INTERNATIONAL TRAINING PROGRAMMES FOR POWER SECTOR EXECUTIVES 2019 – 2020

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आरईसी
REC
असीमित ऊर्जा, अनन्त संभावनाएं
Endless energy. Infinite possibilities.

REC INSTITUTE OF POWER MANAGEMENT AND TRAINING
(Formerly Known as CIRE)
of
REC LIMITED
(A Government of India Enterprise)
Website: *http://www.recipmt.com www.recindia.nic.in*

Promotes Training for Better Tomorrow

About RECIPMT

REC Institute of Power Management and Training (RECIPMT) formerly known as Central Institute for Rural Electrification is a training institute established at Hyderabad in 1979 under the aegis of Rural Electrification Corporation Limited (REC), a Government of India Enterprise. The objective is to design and conduct training programmes on various topics of Electricity Generation, Transmission and Distribution Systems and also on Renewable Energy Systems.

During the last 40 years, RECIPMT has organized programmes and workshops on Technical, Management, Finance & Accounts, HR, Information Technology and Energy Conservations relating to Power Sector.

RECIPMT is the nodal agency for coordination and implementation of the National Training Programmes for C&D Employees across the country, under Deen Dayal Upadhyay Gram Jyothi Yojana (DDUGJY) of Ministry of Power, GoI. Till 31st March 2019, RECIPMT organised training for 2,49,553 C&D category of employees of various power utilities. RECIPMT has also organised training of 41016 power distribution franchisees during the 11th plan.

RECIPMT is also organising training programmes for the Executives of International Power Sector Organisations. So far, trained 1539 executives from 93 countries by organising 95 batches of training to International Power Sector Executives. The duration of trainings varies from 4-12 weeks.

Upto March 2019, the Institute has organized 2106 training programmes and 47771 Engineers/ Managers from various Power Utilities, like Generation, Transmission & Distribution Companies, Electricity Departments, Rural Electric Cooperatives, Regulatory Commissions, Rural Development Agencies, Banks, CPUs, etc., participated in the programmes.

RECIPMT Main Building and Conference Hall

Promotes Training for Better Tomorrow

PROGRAMMES AT A GLANCE

SL.No	Name of Programme	From	To	Duration in Weeks	Qualification Required
1	Certificate Course in Power Distribution Management	24 June 2019	02 Aug 2019	6	Diploma/ Degree in Electrical Engineering (working in power sector)
2	Concepts to Commissioning of Solar Power Plants	24 June 2019	02 Aug 2019	6	Diploma/ Degree in Engineering (working in Power Sector)
3	Financial Management and Accounting Standards for Power Utilities	19 Aug 2019	27 Sep 2019	6	Diploma/ Degree in Finance/Management /Accounts/Commerce /Economies (working in power sector)
4	Design, Erection, Operation, Maintenance and Protection of EHV Substations	19 Aug 2019	27 Sep 2019	6	Diploma/ Degree in Electrical Engineering (working in power sector)
5	Emerging Trends in Rural Electrification & Power Management	21 Oct 2019	13 Dec 2019	8	Degree/Diploma in Electrical/Mechanical Engineering (Working in Power sector)
6	Planning and Management of Power Transmission and Distribution Systems	21 Oct 2019	13 Dec 2019	8	Diploma/ Degree in Electrical Engineering (working in power sector)
7	Certificate Course in Electric Power Management	06 Jan 2020	27 Mar 2020	12	Diploma/Degree in Engineering (preferably Electrical/Mechanical) (working in power sector)
8	Green Energy Development for Sustainable Power Sector	06 Jan 2020	14 Feb 2020	6	Diploma/Degree in Electrical/Mechanical Engineering (working in power sector)
9	Planning, Operation and Maintenance of Power Generation Projects	17 Feb 2020	27 Mar 2020	6	Diploma/ Degree in Electrical/Mechanical Engineering (working in power sector)

1. CERTIFICATE COURSE IN POWER DISTRIBUTION MANAGEMENT

(From 24th June, 2019 to 02nd August, 2019) **Duration: 6 Weeks**

AIM:

Power distribution forms most crucial chain of the entire power business. If this segment is able to demonstrate commercial viability and maintain uninterrupted power supply to customer, there is every possibility that the entire power sector will yield positive results. Therefore, there is necessity to modernize and adopt best practices in power distribution sector. The best technology application and practices will improve quality and reliability of power supply to customer besides, help in reduction of losses. Refurbishment of HV & LV Distribution system will increase customer satisfaction on the one hand and increase the revenue of the utility on the other.

OBJECTIVES:

- Impart knowledge on Operation and Maintenance of distribution systems
- Orient the participants with advance technologies in power distribution sector.
- Educate the participants on technological developments in management of Power Distribution sector

CONTENTS OF THE COURSE:

Introduction

Power scenario of India and its Organizational Structure

Planning of distribution system, Load Forecasting & Analysis

Construction, Operation & Maintenance of Distribution System

Specifications of materials and Construction standards for Distribution systems

Distribution Transformers – Operation & Maintenance & Failure Analysis

Indoor and Outdoor Switchgear – Installation and Maintenance

Adoption of Innovative and Cost Effective Technologies & low cost 33/11 KV SS

Safety Measures and Prevention of Electrical Accidents

Switched Capacitors – HT & LT, Reactive Power Compensation

Power System Protection & Relays coordination

Earthing System and Protection against Lightning, Surges and Transient

O & M Practices for distribution lines and Sub-stations including recent practices such as condition monitoring and hotline maintenance, Maintenance Free Distribution Transformers

Performance improvement of distribution systems

Energy Audit & Accounting

Energy Efficiency and Distribution loss assessment and Loss Reduction methodologies

