

International Conclave
on
**Key Inputs for Accelerated
Development
of
Indian Power Sector for 12th Plan**

**Presentation on Opportunities for Employment
Generation and Training requirement for
Skilled Manpower**

18-19 August 2009

Scenario

- Installed Generation capacity – 1,48,000 MW
- 11th Plan Capacity Addition Target – 78,700 MW
- 12th Plan Capacity addition Target – 1,00,000 MW
- Imminent Planning is required to meet the manpower requirements of the 12th Plan

Norms for Manpower Requirement for Project Construction, Execution and O & M of Generation Projects during 12th Plan

For Construction of New Plants	
Hydro	10 persons per MW
Thermal	8 persons per MW
Nuclear	8 persons per MW

For O & M of Generation Projects	
Hydro	1.9 persons per MW
Thermal	1.1 persons per MW
Nuclear	1.9 persons per MW

Manpower Requirement for the 12th Plan

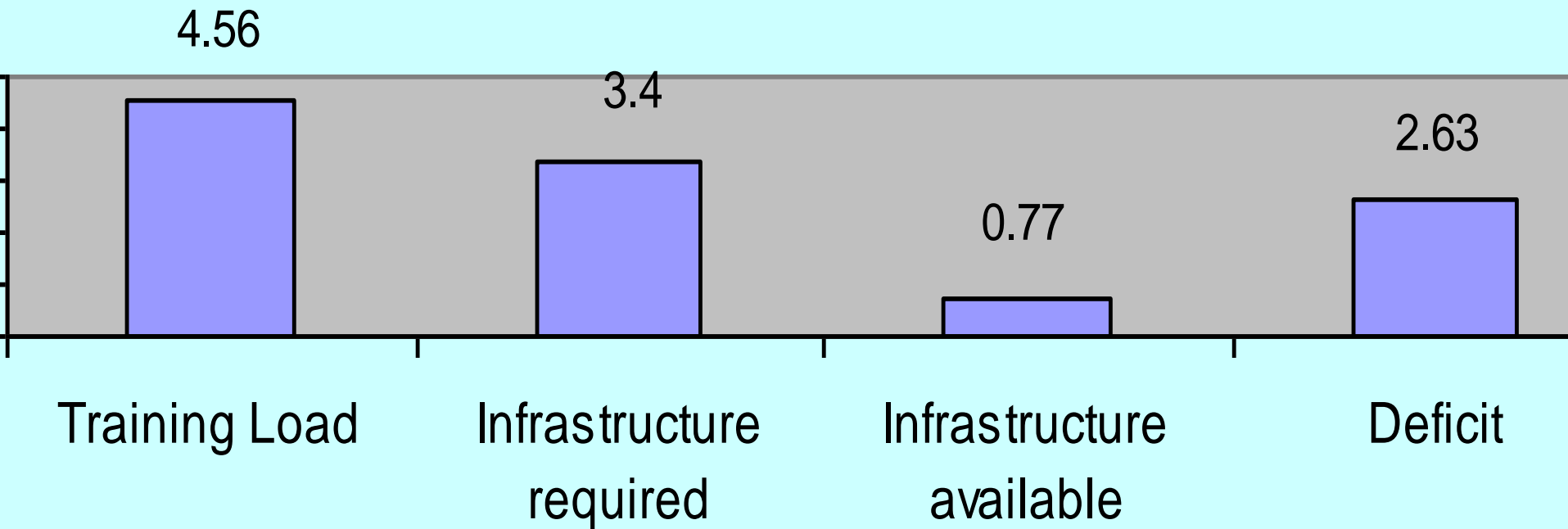
- For the targeted capacity addition pegged at around 1,00,000 MW, 7.4 Lakh additional personnel will be required for Construction and O & M of Generation Projects, Transmission and Distribution facilities

