



PRESENTED BY

SKILL COUNCIL FOR  
GREEN JOBS



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REPORT



# Green Jobs for future

Towards Skilling India Goals 2030

Held on 19<sup>th</sup> April, 2017 at  
India Habitat Centre, New Delhi





Hon'ble Minister for Skill Development and Entrepreneurship  
**Shri Rajiv Pratap Rudy**  
Inaugurating the Summit 'Green Jobs for Future'  
And  
Launching 'SCGJ Industry Connect' Booklet





“Green Jobs is an expanding sector which can employ more than one million people, and it is an area where training can actually be linked to employment.”

Shri Rajiv Pratap Rudy,  
Hon'ble Minister of Skill Development and Entrepreneurship

Inauguration of Summit  
on  
'Green Jobs for Future'  
Towards Skilling India Goals 2030



TÜVRheinland®

# Green Jobs for future

**Towards Skilling India Goals 2030**

**19<sup>th</sup> April 2017, Wednesday**

**Venue: India Habitat Centre, New Delhi**

## One Year of Skill Council for Green Jobs

The Summit – “Green Jobs for future” was organized on the occasion of completion of one year of operation of Skill Council for Green Jobs (SCGJ).

In the first year, SCGJ, had focused on understanding short term and long term skill needs of the sector, kind of skill sets required to fulfill the goal of 2030 and create an ecosystem for delivering quality training. During this period SCGJ had affiliated over 200 training centers, pan India, about 400 certified trainers and 10 Assessment Agencies. SCGJ has already rolled out training on a massive scale in the solar and wind domain.

Understanding current and future Industry needs of skilled manpower in 14 sectors and sub-sectors has been achieved with in-house research, interacting with industry and with studies carried out by Ernst and Young and KPMG. In order to further strengthen these findings and discuss business trends in Green Jobs and future skilled manpower needs, Skill Council for Green Jobs in association with Governance Today, had organizing the Summit on “Green Jobs for Future: Towards Skilling India Goals 2030” on 19th of April 2017 at India Habitat Centre, New Delhi. Hon’ble Minister for State (Independent Charge) Shree Rajiv Pratap Rudy, Ministry of Skill Development and Entrepreneurship, Government of India inaugurated the summit and released Special issue of Governance Today on Green Jobs and a booklet on Industry connect of SCGJ. The summit had covered the following four distinct areas of business:

- **Renewable Energy**
- **Waste Management**
- **Green Transportation**
- **Green Construction**

Detailed studies carried out in the above sectors to understand future skilled manpower needs and associated job and business opportunities were presented. The summit attracted participation of subject matter experts, training partners & assessment bodies allied to Green Jobs. The outcome of the summit was giving direction to skilling opportunities in these sectors.

## The Summit followed following Program:

Time	Program
09:00 AM - 10:00 AM	Registration & Tea
10:15 AM – 11:00 AM	<p><b>Opening Session : ‘Skill Ecosystem in India’</b></p> <p><b>Chairman: Dr. A Ravindra, IAS (retd.), Chairman, Center for Sustainable Development</b></p> <p>Panel :</p> <ul style="list-style-type: none"> <li>• Dr Praveen Saxena, CEO, Skill Council for Green Jobs</li> <li>• Shri Vinod Bihari, CEO, Power Sector Skill Council</li> <li>• Shri S.K. Singh, DG, National Institute of Solar Energy</li> <li>• Shri Amar Variawa, Director, Vestas Wind Technology</li> <li>• Shri Gyan Sharma, Regional Head, TUV Rheinland</li> </ul>
11:00 AM - 11:30 AM	Tea Break
11:30 AM - 01:00 PM	<p><b>Session-1: Renewable Energy</b></p> <p><b>Chairman: Dr. A. Ravindra, IAS (Retd.), Chairman, Centre for Sustainable Development.</b></p> <p><b>Co-chairman: Dr. N.P.Singh, Senior Technical Advisor, UNIDO</b></p> <p>Lead Presentation:</p> <ul style="list-style-type: none"> <li>▪ ‘Skill Gap Study of RE Sector’ by Mr. Tanmay Bishnoi, Head – Standards and Research, SCGJ</li> </ul> <p>Panel :</p> <ul style="list-style-type: none"> <li>• Shri Ravi Parmeshwar, Chief HRO, ReNew Power</li> <li>• Shri Amar Variawa, Director - Marketing &amp; Public Affairs, Vestas Wind Technology India</li> <li>• Shri Devin Narang, Managing Director (Co-generation), Sindicatum Sustainable Resource</li> <li>• Prof. Dr Arun Kumar, Chair Professor (RE) IIT Roorkee</li> <li>• Shri Y Dinesh Babu, Chief of Party, USAID PACE-D Technical Assistance Program</li> <li>• ShriS. C. Natu, Sr. Vice President (Power Division) MITCON, Pune</li> <li>• Shri Satyanarayana Moharana, Managing Director, Aspire Disruptive Skill Foundation</li> <li>• Shri Vamsi Krishna, Institute Of Solar Power Technologies &amp; Vocational Training</li> </ul>
01:00 PM - 02:00 PM	Lunch
02:00 PM – 02:30	<p><b>Presentation:</b></p> <p><b>‘Assessment Methodology for Skilling Sector: Best Practices’ by India Skills</b></p>
02:30 PM - 03:15 PM	<p><b>Inaugural Session</b></p> <p><b>Shri Rajiv Pratap Rudy, Minister of State (Independent Charge), Ministry of Skill Development and Entrepreneurship</b></p> <p>Dr. P. Saxena, CEO Skill Council for Green Jobs</p> <p>Shri Amar Variawa, Director, Vestas Wind Technology, SCGJ (Industry, SCGJ)</p> <p>Shri Gyan Sharma, Regional Head, TUV Rheinland</p> <p>Shri. Anish Chakraborty, Chairman, Seacom Group</p> <ul style="list-style-type: none"> <li>• Unveiling of Governance Today Special Edition magazine on Green Jobs</li> <li>• Launch of ‘SCGJ Industry Connect’ Booklet</li> </ul>

03:15 PM - 04:30 PM	<p><b>Session 2: Waste Management</b></p> <p><b>Chairman :</b> Mr. K D Bharadwaj, Director – Environment, National Productivity Council</p> <p><b>Lead Presentation:</b></p> <ul style="list-style-type: none"> <li>▪ Skill Gap Study of Waste Management Sector by Dr. P. Dhamija, Advisor, Skill Council for Green Jobs</li> </ul> <p><b>Panel</b></p> <ul style="list-style-type: none"> <li>• Shri. Anish Chakraborty, Chairman, Seacom Group</li> <li>• Ms. Bharti Chaturvedi , Chintan</li> <li>• Shri Ashok Chauhan, IL&amp;FS Energy</li> <li>• Dr. Kulwant Singh, Chairman and CEO of 3R WASTE Foundation (India).</li> <li>• Shri. B.K. Soni, Chairman and MD, Eco Recycling Ltd.</li> </ul>
04:30 PM - 05:15 PM	<p><b>Session 3: Green Construction</b></p> <p><b>Chairperson :</b> Dr. Akanksha Chaurey, CEO IT power (India)</p> <p><b>Co-chairman :</b> Lt Col Ajay Kr Jindal, Head – SSC Governance, NSDC</p> <p><b>Lead Presentation:</b></p> <ul style="list-style-type: none"> <li>• Skill Gap Study of Green Construction Sector by Monica Walia, KPMG on behalf of Skill Council for Green Jobs</li> </ul> <p><b>Panel</b></p> <ul style="list-style-type: none"> <li>• Maj. Gen. TPS Bakhshi, Director – Business Affairs, Indian School of Business.</li> <li>• Ms. Sareena Kochar, Vice President, Lemon Tree Hotel</li> <li>• Shri. Anupam Jain, RICS School of Built Environment</li> <li>• Shri. Rupesh Sawant, Mahindra Susten</li> </ul>
05:15 PM - 05:30 PM	Tea Break
05:30 PM – 06:30 PM	<p><b>Session 4:Green Transportation</b></p> <p><b>Chairman:</b> Mr. A.K. Gupta, Director ( Electrical) DMRC</p> <p><b>Panel</b></p> <ul style="list-style-type: none"> <li>▪ Shri. Akshay Ahuja, Sr. Smart Grid Specialist, India Smart Grid Forum</li> <li>▪ Shri. Dinesh Goyal, Konark Energy Solutions</li> <li>▪ Shri. Harit Shah, Devam Electric</li> <li>▪ Shri. Gaurav Minda, Minda Group</li> </ul>
	Vote of Thanks





## Opening Session: Skill Ecosystem in India

**Chairman: Dr. A Ravindra, IAS (retd.), Chairman, Center for Sustainable Development**

**Panel:**

- Dr Praveen Saxena, CEO, Skill Council for Green Jobs
- Shri Vinod Bihari, CEO, Power Sector Skill Council
- Shri S.K. Singh, DG, National Institute of Solar Energy
- Shri Amar Variawa, Director, Vestas Wind Technology
- Shri Gyan Sharma, Regional Head, TUV Rheinland

This being the opening session for the Summit, set the tone for the discussions during the day. The session broadly talked about the new skilling ecosystem and policies of Government for promoting Skill Development. The Chairman mentioned that SCGJ is one of the most recently created Skill Councils addressing the need of skilled manpower for Sustainable Development. While the Council covers 14 sub-sectors, it cuts across almost all spheres of life where there is a scope of improving the efficiency and heading towards sustainable economy.

India, at COP 21 in Paris, declared a voluntary goal of reducing the emissions intensity of its GDP by 33–35%, over 2005 levels by 2030. India has adopted several ambitious measures for clean and renewable energy, energy efficiency in various sectors of industries, achieving lower emission intensity in the automobile and transport sector, non-fossil based electricity generation and building sector based on energy conservation. Thrust on Renewable Energy, Promotion of Clean Energy, Enhancing Energy Efficiency, Developing Climate resilient Urban Centers and Sustainable green transport network are some of the measures for achieving this goal.



**About the Session Chairman: Dr. A Ravindra**, the Chairman of Center for Sustainable Development, Bangalore. Dr. A. Ravindra was Chief Secretary, Govt. of Karnataka in the year 2002. Dr. A Ravindra holds a PhD in Development studies and has specialized in the urban sector including water management. He was instrumental in initializing the Cauvery water supply project (stage IV) and the Metro Rail Project for Bangalore. After retirement, Dr. Ravindra has served as Deputy Chairman, Karnataka State Planning Board, Sr. Visiting Fellow at IIM, Bangalore and Advisor to Chief Minister of Karnataka. Currently, he is Chairman, Institute for Social & Economic Change, Bangalore (ISEC) a leading research organization in Social Science in India and also heads the Centre for Sustainable Development, a non-profit organization, working on sustainability issues. His latest initiative is setting up the Smart Cities India Foundation. Dr. Ravindra has published several papers and articles on urban and public policy issues. His books include Urban Land policy, Dance of Demography and a monograph on Cauvery water Dispute.

**Dr. A Ravindra, covered following issues:**

- The impact of climate change, and especially subsequent mitigation and adaptation policies, on labour markets.
- Impact of climate change including its regulation on labour markets, the dynamics of green growth at the levels of jobs and skills development, and the local implications for mitigation and enabling green growth.
- Role of Skill Council for Green Jobs in Sustainable Development

**About the Panel members: Dr. Praveen Saxena** is the Chief Executive Officer of the Skill Council for Green Jobs. He retired as the Director General of National Institute of Solar Energy and Advisor at MNRE in 2015. Academically established as a M.Sc. and Ph.D. in Physics from Delhi University in 1980, he was with National Physics Laboratory as scientist from 1980-1983. Dr. Saxena worked as a Principal Scientific Officer, Director and Advisor in MNRE, while looking after small hydro power program, solar photovoltaics, wind energy, rural energy program and policy planning of Renewable Energy. Dr Saxena has been UNIDO Consultant on small hydro for Uganda, Tanzania and Kenya and developed integrated plan to develop small hydro in these countries. He has over Dr Saxena has over 50 research publications in international journals. His previous roles include Government Director on the Board of IREDA; Governing Council Member, CPRI, Bangalore; and Chairman, Renewable Energy Committee to develop Standards, Bureau of Indian Standards. He was also the member of Indo-German Energy Forum, Member Indo-US Energy Dialogue, working group on Sustainable Growth, Member, Steering-cum Advisory Committee, UNDP-GEF project on Solar Concentrator.

### **Dr. Praveen Saxena focused on**

- activities of Skill Council for Green Jobs, the achievements so far, and a roadmap for next 5 years.
- strategy for industry linkages and skill development relating to specific industry requirements
- the strength of training institutions and assessment agencies involved in the activities of SCGJ

**About the Panel members: Shri Vinod Behari** the Chief Executive Officer of Power Sector Skill Council, Shri Vinod Bihari is Responsible for development of policies, strategies and action agenda to address skill and capabilities related concerns of Power Industry at cutting edge and operations level. Previously he was the executive director, Human Resource at Rural Electrification Corporation.

### **Shri Bihari covered:**

- activities of Power Sector Skill Council and its integration with the Renewable Energy Sector.
- the need of skilling the manpower engaged in conventional power sector with the emerging new power generation technologies.
- the challenges of grid integration of renewables in the main grid and skills required for integration of rooftop solar PV systems with grid and issues relating to net metering.

**About the Panel members: Shri S.K Singh** is Director General for National Institute of Solar Energy (NISE), which is playing a vital role in spearheading skill development in the entire domain of Solar Energy. Mr Singh has over 25 years of experience in the R&D of various aspects of solar thermal and bio mass technologies. Mr. Singh is directly responsible for the design and development of 1MW Solar Thermal Power Plant and Design Development and fabrication of Solar-biomass hybrid cold storage for Remote Village Application at NISE.

### **Shri Singh broadly covered**

- activities of NISE, facilities available and the international program of skilling undertaken at NISE
- discuss the possibility of skilling in the member countries of International Solar Alliance

**About the Panel members: Shri Amar Variawa** is the Director - Marketing & Public Affairs in Vestas Wind Technology India Pvt. Ltd. Mr. Aman Variawa has 18+ years of experience in fortune 500 companies. Currently he is responsible for Market making and policy creation/intervention of Wind Energy. He is the main architect for the relationship between Vestas and skill council for green jobs and placement of trained man power in the blade manufacturing facility.

#### **Mr Amar Variawa covered**

- the Skill Gap prevalent in the Renewable Energy sector, specifically the Wind Energy Sector.
- the need of skilled manpower with appropriate safety training suitable for hiring in international organizations.

**About the Panel members: Shri Gyan Sharma** is the Regional head of TUV Rheinland: Mr. Gyan Sharma is heading the solar training program of the company, TUV has 70 plus vocational training centre in India. Mr. Gyan Sharma has over 20 years of experience in diverse sectors including pharma, insurance, E learning and skill based training. Mr. Gyan Sharma is Post graduate in Finance & insurance, Masters in Business management, and Diploma in training and development, bachelor's degree in life sciences.

#### **Mr Gyan covered**

- their experience in Skill Development activities across their various centres.
- the approach required for standardization of training methodologies and challenges being faced in delivering quality training.

# Session-I: Renewable Energy



# Session I: Renewable Energy

## Session-I: Renewable Energy

**Chairman: Dr. A. Ravindra, IAS (Retd.), Chairman, Centre for Sustainable Development.**

**Co-chairman: Dr. N.P.Singh, Senior Technical Advisor, UNIDO**

**Lead Presentation:**

**'Skill Gap Study of RE Sector' by Mr. Tanmay Bishnoi, Head – Standards and Research, SCGJ**

**Panel :**

- **Shri Ravi Parmeshwar, Chief HRO, ReNew Power**
- **Shri Amar Variawa, Director - Marketing & Public Affairs, Vestas Wind Technology India**
- **Shri Devin Narang, Managing Director (Co-generation), Sindicatum Sustainable Resource**
- **Prof. Dr Arun Kumar, Chair Professor (RE) IIT Roorkee**
- **Shri Y Dinesh Babu, Chief of Party, USAID PACE-D Technical Assistance Program**
- **ShriS. C. Natu, Sr. Vice President (Power Division) MITCON, Pune**
- **Shri Satyanarayana Moharana, Managing Director, Aspire Disruptive Skill Foundation**
- **Shri Vamsi Krishna, Institute Of Solar Power Technologies & Vocational Training**

The Session started with opening remarks of the Chairman.

India's power system needs to almost quadruple in size by 2040 to catch up and keep pace with electricity demand that – boosted by rising incomes and new connections to the grid. , India's Intended Nationally Determined Contribution (INDC) aims to base 40% of the total installed power generation capacity on non-fossil fuel resources by 2030 with international support on technology transfer and financing. It also aims to reduce the emissions intensity of GDP by 33 to 35%, from 2005 levels, by 2030.

- **TOTAL INSTALLED CAPACITY 3,16,767 MW**
  - **Renewable Energy 51.360 MW**
    - **Wind 29,151 MW**
    - **Solar 9,566 MW**
    - **Bio Mass 8,296 MW**
    - **Small Hydro 4,346 MW**
- **The Government is aiming to achieve 175,000 MW by 2022**
- **This gives an opportunity for investment of about US\$ 100 billion**
- **And About 1.5 million jobs in the RE sector alone**





**Dr. A Ravindra**, chairman of the session gave an over view of the activities of CSD in the area of Skill development. Also touch upon niche areas in sustainable development that require training, capacity building and skill enhancement across sectors. He discussed the premium training packages developed by CSD on 'Sustainable development for businesses'. He gave a brief over view of the RE sector in the country and road map to achieve 175 GW by 2022 and International perspective to the RE status in India

**Dr. NP Singh** co-chairman is the Senior Technical Advisor of UNIDO. Dr. NP Singh is former Advisor of Ministry of New and Renewable Energy (MNRE). Dr. Singh has a Master's Degree in Physics in 1975 and Ph. D in Bio Energy. In 1976, Dr. Singh joined National Physical Laboratory, New Delhi and he is among first few scientist in India who did research work on solar cells. Dr.Singh has been the National Project Director of UNDP/GEF assisted Project and part of many International delegations. Dr. Singh covered an over view of Solar program in the country along with recent policy initiatives taken by Ministry of New and Renewable Energy and Delhi Government.

**About Mr. Tanmay Bishnoi** has multifaceted industry experience in different roles ranging from Consulting, Advisory, EPC, and Training & Skill Development. Currently, Mr. Tanmay is the Head - Standards and Research at Skill Council for Green Jobs (SCGJ), to develop National Qualifications for certification of Green skills with international comparability.

Skill Council for Green Jobs has steered a study on Skill Gap in Solar, Wind and Small-hydro sectors. Mr. Tanmay presented findings of the study which is a result of in depth interaction with relevant industry . He also presented occupational maps and skills gaps in each sector including the job roles in the RE industry and Qualification Packs developed. The presentation made by Mr Tanmay is at the end of this session.

**About the Panel members: Mr. Ravi Parmeshwar** is the Chief HRO of ReNew Power. ReNew Power is committed to leading a change in the country's current energy portfolio by delivering cleaner and smarter energy choices and thereby reducing India's carbon footprint. ReNew Power's mission is to play a pivotal role in meeting India's growing energy needs in an efficient, sustainable and socially responsible manner. The company creates value through reliable and efficient generation of non-conventional power through innovation in solar and wind power solutions. ReNew Power is the promoter industry of SCGJ.

**Mr. Ravi Parmeshwar** explained about the Solar Power Trends in India. He expected growth of the sector in next 5 years and up to 2030. He covered , Skill Gaps being faced in implementing the projects and main occupations with possible large intake of skilled manpower

**Shri Amar Variawa** in this session told about Wind Power Trends in India. He covered about the expected growth of the sector in next 5 years and up to 2030. Skill Gaps being faced in implementing the projects and main occupations with possible large intake of skilled manpower

**About the Panel members: Mr. Devin Narang** is the Managing Director (India) for Sindicatum Sustainable Resource. Mr. Devin is responsible for developing Sindicatum's Sugar Co-Generation Business in India. Devin has 28 years of experience in running sugar mills, distilling, and brewing and renewable energy businesses in India.

**Mr. Devin Narang** covered about Biomass Power / Co-generation Trends in India, expected growth of the sector in next 5 years and up to 2030, skill Gaps being faced in implementing the projects and Main occupations with possible large intake of skilled manpower

**About the Panel members: Prof. Dr. Arun Kumar** is Chair Professor renewable Energy at IIT Roorkee. Prof. Dr. Arun Kumar is a civil, water resources and hydropower engineer by education and Headed the Alternate Hydro Energy Centre (AHEC) at IIT Roorkee from its inception. He is hydro professional of International fame and is well known for small hydropower and environmental management of Rivers and lakes.

He covered Small-hydro Power Trends in India, expected growth of the sector in next 5 years and up to 2030, Skill Gaps being faced in implementing the projects and Main occupations with possible large intake of skilled manpower

**About the Panel members: Mr. Dinesh Babu** is the Chief of Party USAID PACE-D Technical Assistance Program, He was Asia training center Director for GHG Management Institute and Consultant for the Carbon Rating Agency (IDEA carbon).

He experience in implementing SETNET program of USAID for technical training in Solar Energy Sector, Findings of Training Need Analysis in the solar sector and Critical gap in implementing skill development activity

**About the Panel members: Mr. S.C. Natu** is Sr. Vice president at MIDCON's Power Division. Mr. S.C Natu is an expert in renewable Energy Sector. MIDCON's Power Division is a 'One Stop' service provider to Power Projects on any Fuel.


He shared his experience in addressing challenges and implementing training programs for biomass co-generation in sugar industry, Scaling up training activities at different locations and Skill gap in sugar industries for power generation

**About the Panel members: Mr. Satyanarayana Moharana** is the Managing Director of Aspire Disruptive Skill Foundation (ADS Foundation). Mr. Satyanarayana Moharana has founded ADS Foundation for implementing holistic Vocational Skill Programs in Gujarat. ADS foundation has become a leading Skill Development Organization in Solar Sector & trains over 3000 ITI/Diploma Trainees every year in Solar Sector. ADS foundation is known for its quality training and have outstanding track record of placement with national and International Industries like Vestas.

He covered model adopted for large scale training catering to project and location specific requirement of industry, Challenge in mobilizing appropriate candidates, addressing needs as per local requirement of projects and challenges in scaling up trainings and moderating it to the specific industry needs.

**About the Panel members: Mr. Vamsi Krishna** has Founded Institute of Solar Power Technologies & Vocational Training. Mr. Vamsi has started ISPTVT in year 2008. He is the author of the book on Solar PV Installer which is available in Hindi, Telugu, English, Kannada, & Marathi. ISPTVT is a NSDC Partner for Imparting Trainings. Mr. Vamsi Krishna has just launched online programs which were developed in Technical collaboration with SCGJ. Mr. Vamsi Krishna is known for his strengthen in solar energy education.


He covered major challenges in implementing skill training in solar domain , addressing challenges in placement of trained manpower with industry, opportunities in Skilling in Solar Energy Sector based on personal journey or study and scope for Micro Rural Solar Entrepreneur in India.