Optimal Integrated Strategy for Loss Reduction and Voltage Improvement

Pilferage & Theft of Energy

Load management & Demand Side Management Techniques

HV Distribution System

Distribution Automation & SCADA

Distribution Franchising

Revenue management of Power distribution utilities

Issues and challenges in Metering, Billing & Collection

Electricity metering, billing & collection

Metering Technologies & Advancements

Recent Developments in Metering – Remote, Pre-paid & Pilfer Proof

Smart Metering and Spot Billing technologies

Power Quality & Customer Service

Quality of service and Power Supply

Standards of performance for power supply

Customer Relation Management & Consumer Analysis Tools (CAT)

SCADA & Integrated Customer Care Center

Recent Developments in power distribution Management

IT for Distribution Management

Management Information Systems (MIS) & Consumer Information System (CIS)

Geographical Information Systems (GIS) and Global Positioning Systems (GPS)

Smart Meter & Smart Grid

Mobile/Electronic enabled Services

Exercises

Voltage Regulation Calculations for 33 KV, 11 KV and LT Lines

Calculation of Line Losses in Distribution

System Improvement Schemes – Methodology

Load Flow Study

General Management

Change Management, Time Management & Business Communication, Work Life Balance

Field Visits

33/11 KV Substation & HVDS Systems

Visits to Manufacturing Units, O&M of Systems

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/Degree in Electrical Engineering

ORK EXPERIENCE: Should be working in Power Sector

AGE LIMIT: 25- 45 years

2. CONCEPT TO COMMISSIONING OF SOLAR POWER PLANTS

(From 24th June, 2019 to 02nd August, 2019) **Duration: 6 Weeks**

AIM:

Electricity has been the backbone infrastructure facility of any country with its manifold applications covering almost every aspect of human life style, resulting in galloping demand requiring huge generating capacity in addition to enough reserve margins in the system.

Fuel choice itself is a vital consideration in creating power stations, in as much as, every unit that is generated pollutes the atmosphere further, unless CDM practices and clean and Green Power Generation is resorted to, to the hilt. But non-availability of such fuels in the required quantities, operational constraints leading to poor efficiency and low plant load factor, seasonal generation at high costs, inadvertent supply at voltages beyond the reach of load dispatching are some of the problems associated with clean power technologies, making them unsuitable for firm power supply.

Despite the above cited inefficiencies, encouragement to Non-Conventional Energy based Power Plants is essential for safe guarding environment from total degradation. Further, Fossil fuel stocks are fast dwindling and there is a need to identify alternative sources of power supply in order to maintain per capita consumption of the humanity.

Against this scenario, the Solar Power Plants provide a better opportunity as this source is endless if only the cost of generation can be brought down to affordable level. If adopted on a large scale, by improving the efficiency of the system, the cost of solar power generation can be brought down considerably minimizing the effect of Green House Gases. Many organizations world over are progressing in this direction steadfastly.

OBJECTIVES:

- To familiarize on the developments in solar power generation technologies
- To make participants aware about design concepts and O&M Practices of solar power generation
- To discuss Best Practices in O&M and protection for solar power plant

CONTENTS OF THE COURSE:

Global overview of solar power generation

Concepts and policies, solar power generation in India and Jawaharlal Nehru National Solar Mission (JNNSM), Policies and motivation, Case studies of global leaders in renewable power generation

Solar Thermal Power Generation technologies

Heat transfer from Sun, Concepts of Solar power generation, radiation analysis and measurement, Basic Concepts, Stirling and Breyton cycles, Solar thermal power generation, Solar steam engine and turbines, parabolic trough power plants, Issues and challenges in solar thermal power systems etc

Design of Solar Thermal Power Generation System

Tower concept of Solar power Generation (High temp. System) Solar Collectors, Types, Parameters, classification of collectors, materials, and its relative efficiency

Solar Photo Voltaic Power Generation

Solar Photo voltaic, Principles & Technologies, Development of Photovoltaic Technology Solar Cell Modules, Types of cells, Cell construction, selection, testing and applications and latest trends in the design of Solar Power Plants

Design concepts of Photovoltaic Systems

PV modules and arrays - PV Systems types– Stand alone and grid connected – Load estimation – Sizing of the PV array, battery, inverter, etc. – Maximizing efficiency of sub-systems – Balance systems – Single axis and two axis tracking at optimum inclination of the PV array, Power conditioning and control – Maximum Power Point Trackers, Charge controllers/regulators, DC/DC Converters, DC/AC inverters Selection criteria, Safety issues

Typical applications of PV Hybrid systems

Solar PV-Wind, PV-Diesel, PV-Bio mass – System
Sizing and designing examples: Domestic loads, Water pumping, Lighting (using CFLs, White LEDs) - hybrid systems, village power packs – Installation practices

Indirect methods of Solar Energy conversion and Concepts of DDG

Wind energy and Biomass System, Interconnection of multiple renewable sources, Opportunities in Rural Electrification and De-centralized Distributed Generation

Economics, analysis and Project Planning

Life Cycle Cost analysis – Environment impacts of PV – Green buildings – Potential for GHG emission reduction of installed PV systems - stand alone, Grid connected, etc.
Preparation of detailed project reports, Stipulations under Solar Cost Benefit Analysis, and Tariff fixation in cases of Decentralized Distributed Generation
Project planning, DPR Preparation, Project execution and Monitoring Practices

Trouble shooting and Operation and Maintenance practices

Best Practices in Operation and Maintenance of Solar Power generation Plant, Testing of equipment and material, calculation of performance, etc

General Management

Change Management, Time Management & Business Communication, Work Life Balance

Field visits

Visits to solar power plants and Cell, panel manufacturing units

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/ Degree in Engineering
WORK EXPERIENCE: Should be working in Power Sector related organizations
AGE LIMIT: 25 - 45 years

3. FINANCIAL MANAGEMENT & ACCOUNTING STANDARDS FOR POWER UTILITIES

(From 19th August 2019 to 27th September 2019) Duration: 6 Weeks

AIM:

The fundamental issue of power sector is the paucity of funds for capital intensive power projects. The generation, transmission and distribution projects require capital and talented project engineers, planners and finance managers to keep pace with development. As financing is one the basic inputs for any capital intensive project and is complex in nature, the source of financing both short term and long term, need to be planned thoroughly and systematically. The cost of capital and consequently the necessity of learning the techniques of project formulation and viability on technical, financial and economic fronts have become crucial for the success of the projects. Transparency, efficiency and economy being three important factors in the operation of any company, finance and accounts will act as a tool for transparency. Ultimately, finance and accounting is the language of economic activity and in that power distribution is no exception. Therefore, a dynamic power company requires a vibrant and innovative financing and accounting system followed by unbiased audit.

