernization Retrofit and Refurbishment**

Power System Study and Modernization Retrofit and Refurbishment services with total support of application, supply, testing and configuration of numerical relays on Engineering Procurement and Construction EPC basis.

Conducting Electrical Power Distribution System Study and Remedies, Renovation, Modernization, Retrofit and Refurbishment of Electro-Mechanical and Static Relays by Numerical Relays including the Protection Schemes.

Services shall include activities of selection and application of right type of Relay and Model to suit your requirement and Detail Engineering, Modification, Installation including configuration and setting of Relays and Relaying Scheme.

The Protection Package for Industries Electrical Power System includes Generator, Transformer, Motor, Feeder and other Protective Relays required by Industries wherein the Engineering of existing system shall be conducted and retrofit, refurbishment and modification work shall be undertaken.

## **D Protection System Relay and Scheme Testing**

### **Protective Relay Testing**

Single Phase Relay Testing Equipment with manual and software based facility for testing of Voltage, Current, Power, Frequency, Rate of change of frequency and Phase shifting relays.

Three Phase Relay Testing Equipment with manual and advanced software based facility for integrated distance and generator protection relays for precise and accurate testing. Also the stability of Distance and Differential Protective Relays for both steady state as well as dynamic can be carried out.

### **Primary Injection and Relay Scheme Testing**

Manual and Software based Primary Injection Equipment for Testing of Current transformers for Ratio, Polarity, Excitation curve, Burden, Winding resistance and Voltage Transformers for Ratio, Polarity and Burden. The Sensitivity and Stability of Protective Relaying Scheme for Unit Protection of Generator, Transformer and Motor including Differential and REF conducted.

## Independent Sales Representative and System Integrator of SEL Products



**SCHWEITZER  
ENGINEERING  
LABORATORIES**



**SEL IED's comes with  
"No Question asked"  
Worldwide 10 years Warranty**

**[www.selinc.com](http://www.selinc.com)**

### **Independent Sales Representative and System Integrator for Protection and Automation Products**

#### **Protective Relays**

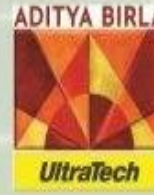
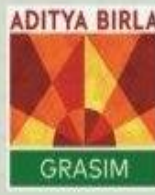
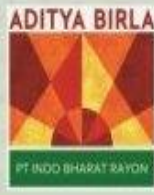
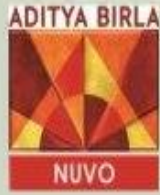
- Generator
- Transformer
- Feeder
- Motor
- Cable Current Differential
- Capacitor Bank
- Bus Bar
- Distance

#### **Solutions**

- Fast Motor Bus Transfer Scheme
- Arc Flash Solution
- Auto Synchronization
- Time Synchronization
- Power Quality Metering System



# Clientele



NAFAL CONTRACTING  
& TRADING CO.LLC



**LARSEN & TOUBRO LIMITED**  
Engineering Construction & Contracts Division



AROMATICS  
OMAN  
LLC



IVRCL Infrastructures & Projects Ltd.



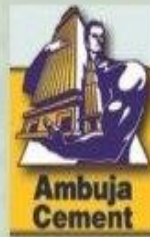
AARTI INDUSTRIES LIMITED



THERMAX



OMAN  
METHANOL  
COMPANY  
L.L.C.



ZUARI INDUSTRIES LTD.



CHEMICAL FERTILIZERS  
AND CHEMICALS LTD.



GAIL (India) Limited



Oman Refineries  
and Petrochemicals  
Company LLC

## **A Power System Design Engineering and Consultancy**

- ⊕ Manikgarh Cement Limited, Chandrapur  
220 kV / 11kV, 2 x 30/35MVA Outdoor Switchyard and Hook-up of power at existing 11kV CPP System (70MW). Complete Design Engineering Project Management and Consultancy for Electrical, Mechanical package, Civil and Structure. Relay coordination and unit protection settings for the new system.
- ⊕ Aarti Industries Limited, Jhagadia  
66kV Line Bay and 66kV / 11kV, 1 x 15/18.75MVA Indoor GIS S/s and Hook-up of power at existing 11kV system. Review Engineering and Consultancy for Electrical, Mechanical package, Civil and Structure. Transient Stability Analysis and Relay Coordination Study, Grid Islanding and Load Shedding Scheme for parallel operation between Grid Power and CPP power.
- ⊕ Jubilant Life-science Limited, Vilayat  
66kV / 11kV, 1 x 15/18.75MVA Outdoor Transformer Bay and Hook-up of power at existing 11kV system. Complete Design Engineering Project Management and Consultancy for Electrical, Mechanical package, Civil and Structure. Relay coordination and unit protection settings for the new bay.
- ⊕ Techno Quest - RR Kabel, Waghodia  
66kV / 11kV, 1 x 10/12.5MVA Outdoor Transformer Bay and Hook-up of power at existing 11kV system. Complete Design Engineering Project Management and Consultancy for Electrical, Mechanical package, Civil and Structure. Relay coordination and unit protection settings for the new bay
- ⊕ Deepak Fertilizers and Petrochemicals Corporation Ltd, Taloja  
Design Engineering Project Management and Consultancy for (1x36TPH + 1x70TPH) Coal Fired Boiler Project which include as under. Single Line Diagram and Concept Design Report. Detail engineering and Specifications for HT/LT panels, Dist. TRs, HT VFDs, HT/LT Capacitors, HT Capacitors and LT APFC panels. Earthing and Lightning Protection System, Lighting System and Cabling system layout and elevation drawings. Technical Specifications for erection, installation, testing and commissioning and complete BOQ of the system.
- ⊕ SRF Ltd, Dahej  
66kV / 11kV 2 x 10/12.5MVA Outdoor switchyard and Hook-up of power at existing 11kV CPP Power. Complete Design Engineering Project Management and Consultancy for Electrical, Civil and Structure. Transient Stability Analysis and Relay Coordination Study, Grid Islanding and Load Shedding Scheme for parallel operation between Grid Power and CPP power.
- ⊕ MBH Power Ltd, Lagos/Vadodara  
380kV / 132kV 2x320 MVA Outdoor Switchyard and 30MVA Reactor at CALABAR, Nigeria Electric Power Authority (NEPA) System configuration- main1, main2 and Half Breaker on 380 kV as well as for 132kV. The Design also includes Supervisory Control And Data Acquisition System – SCADA for both local and remote operation Owner Consultant – LA MEHYER/SCOT/NIPA
- ⊕ MBH Power Ltd, Lagos/Vadodara  
132kV / 33kV 2x40 MVA Outdoor switchyard OKADA - BENIN, Nigeria Electric Power Authority (NEPA) System configuration- main1, main2 and Half Breaker on 132kV and Main and Transfer on 33kV. The Design also includes Supervisory