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## Skill Gap Study of Renewable Energy sector

By,  
Tanmay Bishnoi  
Head - Standards and Research  
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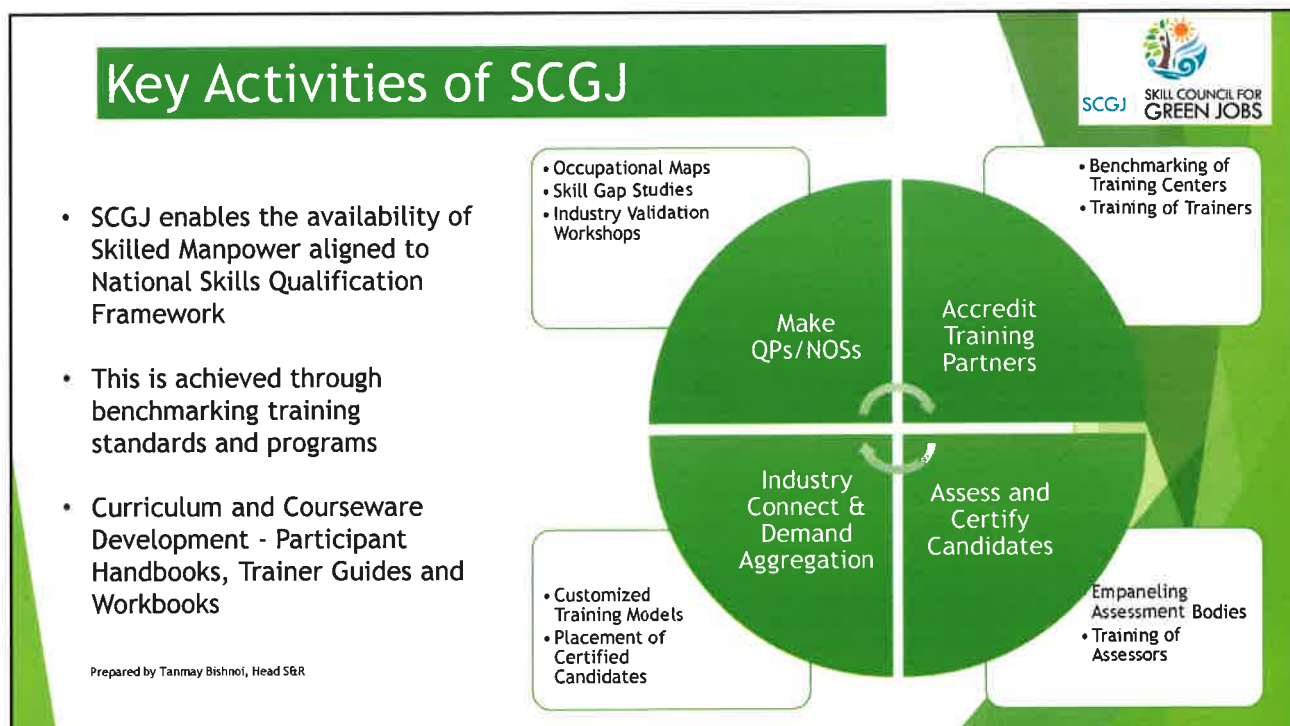
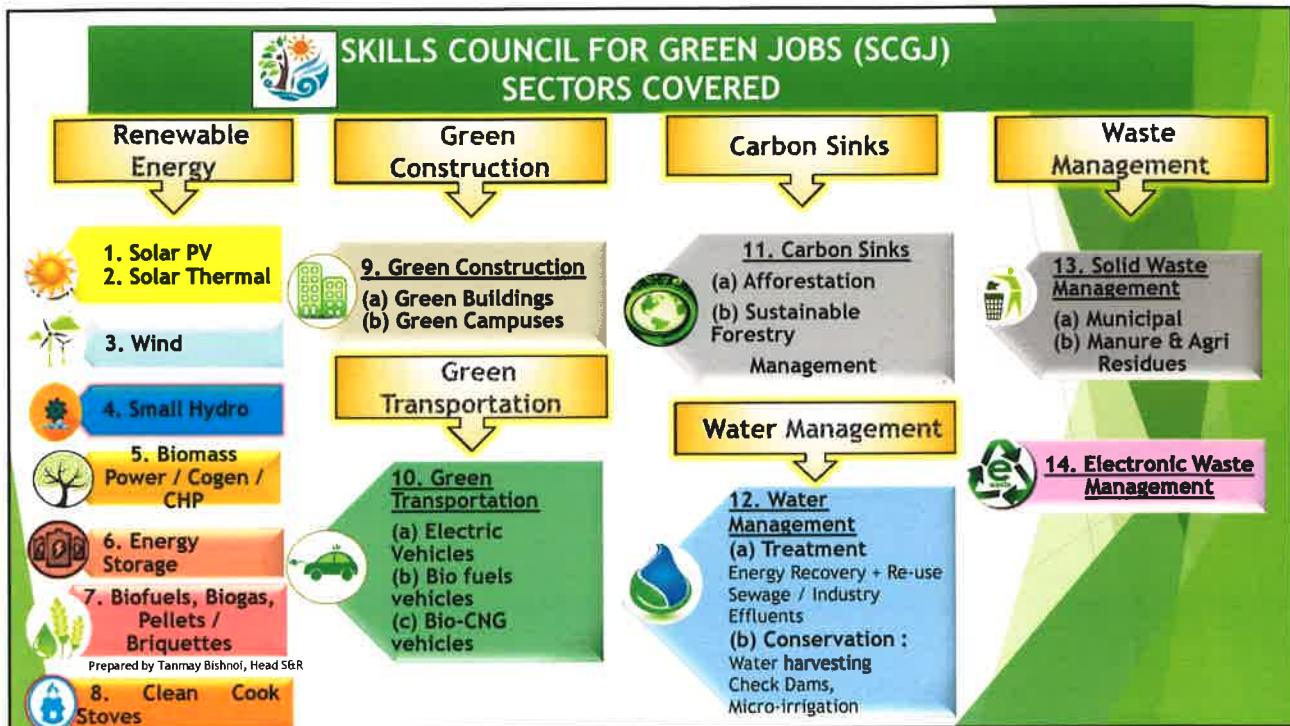
## Session Structure


- ▶ Skilling Potential in Renewable Energy sector
- ▶ Renewable Energy Occupational Maps for Career Progression and Organization Structure
- ▶ National Occupational Standards & Qualification Packs in Renewable Energy
- ▶ SCGJ Strategy for undertaking skill development programs

E-Learning   State Studies   Manpower   Skill Maps   Facilitator Guides   Model Courseware   Participant Handbooks   Online Content

Centre of Excellence

Prepared by: Tanmay Bishnoi, Head, SER



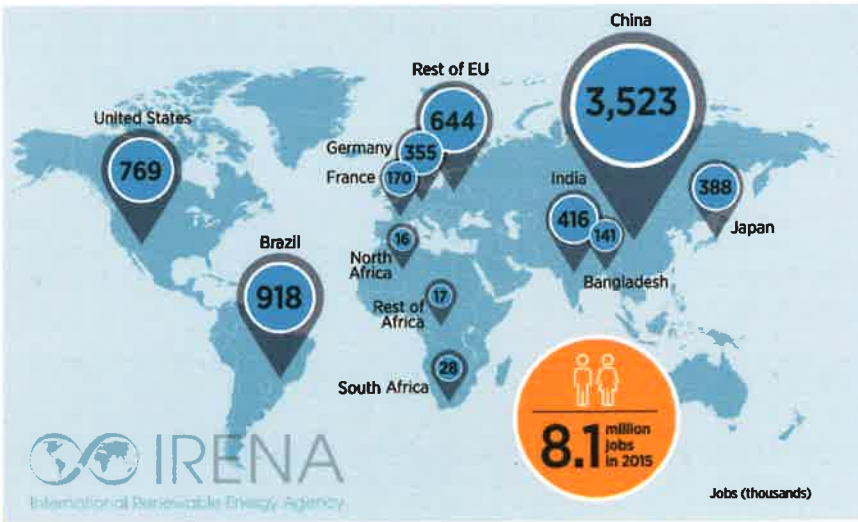


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## Skilling Potential in Renewable Energy sector

Prepared by Tanmay Bishnoi, Head S&R

### IRENA: Jobs Created in Renewable Energy Sector in 2015

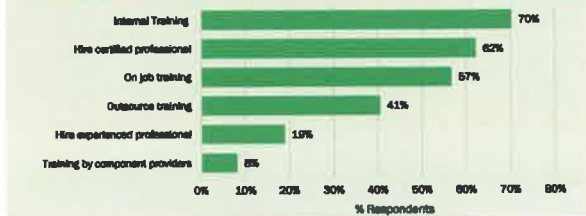


SECTOR	Jobs in India (In thousands)
Solar PV	103
Liquid Biofuels	35
Wind power	48
Solar Heating / Cooling	75
Solid Biomass	58
Biogas	85
Hydropower	12
Geothermal	
CSP	
<b>Total</b>	<b>416</b>

Prepared by Tanmay Bishnoi, Head S&R

## NRDC : FILLING THE SKILL GAP IN INDIA'S CLEAN ENERGY MARKET

How Does Your Company Meet Requirement of Skilled People

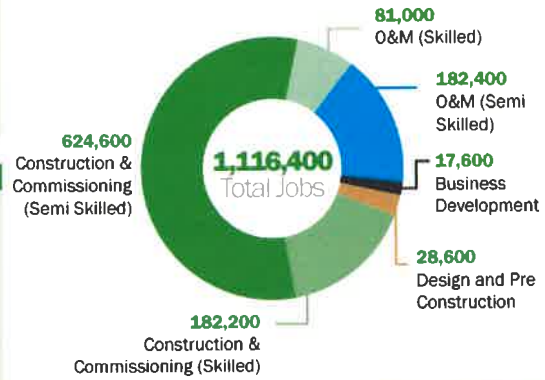


Institutes For Training Sources



Prepared by Tanmay Bishnoi, Head S&R

Number and Type of Jobs Created in India's Solar Sector by 2022



## Training Need Analysis

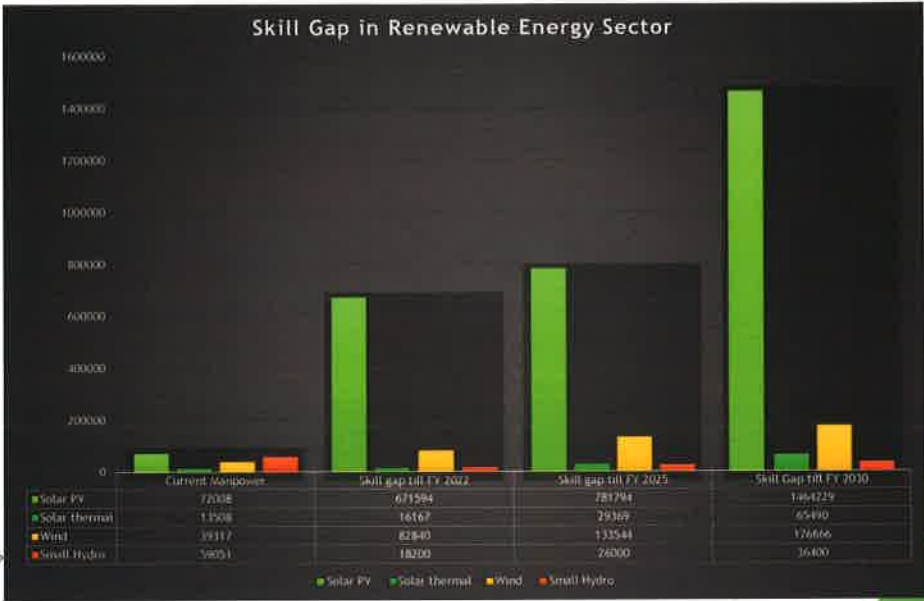
Challenges with Respect to Training Programs



Prepared by Tanmay Bishnoi, Head S&R

NRDC SURVEY EXTRACTS: FILLING THE SKILL GAP IN INDIA'S CLEAN ENERGY MARKET

### Renewable Energy Skill Gap Study



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## Renewable Energy Occupational Maps for Career Progression and Organization Structure

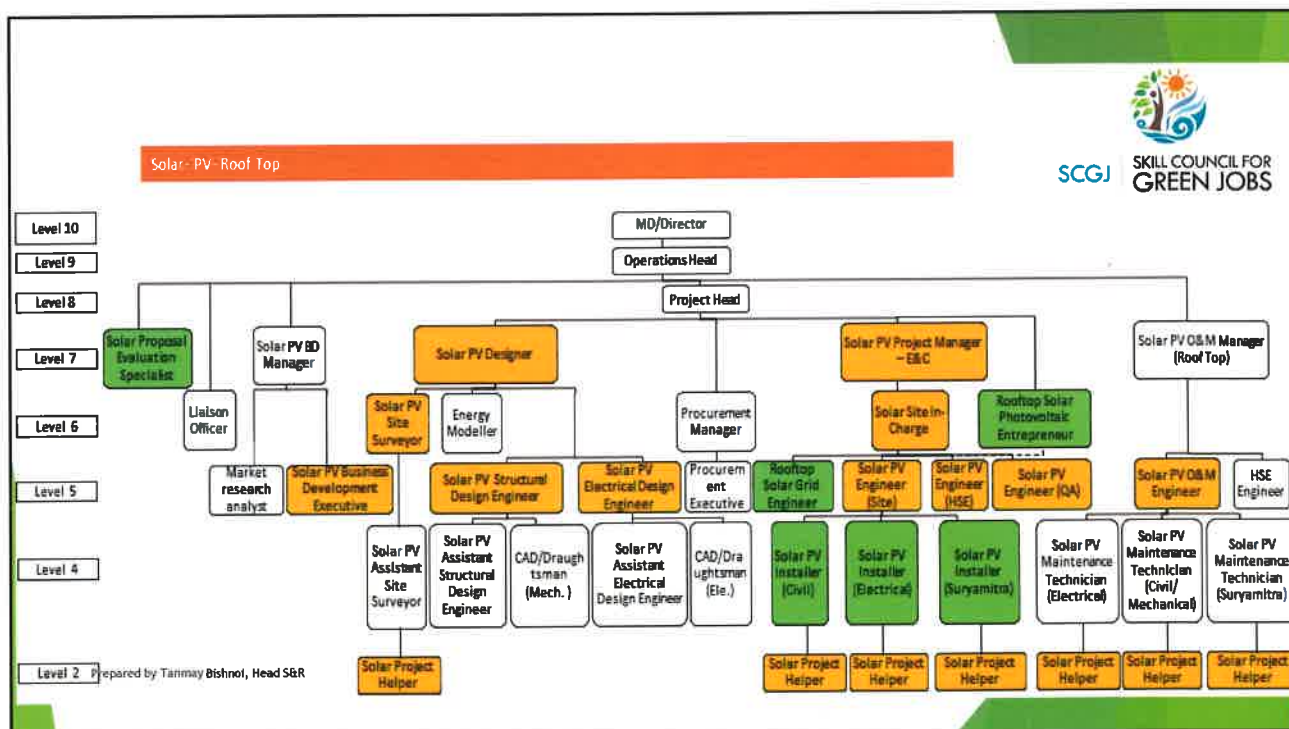
Prepared by Tanmay Bishnoi, Head S&R

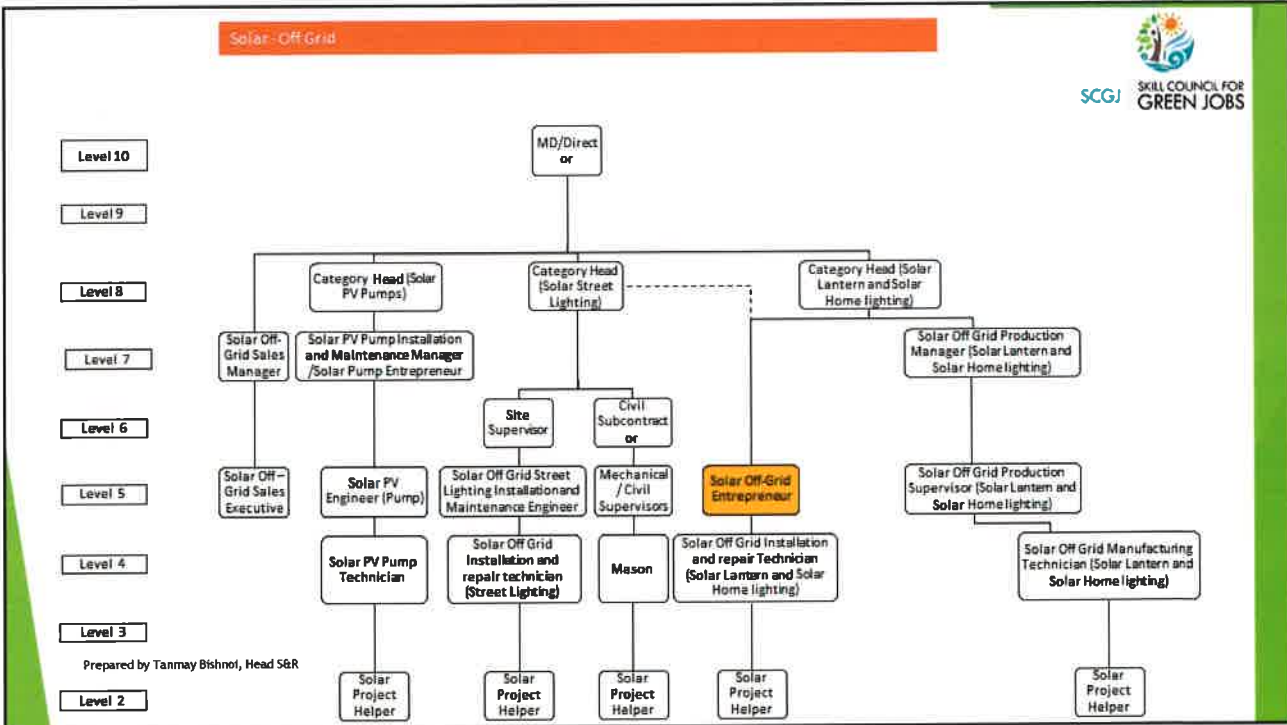
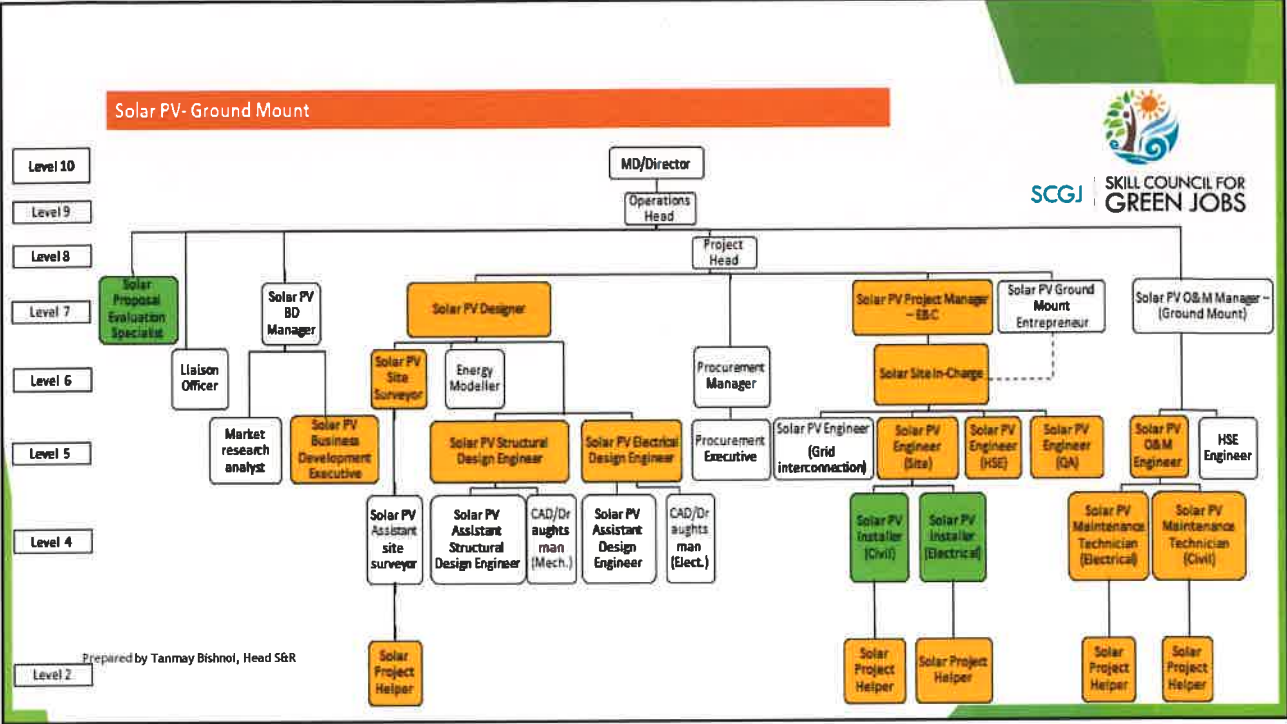


