QUALIFICATION FILE

Green Energy Supervisor – Solar

☒ 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 ☐ OEM

NCrF/NSQF Level: 5

Submitted By:

The TATA Power Company Ltd.

The Tata Power Company Limited, Parel Receiving Station, Parel Tank Road, Mumbai 400 033, Maharashtra, India

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Section 1: Basic Details

1.	**Qualification Name:**	Green Energy Supervisor – Solar	
2.	**Sector/s:**	Environmental Science	
3.	**Type of Qualification: ☒ New ☐ Revised ☐ Has Electives/Options ☐OEM**	**NQR Code & version of existing/previous qualification:** *(change to previous, once approved)* **Not Applicable (new)**	**Qualification Name of existing/previous version:** Not Applicable (new)
4.	**a. OEM Name** **b. Qualification Name** (*Wherever applicable)*	N/A Green Energy Supervisor – Solar	
5.	**National Qualification Register (NQR) Code &Version** (*Will be issued after NSQC approval)*	**QG-05-ES-03868-2025-V1-TATAPWR**	**6. NCrF/NSQF Level: 5**
7.	**Award (Certificate/Diploma/Advance Diploma/ Any Other** *(Wherever applicable specify multiple entry/exits also & provide details in annexure)*	Certificate	
8.	**Brief Description of the Qualification**	A Green Energy Supervisor – Solar specializes in technology, installation, and maintenance & troubleshooting of photovoltaic (PV) systems to ensure efficient solar energy generation. They are responsible for implementing system design, installing panels, troubleshooting issues, and performing routine maintenance to enhance performance and safety. Their role also involves adhering to industry standards, optimizing energy output, and contributing to the growth of renewable energy solutions.	
9.	**Eligibility Criteria for Entry for Student/Trainee/Learner/Employee**	**a. Entry Qualification & Relevant Experience:** **b. Age:** N/A	

S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)
1.	Completed 2nd year of 3-year/ 4-years UG with knowledge of science	2 years of relevant experience in renewable energy/power sector/energy/electrical
2.	Completed 1st year of 3-year/ 4-years UG with knowledge of science	3 years of relevant experience in renewable energy/power sector/energy/electrical
3.	12th Grade pass or equivalent	5 years of relevant experience in renewable energy/power sector/energy/electrical

		4.	Previous NSQF level 4.5	1.5 years of relevant experience in renewable energy/power sector/energy/electrical
		5.	Previous NSQF level 4	3 years of relevant experience in renewable energy/power sector/energy/electrical

10.	**Credits Assigned to this Qualification, Subject to Assessment** *(as per National Credit Framework (NCrF))*	17	**11. Common Cost Norm Category (I/II/III)** *(wherever applicable)*: **Type I**
12.	**Any Licensing requirements for Undertaking Training on This Qualification** *(wherever applicable)*	Not Applicable	
13.	**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**	
14.	**Aligned to NCO/ISCO Code/s** *(if no code is available mention the same)*	NCO 2015/7421.1403, 7421.1402, 3323.0501	
15.	**Progression path after attaining the qualification** *(Please show Professional and Academic progression)*	Site Supervisor, Solar PV Manager	
16.	**Other Indian languages in which the Qualification & Model Curriculum are being submitted**	**English only**	
17.	**Is similar Qualification(s) available on NQR-if yes, justification for this qualification**	☐ **Yes** ☒ **No URLs of similar Qualifications:** The existing QPs in Solar PV focus on technical installation roles, primarily for engineering backgrounds, who seek careers in renewable energy. The proposed Qualification Pack for Green Energy Supervisor – Solar addresses this need by preparing youth for supervisory, managerial, and entrepreneurial roles in the sector. **This QP aims to:** 1. Expand career opportunities for technical graduates. 2. Develop multi-skilled professionals beyond installation roles.	

Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	OJT Recommended (Hours)	Total (Hours)
Classroom (offline)		**80**	**60**	**0**	**140**
Online	**210**	**160**	**-**	**-**	**370**

(Refer Blended Learning Annexure for details)

		3. Support India's energy transition by bridging the demand for supervisors, officers, and managers in the renewable sector. 4. Ensure industry alignment by integrating technical knowledge, safety, and business skills. This initiative will create a skilled workforce to drive scalability and efficiency in renewable energy projects, supporting India's green energy goals.	
18.	**Is the Job Role Amenable to Persons with Disability**	**☒ Yes ☐ No** **If "Yes", specify applicable type of Disability:** Limited Sensory Impaired	
19.	**How Participation of Women will be Encouraged**	The Green Energy Supervisor – Solar QP actively promotes women's participation in the renewable energy sector by addressing accessibility, inclusivity, and skill development. Special outreach programs will create awareness about opportunities in supervisory, managerial, and entrepreneurial roles. Training centers will ensure a safe and supportive environment with flexible schedules and mentorship programs. Scholarships and financial incentives will be explored to encourage more women to enrol. Additionally, collaborations with women-led enterprises and organizations will provide career pathways in solar energy projects. This initiative aims to bridge gender gaps, empowering women to play a vital role in India's energy transition.	
20.	**Are Greening/ Environment Sustainability Aspects Covered** *(Specify the NOS/Module which covers it)*	**☒ Yes ☐ No** **Modules 12-41**	
21.	**Is Qualification Suitable to be Offered in Schools/Colleges**	**Schools ☐ Yes ☒ No Colleges ☒ Yes ☐ No**	
22.	**Name and Contact Details of Submitting / Awarding Body SPOC** *(In case of CS or MS, provide details of both Lead AB & Supporting ABs)*	**Name: Alok Prasad** **Email: alokprasad@tatapower.com** **Contact No.:** 9204857098 **Website: www.tatapower.com**	
23.	**Final Approval Date by NSQC: 08/05/2025**	**24. Validity Duration: 3 years**	**25. Next Review Date : 07/05/2028**

Section 2: Module Summary

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*

S. No	NOS Name	NOS/Module Code & Version *(if applicable)*	Core/ Non-Core	NCrF/NSQF Level	Credits as per NCrF	Training Duration (Hours)					Assessment Marks					
						Theory	Practical	OJT Manhours	OJT-Rec.	Total	Theory	Practical	Project	Viva	Total	Weightage (%) *(if applicable)*
1	Interpret and Apply Electrical Concepts and Wiring	TPCL/SGJ/N0301	Core	5	5	60	90			150	2	2			4	20%
											6	10			16	
											Total Marks				**20**	
2	Demonstrate knowledge of Renewable Energy and Execute the Solar PV Plant Lifecycle	TPCL/SGJ/N0302	Core	5	7	90	60	60		210	2	2			4	48%
											3	4			7	
											3	4			7	
											3	4			7	
											4	4			8	
											2	2			4	
											2	3			5	
											1	1			2	
											1	1			2	
											1	1			2	
											Total Marks				**48**	

3	Understand and implement Safety and Health Practices in Solar PV Projects	TPCL/SGJ/N0303	Non-Core	5	3	30	60			90	1	2			3	22%
											1	2			3	
											1	2			3	
											1	2			3	
											1	1			2	
											1	2			3	
											1	2			3	
											1	1			2	
											Total Marks				**22**	
4	Employability Skills	DGT/VSQ/N0102	Non-Core	5	2	30	30			60	1				1	10%
											1				1	
												1			1	
												1			1	
												1			1	
												1			1	
											1				1	
												1			1	
												1			1	
											1				1	
											Total Marks				**10**	
	Total				**17**	**210**	**240**	**60**		**510**	**40**	**60**			**100**	

Elective NOS/s: None

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-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Optional NOS/s: None

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-Rec.	Total	Th.	Pr.	Proj.	Viva	Total	Weightage (%) *(if applicable)*
1.																
2.																
Duration (in Hours) / Total Marks																

Assessment - Minimum Qualifying Percentage

*Please specify **any one** of the following:*

Minimum Pass Percentage – Aggregate at qualification level: 60 % *(Every Trainee should score specified minimum aggregate passing percentage at qualification level to successfully clear the assessment.)*

Minimum Pass Percentage – NOS/Module-wise: 50 % *(Every Trainee should score specified minimum passing percentage in each mandatory and selected elective NOS/Module to successfully clear the assessment.) Not applicable*