Control And Data Acquisition System – SCADA for both local and remote operation Owner Consultant – LA MEHYER/SCOT/NIPA

- ⊕ MBH Power Ltd, Lagos /Vadodara  
132kV / 33kV 2x60 MVA Outdoor switchyard KARU and KUBWA SS, Nigeria Electric Power Authority (NEPA) System configuration- main on 132kV and Main on 33kV. The Design also includes Supervisory Control And Data Acquisition System – SCADA for both local and remote operation Owner Consultant – LA MEHYER/SCOT/NIPA
- ⊕ Grasim Industries Limited, Vilayat  
3x32 MW Power Generation, 40/45 MVA 66kV / 33kV Grid support – 33kV Indoor AIS New Sub-station. The Design also includes Civil, Structure and Electrical Distribution System and relocation strategy of 33kV panels from existing ground floor location to new first floor location without power interruption.
- ⊕ Enercon India Ltd / Larsen and Toubro Ltd, ECC, Ahmedabad  
132kV / 33kV, 2x75MVA Outdoor switchyard at Jaisalmer - System configuration – main and transfer bus. Project designed in 35 days and commissioned in 100 days
- ⊕ Suzlon Energy Ltd / Larsen and Toubro Ltd, ECC, Ahmedabad  
220kV / 33kV, 2x75MVA Outdoor switchyard at Jaisalmer - System configuration- double main and transfer bus. Project was designed for 132kV and 220kV, with installation of 132kV in the beginning and later conversion to 220kV. Project designed in 45 days and commissioned in 110days
- ⊕ Suzlon Energy Ltd, Pune  
220kV / 33kV, 4x100MVA Outdoor switchyard at Jamde, Valve, Suthri, Sangli Maharashtra - System configuration: 220kV double main and transfer bus and 33kV main and transfer. Specification of all equipments for ordering prepared by EEPL
- ⊕ Suzlon Energy Ltd, Pune  
66kV / 33kV, 2x20MVA and 2x37.5MVA Outdoor switchyards at Erkunahalli, Hariharpura, Nittur, Karnataka - System configuration- single bus system for all substations
- ⊕ Tata Chemicals Ltd, Babrala  
Modification of existing Alstom relays to match the protection requirement
- ⊕ Gujarat Electricity Board / Larsen and Toubro Ltd, ECC, Ahmedabad  
220KV / 66kV 3x100MVA Outdoor switchyard at Utran Power Plant of GEB, Surat - System configuration- double main bus on 220kV and 66KV. Integration of the new bay in the existing system on 220kV side shifting of the existing 220kV bay to a new bay location. Conversion of the existing single bus bays into double bus system on the 66KV level. Integration of the existing 66KV bays into the new 66KV system. The first quad moose bus on 66KV in GEB
- ⊕ Gujarat Electricity Board / Larsen and Toubro Limited-ECC, Ahmedabad  
(66/11KV, 1x10MVA outdoor switchyard at Panetha, Bharuch) Outdoor 11KV recloser type pole mounted breaker.

- ⊕ Gujarat Electricity Board / Larsen and Toubro Limited-ECC, Ahmedabad (66/11KV, 2x15MVA outdoor switchyard at Silli, Silvassa includes civil and structural) System configuration-double bus Outdoor 11KV recloser type pole mounted breaker.
- ⊕ Alstom Projects India Ltd, Vadodara  
66kV / 11kV power distribution system having 7500KVA capacity includes hook up at 11kV existing switchgears
- ⊕ Welspun India Ltd, Vapi  
66kV / 11kV power export system design for 12/15MW having 15000/20000 KVA capacity includes 11kV switchgears and Grid Islanding Scheme
- ⊕ Deepak Nitrate Ltd, Vadodara  
66kV / 11kV power and distribution system having 7500KVA capacity includes 11kV and 433V MV and LV switchgears
- ⊕ FAG India Ltd, Baroda 66kV / 11kV power and distribution system having 5000KVA capacity includes 11kV and 433V MV and LV switchgears.
- ⊕ Alembic Ltd, Baroda 66KV / 11kV power and distribution system having 4000KVA capacity includes 11kV and 433v MV and LV switchgears.
- ⊕ ACC-Nihon Castings Ltd, Nagpur System Design of 33kV / 11kV power and distribution system having 5000KVA capacity includes 11kV and 433V MV and LV switchgears.
- ⊕ Gujarat Water Infrastructure Limited, Gandhinagar Drinking Water Supply Scheme for Client GWSSB (66kV / 11kV / 6.6KV / 3.3kV / 433V - 12.5 / 10 / 6 / 5MVA Power Transformer System)

NC - 1 Gadhada PS

NC - 2 Chavand PS

NC - 3 Babra PS

NC - 4 Vallabhipur PS

NC - 6 Maliya - Morvi PS

NC - 7 Morvi - Tankara PS

NC - 9 Maliya - Bhachau PS

NC - 12A, 12B Tankara - Rajkot PS

NC - 14 Gandhinagar PS

NC - 16 Mehasana PS

NC - 17 Modhera PS

NC - 20 Godhara PS

## **B Power System Study Network Analysis and Solutions**

- ⊕ Lanco Anapara Power Limited, Sonebhadra  
2 x 600MW Thermal Power Plant having evacuation voltage at 765kV and 400kV. Power system Study was conducted by EEPL covering Load Flow Study, Short Circuit Study, Relay Co-ordination Study and Unit Protection Settings review including submission of executive summary for enhanced and reliable operation of plant Electrical System.
- ⊕ Gama Infraprop Limited, Kashipur  
225MW Combine Cycle Gas Based Power Plant having evacuation voltage at 220kV. Power system Study was conducted by EEPL covering Load Flow Study, Short Circuit Study, Relay Co-ordination Study and Unit Protection Settings

review including submission of executive summary for enhanced and reliable operation of plant Electrical System.