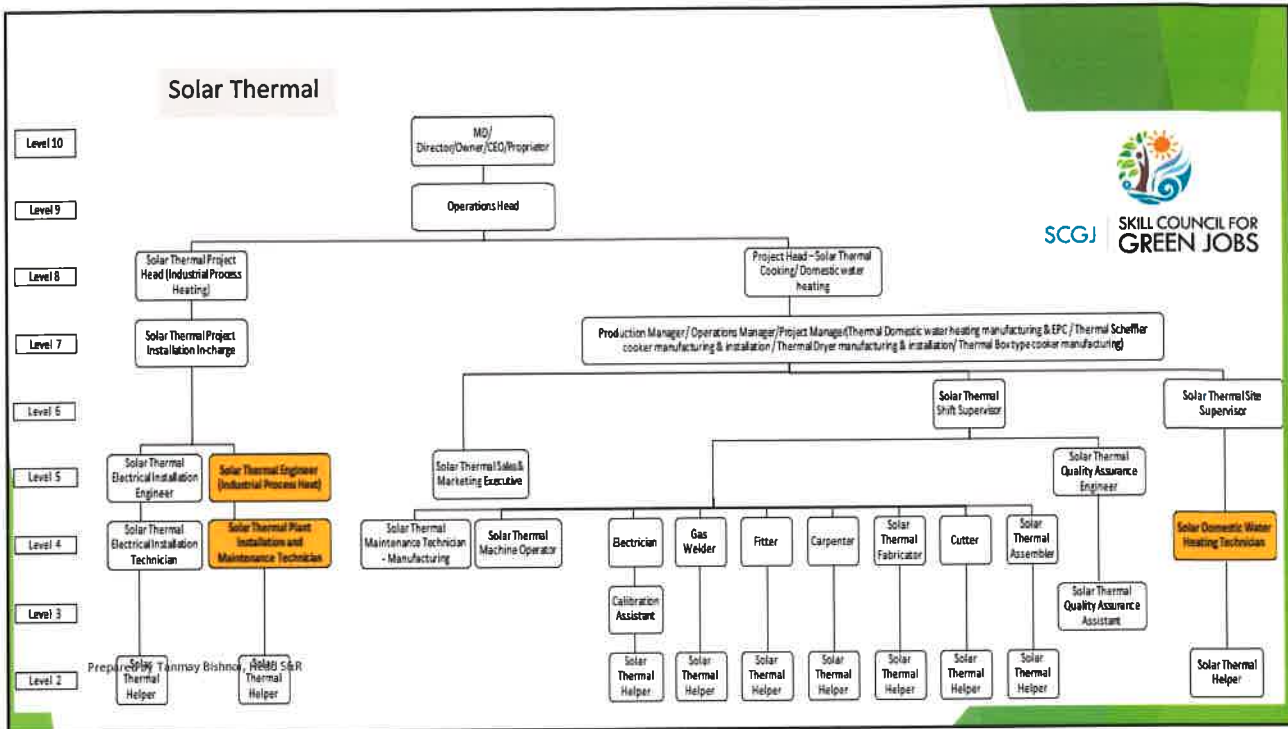


## Occupational Maps for Solar Sector

Prepared by Tanmay Bishnoi, Head S&R



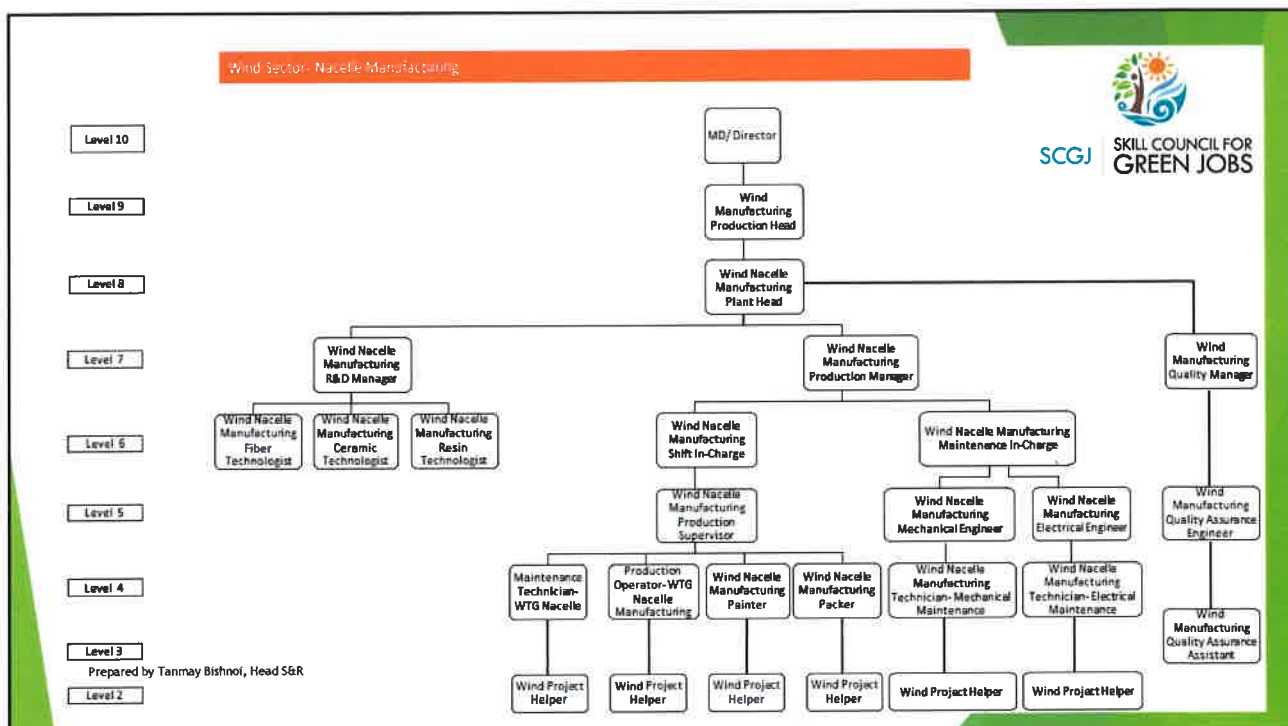
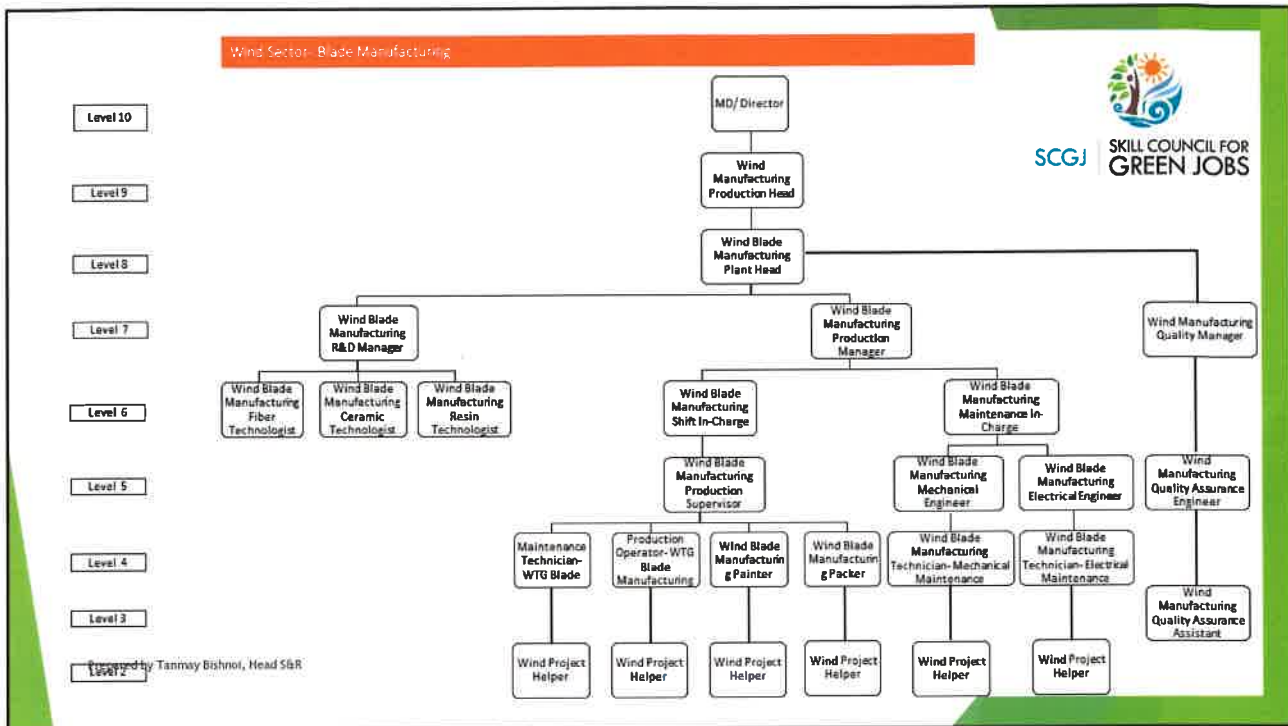


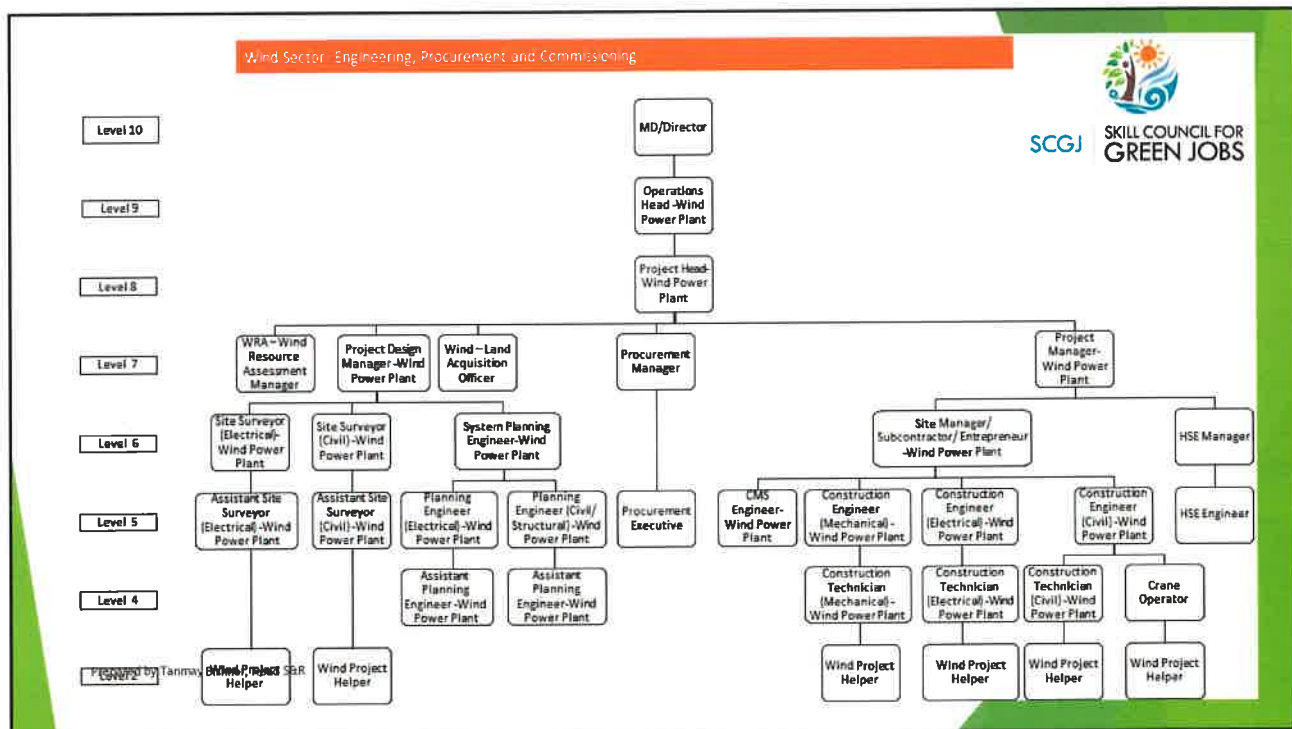
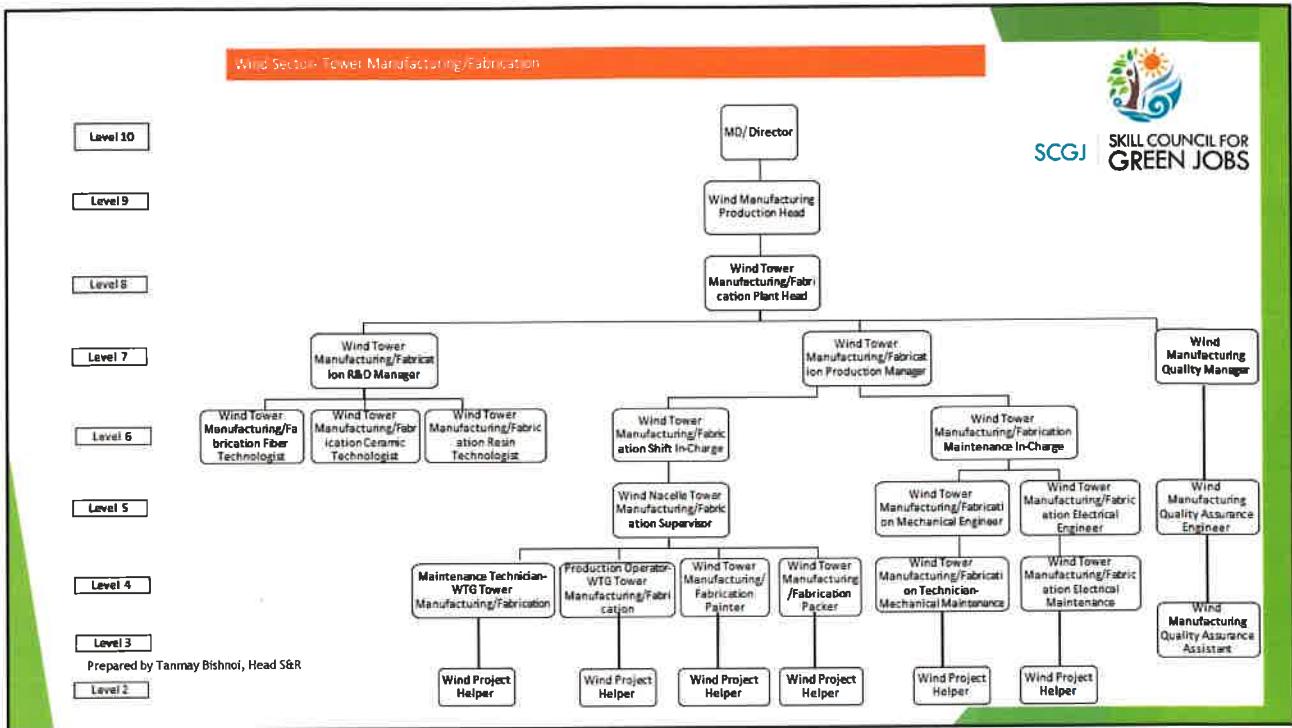


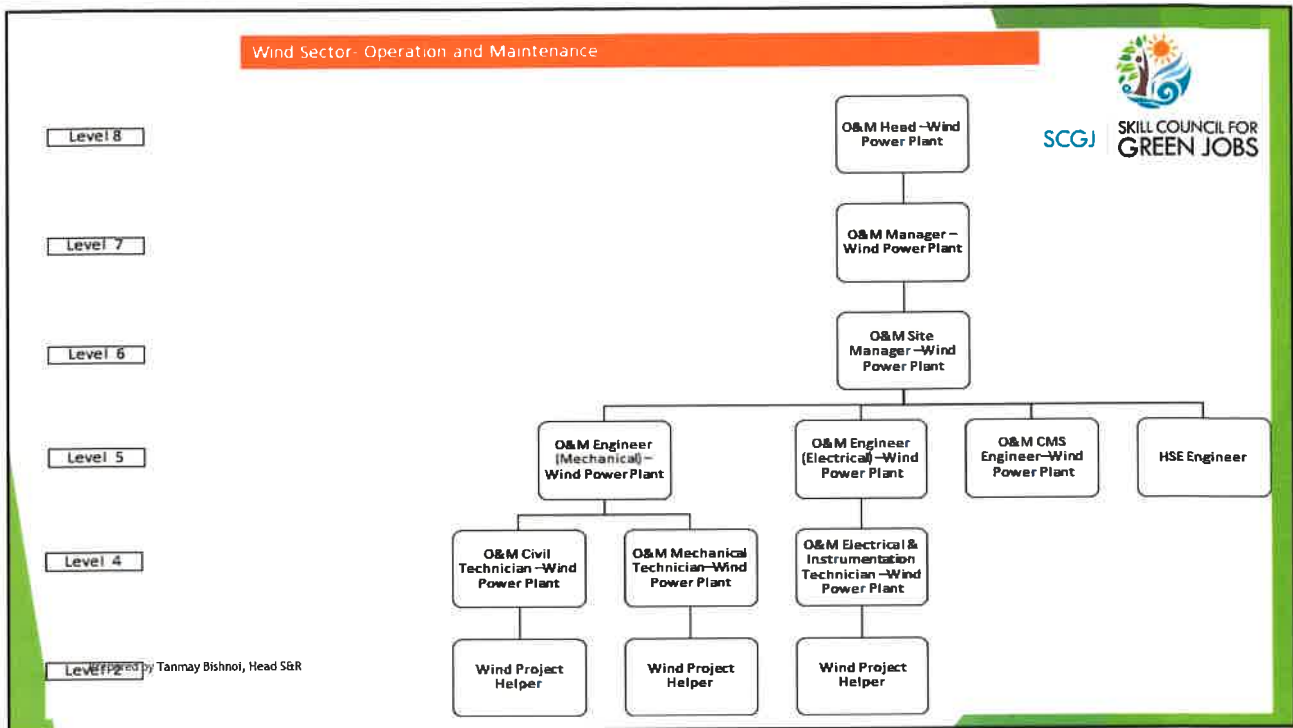
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# Occupational Maps for Wind Energy Sector

Prepared by Tanmay Bishnoi, Head SBR







  
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## Occupational Map for Small Hydro Sector

Prepared by Tanmay Bishnoi, Head S&R






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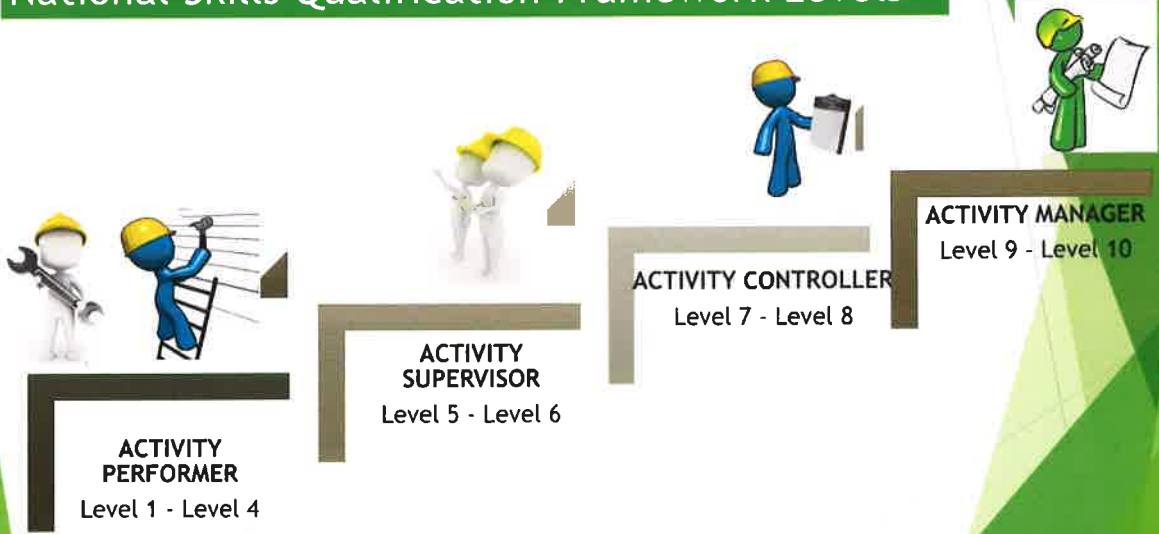
## National Occupational Standards & Qualification Packs in Renewable Energy

Prepared by Tanmay Bishnoi, Head S&R



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### National Skills Qualification Framework Levels



- ACTIVITY PERFORMER**  
Level 1 - Level 4
- ACTIVITY SUPERVISOR**  
Level 5 - Level 6
- ACTIVITY CONTROLLER**  
Level 7 - Level 8
- ACTIVITY MANAGER**  
Level 9 - Level 10

Prepared by Tanmay Bishnoi, Head S&R



Development process of National Qualifications


Outcome based approach towards skilling and upskilling courses considering International comparability



- Cognitive and creative skills involving the use of intuitive, logical and critical thinking
- Communication skills involving written, oral, literacy and numeracy skills
- Interpersonal skills and generic skills
- Nature of working relationships
- Level of responsibility for self and others
- Managing change
- Accountability for actions
- Prepared by Tanmay Bishnoi, Head SGR
- Depth of knowledge considering breadth, kinds and complexity



## National Qualifications in Solar Energy



SCGJ has developed the following Qualifications:

Sl. No.	Name of the QP	Code	NSQF Level
1	Solar PV Installer (Suryamitra)	SGJ/Q0101	4
2	Solar PV Installer (Electrical)	SGJ/Q0102	4
3	Solar PV Installer (Civil)	SGJ/Q0103	4
4	Rooftop Solar Photovoltaic Entrepreneur	SGJ/Q0104	6
5	Solar Proposal Evaluation Specialist	SGJ/Q0105	7
6	Rooftop Solar Grid Engineer	SGJ/Q0106	5

Prepared by Tanmay Bishnoi, Head SGR

Web Link: [www.sscgj.in](http://www.sscgj.in)



SCGJ SKILL COUNCIL FOR GREEN JOBS

## Qualification Packs

Serial No.	Sector	Name of the QP	NSQF Level
1	RENEWABLE ENERGY	Solar PV Business Development Executive	5
2	RENEWABLE ENERGY	Solar PV Site Surveyor	6
3	RENEWABLE ENERGY	Solar PV Structural Design Engineer	5
4	RENEWABLE ENERGY	Solar PV Designer	7
5	RENEWABLE ENERGY	Solar PV Project Helper	2
6	RENEWABLE ENERGY	Solar PV Engineer	5
7	RENEWABLE ENERGY	Solar Site In-charge	6
8	RENEWABLE ENERGY	Solar PV Project Manager (E&C)	7
9	RENEWABLE ENERGY	Solar PV Maintenance Technician - Electrical (Ground Mount)	4

Prepared by Tanmay Bishnoi, Head SBR



SCGJ SKILL COUNCIL FOR GREEN JOBS

## Qualification Packs

Serial No.	Sub-Sector	Name of the QP	NSQF Level
1	RENEWABLE ENERGY	Solar Domestic Water Heater Technician	4
2	RENEWABLE ENERGY	Solar Thermal Plant Installation & Maintenance Technician	4
3	RENEWABLE ENERGY	Solar Thermal Engineer -Industrial Process Heat	5

Prepared by Tanmay Bishnoi, Head SBR



## Qualification Packs

Serial No.	Sub-Sector	Name of the QP	NSQF Level
1	RENEWABLE ENERGY	Assistant Planning Engineer-Wind Power Plant	4
2	RENEWABLE ENERGY	CMS Engineer- E&C and O&M- Wind Power Plant	5
3	RENEWABLE ENERGY	Construction Technician (Mechanical)- Wind Power Plant	4
4	RENEWABLE ENERGY	O&M Mechanical Technician-Wind Power Plant	4
5	RENEWABLE ENERGY	O&M Electrical & Instrumentation Technician – Wind Power Plant	4
6	RENEWABLE ENERGY	Construction Technician (Civil)- Wind Power Plant	4
7	RENEWABLE ENERGY	Construction Technician (Electrical)- Wind Power Plant	4
8	RENEWABLE ENERGY	Production operator- WTG Blade Manufacturing	4
9	RENEWABLE ENERGY	Maintenance Technician WTG blade	

Prepared by Tanmay Bishnoi, Head S&R



## Qualification Packs

Serial No.	Sub-Sector	Name of the QP	NSQF Level
1	RENEWABLE ENERGY	Small Hydro – O&M Mechanical Technician	4
2	RENEWABLE ENERGY	Small Hydro - Turbine Generator Operator	4
3	RENEWABLE ENERGY	Small Hydro -Control System Engineer	5
4	RENEWABLE ENERGY	Small Hydro -Site Surveyor	6

Prepared by Tanmay Bishnoi, Head S&R

## Qualification Pack – Solar PV Business Development Executive - SGJ/Q0107



As per Skill Gap analysis, about 8900 Solar PV Business Development Executives will be required by 2030.

**About the job role**

Solar PV Business Development Executive highlights the benefits of using solar power to develop and generate the business for the organization. He/she has the understanding of the rooftop market, ground mount market and decentralized solutions market to propose the right kind of solution to meet the specific needs of the respective clients. He/she keeps track of central and state solar policies/programs and has good understanding of the solar PV technology, its applications and economics.

The QP contains the following NOS units

- SGJ/ N0122 Development of rooftop solar PV business
- SGJ/ N0123 Development of ground mount solar PV business
- SGJ/ N0124 Development of off grid solar PV business
- SGJ/ N0120 Work effectively with others

Prepared by Tanmay Bishnoi, Head S&R

## Qualification Pack – Solar PV Engineer - SGJ/Q0112



Skill Council for Green Jobs has the mandate to provide skilled manpower in Solar Photovoltaic sector.

As per Skill Gap analysis, about 86,000 Solar PV Engineers will be required by 2030.

**About the job role**

A solar PV engineer specializes in the design, installation and commissioning of the solar PV power plant, its quality assurance and HSE issues. He/she also specializes in designing, installation and commissioning of solar water pumping and other decentralized solar systems

The QP contains the following NOS units

- SGJ/N0109 Prepare site feasibility study report
- SGJ/N0146 Design of solar PV power plant
- SGJ/N0132 Installation and commissioning of solar PV power plant
- SGJ/N0133 Quality Assurance of solar PV power plant & components
- SGJ/N0106 Maintain personal health & safety at project site
- SGJ/N0120 Work effectively with others

**Optional NOS**

SGJ/N0134 Design, Installation, Commissioning of Solar Water Pumping System



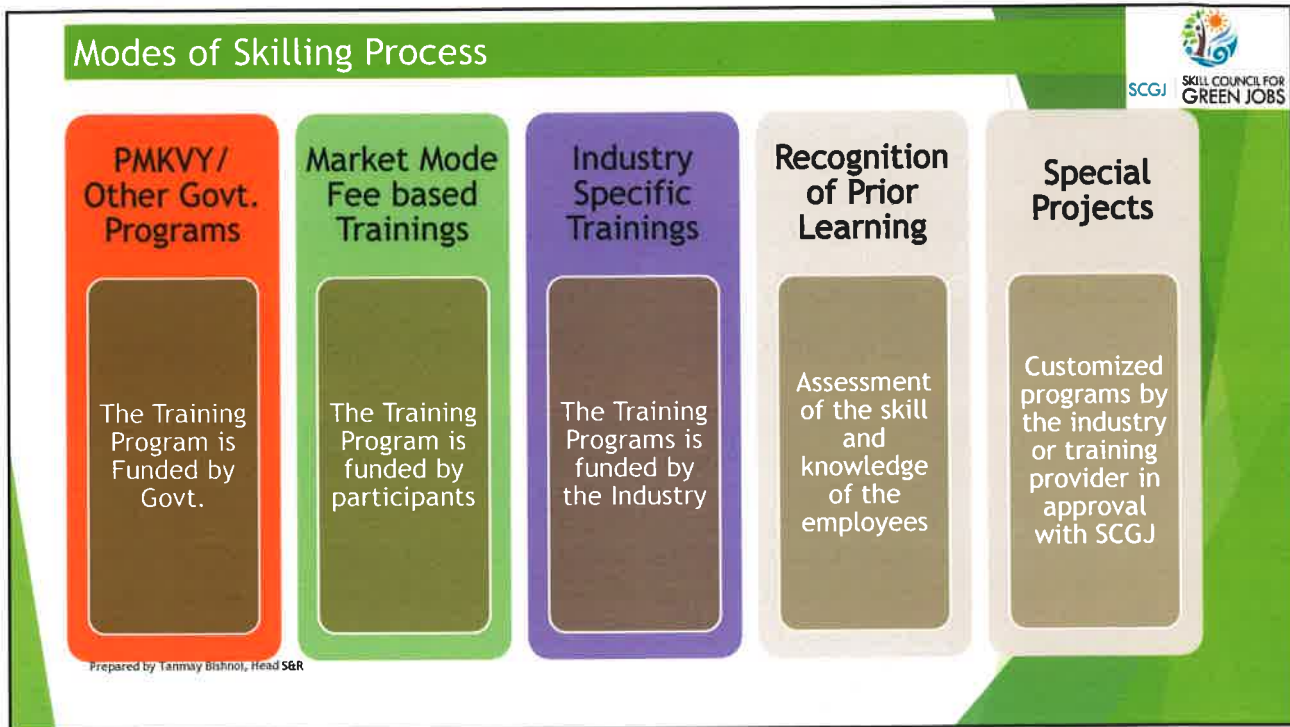
## SCGJ Strategy for skill development

Prepared by Tanmay Bishnoi, Head S&R

### Strategy of SCGJ



Prepared by Tanmay Bishnoi, Head S&R



## Summary

- ▶ Skill Council for Green Jobs (SCGJ) has been created after recognizing the importance of Green skills in the Indian economy by Government of India.
- ▶ SCGJ is working closely with the Renewable Energy industry, banks and financial institutions in the development of National Occupational Standards, Model Curriculums and Courseware.
- ▶ SCGJ is advising the traditional education ecosystem on how to integrate the green skilling component in the formal and informal sector.
- ▶ SCGJ is acting as the bridge between the Government, Industry and academic institutions, to facilitate all stakeholders for smooth adoption of skilled manpower and better employability/self employability of the certified candidates.