Manpower Available for Induction in the Power Sector

- About 1,346 Engineering Colleges in India approved by All India Council of Technical Education (AICTE), seat capacity of 4,40,000 are available. This includes the students who would acquire a specialized B.Tech. / B.E. degree in Power Engineering (about 180 nos.) from NPTI**
- In addition to this, there are Polytechnic Colleges with a seat capacity of 2,65,416**
- Over 2 lakh apprentices in various trades pass out every year from the Industrial Training Institutes**
- This clearly indicates that there is a huge manpower available for induction into the power sector**

Training Load- Thermal, Hydro, Transmission, T & D,
Non-Technical, Refresher, Managerial

**Anticipated Training Load XI Plan (Lakh man-
months/year)**



In spite of such a shortage of the infrastructure, many Training Institutes for the Power Sector personnel are not being fully utilized

Training Load Projections for XII Plan

(In Thousand-man-months/year)

Sl.No.	Area	Training Load	Infrastructure required	Infrastructure available	Deficit
1.	Thermal Induction	80.14	40.07	40.78	0.71
2.	Hydro Induction	39.78	19.88	4.45	15.43
3.	Nuclear Induction	-	-	-	-
4.	Power System Induction	134.90	67.45	29.35	38.10
5.	Non-Tech Induction	13.55	13.55	-	13.55
6.	Refresher (Tech + Non-Tech.)	159.60	159.60	4.75	154.85
7.	Managerial	39.89	39.89	1.57	38.22
	Total	467.86	340.44	80.90	259.54

Importance of HR & Training in the Power Sector

- **Power Sector is highly capital and technology intensive and requires skilled manpower.**
- **The knowledge acquired in the academic Institutions is not adequate for the Operation & Maintenance requirements of the Power Sector**
- **These fresh Engineers require grooming to take up the challenging tasks of manning the power industry**
- **Induction level training is a must to orient their knowledge as per Power Sector requirements**
- **Even Refresher Training is required to update their knowledge due to technology upgradation and ensuing sophistication**

Types of Training Required for Power Sector Personnel

a) Induction Level Training

Various provisions for induction training in Electricity Rules

As per The Electricity Rules, 2005 (Effective 8th June, 2005)

3[(2A)(a) No person shall be authorized to operate or undertake maintenance of any part or whole of a generating station of capacity 100 MW and above together with the associated sub-station unless he is adequately qualified and has successfully undergone the type of training specified.]

Statuary provisions for Hydro training for operation and supervisory staff are applicable.

Statuary provisions for operation and maintenance of sub stations of 132 kV and above are also applicable.

b) Refresher

c) Advanced Training

Induction Level Training for Technical People

Area	Category	Average duration in Months
Thermal *	Engineers – 30%	12
	Operators/Supervisors– 15%	12
	Technicians – 55%	12
Hydro *	Engineers – 20%	9
	Operators/supervisors – 35%	6
	Technicians – 45%	6
Transmission *	Engineers – 10%	12
	Operators/Super/JEs – 20%	6
	Technicians – 70%	6
Distribution	Engineers – 10%	6
	Operators/Super/JEs – 20%	3
	Technicians – 70%	1

Reference : * The Electricity Rule 3, Sub Rule 2A of Indian Electricity Rules, 1956 amended in 1981
% Break-up of manpower as per Sub-group Report for 10th Plan

Induction Level Training for Non-Technical People

Area	Category	Average duration in Months
Thermal	Executives – 20%	3
	Sup/Assistants/Sect Staff etc- 80 %	1
Hydro	Executives – 20%	3
	Sup/Assistants/Sect Staff - 80 %	1
Transmission	Executives – 20%	3
	Sup/Assistants/Sect Staff etc- 80 %	1
Distribution	Executives – 20%	3
	Sup/Assistants/Sect Staff - 80 %	1

% Break-up of manpower as per Sub-group Report for 10th Plan

Major Observations and Recommendations during the International Conclave on key inputs for 11th Plan and beyond – July 2007 regarding Manpower including training facilities commensurate with large capacity addition

There is a shortage of skilled manpower at the project sites resulting in delay in their implementation.

