QUALIFICATION FILE

Solar Water Pumping Junior Engineer

☒ Short Term Training (STT) ☐ Long Term Training (LTT) ☐ Apprenticeship

☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA

☐ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☐ Future Skills

NCrF/NSQF Level: 5

Submitted By:

Skill Council for Green Jobs

Chief Executive Officer
CBIP Building, Malcha Marg,
Chanakyapuri, New Delhi – 110021
Contact no. and mail: 9871119101, ceo@sscgj.in

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Section 1: Basic Details

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<tr><td>1.</td><td>Qualification Name</td><td colspan="2">Solar Water Pumping Junior Engineer</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">Environment Science</td></tr>
<tr><td>3.</td><td>Type of Qualification: ☐ New ☒ Revised ☐ Has Electives/Options ☐ OEM</td><td>NQR Code & version of existing/previous qualification:
QG-05-ES-00522-2023-V1.1-SCGJ & Version 3.0</td><td>Qualification Name of existing/previous version:
Solar PV Engineer (Option: Solar Water Pumping System)</td></tr>
<tr><td>4.</td><td>a. OEM Name
b. Qualification Name (Wherever applicable)</td><td colspan="2"></td></tr>
<tr><td>5.</td><td>National Qualification Register (NQR) Code &Version</td><td>New NQR Code</td><td>6. NCrF/NSQF Level: 5</td></tr>
<tr><td>7.</td><td>Award (Certificate/Diploma/Advance Diploma/ Any Other</td><td colspan="2">Certificate</td></tr>
<tr><td>8.</td><td>Brief Description of the Qualification</td><td colspan="2">A Solar Water Pumping Junior Engineer specializes in the design, installation and commissioning of the solar PV power plant, its quality assurance and Health &Safety issues. He/she also specializes in designing, installation and commissioning of solar water pumping systems.</td></tr>
<tr><td>9.</td><td>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience:
<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with Specialization - if applicable)</th><th>Required Experience (with Specialization - if applicable)</th></tr>
<tr><td>1.</td><td>UG Diploma (Electrical/Electronics) or equivalent</td><td>NA</td></tr>
<tr><td>2.</td><td>12th Grade pass with 1 year of NTC/NAC in relevant trade</td><td>1.5 years of relevant experience in renewable energy/ power sector</td></tr>
<tr><td>3.</td><td>10th+ 3-year Diploma (Any stream of Engineering)</td><td>1.5 years of relevant experience in renewable energy/ power sector</td></tr>
</table></td></tr>
</table>

		b. Age: 19	4.	Previous relevant qualification of level 4.5	1.5 years of relevant experience in renewable energy/ power sector OR
			5.	Previous relevant qualification of level 4 (Solar PV Installer (Suryamitra)	3 years of relevant experience in renewable energy/ power sector

10	**Credits Assigned to this Qualification, Subject to Assessment** (as per National Credit Framework (NCrF))	18	**10. Common Cost Norm Category:** **I**
11	**Any Licensing requirements for Undertaking Training on This Qualification** (wherever applicable)	NA	
12	**Training Duration by Modes of Training Delivery** (Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)	☒**Offline** ☐**Online** ☐**Blended**	

Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)
Classroom (offline)	225	225	90	0	540
Online					

(Refer Blended Learning Annexure for details)

13	**Aligned to NCO/ISCO Code/s** (if no code is available mention the same)	NCO-2015/7421.1403 PV System Installation Engineer
14	**Progression path after attaining the qualification** (Please show Professional and Academic progression)	Vertical Progression: Solar Plant Site In-charge (Level 6) Horizontal Progression: NA
15	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	**Nil**
16	**Is similar Qualification(s) available on NQR-if yes, justification for this qualification**	☐ **Yes** ☒ **No**

17	**Is the Job Role Amenable to Persons with Disability**	**☒ Yes ☐ No** **If "Yes", specify applicable type of Disability:** **☒ Deaf ☒ Hard of Hearing ☒ Acid Attack Victims ☒ Dwarfism**	
18	**How Participation of Women will be Encouraged**	The programme would be proposed to be incorporated in women ITIs and diploma colleges to train women candidates on the job role. TPs shall be encouraged to onboard at least a certain number of female candidates in each batch	
19	**Are Greening/ Environment Sustainability Aspects Covered** (Specify the NOS/Module which covers it)	**☒ Yes ☐ No**	
20	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools ☒ Yes ☐ No Colleges ☒ Yes ☐ No**	
21	**Name and Contact Details of Submitting / Awarding Body SPOC** (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	**Name:** Dr. Praveen Saxena **Email:** ceo@sscgj.in **Contact No.:** 9871119101 **Website: https://sscgj.in/**	
22	**Final Approval Date by NSQC: 30/05/2024**	**23. Validity Duration:** 3 years	**24. Next Review Date: 29/05/2027**

Section 2: Module Summary

S. No	NOS/Module Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Th.	Pr.	OJT-Man.	OJT Recommended	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.	SGJ/N0109: Prepare a site Feasibility Study Report	SGJ/N0109 Version 4.0	Core	5	2	30:00	30:00			60	60	40			100	20
2.	SGJ/N0146: Design of solar PV power plant	SGJ/N0146 Version 4.0	Core	5	4	60:00	60:00			120	67	33			100	20
3.	SGJ/N0132: Installation and commissioning of solar PV power plant	SGJ/N0132 Version 4.0	Core	5	3	30:00	60:00			90	67	33			100	20
4.	SGJ/N0133: Quality assurance of solar PV power plant	SGJ/N0133 Version 4.0	Core	5	2	15:00	45:00			60	25	25			50	10
5.	SGJ/N0106: Maintain Personal Health & Safety at project site	SGJ/N0106 Version 4.0	Core	5	1	15:00	15:00			30	21	29			50	10
6.	Employability Skills (ES)	DGT/VSQ/ N0102 Version 1.0	Non Core	5	2	60				60	20	30			50	10
7.	SGJ/N0134: Design, installation and commissioning of solar pumping system	SGJ/N0134 Version 4.0	Core	5	1	15:00	15:00			**30**	26	24			50	10
8.	On the Job Training				3					90						
Duration (in Hours) with Optional					18	225	225	90		**540**	286	214			500	100

NOS/s of Qualifications

(In exceptional cases these could be described as components)

Mandatory NOS/s:

Specify the training duration and assessment criteria at NOS/ Module level. For further details refer curriculum document.