Prepared by Tanmay Bishnoi, Head S&R



SCGJ | SKILL COUNCIL FOR  
GREEN JOBS

## Thank You

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## Session II: Waste Management





# Session II: Waste Management

## Session-II: Waste Management

**Chairman :** Mr. K D Bharadwaj, Director – Environment, National Productivity Council

**Lead Presentation:**

- Skill Gap Study of Waste Management Sector by Dr. P. Dhamija, Advisor, Skill Council for Green Jobs

**Panel**

- Shri. Anish Chakraborty, Chairman, Seacom Group
- Ms. Bharti Chaturvedi , Chintan
- Shri Ashok Chauhan, IL&FS Energy
- Dr. Kulwant Singh, Chairman and CEO of 3R WASTE Foundation (India).  
Shri. B.K. Soni, Chairman and MD, Eco Recycling Ltd.

Waste Management As per the report of the task force of erstwhile Planning Commission in 2013, the untapped waste has a potential of generating 439 MW of power from 32,890 TPD of combustible wastes including Refused Derived Fuel (RDF), 1.3 million cubic meter of biogas per day, or 72 MW of electricity from biogas and 5.4 million metric tons of compost annually to support agriculture. E-waste management is given the top priority in many developed countries, but in rapid developing countries like India, it is difficult to completely adopt or replicate the E-waste management system in developed countries due to many country specific issues. As per CPCB 2015 estimates, about 62,000 million litres per day (MLD) of sewage is generated from urban areas. A report on Indian wastewater treatment market indicated that the market size stands at 4 billion USD which is growing at a steady rate of 10-12 percent per year (Business Standard, 2015). Discussion on skilled manpower requirements and industry readiness for adopting strategies to incorporate the importance of continual skill development & upskilling programs at all levels of the organizational hierarchy, for achieving sustainable growth; given current scenario, policy and regulatory frameworks available and potential opportunities for uptake of skilled manpower by the Waste Management industry including solid waste, e-waste and wastewater.



**About the Chairman Mr. K D Bharadwaj** is the Director (Environment) at National Productivity Council (NPC). NPC is national level organization to promote productivity culture in India. NPC is established by the Ministry of commerce & Industry, Government of India in 1958.

**Mr. Bharadwaj** gave a broad overview of Waste Management sector. He covered trends in Wastewater Sector, Expected growth of the sector in next 5 years and up to 2030, Skill gap in treatment of Industrial Wastewater and Main occupations with possible large intake of skilled manpower. He also talked about Waste Management through formal and informal sector and its implications for labour markets. Mapping skill gaps with job opportunities in waste management to ensure sustainable development and Strategy for systematic skill development in the sector

**About the lead speaker Dr (Mrs.) Parveen Dhamija** is currently working as Advisor at Skill Council for Green Jobs and is promoting skill development in various sectors of Green Jobs. Dr. P. Dhamija retired as an Advisor from Ministry of New and Renewable Energy (MNRE). Dr. P Dhamija was coordinating National Programs of Biogas, Improved Chulhas. Dr. Dhamija was a Lead Author for the Chapter of Bio-Energy for the Special Report on Renewable Energy Sources and Climate Change Mitigation prepared by International Panel on Climate Change (IPCC's) under the UNEP in May 2011.

Skill Council for Green Jobs has steered a study on Skill Gap in Waste management sectors, including solid waste, wastewater and e-waste. Dr. Dhamija presented findings of the study which is a result of in depth interaction with relevant industry. She also presented occupational maps and skills gaps in each sector. The presentation made by Dr. Dhamija is at the end of this session.

**About the Panel members Mr. Anish Chakraborty** is Chairman & Managing Director at Seacom Group, Seacom Projects Ltd. and Seasonship Management & Maritime Services. He informed about Waste Management in the Ship Building sector and on ports. He also covered Skilling activities relating to waste management in SEACOM Skills University and SEACOM.

**About the Panel members Ms. Bharti Chaturvedi** is the founder and director of Chintan Environmental Research and Action Group. She is an environmentalist and writer. Bharati felt the need for a Chintan-like space because it allowed her freedom from the rhetoric of received wisdom and politically correct constructs, and the opportunity to pursue new ideas.

She gave a broad overview Waste management in informal sector, best practices in household waste management and Training of manpower engaged in informal sector in waste management activities for value addition of waste. She gave in detail and talked about rolling out composting activity as integral part of waste management and impact of proper waste management on environment

**About the Panel members Shri Ashok Chauhan** is Head HR of IL&FS Energy. Mr Chauhan was also associated with Tata Power Delhi Distribution Ltd as the Head of Human Resource Department with significant strategic HR responsibilities. Prior to Tata Power, Mr Chauhan served the Indian Army for around 26 years in various capacities including Personnel Management & Development an alumnus of National Defence Academy, Pune. Mr Chauhan attained his MSc degree in Defence & Strategic Studies from Madras University and Executive Business Management Certification from MDI, Gurgaon. He is also a certified assessor of Tata Business Excellence Model.

**Mr Chauhan** gave an overall status of Waste to Energy in India. He detailed Manpower challenges and skill gaps in waste management, including waste to energy. A projection on the expected manpower requirements in next 5 years and up to 2030 was made.

**About the Panel members Dr. Kulwant Singh** is the Chairman and CEO of 3R WASTE Foundation (India). 3R Waste is an organization working in partnership with WASTE Netherlands and Collaborative Working Group on Solid Waste Management based in Switzerland. Dr. Singh earlier served as Chief Technical Adviser for the Water, Sanitation and Infrastructure Branch of UN-Habitat from January 2004 to December 2008. In his role of Chief Technical Adviser he contributed significantly to policy dialogue with partner countries in Asia and the Pacific and in the design and implementation of a large number of water and sanitation initiatives.


He presented Strategy for handling Organic Waste and Local challenges in sanitation and solid waste management. Challenges in financing waste business and Skill Gaps being faced in implementing the projects. Main occupations with possible large intake of skilled manpower was also touched.

**About the Panel members Mr. B.K. Soni** is the Chairman and Managing Director of Eco Recycling Ltd (formerly known as Ecoreco). Under Mr. Soni's stewardship the company has attained a leadership position as India's foremost e-waste management company with a dominant pan-India market presence.

He covered the model adopted for large scale training catering to project and location specific requirement of e-waste management industry. He further mentioned about the challenge in mobilizing appropriate candidates and penetration of skills in the informal economy. He also mentioned about Challenges in scaling up trainings and moderating it to the specific industry needs.

# SKILL COUNCIL for GREEN JOBS

Autonomous Body under the aegis of Ministry of Skill Development and Entrepreneurship



SCGJ SKILL COUNCIL FOR GREEN JOBS

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## Skill Gap Study of Waste Management Sector


**SKILLS COUNCIL FOR GREEN JOBS (SCGJ)**  
**SECTORS COVERED**

*(Faded content representing other sectors covered)*

**Waste Management**


**13. Solid Waste Management**  
 (a) Municipal  
 (b) Manure & Agri Residues


**12. Water Management**  
 (a) **Treatment**  
 Energy Recovery + Re-use  
 Sewage / Industry Effluents  
 (b) **Conservation :**  
 Water harvesting  
 Check Dams,  
 Micro-irrigation


**14. Electronic Waste Management**

# Background



Waste is an unwanted or undesired material or substance. It may consist of the unwanted materials left over from a manufacturing process (industrial, commercial, mining or agricultural operations.) or from community and household activities. The material may be discarded or accumulated, stored, or treated (physically, chemically, or biologically).



# Municipal Solid Waste: Scenario



As per the Solid Waste Management Rules, 2016, "Solid Waste" means and includes solid or semi-solid domestic waste, sanitary waste, commercial waste, institutional waste, catering and market waste and other non residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities mentioned in rules.

- As per a World Bank report – 2012, cities across the globe generated 1.3 Billion Tonnes of solid waste in the year 2012, which is expected to increase to 2.2 Billion Tonnes by the year 2025.
- As per a CPCB report – 2011, urban India generated 46.53 Million Tonnes of solid waste.
- In India, no city can claim 100% segregation of waste at dwelling unit, and on an average only 70% waste collection is observed, while the remaining 30% is again mixed up and lost in the urban environment. Out of total waste collected, only 12.45% waste is scientifically processed and rest is disposed in open dumps (CPCB Report 2013).
- With rapid increase in population, urbanization and industrialization, the waste generated from urban areas is constantly increasing at a high rate, and its management has emerged as a major challenge in India.

# Municipal Solid Waste: Rules



The Government of India has continually developed overarching rules and frameworks to regulate the municipal solid waste management sector in India. These rules focus on control of pollution and management of waste.

### The Environment (Protection) Act, 1986



- The Act is one of the primary legislatures in India to protect the environment, and regulate all forms of waste.
- The Act prohibits discharge of pollutants in excess of prescribed standards.
- The Act embodies the "Polluter Pays Principle" which mandates remediation of damages to the environment upon a person or entity engaging in environmental degradation.

### Municipal Solid Waste (Management & Handling) Rules, 2000



- Guides country wide urban areas to practice sustainable municipal solid waste management.
- Recommends adoption of waste minimization at source with an emphasis on 3R principles of reduce, reuse, and recycle.
- Prohibits open disposal and incineration of waste.
- Promotes treatment of organic waste through biodegradation techniques.

### Solid Waste Management Rules, 2016

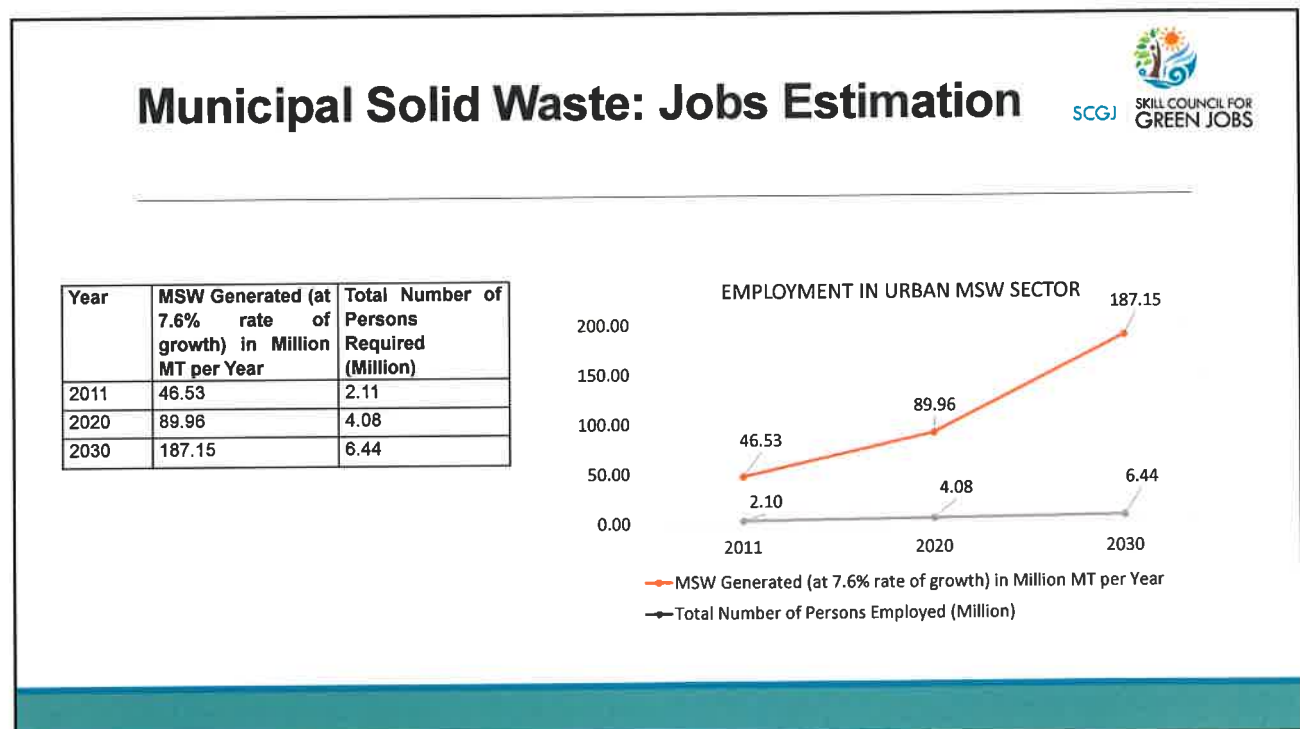
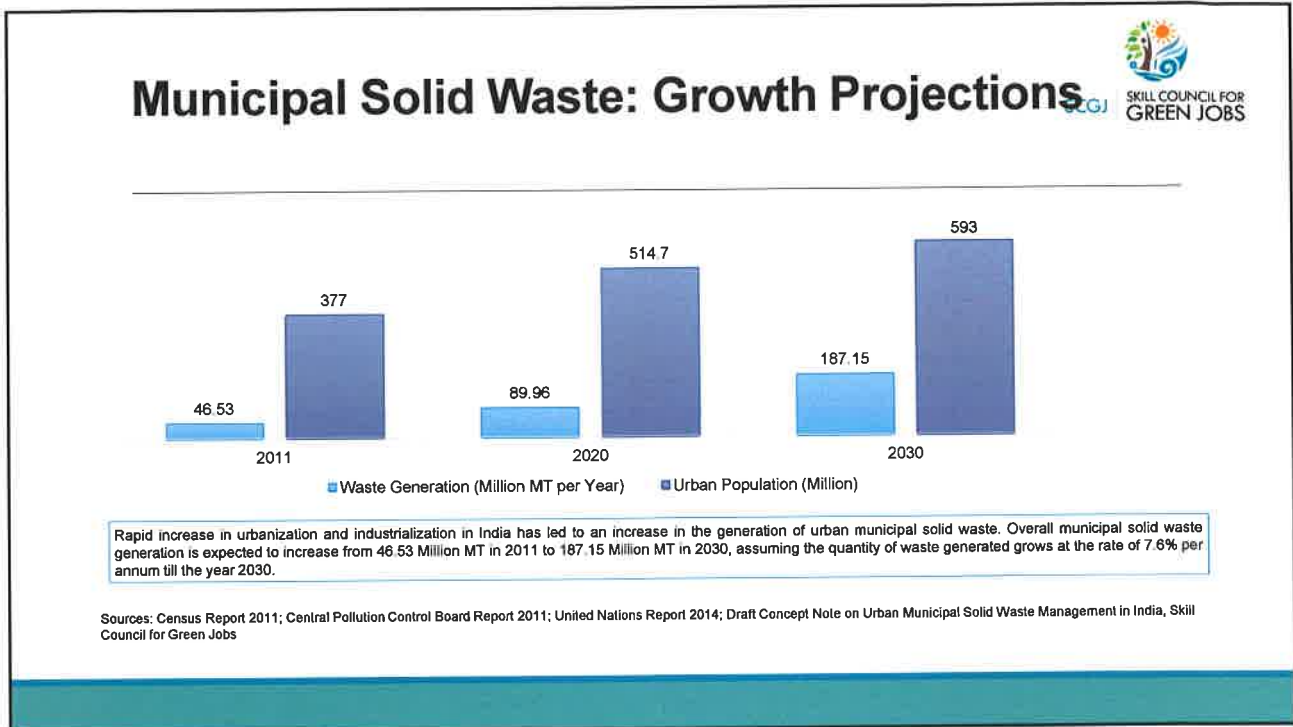


- Replaced the Municipal Solid Waste (Management & Handling) Rules, 2000.
- Mandated source segregation of waste into three streams – biodegradable, dry, and domestic hazardous waste.
- Manufacturers and brand owners to be responsible for collection of packaging waste.
- User Fees and Spot Fines to be levied by the municipal corporations.
- Biodegradable waste to be processed, treated, and disposed through composting or biomethanation.


# Municipal Solid Waste: Issues



- **Lack of source segregation**
  - Non-cooperation from community towards segregation at source
  - Lack of regulatory enforcement measures to mandate source segregation
- **Unavailability of adequate infrastructure with ULBs**
  - Lack of space for expansion including creation of landfills, processing facilities, etc
  - Unavailability of funds
  - Lack of private participation
- **Highly informal nature of the sector**
  - Large presence of informal workforce in the sector
  - Lack of traceability in operations due to complex nature of informal value chain
  - Lack of skilling / training
  - Lack of health and safety provisions
- **Lack of economically viable processing technologies**
  - Large volume of urban MSW subjected to indiscriminate open dumping or incineration
  - Lack of technological innovations in urban MSW management












## Municipal Solid Waste: Job Roles

Identified through stakeholder consultation and secondary research.

Sector	Job Roles
Administration 	Managing Director, General Manager, DGM – Admin / HR, Manager – EPR Compliance, Area Coordinator, Education Officer, Manager – IT, Assistant Manager – IT, IT Executive, Manager – Administration, Assistant Manager – Administration, Administration Executive, Manager – HR, Assistant Manager – HR, HR Executive
Logistics 	DGM – Logistics, Manager – Collection and Transport, Fleet Supervisor, Hauler – Truck / Compactor, Supervisor – Waste Collection, Waste Collector / sorter, Sweeper, Rag Picker, Recyclable waste collector & segregator, Manager – Maintenance, Maintenance Supervisor, Painter, Mechanic, Manager – Purchase, Store Supervisor, Purchase Executive, Helper – Store
Operations 	DGM – Operations, Manager – WTE Plant, Operator – WTE Plant, EHS Supervisor, Asset Maintenance Supervisor, Landfill supervisor, Welder, Fitter, Electrician, Mechanic, Operator – Weigh Bridge, Helper – WTE Plant
Sales and marketing 	DGM – Sales & marketing, Manager – Sales & marketing, Assistant Manager – Sales & marketing, Sales & marketing executive, Supervisor – Compost plant, Operator – Compost plant, Helper – Compost plant



## Municipal Solid Waste: QPs

The following Qualification Packs are under preparation

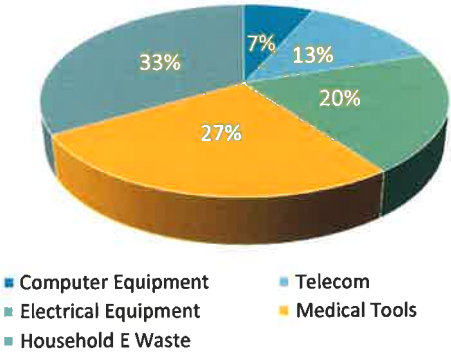
S.No.	Job Role	NSQF Level
1	Entrepreneur (Compost Yard)	7
2	Entrepreneur (Dry Waste Collection Center)	5
3	Segregated MSW Collector & Aggregator	3
4	Safai Karamchari	3
5	Waste Picker	3

## E-Waste Sector

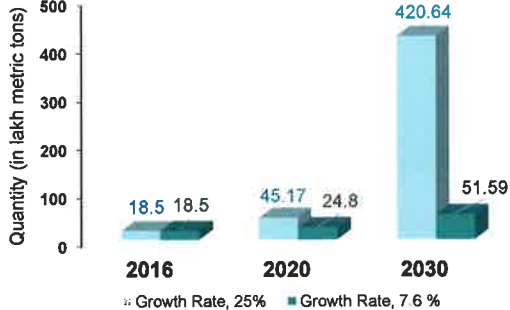


- "Electronic waste" or "E-Waste" may be defined as discarded computers, office electronic equipment, entertainment device, mobile phones, television sets, refrigerators etc.
- Proper treatment of E-waste i.e. reuse, resale, salvage, recycling, or disposal is known as E-waste Management.
- It may cause serious health hazards and effect the environment if it is not treated.

