The evolving energy sector challenges
New Jobs New People

Session 3
3rd WePOWER Regional Conference
Bangkok, Thailand (Dec 6-8, 2022)
Reflections from 30 years in the Infrastructure Sector

Dr. Masood Ahmed, Retired Lead Water Resources Specialist, World Bank
1. In Karakapastan Autonomous Region of Uzbekistan, a Drainage Project. In the background an electric walking excavator with 11 meters bucket.
2. Feraghana Valley area
3. Northern Aral Sea Project spillway structure under construction in Kazakhstan
4. Aitek Structure on Syr Draya in Kyzl Orda Kazakhstan old and replaced under the Project
5. Padma Bridge Project, Bangladesh
6. Farm Water management Project in Sarghoda Pakistan
7. Tarbela dam project in Pakistan
8. Dasu HPP in Pakistan
11. Mangala dam project, behind is water jet from the power house
Strategic Planning for new skills and jobs: developing trainings and standards – what will future Energy Jobs look like?

Mr. Deepak Rai, Head - Standards and Research, India
Skills Council for Green Jobs
About Skill Council for Green Jobs (SCGJ)

Set up in 2015 as a sector skill council by the Ministry of Skill Development and Entrepreneurship (MSDE) and the Confederation of Indian Industry (CII) to catalyse growth in green business through skilling and entrepreneurship development.

Now recognised as an Awarding Body by the regulator - National Council for Vocational Education and Training (NCVET) and implements Skill India Mission.

- Skilling interventions are aligned with leading schemes and missions of the Government of India while building partnership with stakeholders from industry, vocational institutions, academia and communities.

- Trained and certified over 526,000 trainees till date (mainly in waste management and renewables mainly solar energy) and aims to further train and certify up to 3 Million trainees by 2030, with at least 30% female candidates.

- The skill strategy is complemented by specific efforts to promote entrepreneurship as well.

India can potentially create about 3.4 million jobs (short and long term) by installing 238 GW solar and 101 GW new wind capacity to achieve the 500 GW non-fossil electricity generation capacity by 2030 goal.

India to create an estimated 30-35 million additional jobs across Green Business by 2047.
SSCs/ABs are Industry lead bodies set up for the purpose of developing sector-specific competencies, quality assurance through accreditation of trainers, assessors and training partners along with curriculum development, setting of standards and benchmarks, imparting trainings, certifications and placement of certified trainees, etc.
## Snapshot of Thematic Job Roles

<table>
<thead>
<tr>
<th>Sector-wise Job Roles</th>
<th>NSQC approved Job Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 2</td>
</tr>
<tr>
<td>Solar Photovoltaic</td>
<td>1</td>
</tr>
<tr>
<td>Wind Energy</td>
<td>0</td>
</tr>
<tr>
<td>Bioenergy</td>
<td>0</td>
</tr>
<tr>
<td>Waste Management</td>
<td>0</td>
</tr>
<tr>
<td>Waste Water Treatment</td>
<td>0</td>
</tr>
<tr>
<td>Clean Cooking</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1</td>
</tr>
</tbody>
</table>

*Project emerging skills needs and coordinate matching demand and supply of skilled workforce*
Snapshot of Skill Delivery cycle

1. Identify Needs/Skill Gaps
2. Occupational Mapping and identifying job roles
3. Create/Revise National Occupation Standards (NOS) & Qualifications
4. Affiliate TPs, Trainers and Assessors
5. Seek Requisite Approvals
6. Develop/Revise Curriculum and Courseware
7. Training Delivery/Assessment and Certification through various Modes at required Scale, Pace and Quality

Impacts:
- 526,000+ trainees certified
- 400+ Affiliated TPs
- 500+ industry member
- 700 Assessors and 1000 Trainers
- 10 CoEs
Hon’ble Prime Minister  
Shri. Narendra Modi  
on 15\textsuperscript{th} August 2021

Make India energy independent before the completion of 100 years of independence (Year 2047).

India is also emphasizing on Clean Energy Transition and Circular Economy creating new opportunities for Green Growth and Green Jobs
India’s pathway to combat climate change
PANCHAMITRA at COP 26, Glasgow

India’s five-point climate action plan, is set to give a firm push to its plans for an accelerated transition to a low carbon economy.