- ⊕ KSK Mahanadi Power Company Limited, Chhattisgarh (In Progress)  
6 x 600MW Thermal Power Project having evacuation voltage at 400kV. At present 3 x 300MW units have been installed. Power system Study is being carried out by EEPL covering Load Flow Study, Short Circuit Study, Relay Co-ordination Study and Unit Protection Settings review including submission of executive summary for enhanced and reliable operation of plant Electrical System.
- ⊕ ZapsibNeftkhim LLC, Russia (Through Linde AG, Germany)  
Refinery having local grid support at 70kV and power distribution at 10kV, 6kV and 400V. Power system Study was conducted by EEPL covering Load Flow Study, Short Circuit Study, Relay Co-ordination Study and Unit Protection Settings review including submission of executive summary for enhanced and reliable operation of plant Electrical System.
- ⊕ AV Cell, AV Terrace Bay and AV Nackavic - Canada  
All the three units are manufacturing pulp and have 138kV Grid support and approximately 30/40MW STG Power Plant with contra rotating turbines running in parallel with grid. The major issue was grid islanding not occurring and machines were tripping resulting into total dark out. The study includes Load Flow, Short Circuit and Relay Co-ordination including submission of executive summary for enhanced and reliable operation of plant Electrical System. The study also includes transient stability and grid islanding as well as load shedding for various outage conditions.
- ⊕ P.T. Indo-Bharat Rayon, Indonesia  
A Viscose staple fibre plant having grid supply through 70kV / 12kV, 15MVA power transformer and 2x10.8MW + 1x15MW CPP running in parallel. The study also includes transient stability and grid islanding as well as load shedding for various outage conditions. Also the restudy of system was done due to additional load and change in operating philosophy.
- ⊕ Oman Refinery and Petrochemicals Company L.L.C. – Sohar Refinery  
A Refinery having 2x132kV / 33kV 75MVA Power Transformers as Grid support and 2x40MW STG and 2x20MW GTG. All six sources running in parallel and distributing the total 55MW load for various sub-stations at 33kV voltage level and other voltage levels are 6.6kV and 433V. The study includes Load Flow, Short Circuit, Motor Acceleration and Relay Co-ordination including submission of executive summary for enhanced and reliable operation of plant Electrical System.
- ⊕ Oman Polypropylene L.L.C. – Sohar Refinery  
A Polypropylene plant receiving power from two feeders of ORPC – Sohar Refinery and the total 18MW load for Electrical Power Distribution at 33kV / 11kV / 6.6kV / 433V. The study includes Load Flow, Short Circuit, Motor Acceleration and Relay Co-ordination including submission of executive summary for enhanced and reliable operation of plant Electrical System.
- ⊕ Aromatics Oman L.L.C – Sohar Refinery

A Aromatics plant having 2x132kV / 33kV 75MVA Power Transformers as Grid support was initially design and plant commissioned. Subsequently due to merger of AOL plant with ORPC, two feeders from ORPC – Sohar Refinery brought to AOL plant to cater the total 35MW load for various sub-stations at 33kV voltage level and other voltage levels are 6.6kV and 433V. The study includes Load Flow, Short Circuit, Motor Acceleration and Relay Co-ordination including submission of executive summary for enhanced and reliable operation of plant Electrical System. The load Shedding scheme for entire complex consisting of ORPC, OPP and AOL was also studied and implemented for various outage conditions.

- ⊕ Ministry of Defence (MOD) through Nafal Contracting LLC, Oman  
The concept design and power and protection system study conducted for converting existing 33kV outdoor switchyard into indoor sub-station by providing 33kV / 11kV 20MVA transformers to run in parallel with 2x12MW GTG set at Wudam base and 33kV / 11kV 20MVA transformers to run in parallel with 4x4MW GTG set at ShafaIzki base. The system was protected for both import and export of surplus power to National Grid.
- ⊕ Grasim Industries Ltd, Nagda  
A Viscose Staple Fibre Plant and Caustic Plant in Chemical Division having EC-2 30MW and EC-4 40MW STG in Energy Centre and 132kV Grid supply in Chemical Division for exporting power of 10MW for 10 days and normal running of plant for 20 days with generator in solo. Also the complete study of EC-4 40MW and EC-5 30MW running in parallel to cater the staple fiber division and conducted Load Flow, Short Circuit and Relay Co-ordination for this new operating philosophy.
- ⊕ Rajashree Cement Works, Malkhed Road, Gulbarga, Karnataka  
A Cement plant having 58.5MW Captive Power Plant Generating Power at 6.6kV and load of Line - 1, 2 & 3 at 6.6kV. Plant expanded with Line-4 having 45MW load at 11kV and a new TPP having generation capacity of 67MW at 11kV. Plat has grid support from KPTCL at 110KV. Feasibility study was conducted to have batter reactive power margins to avoid the blackout post fault condition. Suggestions for 110kV new line and switchyard for transferring the surplus power from 11kV to 6.6kV were given.
- ⊕ Aditya Birla Chemicals (India) Ltd - Renukoot Chemical Division, Renukoot  
New Project and Old Plant Electrical System  
A Chemical project / plant having 132kV / 11kV grid supply through 25MVA / 31.5 MVA / 12.5 MVA power transformers and 2x25MW CPP running in parallel. The power system study conducted including switching stability of rectifier transformer, transient Stability and Grid Islanding study as well as Load Shedding logics for various outage conditions.
- ⊕ Aditya Birla Nuvo Ltd – Chemical Division, Patalganga  
Existing Hi-tech Carbon plant having 100kV / 11kV grid supply through 15MVA power transformers and 1x15MW + 1x8MW CPP running in parallel was coming up with brown field project of Chemical Division. The power system study conducted including switching stability of rectifier transformer, transient Stability and Grid Islanding study as well as Load Shedding logics for various outage conditions.

⊕ Schneider Electric Infrastructure Ltd.

Cairn India Limited, Radhanpur Terminal

A Viramgam - Barmer crude oil line has a pumping cum heating station at Radhanpur Gujarat. Terminal receives the 11kV power from nearby GETCO S/s and has further load Distribution at 440V. Plant has 2 x 3.15MVA, 11kV / 440V Transformers and five nos. DG sets at 440V. Short Circuit and Protective Device Coordination Study, Arc Flash Analysis and Harmonic Analysis were conducted for the system.

Dell International Services India, Bangalore

Dell has a major data centre at ITPL, Whitefield, Bangalore known as Dell-8. Facility mainly receives the power at 11kV from nearby 66kV / 11kV, KPTCL , S/s. There is a nine storey building having AHU, Chiller, Lighting and Server Hub as major load. Load Flow Study, Short Circuit and Protective Device Coordination Study, Arc Flash Analysis were conducted. Arc Flash Labels were implemented at site and special staff awareness program on Arc Flash Hazard and Solutions was organized.

Johnson & Johnson, Aurangabad

Plant receives power at 33kV from nearby 132kV/33kV, MSEB S/s and have further distribution through 2 x 1500KVA, 33kV / 440V Distribution Transformers. Plan has all connected load at 440V. Load Flow Study, Short Circuit and Protective Device Coordination Study, Arc Flash Analysis were conducted.

Nestle, Samalkha Plant, Sonipat

Plant receives power at 33kV from nearby 132kV/33kV, State Utility S/s and have further distribution through 3 x 2000KVA, 33kV / 440V Distribution Transformers. Plan load is connected at 440V. Load Flow Study, Short Circuit and Protective Device Coordination Study, Arc Flash Analysis were conducted. Special staff awareness program on Arc Flash Hazard and Solutions was organized.