The project developers and major EPC contractors have to contribute in building up a large skilled manpower pool for power sector

Each project developer and major EPC Contractor should adopt ITIs near the project area and organize project specific training to obtain skilled workers for them and their contractors/sub-contractors and to ensure local availability of skilled manpower and train them wherever necessary

Training in the specialized categories

- **High Pressure Welding**
- **Pipe Fittings**
- **Highly Skilled Mill Wright Fittings**
(Turbine Blades/Turbine Assembly etc.)
- **Repair & Maintenance of Power & Control Panels**
- **Shaft Alignment of Drives**
- **Valves & Actuators Maintenance**
- **D.C. System Maintenance**
- **Relay & Protection**

Follow – up action regarding Manpower Requirement

- Estimated additional manpower required for Construction, O&M during 11th Plan – 8,60,000
- Scheme of adopt an ITI to address the issue of skilled and trained manpower was launched in July 2007
- Government has traditionally focussed on operation and maintenance training – need to focus on construction training as well

Estimated Requirement of BOPs for 12th Plan Thermal Projects

Name of the System	BOPs requirement
Coal Handling System	148
Ash Handling System	148
DM Plant	211
Cooling Towers	218
Chimneys	77
Fuel Oil System	148
Pre-Treatment Plant	160

ITI Trades for Power Industry

Trade	Number of units	Annual intake
Fitter	8,531	1,36,496
Electrician	8,221	1,31,536
Welder	1,068	17,088
Wireman	2,005	32,080
Turner	1,773	28,368
Mechanic	1,157	18,512
Carpenter	475	7,600
Sheet metal	285	4,560
Mason	165	2,640
Tool & die maker	38	608
Plumber	448	7,168
Total	24,166	3,86,656

Source: Director General (Employment & Training)

Actions Required for Skilled Manpower Development

- **Improve & Upgrade Training Assets**
- **Ensure adequacy of training materials**
- **Provide equipment and funds**
- **Change in Course Curriculum and/or develop standardised Add-on Modules as per Power Sector Requirements**
- **Upgrade the skills of ITI Institute Teachers for the Quality Improvement of the Programs**
- **DG E & T to be sensitised for an enabling environment**
- **Benefits both skilled manpower as well as the power sector**

**ALL THIS WOULD REQUIRE FUNDS & SENSITISATION
AT VARIOUS QUARTERS**

Funding

- DG E & T schemes
 - World Bank aid to 500 Govt. owned ITIs
 - Govt aid to 1396 Govt. owned ITIs through public private partnership mode
- Rs 2.5 crore interest free loan returnable in 25 annual instalments over 25 years after 10 yr moratorium on repayment
- Institute Management Committees (Registered Societies) with industry partner as Chairperson

Benefits of adopting ITIs

- **Skilled workers from near the project sites would be more likely to remain with projects**
- **Would contribute significantly towards relief and rehab aspirations of project affected people**

Status of Adoption of ITIs

Name of the organization	No. of ITIs Adopted/being adopted	Total
NTPC	5/9	14
NHPC	3/3	6
DVC	9/0	9
NHDC	0/1	1
THDC	1/1	2
NEEPCo	2	2
PGCIL	4	4
SJVNL	2	2
TATA POWER	4	4
O&M Solutions	1	1
Jindal Power	5	5
Reliance Energy	2	2
Total		52

Setting up of Five (5) Task Forces

1. Curriculum Development
2. Key Program Indicators for it is established through PPP
3. Road Map for 11th and 12th Plans
4. Setting-up a Job Portal
5. Expanding Coverage through Distance Learning

Conclusions

- Modifications to existing Trades suggested
- Inclusion of new Trades suggested
- Refresher Programs suggested
- Audio/Visual Course Material suggested for Quick delivery
- Certification and Networking
- Implementation Strategy
- A web portal www.indiapowerjobs.com was set up to provide information on employment opportunities

Suggestions for New Trades

(6 month Duration)