Section 3: Training Related

1.	**Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Degree in Electrical/ Electrical and Electronics Engineering from recognized Engineering College/ university with one year's experience in the relevant field. OR Diploma in Electrical / Electrical and Electronics Engineering from recognized board of technical education with two years' experience in the relevant field. OR Existing Instructors of ITIs/NSTIs/ IToTs of Solar Technician (Electrical) / Electrician CTS/ CITS trades. OR NTC passed in the Trade of "Solar Technician (Electrical)" With three years' experience in the relevant field. Domain Certification Required : ToT completion certificate from NCVET recognized Awarding Body Platform Certification Required : NSDC certification from SIDH portal for ToT completion
2.	**Master Trainer's Qualification and experience in the relevant sector (in years)** *(as per NCVET guidelines)*	Degree in Electrical/ Electrical and Electronics Engineering from recognized Engineering College/ university with three year's experience in the relevant field. OR Diploma in Electrical / Electrical and Electronics Engineering from recognized board of technical education with four years' experience in the relevant field. OR Existing Instructors of ITIs/NSTIs/ IToTs of Solar Technician (Electrical) / Electrician CTS/ CITS trades with five years' experience in the relevant field. Domain Certification Required : ToT completion certificate from NCVET recognized Awarding Body Platform Certification Required : NSDC certification from SIDH portal for ToT completion
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**	**N/A**

Section 4: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Same as point 1 of Section 3 (Trainers' qualification and experience)
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Same as point 1 of Section 3 (Trainers' qualification and experience)

3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per NCVET guidelines)*	Same as point 2 of Section 3 (Master Trainers' qualification and experience)
4.	**Assessment Mode** *(Specify the assessment mode)*	Summative Assessment and Formative Assessment
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
2.	**Latest Market Research Reports or any other source (not older than 2 years) (Yes/No): Yes,** Industry Consultation
3.	**Government /Industry initiatives/ requirement (Yes/No):** Yes
4.	**Number of Industry validation provided:** More than 20
5.	**Estimated nos. of people to be trained and employed:** 9,000
6.	**Evidence of Concurrence/Consultation with Line Ministry/State Departments:** If "No", why: Yes (SCGJ)

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
3.	**Annexure:** Detailed Assessment Criteria (Mandatory)	Annexure: Detailed Assessment Criteria
4.	**Annexure:** Assessment Strategy (Mandatory)	Annexure**:** Assessment Strategy
5.	**Annexure:** Blended Learning (Mandatory, in case selected Mode of delivery is "Blended Learning")	N/A
6.	**Annexure:** Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	N/A
7.	**Annexure:** Acronym and Glossary (Optional)	YES
8.	**Supporting Document:** Model Curriculum (Mandatory – Public view)	YES
9.	**Supporting Document:** Career Progression (Mandatory - Public view)	YES
10.	**Supporting Document:** Occupational Map (Mandatory)	Annexure**:** Occupational Map
11.	**Supporting Document:** Assessment SOP (Mandatory)	Annexure**:** Assessment SOP
12.	**Any other document you wish to submit:**	Annexure: Skill-Gap Analysis

Annexure: Evidence of Level

Title/Name of qualification/component: Solar PV Supervisor			**Level: 5.0**
NCrF/NSQF Level Descriptors	**Key requirements of the job role/ outcome of the qualification**	**How the job role/ outcomes relate to the NCrF/NSQF level descriptor**	**NCrF/NSQF Level**
Professional Theoretical Knowledge/Process	Understands solar PV system components, electrical circuits, and grid integration. Applies Ohm's Law, Kirchhoff's Law, MPPT algorithms, and power factor correction. Knowledge of energy storage, load management, and hybrid system integration.	Demonstrates specialized technical knowledge of electrical and solar energy systems, enabling professionals to design, install, and optimize PV systems independently. Learn multidisciplinary concepts such as electrical safety, energy efficiency, and renewable energy policies. Knowledge is deep enough to make design and installation decisions in compliance with national and international standards.	5.0
Professional and Technical Skills/ Expertise/ Professional Knowledge	Installs, configures, and maintains solar PV systems, including inverters, batteries, and energy meters. Uses IV curve tracers, pyranometers, insulation testers, and monitoring software for system performance assessment. Troubleshoots faults related to solar panels, inverters, charge controllers, and wiring connections.	Develops specialized skills to apply scientific principles in troubleshooting, system optimization, and real-time fault detection in PV systems. Has the ability to work with precision using advanced testing equipment. Applies cognitive and practical skills to evaluate the efficiency of PV systems and improve their reliability. Develops expertise in performing system upgrades and preventive maintenance.	5.0
Employment Readiness & Entrepreneurship	Equips professionals with technical and business skills for job roles in solar PV installation, maintenance, and consulting. Understands net metering, financing models (CAPEX, RESCO), and government incentives. Learns documentation and compliance processes for grid interconnection and regulatory approvals. Develops an entrepreneurial mindset for setting up a solar installation or service business.	Meets industry demand for skilled solar professionals, enabling employment and self-employment through business setup, project management, and financial assessment. Demonstrates the ability to conduct feasibility studies, assess financial returns (ROI, payback period), and work in the distributed renewable energy sector. Can plan and execute projects, interact with clients, and manage a workforce in the solar PV domain.	5.0
Skills & Mind-set/Professional Skill	Diagnoses system faults, analyzes PR and CUF values, and optimizes solar energy generation. Follows safety protocols (LOTO, PPE, fire prevention). Uses digital tools (PV Syst, Helioscope) for system design and performance analysis. Develops problem-solving abilities for real-world troubleshooting in solar installations.	Enhances problem-solving, risk management, and adaptability in real-world PV installations. Ensures safety and regulatory compliance by understanding electrical safety measures and fault prevention techniques. Demonstrates professional skills in handling electrical tools and digital simulation software for system evaluation. Ability to make real-time decisions to ensure system stability and efficiency.	5.0
Broad Learning Outcomes/Core Skill	Demonstrates knowledge of PV design, load assessment, cable sizing, and energy monitoring. Applies mathematical calculations for energy output, system losses, and efficiency improvement. Uses technical documentation, industry codes, and standards (IEC, IS, NEC). Communicates effectively in professional settings for reporting and teamwork.	Provides broad learning across solar PV design, maintenance, and monitoring, integrating digital literacy and numerical skills. Enhances the ability to document and interpret project blueprints, technical specifications, and maintenance logs. Strengthens technical writing, report generation, and communication skills essential for collaboration in the energy sector.	5.0
Responsibility	Takes ownership of system performance, safety compliance, and quality control. Works independently or in a team to execute PV installations.	Demonstrating autonomy, accountability, and professional responsibility in solar PV system implementation and maintenance. Ability to work under minimal supervision while handling critical tasks such as power	5.0