***Th.**-Theory **Pr.**-Practical **OJT**-On the Job **Man.**-Mandatory Training **Rec.**-Recommended **Proj.**-Project*

Assessment - Minimum Qualifying Percentage

Minimum Pass Percentage – Aggregate at qualification level: 70 % *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Any Engineering or Science Graduate with Two years of experience in Designing and Installation of Solar PV power plants/solar water pumping system and or delivering trainings in solar sector As per the Relevant Craft Instructor Training Scheme (CITS) *The education qualification can be relaxed in case of extraordinary relevant field experience*
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Any Engineering or Science Graduate with 5 years of experience in Designing and Installation of Solar PV power plants/solar water pumping system and or delivering trainings in solar sector post their ToT Certification. As per the Relevant Craft Instructor Training Scheme (CITS) *The education qualification can be relaxed in case of extraordinary relevant field experience*
3.	**Tools and Equipment Required for Training**	☒Yes ☐No (*If "Yes", details to be provided in Annexure)*
4.	**In Case of Revised Qualification, Details of Any Upskilling Required for Trainer**	Not Applicable

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Any Engineering Graduate or Science Graduate with three years of experience in Designing and Installation of Solar PV power plants/water pumping system or training/assessment in solar job roles Or Certified under relevant Craft Instructor Training Scheme (CITS) course. *** The education qualification can be relaxed in case of extraordinary relevant field experience.**
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Any Engineering Graduate or Science Graduate with four years of experience in Designing and Installation of Solar PV power plants/water pumping system or training/assessment in solar job roles Or Certified under relevant Craft Instructor Training Scheme (CITS) course. *** The education qualification can be relaxed in case of extraordinary relevant field experience.**
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Any Engineering Graduate or Science Graduate with 10 years of experience in Designing and Installation of Solar PV power plants/water pumping system or training/assessment in solar job roles post their ToA Certification. Or Certified under relevant Craft Instructor Training Scheme (CITS) course. *** The education qualification can be relaxed in case of extraordinary relevant field experience.**
4.	**Assessment Mode** *(Specify the assessment mode)*	Online and offline both
5.	**Tools and Equipment Required for Assessment**	☒ Same as for training ☒ Yes ☐ No *(details to be provided in Annexure-if it is different for Assessment)*

Section 5: Evidence of the need for the Qualification

Provide Annexure/Supporting documents name.

1.	**Latest Skill Gap Study (not older than 2 years) (Yes/No):** Yes available at https://sscgj.in/wp-content/uploads/2022/03/Green-Jobs-Report-Jan27.pdf
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):** yes Yes following key documents are available in the public domain a. https://sscgj.in/wp-content/uploads/2022/03/Green-Jobs-Report-Jan27.pdf b. https://solarrooftop.gov.in/knowledge/file-44.pdf c. https://jmkresearch.com/wp-content/uploads/2022/02/Photovoltaic-Manufacturing-Outlook-in-India_February-2022_JMK.pdf
3.	**Government /Industry initiatives/ requirement (Yes/No):** The Government of India has set the target to expand India's non fossil fuel based installed capacity to 500 GW by 2030. Out of this target over 300 GW is expected to be achieved exclusively through solar. India has promised to source nearly half its energy from non-fossil fuel sources by 2030 and, in the shorter term, source at least 60% of its renewable energy from solar power. National Solar Mission: It is a major initiative of the Government of India to promote ecologically sustainable growth while addressing India's energy security challenge. Key schemes of the Government on Solar energy • Solar Park Scheme: This plans to build a number of solar parks, each with a capacity of nearly 500 MW, across several states. • Rooftop Solar Scheme: The Rooftop Solar Scheme aims to harness solar power by installing solar panels on the roof of various consumers including residential, commercial and industrial. • SRISTI Scheme: Sustainable rooftop implementation of Solar transfiguration of India (SRISTI) scheme to promote rooftop solar power projects across residential consumers in India. • International Solar Alliance: International Solar Alliance is an action-oriented, member-driven, collaborative platform for increased deployment of solar energy technologies. • Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM): Launched by the Ministry of New and Renewable Energy (MNRE), it aims to support deployment of solar pumps in rural areas. This qualification aims to prepare the candidates on the knowledge and competencies required for performing the role of technicians for installing small grid interactive and off grid solar projects. This qualification also complements Solar PV Installer (Suryamitra) qualification which is being successfully utilized for delivering short term trainings across the country. It is proposed to introduce this qualification for vocationalisation in schools (in Grade XII) along with short term training to ensure a large number of learners/trainees are trained and certified in the concerned job role.
4.	**Number of Industry validation provided:** Up to 10 industry validations are expected to be received for the qualification.

5.	**Estimated nos. of persons to be trained and employed:** A large number of persons are employed at Ultra Mega SolarPV power plants. RPL may be conducted at these sites. The increase in manpower requirements (as per projections)till 2025 and 2030 is approx. 40,000 and 60,000 respectively.
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** Concurrence has been requested from the Ministry of New and Renewable Energy

Section 6: Annexure & Supporting Documents Check List

Specify Annexure Name / Supporting document file name

1.	**Annexure:** NCrF/NSQF level justification based on NCrF level/NSQF descriptors *(Mandatory)*	Annexure: Evidence of Level
2.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory, except in case of online course)*	Annexure: Tools and Equipment (Lab Set-Up)
3.	**Annexure:** Detailed Assessment Criteria *(Mandatory)*	Annexure: Detailed Assessment Criteria (Mandatory)
4.	**Annexure:** Assessment Strategy *(Mandatory)*	Annexure: Assessment Strategy
5.	**Annexure:** Acronym and Glossary *(Optional)*	Annexure: Acronym and Glossary
6.	**Supporting Document:** Model Curriculum *(Mandatory – Public view)*	Attached
7.	**Supporting Document:** Career Progression *(Mandatory - Public view)*	Annexure: Career progression and OM
8.	**Supporting Document:** Occupational Map *(Mandatory)*	Annexure: Career progression and OM
9.	**Supporting Document:** Assessment SOP *(Mandatory)*	Annexure: Assessment Strategy

Annexure: Evidence of Level

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			Level:5
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
Professional Theoretical Knowledge/ Process	The individual is expected to Design, installed and monitor operation of the solar PV power plant. He/ Sheconduct site feasibility study, conduct the the physical inspection before commissioning of the plants. Perform the various test in order to successfully commission theplants, watch on voltages at various levels, operational efficiencies of individual components, generation of power; computes performance ratio and compares with simulated values etc.	The Job holder is expected to exhibit well developed skills with a clear choice of procedures in familiar context such as ensuring marking of complete layout of plant as per detailed drawings, managing schedule for installation of plant components, inspecting the plant equipment during and post-installation, measuring and recording and monitoring all parameters like voltage, current, energy prior to commissioning, checking the modules through random selection, ensuring proper off-load of equipment at site, carrying out visual inspection of the plant and carrying out various tests like performance ratio tests, thermography, ensuring the test values are as per industry norms and carrying out corrective action, if necessary. Optionally is also expected to carry out design, installation and commissioning of solar pumping systems Thus considering the scope of work the job holder can be placed at Level 5 Since the individual's work is not limited to working in familiar, routine & predictable environment but rather encompasses job that requires working in non-routine and fairly unpredictable environment such as ensuring that the erection and commissioning is carried out safely and as per schedule, inspection the plant equipment during and post installation through visual inspection and test and deciding on actions in case of deviations, monitoring the plant	5