⊕ Schneider Electric India Pvt. Ltd.

Ford India Pvt. Ltd, Sanand

A Giant of Automobile has a world class facility at Sanand, Gujarat. Plant receives power at 220kV from nearby GETCO S/s and plant had further distribution at 33kV through 2 x 220kV / 33kV Power Transformers. Load Flow Study, Short Circuit and Protective Device Coordination Study, Arc Flash Analysis were conducted for Engine Shop and DV5 facilities. Special staff awareness program on Arc Flash Hazard and Solutions was organized.

⊕ SRF Ltd, Dahej

Plant having in-plant generation capacity of 20MW (1x15MW + 1x5MW) and has main distribution at 11kV. All plant load has been connected at 440V. Further the GETCO grid power support at 66kV is proposed and shall be Hooked-up at 11kV with CPP Power. Load Flow Study, Short Circuit Analysis, Relay Coordination and Review of Generator Protection Setting and Logics has been conducted.

⊕ Grasim Industries Limited - Chemical Division and Cellulosic Division, Vilayat

A complex having 66kV / 33kV state power grid support through 2x40MVA power transformers and 3x32MW CPP running in parallel. Viscose Staple Fibre Plant and Chemical plant are the major load centres in the complex. The power system study conducted for entire complex including switching stability of rectifier transformer, transient Stability and Grid Islanding study as well as Load Shedding logics for various outage conditions.

- ⊕ Indo Gulf Corporation Ltd, Jagdishpur  
A Fertilizer plant having 132kV / 11kV, 2x25MVA power transformer and CPP having 2x22MW GTG running in iso mode. The study was conducted for system reliability including replacement of existing electro mechanical relays into numerical protection relays for plant distribution sub-station and also generators as a part of major solution.
  - ⊕ Birla Cellulosic, Kosamba (A Unit Of Grasim Industries Ltd)  
A Viscose staple fibre plant having 22kV / 6.6kV, 2.5MVA and 2x15MW CPP running in island mode and grid supply as standby for start up. The second stage study is for adding one more TG set of 12MW capacity. The third restudy of system was done due to additional load of 2TPD plant and change in operating philosophy.
  - ⊕ RajashreePolyfils, Umalla unit of Century Enka Group of Company  
A Poly Fibre plant having 132kV / 11kV grid support through 2x20/25MVA power transformers and CPP having 1x4.3MW GTG and 1x4.1MW HFO running in parallel. The study was conducted for system reliability including addition of Distance Protection Schemes and Grid Islanding relays.
  - ⊕ Nirma Ltd – Bhavnagar  
A Caustic Soda Plant having 66kV, 15MVA Power Transformer and CPP having power generation capacity with 2x16.32MW TOYO DENKI TG sets, 1x6.5MW BHEL make TG set and 1x23MW TG set of China make running in parallel to cater the plant load and exporting approximately 10MW power to grid and its auxiliaries. The study also includes transient stability and PLC based load shedding schemes
- Harmonic Measurement Study at 22 locations of Electrical Network using LMG500 Precision Power Analyzer. The Voltage and Current wave forms have been analyzed upto 25<sup>th</sup> Harmonic by Fast Fourier Transformation (FFT) Algorithm.
- ⊕ Chambal Fertilizers and Chemicals Ltd, Kota  
A Fertilizer Plant having 2x22.4MW GTG and a Grid support of 132kV / 11kV, 15/20MVA and Allied Distribution System of entire plant having Voltage Level 11kV / 3.3kV / 0.433kV for Gadapan-1 and 2 units
  - ⊕ Alstom Projects India Limited – Kolkata / Vadodara  
Feasibility study report for Reliability of existing generator protections relays of 34.5MW GTG installed at Bhola, Bangladesh running in parallel with 11/33kV 2x25MVA power transformer for power evacuation to National Grid of Bangladesh
  - ⊕ Welspun India Ltd, Vapi  
A terry towel and rugs manufacturing plant having 66kV / 11kV power export system design for 12/15MW having 15000/20000 KVA capacity includes 11kV



switchgears and Grid Islanding Scheme. The exclusive export is by DG sets of rating 2.14MW, 4.206MW and 6.2MW and Plant load catered by one GTG rated 7.52MW and one GEG rated at 6.945MW Gujarat Heavy Chemicals Ltd, Sutrapada

A Caustic soda plant having 1x5MVA, 66kV power and 2x11MW + 1x6MW CPP

- ⊕ Search Chem Industries Ltd – Jaghadia  
A Chemical Plant having 66kV / 11kV, 3x20MVA and 1x41.9MW, 1x26.18MW CPP running parallel and also with grid having system to export 10 MW Power and balance for the plant load including load shedding schemes on PLC basis. Power plant isolated during cascade tripping of Grid supply in Gujarat in the year 1996.
- ⊕ GAIL (India) Ltd, Guna  
A LPG Plant having 132kV / 6.6kV, 2x10/12.5MVA Power Transformer, 2x2.7MW GTG and Allied system at 6.6kV and 433V
- ⊕ Hindalco Industries Ltd, Muri Plant, Ranchi  
AAuminium Powder manufacturing plant having 2x15MW STG at 11kV and entire plant distribution system at 11kV / 6.6kV / 433V. the study of Load Flow and Short Circuit conducted for two generators running in parallel. Subsequently the Short Circuit study for Grid support at twin feeders of 132kV / 11kV, 20MVA Transformers running for various combinations conducted to decide the MVA rating for new switchgears and equipment and also to authenticate the MVA rating of existing switchgears.
- ⊕ Indian Rayon Industries Ltd, Veraval  
A Rayon plant having 11kV 2x3MVA, 2x16MW and 8x2MW CPP Both TG running in parallel and meeting caustic plant load requirement and 8x2MW DG sets feeding the critical Rayon plant.
- ⊕ Alstom Projects India Limited – Kolkata / Vadodara  
Feasibility study report for Reliability of existing generator protections relays of 20MW GTG installed at Sylhet, Saidpur and Rangpur Bangladesh running in parallel with 11/33kV 1x25MVA power transformer for power evacuation to National Grid of Bangladesh
- ⊕ Nandan Exim Ltd, Ahmedabad  
A fibre plant having 33kV, 2x12.5MVA Grid support and 1x30MW CPP running in parallel with grid supply which was having frequent black outs and solution provided
- ⊕ Alembic Ltd, Vadodara  
A Penicillin company having 66kV / 11kV 15MVA and 3x4.2MW CPP running in parallel with grid to cater plant load and grid supply as standby
- ⊕ VikramIspat Ltd, Revadanda  
A Steel Ingot plant having 1x8.7MW and 4x2.5MW CPP running independently and feeding the plant load
- ⊕ Thermax Ltd, Pune  
Feasibility study report for Reliability of existing generator protections relays including frequent tripping and mal operation of 1x30MW STG and 2x25MW STG installed at SKS Ispat Ltd, Raipur running in parallel with 11/132kV 1x31.5MVA

and 2x20/25MVA power transformer for power evacuation and export to State Grid of Chhattishgarh. Also conducted detail system study after submission of FSR.