OBJECTIVE:

- Familiarize the participants with the institutional framework for sources and methods of financing of power companies
- Equip the participants on Accounting standards used in Power utilities
- Impart knowledge on accounting standards including IFRS

CONTENTS OF THE COURSE:

Introduction to Power Sector

Power sector scenario in India and Organizational setup
Electricity Act 2003 and National Electricity Policy
Regulatory mechanism - India's & International experience, Issues and challenges

Financial Management of Power Companies

Institutional framework for financing of power sector
Identification and formulation of different types of power projects
Detailed Project Report (DPR) preparation and its components
Investment appraisal including DCF & ERR techniques
Cost of capital & Capital Budgeting
Monitoring and evaluation of the power projects
Preparation of Annual Revenue Requirement (ARR)
Value chain analysis & Life cycle costing
Financial closure of the projects
Project Management - PERT & CPM

Accounting Systems and Standards

Legal framework for Accounting and financial reporting
Basic accounting principles and approaches
Indian Accounting Principles and standards

Issues in application of accounting standards
International Financial Reporting Standards (IFRS)
Financial ratios and key performance indicators
Corporate Governance
Qualitative characteristics of financial information and financial statements
Consolidated of financial statements
Balance sheet analysis and profit & loss account
Global practices and benchmarks
Valuation of inventories, depreciation accounting
Companies Act

Commercial Aspects

Tariff policies and pricing
Energy Audit and Accounting
Metering, Billing and Collection
Power Purchase Agreement
Electricity Market, Trading & ABT

Exercises & Case studies

Balance sheet analysis
Investment appraisal

Group Discussions

Comparison between Indian Accounting Standards and in participating countries
Comparison between Indian Accounting Standards and IFRS
Financial appraisal of a project

General Management:

Change Management, Time Management & Business Communication, Work Life Balance

Field Visits

Financial Institutions
Power Companies

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/ Degree in Finance/Management / Accounts/ Commerce /Economies

WORK EXPERIENCE: Should be working in Power Sector related Organizations

AGE LIMIT: 25 - 45 years

4. DESIGN, ERECTION, OPERATION, MAINTENANCE AND PROTECTION OF EHV SUB-STATIONS

(From 19th August 2019 to 27th September 2019) Duration: 6 Weeks

AIM:

With phenomenal growth in the power to be transferred, it has become essential to transmit power with least interruptions and minimum losses requiring to revise the transmission voltage levels from the present levels to 765 KV and above with optimum number of transformations, to ensure least possible losses. EHV substations are the nerve centers of the transmission system by controlling and protecting the entire transmission network.

The EHV Sub-stations are essentially needed at load centers to facilitate transformation of power from EHV to voltages of utilization. Longer AC EHV lines have a tendency to carry lesser loads and cause problems of over voltages at the receiving ends on switching and during light loads, necessitating establishment of new switching stations sometimes. Of late, the regulators are also enforcing higher performance standards for transmission utilities to comply with. Penal provisions for non-compliance are in the offing. Efficient and economical design, erection and operation and maintenance procedures of substations without any compromise become paramount in providing reliable supply besides prolonging the life of equipment.

Meeting this changing scenario requires special skills on the part of the executives of the transmission sector to handle the system efficiently and economically and making it essential to undergo training programmes oriented towards subject – specific.

OBJECTIVE:

- Orientation towards the state–of–the –art technologies in the design of EHV substations
- Equip with necessary skills in the Operation and Maintenance of EHT substations including protection aspects
- Condition Monitoring and enhancing the life of the equipment by adopting effective operation and maintenance practices and modern condition monitoring techniques.

CONTENTS OF THE COURSE:

Introduction to Power Sector

Power sector scenario in India and Organizational setup
Electricity Act 2003 and National Electricity Policy and growth of Indian power sector
Regulatory mechanism - India's & International experience

Design Concepts of EHV substations

Salient aspects of Sub-Station Design: EHT substations layouts and Bus bar arrangement to be adopted, lightning impulse and switching impulse withstand levels, insulation coordination and selection of Lightning Arrestors, Measuring soil resistivity and design of earth mat and lightning protection, Soil analysis and specific considerations in foundation design, Design aspects of substation main and auxiliary structures , Design of station lighting system, Civil aspects covering yard levelling, controlling room, station drains,

internal and approach roads, fencing, etc. Design of communication system for data transmission and protection covering PLCC and OPGW

Commissioning and testing of sub stations

Salient features, Selection and economical procurement of EHV class Power Transformers; and substation equipments and erection practices.
Substation construction practices

Sub Station Protection Issues

Salient features of substation protection systems
AC and DC systems including battery capacity calculations
Transformer, Bus Bar and Equipment Protections and Schemes, Digital Techniques in protection

Condition monitoring of EHV Substations and Best Practices in O&M

O&M of Power Transformers and substation equipments, operational problems; maintenance practices and troubleshooting
Condition Monitoring and Hotline maintenance practices

Advanced topics

Gas Insulated Substations
Substation Automation & SCADA, SAS, Outage management

General Management

Change Management, Time Management & Business Communication, Work Life Balance

Field visits:

Field Visit to a 400/220 KV SS and a Gas Insulation Substation
Protection Systems

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/ Degree in Electrical Engineering

WORK EXPERIENCE: Should be working in Power Sector

AGE LIMIT: 25 - 45 years

5. EMERGING TRENDS IN RURAL ELECTRIFICATION & POWER MANAGEMENT

(From 21nd October 2019 to 13th December 2019) **Duration: 8 Weeks**

AIM:

Electricity is an indispensable requirement for all activities of human life. It has been recognized as a basic human need and a critical infrastructure on which the socio-economic development of an economy depends. Rural Electrification is viewed as a prime mover for rural development and the basic pre-requisite for all industrial activities besides contributing significantly to increase agricultural productivity, creating employment and income generation. However, distribution of electricity to rural areas through grid connectivity is more complex by virtue of its nature as it involves high cost & technical losses, besides, demand are very low and scattered. In these circumstances, decentralized generation and distribution is the convenient mode for supply of electricity to remote and far-flung rural areas. In recent times, attempt has been made to harness and manage the distribution of electricity at local level with people's participation for adequate distribution at affordable prices.

