

"स्मार्ट ग्रिड में आरई एकीकरण के साथ विद्युत गुणता (पीक्यू) चुनौतियां"
पर एक दिवसीय कार्यशाला
फरवरी 28, 2020

**One day workshop
on
"Power Quality (PQ) challenges with RE Integration in Smart
Grid"**

February 28, 2020



आयोजक / Organised By



विद्युत प्रणाली प्रभाग (पीएसडी)
Power Systems Division (PSD)
केंद्रीय विद्युत अनुसंधान संस्थान / Central Power Research Institute
(भारत सरकार की सोसाइटी, विद्युत मंत्रालय) / (Govt. of India Society, Ministry of Power)
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About the Workshop

Smart Grid is increasingly seen as a means to facilitate climate friendly Renewable energy sources and to enable efficient use of electricity (Modern electrical networks can link Wind and Solar power with Electric Vehicles. A consequence of smart grid is a drastic increase in use of electronics in the power system. This makes the satisfactory function of electrical and electronic equipment vital for realization of a robust smart grid. Smart grid requires intelligent PQ monitoring to solve different PQ related problems. The intelligent power quality monitoring system will help to detect different PQ disturbances and consequently assist in employing or implementing appropriate mitigation techniques.

Ministry of Power, Govt. of India has initiated many initiatives to provide Quality Power to all.

The following topics will be covered in the workshop:

- **Smart Grid Technologies and Conceptual Model**
- **Power Quality issues in Grid connected Wind Energy System**
- **Power Quality issues in Solar PV Plant**
- **Power Quality Impacts on Electric Vehicles (EVs)**
- **Micro-PMU for Power Quality**
- **Calibration of Power Quality Analyser using PMU Calibrator**
- **Power Quality-Intelligent monitoring and Benchmarking**
- **Power Quality Mitigation & Control techniques**
- **Power Quality Standards and Guidelines**
- **Regulatory framework in Power Quality**



Who should attend?

The workshop is aimed at Engineers, Managers responsible for the operation and maintenance of Renewable Energy Systems, Distribution Systems, Transco's, Discoms, Transmission & Distribution Planners, Consultants, Officers of Power Utilities/Corporations, State Govt./SEBs, Policy makers, Entrepreneurs, Energy Planners, Renewable Energy Providers, Private Entrepreneurs, Manufacturers, Research/Academic Institutions and Financial Institutions, etc.

Registration

Private Organisations	Rs 5900/- (Inclusive of GST)
State Power Utilities	Rs 4,130/- (Inclusive of GST)
Faculty members of Educational Institutions	Rs 4,130/- (Inclusive of GST)
Students/Research Scholar of Educational Institutions	Rs 2,950/- (Inclusive of GST)

Registration form, a part of this brochure, complete in all respect shall be sent to the workshop Coordinator along with the registration fee in the form of crossed DD drawn in favour of Accounts Officer, CPRI, payable at Bangalore.

Participants from international may transfer the fee via Swift code No.: SBININBB425, SBI A/C No. 10270577483, and participant from National may transfer fee to SBI A/C No.10356553310, IFSC code: SBIN0002215. Beneficiary Name: SBI, IISc Branch, Bangalore under intimation to the workshop coordinators.

Kindly use separate form for each participant, Downloaded/ Photo copies of Registration form are acceptable.

The Registration fee includes kit, workshop material-soft copy, tea/coffee with snacks and working lunch for one day.

Travel & Accommodation

Bangalore is well connected by Road, Rail and Air.

Participants have to make their own travel arrangements.

Guest house accommodation on twin share basis can be provided on chargeable basis subject to availability

Power Systems Division (PSD)

Power Systems Division with its state-of-the-art facilities and latest software tools offers a wide range of power system simulation services, including real time performance analysis of various types of controllers such as FACTS, HVDC, SVC and protection relays. It has been conducting power system studies for the past two decades for its own needs and at the request of utilities and manufacturers. To carry out such studies the division possesses Real Time Digital Simulator (RTDS), RT Lab and various Power System Analysis Software Packages. Power Systems Division has carried out for the first time in the country the pilot project on "Protection system study and Protection audit" of selected DTL transmission system. Furthermore the Division is accredited by ISO: 9001-2015.