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			Level:5
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
		performance during start-up and taking corrective actions in case of fault occurrence, visiting the OEMs factory to carry out inspection through random selection, etc., s/he can't be placed in Level 4 And as the individual doesn't require to exhibit wide range of specialized developed skill and working around non-standard practices, it does not qualify as a level 6 role.	
Professional and Technical Skills/ Expertise/ Professional Knowledge	The individual is expected to exhibit the knowledge of the typical specifications, functioning, operating principle of various solar PV plant components, the monitoring system (SCADA or any other), related performance metrics of solar PV power plant, as built electrical drawings, fault identification procedures, various types of tools, measuring equipment, maintenance procedures and requirement.	The Job holder is expected to exhibit knowledge of facts such as typical specifications and types of solar PV plant components like solar PV modules, inverters, charge controllers, mounting structures, cables, junction boxes, etc. site survey reports and evaluation parameters, grid connection codes, relevant IEC/ IS standards, industry norms of test outputs like IV curve and performance ratio tests knowledge of principles such as solar PV power generation technology, solar PV power plant testing principles, fault identification and rectification principles, etc. knowledge of processes like solar PV plant operating procedures, testing procedures of solar PV plant components, random sampling processes according to standards, and general concepts of in the field of solar PV such as knowledge of power generation, electrical concepts like voltage, current, power, etc. S/he should possess the ability to speak, read and write in the local vernacular language and English which is always preferred. Optionally, h/she is also expected to know the working and usage of solar simulation software like PV*SOL, tracking systems like Maximum power point tracker (MPPT), DC/ AC solar pumping systems, etc.	5

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			**Level:5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
		Thus considering the professional knowledge, s/he can be placed at level 5 The Job holder is expected to possess professional skills more than just factual knowledge about solar PV components but also knowledge of facts like solar PV power output and testing parameters like power, energy, power factor, performance metrics like IV curve, performance ration, grid connectivity standards, random sampling standards, etc. therefore s/he can't be placed at Level 3 And since the job holder doesn't require to exhibit factual & theoretical knowledge in broad contexts within solar PV such as evolving technological trends, the various socio- economic factors and their impact on solar PV etc., the individual can't be placed at Level 6.	
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill	The individual is expected to plan & organize the schedule for all meetings and discussions to be undertaken by self or by the team. Further s/he must be able to take decisions on a regular basis, manage relationship with customers and apply domain knowledge to perform tasks related to solar PV. S/he is also expected to critically evaluate information obtained from customers and teams to create relevant solutions.	The Job holder is expected to possess a range of practical and cognitive skills required to accomplish tasks and solve problems by selecting and applying basic methods and tools. For example, the individual has to visit the facility of the module manufacturer and ensure the quality of solar PV modules through random sampling, ensure that the solar modules delivered at site are according to specifications, ensure the erection and commissioning of the plant happens according to schedule, carry out testing of the plant equipment through visual inspection and measurement and analysis of plant parameters like voltage, IV curve,	5

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			**Level:5**
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
		performance ratio, etc., ensuring all safety protocols are followed during the installation and commissioning of the solar PV power plant, monitor performance of solar PV plant during start-up and take corrective action if necessary. Optionally, he is also expected to analyse the water usage and level of water table at site and design a suitable solar PV pumping solutions and ensure the installation, testing and commissioning of solar pumping system as well as carry out its operation and maintenance periodically. Thus considering the professional skills the job holder can be placed at Level 5 Since the Job holder is expected to exhibit cognitive skills along with practical skills required to accomplish the tasks and solve problems like carrying out random sampling at manufacturer's site, identifying faults by though visual inspection and by carrying out tests like IV curve and performance ratio tests, etc. s/he can't be placed at Level 4. And as the job holder is not expected to possess practical and cognitive skills required to generate solutions for specific problems related to solar PV as a whole, but rather expected to generate solutions specific to the solar PV power plant, s/he can't be placed at level 6	
Broad Learning Outcomes/ Core Skill	The individual is expected to be reasonably good in mathematical calculation, data collection and to exhibit electrical installation skills, electrical testing skill with the help of using multiple tools and techniques needs to know and understand how to read product and equipment manuals, installation manuals, etc.	The Job holder is expected to be possess the desired mathematical skills for analysing and comparing test parameters like conductivity tests, IV curve tests, energy readings, etc. have understanding of social /political environment like local cultures so as to communicate	5

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			Level:5
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
		effectively with solar project helpers under him/her who primarily belong to the regions surrounding the solar PV power plant skill of collecting and organizing information like collecting information about progress of plant erection and commissioning, recording and analysing information about plant equipment condition from the installation technicians as well as test outputs and anticipate the probable faults and issues and take corrective action and communication skill for so as to provide instructions and guidance to the solar PV installers so as to carry out daily activities in the plant. Thus considering the core skills, s/he can be placed at Level 5. The Job holder is expected to exhibit core skills more than language to communicate with required clarity, basic algebraic and arithmetic skill and basic understanding of socio- political environment. For example, s/he is supposed to compute complex plant performance metrics, compare them with norms and analyze and deviations in plant performance through the same, etc. S/he is also expected to carry out inspection at manufacturer's site as well as project site to ensure fault free installation of solar PV equipment. Hence, s/he can't be placed at Level 4. And since the job holder requires only some skill of collecting and organizing information but doesn't need to be reasonably good like conducting primary and secondary research and only the desired mathematical skill restricted to evaluating,	