• Achieve the target of net-zero by 2070
• Non-fossil energy capacity to reach 500 GW by 2030
• 50% of energy requirements to be met through RE by 2030
• Emissions intensity of GDP to be reduced by 45% by 2030
• Reduce 1 Billion tonne of Carbon Emissions by 2030
Wind Power 41,666 MW
Solar Power 60,813 MW
Small Hydro Power 4,899 MW
Bio-Power 10,977 MW

Source: MNRE, Programme/Scheme wise Cumulative Physical Progress as on Sep, 2022 | https://mnre.gov.in/the-ministry/physical-progress
Indian Energy Sector 2022-2047

CURRENT

Generation Capacity (GW)

- RE: 151 GW
- Total: 393 GW

Electricity Production (BU)

- RE: 297 BU
- Total: 1,372 BU

2030

Generation Capacity (GW)

- RE: 506 GW
- Total: 817 GW

Electricity Production (BU)

- RE: 1,012 BU
- Total: 2,518 BU

2047

Generation Capacity (GW)

- RE: 1,125 GW
- Total: 1,325 GW

Electricity Production (BU)

- RE: 3,153 BU
- Total: 4,721 BU


RE Share in Generation Capacity

Current: 39% 2030: 62% 2047: 85%

RE Share in Electricity Generation

Current: 22% 2030: 40% 2047: 67%
Government of India Goals & Plan

RE Sector Key Goals for India - 2047

- Energy Independence and Security
- Enhancing Decarbonization of the Energy Sector
- Self sufficiency in manufacturing of RE Technologies
- Global hub for Green Hydrogen Production and Exports

Programmatic Interventions

01 National Green Hydrogen Mission
02 Interventions to promote Domestic Manufacturing like PLI
03 Innovative Market Mechanisms for RE
04 Policies & Regulations to promote decarbonization and circularity across value chains
05 Scaling up programmes for Off-shore wind, waste to energy, DRE, farmers (KUSUM), rooftop solarization
06 Strategic bilateral and multilateral partnerships on technology, finance, trade
07 Measures to build supply chains for critical materials and components
08 Strengthening institutional capacity and industrial competitiveness
New Skills and Jobs Opportunities in Emerging Sectors

Opportunities
For multi-skilling and new jobs creation

**Green Hydrogen**
Job roles like Green Hydrogen Production Operator
Green Hydrogen Application Analyst, etc

**Energy Storage**
Job roles like Storage System Operator
Battery Management System Operator, etc.

**Renewable Power Generation**
Job roles like RE Installation and O&M Technicians
Clean Energy Entrepreneurs
Biomass Plant/Biofuel Production Operator, etc.

**Circular Economy**
Job roles like Manager - Circular Economy
Product and Packaging Technicians, etc.

**EV Charging and Clean Transportation**
Job roles like Solar Charging Operator
Battery Swapping Operators,

**Make in India for the world**
Job roles like Solar PV Manufacturing Operator
Wind Turbine Manufacturing Technician, etc.

**Green Buildings**
Job roles like Energy Efficient Building Designer
Green Building Material Sourcing Manager, etc.
Future sectors with high job potential in Green Business

01 E Mobility/Green Transportation
02 Solar manufacturing
03 Energy Storage
04 Green Hydrogen
05 Wind-Solar Hybrid and other Renewable Energy Systems
06 Off Shore Wind Power Plants
07 Biomass based power generation /Biofuels/ Bio CNG Production and Supply Chain
08 Pollution Prevention and Control Network
09 E-waste Management
10 Decarbonization of Energy intensive Sectors/
11 Green Buildings
12 Green Financing

Key existing and emerging thematic areas for accelerating jobs creation

- Renewable Power Generation
- Green Hydrogen
- Make in India for the world
- Energy Storage
- EV value chain

Factors driving skilling and employment opportunities in a Low carbon Indian economy
Preparing Workforce for the Future Jobs

- Align with industry on skill requirement, trainings, jobs and workforce transition pathways
- Ensure integration of on Job Training/Apprenticeship
- Partner with industry and academia to create Trainers/Experts Pool
- Co-create training and accreditation programs
- Integrate gender perspectives in training and capacity building efforts
- Build a network of certified women trainees and entrepreneurs to establish cross learning
- Map supply and demand centers and enable quality skilling on key job roles at required scale and pace

Demonstrate scalability of industry supported and other market mode based skill interventions

Establish skilling capacity & support infrastructure within Training Partners, Vocational Institutions and now schools and Institutions of Higher Learning

Recalibration of skilling policy and strategies: To deliver skills for Net Zero green economy,

Government(s), employers, training providers, awarding bodies, vocational and academic institutions, urgently need to collaborate to get us where we need to.