OBJECTIVES:

- Familiarize participants with recent practices in Rural Electrification and Emerging trends in Rural Power Management
- Impart knowledge on Planning and management for Rural Electricity Distribution sector
- Discuss different issues about power distributed power Generation Options for rural electrification

CONTENTS OF THE COURSE:

Introduction

Power scenario in India
Organizational Structure of Power Sector
Reforms, Acts & Policies in Power Sector
Regulatory Mechanisms and their Functions

Rural Electrification

Rural Electrification in India – Policies & Challenges
Government policies and initiatives
Rural Electrification - Experiences of developing Countries
Institutional Framework for Financing Rural power projects

Rural Distribution Systems planning

Rural Distribution changing Scenarios, Rural Distribution Network Design & Planning
Load Forecasting & Load Management
Feeder Segregation and Renovation, Modernization Schemes
DSM Techniques and Methodology

Rural Power Distribution Systems - Operation & Maintenance

Construction Practices & Standards in Rural Power Distribution
Standards and construction practices,
Operation and Maintenance Practices for power distribution systems
Maintenance issues related to transformers & Sub-Station Equipment
Protection of Sub-Station Equipment & Ancillaries
Safety Measures, Prevention of Electrical Accidents and Disaster Management

Rural Power Distribution Management

Standard of Performance for Power Supply
Quality of Service & Supply
Performance improvement strategy for Loss Reduction and Voltage Improvement
Switched capacitors & Reactive Power Compensation
Rural Power Distribution Management and various participatory models
Rural Power Distribution Management by Franchisees
Energy Audit & Accounting, Electricity Metering, Billing & Collection

Emerging Trends in Rural Power Distribution

Innovative & Cost Effective Technologies for Rural Power Distribution
Distribution Automation & SCADA
REC's Specifications for Materials, Equipment & Unmanned Sub-station
IT Applications in Power distribution sector
Metering Technologies and their Advancement
Remote Metering & Pre-paid Metering

Renewable generation and rural power distribution

Renewable Energy Technologies, Increasing Interest, Integration of Solar, Wind and other power generation technologies for remote rural power distribution,
Different options of power distribution for rural areas such as Distributed Generations and renewable energy integration,
Generation through other renewable mode such as Mini/Micro Hydel, Wind farms, Solar, Bio-mass, municipal waste, Sustainable power infrastructure etc

General Management

Change Management, Time Management & Business Communication, Work Life Balance

Field Visits

Power Generating Units – Hydel, Thermal, Solar, Wind Farms, etc.
Regulatory Commissions, Sub-Stations – 132/33KV & 33/11KV
Load Dispatch & SCADA Centers, Renewable Projects

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Degree/Diploma in Electrical/Mechanical Engineering

WORK EXPERIENCE: Should be working in Power Sector Organizations

AGE LIMIT: 25 - 45 years

6. PLANNING AND MANAGEMENT OF POWER TRANSMISSION AND DISTRIBUTION SYSTEMS

From 21nd October 2019 to 13th December 2019) **Duration: 8 Weeks**

AIM:

Power is a vital infrastructure for economic development. It is most capital intensive infrastructure. Accelerating economic growth and achieving higher standards of living depend upon the availability of adequate and reliable power at an affordable price. To make power sector commercially sound and self-sustaining, efficient transmission management policies and adoption of modern technologies are fundamental. Obsolescence in design, construction practices and technologies, inadequate interregional transmission links will lead to poor quality, unreliable power supply, high energy losses and interregional imbalances. It has become, utmost important to review the existing practices and technologies adopted to optimize and modernize them, so as to supply electricity at affordable cost to all categories of consumers to help bolster economic growth.

OBJECTIVE:

- Impart knowledge on design, operation & maintenance of power Transmission and distribution systems.
- Orient the participants with the latest technologies and methods including automation and IT practices in Power Transmission distribution sector
- Discuss about the commercial and managerial aspects of power transmission and distribution business

CONTENTS OF THE COURSE:

Introduction

Power scenario – Indian experience
Organizational Structure of Power Sector in India
Planning and designing of transmission and distribution system
Role of Regulatory Commissions & Electricity Act, 2003

Transmission System

Transmission System Planning in India
Tower Design, Erection and Structural Details
Technical and Economic aspects of Systems Interconnection
EHV,UHV and HVDC System
Erection Commissioning and testing of sub stations and Lines:
Standards, Specifications of materials and Construction practices for Transmission infrastructure
O & M Practices of Overhead lines and Sub-stations, Power Transformers – O & M & Failure Analysis, EHV Switchgear –Maintenance Practices
Protection Aspects of Sub Stations and Lines
Salient features of substation protection systems and Lines
Protection Aspects of Transformers,

AC and DC systems including battery capacity required;
Communication system for data transmission and protection covering PLCC and OPGW
Inter-System Power Exchange & ABT
Maintenance of EHV-AC and HVDC Substation and Electrical Equipment
Best practices in Grid management
IT Application in Transmission system, Safety Measures and Prevention of Electrical Accidents
Energy Efficiency and Maintenance Free Transformers

Advance topics in O&M of Substations and lines

- Condition Monitoring of Power Transformers and Substations
- Hotline Maintenance Practices
- Gas Insulated Substations
- Substation Automation & SCADA and SAS
- Field Visit to a 400/220 KV SS and a Gas Insulation Substation