- Technician – Distribution
- Technician – Transmission
- Technician – Metering
- Technician – Generation
- Rigger or Construction Mechanic
- Maintenance Mechanic (Power Plant)
(suggested to be clubbed with Technician – Generation)
- Attendant Operator (Power Plant)
(suggested to be clubbed with Technician – Generation)
 - **Common Computer Modules for all the above Trades**
 - **Common Module on use of Tools & Tackles (including modern tools), relevant to the above Trades**

Training of Trainers (ToTs)

- **Growth of Power Sector**
- **Electricity Distribution and Reforms**
- **Indian Electricity Rules, Electricity Act & Private Participation in Distribution and Distribution Code**
- **Role of Regulatory Commissions**
- **Energy Conservation, Energy Audit & Accounting, DSM**
- **Customer Call Centre Training, Expectations of Consumers and Consumer Grievance Handling**
- **Conflict Resolution Techniques**
- **Sub-Transmission and Distribution Lines**
- **Sub-stations and associated equipments, layouts & Switching Schemes**
- **Sub-Station Automation and SCADA**
- **Types of Relays and Relay Maintenance**
- **Thermo-vision Scanning & Hot Spots**

Training of Trainers (ToTs)

- **Hotline Maintenance of lines including insulator cleaning**
- **Earthing Practices in Distribution & Sub-stations and Consumer Premises**
- **Meter Installation, Inspection and Meter Reading, Standard Metering Arrangements**
- **LT Overhead Lines**
- **Types of Cables, Loading, laying of Cables, cable jointing and fault location**
- **Transformers, Failure Analysis of Distribution Transformers**
- **New Technologies in Distribution**
- **Practices in AT & C Losses**
- **Reliability Issues, Quality of Power Supply, Customer Awareness & Satisfaction**

Training of Trainers (ToTs)

- **IT Interventions in Distribution Sector**
- **Network Mapping & Consumer Indexing**
- **Best Practices in Distribution Management**
- **Rural Electrification**
- **Disaster Management**
- **Electrical Safety & First Aid**
- **Testing Lab facilities**
- **Attitudinal Re-orientation**
- **Theft Detection, Anti-Theft Measures and Case Studies**
- **RGGVY – Distribution Franchisees**
- **Relevant Case Studies should all be a part of the training modules**

For Technicians/Linemen/C & D Staff

- **Types of Distribution Towers/ Poles/ Supports/Lines**
- **Conductors, Earthing, Types of Insulators**
- **Conductor laying, Stringing, Jointing/binding, Sagging & Tensioning,**
- **Clipping & Jumpering**
- **Operation & Maintenance of Distribution Lines**
- **O & M of Sub-Stations, Testing of Sub-Station equipments**
- **O & M of Distribution Transformers**
- **Condition Monitoring of Transformers & Transformer Oil, Transformer Oil Properties & Testing**
- **Sub-station Maintenance – Routine, Preventive, Planned, predictive, Breakdown, Visual Checks, Condition Monitoring Techniques, On-line maintenance, maintenance of History & Records, Tools & Tackles etc.**
- **Thermo-vision, Scanning & Hot Spots**

For Technicians/Linemen/C & D Staff

- **Types of Cables, trenches, routing, laying, junction boxes, cable jointing & fault locating**
- **Erection commissioning and Testing of GO Switches, Fuses, Isolators, CTs, PTs, Relays, Carrier Communication, Earthing Switches, Lightning Arrestors etc.**
- **Installation of Service Lines & Connections**
- **Line/Cable Maintenance, Line patrolling, Inspection, Work Permits/Line-Clear Authorizations**
- **Different Types of Substations & Layouts, Erection and Commissioning of Switchgear**
- **Diesel Generator Sets**
- **UPS & Battery Systems**
- **Electric Shock Safety & Fire-fighting, List of Safety Equipments - Use and Maintenance, Causes of Accidents and Safe Working Practices - First Aid, Electrocution, Falls-Cuts-Burns, Artificial Respiration-Resuscitation**