Title/Name of qualification/component: Solar Water Pumping Junior Engineer			Level:5
NSQF Domain	**Outcomes of the Qualification/Component**	**How the outcomes relate to the NSQF level descriptors**	**NSQF Level**
		comparing and analysing plant performance metrics, s/he can't be placed at Level 6	
Responsibility	The individual is primarily responsible to Design installed and commissioned the solar PV plant while ensuring the quality at uttermost priority. S/he is also responsible for ensuring that the site survey of the proposed site is carried out properly. Further, s/he is responsible managing and leading the team of site surveyors, designers, draughtsman, etc.	The Solar Water Pumping Junior Engineer is responsible for his/ her own work as s/he has to carries out inspection and to conduct various test in order to commissioning the plant. Conduct the site feasibility studies in order to design the systems. S/he should be responsible for ensuring the timely completion of solar PV plant while ensuring the quality of the plant in all manner. Considering the responsibilities the individual can be placed at level 5. Since the Job holders responsibility is not limited till his/her own work & learning but also encompasses some responsibilities for others learning as s/he is expected to ensure knowledge transfer to team members s/he can't be placed at 4. As the responsibilities are not so broad enough to be fully responsible for other's work and learning like conducting trainings, taking disciplinary actions in case of deviations from organisation conduct rules, etc. s/he can't be placed at level 6.	5

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Rooftop solar PV design software with valid license,	Nos	1
2	1 kW solar PV power plant,	Nos	1
3	Functional solar PV water pumping system	Nos	1
4	Solar Power Plant Installation toolkit,	Nos	1
5	Performance testing equipment for solar PV power plant and its components,	Nos	1
6	Sample SLD of Electrical and solar PV power plant layout	Nos	1
7	Clamp meter	Nos	3
8	Multimeter	Nos	5
9	Phase sequence meter	Nos	1
10	Megger	Nos	1
11	Safety helmet,	Nos	30
12	Safety shoes,	Nos	30
13	Safety belt,	Nos	30
14	PVC hand glove,	Nos	30
15	Cotton hand glove,	Nos	30
16	Reflective jacket,	Nos	30
17	First aid kit	Nos	1
18	Safety Gloves,	Nos	30
19	Practical site	Nos	1

Classroom Aids

The aids required to conduct sessions in the classroom are:

Marker, chart and visual aid, Pellet production flowchart, raw material supply chain flow chart, Schematics of Compressed biogas waste to energy plant;

Annexure: Industry Validations Summary

Provide the summary information of all the industry validations in table. This is not required for OEM qualifications.

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1.	Ashlyn Solar Infra Private Limited	Arun Kumar	Director	C-44, Mansa Ram Park, Uttam Nagar, New Delhi - 110059	8130841685	arun@greenaffiliates.in	NA
2.	Danao Green Tech Private Limited	Dr. Sanjay Danao	Director	203, Sai Avenue, D-7, CIDCO Meghdoot, Butibori MIDC, Nagpur - 441122	9545648496	Danaogreentech@gmail.com	NA
3.	M/s Oriana Power Limited	Parveen	CEO	C-103, 1st Floor, Sec-2, Noida, U.P-201301	0120-4114695	Rupal.gupta@orianapower.com	NA
4.	PowerXP Consultants Private Limited	Puneet Sharma	GM	86, Marudhara Nagar, Bikaner, Rajasthan - 334003	7726884770	pxpsolar@gmail.com	NA
5.	Innodust Marketing Private Limited	Sunil Kumar Sahoo	Director	Plot No. A/63/1, Saheed Nagar, Bhubaneshwar, Odisha - 751007	7894412585	Sunil.innodust@gmail.com	NA
6.	Vacen Engineering and Solutions Private Limited	Vibhutinath Pandey	Director	H-72-A, Second Floor, Kh No. 80/14, Mahavir Enclave, Palam, New Delhi - 110045	7503208625	Vibhuti.vacen@gmail.com	NA

7.	Ayodhyawasi Corporation (OPC) Private Limited	Anurag Srivastava	CEO	D-2/101, Vibhuti Khand, Gomti Nagar, Lucknow - 226010	8887521559	ayodhyawasigroup@gmail.com	NA
8.	Gujarat Institute of Solar Energy	Dipti Shah	Principal Director	620, Sharan Circle Business Hub, Opp. Zundal BRTS, Zundal Cross Road, Gandhinagar - 382421	9898167732	director@gise.in	NA
9.	GORenewable Technology	Japen Gor	Managing Partner	214, Devpath Complex, B/H Lal Bungalow, Off C.G Road, Navrangpura, Ahmedabad-380009	9099064348	japen@gorenewtech.com	NA
10.	SolarTech Saarthi Pvt. Ltd.	Lucky Agarwal	Managing Director	A-6/49, Sector 17, Rohini, Delhi - 110089	9711851306	solarsaarthi@gmail.com	NA
11.	Global Sustainable Energy Solutions India Pvt. Ltd.	Dwipen Boruah	Managing Director	FIEE Complex, A-46, Upper Ground Floor, Okhla Industrial Area, Phase II, New Delhi - 110020	9560550075	Dwipen.boruah@gses.in	NA
12.	ASW Projects Pvt. Ltd.	Uzma Ali	Assistant Manager	38 A,1st Floor, Surya Kiran Complex, Opposite Khureji Petrol Pump, West Laxmi	7011485393	aswprojects@gmail.com	NA

				Market, Delhi - 110051.			
13.	Friends Power Solution	Hiren Thakkar	Partner	25/c Mahakant Complex, Opp. v.s. hospital Ellisbridge, Ahmedabad	9825431155	Friendspowersolution1121@gmail.com	NA
14.	Grun Green Power Private Ltd	Ramesh Shivanna	Director	99, 2nd Cross, 2nd Main, MLA Layout, R T Nagar, Bangalore	9845010306	ramesh@prideworld.in	NA
15.	Heemsol Energy System Pvt Ltd	Dipti Shah	Director	620, Sharan Circle Hub, Near Zundal BRTS Bus Stand, Zundal, Gandhinagar-382421, Gujarat	9898167732	dipti@heemenergy.com	NA
16.	MS Enterprises	Nitin Verma	Director	248-A, Veer Sawarkar Nagar, Kota (Raj.) - 324005	9001860235	Rajsingh.necessary@gmail.com	NA
17.	OM SAI SOLAR POWER SYSTEM	Rajendra Singh	Director	Plot No. C-183, Noida, Sector 63	9999596127	Omsaisolarpowersystem12@gmail.com	NA
18.	SAURGURU GREEN ENERGY SOLUTIONS	Manisha Anand Barbind	Proprietor	Plot No. 03, Peshwe Nagar, Satara Parisar, Aurangabad (M.S)	9422108057	mabarbind@gmail.com	NA
19.	Shri Rang Aditya Solar Power EPC Pvt Ltd	Atul Jani	Director	A-413, Fourth Floor, Maradia Plaza, Near Panchvati 5 Cross Road, C. G.	76328 50466	rangadityaaspepc@gmail.com	NA

				Road, Ahmedabad			

Annexure: Training & Employment Details

Training and Employment Projections:

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2024-25	250		50		10	
2025-26	250		50		10	
2026-27	500		50		20	

Data to be provided year-wise for next 3 years

Training, Assessment, Certification, and Placement Data for previous versions of qualifications:

Qualification Version	Year	Total Candidates				Women				People with Disability			
		Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed	Trained	Assessed	Certified	Placed
1	2023-24	86		55									
2	2018-19	40		40									

Applicable for revised qualifications only, data to be provided year-wise for past 3 years.