Distribution System

Standards, Specifications of materials and Construction practices
O & M of Overhead lines and Sub-stations
Transformers – Installation and O & M & Failure Analysis
Switchgear – Installation and Maintenance
Adoption of Innovative and Cost Effective Technologies & Unmanned Sub-station
Safety Measures and Prevention of Electrical Accidents
Energy Efficiency and Maintenance Free Transformers
Switched Capacitors & Reactive Power Compensation
Integrated Distribution Planning for Loss Reduction and Voltage Improvement
Gas Insulated Sub-stations (GIS) & Dissolved Gas Analysis of Transformers
Power System Protection & Differential Relays
Earthing System and Protection against Lightning, Surges and Transient
Energy conservation in Agriculture, Domestic & Industrial Services
HVDS – Control, Operation, Protection and Economics – Case Study
DSM Tools & Techniques and its Methodology

Energy Meters

Introduction to Energy Meters – An Overview
Specification of Energy Meters - Meter Seal, Testing and Calibration
Meter Reading Instrument Technologies and Spot Billing
Solid-state Electronic Meters and Automatic Meter Reading Equipment
Recent Developments in Metering – Remote, Pre-paid, etc.

Commercial Aspects

Tariff Structure, Billing and Accounting
Technical and Legal Remedies to Control Theft of Energy
Annual Revenue Requirement Calculations
Power Distribution Franchising
Energy Audit & Accounting
Clean Development Mechanisms (CDMs)

Information Technology (IT)

IT for Transmission and Distribution Management
Management Information Systems (MIS) & Consumer Information System (CIS)
Geographical Information Systems and Global Positioning Systems (GIS & GPS)
SCADA Applications and Functions
Customer Relation Management & Consumer Analysis Tools

Exercises

Voltage Regulation Calculations for 33 KV, 11 KV and LT Lines
Load Flow Study & Calculation of Line Losses

Group Discussions

Measures to prevent Pilferage of Electricity & Line Losses
Measures to prevent failure of Distribution Transformers

Local Field Visits

SCADA and Power Management Center, SLDC, Laboratories
Gas Insulated Sub-station, Transformer Manufacturing & Load Dispatch centers, Etc

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/ Degree in Electrical Engineering

WORK EXPERIENCE: Should be working in Power Sector / Energy related Organizations

AGE LIMIT: 25 - 45 years

7. CERTIFICATE COURSE IN ELECTRIC POWER MANAGEMENT

(From 06th January 2020 to 27th March 2020) **Duration: 12 weeks**

AIM:

Power is a critical infrastructure for development of any nation. The socio-economic development and life-style of citizens depends on availability of power. The availability and quality of power supply depends on proper planning, designing, use of latest technologies and practices for effective and efficient management of the system. It has become, utmost important to review the existing practices & technologies adopted to optimize and modernize them, so as to supply electricity at affordable cost to all categories of consumers to help bolster economic growth. The entire gamut of power management, i.e., generation, transmission, distribution, financial aspects, accounting practices and general management aspects will be dealt in the course.

OBJECTIVE:

- Impart knowledge on planning, designing and operation & maintenance of power sector systems
- Orient the participants with the latest equipment and technologies of the power sector
- Discuss about energy accounting, auditing and management aspects for efficient management of power business.

CONTENTS OF THE COURSE:

Introduction to Power Sector (2 Week)

Overview of Power scenario & Indian experience
Organizational Structure of Power Sector in India
Restructuring & Power Sector Reforms, Electricity Act, 2003
Role of Regulatory Commissions in India & International experiences
National Electricity Policy, Rural Electrification Policy and Tariff policy
Open Access and trading in power

Power Generation Management (2 Weeks)

Planning and Designing of power generation projects
Types of generation projects (Thermal, Gas Atomic and Hydro power Plants)
Economics of Power generation under various options
O & M of power generation projects
Renovation and Modernization of Generation Projects
New and Renewable energy sources – Solar, Wind, Biomass/Municipal Waste, etc.
Automation for efficient management of power plants
CERC Norms for power generation and project completion
Energy conservation in Power plants
Control systems and protection including Generator protection
Fixation of generation Tariff under cost plus method and competitive bidding

Transmission Management (2 Weeks)

Transmission System Planning
Tower Design, Erection and Structural Details
Transmission line materials, Tower erection, Line stringing and commissioning
Technical and Economic aspects of Systems Interconnection
Electric Power Transmission by HVDC System
Inter-System Power Exchange & ABT
Maintenance of EHV- AC and HVDC Substation and Electrical Equipment
Best practices in Grid management
Gas Insulated Sub-stations (GIS)
Bus-bar arrangements and design
Power System Protection
Power Transformers – Erection, Testing, Commissioning and O & M
SCADA Applications & Functions
Design of substation structures, erection and testing and commissioning of a substation
Transmission and SLDC tariff fixation
Reactive power management
Communication systems and OPGW

Distribution Management (2 Weeks)

Load forecasting, planning and designing of distribution system
Integrated Distribution Planning for Loss Reduction and Voltage Improvement
Standards, Specifications of materials and Construction practices
O & M of Overhead lines and Sub-stations
Distribution Transformers – Installation and O & M
Switchgear – Installation and Maintenance
Adoption of Innovative and Cost Effective Technologies & Unmanned Sub-station
Switched Capacitors & Reactive Power Compensation
Earthing System and Protection against Lightning, Surges and Transient Over voltages
Energy Meters and its technologies
DSM Tools & Techniques and its Methodology
HVDS – Control, Operation, Protection and Economics – Case Study
Energy Audit & Accounting
Safety practices, Accident Prevention and Disaster management

Information Technology (1 week)

IT for Transmission and Distribution Management
Management Information Systems (MIS) & Consumer Information System (CIS)
Geographical Information Systems and Global Positioning Systems (GIS & GPS)
Customer Relation Management (CRM) & Consumer Analysis Tools (CAT)
Distribution Automation and SCADA
Smart Meters & Smart Grid