	Conducts performance audits, ensures compliance with safety codes, and maintains PV systems for long-term reliability.	system troubleshooting, grid synchronization, and solar plant commissioning.	

Annexure: Tools and Equipment (Lab Set-Up)

List of Tools and Equipment

Batch Size: *Quantity Assumption: 2 groups of students in one batch of 20 students.

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Hand crimping tools	for MC4 Connector Lugs	2
2	Screwdriver Set	5 Inch – 16 Inch	2
3	Wire stripper	150B for 12-24 Gauge wires, 50 mts	2
4	Clip-On Clamp meter	20 Amp	2
5	Multimeter	1 M-Ohm, 1000 Volts AC, 20 Amp	2
6	Megger Digital	500 Volts	1
7	Earthing Rod	3 Meters	1
8	Solar PV system (3kW)		1
9	ACDB	Assembled	1
10	DCDB	Assembled	1
11	SPD AC	10 KA, 600 Volts	5
12	SPD DC	10 KA, 500 Volts	5
13	Charge Controller	3 kW (for a 3kW solar PV system)	1
14	Allen key set	Standard - Upto 16 MM	1
15	Module clamp set	Assembled	24
16	Magnetic compass	Standard	2
17	Temperature sensor	0-150 degrees Centigrade	2
18	Self-threaded screws	Standard	200
19	Solar PV cells	Standard, 6 x 6 Inches	15
20	MC4 connectors	Standard	60 pairs
21	Keys for MC4 connectors	Standard	6
22	Rheostat	50 Ohm, 10 Amp, 500 Watts	1
23	Solar DC cable 4 Sq. MM	4 Sq. MM	100 meters
24	Angle Finder/ Inclinometer	Standard	2
25	Cable gland – metallic 1”	1 Inch	10
26	PG gland	5-20 MM	5
27	Lightning arrestor	12 kV / 42 kV	1
28	Bentonite powder	25/50 Ltrs	2 bags
29	Earthing clamps	Standard	25

30	Earthing strips	25 MM x 3 MM GI	10 Meters
31	Spacers for earthing strips	Standard	10
32	Crocodile clip	Standard	12
33	Hydrometer	12 Volts, 1100-1300 SPGR	4
34	Cable tie set – plastic 100 NOS (150 MM)	150 MM	2 packets
35	Cable tie set – plastic 100 NOS (200 MM*3.6)	200 MM*3.6	2 packets
36	Ferrule set (A TO Z & 0 TO 9) 4mm	A TO Z & 0 TO 9 4mm	1 packet
37	Bare copper conductor/ GI conductor	10 Sq. MM	10 meters
38	Solar Battery	12 Volts 75AH	Depending on the system, minimum 1
39	Solar Pathfinder	NA	1
40	Solar Panel Cleaning Liquid 5ltr	NA	1 can (5 ltrs)
41	Acrylic adhesive for solar	NA	1 can

Classroom Aids

The aids required to conduct sessions in the classroom are:

1.
2.