- ⊕ Thermax Ltd, Pune  
Feasibility study report for Reliability of existing generator protections relays including frequent tripping and mal operation of 2x30MW STG installed at Kamachi Sponge and Power Corporation Ltd., Chennai running in parallel with 11/132kV 2x40MVA power transformer for power evacuation and export to State Grid of Tamil Nadu and also meeting in house requirement of power for various plants
- ⊕ Thermax Ltd, Pune  
Feasibility study report for Reliability of existing generator protections relays including frequent tripping and mal operation of 1x30MW STG installed at Bengal Energy Ltd, Kharagpur, West Bengal running in parallel with 11/132kV 1x40MVA power transformer for power evacuation and export to State Grid of West Bengal and also meeting in house requirement of power for various plants
- ⊕ Enercon India Ltd / Larsen and Toubro Ltd, ECC, Ahmedabad  
132kV / 33kV, 2x75MVA Outdoor switchyard at Jaisalmer-System configuration – main and transfer bus for Wind Power Generation and Evacuation. The study conducted for complete protection requirement including unit protections.
- ⊕ Gujarat Electricity Board / Larsen and Toubro Ltd, ECC, Ahmedabad  
220KV / 66kV 3x100MVA Outdoor switchyard at Utran Power Plant of GEB, Surat - System configuration- double main bus on 220kV and 66KV. Integration of the new bay in the existing system on 220kV side shifting of the existing 220kV bay to a new bay location. Conversion of the existing single bus bays into double bus system on the 66KV level. Integration of the existing 66KV bays into the new 66KV system. The study conducted for complete protection requirement including unit protections.
- ⊕ Suzlon Energy Ltd / Larsen and Toubro Ltd, ECC, Ahmedabad  
220kV/33kV, 2x75MVA Outdoor switchyard at Jaisalmer-System configuration- double main and transfer bus for Wind Power Generation and Evacuation. The study conducted for complete protection requirement including unit protections
- ⊕ Suzlon Energy Ltd, Pune  
66kV / 33kV, 2x20MVA and 2x37.5MVA Outdoor switchyards at three different locations of Wind Farms at Erkunahalli, Hariharpura, Nittur, Karnataka State - System configuration- single bus system for all substations for Wind Power Generation and Evacuation. The study conducted for complete protection requirement including unit protections.
- ⊕ Suzlon Energy Ltd, Pune  
220kV / 33kV, 4x100MVA Outdoor switchyard at four different locations of Wind Farms at Jamde, Valve, Suthri, Sangli in Maharashtra State - System configuration: 220kV double main and transfer bus and 33kV main and transfer bus for Wind Power Generation and Evacuation. The study conducted for complete protection requirement including unit protections.
- ⊕ Arvind Mill, Sanand  
A Denim Cotton Mill unit having 3x10MW GTG and 1x4MW GE running in iso mode as well as running in parallel with grid having 66/11kV 3x15/20MVA Power Transformers.

- ⊕ Sanghi Industries Ltd, Cement Division, Sanghipuram  
A Cement plant having 4x11.3MW CPP three of them running in parallel meeting total plant load requirement of 33.9MW and fourth unit as standby
- ⊕ Gujarat Water Infrastructure Limited, Gandhinagar  
Drinking Water Supply Scheme for Client GWSSB (66kV / 11kV / 6.6KV / 3.3kV / 433V – 12.5 / 10 / 6 / 5MVA Power Transformer System). The study conducted for complete protection requirement including unit protections for all fourteen locations as under.
  - NC – 1 Gadhada PS
  - NC – 2 Chavand PS
  - NC – 3 Babra PS
  - NC – 4 Vallabhipur PS
  - NC – 6 Maliya – Morvi PS
  - NC – 7 Morvi – Tankara PS
  - NC – 9 Maliya – Bhachau PS
  - NC – 12A, 12B Tankara – Rajkot PS
  - NC – 14 Gandhinagar PS
  - NC – 16 Mehasana PS
  - NC – 17 Modhera PS
  - NC – 20 Godhara PS
- ⊕ Gujarat Water Resources And Development Corporation Limited  
66kV / 6.6KV / 433V – 12.5 / 10 / 6 / 5MVA Power Transformer System. The study conducted for complete protection requirement including unit protections for all locations as under.
  - Khorsam-Saraswati Lift Irrigation Project
  - Modhera-Dharoi Lift Irrigation Project
  - Modhera To SujlamSuflam Spreading Canal Lift Irrigation Project
  - Jalundra To SujlamSuflam Spreading Canal Lift Irrigation Project
  - Khorsam To SujlamSuflam Spreading Canal Lift Irrigation Project
  - Adundra To SujlamSuflam Spreading Canal Lift Irrigation Project
- ⊕ Narmada Water Resources And Water Supply (Nwrws)  
66kV / 6.6KV / 433V – 12.5 / 10 / 6 / 5MVA Power Transformer System. The study conducted for complete protection requirement including unit protections for all locations as under.
  - Piyaj-Dharoi Line-1 Lift Irrigation Project
  - Hathmati-Guhai Lift Irrigation Project
- ⊕ Hindustan Construction Company Ltd (Hcc) Mumbai  
66kV / 6.6KV / 433V – 12.5 / 10 / 6 / 5MVA Power Transformer System. The study conducted for complete protection requirement including unit protections for Piyaj-Dharoi Line-2 Lift Irrigation Project
- ⊕ Remi Metals Ltd, Jhagadia  
A Metal plant having 220kV / 33kV / 11kV 42MVA and 25MVA power transformers for Induction Furnaces
- ⊕ Tata Chemicals Ltd, Babrala  
A Fertilizer plant having 2x20 MW CPP and allied 11kV / 3.3kV / 433V Power Distribution System
- ⊕ Orient Abrasives Ltd, Porbandar  
A Chemical Plant having 11kV 2x3MVA Power Transformer and 2x4.2MW CPP
- ⊕ Wockhardt Ltd, Ankleshwar