General and Financial Management (1 week)

Detailed Project Report preparation for Power Projects
Financial appraisal of Power Projects
Monitoring and Evaluation of Power Projects
Performance Evaluation by Ratio Analysis

Tariff Structure, Billing and Accounting
Cost of Capital and Capital Budgeting Decisions
Budgeting and Budgeting Techniques
Accounting Principles and Policies
Principles and Practices of Cost Accounting
Project Management & Accounting
Leadership & Communication skills
Positive Attitude and Thinking
Exploring Self and Personality Development
Motivation and team building
Stress Management

Project Work (1 week)

Each participant has to submit a detailed project report on one of the aspects of the training or its applications, alternatively a lingering problem of their country can be discussed suggesting solutions from the topics learnt in the training, the project report shall be exhaustive with diagrams and illustrations. Where required, the participant can visit certain offices or sites for collecting data or photographs and these expenses can be claimed subject to the maximum limit fixed for the Project allowance. The prepared project will be presented before the panel of Faculties who will assess the reports and suggest for additions or deletions, if any for refinement of the Report.

Field Visits (2 Weeks)

Visit to Generating Plants, Transmission Sub-Station, Automation and SCADA Center, Load Dispatch Centre, Manufacturing Units like, Transformer, Switchgear, Capacitors, Meters, etc.

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/Degree in Engineering (preferably Electrical/Mechanical)

WORK EXPERIENCE: Should be working in Power Sector or in power generation, transmission or distribution sector/ organizations

AGE LIMIT: 25- 45 years

8. Green Energy Development for Sustainable Power Sector

(From 06th January 2020 to14th February 2020) **Duration: 6 Weeks**

AIM:

Electricity has been the back boned infrastructure and its per capita consumption has a direct bearing on the Gross Domestic Product (GDP) of the country, and therefore it is and essential that power sector has an economical and efficient developmental planning. The challenges in power generation is scarcity of resources and proper planning. Non-Conventional Energy based Power Plants is essential for safe guarding environment from total degradation. Further, Fossil fuel stocks are fast dwindling and there is a need to identify alternative sources of power supply in order to maintain per capita consumption of the humanity.

Against this scenario, the renewable power Plants provide a better opportunity as they are derived from the sources which are endless. The Challenges faced are the cost of generation and reliability, which can be brought down to affordable level. If adopted on a large scale, by improving the efficiency of the system, the cost of renewable power generation can be brought down considerably minimizing the effect of Green House Gases. Many organizations world over are progressing in this direction steadfastly.

OBJECTIVE:

- Impart knowledge on opportunities in renewable energy generation
- Orient the participants about the planning, designing and O&M of Renewable energy projects
- Aware the participants about challenges in the sector
- Discuss commercial and managerial aspects related to renewable energy systems

CONTENTS OF THE COURSE:

Introduction

Global Power Scenario – India & Other Developing Economies
Organizational Structure of Power Sector
Regulatory Mechanisms and their Functions
Issues and Challenges in conventional power generation technologies.
Government policies and motivations

Solar Power Generation

Global overview of solar power generation
Concepts and policies, solar power generation
Solar Thermal Power Generation technologies
Basic Concepts, Solar Power Generation, Solar steam engine and turbines, parabolic trough power plants, Issues and challenges in solar thermal power systems etc, Design of Solar Thermal Power Generation System
Tower concept of Solar power Generation (High temp. System) Solar Collectors, Types, Parameters, classification of collectors, materials, and its relative efficiency

Solar Photo Voltaic Power Generation

Principles & Technologies, Solar Cell Modules, Types of cells, Cell construction, selection, testing and applications, Development of Photovoltaic Technology and latest trends in the design of Solar Power Plants, Design concepts of Photovoltaic Systems

PV modules and arrays - PV Systems – Stand alone and grid connected – Load estimation – Sizing of the PV array, battery, inverter, etc. – Maximizing efficiency of sub-systems – Balance systems – Single axis and two axis tracking at optimum inclination of the PV array, Power conditioning and control – Maximum Power Point Trackers, Charge controllers/regulators, DC/DC Converters, DC/AC inverters Selection criteria, Safety issues

Typical applications of PV Hybrid systems

Solar PV-Wind, PV-Diesel, PV-Bio mass – System
Sizing and designing examples: Domestic loads, Water pumping, Lighting (using CFLs, White LEDs) - hybrid systems, village power packs – Installation practices

Wind Power generation

Project feasibility studies, selection of technologies, installation methodologies, grid integration issues, and advance O&M practices

Bio Mass and Bio gas power plants

Project feasibility studies, selection of technologies, installation methodologies, grid integration issues, and advance O&M practices

Geothermal power Generation

Project feasibility studies, selection of technologies, installation methodologies, grid integration issues, and advance O&M practices

Indirect methods of Solar Energy conversion and Concepts of DDG

Wind energy and Biomass System, Interconnection of multiple renewable sources, Opportunities in Rural Electrification and De-centralized Distributed Generation

Economics, analysis and Project Planning

Economics of power generation, selection criterion, Life Cycle Cost analysis –Green buildings – Potential for GHG emission reduction of
Preparation of detailed project reports, Stipulations under Solar Cost Benefit Analysis, and Tariff fixation in cases of Decentralized Distributed Generation

Trouble shooting and Operation and Maintenance practices

Best Practices in Operation and Maintenance of renewable Power generation Plant, Testing of equipment and material, calculation of performance, etc

General Management

Change Management
Time Management & Effective Communication

Field Visits

Renewable power generation projects, research laboratories and manufacturing industries Field visits to solar power plants and Cell, panel manufacturing units

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/Degree in Electrical/Mechanical Engineering

WORK EXPERIENCE: Should be working in Power Sector / Energy related Organization

AGE LIMIT: 25 - 45 years

9. Planning, Operation and Maintenance of Power Generation Projects

(From 17th February 2020 to 27th March 2020) **Duration: 6 Weeks**

AIM:

Power generation and Transmission form the vital segment in the power supply chain to facilitate supply meeting the demand. Huge costs and high risks involved due to dealing with high voltages require cost effective procurements and safe, economical & efficient erection, operation & maintenance practices. Planning, execution and operation of generating and transmission systems, thus acquire highest significance in the extension of power supply of quality at affordable price at least losses. The course is designed to create necessary awareness.