Annexure: Skill Gap Analysis

Sector	Segment	Roles	Workforce Forecast	Region	Timeframe	Source Reference
Green Energy	Solar	Component Mfg & Assembly	32.6 Lacs	India	2050	Skills-Landscape-for-Green-Jobs-Report
		Installation & Commissioning			2030	
		O & M				
	Wind	Manufacturing	1.8 Lacs			
		O & M				
	Bioenergy	Feedstock Collection	1 Lac			
		Installation/Construction				
		Production and O & M				
	Green Hydrogen	Installation	6 Lacs			
		Electrolyser & Component Mfg.				
		Plant Construction & Commissioning				
		GH2 Production				
		GH2 Storage				
		Distribution & Transport				
		Application				
Power	Generation	Electrical generation systems	70 Lacs	Global	2030	IEA - World Energy Employment Report
		O & M in power sector	4 Lacs	India	2027	Proposed by Central Electricity Authority
	Transmission & Distribution	T & D	7.85 Lacs	India	2027	
		Grid Workers	50 Lacs	Global	2030	IEA - World Energy Employment Report

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	Horizon	Vikas Agarwalla	Partner	Hari Kunj Apartment, Saraidhella, Main Road, Dhanbad -828127	9431122219	vikas@horizon4u.in	
2	Life Liner Private Limited	Subash Chandra Sahoo	CEO	Plot no 436, Lane 5, Sector 5, Niladri Vihar, Bhubaneshwar, Odisha	9886699097	info@lifeliner.in	
3	MVP Enterprises	Moulick Kumar Ranpara	Partner	Shop no 5, Line no 12, Bistupur, Jamshedpur, Jharkhand - 831001	9973377226	mvpbatteries@gmaill.com	
4	Power Rays	Madhur S Shetty	Proprietor	#131, Service Rd, East of NGEF Layout, Kasturi Nagar, Bengaluru, Karnataka 560043	8970820110	Madhur@powerrays.in	
5	Raj Energy	Biswa Bhushan	Head of Marketing	Plot No - 4780, Chakeishiani, Near Mancheswar Industrial Estate, Bhubaneswar, Odisha - 751010	7827221125 9937370606	rajenergy2050@gmail.com	
6	Rani Enterprises	Abhijit Kumar	Proprietor	Sarveshwari Niketan, Near Krishna Apartment, Radium Road Ranchi – 834001, Jharkhand	7903090280	Ranienterprises47@gmail.com	
7	Sidvin Enterprises	Amit S Shenoy	Business Head	#797, Ganapa, Adarsh Nagar, Nelamangala, Bengaluru - 562123	9901799287	Amit.shenoy@sidvinenterprises.com	
8	The Solar Flux	Vandana Sah	Proprietor	502, Mahaveer Trade Centre, Gamharia, Jamshedpur, Jharkhand - 832108	8010604770	thesolarflux@gmail.com	
9	Sudarshan Solar Systems and Agencies	Channdrasekhar Mahajan	Proprietor	New B J Market, Shop no -203, C wing, Jalgaon - 425001	9766001021	Solar.sudarshan@gmail.com	
10	Surya Enterprises	Rajesh Salunkhe	Proprietor	Shivkamal silver arch, Nandi stop, Ausa road lathur, Maharashtra - 413531	9423744666	Surya.enterp2016@gmail.com	
11	Surya Mitra enterprises	Suman Kumar Mishra	Partner	Plot no 28, Prapti Estates, chira chas, Bokaro, Jharkhand 827013	8789098446	sales@suryamitra.co.in	
12	SVPL Solar	Himanshu Avinash Ingale	CEO	N101, MIDC, Jalgaon 425003	9518798020	Himanshuinglae55@gmail.com	