List Schemes in which the previous version of Qualification was implemented:

1. NA

Content availability for previous versions of qualifications:

☒ **Participant Handbook** ☒ **Facilitator Guide** ☐ Digital Content ☐ Qualification Handbook ☐ Any Other:

Languages in which Content is available: Available in English

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	☒Theory/ Lectures - Imparting theoretical and conceptual knowledge	Not Applicable	Not Applicable
2	☒Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners		
3	☒Showing Practical Demonstrations to the learners		
4	☒Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☒Tutorials/ Assignments/ Drill/ Practice		
6	☒Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☒On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training		

Annexure: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0109: Prepare a site feasibility study report	*Introduction to Solar PV Sector in India*	**21**	**15**	**-**	**-**
	PC1. discuss and provide an overview of solar PV technology	3	-	-	-
	PC2. discuss and provide an overview of ground mounted and rooftop solar sector	3	-	-	-
	PC3. discuss types of ground mounted PV Power Plants and their working principles	3	-	-	-
	PC4. discuss various types of Rooftop Solar PV Power Plant and working principles	3	-	-	-
	PC5. discuss solar PV water pumping system technology and market	3	-	-	-
	PC6. discuss and provide an overview of National and State specific Solar PV water pumping related policies (e.g. PM KUSUM) and regulations	3	-	-	-
	PC7. discuss and provide an overview of available subsidies and financing options of solar water pumping system	3	-	-	-
	PC8. show the function of any solar PV system including solar water pumping system	-	5	-	-

	PC9. demonstrate know how of installation of solar water pump.	-	5	-	-
	PC10. show how financing for solar water pumping system can be arranged and how subsidies can be availed	-	5	-	-
	Prepare a site Feasibility Study Report	**39**	**25**	**-**	**-**
	PC11. discuss how to identify optimum location for installations	3	-	-	-
	PC12. discuss different types of Roofs and their structural load profile	3	-	-	-
	PC13. discuss how to assess the site level pre-requisites for solar panel installation on both ground and roof	*3*	-	-	-
	PC14. discuss how to analyse type of mounting to be constructed and place of mounting as per client requirement	*3*	-	-	-
	PC15. discuss how to check for any shading obstacles	*3*	-	-	-
	PC16. discuss how to prepare a site map of the location where installation has to be carried out	*3*	-	-	-
	PC17. discuss how to assess the load to be run on solar PV power plant and prepare a load profile	*3*	-	-	-
	PC18. discuss how to estimate the capacity of solar PV power plant	*3*	-	-	-

	PC19. discuss how to decide on battery backup as per grid availability, loads and client expectation	*3*	-	-	-
	PC20. discuss how to assess or obtain the site specific major parameters of solar resource data like Global Horizontal Irradiance (GHI), Diffused Normal Irradiance (DNI), Temperature and Wind	*3*	-	-	-
	PC21. discuss how to perform shading analysis using simulation tools	*3*	-	-	-
	PC22. discuss how to identify the risks associated with the specific solar project	*3*	-	-	-
	PC23. discuss how to prepare a site Feasibility Study Report using specialized software like PV*SOL®, PVsyst, SketchUp etc	*3*	-	-	-
	PC24. show how to perform simple calculations to illustrate the fundamental concepts of power and energy	*-*	**5**	-	-
	PC25. show how the movement of sun affects the performance of the solar power plant	*-*	**5**	-	-
	PC26. show how to obtain site specific resource data like GHI, DNI etc	*-*	**5**	-	-

	PC27. show how to estimate the energy generated from the solar PV power plant using solar design software like PV*SOL®, PVsyst, etc..	-	5	-	-

	PC28. show how to prepare a site feasibility report	-	5	-	-
NOS Total		**60**	**40**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0146: Design of solar PV power plant	*Design of solar PV power plant*	**26**	**24**	**-**	**-**
	PC1. discuss and show how to review and correctly interpret the mounting structure and foundation design & drawings	2	3	-	-
	PC2. discuss and show how to review the overall structural layout of the solar PV power plant	3	3	-	-
	PC3. discuss and show how to select solar module technology and size, based on analysis of cost, power output, quality, climatic conditions of the site, global and diffused irradiance ratio at the site, etc	3	3	-	-
	PC4. discuss to calculate the total numbers of modules based on the total capacity of the plant and the capacity of selected modules	3	-	-	-
	PC5. discuss to prepare the earthing design of solar module arrays	3	-	-	-
	PC6. discuss how to select inverter, based on compatibility with module technology, compliance with grid code and other applicable regulations, reliability, system availability, serviceability, quality, cost	3	-	-	-

	PC7. discuss how to decide on specifications of the inverter to power the AC loads in the building, in rooftop system	3	-	-	-
	PC8. discuss how to decide on number of inverters to be used based on the capacity and specifications of the inverter selected	3	-	-	-
	PC9. discuss to finalize the inverter layout and inverter locations on the basis of total capacity	3	-	-	-
	PC10. show how to perform calculation to estimate the total numbers of modules based on the total capacity of the plant and the capacity of selected modules	-	3	-	-

	PC11. show how to decide on number of inverters to be used based on the capacity and specifications of the inverter selected	-	3	-	-
	PC12. show how to perform calculation to estimate number of modules in a string based on the input voltage and MPPT voltage range of the inverter	-	3	-	-
	PC13. show how to estimate number of strings connected to a combiner box based on minimum run of DC connecting cables to minimized DC losses	-	3	-	-

	PC14. show how to perform calculation to estimate the number of combiner boxes connected to one panel of the inverter based on the input current rating of the inverter	-	3	-	-
NOS Total		**26**	**24**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0132: Installation and commissioning of solar PV power plant	*Installation and commissioning of solar PV power plant*	**58**	**42**	**-**	**-**
	PC1. discuss and show how to interpret the design and detailed drawings of the civil, mechanical and electrical works to be carried out at site	2	1	-	-
	PC2. discuss and show how to arrange for tools and consumable required for installation	2	1	-	-
	PC3. discuss how to follow the schedule for each of the civil and mechanical construction activity	3	-	-	-
	PC4. discuss and show how to manage the schedule for installation of modules, inverters, transformers, power protection devices, lightning arresters, earthing systems, etc. and ensure installation as per the design documents	3	1	-	-
	PC5. discuss how to check cables for continuity and manage the installation of communication and storage system with SCADA facility/ any monitoring system	2	-	-	-