**E Waste Stream (Sectorwise)**  
Source: ASSOCHAM/Frost Sullivan Study, 2014

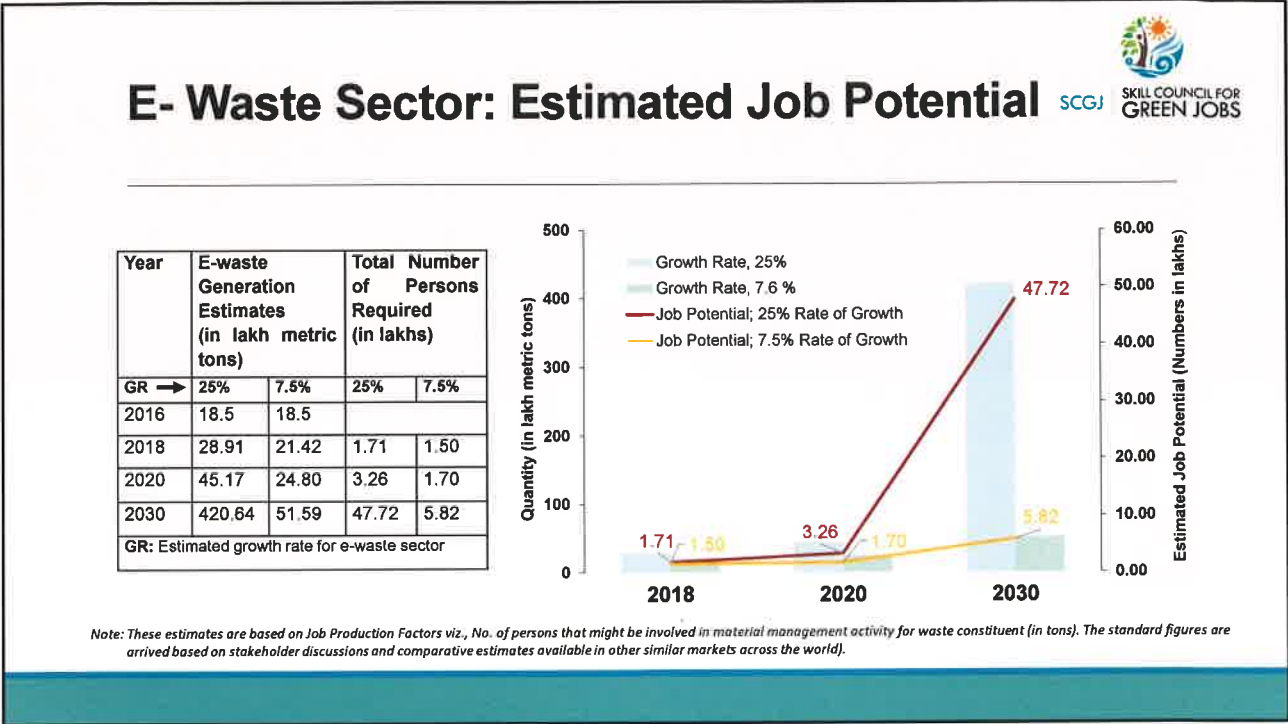


## E- Waste Sector: Growth Projections




India has emerged as the second largest mobile market with 1.03 billion subscribers, but also the fifth largest producer of e-waste in the world, discarding roughly 18.5 lakh metric tonnes of electronic waste each year. To estimate the e-waste volumes which are likely to be generated in India, the projections are made considering two different growth scenario's viz., at CAGR\* of 25% and at GDP Growth Rate approximated (@ CAGR: 7.6 %) projected considering base figure of 18.5 lakh MT (which is the amount of e-waste estimated to be generated in 2016). (Source: Results of ASSOCHAM-KPMG Joint Study; 25<sup>th</sup> May 2016)

Note: [1]: (\*) This CAGR of 25% is based on the discussions and consultations done with the stakeholders working in the e-waste sector. Most of the stakeholder were of the opinion that this is the actual rate prevalent in the e-waste industry currently; [2]: These estimates are for e-waste generated in India and does not take into account the e-waste coming and processes in to the country illegally



## E-Waste Sector / Job Roles



Stage	Steps in the Value Chain	Job Roles
Generation	Manufacturing of Electrical and Electronic Equipment	Legal Specialist/EPR Manager, Customer Relationship Manager (CRM), health and Hygiene Manager
Collection	Product Collection	Logistics and Procurement Supervisor, Waste Collector, Waste Transporter
Pre-Processing	Test / Sorting Disassembly	Testers (Quality Assessors), Sorters / E Waste Segregator Assessor (Product Value / Quality / Analytical), Material Handling Operator/Dismantlers, Operator (Material Handling/Process Machine)
End-Processing	Re-sale / Re-Use Product  Size Reduction  Separation by Materials  Recovery	Assessor (Product Value / Quality /Analytical), Material Handling, Operator, Customer Relationship Manager (CRM), Procurement Manager  Material Handling, Operator/Dismantlers  Sorters, Operator (Material Handling/Process Machine), Process Engineer, Equipment Operator viz., Furnace etc. Material Recovery Specialists, Process Engineer, Equipment Operator viz., Furnace etc., Assessor (Product Value/ Quality /Analytical), Recycling Facility Supervisor
Disposal / Recycle/Other Options	Re-sale / Re-Use Product which received after separation of material	Customer Relationship Manager (CRM), Procurement Manager, Assessor (Product Value/Quality /Analytical), Material Recovery Specialists, Hazardous Waste Management Specialist, Waste to Energy, EHS Manager

# E-Waste: QPs



The following Qualification Packs are under preparation

S.No.	Job Role	NSQF Level
1	ICT personal devices Aggregator (incl. Collection & Transport)	3
2	White/Brown goods Aggregator (incl. Collection & Transport)	3
3	Fluorescent/CFL bulbs Aggregator (incl. Collection & Processing)	4
4	ICT and personal devices Recycling Entrepreneur	7

# Urban Sewage

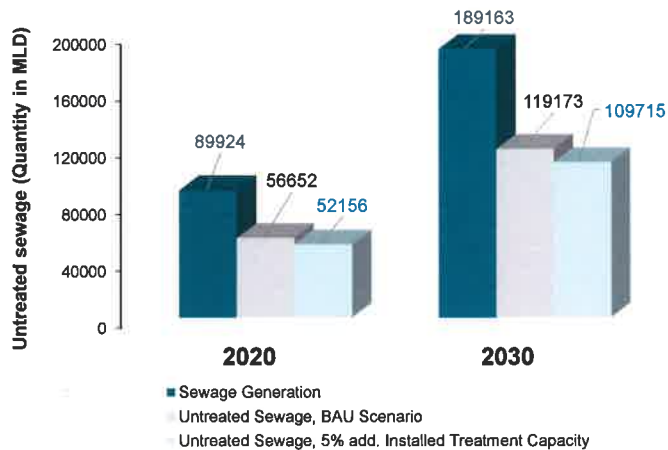


- Urban Sewage is the water-carried waste which is generated in cities and town.
- It is the major source of water pollution.
- A septic tank or other on-site wastewater treatment system constructed used to treat sewage.





## Urban Sewage: Growth Projections

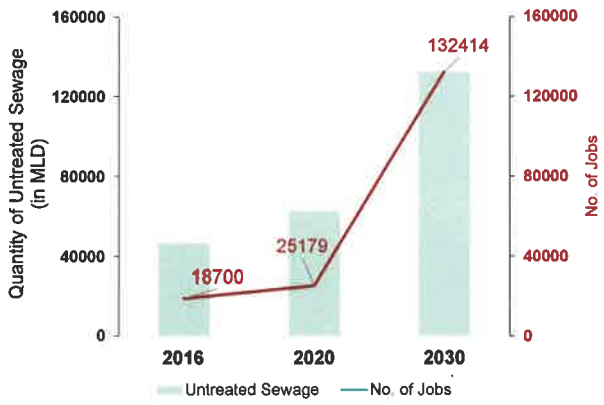


- Snapshot:**
- About **62,000** million litres per day (MLD) and with an installed treatment capacity is of sewage is generated from urban areas in India (CPCB, 2015) about 37% of the total sewage generated.
  - As per CPHEEO estimates, **70-80 %** of water supplied in urban areas become wastewater and only 30% of total sewage generated in urban India is treated.
  - Considering that increase in urban water demand is proportionate to the increase in sewage, the expected increase in the sewage generation at a rate of 7.5 – 7.7 % per annum is **89,924 MLD by 2020** and **189,163 MLD by 2030**.
  - In case of Business as Usual Scenario (BAU) and the GDP growth rate of the country where only 37 % sewage is treated, the volume of untreated sewage is expected to be 56,652 MLD by 2020 and 119173 MLD by 2030.


Note: Considering that there might be some increase in installed sewage treatment capacity (assuming an additional 5% installed sewage treatment capacity), the growth estimates on the volume of untreated sewage are also made for the scenario with an installed treatment capacity of 42%.



## Urban Sewage: Estimated Job Potential





Note: Manpower requirements: A 50 MLD CETP will require 20 persons for operation in various capacities such as Manager, Chemist/Engineer, Operator, Skilled Technicians and Unskilled Professionals. (Reference: Sewage Treatment in Class-I Towns, IT, Kanpur Report, 2010).



## Urban Sewage : Job Roles

Identified through stakeholder consultation and secondary research.

Sector	Job Roles
Operations 	Manager (Projects); Executive( Costing and Proposal); Environmental Engineer; Civil Engineer (Design); Surveyor; Manager (Environment); Operator (STP); Helper & Loaders
Quality Assurance	Manager (QA/QC); Executive (QA/QC);



## Water Management: QPs

The following Qualification Packs are under preparation

S.No.	Job Role	NSQF Level
1	Rooftop RWH Installer	4
2	QA/QC Analyst (Sewage Treatment Plant)	4
3	Drinker Water ATM Entrepreneur	4
4	Watershed Development Contractor	5
5	Micro Irrigation System (MIS) Entrepreneur	6
6	Water Resources/Ground Water Expert	7
7	Integrated Water Shed Management Expert	7

# Municipal Solid Waste: Skill Gap



- Skilled manpower is required for efficient waste management based on technology and social effort.
- As per the Labour Bureau Report – 2014, only 2 percent of labour is skilled, and there is a need to create new direct skilled jobs and also carry out re-skilling and up-skilling of the existing workforce.
- Need to bring change in negative public perceptions about create opportunities to attract huge pool of talent.
- Available skill base is unlikely to keep pace with expected speed of transformation of waste as a resource.
- With the paradigm shift from waste disposal to sustainable resource management, there is a need to combine existing market and infrastructure knowledge with new commercial skills and different prototypes of processing.

## Session III: Green Construction





# Session III Green Construction

## Session- III : Green Construction

**Chairperson :** Dr. Ms Akanksha Chaurey, CEO IT power (India)

**Co-chairman:** Lt Col Ajay Kr Jindal, Head – SSC Governance, NSDC

### Lead Presentation:

- Skill Gap Study of Green Construction Sector by Monica Walia, KPMG on behalf of Skill Council for Green Jobs

### Panel

- Maj Gen TPS Bakhshi, Director – Business Affairs, Indian School of Business.
- Ms Sareena Kochar, Vice President, Lemon Tree Hotel
- Shri. Anupam Jain, RICS School of Built Environment
- Shri. Rupesh Sawant, Mahindra Susten

The National mission on sustainable habitat approved by Prime minister is one of the eight missions under national climate change action plan. Buildings are big end-users of energy; buildings account for 20-40% of the energy demands in developed nations, and the rate of new building construction in developing nations is accelerating. The Demand for indirect & direct use of energy and water is very high throughout the construction, operation & maintenance phase. This calls for usage of alternate materials and technologies in the construction industry moving towards Green construction concepts and sustainable buildings.

The green concepts and techniques in campuses (viz., administrative campuses, convention centres, educational campuses, healthcare campuses, hospitality campuses, IT parks, Industrial parks, leisure & recreational campuses, military campuses, religious campuses, etc.) can help address National issues like water efficiency, energy efficiency and reduction in fossil fuel use in commuting, handling of consumer waste and conserving natural resources. Most importantly, these concepts can enhance occupant health, happiness and well-being.

Green rating in India is undertaken by several bodies like Indian Green Building Council (IGBC) and Green Rating for Integrated Habitat Assessment (GRIHA). While internationally LEED (Leadership in Energy & Environmental Design) is a globally recognized Green rating certification which has been developed by USGBC (U.S. Green Building Council). Apart from IGBC, (GRIHA) is the national rating



system adopted by the Ministry of New & Renewable Energy with a 1-5 star rating system. Another body for rating under the Ministry of Power is the Bureau of Energy Efficiency (BEE) which has developed its own rating system for the buildings based on a 1 to 5 star scale rating 5 being most energy efficient and 1 being lowest.

Discussion on skilled manpower requirements and industry readiness for adopting strategies to incorporate the importance of continual skill development & upskilling programs at all levels of the organizational hierarchy, for achieving sustainable growth; given current scenario, policy and regulatory frameworks available and potential opportunities for uptake of skilled manpower by the Green Construction industry.

**About the Chairperson Dr. Akanksha Chaurey** is the CEO of IT power (India). Dr. Akanksha Chaurey is an expert on renewable energy technologies and markets and has led several projects on technology assessment, market analysis, business models, capacity building, etc. Dr. Akanksha Chaurey has more than 28 years of experience which is spread over 20 countries.

She discussed Policy environment to promote Green Buildings and campuses in India, Expected growth of the green construction sector in India in next 5 years and up to 2030 and Status of skilled manpower for Green Building / Campuses

Presentation by **Ms. Monica Walia**

Skill Council for Green Jobs has steered a study on Skill Gap in Green Construction sector. Ms Walia presented the findings of the study which is a result of in depth interaction with relevant industry. She covered major drivers and growth projections, including job roles identified and QPs under development. The presentation made by Ms. Monica Walia is at the end of this session.

**About the Panel members Lt Col Ajay Kr Jindal** is the Head for SSC Governance at National Skill Development Corporation (NSDC). NSDC is a one of its kind, Public Private Partnership in India, under the Ministry of Skill Development & Entrepreneurship. It aims to promote skill development by catalyzing creation of large, quality, for-profit vocational institutions.

He presented the National Skill Development schemes of Ministry of Skill Development and Entrepreneurship (Pradhan Mantri Kaushal Vikas Yojana) and Udaan Program: A special industry skill development initiative of Ministry of Home Affairs for the youth of J&K, implemented through National Skill Development Corporation

**About the Panel members Maj Gen TPS Bakhshi** is Director Business Affair at Indian School of Business, Mohali since November 2011. He has served in the Indian Army for over 40 years and is

recipient of Sena Medal for Gallantry. Major General Tej Bakhshi superannuated from the army as Dy. Commandant and Chief Instructor, Indian Military Academy, Dehradun. He worked with Manipal Education as Vice President, Group Corporate Affairs and Director, Distance Education during which he worked closely with the then upcoming Skill Ecosystem in India. He shared the experience and challenges in adopting green building / campus concepts at the campuses of Indian School of Business.

**About the Panel members Ms Sareena Kochar** is Vice President at Lemon Tree Hotel. Lemmon tree under their CSR activities Promotes education, including special education and employment enhancing vocation skills for children, women, elderly, and for the differently abled. She talked about adoption of Green Practices in the Hospitality sector and skill gaps being faced in implementing the green building concepts in the Hotels industry

**About the Panel members Mr. Anupam Jain** is the Founder and Principal Consultant at Rationale de Design, a sustainability consultancy firm in New Delhi. His professional experience spans multiple project types including convention centre, SEZs, campus planning for IITs, townships, multi modal train stations, museums, offices, hotels, group housings, schools, colleges, factories, etc. primarily in India and USA. He has won several awards for his professional work and academic research. He talked about Industry readiness for a transformation towards Green Construction and manpower requirements to catalyze the shift. Further, about importance of continual skill development and addressing the challenges in adopting green practices

**About the Panel members Shri Rupesh Sawant** graduated as a Civil Engineer in May 2000. Currently he is handling EPMC for Solar power plants & Green Factory Buildings across India for Mahindra Susten Pvt Ltd. Mr Sawant has more than 16 years of experience in the various commercial, residential, industrial projects, Project Design & Overall Project management. He gave an over view of Green Construction Technology Trends in India, Skill Gaps being faced by EPC companies in implementing the green building projects in India. He also discussed main occupations with possible large intake of skilled manpower in green construction industry



## What is Green Construction !

*"Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs".*

**Green Construction** is a sustainable way of designing, constructing, operating & maintaining the Infrastructure. Waste reduction, energy efficiency, water conservation, enhanced indoor environment quality and environmentally preferable materials and eco-friendly transportation are some key components of Green construction



## Facts & Figures

**The residential sector & commercial sector consumed 22.5% and 8.7% of the total energy respectively**

**Sector consumes 30% of the total electricity consumption in India, out of which almost 72% is consumed by the residential sector**

**Buildings sector is responsible for roughly 12% of fresh water use, generation of an estimated wastewater of 22,900 million litres per day (MLD), most of which goes untreated to the very sources of water-rivers, streams and ocean.**

**25% of India's solid waste comes from the construction industry**

2

Under the IPCC's high growth scenario it is estimated that the total GHG emissions from the building sector will almost double by 2030

## Potential for energy efficiency

Population growth of over 500 million

Urban population - 40% of India's population by 2030

Cities accommodate nearly 30% of population currently

Potential to create energy efficient building stock

80% of present construction activities to come by 2030

Growth in construction industry at a rate of 10%

Growth in energy-intensive construction & infrastructure

4

## India's Intended Nationally Determined Contribution (INDC) & role of Green Construction

India to reduce Emission Intensity by 33 to 35% by 2030 compared to 2005 level

Promote Energy Efficiency

Adopt renewable energy sources

Develop sustainable habitats

Water efficiency

Waste reduction

5

## Major elements in Green Construction

- LED Lighting
- Day Lighting Systems
- Lighting controls & automation
- Solar Lights

- Passive Architecture Designs (Vertical Gardens , Green Roof)
- Proper building orientation,
- Shading for building facade glazing
- Passive Solar Techniques
- Daylight integration

- Solar Photovoltaic System
- Wind Turbines
- Geo thermal
- Solar Water Heating
- Building integrated photovoltaic energy systems

- Fly ash bricks , fly ash lime sand bricks, autoclaved aerated concrete (AAC) blocks
- Double Glazed windows
- Certified wood, Low VOC paints & coatings, high performance glass, wall & roof insulation, Hollow blocks
- Low embodied energy materials, locally harvested materials, rapidly renewable materials

- Energy efficient chiller
- High efficiency pumps and fans,
- Heat recovery system
- Fresh air monitoring & control,
- IBMS, VAV system,
- CO2 based fresh air control, chilled beam, radiant cooling,
- Solar based HVAC system,
- Hot water generation from heat reject

- Rainwater Harvesting
- Waste water treatment & reuse
- Water efficient fixtures (dual flush, Low flow water fixtures)
- Irrigation automation

# Green Construction Certification

6

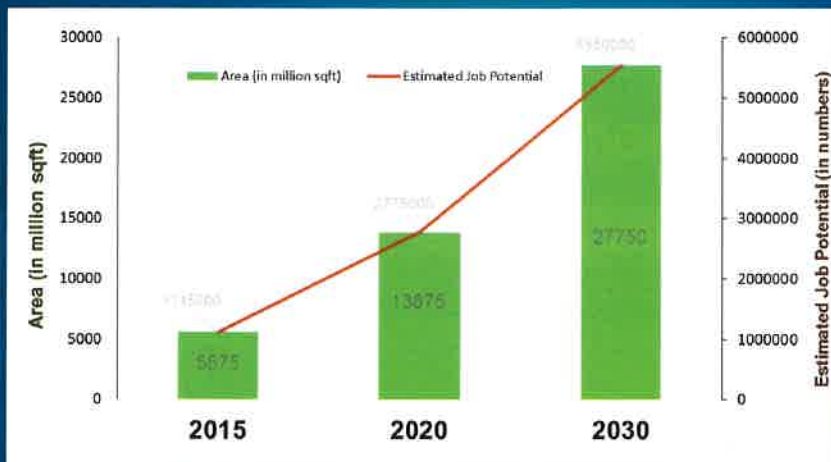
**GRIHA** - Green Rating for Integrated Habitat Assessment  
The national rating system adopted by the Ministry of New & Renewable Energy

**IGBC** (Indian Green Building Council)

**LEED-USGBC** (Leadership in Energy & Environmental Design- U.S.Green Building Council)

# Sector Growth Projections

7



**Numbers Speak**  
Green construction area is expected to increase to 27750 million sq.ft. by 2030  
Job Potential of up to **"5.5 million"**

Graphical representation of sector projections & job forecast



## Key Challenges in the sector

8

Incorporating the concept from the design stage (including maximum passive architecture concepts)

Awareness about the importance & need of green habitat , hence creating demand

Need for skills training for workers and managerial training for enterprises

Highly unorganized and principle industry employing short duration out-migrant

More than 80% of the employment in Building and Construction sector is minimally skilled workforce

Reluctance on the part of organizations to invest on training

## Skill gap

9

Skill gap defines the skills and knowledge required to complete a task and there is a huge requirement for the Green Construction sector

NSSO findings also reconfirmed that over 97% of individuals between 15 and 65 have no exposure to any training

In Green Construction Skill gap is more pronounced in Managers and Engineers. They lack leadership and management qualities along with technical knowledge like CAD designing

There is imminent need to expand the reach of training providers, set up models and institutes with the capability to scale across the Country



## Identified job roles

11

S.no	Job Roles	NSQF Level
1	GM Design & Operations	10
2	DGM Supply Chain Management	9
3	Senior Manager - Design & Operations, Credit Head, Lawyer - Green Constructions Financing	8
4	Plumbing Specialist, Facade Designer, AM Facility, AM – Customer Relationship, Credit underwriters, AM- Sales, AM-Marketing	5
5	Environmental Consultant ,Green Building Consultant, Construction Manager, Manager Logistics & Storage, Facility Manager (Operation & Maintenance),Alternate material procurement (Entrepreneur),Green Campus Specialist, Energy Energy Auditor,MEP specialist, Structural Engineer, Electrical Engineer, Mechanical Engineer, Manager –Procurement & Procurement & Quality, Manager – Finance,Manager-IT,Manager -HR, Supervisor -Secondary Processing, Manager - Sales & Marketing, Customer Services manager, Green Construction (C&D waste processing)	6
6	Land Surveyor, Recyclable waste collector & segregator,HVAC Installer, Supervisor -Primary Processing, Transport Supervisor, Warehouse Supervisor, Procuring Officer, Market Analyst	4
7	Construction worker,Mason,Plumber,Welder,Carpenter,Electrician,Construction Equipment Operator, IT contractor (Outsource ),Finance Executive, Executive CRM,Inventory Control technician, Sales Executive, Executive – Customer Customer Relationship Management	3
8	Driver, Helper Facility, Helpers - Processing, Worker - Processing, Workers - Inbound Logistics, Production worker (sorting, Packaging & Labelling),	2
9	Snr. Manager -Logistics,Sn.Manager- Sales & Marketing	7
10	Labor – Loading/unloading	1

12

# QP's under development



- Façade Designer  
Green Campus Specialist
- C&D waste processing -  
Entrepreneur  
Facility manager  
Credit Underwriter
- Green Building Consultant  
Entrepreneur –  
Alternate Material

# Thank You

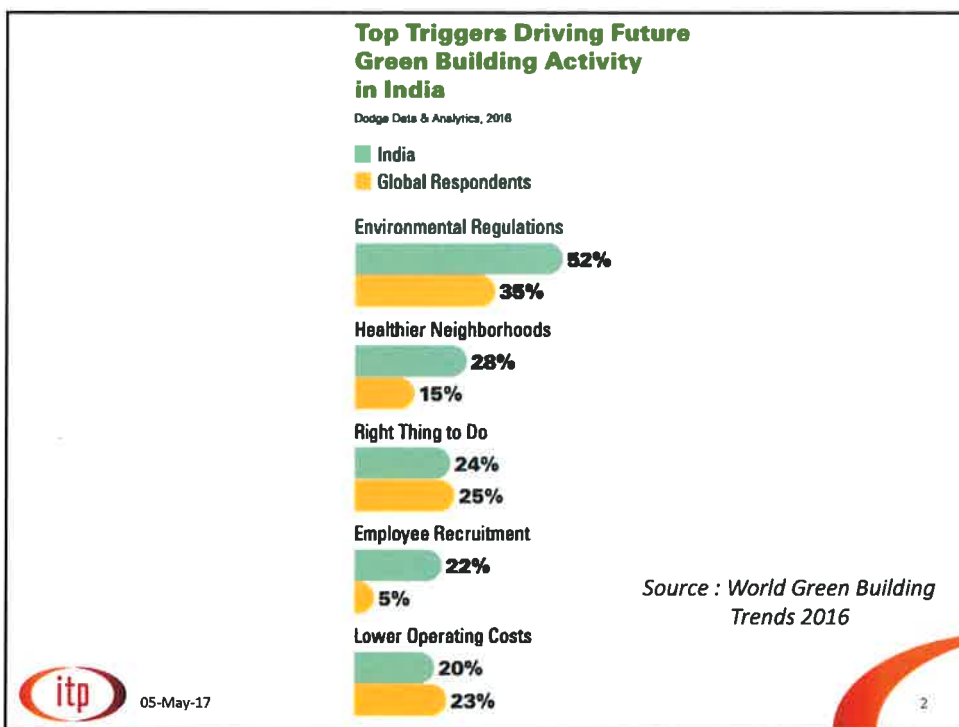


# Green Jobs For Future

Akanksha Chaurey  
19<sup>th</sup> April 2017

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Consulting · Engineering · Implementation



## Barriers in Green Construction

- Lack of
  - Subject experts - Architects
  - Service consultants
  - Building Energy Auditors
  - Sustainable urban drainage systems (SUDS) designers
  - Rain water harvesting designers

Source : <http://www.teriin.org/projects/green/pdf/National-Buildings.pdf>



05-May-17

3

- Around 76.5 million strong workforce is needed in India's Building, Construction and Real Estate Sector – National Skill Development Corporation (NSDC)
- This sector will have the maximum incremental human resource requirement from 2013-2022 (among the 24 sectors studied by NSDC)
- Workforce skilled
 

➤ India – 4 %	➤ Germany – 74 %
➤ China – 45 %	➤ Japan – 80 %
➤ UK – 68 %	➤ South Korea – 96 %



05-May-17

Source : <http://credai.org/skill-development>

4

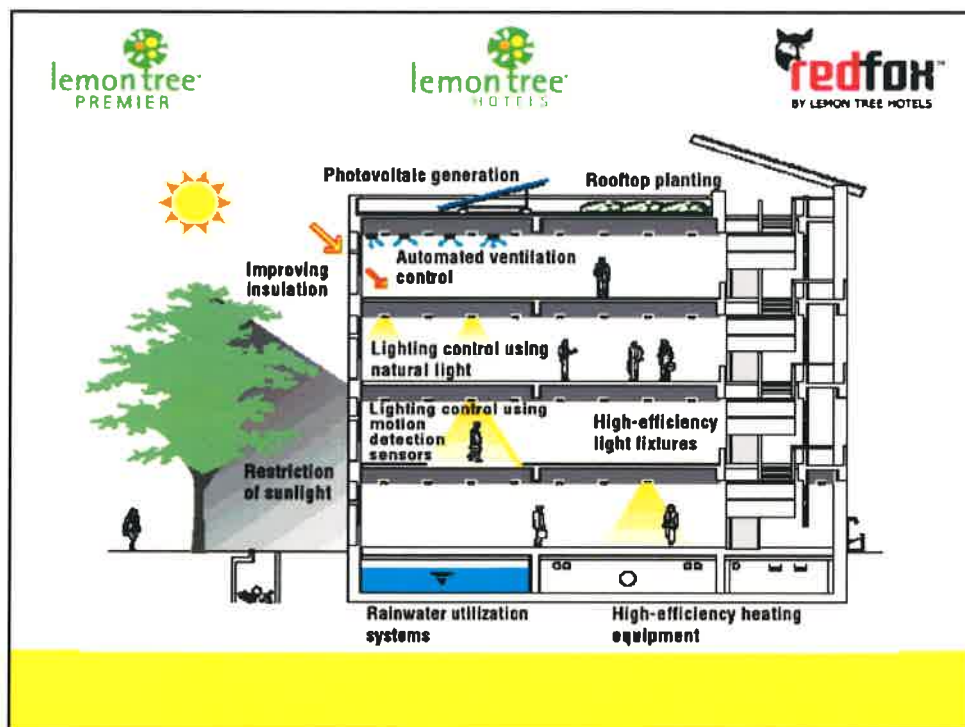


# Green Practices in Hospitality sector




## What is Green Building ?

"A green building is one which uses less water, optimizes energy efficiency, conserves natural resources, generates less waste and provides healthier spaces for occupants, as compared to a conventional building."



lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

## Sustainable Sites



A large, mature tree with a thick, dark trunk and a dense canopy of leaves in vibrant autumn colors, including bright red, orange, and yellow. The tree is set against a background of more green foliage and a clear sky.