For Technicians/Linemen/C & D Staff

- **Erection of Poles**
- **Erection & Commissioning of Transformers including Connections**
- **Standard Earthing Practices in Distribution & Sub-stations**
- **Failure Analysis of Distribution Transformers including Case Studies**
- **Energy Meters – Single Phase & Three Phase, Meter Installation, Types of Meters, Digital Meters, Standard Metering Arrangements**
- **Erection & Maintenance of LT Overhead Lines**
- **Concept of Network Mapping & Consumer Indexing**
- **Reducing Technical & Commercial Losses**
- **Fault Detection & Rectification**

For Technicians/Linemen/C & D Staff

- **Sub-station Maintenance – Routine, Preventive, Planned, predictive, Breakdown, Visual Checks, Condition Monitoring Techniques, On-line maintenance, maintenance of History & Records, Tools & Tackles etc.**
- **Zero Breakdown by proper Maintenance of Distribution Network**
- **High Voltage Distribution Systems (HVDS)**
- **Best Practices in Distribution Management**
- **Environment Threats, Energy Conservation Techniques**
- **Different Breakers, Erection & Commissioning and Maintenance**
- **Theft Detection, Anti-Theft Measures and Case Studies**
- **Customer Care – Dealing Customers, Consumer Satisfaction**
- **Attitudinal Re-orientation, Work Ethics & Culture**
- **IT Interventions in Distribution**

Role of CEA

- CEA has been playing a pioneering role in Training and Development in Power Sector
- CEA has regular interaction with SEBs/Power utilities for training their personnel
- Advise SEBs/Power Utilities for setting up training centers as well as granting them recognition as per IE rules, 1956 - So far over 63 Institutes have been recognized by CEA
- Monitoring of these training facilities for upgradation of infrastructure and faculty

Some Existing Programs

- **Short-term programs with multiple program themes**
 - **Course Curriculum centrally developed under DRUM and delivered through institutional spread of 20 Training Institutions**
 - **Structured Training for C&D Level Distribution employees and Franchise development initiated under DRUM**
- **Distance Learning Certificate Programs on Power Distribution Management for JEs/ AEs level**
 - **Advanced Certificate in Power Distribution Management (ACPDM) - Course developed in association with NPTI and delivered by IGNOU through multiple Regional Centres spread across the country. The course is meant for Graduate Engineers/Diploma holders, or Science/Commerce/Art Graduates or Equivalent with two years experience in Power Utilities or the Electricity Sector**
 - **Certificate of Competency in Power Distribution (CCPD)) – The course is meant for Technicians/Equivalent Trade or manpower working in Power Sector (sponsored candidates) or General Candidates or Private electricians at least 8th Pass (non-sponsored). The course is scheduled to be inaugurated on 31st August, 2009**

Training in the new areas

Specialised subjects emerged from Technological advances/ Sectoral needs

- IT applications in the sector
- DSM / Energy Conservation / Distribution efficiency
- Power Trading
- Regulations and reforms
- Decentralised Distributed Generation
- Entrepreneurship development
- Distribution franchising

Development of Cadre:

- Energy Managers and Auditors
- Change Managers
- Entrepreneurship in last mile delivery (Distribution Franchising / Decentralized Distribution)
- IT integration with organizational systems.
- Others

Development of institutional resource base for training in new fields

उत्कृष्टता की बुलन्दियों को छूने में एकजुट

TOGETHER IN PURSUIT OF EXCELLENCE



तमसो मा ज्योतिर्गमय्



Performance of NPTI during 2006-07

Trainees	Trainee-Weeks
13,156	84,173

Performance of NPTI during 2007-08

Trainees	Trainee-Weeks
12,555	98,439.3

Performance of NPTI during 2008-09

Trainees	Trainee-Weeks
14,225	1,13,305.4

	2007-08	2008-09
EARNINGS (in Lakhs)		
University Affiliation Program	363.67	422.59
Training Course Fee	1461.12	2280.92
Sale of Publication	5.81	4.20
Sale of C.B.T	23.15	10.86
Others (Misc)	90.53	114.71
Building Rent	116.53	210.77
Consultancy Charge	0	60.20
TOTAL	2060.81	3104.25
PAYMENTS	Amount	Amount
SALARY	910.15	1457.75
OTHERS	698.60	1073.14
Payment to Experts	77.39	87.11
Capital Exp.	144.18	101.72
TOTAL	1830.32	2719.72