	PC6. discuss to ensure installation of battery banks, if required	2	-	-	-
	PC7. discuss how to prepare, review and report progress on daily basis to the site in-charge for further action	3	2	-	-
	PC8. discuss and show how to visually inspect the plant and get pre connection connectivity and conductivity test done	3	1	-	-
	PC9. discuss how to verify system grounding and get the insulation resistance measured	2	-	-	-
	PC10. discuss as per design Confirm that electrical protections, disconnection and other provisions are fulfilled documents	3	-	-	-
	PC11. discuss how to get the DC voltage and current test done for each of the module strings	3	-	-	-
	PC12. discuss how to measure and record all relevant parameters of energy storage system if present	*2*	-	-	-
	PC13. discuss how to ensure calibration of SCADA/any monitoring system	*2*	-	-	-
	PC14. discuss how to prepare inspection report and forward to site-in charge for further action	*3*	-	-	-
	PC15. discuss how to the getting the clearance from electricity inspector, initiate startup procedures as per manufacturer's instructions	*3*	-	-	-

	PC16. discuss and show how to monitor the energy readings and voltages at regular intervals on start up	*2*	**1**	-	-
	PC17. discuss on record and report any anomalous condition to the site in-charge for further action	*3*	-	-	-
	PC18. discuss how to prepare as-built drawings and document design changes, if any	*3*	-	-	-
	PC19. explain how to perform trouble shooting of a Solar PV system, during commissioning and during maintenance	*2*	**1**	-	-
	PC20. explain Field parameter settings of Inverter	*2*	-	-	-
	PC21. show how to ensure the marking of the complete layout of the plant as per design	*-*	**3**	-	-
	PC22. show how to manage the schedule for installation of modules, inverters, transformers, power protection devices, lightning arresters, earthing systems, etc. and ensure installation as per the design documents	*-*	**2**	-	-
	PC23. discuss and show how to ensure the installation of cables between different components as per design documents	*1*	**2**	-	-
	PC24. explain and show how to perform installation of battery banks, if required	*1*	**2**	-	-

	PC25. explain and demonstrate how to Prepare, review and report progress on daily basis to the site in-charge for further action	1	2	-	-
	PC26. discuss and show how to Visually inspect the plant and get pre connection connectivity and conductivity test done	1	2	-	-
	PC27. discuss and show how to verify system grounding and get the insulation resistance measured	1	2	-	-
	PC28. show to confirm that electrical protections, disconnection and other provisions are fulfilled as per design documents	-	3	-	-
	PC29. discuss and show how to perform DC voltage and current test for each of the module strings	-	2	-	-
	PC30. show how to Measure and record all relevant parameters of energy storage system if present	-	2	-	-
	PC31. explain and show how to prepare inspection report	1	2	-	-
	PC32. discuss and show how to monitor the energy readings and voltages at regular intervals on start up	1	2	-	-
	PC33. explain and show how to record and report any anomalous condition to the site in-charge for further action	1	2	-	-

	PC34. show how to prepare as-built drawings and document design changes, if any	-	2	-	-
	PC35. show how to identify materials which can be replaced by environment friendly substitutes	-	2	-	-
	PC36. show how to identify processes where material and resource utilization can be optimized	-	2	-	-
NOS Total		**58**	**42**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0133: Quality assurance of solar PV power plant	*Quality Assurance of Solar PV power plant & components*	**25**	**25**	**-**	**-**
	PC1. discuss how to check modules earmarked for power plant using a random selection as per relevant IS/IEC standards	2	-	-	-
	PC2. discuss how to collect documentation related to each and every equipment and submit to site in- charge	2	-	-	-
	PC3. discuss how to ensure proper delivery/off-load of solar equipment	2	-	-	-
	PC4. discuss how to ensure to check all the material and equipment received at site for any physical damage	2	-	-	-

	PC5. discuss how to ensure specifications of the equipment and components match with what has been ordered	2	-	-	-
	PC6. discuss to ensure all warranty documents by manufacturers are properly signed and are in order	2	-	-	-
	PC7. discuss how to inspect the foundations of structures and verify cable routes and specifications as per design documents	2	-	-	-
	PC8. discuss how to inspect module installation, cable terminations while ensuring tightness	2	-	-	-
	PC9. discuss how to inspect the installation of inverters, protection devices and systems	3	-	-	-
	PC10. discuss how to carry out thermography of doubtful strings and modules to know the defects	3	-	-	-
	PC11. discuss how to collect and compile conformity, warranty documentation, performance guarantees, calibration certificates and any other relevant documentation and handover to site incharge, certificates	3	-	-	-
	PC12. show how to visit of the manufacturing facility of module manufacturer and inverter supplier and witness testing of a few inverters	-	**4**	**-**	**-**

	PC13. show how to inspect the foundations of structures and verify cable routes and specifications as per design documents	-	4	-	-
	PC14. show how to inspect module installation, cable terminations, installed inverters and protection devices and systems	-	4	-	-
	PC15. show how to perform visual inspection of the plant to find out defects and deficiencies	-	4	-	-
	PC16. show how to measure and record the circuit voltage and short circuit current of all the module strings and compare that with design values	-	4	-	-
	PC17. show how to carry out performance ratio test by continuous operation of the plant as per the industry norms and compare with designed values	-	5	-	-
NOS Total		**25**	**25**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0106: Maintain Personal Health & Safety at project site	*Adopt safe practices at workplace*	**13**	**19**	**-**	**-**
	PC1. explain the requirements for safe work area	2	-	-	-
	PC2. identify and report any hazards, risks or breaches in site safety to the appropriate authority	2	3	-	-
	PC3. follow recommended safe practices in handling physical, chemical, electrical and fire hazards and risk	1	2	-	-
	PC4. use appropriate Personal Protective Equipment(PPE) for head, eye, hand, ear, face, body and fall protection specific to work condition	2	4	-	-
	PC5. follow safe practices when working at height and in confined space	1	1	-	-
	PC6. handle all required tools, tackles, materials and equipment safely	1	2	-	-
	PC7. identify expiry dates, wear and tear issues of specified equipment and accordingly inform supervisor and undertake corrective measures	1	2	-	-
	PC8. apply ergonomic principles wherever required	1	2	-	-
	PC9. use safety signs, labels, charts and notices at workplace	1	1	-	-