Enable upskilling and transition of existing Workforce in Fossil fuel based sectors to Green Sectors
Technical and Employability Skills

The speed of skills transition for a net zero green economy will be determined by the investment and focus from industry, Government along with education and vocational counterparts.

Skills required in medium- to high-skilled occupations

- STEM Skills
- Sector Specialized skills
- Digitalisation and AI
- Information and communications technologies (ICT)
- Analytical and Problem solving
- Management and Business skills
- Innovation and Entrepreneurial skills
- Consulting and Project management
- Marketing Skills
- Financial, Legal and contract management
- Networking and language Skills
- Strategic and leadership skills

Skills Required across the workforce

- Entrepreneurial skills
- Occupational Health and safety
- Adaptability and transferability skills
- Communication and other soft skills
- Team work skills
- Digital and financial literacy
Selected NSQC approved Qualifications in Green Business
## Solar Energy Qualifications (Skill Course)

### Solar PV Installer (Suryamitra) SGJ/Q0101 v2.0

**NQR Code:** 2021/EHW/SCGJ/04257

**DESCRIPTION**

The Learner will be able to check, configure, install, inspect, test, and commission different components of photovoltaic systems, that meet the performance and reliability needs of customers by incorporating quality craftsmanship and complying with all applicable codes, standards, and safety requirements.

**Overview of QP**

<table>
<thead>
<tr>
<th>NSQF Level: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Duration/Training Hours: 300</td>
</tr>
<tr>
<td>Trainee Qualification: 10th pass + ITI / Diploma (Electrical, Electronics, Civil, Mechanical, Fitter, Instrumentation/Welder)</td>
</tr>
<tr>
<td>Entry Age (Years): Minimum age: 18</td>
</tr>
</tbody>
</table>

### Solar PV Installer – Electrical SGJ/Q0102 v2.0

**NQR Code:** 2021/EHW/SCGJ/04258

**DESCRIPTION**

The Learner will install, test, and commission different electrical components of photovoltaic systems, that meet the performance and reliability needs of customers by incorporating quality craftsmanship and complying with all applicable codes, standards and safety requirements.

**Overview of QP**

<table>
<thead>
<tr>
<th>NSQF Level: 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Duration/Training Hours: 220</td>
</tr>
<tr>
<td>Trainee Qualification: 10th + I.T.I (Electrical and Electronics)/Diploma (Electrical, Electronics) OR 10th pass+3 years of experience as Electrician</td>
</tr>
<tr>
<td>Entry Age (Years): Minimum age: 18</td>
</tr>
</tbody>
</table>
Qualifications (Skill Course)

Waste Management

Recyclable Waste Collector and Segregator SGJ/Q6101 v2.0
NQR Code: 2021/WSSWM/SCGJ/04271

DESCRIPTION
The Learner would be able to properly collect, identify different types of waste and segregate at source or at collection center as per recycling / reuse / disposal requirement. S/he also ensure health and safety at the workplace. As an entrepreneur S/he would be able to venture into entrepreneurship for recyclable waste collection.

Overview of Qualification
NSQF Level: 4
Course Duration/Training Hours: 160
Trainee Qualification: Ability to read and write
Entry Age (Years): Minimum age: 16

Safai Karamchari SGJ/Q6102 v2.0
NQR Code: 2021/WSSWM/SCGJ/04272

DESCRIPTION
The Learner would be able to sweep with a broom and / or other suitable equipment to remove dust, debris and garbage. In buildings, s/he will be able to sweep the floor, scrub the floor using appropriate cleaning solution to remove the fine dust. As an elective for wet cleaning, s/he would specialize in wet cleaning, cleaning and washing bathrooms, lavatory and removing garbage and other waste in closed dustbin. As an elective for mechanized cleaning, s/he will specialize in mechanized cleaning sweeps, cleaning and removing garbage with the help of vacuum cleaner, mechanical sweeper, mechanical sweeper ride and mechanized scrubbing machine.