National Training Policy (NTP) Guidelines

- **Every Organisation to have a Training plan**
- **Training for all Cadres**
- **One- week Refresher Training for All**
- **Training for T& D Personnel**
- **Research in training techniques and methodologies to improve training effectiveness**
- **Educational up gradation plan**
- **Management Development programs**
- **Training on Reforms**
- **Training at Manufacturer's works**

National Training Policy (NTP) Guidelines

- **Simulator Training**
- **Training for Contract Labour**
- **Training in Disaster Management**
- **Training Abroad**
- **Distance Education**
- **Networking of Training facilities**
- **Creation of Training Infrastructure**
- **Training Budget – 1.5 to 5% of salary budget**

Thank You



Audio/Visual Course Material

- 275 A/V courses – one of the resources identified
(L & K International, Canada, Indian Partner: M/s Edutech India Pvt. Ltd. (www.edutech.com))
 - Distribution System Training (40 courses)
 - Transmission System Training (~ 30 courses)
 - Generation Operation Training (~ 50 courses)
- Custom Development of A/V courses
 - NPTI – CBTs
 - REL – A/Vs on Cable Jointing, e-learning modules
- Deployment of A/V, e-learning courses and virtual classrooms
 - Anytime, anywhere learning through Learning Management System
 - Virtual classroom techniques of IGNOU, WebEx, Interwise, etc

Outcome of the Task Forces Syllabi and curriculum – Modification & Identification of New Courses

I. Suggested Refresher Programs

II. Suggested Audio/Visual Contents

A. Institutional Network / Certification

I. Training of Trainers Programs

II. Certification Agencies

Action points?

- Implement “ADOPT AN ITI” by start of next academic session
 - Curricula (can changes be approved within 6 mths?)
 - Equipment
 - Teachers (“train the trainers”)
- CEA has already set up a portal to provide info on power industry employment opportunities
 - <http://indiapowerjobs.com>
 - help make this a power jobs data warehouse

Action points?

- Standardised theory and practical training modules developed by organisations with experience and skills
- Training of trainers by lead institutions
- Improved quality bench-marking –all stakeholders can help

Action points?

- •DG E & T to ensure enabling environment – quick change in curricula in particular
- •Collect info on available training capacity
- –Government (State-Central), private

Induction level Training

(Under IE Rules/ CEA Regulations)

Thermal Generation (O&M)	Engineers operators Technicians	52 week	Mandatory Under IE Rules	Conducted in CEA Recognized Institutes
Hydro (O&M)	Engineers Operator Technician	39 week 26 week	Mandatory Under IE Rules	Conducted in CEA Recognized Institutes
Transmission (O&M)	Engineers Operators Technicians	26 week 26 week 26 week	Mandatory Under IE Rules	Conducted in CEA Recognized Institutes
Distribution (O&M)	Engineers Operators Technicians	26 week 26 week 12 week	Likely to be covered under CEA Regulations	Conducted in CEA Recognized Institutes

ITI graduate quality improvement measures

- Funds will flow to Govt. owned ITIs from two sources
 - DG E & T schemes (including World Bank)
 - Project developer who adopts an ITI
- CEA is facilitating this by
 - Encouraging developers to adopt ITIs
 - Enabling smooth developer-State government dialogue

The Implementation Strategy

❖ Short Term

- Put on board the existing infrastructure with the utilities.
- Integrate efforts through model training curriculum (based on best practices) covering various skills and levels of employees.
- Institutionalize and encourage all utilities by facilitating development of training programs and turnover linked partial support during implementation.

The Implementation Strategy

(...Contd.)