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
13	Tirupati Solar energy and services	Dilip Shiradkar	Proprietor	Sumangal complex cidco N7 Aurangabad 431001	8441707441	Tirupatisolar2020@gmail.com	
14	Bhatt Enterprises	Sanchay Bhatt	Partner	Shop no 04, 3rd floor, Cross Road Business park, Vaupar Vihar, Bilaspur - 495001	7000103302	enterprisebhatt@gmail.com	
15	Go Mumbai Solar	Shadab	Partner	14/B bldg. no 2, Jai Hind CHS, Gulab Nagar, Khar(W), Mumbai - 400052	9819086830	shadab@gomumbaisolar.com	
16	Kalawati Enterprises	Goutam Kumar	Proprietor	Room no 201, Ganapti PalaceNH 33, Charhi Hazaribagh - 825336	9122512611	enterpriseskalawati@yahoo.com	
17	Swetark Solar	Vikas Verma	Partner	49/107 Ward 35, Tiranga nagar, Bhilai, Durg 490011	9691892282	swetarksolar@gmail.com	
18	The Prime Power Controls	K Maheshwari	Partner	SF No.446/1, Sathy Road, Ganapathy. Coimbatore 641006.	9842131625	Kmw1968@gmail.com	
19	Triples Energy	K Arut Chelvam	CEO	149 Hope college, Avinashi Road, Coimbatore 641004	9894719995	arul@iclindia.in	
20	Ayushmaan Solar Enterprises	Akshay B	Proprietor	405 H, Sathya Complex, Big Bazar Street, Townhall, Coimbatore - 641001	9677889830	md.ayushmmaansolar@gmail.com	
21	Chandra Lubicare	R. Tamilarasu	Partner	5A/9, First Floor, Venkatraman Street, Chinna Chokkikulam, Madurai - 625002	9345822595	tatapowersolar@chandralubricare.com	
22	RPS Solar India Private Ltd.	A. Sambath Gowri	Director	No.7, Star Avenue,behind taj marriage Hall, Trichy - 620002.	9842418882	info@rpssolarindia.com	
23	Solares	S. Sasipriya	Director	34, Sambakulam, Ganesh Nagar, 120 Feet road, Madurai - 625007	7502022287	Sasimca.20@gmail.com	
24	Tata Power Renewable Energy Ltd.	V. Karthikeyan	National Head- BD	No 78, Electronic City, Hosur Main Road, Bangalore 560100	9008311556	Karthikeyan.v@tatapower.com	
25	Trident Solar	P. Balaji B.E	Managing Director	No 69/1/38 A, Arumugam Nagar, Alagapuram, Salem - 636016	9842710153	tridentsolarsalem@gmail.com	

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
2025-2026	2000	40000	200	10000	20	400
2026 - 2027	3000	60000	300	15000	30	600
2027 -2028	6000	70000	600	20000	50	700

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

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.
2.

Content availability for previous versions of qualifications:

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

Languages in which Content is available: 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		
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 Name - Interpret and Apply Electrical Concepts and Wiring						
NOS No.	**NOS Name**	**Performance Criteria**	**Assessment Criteria**	**Theory Marks**	**Practical Marks**	**Total Marks**
1	Interpret and Apply Electrical Concepts and Wiring	Identify basic electrical terms: voltage, current, and resistance.	Explain key electrical terms and their significance.	1	-	1
		Explain the use of Ohm's Law in simple circuits.	Apply Ohm's Law to determine voltage, current, or resistance in a basic circuit.	1	-	1
		Demonstrate the measurement of voltage, current, and resistance using a multimeter.	Use a multimeter to measure basic electrical parameters.	-	2	2
		Identify common electrical symbols in circuit diagrams.	Recognize and interpret common symbols used in wiring diagrams.	2	-	2
		Explain the difference between series and parallel circuits.	Describe how series and parallel circuits function in electrical systems.	1	1	2
		Demonstrate basic electrical wiring for a simple circuit.	Connect and test a basic electrical circuit following a wiring diagram.	-	3	3
		Demonstrate how to check continuity in a circuit using a multimeter.	Use a multimeter to check the continuity of wires and components.	-	3	3
		Identify safety precautions for electrical wiring.	Explain key safety measures while handling electrical wiring and connections.	2	-	2
		Demonstrate proper wire connections and insulation techniques.	Connect wires securely and apply insulation following standard practices.	1	3	4
TOTAL				**8**	**12**	**20**