A Bulk Drug Plant having 22kV / 433V 2x2MVA Power Transformer and 4x1MW CPP

- ⊕ RathiIspat Ltd, Ghaziabad  
A Steel and Rolling Plant having Switchyard of 132kV / 11kV, 2x25MVA Power Transformer and allied system at 11kV and 433V Power Distribution
- ⊕ United Phosphorus Ltd, Unit – I, Ankleshwar  
A Phosphorus Plant having Switchyard of 66kV / 22kV, 1x15MVA, Power Transformer and 22kV / 433V, 2x2.5MVA Distribution Transformer and allied system at 433V Power Distribution
- ⊕ Gujarat Guardian Ltd, Ankleshwar  
A Glass manufacturing company having 132kV / 11kV, 2x10MVA Power Transformer and Allied system
- ⊕ Shree Digvijay Cement Co. Ltd, Jamnagar  
A Cement Plant having 3 x 6.370MW CPP running in parallel and catering the plant load including load sharing and shedding scheme
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd – Kalol Unit  
A Fertiliser plant having 66kV / 11kV 2x10MVA and 1x8MVA Power Transformer and 11kV, 3.3KV and 415V Electrical Power Distribution System
- ⊕ Petrofils Co-operative Ltd, Valia  
A fibre manufacturing company having 132kV / 11kV, 2x15MVA Power Transformer and Allied system at 11kV / 3.3kV and 433V system
- ⊕ Nova Petrochemical Ltd, Ahmedabad  
A Petrochemical plant having 1x7.5MW and 8x1MW CPP
- ⊕ Modern Petrofils Ltd, Vadodara  
A fibre plant having 132kV / 6.6kV, 2x20MVA Grid support and 5x1.18MW CPP running in parallel with grid supply and Power plant isolated during cascade tripping of Grid supply in Gujarat in the year 1996
- ⊕ Saurashtra Cement Ltd, Porbandar  
A Cement plant having 132kV / 33kV, 2x20MVA and 2x7.2MW CPP
- ⊕ Vardhman Acrylics Ltd, Jhaghadia  
A Fibre plant having 1x5.5MW and 6x1MW CPP
- ⊕ Garden Silk Mills Ltd, Surat  
A Silk Mill having 66kV / 11kV, 3x5 MVA and 3x3.2 MW CPP running in island mode

## **C Power System Modernization Retrofit and Refurbishment**

- ⊕ Birla Cellulosic, Kosamba (A Unit Of Grasim Industries Ltd)  
Incorporation of generator protection relays for 2 x 16 MW TG set Modification of existing Alstom relays to match the protection requirement on EPC basis. Execution of providing interposing current transformer and incorporation of required CTs to complete REF protection scheme for 7 nos. 6.6kV / 433V 1600KVA distribution transformers of expansion project.

Retrofitting of total 140 nos. of old relays with SEL make Numerical Protection Relay models SEL551C and SEL751A for feeder protection, SEL749 for motor protection on EPC basis in phase manner including testing and configuration of relays.

⊕ Grasim Industries Ltd, Harihar  
Retrofitting of total 60 nos. of old relays with SEL make Numerical Protection Relay models SEL751A for feeder protection on EPC basis in phase manner including testing and configuration of relays.

⊕ Grasim Industries Ltd, Nagda  
Retrofitting of total 30 nos. of old relays with SEL make Numerical Protection Relay models SEL751A, SEL551C and SEL749A on EPC basis including testing and configuration of relays.

⊕ Zuari Agro Chemical Limited, Goa

Retrofitting of total 47 nos. of relays with SEL make Numerical Protection Relay models SEL751 and SEL551C for feeder protection, SEL749 for motor protection, SEL710 for synchronous motor protection and SEL787 for transformer protection on EPC basis, in phase manner including testing and configuration of relays.

Retrofitting of total 29 nos. of 3.3kV Fujii make bulk oil circuit breaker panels with ABB make VCB panels on EPC basis including testing and commissioning of panels

Retrofitting of total 2 nos. of RTCC Panel for 33/3.3kV 8.9MVA Transformers and Emergency Generator Supervisory Panel on EPC basis including testing and commissioning of panels

⊕ Welspun Industries Ltd, Vapi  
Engineering, Procurement and Construction of 28 nos. feeder protection relay type SEL751A and 2 nos. feeder protection relay type SEL351A having additional direction features.

⊕ Indian Rayon Industries Ltd, Veraval  
Incorporation of REF protection schemes for distribution transformer (26 nos.) Refurbishment and replacement of IDMT over current and earth fault relays at 160 locations on EPC basis

⊕ Indo Gulf Corporation Ltd, Jagdishpur  
Incorporation of REF protection schemes for distribution transformer (26 nos.)

⊕ Nirma Ltd, Bhavnagar  
Incorporation of split core current transformer and earth fault protection relay type CTUM15 for sensitivity of all large feeders having CT ratio more than 200Amp due to 100Amp earth fault current limitation on generators. Implementation of Transformer Differential Protection Scheme on two transformers of 5MVA 6.6kV / 33kV using SEL 587 relays on EPC basis

⊕ Sanghi Industries Ltd, Sanghipuram

Incorporation of protection system for generators initially design for restricting earth fault current to 20 Amps for 4x11.3 MW DG sets Modification of existing Alstom relays to match the protection requirement on EPC basis

- ⊕ Indian Farmers Fertilisers Co-operative Ltd, Kalol Unit  
Refurbishment and replacement of IDMT over current and earth fault relays at 16 locations on EPC basis
- ⊕ Hitawa Electrical Consultants and Services Ltd, Lagos, Nigeria  
Providing total Engineering support supply of Schneider make relays type SEPAM 1000 S20 and S80 T87 Retrofit, Testing and Configuration at site for customer PHCN on EPC basis
- ⊕ Aditya Birla Chemicals (India) Ltd, Renukoot Chemical Division  
Providing total Engineering support supply of Schneider make MICOM relays type P521 Retrofit, Testing and Configuration at site on EPC basis
- ⊕ Alembic Ltd, Vadodara  
Incorporation of REF protection schemes for distribution transformer (26nos.)  
Incorporation of protective relays in place of time delayed shunt fuse arrangement provided on MOCB (15 panels). Modification of existing Alstom / Jyoti relays to match the protection requirement on EPC basis
- ⊕ Hitawa Electrical Consultants and Services Limited – Lagos, Nigeria  
Engineering, Procurement and Construction of 31 nos. Over current and Earthfault relay type SEPAM1000S20 and 7 nos. Transformer protection relay type S80T87 for various 33/11kV sub-stations of PHCN
- ⊕ Bahwan Engineering Company L.L.C. – Oman  
Engineering, Procurement and Construction of complete transformer protection relay for 33/11kV, 20MVA including all supply materials like CT, ICT and sundry materials
- ⊕ P.T. Indo-Bharat Rayon, Indonesia  
Engineering, Procurement and Construction of 5 nos. feeder protection relay type SEL551C / 501C
- ⊕ Tata Chemicals Ltd, Babrala  
Modification of existing Alstom relays to match the protection requirement  
Incorporation of Numerical Feeder relay type REF/SPAJ, Motor Protection Relay type SPAM and Transformer Feeder Protection relay type RET of ABB replacing old Electro-mechanical relays of AREVA. The total number of various feeders amounted to approximately 120 nos.
- ⊕ Orient Abrasives Ltd, Porbandar  
Incorporation of REF protection schemes for distribution transformer (06 nos.)  
Incorporation of protective relays in place of time delayed shunt fuse arrangement provided on MOCB (08 nos.) on EPC basis
- ⊕ Hindustan Gas Industries Ltd, Halol  
Incorporation of REF protection schemes for distribution transformer (04 nos.) on EPC basis
- ⊕ Saurashtra Cement and Chemical Ltd, Porbandar