❖ Medium / Long Term

- Institutionalize skill specific career development linked programs.
- Encourage and facilitate inter utility transfers / exchanges
- Development and Strengthening of National level resource institute on good practices
- Showcase excellence in practices and performance.
- Data repository for developers / entrepreneurs / planners / academicians
- Rating of the Institutes

National Power Training Institute

Apex Body

for

Training & Human Resources Development

of

Power & Energy Sectors

**Trained over 1,51,000 Power Professionals
in Regular Programs over the last 4 decades**

NPTI – An All India Organisation



Broad Activities of NPTI – Training

- ❑ Long Term & Short Term Training Programs for Engineers , Operators, Supervisors and Technicians in

- * Thermal
- * Hydro
- * Transmission
- * Distribution
- * Other related areas including Management

- ❑ On-Site Training Programs
- ❑ Seminars, Workshops, Conferences
- ❑ AICTE Approved Industry Oriented Programs
- ❑ DRUM Training Programs
- ❑ Franchise Training programs

Existing Trades at ITIs

- Carpenter, Electrician, Fitter, Welder, Wireman, Plumber, Sheet Metal Worker, Tool & Die Maker, Turner, Machinist, Mason (1-3 year duration)

Name of the sector	Name of BBBT Modules (one year duration)	Name of Advanced Modules approved by NCVT (6 month duration)
Electrical	<ol style="list-style-type: none"> 1. Basic Engineering Skill 2. Basic Electrical Engineering 3. Basic Electronics; 4. Basic Electrical Wiring and Winding; 5. Basic Power Generation, Transmission & Distribution 6. Basic Computer Operating Skill & its Application 	<ol style="list-style-type: none"> 1. Repair & Maintenance of Domestic Appliances . 2. Repair and Maintenance of Instruments used in Electrical Engineering . 3. Operation & Maintenance of Equipments used in HT, LT, Substation & Cable Jointing . 4. Repair & Maintenance of Electrical Machine & Power Supply . 5. Non-Conventional Power Generation, and Inverter .

Centres of Excellence Scheme (CoE) of DG (E&T) :
Broad Base Basic Training (BBBT)

Manpower Available and Projected during Various Plans

	<u>10th Plan</u>	<u>11th Plan</u>	<u>12th Plan</u>
Available at the Beg. of the Plan	989.9 Ths (NEP)	950.47 Ths	1176.03 Ths
Available at the End of the Plan	866.3 Ths	831.63 Ths	1029.01 Ths
Additional Manpower due to capacity Additions	84.23 Ths	344.40 Ths	293.92 Ths
Total at the End of the Plan	950.47 Ths	1176.03 Ths	1322.93 Ths
Man/MW ratio	7.00	5.82	4.93

End of 9th Plan : Man / MW Ratio : 9.42: -

Manpower Projection for XI Plan

(Manpower In Thousands)

Sl. No.	Area	Capacity Addition (MW)	New Recruitment			Total Manpower			Total Capacity (MW)
			Tech	Non-Tech	Total	Tech	Non-Tech	Total	
1	Thermal	50329	43.18	17.11	60.29	123.54	45.77	169.31 *109.02	145145
2	Hydro	17694	29.73	8.96	38.69	68.67	25.65	94.32 * 55.63	53457
3	Nuclear	3160	9.01	1.93	10.94	15.64	5.06	20.70 *9.76	7280
4	Power System	-	244.13	73.69	317.82	692.41	213.12	905.53 *587.71	-
	Total	71183	326.05	101.69	427.74	900.26	289.6	1189.86	205822
Source SG – 1 For Capacity Additions								* from the previous plan	

Training Load Projections for XI Plan

(In Thousand-man-months/year)

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2.	Hydro Induction	39.21	19.60	4.26	15.34
3.	Nuclear Induction	-	-	-	-
4.	Power System Induction	110.65	55.32	27.98	18.41
5.	Non-Tech Induction	27.91	27.91	-	27.91
6.	Refresher (Tech + Non-Tech.)	150.46	150.46	4.53	145.93
7.	Managerial	37.60	37.60	1.50	36.10
	Total	469.40	342.67	77.13	256.61

