



**50 YEARS OF SERVICE**



**EXPERIENCE THE EXCELLENCE**



# **POWER SYSTEMS**

## **ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION**

# INTRODUCTION

ERDA has established Expert Services capability related to Power systems for the benefits of power sector with a special focus on transmission and distribution companies, regulatory commissions as well as Public and Private Sector Industries. The section is well equipped with **Mi-Power, ETAP, PSS@E, Ansys/Maxwell, EMTP-RV and MATLAB** softwares to provide expert services in the area of power system studies and power quality (including harmonics and switching surges) with mitigation measures.

## SOFTWARE STUDIES

- Load Flow
- Short Circuit
- Transient Stability
- Power Quality Analysis
- Dynamic Stability
- Relay Co-ordination
- Protection Audit
- Reactive Power Compensation
- Motor Starting
- Transmission Planning and Power Evacuation
- Power Quality Measurement & Mitigation for Utilities, IPPS and CPPS
- Switching Surge Measurement and Analysis
- Arc Flash Analysis
- FEM Analysis

## LIST OF STUDIES / R&D PROJECTS

- Short circuit and relay coordination study for GAIL (India) Limited , Waghodia, Gujarat
- Load flow, Short circuit, Relay co-ordination, Transient stability studies for Hindustan Zinc Limited, Rajasthan
- Transmission line loss reduction study for Madhya Pradesh Power Transmission Company Limited
- Power Evacuation study of 25 and 50MW wind power plants for Enercon, Suzlon and Powerica Limited
- Evaluation of parallel operation charges to be levied from Captive Power Plants for State Regulatory Commission of Madhya Pradesh and Chhattisgarh, and Jaipur Vidhyut Vitaran Nigam Ltd. (JVVNL)
- Load flow, Short circuit, Relay co-ordination, Motor starting studies, Power quality measurement for BPCL, Mumbai
- Load Flow, Short circuit, Relay co-ordination, VAR compensation, and Power Quality measurement for Jindal Stainless Hissar Ltd.
- Current Harmonic measurement, flicker and DC current injection measurement for more than 10 renewable energy generation plants done as per CEA guidelines amendment 2019
- Switching surge measurement for Reliance Infrastructure Ltd., Torrent Power and Metros
- Bus reactor planning study for Chhattisgarh State Power Generation Company Ltd.
- Protection Audit for Adani Electricity Mumbai Ltd., Tata Power Maithon, Trombay, JMRC, NEEPCO, OBRA Thermal Power Station etc.

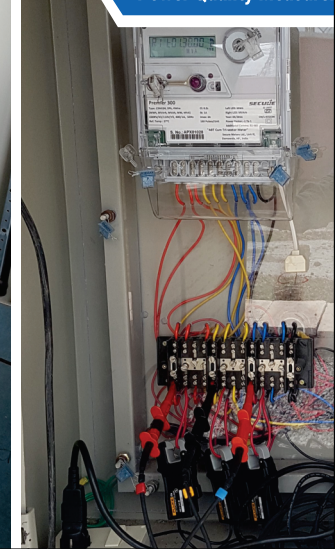
Protection Audit at Switchyard



Power Quality Measurement at substation panel



Power Quality Measurement



## POWER QUALITY MEASUREMENT

Power quality measurement for single phase and three phase systems includes RMS voltage, RMS current, active power, reactive power, apparent power, power factor, voltage THD, current THD and individual harmonics in both voltage and current up to 50th order. Based on guidelines given in IEEE 519, this section undertakes measurement of power quality parameters at point of common coupling (PPC) and at harmonic generating loads for Captive Power Plants, Independent Power Plants, Utilities, Chemical & Fertilizer Plants etc.

This section also undertakes power quality measurement of renewable energy plants as per CEA guidelines using IEC 61000-4-30 compliant class A meters.

- Harmonics are measured using precision power analyser according to IEC 61000-4-30 and limits as per IEEE519
- Flicker as per IEC 61000-4-30 & limits as per IEC 61000-3-7
- DC current injection measurement as per CEA guidelines

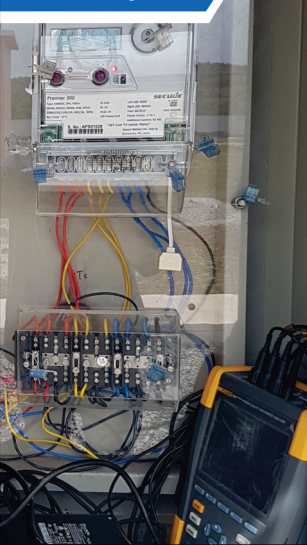
## SWITCHING SURGE MEASUREMENT

ERDA offers measurements of switching surge voltage up to 66 kV line (all phases at a time) up to 300 kVp impulse voltage measurement capacity with capacitor voltage divider and high bandwidth oscilloscope. ERDA performed switching surge measurement at various locations including metro projects.

## KEY CUSTOMERS

- Chhattisgarh State Electricity Regulatory Commission
- Madhya Pradesh Electricity Regulatory Commission
- Madhya Pradesh Power Transmission Company Limited
- GAIL(India) Limited
- Powerica Limited
- Renew Power
- KRIBHCO
- Suzlon, Enercon, Greenko, Vestas
- Essar Power
- L&T Infra
- Avaada
- Charanka Power Plant
- Chambal Fertilizers & Chemicals Limited
- Reliance Infrastructure Limited
- Mahindra Susten Private Limited
- ACME Cleantech Solutions Private Limited
- BPCL, GIPCL, GSECL
- Rashtriya Chemicals & Fertilisers Limited
- CSPGCL, Raipur
- Adani Electricity Mumbai Ltd.
- JVVNL, Jaipur
- Hyderabad & Lucknow Metro Rail Corporation

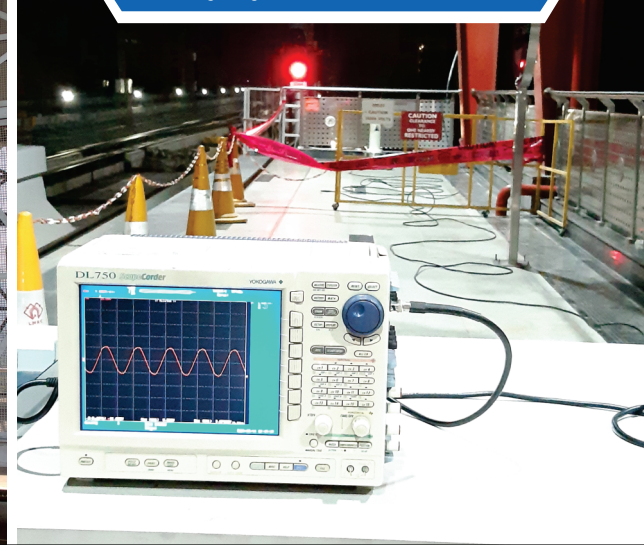
Measurement at Metering CT-PT



Switching Surge Measurement at Capacitor Bank



Switching Surge Measurement at Metro Station





TECHNOLOGY CENTRE



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## ELECTRICAL RESEARCH AND DEVELOPMENT ASSOCIATION

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