Incorporation of protective relays in place of time delayed shunt fuse arrangement provided on MOCB (04 nos.). Modification of existing Alstom / Jyoti relays to match the protection requirement

- ⊕ Garden Silk Mills Ltd, Surat  
Incorporation of generator protection relays for 2 x 16 MW TG set  
Modification of existing Alstom relays to match the protection requirement on EPC basis
- ⊕ EasunReyrolle Ltd, Bangalore  
Incorporation of Numerical Distance Protection Relay type SEL 311C of SEL USA in place of Electromechanical Distance Protection Scheme for various substations of GETCO The work carried out is complete retrofit including testing and setting of relays for 19 schemes

## **D Protection System Relay and Scheme Testing**

- ⊕ KrishakBharati Co-Op Ltd, Fertiliser Plant at Hazira - Surat  
A Fertiliser plant having 2x20MVA 66kV grid power and 2x15MW CPP  
Approx quantity of relays 2250 nos carried out in 35 days shutdown
- ⊕ KrishakBharati Co-Op Ltd – HAEP at Hazira – Surat  
A Heavy Water plant having 2x15MVA 66kV grid power  
Approx quantity of relays 1250 nos carried out in 15 days shutdown
- ⊕ Indo-Gulf Corporation Ltd, Jagdishpur)  
A Fertiliser plant having 2x20MVA 132kV grid power and 2x28MW CPP  
Approx quantity of relays 1750 nos carried out in 18 days shutdown
- ⊕ Gujarat Heavy Chemicals Ltd, Sutrapada  
A Caustic Soda plant having 1x5MVA 66kV grid power and 2x11MW CPP  
Approx quantity of relays 950 nos carried out in 10 days shutdown
- ⊕ Gujarat Narmada Fertiliser Valley Co. Ltd, Bharuch  
A Fertiliser plant having 2x50MVA 132 kV grid power and 2x25MW CPP  
Approx quantity of relays 2075 nos carried out in 25 days shutdown
- ⊕ Gujarat State Fertiliser Co. Ltd, Vadodara  
A Fertiliser plant having 2x50MVA 132 kV grid power and 2x15MW + 1x30MW CPP  
Approx quantity of relays 1800 nos but carried out approx. 900 relays during split shutdown
- ⊕ Elme Petro-Chemicals Company Ltd – Port Harcourt, Nigeria  
A petrochemical plant having 4x30MW CPP. The relays in the plant are of seven different makes which are electromechanical and static type and initial phase of work of assessment has been done so that during plant shutdown no difficulty shall be faced for testing of relays.
- ⊕ Zuari Industries Ltd, Goa  
A Fertiliser plant having total 632 nos. of relays of four different makes in combination of electro- mechanical, static and numerical protection relays.
- ⊕ Birla Cellulosic, Kosamba (A Unit Of Grasim Industries Ltd)



A Viscose plant having 1x2.5MVA 22kV grid power and 2x15MW CPP  
On line testing of 1485 nos. of plant relays carried out in 45 days without shutdown and testing of 3 nos. of generator numerical protection relays REM543 in phase manner.

- ⊕ Grasim Industries Ltd, Nagda  
A Viscose plant having 2x5MVA 33kV grid power and 2x15MW+1x30MW 1X18MWCPP Approx quantity of relays 2650 nos carried out in 25 days shutdown
- ⊕ Grasim Industries Limited - Chemical Division, Vilayat  
Sensitivity and stability check up for Differential and REF protection schemes installed for 2 nos. of 33/6.6kV power transformers and for REF protection schemes installed for 9 nos. of 33/0.433kV distribution transformers.
- ⊕ GAIL (India) Ltd, Pata  
A Petroleum and Chemical plant having 2x20MVA 66kV grid power and 2x15MWCPP. Approx quantity of relays 3250 nos carried out in 30 days shutdown
- ⊕ GAIL (India) Ltd, Vadodara  
A LPG recovery plant having 2x20MVA 66kV grid power and 2x5MW CPP  
Approx quantity of relays 650 nos carried out in 15 days shutdown
- ⊕ GAIL (India) Ltd, Guna  
A LPG recovery and Petroleum plant having 2x20MVA 132 kV grid power and 2x16MW CPP  
Approx quantity of relays 1150 nos carried out in 25 days shutdown
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd, Aonla Unit  
A Fertiliser plant having 2x25MVA 132 kV grid power and 2x28MW CPP  
Approx quantity of relays 1750 nos carried out in 25 days shutdown
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd, Phulpur Unit  
A Fertiliser plant having 2x25MVA 132 kV grid power and 1x15MW + 1x18MW CPP  
Approx quantity of relays 2750 nos carried out in two separate shutdown Of 20 days each
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd, Kalol Unit  
A Fertiliser plant having 3x12.5MVA 66kV grid power  
Approx quantity of relays 950 nos carried out in 12 days shutdown
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd, Paradeep Unit  
A Fertiliser plant (132kV / 33 kV, 2x75MVA switchyard and 2x60MW CPP. The relay testing and primary injection testing carried out for entire plant electrical power distribution system at 33kV/11kV/6.6kV/440v carried in 100 working days.
- ⊕ Indian Farmers Fertilisers Co-Operative Ltd, Kandla Unit  
A Fertiliser plant (66kV / 3.3 kV, 4x5MVA switchyard  
Approx quantity of relays 650 nos
- ⊕ Indian Rayon Industries Ltd, Veraval

A Rayon and important Viscose plant having 2x2.5MVA 11kV Grid Power, 8x2.25MW DG sets and 1x15MW + 1x20MW CPP  
Approx quantity of relays 1490 nos carried out on line in 35 days time.