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

## Adoption of Green Practices in the Hospitality sector

- Erosion/Sedimentation Control Plan
- Use of alternative fuel refilling system for hybrid vehicles
- Reflective roofing to reduce heat load
- Light-colored exterior paving (Heat Island)
- Growth near public transportation to reduce automobile emissions
- Preferred car space for car pools vehicles
- Rain water harvesting




Three small images illustrating green practices: a green rainwater harvesting tank, a bicycle rack, and a lush green landscape.



lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

## Water Efficiency



A close-up photograph of water droplets and bubbles on a metallic surface, illustrating water efficiency.

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

- Low flow lavatory faucets, automatic shutoff
- Dual Flush WC/ water less urinals/ use of STP or RWH for flushing
- Use of Drip irrigation systems/ Sprinklers
- Use of native species of trees
- Adoption STP or Rain water harvested water – to eliminate portable water use



A white wall-mounted urinal. A dual flush toilet with a button on the lid. A hand holding a small blue water filter or aerator. A lush green palm tree in a garden setting.

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS




## Energy & Atmosphere






A photograph of a white, energy-efficient compact fluorescent light bulb (CFL) standing upright in a field of tall green grass. The background is a bright, clear sky.

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

- Efficient Building Envelope
- Aggressive LPD's (Light power density)
- Low E glass double glazed (Efficient U values)
- Efficient Equipment ,efficient chillers, pumps, motors, CT
- Additional Building Systems Commissioning for ensuring the efficient operations of the systems
- HCFC Refrigerants and Halons prohibited
- Measurement & Verification-Energy and Water metering
- Renewable Source of energy

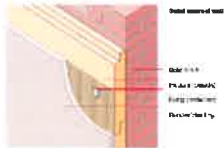
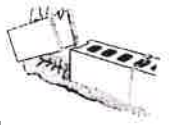
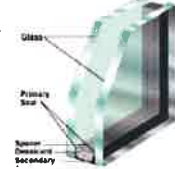




Three small images at the bottom of the slide: a red circular logo with white stars and the text 'ENERGY SAVINGS GUIDE'; a photograph of solar panels; and a photograph of an energy-efficient light bulb.

### Efficiency in building Envelope

1. Efficient building Envelope by use of Thermally insulated blocks for construction of Envelope
2. Use of clay bricks, AAC blocks along with wall insulation material of appropriate thickness which combination enhances thermal insulation
3. Efficient glazing: Double glazed windows or single glazed window of stringent (SHGC, U – value and VLT)
4. Efficient roof assembly:  
Light or white coloured roof with china mosaic tiles, further use of over deck insulation offers more thermal insulation in turn preventing the solar heat gain. Also one can adopt roof garden to prevent heat again from the roof top





## Materials



lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

- ❑ Provide facilities for materials recycling-Provide bins for segregation of waste-Paper, Cardboard, Glass, Metal and wood
- ❑ Demolition/Construction Waste Recycling – target 75-95% recovery of all non-hazardous materials
- ❑ 10% Minimum Recycled Content
- ❑ 20-40% Regional Manufacture products
- ❑ Locally-harvested 50% FSC-Certified hardwoods and veneers for all built-in millwork and casework



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lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

## Indoor Environmental Quality



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- ❑ Ventilation design per ASHRAE-62-2010
- ❑ Smoking prohibited
- ❑ Construction IAQ Management Plan
- ❑ Acoustic Standards for key spaces
- ❑ Natural day lighted space

EnviroSafe Interior Semi-Gloss Enamel White      CO2 sensor      GREENGUARD® Indoor Air Quality Certified

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS

## Innovations

lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS




- Green housekeeping practices:
  - a. **Packaging of amenities:** At lemon tree hotels all guest amenities are packed in recycle butter paper in place of cardboard boxes saving environment and cost



lemon tree PREMIER      lemon tree HOTELS      redfox BY LEMON TREE HOTELS


- Green housekeeping practices:
  - b. **Use of dispensers:** Bath amenities in guest rooms are provided in fixed dispensers reducing the use of plastic tubes and bottles and assisting green building cause.









Green housekeeping practices:

**c. Recycling of linen:** At lemon tree hotels eco fact poster is displayed in all room, we are encouraging guest to re use his bed and bath linen to help saving the environment. Guest linen is changed after every 2 nights of stay for sustainability purpose.







Green housekeeping practices:

**d. Use of recycled water in flush and gardening:** Recycled water using STP is used in flush and for gardening purpose reducing the consumption of fresh water and to sustain the environment around us and creating zero discharge.

**e. Provision of buckets on guest request:** on request guest are provided with bucket for reducing the consumption of water while taking shower.







Green housekeeping practices;

**f. Green walls:** creating vertical green walls across hotels creating sustainable environment.



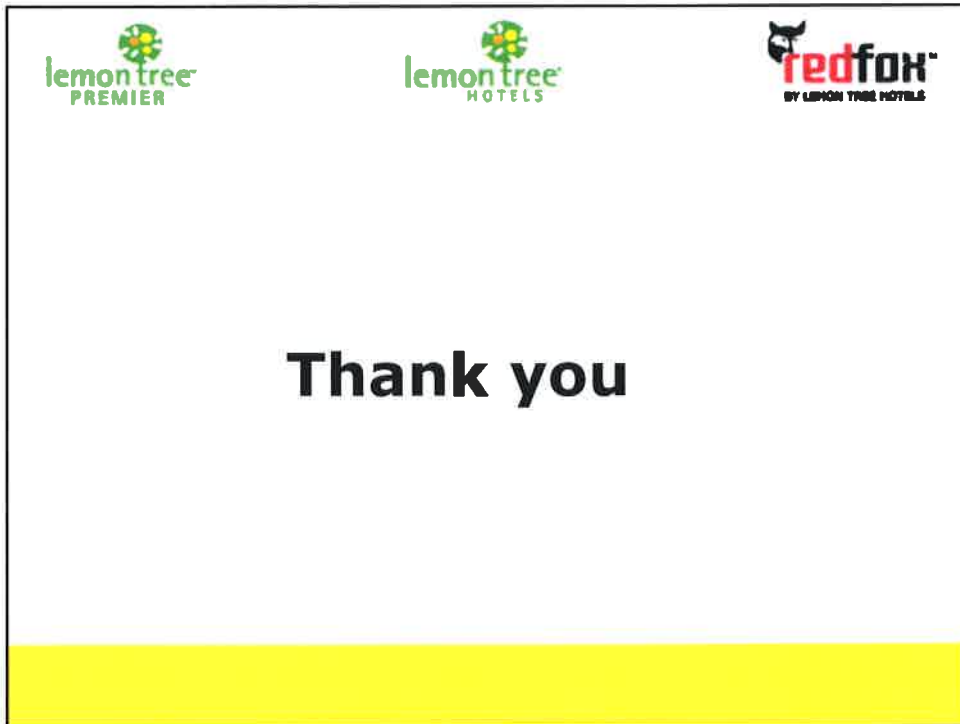




**Skill Gaps being faced in implementing the green building concepts in the Hotels industry :**

- Specific green building guidelines for hospitality sector
- Safety guidelines and training for workers at site
- Reliability on 3<sup>rd</sup> party commissioning for certification
- Post occupancy review





## Session IV: Green Transportation



# Session IV: Green Transportation

## Session- IV : Green Transportation:

**Chairman:Mr. A.K.Gupta, Director ( Electrical) DMRC**

### Panel

- Shri. Akshay Ahuja, Sr. Smart Grid Specialist, India Smart Grid Forum
- Shri. Dinesh Goyal, Konark Energy Solutions
- Shri. Harit Shah, Devam Electric
- Shri. Gaurav Minda, Minda Group

The Indian automotive industry has made tremendous progress in the last decade. India has emerged as the 6th largest vehicle manufacturer globally with the automotive industry contributing approximately 22% to the manufacturing GDP of the country. As per Automotive Mission Plan 2006-16, 25 mn jobs have been created in automotive sector till 2016 and 10 mn jobs are expected to be created till 2022.

As per a study by the Center of Automotive Research, University of Duisburg-Essen, Germany, by the year 2030, 56% vehicles produced would use combustion engines, 35% hybrid technologies and 9% electric power. 100% battery-driven electrical vehicles (EVs) are the ultimate goal of the vehicle alternative powertrain development over the next 15-20 years. Bio-fuels, ethanol, and compressed natural gas (CNG) are clean fuels. Besides these, electric and solar powered vehicles are also being promoted. Vehicles running on hydrogen as fuel and using fuel cell technology are also a clean option. CNG has already become a popular fuel in India due to its low cost.

UNEP defines a green economy as one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive (UNEP, 2011).



Discussion on skilled manpower requirements and industry readiness for adopting strategies to incorporate the importance of continual skill development & upskilling programs at all levels of the organizational hierarchy, for achieving sustainable growth; given current scenario, policy and regulatory frameworks available and potential opportunities for uptake of skilled manpower by the Green Transportation industry.

**About the Chairman Mr. A.K.Gupta** is Director (Electrical) at DMRC. Mr. Gupta was working as Chief General Manager and was heading the electrical maintenance wing of the company for the last 6 years. An electrical engineer from IIT Roorkee and from IRSEE (Indian Railway Service of Electrical Engineers), Mr Gupta has a vast experience of over 31years. On DMRC's behalf, he was the Benchmarking Coordinator of NOVA Metro Group (a consortium of 14 medium sized Metro systems around the world) and was also chief of the Disaster Management Team of Delhi Metro. Mr. Gupta has an extensive exposure to Metro and Railways systems around the world as he has studied Metro systems of Stockholm, Lisbon, New York, Paris, London and Guangzhou.

He covered Technology trends in Green Transportation, Non fossil fuel based transportation and • Status of Electric Vehicles and allied infrastructure. He extensively covered Experience of Delhi Metro as a clean transport mechanism

**About the Panel members Shri. Akshay Ahuja** is the Smart Grid Specialist at India Smart Grid Forum. India Smart Grid Forum is a public-private partnership initiative of the Ministry of Power. Working closely with working groups under ISGF namely "Policy and Regulation", "Consumption & Load Control" and "Smart Utilities Group". Shri Akshay Ahuja is a MBA in Power Management from NPTI (National Power Training Institute).

He presented New Business models for implementation of green transportation infrastructure and Skilled manpower requirements to scale up green transportation industry including Charging Infrastructure for electric vehicles

**About the Panel members Shri. Dinesh Goyal** is the founder of Konark Energy Solutions. Mr. Dinesh is working closely with SCGI in Smart Gram Initiative of Rashtrapati Bhawan. KES promoting E-Rickshaws in all 5 villages adopted by our Honorable President of India. On November 11, 2016, Hon'ble Chief Minister of Haryana, Shri Manohar Lal presented keys to first 5 customers among these villages. He covered Market Potential of E-rickshaws in India, Challenges in promotion and deployment of e-rickshaws on a large scale and Skill Development Opportunities. He presented Major Job Roles in e-rickshaw segment.

**About the Panel members Shri. Harit Shah** is director at Devam Electric vehicles private limited. Devam EV is a leading Manufacturer, Importer, and Supplier of new generation Electric Rickshaws, Cargo Rickshaws and Battery Operated Pedi Cabs, among other technologies. They offer eco-friendly, pollution free, noiseless, cost effective, and designer, along with aesthetic appeal which makes these products widely appreciated around the world. Devam is also planning to launch products powered by Solar Energy. He outlined Challenges associated with Green Transportation, Skill Development and Training requirements in Green Transportation. Further, he also covered Job Opportunities and Future roadmap for Green Transportation sector.

**About the Panel members Shri. Gaurav Minda** is the founder and director of Minda Group. Minda Group is one of the leading manufacturers of Solar Energy based standalone systems like Emergency Lights, Electronic Luminaries, Electronic Ballasts and LED Lightings including LED Street Lightings and also provides Solar Application based solutions like Rooftop Solar Power, Mini Grid, Micro Grid and Hybrids.

He gave details of Manufacturing of e-rickshaws, Integration of Solar Panels with e-rickshaws and Skilled manpower requirement

The Summit ended with Vote of thanks to the Hon'ble Minister, Chairmen of the sessions, Panelists, sponsors, participants and members of SCGJ.

\*\*\*\*\*



**DMRC**

# Green Transportation System

Anoop Kumar Gupta  
Director/ Electrical  
<http://www.delhimetrorail.com>

## CONTENTS

- INTRODUCTION TO DMRC
- GREEN INITIATIVES
- ENERGY CONSCIOUS INITIATIVES
- USE OF SOLAR POWER
- BENEFITS OF DELHI METRO

2



## DMRC – Introduction

### Delhi Metro Rail Corporation

A Government Company jointly promoted by Government of India and Government of Delhi.

Incorporated in May 1995, under the name Delhi Metro Rail Corporation Ltd. (DMRC).

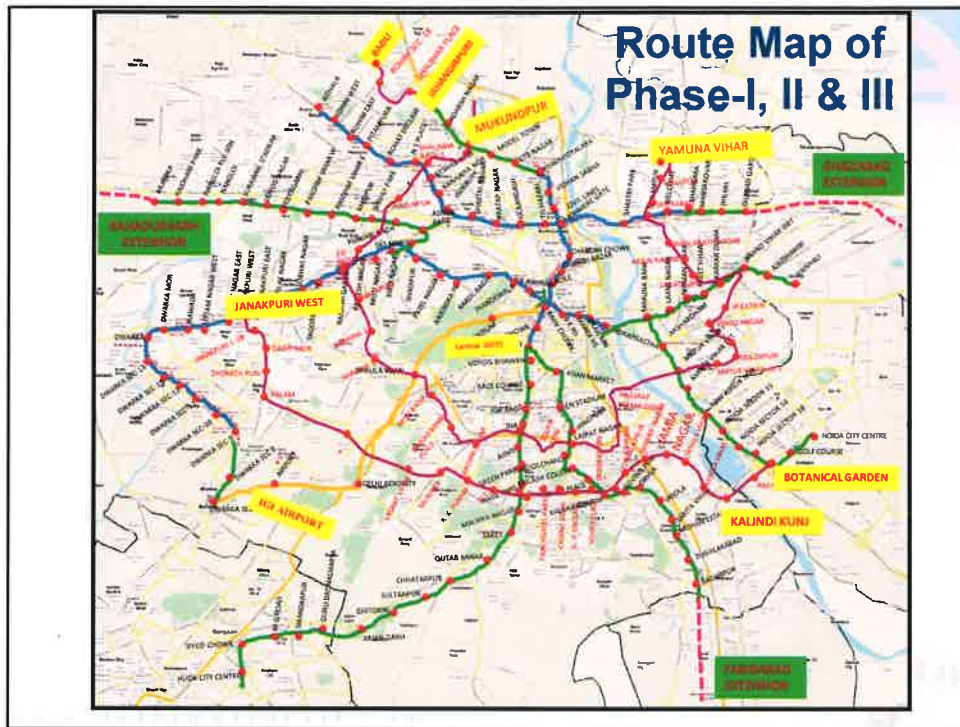
Two Governments have 50% shares each.  
Both Governments have equal number of Directors.

It has the responsibility for construction and operation of Delhi Metro.

Master Plan for Delhi consists of 12 lines covering 420 kms & to be completed in 4 Phases by 2021.

Delhi Metro is “mainstay” of Delhi’s Public Transport System !!



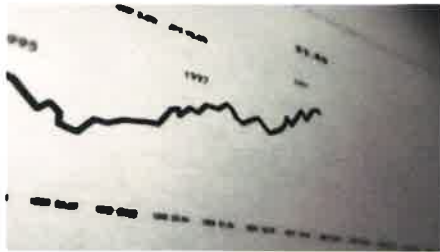


### OPERATIONAL CORRIDORS

Corridors	Total Length (In KM)	U/G (In KM)	Elevated (In KM)	At Grade (In KM)
Dilshad Garden-Rithala (Line 1)	25.09	0.0	20.59	4.5
Samaypur Badli-Huda City Center (Line 2)	49.43	23.7	25.73	0.00
Noida City Center-Dwarka Sector 21 (Line 3)	49.94	3.13	44.64	2.17
Yamuna Bank-Vaishali (Line 4)	8.74	0.0	8.74	0.00
Kirti Nagar-Inderlok-Mundka (Line 5)	18.46	0.0	18.06	0.40
ITO - Escorts Mujesar (Line 6)	38.03	10.44	27.59	0.00
<b>Grand Total</b>	<b>189.69</b>	<b>34.27</b>	<b>145.35</b>	<b>7.07</b>
Airport Express link	22.7	15.13	7.57	0.00

## OPERATION HIGHLIGHTS

- Network Length: **190 kms** (excl. AEL)
  - Stations: **154 stations** (by Line)
  - Average Ridership: **2.93 million** (Feb'17)
  - Max. Ridership: **3.37 Million** (17<sup>th</sup> Aug' 16)
  - Avg train trips per day: **2895**
  - Total number of train cars: **1424**
- Network Length: **22.5 Km** (AEL)
  - Stations: **6 stations** (by Line)
  - Average Ridership: **40,855** (Feb.'17)
  - Max. Ridership: **54,206** (28<sup>th</sup> Oct'16)
  - Avg train trips per day: **181**
  - Total number of train cars: **48**



7



**Green Initiatives of DMRC**

### **Green Initiatives by DMRC in Phase – III Project**

- ❖ Environment monitoring at construction sites
- ❖ Noise barriers during construction
- ❖ Recycle and re-use of Construction waste. (proposed to construct C&D Waste Management facility owned by DMRC).
- ❖ Vegetation (with native / naturalized species) for at least 50% of median area below viaduct.
- ❖ Ultra efficient water fixtures in stations to minimize use of water.
- ❖ Rain Water Harvesting System for each stations and viaduct.
- ❖ Natural Sewage Treatment Plant using Constructed wetland
- ❖ Use of RO reject water for wheel washing, toilets and for dust suppression during construction.

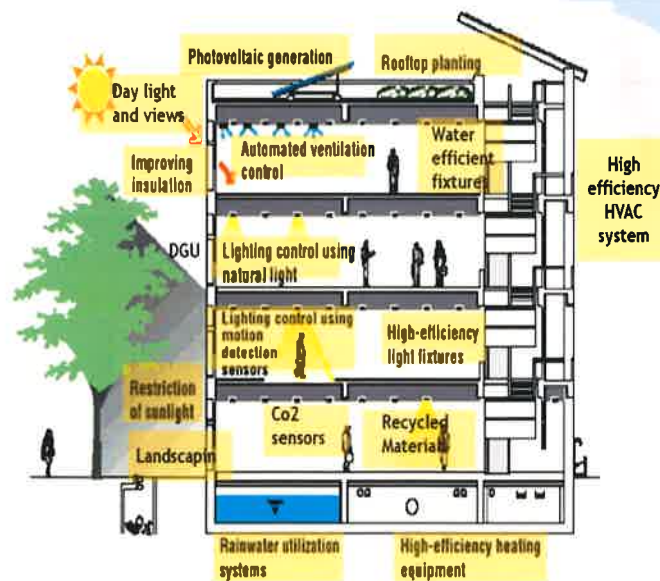
### **Green Initiatives by DMRC in Phase-III (... Contd.)**

- ❖ Material which are being manufactured locally within a distance of 400 KM and thus minimise environmental impacts from transportation.
- ❖ Use of low VOC (Volatile Organic Compound) paints, adhesive and sealants for finishing of stations.
- ❖ Seamless transitions / interchanges between different modes of transport to complete travel trip
- ❖ Creation of Drop Off zone for intermediate Bus Stop / feeder bus / auto / Taxi / Gramin Seva facility within walk able distance from all entry / exit points.
- ❖ Use of Feeder Buses that operates on alternative fuels such as CNG / Electricity.



## Energy Conscious initiatives

## Energy Efficiency in Buildings



### Energy Conscious Initiatives

- ❖ Solar panels on all Roofs (Station, Depots, & Staff Houses).
- ❖ Careful Selection of Energy Efficient Equipment for all Systems
- ❖ 100% LED light fixtures for Underground Stations.
- ❖ Selected Chillers with high COP.
- ❖ Variable Frequency Drive for Fans – Fresh Air Fan & in AHU
- ❖ Regenerative braking in Lifts (Elevators) and Trains,
- ❖ Variable Speed Drives for Escalators,

### Energy Conscious Initiatives

- ❖ Continuous energy monitoring of “Station Load Centres” with sub- metering for end use of electricity.
- ❖ Annual Energy Audit
- ❖ Upgrading Energy Efficiency of Systems at existing stations by “retro-fittings”.
- ❖ Train Time Table Rationalization



## Use of SOLAR Power

In order to reduce  
Carbon footprints and  
to  
insulate from Electricity Tariff increase,  
DMRC decided to  
**GO SOLAR.**

## Harnessing Roof top Solar Energy

- **Land is precious.** DMRC decided to install **solar plants on rooftops** of stations & Depot sheds on **RESCO basis**.  
(Till date **16 MWp** capacity commissioned)
- **Badarpur – Escorts Mujesar (Faridabad) line** provided with Solar PV plants of **~ 2 MWp capacity**.
  - Shortlisted in **Top 20 innovations for Prime Minister's Awards for Excellence in Public Administration for 2017 under Innovations Category (Stage – 1)**.
- DMRC has enhanced Target to install Solar Plants on own Roof Tops from **20 MWp by 2017 to 50 MWp by 2020**.  
(Till Now PPA for 32 MWp Solar PV Plants have been signed – Investment of Rs. 240 Crores)

## Faridabad Stations fully Solar Powered



### Inclined Roof



### Curved Roof





## Off – Site solar Plants

- On 17.04.17, DMRC has signed PPA with Rewa Ultra Mega Solar (RUMS) Project to procure 345 MUs through open access at levelized tariff of Rs. 3.30 per unit for 25 years.

**DMRC is the only metro organization, to sign a PPA for the Single largest Solar Energy Power Plant (750 MWp) in the world to be constructed in Rewa, M.P.**

- This will ensure that Phase – 3 project of DMRC in advanced stages of construction – **will be fed fully from Solar Power.**



## Benefits of Delhi Metro

### Delhi Metro - Energy Efficient

Comparative figures of unit energy consumed for different modes of transport are as under:


<b>Metro</b>	<b>1</b>
<b>Bus</b>	<b>3</b>
<b>Two wheeler</b>	<b>5</b>
<b>AC Bus</b>	<b>6</b>
<b>Petrol Car</b>	<b>21</b>
<b>Diesel Car</b>	<b>22</b>

- MRTS is the most Energy Efficient mode of transport.
- DMRC has relevant Policies in place.