The Relay Testing Laboratory (RTL) is equipped with sophisticated Computerized Relay Testing Systems for testing of Protection relay for all its characteristics/functions meeting its accuracy requirements as per IS:3231 series and IEC:60255 series of standards. The laboratory conforms to ISO/IEC 17025-2017 requirements. Field-testing of protection relays is also carried out for major power stations and utilities and also undertakes pre-dispatch Third Party Inspection (TPI) on Relay and Control panel.

Central Power Research Institute, Bangalore has established **country's first** Phasor Measurement Unit (PMU) test facility. Fluke make 6135A/PMUCAL Phasor Measurement Unit Calibration system is an automated system and is traceable to International reference standard. It's a unique facility for carrying out Validation/Evaluation of PMU both M-class and P-Class steady state and Dynamic conditions as per IEEE C37.118.1-2011, IEEE C37.118.1a-2014, IEEE C37.242.2013, IEEE Synchrophasor Measurement Test suite Specification-Version 2-2015 and IEC/IEEE 60255.118.1:2018.

6135A/PMUCAL at a Glance

The 6135A/PMUCAL system enables you to:

- * Calibrate and test a PMU from a client PC, either at the site of the test system or remotely over the Internet
- * Quickly set up a PMU test
- * Speed through automated calibration procedures
- * Provide the required static and dynamic voltage and current conditions that occur in a power distribution grid specified by the standard
- * Apply those signals to a phasor measurement unit
- * Capture the PMU's reported results
- * Compare those results with the original stimulus
- * Evaluate against the thresholds defined in IEEE Std C37.118.1a™-2014 & IEC/IEEE 60255-118-1:2018
- * Create test reports, graphs and calibration certificates that can be readily printed or shared electronically



CPRI'S Profile

Central Power Research Institute (CPRI) set up in 1960 by the Government of India, functions as a National organization for applied research in power sector and also serves as an Independent Laboratory for testing and certification of power equipment. CPRI is a member of STI (Short Circuit Testing Liaison) of Europe and is accredited by M/s ASTA of UK. CPRI also provides consultancy services on various facets of power sector. CPRI has expertise in the area of Simulation, Diagnostics, System Analysis and Testing. CPRI laboratories have modern equipment needed for Power system simulation, Short circuit testing, Diagnostics of equipment, Materials engineering, Seismic qualification etc. CPRI has experienced faculty in different subjects concerned to power sector with practical experience in their areas of interest, as well as extensive experience in presenting courses/seminars.

Over the period, CPRI officers have gained lot of practical knowledge concerning to testing and operational problems of the industry. CPRI is a leading provider of Training and Continuing Education to Utilities, PSUs across the country for the past 50 years. CPRI is continually setting new standards in training and continuing education from basic theoretical information to practical hands-on electrical equipment training. CPRI courses have made substantial impact on the level of training and education to India's electricity utilities, manufacturing companies, transmission and distribution companies. By upgrading the occupational skill of technical workers, CPRI training courses have improved the career path of many electrical personnel as well as contributed to an improvement in electricity efficiency, plant productivity, electrical system reliability an overall competitiveness of Indian industry.

Registration form shall be sent by E-mail/Fax/Post to
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Programme Coordinators



Shri Kaliappan Perumal, B.Tech., M.E., (Ph.D). He has 25 years of experience with CPRI working in the field of Power System Protection, Synchrophasor, Wide Area Monitoring, Protection and Control (WAMPAC) and Smart Grid Technology and Applications. His areas of interests are Adaptive Relaying, Computer Relaying, Protection issues in Distributed Generation, Validation of Phasor Measurement Unit, Synchrophasor for Power system Protection and Control applications, Internet of Things with Renewable Energy, Internet of Things with Smart Grid, Cyber Physical System Security for the Smart Grid. Presently he is Joint Director with Power Systems Division of CPRI, Bangalore. He is an IEEE member as well as member in IEEE PES Bangalore section and he is also pursuing his Ph.D at National Institute of Technology (NIT), Tiruchirappalli. Mobile: +91 94491 49924, Email: kaliappan@cpri.in