NOS Name – Demonstrate knowledge of Renewable Energy and Execute the Solar PV Plant Lifecycle						
NOS No.	**NOS Name**	**Performance Criteria**	**Assessment Criteria**	**Theory Marks**	**Practical Marks**	**Total Marks**
2	Demonstrate knowledge of Renewable Energy and Execute the Solar PV Plant Lifecycle	Explain the different types of renewable energy sources and their significance.	Identify and compare various renewable energy sources such as solar, wind, hydro, and biomass.	2	2	4
		Describe the advantages and limitations of renewable energy sources.	Analyse case studies to assess the feasibility of renewable energy solutions.	2	2	4
		Explain the basic working principle of solar photovoltaic technology.	Identify the key components of a solar PV system and describe their functions.	2	2	4
		Describe the different types of solar panels and their efficiency factors.	Compare monocrystalline, polycrystalline, and thin-film solar panels based on efficiency and cost.	2	2	4
		Identify the essential tools required for solar PV installation.	Demonstrate the correct use of tools such as multimeters, crimping tools, and insulation testers.	2	2	4
		Explain the function of key electrical and mechanical components in a solar PV system.	Inspect and test PV system components such as connectors, fuses, and junction boxes.	2	2	4
		Explain the importance of conducting a site survey before solar PV installation.	Identify key site assessment parameters such as shading analysis, roof strength, and orientation.	2	2	4
		Demonstrate the use of site survey tools and techniques for solar PV assessment.	Conduct a site assessment using tools such as solar pathfinders, inclinometers, and measuring tapes.	1	1	2
		Explain the step-by-step process of installing a solar PV system.	Demonstrate the correct installation of solar panels, inverters, and mounting structures.	1	1	2
		Describe the commissioning process and performance verification of a solar PV system.	Perform system testing, including voltage and current measurement, before commissioning.	1	1	2

		Performance Criteria	Assessment Criteria	Theory Marks	Practical Marks	Total Marks
		Explain the key maintenance practices for solar PV systems.	Demonstrate routine maintenance procedures such as panel cleaning and connection tightening.	1	1	2
		Describe fault detection techniques for solar PV systems.	Identify common system faults and demonstrate troubleshooting techniques.	1	1	2
		Explain the importance of monitoring solar PV system performance.	Analyze performance data to detect underperformance or failures.	1	1	2
		Demonstrate basic troubleshooting of solar PV systems.	Use a multimeter and IV curve tracer to diagnose issues in a PV installation.	1	1	2
		Explain the key financial aspects of solar PV projects, including ROI and payback period.	Calculate ROI and payback period for a sample solar PV project.	1	1	2
		Describe the regulatory approvals and procedures for solar PV installations.	Identify key government schemes, incentives, and approval processes for solar projects.	0	1	1
		Explain emerging technologies in solar PV, such as bifacial panels and floating solar.	Compare traditional and new solar PV technologies in terms of efficiency and application.	0	1	1
		Describe advancements in energy storage and hybrid solar solutions.	Demonstrate the working principles of solar-plus-storage systems.	0	1	1
		Explain the basic process of solar PV panel manufacturing.	Identify key stages such as wafer production, cell assembly, and module lamination.	0	1	1
TOTAL				**22**	**26**	**48**

NOS Name – Understand and implement Safety and Health Practices in Solar PV Projects						
NOS No.	**NOS Name**	**Performance Criteria**	**Assessment Criteria**	**Theory Marks**	**Practical Marks**	**Total Marks**
3	Understand and implement Safety and Health Practices in Solar PV Projects	Explain general workplace safety guidelines and best practices.	Identify and demonstrate the use of personal protective equipment (PPE).	1	2	3
		Describe the hazards associated with electrical work.	Demonstrate safe handling of electrical tools and equipment to prevent electric shock.	1	2	3
		Explain the risks and precautions while working at heights.	Demonstrate the proper use of harnesses and fall protection equipment.	1	2	3
		Describe the proper techniques for lifting and transporting materials.	Demonstrate safe handling of heavy loads using lifting equipment or proper manual methods.	1	2	3
		Explain the importance of a proactive safety culture in the workplace.	Identify unsafe acts and conditions and report them for corrective actions.	1	1	2
		Explain fire hazards, fire classifications, and firefighting techniques.	Demonstrate the correct use of a fire extinguisher using the PASS method.	1	2	3
		Explain the basic principles of first aid and emergency response.	Demonstrate first aid techniques for treating burns, cuts, and electric shock incidents.	1	2	3
		Explain the principles of 5S methodology and its benefits.	Demonstrate workplace organization, waste disposal, and proper tool placement.	1	1	2
TOTAL				**8**	**14**	**22**