Overview of Qualification
NSQF Level: 3
Course Duration/Training Hours: 200 (Elective:40/40)
Trainee Qualification: Ability to read and write
Entry Age (Years): Minimum age: 18
Thank You!
Group Discussion Question 1 (5 minutes)

• Identify 3 top key technical skills that are required for future careers in the energy sector?
Go to www.menti.com and use the code 7848030

Identify 3 top key technical skills that are required for future careers in the energy sector.
Group Discussion Question 2 (5 minutes)

• Identify 3 top soft skills required for a successful career?
Go to www.menti.com and use the code 7848030

Identify 3 top soft skills required for a successful career.
Group Discussion Question 3 (5 minutes)

• Identify 3 key job areas/profiles you expect to hire in the near future where you need qualified candidates?
Go to www.menti.com and use the code 78 48 03 0

Identify 3 key job areas/profiles you expect to hire in the near future where you need qualified candidates.
Implementing training for new skills and jobs: How is NPTI training the workforce for the future? Especially women?

Dr. Tripta Thakur
Director General
National Power Training Institute
National Power Training Institute (NPTI)

• National Power Training Institute (NPTI) has been set up by Government of India to function as the National Apex Body for the Human Resources Development of Power Sector personnel in India.

• NPTI has been providing its dedicated service for more than five (5) decades.

• NPTI has trained over 3,80,000 power professionals in its regular programs over the past five decades.

• NPTI operates through its Eleven (11) Institutes in the different power zones of the country on an all India basis.
NPTI – An All India Organisation

Badarpur
Nagpur
Durgapur
Nangal
Faridabad
Guwahati
HLTC Bengaluru
Neyveli
PSTI Bengaluru
Two New Institutes

NPTI Shivpuri

NPTI Alappuzha
NPTI conducts several long-term, medium-term & short-term Training Programs for Engineers & Supervisors on various technical and managerial topics in the areas of Thermal, Hydro, Renewable, Transmission & Distribution, Management, Regulatory Affairs etc. pertaining to power sector.

Customized training programs for various Power Utilities are also organized round the year along with Workshops and Seminars on latest developments in the Sector.
On - Job Training

• On-job training is an essential supplement to formal training which provides the trainees an understanding of the functions through involvement with real work situations. NPTI conducts on-job training programs as per clients requirements.

• Online Training Course NPTI is conducting online training programs on various topics like Smart Grid and Smart Metering, SPV, Cyber Security etc.
On-Job Training
Important Achievements

NPTI has been given a mandate for :-

- **Training & Certification in the area of Cyber Security** - Providing Certification.

- **Capacity Building Under Revamped Distribution Sector Scheme** - Till date NPTI has conducted 51 Nos. of Programs and 1903 personnel have been trained from various Utilities.

- **Training & Certification of Load Dispatch Personnel** - Till date in Basic level Certification Exam 2501 personnel appeared and 2027 Qualified, in Specialist level 671 Personnel appeared and 409 Qualified.
NPTI has trained around 2500 Distribution Linemen under “Urja Sarathi”, “Uttam Urja Sarathi” and TF Engineers Training Programs.
Demonstration of 400 kV live line insulator washing of Kalwa Sub – Station of Maha Transco Ltd., Mumbai.
Live line Maintenance
Skill Development Training

• NPTI has been empanelled as a Government agency with Ministry of Rural development (MoRD) for conducting NSQF aligned training programs on all India basis for Power Sector & Renewable Energy Sector.

• NPTI has been recognized as an Assessment & Certification body for 60 Qualifications in Power Sector and Renewable Energy Sector.
• NPTI is conducting training programs through ITEC, MEA, Govt. of India for the countries of the world i.e. SAARC, African Countries etc.
Technical and Management Training Program for the PIU Staff, Kaduna State, Nigeria
International Training for Bhutan
Hi - Tech Real - Time Simulators
Importance of Women Education in India

Women play a key role in building a nation, and every country is being known for the power of women's empowerment. It is an essential element for any nation. Promoting education among women helps them understand their individuality to refrain from any exploitation. India has seen women achievers in each field due to encouraging women's education in the nation; it helped them improve their knowledge, which made them stronger and confident.
NPTI (PSTI), Bangalore has conducted 5 Days Internship Program for Women Students