Data Courtesy : TERI Report

### CUTTING COSTS AND EMISSIONS

Vehicle	Reduction in no. of vehicles	Reduction in fuel consumption (litres/day)	Cost saving (Million RS/year)
<b>FOR 2016</b>			
Bus	1,237	24,276	265.8
Car	51,870	1,03,740	1,726.7
2-wheeler	47,401	42,661	934.3
<b>FOR 2025</b>			
Bus	1,760	34,540	378.2
Car	73,748	1,47,496	2,454.9
2-wheeler	67,395	60,656	1,328.4



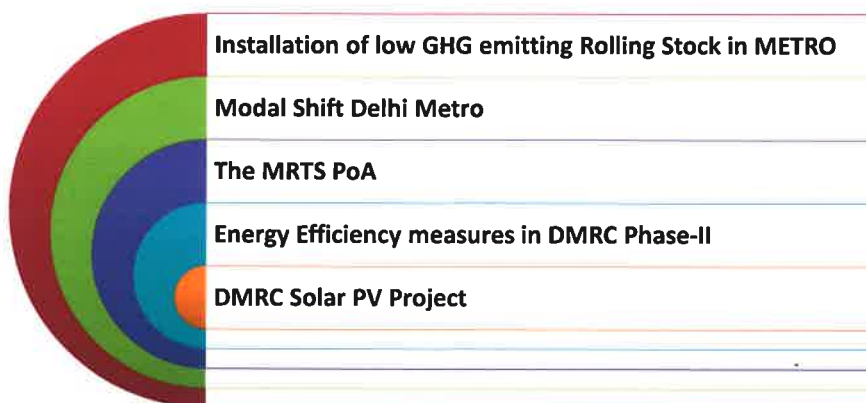
### QUANTIFIED BENEFITS OF PHASE I AND II

DESCRIPTORS	PHASE I (2007)	PHASE I & II (2011)	PHASE I & II (2014)*
No. of vehicles off the road daily	16,895	1,17,249	3,90,971
Annual reduction in fuel consumption (tonnes)	24,691	1,06,493	2,76,000
Annual reduction in pollutants (tonnes)	31,520	1,79,613	5,77,148
Savings in time per trip (minutes)	31	28	32
Annual reduction in fatal accidents (no.)	21	111	125
Annual reduction in all accidents (no.)	93	591	937

\* Ridership of 27 lakh

### DMRC PROJECTS registered under UNFCC CDM

DMRC contributes significantly in arresting the effects of climate change through Clean Development Mechanism (CDM). Following projects have been registered under the clean development mechanism which demonstrates savings in CO<sub>2</sub> emissions from DMRC activities-



### DMRC's role in developing GREEN Rating Systems

- DMRC has played a leading role in preparing Reference ratings for MRTS which will be help in benchmarking of the metros world-wide.
- In collaboration with **IGBC**, DMRC developed **2** Green MRTS rating systems – (a) for NEW stations, (b) for Existing Stations.
- All Phase – 3 stations, Depots and RSSs are with **Platinum rating**.
- In collaboration with U.S. Green Building Council (**USGBC**) launched **LEED for Transit for 2017** on 15<sup>th</sup> Feb 2017.  
*(It measures & monitors 5 key areas – ENERGY, WATER, AIR QUALITY, HUMAN EXPERIENCE & TRANSPORTATION.)*
- It is the 1<sup>st</sup> rating system in the World to follow Performance pathway
- DMRC, USGBC & GBCI shall jointly certify other metro systems world wide, based on this new rating system called **LEED for Transit**.

### International Recognition

- DMRC became First Ever Indian Company to Bag the Prestigious “**Business leadership in Sustainability**” Award in **Asia Pacific Region** by **World Green Building Council**.



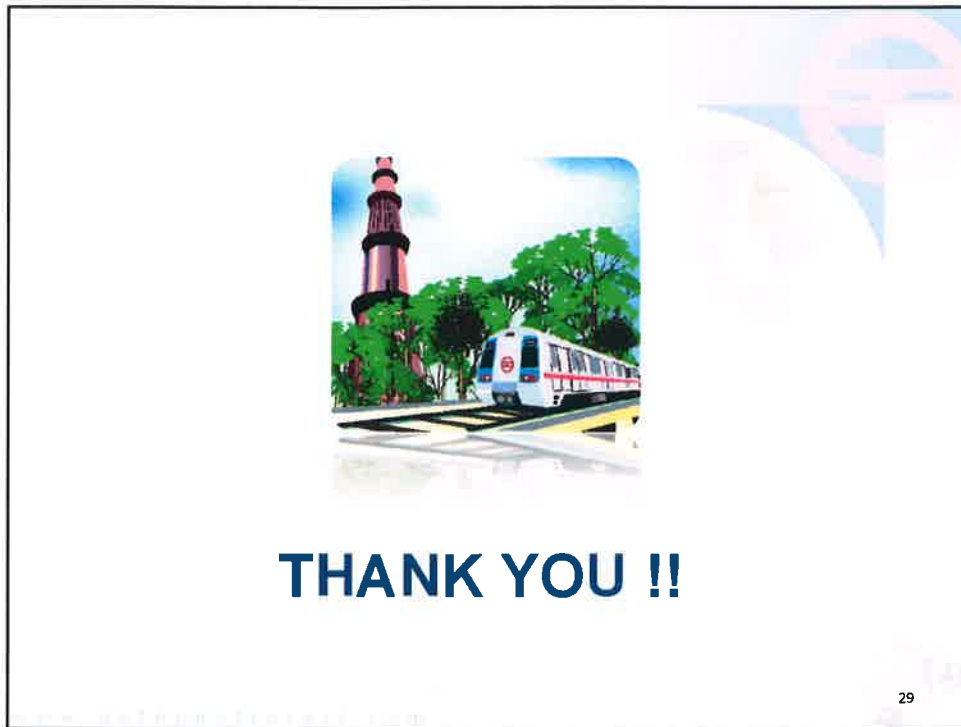
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Conclusion



Delhi Metro has not only reduced pollution in Air and congestion on the roads, by bringing in energy efficiency in design and operations, is also striving to become **TOTAL GREEN TRANSPORT SYSTEM**

**Delhi Metro is a success Story and its being replicated in many more cities !!!**



# 'SCGJ's Industry Connect' Booklet

# SCGJ's Industry Connect Booklet



SCGJ | SKILL COUNCIL FOR GREEN JOBS

## Industry Connect



Skill Council for Green Jobs  
3rd Floor, CRIP Building, Malcha Marg, Chanakypur, New Delhi - 110021  
[www.scgj.in](http://www.scgj.in) | [info@scgj.in](mailto:info@scgj.in) | [011 - 40792864](tel:011-40792864) | Follow us on [Facebook](#) [Twitter](#)

Special Edition Issue on Green Jobs by  
Governance Today Magazine



# G GOVERNANCE

APRIL 2017 VOL. 03 ISSUE 07 ₹60

# TODAY

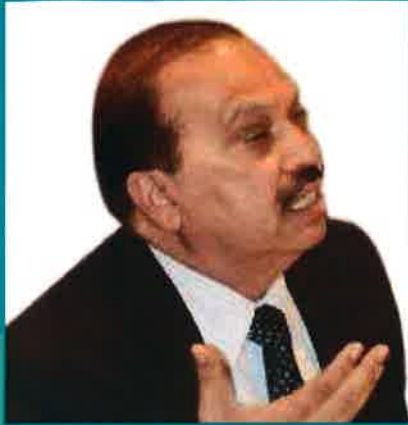
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When the going gets...

# Green





**Dr Praveen Saxena**  
CEO, Skill Council for Green Jobs

Skill Council for Green Jobs (SCGJ) has completed one year of its operation. In the first year of SCGJ, the council has focused on understanding short term and long term skill needs of the sector, kind of skill sets required to fulfill the goal of 2030 and create an ecosystem for delivering quality training. The council has about 200 affiliated training centers, pan India, about 500 certified trainers and 10 Assessment Agencies with over 120 certified assessors. SCGJ has already rolled out trainings on a mass scale in solar and wind domains. Understanding current and future Industry needs of skilled manpower in Green Business sectors and sub-sectors has been achieved by our in-house research, interacting with industry and with studies carried out by Ernst and Young and KPMG...

## **Green Jobs for Future: Towards Skill India Goal 2030**

The Skill Council for Green Jobs has been created as part of Skill India Mission by National Skill Development Corporation to address the skill needs of the Green Business Industry. The Council is promoted by the Ministry of New and Renewable Energy and Confederation of Indian Industry. SCGJ is managed by an industry led Governing Council. SCGJ acts as a bridge between the Government of India, State Governments and industry for developing strategy & implementing programmes for Skills Development, correlated to Industry needs and also aligned to best International practices.

The SCGJ scope covers the entire gamut of "Green Businesses", viz Renewable Energy, Energy Storage Clean cooking, Green Construction, Green Transport, Carbon Sinks, Solid Waste Management, Water Management & e-Waste Management, hence would have pan India impact.

The Skill Council for Green Jobs is focusing on understanding and capturing the skill needs for both service users and service providers within the sector and will work

on a road-map for a nation-wide, industry led collaborative skills initiative. The key activity drivers of SCGJ are

- Skill India Mission
- India's Intended National Determined Contribution (INDC)
- National Solar Mission
- Swachh Bharat Mission
- Green India Mission
- Smart City

It would develop sector-specific competencies /skills, quality assurance of the skills acquired by trainees, curriculum development, qualification framework and setting of standards and benchmarks, recruitment and placement of trained and skilled workforce, as well as a data collection, management and provider to the industry. The key activities include:

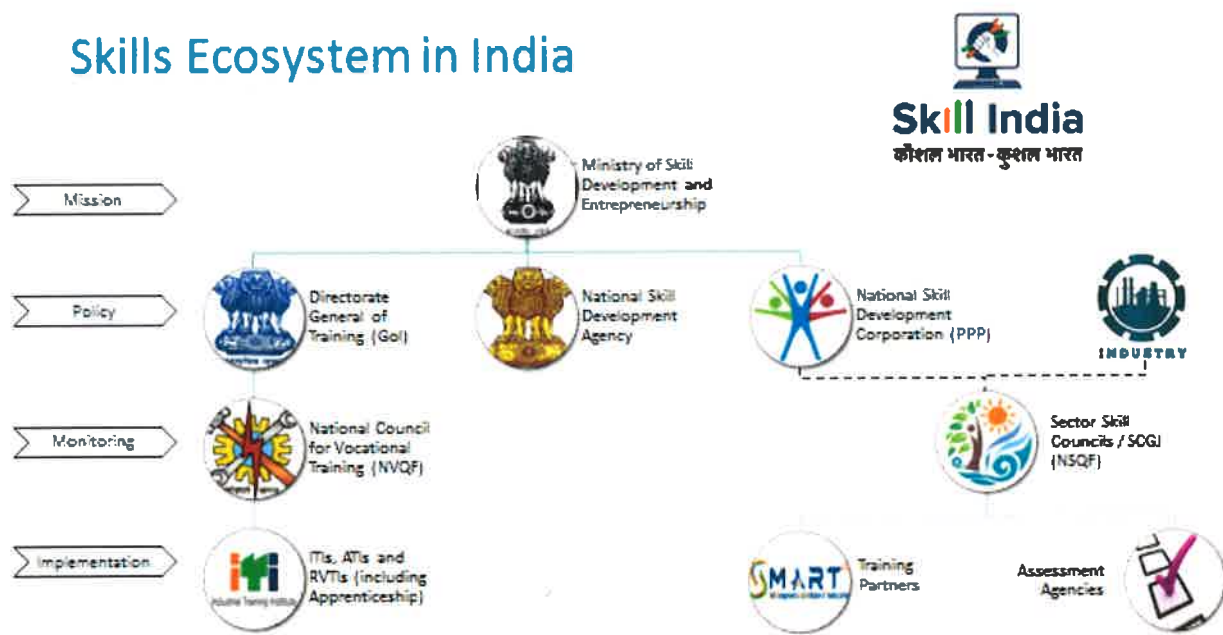
- Skill development plan and an occupational map for all the sub-sectors
- Develop & Set National Occupational Standards for Job Roles.
- Evolve career paths and skill competency standards for upgrading
- Put in place an Assessment & Certification mechanism for Accreditation

- To help the member organizations across market value chain, sharpen their business focus, updating on the emerging market trends and development.
- Ensure delivery of training programs by accredited organizations
- Put in place an effective Labour Market Intelligence System (LMIS)

SCGJ is continuing to develop strong industry linkage in all sub-sectors. The Governing council has representation of large and medium industry from solar, wind, Bio mass, Bio-fuel and water industry. SCGJ has established direct contact with about 150 industries to get its qualification packs validated. The strategy is to focus on the areas where projects are being implemented or in the location of manufacturing hubs. The focus of SCGJ is to have strong industry connect, including contractors and sub-contractors, in all its areas of work. Talk to large industry to understand the manpower requirement and establish long term contacts to improve employability of trained and skilled manpower.

The SCGJ proposes to skill about 10,60,000 people by

## Skills Ecosystem in India





2025 in the domain of Green Jobs. SCGJ proposes to extend its activities through its regional centres and training partners. It is proposed to set up Centers of Excellence, Standalone centers. It has already affiliated about 200 Training Centers spread in 25 states of the country.

### The Year 2017-18 to see corporate sourcing of renewables

In the pie of 316 GW for total installed capacity for power generation in India, Renewables contribute 51.36 GW, over 16%. The year 2016-17 has been another year of success for renewable energy technologies. The confidence that RE technologies can be mainstreamed is strengthening every year. This year, a capacity addition of about 5415 MW has been achieved. The highlight of the year has been increasing confidence of corporates in renewable energy technologies both grid connected as well as off grid. This is opening a large scope and demand of skilled manpower.

India had pushed for inclusion of sustainable lifestyle with minimum carbon footprint and

a clear cut mention of flow of funds in the political proclamation of COP22. The International Solar Alliance (ISA), moved to a next level when more than 20 countries, including India, France and Brazil, signed its framework agreement on the first day of COP22. Government has formulated an Integrated Energy Policy (IEP) document gives a roadmap to develop energy supply options and increased exploitation of renewable energy sources. For promotion of Renewable Energy, Government had amended the National Tariff Policy for electricity.

Given that over 50% of electricity demand in our country is from businesses, the sector has the opportunity to shape India's transition to a low carbon energy future. Companies can provide technologically sound, financially feasible and professionally managed energy solutions in return for policy support. From tax relief for generators to energy security and protection against cost inflation for consumers, there are clear benefits for businesses switching their electricity supply to renewables. Renewable energy offers an increasingly affordable solution for businesses. It is widely

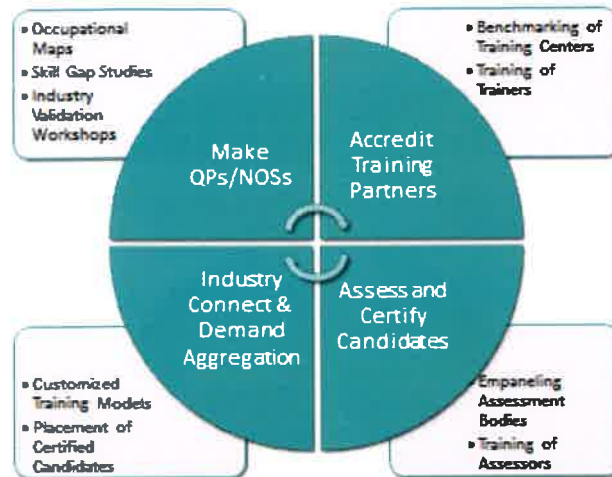
available without the risk of fuel inflation.

As renewable energy has become more and more cost effective and companies are setting more ambitious goals to buy it, large companies are increasingly looking for ways to contract directly for renewable energy to protect against future energy price increases and meet their climate and renewable energy goals. To meet the scale of their goals, these companies need access to more renewable energy in more places. Companies have stepped forward to join the Buyers' Principles because the Principles fit their corporate energy strategy and describe the sorts of products they hope the marketplace will offer them.

With an increasing number of companies committing to ambitious sustainable energy goals to reduce their carbon footprint, corporate electricity strategies can play an important role in accelerating renewable energy deployment and progress towards global climate objectives. The Stage is set to achieve at least 10,000 MW during 2017-18 and 15,000 in the year 2018-19 and now a leapfrog could be

## Key Activities

- SCGJ enables development of Skilled Manpower aligned to National Skills Qualification Framework
- This is achieved through benchmarking training standards
- To meet specialized industry requirement, customized Training Delivery can be organized



through companies committing to ambitious sustainable energy goals to reduce their carbon footprint. This is opening an unprecedented opportunity for jobs and quality skilling activities.

### Two years of Skill India Mission

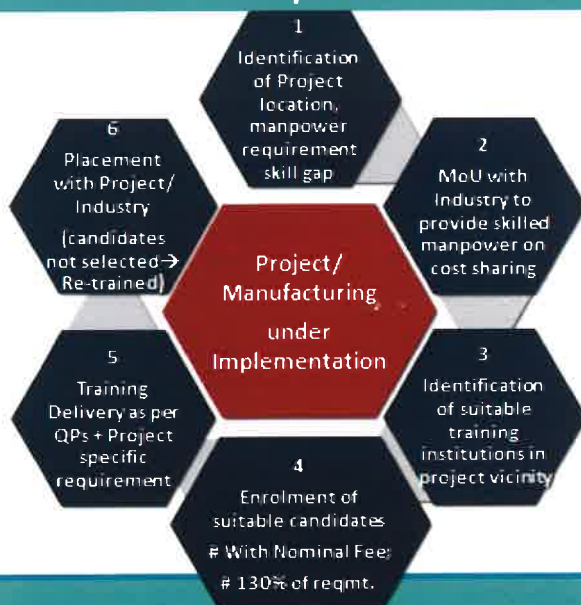
The Skill India Mission of Government of India is now approaching towards completing

two years in July, 2017. Marking the first anniversary of the "Skill India" initiative in July, 2016, Ministry of Skill Development and Entrepreneurship (MSDE) had announced the launch of five major initiatives reinforcing Ministry's commitment to the youth of India. These initiatives are Pradhan Mantri Kaushal Vikas Yojana 2.0, India International Skill

Centres, India Skills Online, a Labour Management Information System (LMIS) and Apprenticeship Protsahan Yojana.

Skill India is seeing great traction and is all geared to meet its philosophy of speed, scale and standards ensuring there is opportunity to get skilled for all. The Pradhan Mantri Kaushal Vikas Yojana

## SCGJ's Industry Connect Strategy



**SCGJ would be working in Project/Manufacturing location specific mode:**

- MoU with Industry for recruitment
- Pre-selection of candidates suitable for the job
- Industry to pay for certified manpower
- Candidate to pay nominal fee
- Training as per QP + Industry specific requirement
- Unsuccessful candidates to be re-trained.

(PMKVY), has secured an approval from the Government for its 2.0 version to train a total of 1 crore youths over the 4 years (April 2016 to March 2020). This is an endeavour to scale up the reach of PMKVY and at the same time strengthen the system and make these trainings more effective with robust monitoring and outcome.

The Government has also launched a single window platform to aggregate supply and demand trends in the Indian skill development ecosystem. This is known as the National Labour Market Information System (LMIS). This is an integrated set of institutional arrangements, procedures, mechanisms and data systems designed to produce labour market information as per global standards and best practices. The system would bring together quantitative and qualitative information concerning labour market actors and their environment and generate key analysis and reports which can be used for various policy interventions by different government stakeholders, as well as by the industry at large. The core function of the LMIS is convergence of information such as data of Training Providers, Training Centers, Employers, Certified candidates,

### SCGJ Training Capacity

**Skill Council for Green Jobs has more than 200 Training Centers across 25 States to execute Industry Oriented Skill Development Training Programs.**



Candidates seeking Training, etc. across Ministries/Departments/ Geographies and Sectors.

The Ministry of Skill Development and Entrepreneurship is moving to leveraging technology to reach millions of skill seekers, is the India Skills Online ([www.indiaskillsonline.com](http://www.indiaskillsonline.com)), an online platform for learning skills of choice. With the introduction of Online Skill-learning environment, the whole nation potentially becomes a classroom. The audio-video graphical illustrations format will help internalize the concepts for the skill-seekers, faster and longer. Online, the hard skills are supported by soft skill learning opportunities that help candidates become more confident,

presentable, professionals. Skill India resolves to bridge the digital divide by providing basic digital literacy opportunities to all skill-seekers. Thus enabling them to become more aware and better suited for the work environment of the day.

India's youth has a huge potential to make the country a clear leader in human resource worldwide. A base for skill development has been set. There is no doubt that this is a big step for our country. The support from the industry is paramount in making the scheme success. This is not just a scheme of Government but is a path changer for the country and youth should reap maximum benefit.

## Growth Drivers:

Skill India Mission



INDCs



National Solar Mission



Make in India



Swachh Bharat Mission



Green India Mission



# India Skills Towards

## Skill Assessment

- PMKVY under NSDC
- NON PMKVY( RSLDC , UPSDM, MoRD, etc.)
- SDMs (State Scheme Missions)
- MES scheme under DGT
- CSR Programs
- THIRD PARTY Certification

## Quality Assurance

- Assessment Quality Verification
- Customer Excellence Monitoring System
- Data centre management
- Monthly Internal audits

## VISION

Improving Livelihoods of people globally by providing best in class skill assessment practices.

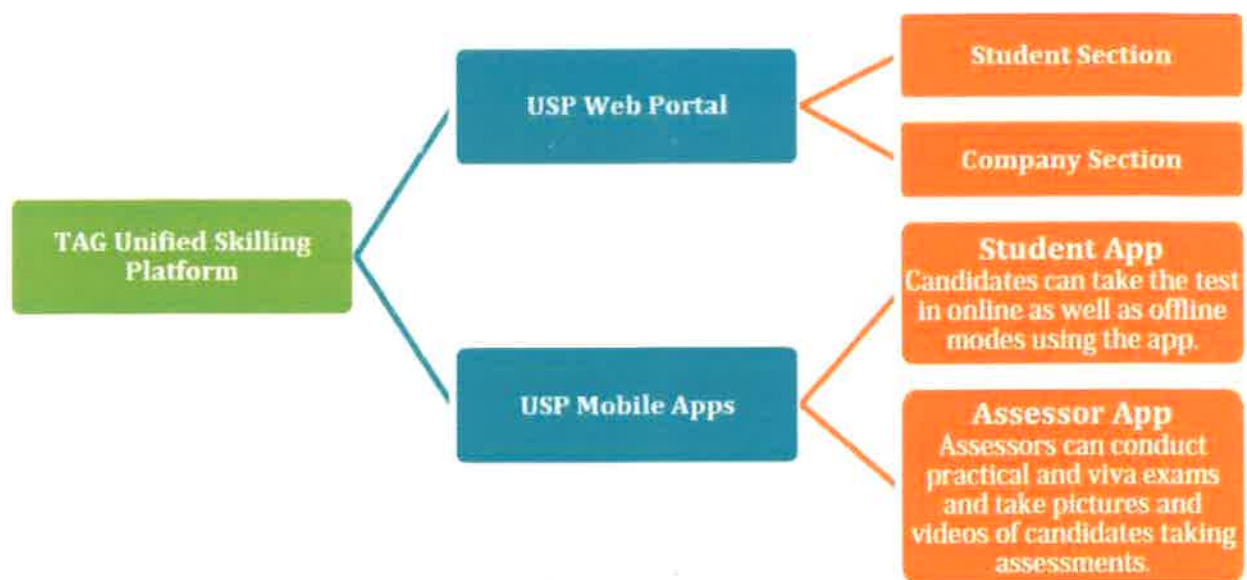
## MISSION

Build an Ecosystem to ensure that every assessment we do is in-line with quality accreditation standards and delivered with integrity.



Working Towards Building National Skills

# Skilling India Goals



## INDIA SKILLS PVT. LTD

India Skills Pvt Ltd (ISPL) is one of the leading PAN INDIA Assessing Bodies for all the sectors, accredited by Directorate General of Employment and Training, Ministry of Skill Development & Entrepreneurship for conducting skills assessments under Modular Employable Scheme (MES), other Central & State Government Schemes to create a reliable and proficient INDIA. ISPL conducts evaluations for the skilled, semi-skilled and unskilled workforce in all businesses/sectors and has spanned more than 400,000+ lives (majorly in the semi-skilled sector) through skills assessments. ISPL also works jointly with National Skills Development Corporation (NSDC) of India and various Sector Skill Councils (SSC) supporting the Ministry of Skill Entrepreneurship

and Development. Assessors and Subject Matter Experts are selected from topmost Institutes and Organizations of India. ISPL majorly concentrates on Skill Assessments and Quality monitoring system with a focused concept.