OBJECTIVE:

- Impart knowledge on operation & maintenance of thermal power generation systems.
- Orient the participants with the latest technologies, methods and equipment including IT and automation applications in thermal Power generation.
- Discuss about the commercial aspects of thermal power generation
- Energy auditing, accounting and conservation in thermal power generation

CONTENTS OF THE COURSE:

Introduction

Electricity Act 2003, National Electricity Policy 2005 and its background,
Challenges in Electricity generations,
Overview of conventional power generation processes and recent renewable opportunities

Planning of Power generation

Load forecast on long term basis and arriving at annual energy and peak demands and fixing of LoLP (loss of load probability) and USE (un-served energy) targets using computer techniques, Fuel Linkages and its Issues
Comprehensive Generation Planning up to unit level considering limits fixed for LoLP
Power system studies relevant to alternative sites proposed and selecting the location of a power plant

Erection and Commissioning and testing of Plants

Salient features of Erection & Commissioning of Generating stations (Hydro, Thermal and Gas power plants including ultra-mega power projects and Power Plants operating on renewable energy sources) Preparation of Detailed Project Reports for generation projects

Operation and Maintenance Practices of Power Plants

Operation and maintenance aspects of Hydro, thermal, gas and Power Plants operating on renewable energy sources

Performance and Efficiency issues

Ways and means to improve plant load factor and efficiency
Renovation & Modernization of generating plants
Protection systems in generating stations
RLA and R&M of Power Plants
Energy Auditing in generating stations and reduction of auxiliary consumption

General Management

Time Management Leadership, Procurement and Negotiations, Work life balance

Field visits

Thermal/Gas Power Generating stations

ELIGIBILITY CRITERIA FOR PARTICIPANTS:

EDUCATIONAL: Diploma/Degree in Electrical/ Mechanical Engineering

WORK EXPERIENCE: Should be working in Power Sector related Organizations

AGE LIMIT: 25 - 45 years

GENERAL INFORMATION:

METHODOLOGY

The training approach and tools deployed are typically interactive besides facilitating participative learning. Discipline-specific background theme papers as material set the tone for introspective learning. Lecture-cum-discussions, case studies form major tools. Inclusion of field study visits and in-plant studies in the curriculum ensures an appropriate mix of theory with practice. Renowned subject experts and experienced field level functionaries form the core source faculty.

MEDIUM OF INSTRUCTION

The medium of instruction is English. Adequate knowledge of English is necessary for effective participation in the program. The participants are expected to be proficient in English and must satisfy the Indian Mission about their proficiency in English as well as health to travel widely.

FIELD VISITS AND STUDY TOUR

Participants will be taken on field visits and study tour for about ten days to various organizations/places in and outside Hyderabad

PROJECT REPORT

Each participant should prepare one project report on the subject of his choice in power sector which will be identified in the second week of the course. The aim of the project report is to indicate as to how the knowledge acquired would be utilized in his/her background situation. Study tour and local visits will be designed to suit the requirement of the training program. During the last week of the program, the participants will present project reports prepared in the presence of faculty dealing with the subject.

MATERIAL FOR EXCHANGE OF INFORMATION

For effective and purposeful contribution to discussions among the participating countries, each participant is required to bring with him/her the following information/items applicable to his/her country:

- Basic data about policies, programs and their status
- Information about the support institute/organization/agencies for promoting and developing power sector
- National Flags (one in smaller size for table purpose and the other in normal size)
- Participants are also advised to bring with them their costumes, audiovisuals, materials, which they wish to share with their fellow participants in seminars, cultural evenings, other social occasions, etc.

CERTIFICATE

Each participant will be given a certificate on successful completion of course and having satisfactory record of attendance.

FELLOWSHIP AND STIPENDS

RECIPMT by itself does not fund participation in any of the international programmes. The assistance offered through Government of India Fellowships is made available under:

- Indian Technical and Economic Cooperation (ITEC)
- Special Commonwealth African Assistance Plans (SCAAP)

For details regarding fellowship are available from the Govt. of India website. Intending applicants or their organizations may contact the High Commission / Embassy of India accredited to the country. The sponsoring Governments are required to pay their nominees' supplementary allowance to meet personal expenses during training as per their respective levels and practices. The sponsoring government may also have to pay to meet the transit expenses, etc., that will be incurred by the nominee.

VISA

Before coming to India the participants should obtain a valid visa for the period of programmes from the Indian Mission. Immediately after the completion of the programmes, the participants are required to go back to their own countries and cannot travel to any other destination.

EXCESS BAGGAGE

Participants attending programmes through Government of India Fellowships should ensure the excess baggage coupons/voucher as admissible under the fellowship while collecting their tickets from the respective Indian Missions.

SELECTION

The Government of India along with RECIPMT will select the participants from the applications received. After the selection has been made, the same would be intimated by fax/e-mail to the concerned Indian Mission, who could confirm the candidate's agreement by return fax/e-mail.

ACCOMMODATION

Air conditioned hostel accommodation on single/double occupancy basis will be made by RECIPMT on receipt of advance intimation.

SUNDRY

Participants are advised to carry private funds to cover expenses for the contingencies and enforced halts, long distance telephone calls, sightseeing, etc. The Government of India fellowship by its nature does not cover such contingencies. From their entitled living allowance of Rs.835/- per day per participant will be paid by the Government of India, based on their actual arrival and departure details. Amount per day will be deducted from the participants living allowances towards the boarding charges at RECIPMT. As the fellowship under Government of India may not suffice to meet expenses on special dietary needs and shopping etc., nominees are advised to bring extra foreign exchange.