- ⊕ Nirma Ltd – Bhavnagar  
A Caustic Soda plant having 66kV, 15MVA Power Transformer and CPP having power generation capacity with 2x16.32MW TOYO DENKI TG sets and 1 no. 6.5MW BHEL make TG set  
Approx quantity of relays 1100 nos. and various scheme testing carried out in 10 days shutdown period.
- ⊕ Chambal Fertilizers and Chemicals Ltd, Kota  
A Fertiliser plant having total 410 nos. of relays in Gadepan-I and 534 nos. of relays in Gadepan-II in combination of electro- mechanical, static and numerical protection relays.
- ⊕ Gujarat Alkalies and Chemicals Ltd, Vadodara  
A Caustic Soda and Chemical plant having 2x20MVA 66kV grid power  
Approx quantity of relays 850 nos carried out in 15 days shutdown
- ⊕ Birla Copper, Dahej (A Unit Of Hindalco Industries Ltd)  
A Copper Smelter plant having 220kV grid power and 135MW CPP  
Approx quantity of relays 375 nos carried out in phase manner during plant shutdown.
- ⊕ Aarti Industries Limited, Vapi  
Sensitivity and stability check up for Differential protection scheme installed for 8MW of turbo generator in CPP and testing of 92 nos. of protective relays of various application.
- ⊕ Grasim Industries Ltd, Rajshree Cement, Malkhed  
A Cement plant having 3x20MW STG and 132kV grid power and allied Electrical System. Approx quantity of relays 650 nos carried out in shutdown including testing of 3 nos. of numerical generator protection relays Micom P343 and REM543.
- ⊕ Tata Chemicals Ltd, Babrala  
A Fertiliser plant having no grid power and 2x25MW CPP  
Approx quantity of relays 1675 nos carried out in 22 days shutdown
- ⊕ Tata Chemicals Ltd, Haldia  
A Fertiliser plant having no grid power and 2x12.5MW CPP  
Approx quantity of relays 475 nos carried out in 12 days shutdown
- ⊕ Oswal Chemicals And Fertilizers Ltd, Shahjahanpur now KRIBHCO Shyam Fertilizers Ltd  
A Fertiliser plant having no grid power and 2x28MW CPP  
Approx quantity of relays 1450 nos carried out in 20 days shutdown
- ⊕ Essar Power Ltd, Hazira  
A power plant having 4x100MW generation and allied distribution system  
Approx quantity of relays 1100 nos carried out in two to three shutdown of 10/12 days

- ⊕ Oil and Natural Gas Corporation Ltd, Gandhar  
A Gas plant having 2x20MVA 66kV grid power and 2x18MW CPP  
Approx quantity of relays 1850 nos carried out in two separate shutdown of 20days each
- ⊕ Reliance Industries Ltd, Hazira  
A Petrochemical plant having 2x50MVA 220/33KV Outdoor Switchyard and 7X30MW Captive Power Plants. The Distribution Network System is at 33KV, 6.6KV and 433V and the number of plant substations are approximately 33. The total no of relays shall be 8500 including Distance, Generator, Motor and Feeder Protections. The job was carried out on AMC basis with an emergency call to attend within 2/3 days time and carried out entire work successfully
- ⊕ Torrent Gujarat Biotech Ltd, Vadodara  
A Pharma plant having 2x15MVA 66/6.6kV Grid Power and Captive Power Generation of 6x1000kw DG sets and Allied Distribution System  
Approx quantity of relays 850 nos carried out on line in 10/12 days
- ⊕ Ambuja Cement Ltd, Unit Rabriyawas, Jaitaran  
A Cement Plant having 2x15MVA 132/11kV Grid Power and Captive power Generation of 1x15MW TG set and Allied Distribution System  
Approx quantity of relays 850 nos carried out during shutdown of 12/15 days including testing of 2 nos. numerical generator protection relays Micom P343.



- ⊕ Enercon India Ltd / Larsen and Toubro Ltd – ECC, Ahmedabad  
132kV / 33 kV, 2x75MVA switchyard at Jaisalmer. Protective relays and Primary Injection Testing includes Schemes.
- ⊕ Suzlon Energy Ltd / Larsen and Toubro Ltd – ECC, Ahmedabad  
220kV / 33kV, 2x75MVA switchyard at Jaisalmer Protective relays and Primary Injection Testing includes Schemes.
- ⊕ Enercon India Ltd / Joyti Engineers and Contractors Pvt. Ltd, Gondal  
220kV / 33kV, 2x100 MVA Switchyard at Somania. Protective relays and Primary Injection Testing includes Schemes.
- ⊕ Bharat Heavy Electricals Ltd, Hyderabad  
IOCL Gujarat Refinery (30MW CPP), OIL AND NATURAL GAS CORPORATION LTD- Hazira (15MW CPP), Nirma – Bhavnagar (6MW CPP), GHCL – Veraval (6 MW CPP)
- ⊕ DLF Ltd, New Delhi  
Ambuja Cement (15MW CPP), Nagpur Alloy and Casting (2x4MW, CPP), Indian Rayon (16 MW CPP)
- ⊕ Gujarat Narmada Valley Fertilizers Co. Ltd, Bharuch / Jyoti Ltd  
The complete Electrical Power Distribution and Auxiliary system at 11kV / 3.3kV / 433V HT panel LT panel MCC Power Transformer and Generator control and relay panel for 2x25MW CPP
- ⊕ Alembic Ltd, – Vadodara  
The complete Electrical Power Distribution and Auxiliary system at 11kV / 433V HT panel LT panel MCC, Generator control and relay panel for 3x4.25MW CPP
- ⊕ Alstom Projects India Ltd, Vadodara  
Carrying out Testing of Protective relays of CPP including Generator Protection Relays, Primary Injection testing of CTs and unit protection scheme validation during overhauling carried out by Alstom at various Captive Power Plant sites in India listed as under
  - Indian Farmers Fertilisers Co-operative Ltd, Paradeep
  - Indian Farmers Fertilisers Co-operative Ltd, Aonla
  - Indraprastha Gas Power Co. Ltd, Delhi
  - Indo Gulf Fertilisers Ltd, Jagdishpur
  - Numaligarh Refinery Ltd, Numaligarh
  - Tata Chemicals Ltd, Babrala
- ⊕ Thermax Ltd, Pune  
Carrying out Testing of Protective relays of CPP including Generator Protection Relays, Primary Injection testing of CTs and unit protection scheme validation during overhauling carried out by Thermax at various Captive Power Plant sites in India listed as under
  - Saurashtra Cement, Porbandar
  - J. K. White Cement, Gotan
  - UrjankurShirol – Kolhapur
  - Hindustan Zinc Ltd., Rajasthan
  - SKS Ispat and Power Ltd., Raipur
  - J. K. Cement Works, Nimbahera

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