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the Internship Program</th>
<th>Participants</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Internship Program on Accounting and Personality Development</td>
<td>40 Women Students from Vivekanandha College of Arts and Science for Women, Elayampalayam, Tamilnadu</td>
<td>5 Days; from 19&lt;sup&gt;th&lt;/sup&gt; to 23&lt;sup&gt;rd&lt;/sup&gt; September, 2022</td>
</tr>
<tr>
<td>2.</td>
<td>Internship Program on Accounting and Personality Development</td>
<td>40 Women Students from Vivekanandha College of Arts and Science for Women, Elayampalayam, Tamilnadu</td>
<td>5 Days; from 10&lt;sup&gt;th&lt;/sup&gt; to 14&lt;sup&gt;th&lt;/sup&gt; October, 2022</td>
</tr>
<tr>
<td>3.</td>
<td>Internship Program on Accounting and Personality Development</td>
<td>40 Women Students from Vivekanandha Arts and Science College for Women, Sankari - TK, Salem District, Tamilnadu</td>
<td>5 Days; from 07 to 11 November, 2022</td>
</tr>
</tbody>
</table>
Batch-III
ऊर्जा संरक्षण पर क्षमता संवर्धन कार्यक्रम - सुल्तानगंज डायट परिसर भोगाव मैनुजी

ऊर्जा संरक्षण पर क्षमता संवर्धन कार्यक्रम - रामदूर्गांज - सोनभद्र
ऊर्जा संरक्षण पर क्षमता संयोजन कार्यक्रम - जिला हायपुर

ऊर्जा संरक्षण पर क्षमता संयोजन कार्यक्रम - बड़ौदा बाघपत
ऊर्जा संरक्षण पर क्षमता संवर्धन कार्यक्रम - प्रयागरज, उत्तर प्रदेश

ऊर्जा संरक्षण पर क्षमता संवर्धन कार्यक्रम - खिरकिया कुशीनगर
Training Needs Analysis in RE Sector

- Mini and Micro Grids
- Floating Solar Plants
- Solar-Wind Hybrid Plants
- Off-Shore Wind Plants
- Battery Storage

Each emerging above listed topics needs to have a separate training program in four different areas listed below:

- Business Development
- Design
- Construction and commissioning
- Operation and Maintenance (O&M)
<table>
<thead>
<tr>
<th>S. NO.</th>
<th>Topic</th>
<th>Training in Specialized Area</th>
<th>Duration **</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mini and Micro Grids</td>
<td>Business Development</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and commissioning</td>
<td>Sort and Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operation and Maintenance (O&amp;M)</td>
<td>Medium term Training</td>
</tr>
<tr>
<td>2.</td>
<td>Floating Solar Plants</td>
<td>Business Development</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and commissioning</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operation and Maintenance (O&amp;M)</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td>Solar-Wind Hybrid Plants</td>
<td>Business Development</td>
<td>Short term Training</td>
</tr>
<tr>
<td>---</td>
<td>--------------------------</td>
<td>----------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and commissioning</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operation and Maintenance (O&amp;M)</td>
<td>Medium term Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Off-Shore Wind Plants</th>
<th>Business Development</th>
<th>Short term Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and commissioning</td>
<td>Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operation and Maintenance (O&amp;M)</td>
<td>Medium term Training</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Battery Storage</th>
<th>Business Development</th>
<th>Short term Training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Design</td>
<td>Medium term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Construction and commissioning</td>
<td>Short term Training</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Operation and Maintenance (O&amp;M)</td>
<td>Medium term Training</td>
</tr>
</tbody>
</table>
Thank You
Group Discussion Question 4 (10 minutes)

• Identify 3 top key technical trainings that you would like to take or deliver in your organization?
Identify 3 top key technical trainings that you would like to take or deliver in your organization?
Group Discussion Question 5 (10 minutes)

• Identify 3 top soft skills trainings that you intend to take or deliver in your organization?
Go to www.menti.com and use the code 78 48 03 0

Identify 3 top soft skills trainings that you intend to take or deliver in your organization?
Dr. Maria Beatriz Orlando, Lead Social Development Specialist, World Bank

Closing Remarks
3rd WePOWER Regional Conference
Bangkok, Thailand (Dec 6-8, 2022)