Reference * Sub-group Report for 10th plan - 2002(The group has taken the data from the Draft Report of the Committee set up by Gol, MoP - 1996)

Areas of Training

- a) **Simulators - Periodic Upgradation of Operation & Maintenance Capabilities**
- b) **Renewable Sources of Energy**
- c) **Demand Side Management (DSM), Energy Efficiency (EE) and Energy Conservation (EC)**
- d) **Transmission / Grid operation**
- e) **Distribution**
- f) **Capacity Building for Decentralised Distributed Generation (DDG)**
- g) **Capacity Building for Franchisees**
- h) **HRD and Technical Competence Building due to Technology Advancement**
- i) **Training on Attitudinal Changes/ Behavioral Sciences**
- j) **Information Technology**
- k) **Training of Non-technical officers and staff**

Broad Activities of NPTI - Consultancy

- **Human Resource Development**
 - Training Need Analysis
 - Upgradation of Training Facilities
 - Customized Course Designs
 - Capacity Assessment/Evaluation for Promotion/ Recruitment
- **Technical Areas**
 - * Preparation of DPR for Sikkim & PuVVNL, Varanas is under R-APDRP for 11th Plan
 - * Preparation of Feasibility Report for Solar Photovoltaic Panels Project
 - * REC Quality Monitors (RQM) for Tier-II Inspection of RGGVY Works for six (6) states

Training Institutes / Centers recognised by CEA

Region	CPSUs	SPSUs	Private	Total
NR	13	4	1	18
WR	5	3	7	15
SR	5	5	—	10
ER	4	3	1	8

27

18

9

51

India —A Young Nation

- □ Median age is 24 years □
- 54% of population below 25 years □
- India's working age population –63.3% of the total population; expected to rise till 2025; and marginally decline thereafter till 2050; but still remain above 60%.

Age structure

0-14 years --31.05%

15-64 years —63.3%

65 years & above —5.2%

Seminar on Requirement and Availability of Highly Skilled Manpower for the Power Sector on 3-10-2007

- Adoption of ITI Institutions closer to the upcoming and existing Projects and necessary upgradation of the infrastructure
- Teachers of the ITIs to be provided Industry Interface Programs and Inputs
- Some Nodal Organizations may be identified for preparation of syllabus and course content
- Centralized Course material for ITI Trades also to be developed in local languages.
- CPSUs and other organizations may look into the prospect of going in for Campus Placements from Colleges where NBA Accredited Course are run.
- Integration of various training facilities across the country should be considered in view of the huge training load.
- All the States should respond and send information regarding the training infrastructure available, training load etc. which would enable us to coordinated our efforts in this direction.

Seminar on Requirement and Availability of Highly Skilled Manpower for the Power Sector on 3-10-2007

- Each State should come up with their consolidated requirements to coordinate with authorities in Employment and Training and other agencies.
- While recruiting people it should be noted that Standard should not be compromised with.
- Along with Generic Degrees/Diplomas, Short-Term vocational training/Post Diplomas should be given due Importance.
- Industry specific new courses should be introduced in Colleges and ITIs.
- Common Job Portal for the Power Sector may be designed for easy employment.
- State Level Institutions may look at Local Industry requirements and have add on modules in their syllabus.
- Dedicated Polytechnics for the Power Sector can also be thought of.
- In the North-Eastern States, more infrastructure may be provided and Local Institutions may equip to cater to the local needs.
- National Training Policy Guidelines may be followed.
- Summer Internships for students with local industries may be considered.

Training at Afghanistan by NPTI Faculty

- **NPTI conducted training for employees of Ministry of Power & Water, Afghanistan under ADB Project in July – Sept' 2008 on aspects relating to**
 - **Sub – Station layout, Equipment and Maintenance**
 - **Sub – Station auxiliaries**
 - **Protection of Sub – Station equipment**
 - **Testing of Sub-station Equipment**
 - **Transmission Line engineering**
 - **Power System studies**
 - **Power System Operation**
- **NPTI also prepared a DPR for Setting up of a Vocational Training Institute at Afghanistan**