	PC10. identify work safety procedures and instructions for handling heavy components	1	2	-	-
	Follow emergencies, rescue and first aid procedures	**4**	**4**	**-**	**-**
	PC11. follow emergency and evacuation procedures in case of accidents, fires and natural calamities	1	1	-	-
	PC12. use appropriate fire extinguishers for different types of fire	1	1	-	-
	PC13. administer first aid to victim in case of various medical emergencies including bleeding, burns, choking, electric shock, cardiac arrest, etc.	*1*	**1**	**-**	**-**
	PC14. use correct method to move injured person during an emergency	*1*	**1**	**-**	**-**
	Follow good housekeeping practices and infection control guidelines	*4*	**6**	**-**	**-**
	PC15. follow recommended personal hygiene, workplace hygiene and sanitation practices	*1*	**1**	**-**	**-**
	PC16. clean and disinfect all material, tools and supplies before and after use	*1*	**1**	**-**	**-**
	PC17. report immediately to concerned authorities regarding sign and symptoms of illness of self and other colleagues	*1*	**2**	**-**	**-**
	PC18. follow processes specified for disposal of hazardous waste	*1*	**2**	**-**	**-**
NOS Total		**21**	**29**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
DGT/VSQ/N0102: Employability Skills (60 Hours)	*Introduction to Employability Skills*	**1**	**1**	**-**	**-**
	PC1. identify employability skills required for jobs in various industries	-	-	-	-
	PC2. identify and explore learning and employability portals	-	-	-	-
	Constitutional values – Citizenship	**1**	**1**	**-**	**-**
	PC3. recognize the significance of constitutional values, including civic rights and duties, citizenship, responsibility towards society etc. and personal values and ethics such as honesty, integrity, caring and respecting others, etc.	-	-	-	-
	PC4. follow environmentally sustainable practices	-	-	-	-
	Becoming a Professional in the 21st Century	**2**	**4**	**-**	**-**
	PC5. recognize the significance of 21st Century Skills for employment	-	-	-	-
	PC6. practice the 21st Century Skills such as Self- Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn for continuous learning etc. in personal and professional life	-	-	-	-

	Basic English Skills	**2**	**3**	**-**	**-**
	PC7. use basic English for everyday conversation in different contexts, in person and over the telephone	-	-	-	-
	PC8. read and understand routine information, notes, instructions, mails, letters etc. written in English	-	-	-	-
	PC9. write short messages, notes, letters, e-mails etc. in English	-	-	-	-
	Career Development & Goal Setting	**1**	**2**	**-**	**-**
	PC10. understand the difference between job and career	-		**-**	**-**
	PC11. prepare a career development plan with short- and long-term goals, based on aptitude	-		**-**	**-**
	Communication Skills	*2*		**2**	**-**
	PC12. follow verbal and non-verbal communication etiquette and active listening techniques in various settings	-		**-**	**-**
	PC13. work collaboratively with others in a team	-		**-**	**-**
	Diversity & Inclusion	*1*		**2**	**-**
	PC14. communicate and behave appropriately with all genders and PwD	-		**-**	**-**
	PC15. escalate any issues related to sexual harassment at workplace according to POSH Act	-		**-**	**-**

	Financial and Legal Literacy	*2*	**3**	-	-
	PC16. select financial institutions, products and services as per requirement	-	-	-	-
	PC17. carry out offline and online financial transactions, safely and securely	-	-	-	-
	PC18. identify common components of salary and compute income, expenses, taxes, investments etc	-	-	-	-
	PC19. identify relevant rights and laws and use legal aids to fight against legal exploitation	-	-	-	-
	Essential Digital Skills	*3*	**4**	-	-
	PC20. operate digital devices and carry out basic internet operations securely and safely	-	-	-	-
	PC21. use e- mail and social media platforms and virtual collaboration tools to work effectively	-	-	-	-
	PC22. use basic features of word processor, spreadsheets, and presentations	-	-	-	-
	Entrepreneurship	*2*	**3**	-	-
	PC23. identify different types of Entrepreneurship and Enterprises and assess opportunities for potential business through research	-	-	-	-
	PC24. develop a business plan and a work model, considering the 4Ps of Marketing Product, Price, Place and Promotion	-	-	-	-
	PC25. identify sources of funding, anticipate, and mitigate any financial/ legal hurdles for		-	-	-

	the potential business opportunity	-			
	Customer Service	*1*	**2**	**-**	**-**
	PC26. identify different types of customers	-	**-**	**-**	**-**
	PC27. identify and respond to customer requests and needs in a professional manner.	-	**-**	**-**	**-**
	PC28. follow appropriate hygiene and grooming standards	-	**-**	**-**	**-**
	Getting ready for apprenticeship & Jobs	*2*	**3**	**-**	**-**
	PC29. create a professional Curriculum vitae (Résumé)	-	**-**	**-**	**-**
	PC30. search for suitable jobs using reliable offline and online sources such as Employment exchange, recruitment agencies, newspapers etc. and job portals, respectively	-	**-**	**-**	**-**
	PC31. apply to identified job openings using offline /online methods as per requirement	-	**-**	**-**	**-**
	PC32. answer questions politely, with clarity and confidence, during recruitment and selection	-	**-**	**-**	**-**
	PC33. identify apprenticeship opportunities and register for it as per guidelines and requirements	-	**-**	**-**	**-**
NOS Total		**20**	**30**	**-**	**-**

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
SGJ/N0134: Design, installation and commissioning of solar water pumping system	*Design, installation and commissioning of solar water pumping system*	**24**	**26**	**-**	**-**
	PC1. discuss how to carry out Solar resource assessment	2	-	-	-
	PC2. discuss how to decide on the specifications of the pumping set and motor	2	-	-	-
	PC3. discuss how to decide on the capacity of PV modules	2	-	-	-
	PC4. discuss how to design the plan of mounting structures and foundation	2	-	-	-
	PC5. discuss how to oversee the preparation of the foundation for solar module mounting structure and motor pump set.	2	-	-	-
	PC6. discuss how to ensure structure is fixed on the foundations	2	-	-	-
	PC7. discuss how to oversee the mounting of solar modules; connection of solar module array to pump set in case of DC pumps and installation of inverter (in case of AC pumps).	2	-	-	-
	PC8. discuss how to ensure protection system are in place	2	-	-	-