CLIMATE

The Hyderabad city situated in the Deccan Plateau has varied climatic conditions. During July to November, the maximum temperature ranges from 20–30^{0}C. December and January are cold with night time lows of 12^{0}C. During the months of February and March, the maximum temperature varies between 25–35^{0}C.

ABOUT THE HYDERABAD CITY

Hyderabad, the capital of Telangana State, is a picturesque sprawling city located about 1700 kms south of New Delhi, India's capital and nearly 800 kms to east of Mumbai, the business capital of India. It is situated at an elevation of 540 meters above the sea level and enjoys pleasant climate almost throughout the year. The city has many majestic historical monuments, mosques and marvelous minarets and palaces.

The ancient city of Hyderabad was ruled by Nizam who was fascinated for pearls and attracted traders/craftsmen to bring the best to this land. It is, therefore, is also known as pearl city. It is famous for Silver inlay work, popularly known as Bidri Ware.

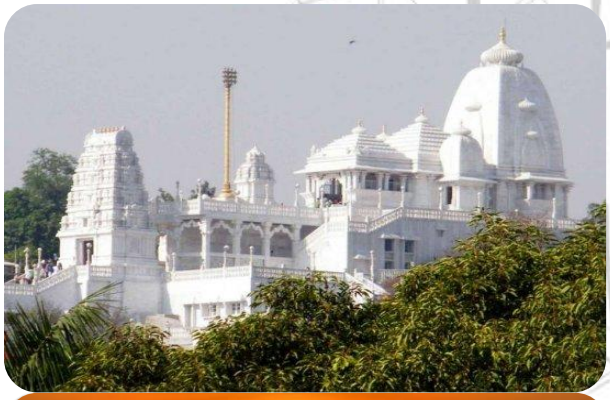
The world famous monument Charminar – an imposing structure with 53 meters high – is an attraction of the city. On the western outskirts of the city, the historical Golconda Fort is located. The Salar Jung Museum, the world's largest one man collection, displays around 35,000 antiques and art objects.

The Asia's biggest Film City i.e. Ramoji Film City is located about 30 kms away from city. The city also has one of the world's largest monolith statues of Lord Buddha, the incarnation of peace in the middle of Hussain Sagar Lake.

Magnificent Cyber Towers, housing IT companies symbolizes the grand entry of IT era in Hyderabad City.

Hyderabad Special attraction

- Hyderabadi Biryani
- Osmania Biscuits
- Pearls and Bangles



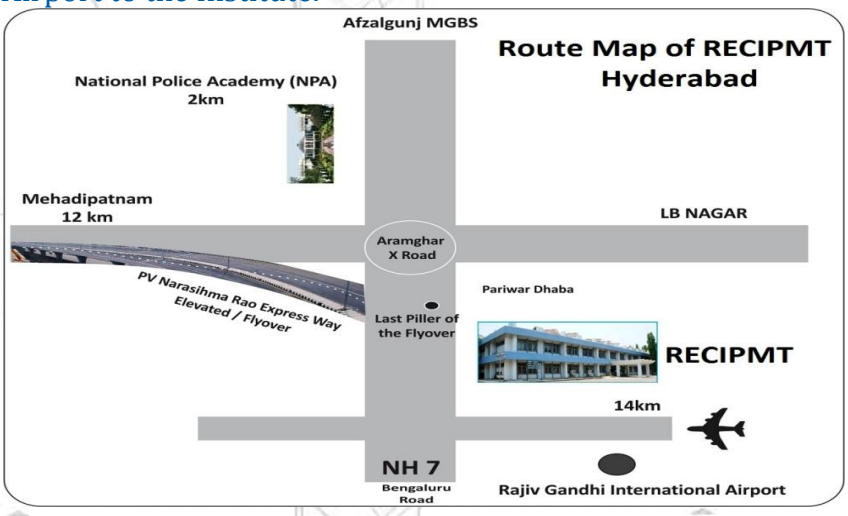
RECIPMT – VENUE & LOCATION

The programmes will be organized at RECIPMT campus, NPA Post, Shivarampally, Hyderabad - 500052, Andhra Pradesh, India, located on the National Highway No.7, which is about 16 Kms away from the new Rajiv Gandhi International Airport (Shamsabad).

Landmark: NEAR ARAMGARH CIRCLE (at the right side of the PVNR Expressway Flyover entry point)

REACHING RECIPMT

Participants will be received at the airport if a request is made in advance indicating confirmed arrival timings. However, pre-paid/metered cab/taxi service facilities are also available from Airport to the Institute.



FACILITIES

The sprawling complex of RECIPMT is spread over an area of around 15 acres with Administrative, Teaching and Hostel block (Hall of Residence). The Hostel Block has got 36 air-conditioned rooms and air-conditioned dining hall. The Institute has latest teaching aids as well as full-fledged Computers lab and Internet facilities. Indoor games like Table Tennis, Chess and Caroms are available. A Jogging Track of 1 km length, Shuttle court and a Mini Gym is also available.

HOSTEL BUILDING

LIBRARY

RECIPMT Library is one of the specialized centers with more than 4000 books and reference materials on the subjects like generation, transmission & distribution, energy efficiency and conservation, construction standards and specifications, management and information technology, electricity rules and laws, reforms and restructuring in power sector, etc. It subscribes to selected national and international journals on energy and power sector which caters to the information needs of the participants, in-house faculty and guest faculty for which the library uses e-grandhalaya software for easy reference and accessible of all books available in the library.

ENERGY PARK

An Energy Park equipped with 40 kWp Roof top solar PV system to partly meet the energy need of institute, 5 kWp Solar Photo Voltaic Water Pumping System, 1kWp Solar Photo Voltaic Street Lighting System along with Solar Water Heating System, Solar Photo Lantern, 4 KW Wind Energy System and HVDS Resource Centre exists at campus for demonstration.

FOR FURTHER INFORMATION PLEASE CONTACT

SANTOSH KUMAR SAHU
DIRECTOR

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