ISPL consists of an actively committed team with a proper structure for handling the center validation of Training partners to conclude if the centers comply as per the specifications organized by Sector Skill Councils (SSCs). We also operate towards assuring that the trainees are to given the quality training needed, as per distinct job roles at the center. Moreover we develop a Rating Metrics System to incorporate the Centers.

## TAG SCORES-TECHNOLOGY PLATFORM

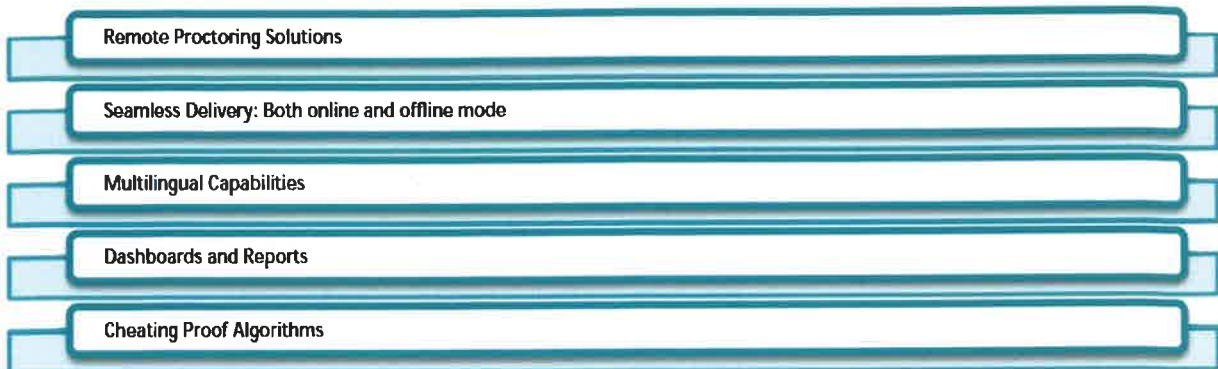
TAG Scores is the technology platform of India Skills Pvt Ltd providing top of the line, cutting edge technologies that enable e-assessments in multiple settings. We have built a visionary platform that incorporates several new to market features in order to tackle the multiple challenges and obstacles faced by organizations while implementing their skill assessment initiatives such as authentication of candidates, preventing cheating, addressing language needs, verification of assessors, ensuring seamless assessments in areas of poor internet connectivity and providing deep insightful analytical reports.

### Platform Architecture

TAG USP Portal (Unified Skilling Platform): The web portal has two sections, one for organizations and second for candidates. Organizations can manage their



## Salient Features



profile, purchase standardized tests or request for customized assessment solutions for their existing and new employees, schedule their tests, get skill gap analysis reports and view proctoring details, analytical reports and statistics. Individuals can manage their profile, view our test repository, add tests to their cart, take exams, view past results and identify areas of improvement. The candidates can take assessments on a web portal or a mobile app. There is also a mobile app for Assessors who would be able to authenticate the students using it.

## India Skills towards Skilling

### India Goals

Skill development is significant for achieving accelerated, sustainable and inclusive growth on the one hand and for fulfilling enough employment opportunities to the growing young population on the other.

India Skills Pvt Ltd, appreciate

various initiatives and efforts for "Green Jobs for Future: Towards Skilling India Goals 2030" which will make a positive impact. However, there is a need to further development and empowerment of human capital to ensure the nation's global competitiveness.

SCGJ have focused on understanding short term and long term skill needs of the sector, kind of skill sets required to fulfill the goal of 2030 and create an ecosystem for delivering quality training.

Skill development is critical for achieving faster, sustainable and inclusive growth on the one hand and for providing decent employment opportunities to the growing young population on the other.

Government has also planned to set up Indian Skill Development Services (ISDS) which has been created for the Training Directorate of the Ministry of Skill Development and Entrepreneurship. However, there is a need to further develop and empower the human capital

to ensure the nation's global competitiveness. Against this backdrop SCGJ highlights the key issues for the sector and the need for favorable regulatory support and farsighted intervention to help realize its growth potential.

According to the International Labour Organization, "Skill development is of crucial influence in inciting a sustainable growing method and can make a contribution in facilitating the transition from an informal to the formal economy. It is also imperative to discuss the possibilities and difficulties to match new demands of growing economies and distinct technologies in the connection of globalization."

Skill development is a critical ingredient for achieving faster, sustainable and inclusive economic growth. In a globalized and multicultural world, skill development supports to generate a workforce enabled with imperative skills, knowledge and globally recognized certifications to obtain access to quality

"We want to go for the capacity building of such young people. My brothers and sisters, having taken a resolve to enhance the skill development at a highly rapid pace, I want to accomplish this."

-Hon'ble Prime Minister of India, Shri Narendra Modi Independence Day 2014 Speech

employment and guarantee competitiveness in the global market. It also points at enhancing the productivity and employability of the workforce and enhancing its inclination to accommodate to improving technologies and labor market demands.

India is blessed with the second largest working population in the world after China. It is estimated that by 2022, 63 percent of our population will be in the working age group. This translates into an enormous number in absolute terms. We are also one of the few countries where the working age population will be far more than those reliant on them, for at least 3 decades till 2040, as per the World Bank. It would be a possible source of strength for our economy provided we can impart and continuously enhance the skills of our community. In this circumstances, mentoring, skilling and implementing productive employment to our teeming millions, especially the youth, becomes a matter of highest priority to reap the advantages of the 'demographic dividend' and also to develop as the skill capital of the world.

As the Indian economy continues to evolve, large-scale sectoral variations in the employed society are determined, particularly from agriculture to manufacturing and services sectors. These areas, nevertheless, demand significantly diverse and frequently specialist skill sets, which need training and skill development. It is this skill gap which also requires being spoken through extensive efforts, at various levels, including schools. The initiative of organizing the Summit on "Green Jobs for Future: Towards Skilling India Goals 2030" is an excellent one, as it provides all stakeholders a robust platform to discuss and deliberate on issues of mutual concern and interest.

India has witnessed rapid growth in recent years driven by the increase in new-age industries. The increase in purchasing power has resulted in the demand for

“

“We all have to come together to Make in India and Skill India mission successful.”

a new level of quality of service. However, there is a growing deficit of skilled labor in the nation. In the earliest stage of the growing financial conditions, it is imperative to focus on instilling and developing the skill sets of the young population of the country. Today, the world and India need a skilled workforce. If we have to promote the development of our country then our mission has to be 'Skill Development' and 'Skilled India'. Millions and Millions of Indian youth should acquire the skills which could contribute towards making India a modern country

India has constantly emerged as a knowledge-based economy due to the plenty of proficient, flexible and qualified human capital. However, there is a need to develop further and empower the human capital to ensure the country's global competitiveness. Notwithstanding the emphatic stress laid on education and training in this country, there is still a shortage of skilled workforce to discuss the mounting requirements and interests of the economy. As an instantaneous demand that has primarily derived from the current scenario, the government is dedicatedly endeavoring to begin and accomplish. formal/informal skill development of the working population via education/vocational training/skill training and other upcoming learning methods.

## Conclusion

Presently India is facing some challenges in skill development.

The major challenges are Participation, Infrastructure, Awareness and Implementation.

India has a large industrial base across sectors ranging from pin manufacturing to automobile which requires large no of skilled people. A Boston Consulting Group study for PHD Chamber of Commerce & Industry has estimated that by 2020 the world will have shortage of 47 million working people but India will have a surplus of 56 million people. In order to reap the benefits of demographic dividend India will therefore have to equip this manpower to meet the requirement of skill talent across geographies. India has a large population base of 1.25 billion with a demographic shift in favor of working age group (15-59 years). While the overall population is projected to grow at 1.4% over the next five years the working age is expected to grow at 2.15%.

India's skill development initiatives of skilling approximately 500 million people will not only benefit India but also make India the 'global manpower hub'. Among the developing countries of the world, India has the highest potential to meet the skill gap with its large, young, English speaking population. The world shortage of skilled manpower will stand at approximately 56.5 million by 2020.

With a target of skilling 500mn by 2020, India can not only fulfill its own requirements but can also cater to the labour shortages in other countries such as the U.S., France and Germany. Presently 80% of the workforce in India (both rural and urban) does not possess any identifiable or marketable skills.

Therefore, bridging this gap (through the various skill development initiatives) could make India the global hub for skilled manpower, and also result in a surplus of skilled manpower of approximately 47 million by 2020. ■■

# MITCON: Developing skilled manpower for future

**M**ITCON Consultancy & Engineering Services Limited, listed on SME Platform (Emerge) of having an experience of over three decades in providing consultancy and engineering services. It is headquartered at Pune (Maharashtra) and has presence across the country through its

and environmental management sectors and it has also diversified into providing services to banking, infrastructure and biotechnology sectors.

MITCON is registered as training partner of NSDC for developing skilled manpower. We regularly gets support for conducting Skill and Entrepreneurship Development

their requirements inter alia including Feasibility Studies, Detailed Project Reports, Techno Economic Feasibility Report, Financial Syndication, Lenders Engineer Services, Environment Impact Assessment (EIA), Basic and Detailed Engineering, Bid Process Management, Project Management, Cluster Development, Technical/ Financial



regional offices at Mumbai, New Delhi, Ahmedabad, Chennai, Bangalore, Nanded and Nagpur.

Incorporated in April 1982, MITCON's key shareholders includes SIDBI, SICOM Ltd. and nationalized banks, financial institutions and state government development corporations. Over the last three decades, the Company has gained proficiency in providing corporate solutions in power, energy efficiency, renewable energy, climate change

Programmes from Ministries of Central and State Government Departments / Agencies including NABARD, Ministry of Food Processing Industry, Department of Science and Technology, Govt. of India, New Delhi, Ministry of Heavy Industries & Public Enterprises, Govt. of India, New Delhi, National Institute for Micro, Small & Medium Enterprises, Ministry of MSME (NI-MSME), Hyderabad, etc.

MITCON provides solutions to its clients depending on

Restructuring, Energy Audits, Corporate Debt Restructuring, Due Diligence, Qualitative and Market Research, Assets/ Business Valuation and Consultation Services in wind power project. MITCON also conducts IT based training courses and skill based training programs. The Company owns a wind power plant at Idukki, Kerala with installed capacity of 0.75 MW.

It provides Consultancy and Engineering Services

to various sectors through business divisions such as Power, Energy and Carbon Services, Environment Management and Engineering, Infrastructure Consulting Group, Banking and Financial Solutions, Agri Infra & Food Consulting, Bureau of Market Research, Clusters-Infra & Textiles Cell, Securitization and Financial Restructuring, Biotechnology and Pharmaceutical Centre, and conduct IT based IT training programs through Entrepreneurship & Vocational Training, Multi Skills Development and MITCON e-school.

MITCON has so far conducted large number of micro enterprise development programmes all over the State particularly in rural areas. MITCON has got more than 50 Entrepreneur Facilitators working in the State of Maharashtra with having well equipped offices at district headquarters. MITCON

has a very good network with NGOs engaged in micro credit activities. Apart from in-house pool of facilitators and consultants we closely work with developmental agencies, management experts, technology-providing institutions, financial institutions and NGOs engaged in micro credit/ micro enterprise activities.

It also has established Technology Business Incubator (TBI) with the help of Department of Science & Technology, Govt. of India and APCCT New Delhi. MITCON TBI is recognized by DSIR, Govt. of India. Here we are providing facility for incubation to various entrepreneurs those who want to set up their enterprise. Under different schemes of MSME, we are supporting innovative ideas from conceptual stage to prototype development. We are developing trained manpower in the sector of Clinical Research,

Industrial Biotechnology and Medical Coding Billing.

It is also a resource organisation and a nodal agency to impart training under various schemes promoted by the Government throughout the State of Maharashtra. We are developing skilled manpower & providing wage/self-employment opportunities in the sector of Solar Energy. These programmes are sponsored by National Institute of Solar Energy (NISE), in Maharashtra, Madhya Pradesh, Rajasthan, Jharkhand & Chhattisgarh.

MITCON is Hand Holding Agency for implementing Stand Up India Scheme at National Level, implementing Special Project for developing skilled manpower sponsored by Jharkhand Skill Development Mission at Ranchi. ■■■

## Harvesting Talent to meet the demand

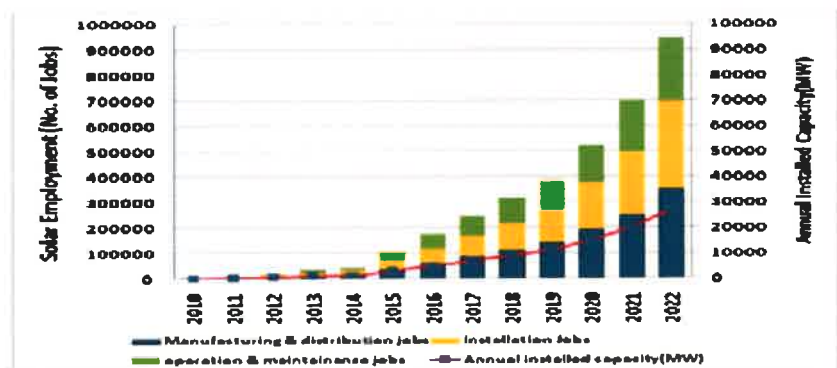


**W**e are a unique source for all Solar PV Technology professionals. Our exhaustive data bank has professionals for all your needs including Design, Manufacturing, Installation, Commissioning, O&M, Projects Management, Business Development and System Integration. With ethics as our hall-mark, we source the right candidates using our proprietary search mechanism. Our specialty is in renewable energy. The active profiles in our data base range are across all levels, that is: Project Head, EPC Head, Project Directors, Manager Projects, Purchase Manager, Engineer, Procurement

Manager, Supervisors, Technicians and Operation & Maintenance professionals etc.

We provide professionals who are ready to deliver their services from Day 1, and, therefore, you

need not spend your time and money to train them. We also work in a scenario, wherein our customers can opt for temporary work-force without creating a perpetual liability for themselves.



## GREEN ECOSYSTEM

In this context we also provide Freelance Qualified Professionals, which are of particular need for start-ups, therefore, creating a win-win situation for both employers and job-seekers. We ensure that you have the right resources when you need.

### Installation and Commissioning (I&C)

Highly skilled and dedicated I & C team at Solar Energy Workforce ensures completion of

each solar power generation plant from concept to commissioning including its operation and maintenance for the complete lifecycle of the plant.

### Operation and Maintenance (O&M)

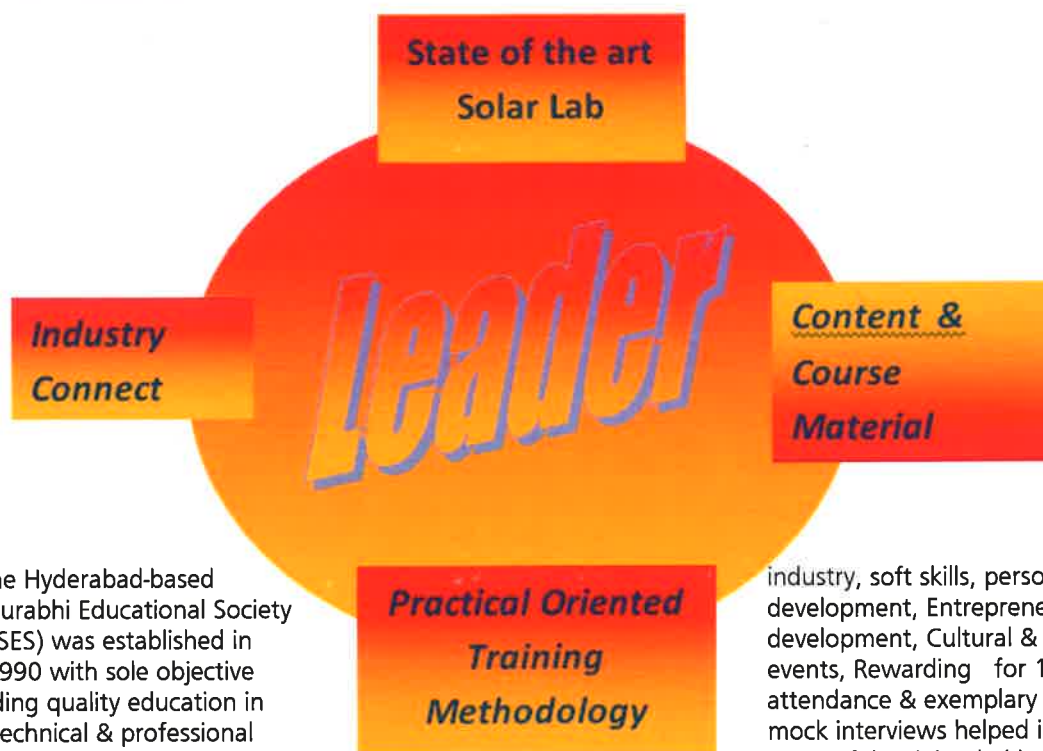
Solar Energy Workforce offers and provides a comprehensive O & M service with the highest quality, tailored to the client's needs for solar PV generation. We under-take Maintenance contract

for Operation& Maintenance of Rooftop/Grid Utility Solar power plant

### Training for SPV Professionals

The following graph shows the projected requirement of demand for various professionals in solar industry as a function of growing solar installations. In this context, we enable professionals to acquire adequate hands-on experience to enhance their "Employability". ■■

## Surabhi: Setting Goal to achieve its target in RWE Industry



**T**he Hyderabad-based Surabhi Educational Society (SES) was established in 1990 with sole objective of providing quality education in various technical & professional fields. SES quick realization regarding the skill gap in the renewable energy sector that resulted in laying the foundation of Surabhi Institute of Renewable energy (SIRE) in October-2014. SIRE started practical orientation courses such as Suryamitra, Solar PV Engineers & Solar Entrepreneur's to address the skill gap.

It had developed state-of-the-art solar lab with live working models such as 3KW Fixed Axis, 250W Trackers, 1KW Dual Axis System, 3HP Solar Water pump with VFD,

Solar Street lighting, Solar Home lighting Systems, lab equipment & tools, Safety equipment etc.

Experts from the solar industry were also roped in for creation of the content and syllabus based upon the guidelines from NISE and requirement of the industry in a bid to ensure seamless transformation of the trainees.

Practical oriented Training methodology such as daily recaps, working on live models, weekly tests, exposure to real world

industry, soft skills, personality development, Entrepreneurship development, Cultural & Sports events, Rewarding for 100% attendance & exemplary behaviour, mock interviews helped in successful training led by the Institute's expert faculty, and it is proud to say that it had achieved 98% results in the assessment conducted by Skill Council for Green Jobs(SCGJ)

In fact, practical oriented training methodology came handy in filling the gap needed in the industry through Industry Connect program. Surabhi claims to produce 500 (360 Suryamitra's + 140 Solar PV Engineers) more than 70% of them are placed in MNC's, Solar Roof-top companies, Module manufacturing etc. ■■

# Solar Power for Micro Entrepreneurship

## Institute of Solar Power Technologies & Vocational Training (ISPTVT)



C Vamsi Krishna,  
CEO

**F**ew entrepreneurs find themselves in the position of C Vamsi Krishna, CEO of the Institute of Solar Power Technologies & Vocational Training and also of Solar Home Solutions in Hyderabad. When Vamsi Krishna left IIT Chennai in 2008, he knew as an entrepreneur

that a vast market would be available for his passion.

Vamsi Krishna's passion is solar power. In a time of climate change and precarious resources of oil, coal and water, he is convinced solar power can be the most widely used form of energy in India. On ground research gave him the grounds on which to establish his business: vocational training for rural micro solar entrepreneurs- people who would install and maintain solar power equipment.

In his estimate, at least one million people could benefit from formal vocational training in solar power. Although he had a poor response when he began, but training was always his primary objective. He faced lot of challenges as they were the first entrants to this field. Because there had never been any training in this field, there was no training content available. With some other constraints and on ground

challenges, the training process was slow in the initial years.

However, in 2014-15, he trained 180 people under the MNRE patronage, which marked the start of his success.

ISPTVT also works with National Skills Development Corporation. Subsequently, it became a professional training associate of the Khadi & Village Industries Commission, Ministry of Skill Development & Entrepreneurship also promotes its scheme to trainee students who aspire to become entrepreneurs.

'We are happy to learn the formation of Skill Council for Green Jobs in 2015 to give renewed focus to skill development training in the solar energy domain. Ever since ISPTVT has been working closely with SCGJ as a training partner', Vamsi Krishna says.

Most recently, ISPTVT has introduced an e-Learning module in collaboration with SCGJ on its website. ■■■



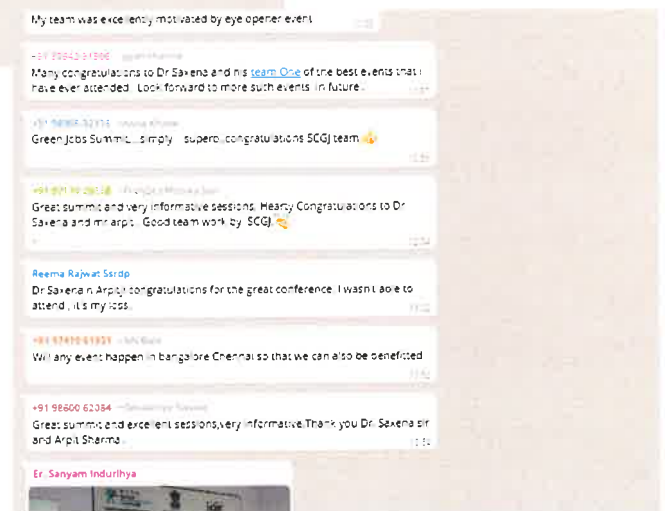
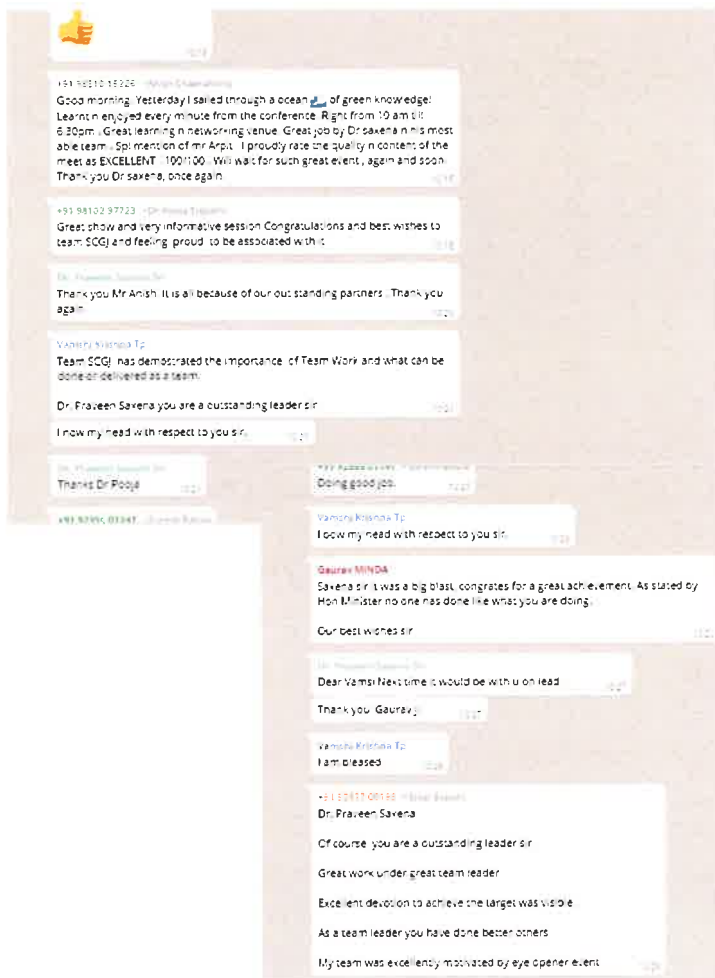
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