	PC9. discuss how to compare the output with design output and take corrective actions, if required	2	-	-	-
	PC10. discuss how to ensure connection of the solar module array to motor pump set through a Maximum Power Point Tracker (MPPT) to get maximum power from the array	2	-	-	-
	PC11. discuss how to install an inverter after MPPT to convert DC power to AC power in case an AC submersible motor pump set is used	2	-	-	-
	PC12. discuss how to ensure periodical cleaning of solar module array; periodically ensure tightness of cable connections and periodic maintenance of motor pump set	*2*	-	-	-
	PC13. show how to perform Solar resource assessment	-	**2**	-	-
	PC14. show how to analyze the water usage and level of water table at site	-	**2**	-	-
	PC15. show how to decide on the specifications of the pumping set and motor	-	**2**	-	-
	PC16. show how to decide on the capacity of PV modules and design the plan of mounting structures and foundation	-	**2**	-	-

	PC17. show how to oversee the preparation of the foundation for solar module mounting structure and motor pump set	-	2	-	-
	PC18. show how to ensure that structure is fixed on the foundations	-	2	-	-
	PC19. show how to perform inspection and testing of equipment	-	2	-	-
	PC20. show how to perform start-up procedures and measure output	-	3	-	-
	PC21. show how to compare the output with design output and take corrective actions, if required	-	3	-	-
	PC22. show how to install an inverter after MPPT to convert DC power to AC power in case an AC submersible motor pump set is used	-	3	-	-
	PC23. show how to assess various technical aspects of a Pump controller to perform trouble shooting of a Solar PV Pumping system	-	3	-	-
NOS Total		**24**	**26**	**-**	**-**

Annexure: Assessment Strategy

This section includes the processes involved in identifying, gathering, and interpreting information to evaluate the Candidate on the required competencies of the program.

1. Assessment System Overview:

- Batches assigned to the assessment agencies for conducting the assessment on SDSM/SID or email
- Assessment agencies send the assessment confirmation to VTP/TC looping SCGJ
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SCGJ monitors the assessment process & records

2. Testing Environment:

- Confirm that the centre is available at the same address as mentioned on SDMS or SIP
- Check the duration of the training.
- Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
- Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
- Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
- Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
- Check the availability of the Lab Equipment for the particular Job Role.

3. Assessment Quality Assurance levels / Framework:

- Question papers created by the Subject Matter Experts (SME)
- Question papers created by the SME verified by the other subject Matter Experts

- Questions are mapped with NOS and PC
- Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
- Assessor must be ToA certified & trainer must be ToT Certified
- Assessment agency must follow the assessment guidelines to conduct the assessment

4. Types of evidence or evidence-gathering protocol:
   - Time-stamped & geotagged reporting of the assessor from assessment location
   - Center photographs with signboards and scheme specific branding
   - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
   - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos

5. Method of verification or validation:
   - Surprise visit to the assessment location
   - Random audit of the batch
   - Random audit of any candidate

6. Method for assessment documentation, archiving, and access
   - Hard copies of the documents are stored
   - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
   - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

On the Job:

OJT Monitoring Report

- As in Green Jobs Sector, reproducing the evidence for assessment is not feasible due to constraints like cost, confidentiality and controlled environment, every
- Apprentice is required to record the evidences performed during the OJT and the same gets authorized by his/her supervisor.
- The evidence recording is done in a structured monitoring report, termed as OJT Monitoring report.
- During the OJT, every trainee is required to fill the OJT monitoring report which is required to be signed by his/her supervisor.
- Towards the end of OJT period these reports are submitted with the HR department of company
- These duly submitted reports are then verified by an Industry nominated assessor for verification of evidence.

Theory, Practical & Viva:

- Scope – Is used to test the knowledge and understanding and skills acquired during the OJT as well as to conform the OJT monitoring report.
- Some personality traits and generic skills (such as – promptness, sharpness, communication skills, depth of knowledge, comprehension, presentation, patience
- etc) can also be tested, which is also required for the QP.
- Tools – The assessment's questions should be aligned with the Qualification Pack, covering the PCs. There will be summative assessment at the end of the OJT.
- Method – Direct questions open and close ended questions, situation-based questions, analytical questions, and decision-making based questions for Viva,
- MCQ for the theory and performing QP related operations for practical. Different questions in theory, practical and viva are included to test relevant PCs from
- the QP
- Analysis – Assessor draws a spectrum of ready answers to be expected from trainee for Viva. This reduces effect of subjectivity of the assessor. Comparative
- Quality of trainees within a batch or different institutes can be gauged. The skill is gauged by observing the practical work.

Execution of OJT Assessment:

- HR department hands over the individual OJT monitoring report with Industry nominated assessor and schedules an assessment meeting for each trainee.
- Industry nominated assessor assesses each trainee based on OJT monitoring report, viva on each PC and also takes into account attendance of each trainee towards the end of the OJT period.
- The OJT marks are compiled for each NOS by the Industry nominated assessor and submitted with HR department of company.
- The OJT assessment results are then sent to SCGJ by HR department of company in a sealed envelope for compiling the assessment results in case of offline assessment.

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body

ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NOS	National Occupational Standard(s)
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
National Occupational Standards (NOS)	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
Qualification	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
Qualification File	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
Sector	A grouping of professional activities on the basis of their main economic function, product, service or technology.
Long Term Training	Long-term skilling means any vocational training program undertaken for a year and above. https://ncvet.gov.in/sites/default/files/NCVET.pdf

Annexure: Annexure: Career Progression and OM

NSQF Level/domain	Solar PV - Off Grid							
8	MD/Director							
6.5-7			Category Head (Solar PV Pumps)	Category Head (Solar Street Lighting)		Category Head (Solar Lantern and Solar Home lighting)		
5.5-6	Solar Off-Grid Sales Manager		Solar PV Pump Installation and Maintenance Manager /Solar Pump Entrepreneur	Site Supervisor	Civil Subcontractor		Solar Off Grid Production Manager (Solar Lantern and Solar Home lighting)	
4.5-5		Solar Cold Storage Dealership or Channel Partner	Solar Water Pumping Junior Engineer	Solar Off Grid Street Lighting Installation and Maintenance Supervisor	Mechanical / Civil Supervisors	Solar Off-Grid Entrepreneur	Solar Off Grid Production Supervisor (Solar Lantern and Solar Home lighting)	
3.5-4	Solar Off – Grid Sales Executive	Solar Cold Storage Entrepreneur	Agrivoltaic Installer/ Solar Pump Technician	Solar Lighting Assembler	Mason	Solar Off Grid Installation and repair Technician (Solar Lantern and Solar Home lighting)		Solar Off Grid Manufacturing Technician (Solar Lantern and Solar Home lighting)
2.5-3		Junior Technician-Solar Cold Storage		Solar Domestic Product Assembler				
2			Solar PV Project Helper	Solar PV Installation Helper	Solar PV Project Helper	Solar PV Project Helper		Solar PV Project Helper
1								

Solar Water Pumping Junior Engineer