NOS Name – Employability Skills						
NOS No.	**NOS Name**	**Performance Criteria**	**Assessment Criteria**	**Theory Marks**	**Practical Marks**	**Total Marks**
4	Employability Skills	Explain the importance of employability skills in career development.	Identify key employability skills required in different industries.	1	0	1
		Explain the fundamental rights, duties, and values of citizenship.	Demonstrate awareness of ethical responsibilities in the workplace.	1	0	1
		Describe the key attributes of professionalism in modern workplaces.	Explain the importance of adaptability, problem-solving, and continuous learning.	0	0	0
		Demonstrate understanding of basic grammar and sentence structure.	Read, write, and communicate simple sentences effectively.	0	1	1
		Explain the significance of career planning and setting long-term goals.	Identify personal strengths and areas for improvement in career growth.	0	1	1
		Explain the importance of effective communication in professional and personal settings.	Demonstrate verbal and non-verbal communication techniques for workplace interactions.	0	1	1
		Explain the importance of inclusivity and respecting workplace diversity.	Identify practices that promote a diverse and inclusive work environment.	0	0	0
		Explain basic financial concepts such as budgeting, savings, and taxation.	Describe legal rights and responsibilities in employment contracts and workplace policies.	0	1	1
		Explain the importance of digital literacy and internet safety.	Demonstrate basic computer operations, email communication, and online job searches.	1	0	1
		Explain key entrepreneurial skills such as innovation, risk management, and problem-solving.	Demonstrate how to create a simple business plan or pitch an idea.	0	1	1
		Explain the importance of customer service skills in professional settings.	Identify best practices for handling customer inquiries and complaints effectively.	0	1	1
		Explain how to prepare a CV, apply for jobs, and develop interview skills.	Identify job opportunities and apprenticeship programs relevant to career goals.	1	0	1
TOTAL				**4**	**6**	**10**

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.

Mention the detailed assessment strategy in the provided template.

The assessment strategy ensures a structured evaluation of learners' theoretical knowledge and practical skills using formative and summative assessments. The assessment is conducted by an external assessment body with a focus on written tests, practical demonstrations, and viva-voce while maintaining fairness and reliability.

Assessment Type	Mode of Assessment	Purpose	Frequency	Total Marks
Formative Assessment	Written MCQs, Quizzes, Practical Demonstrations, Viva-Voce	Continuous evaluation to track learning progress	After every 10 modules	20
Summative Assessment	Written MCQs, Practical Demonstration, Viva-Voce	Final evaluation of knowledge and hands-on skills	At the end of the course	50
Skill Demonstration	Installation of PV systems, Troubleshooting, Use of Measuring Tools	Hands-on practical demonstration	Mid-course and End-course	15
Soft Skills & Employability Assessment	Communication, Problem-Solving, Teamwork, Safety Compliance	Evaluation of professional skills required for workplace readiness	Throughout the course	15

1. **Total Marks**: 100
2. **Passing Criteria**: 60% (60 Marks)

Annexure: Assessment SOP

A. Pre-Assessment Preparation

Appointment of Assessors:

- The assessment body appoints certified external assessors.
- Ensure the assessor is independent of the trainers.
- Preparation of Question Papers & Practical Tasks:
- Develop multiple sets of question banks for written, practical, and viva-voce assessments.
- Align assessments with National Occupational Standards (NOS) and job role competencies.
- Scheduling of Assessments:
- Assessments are scheduled in coordination with training partners to avoid interruptions.
- Practical assessments to be conducted in fully equipped training labs or field sites.

B. Conducting Assessments

Formative Assessments (After every 10 Modules)

- Practical Demonstration (5 Marks)
- Viva-Voce (5 Marks)
- Conducted by internal trainers but verified by the external assessment body.
- Feedback is provided to candidates for improvement.

Summative Assessments (Final)

- Conducted by external assessment body.
- Written Test (40 Marks)
- MCQs, Case Study, Short Answer Questions.
- Practical Demonstration (60 Marks)
- Install a PV system, test energy meters, troubleshoot a faulty circuit.
- Assign hands-on practical tasks on grid-connected PV systems, troubleshooting, and maintenance.

Soft Skills & Employability Assessment

- Evaluation of professional skills required for workplace readiness throughout the course (5 Marks)

C. Post-Assessment Procedure

- Evaluation & Result Compilation
- Written exams are graded manually/electronically.

- Practical & Viva-Voce assessments are scored by the external assessor.
- Declaration of Results & Certification
- Results are compiled and verified within 7 days of assessment.
- Successful candidates receive NSQF Level 5 certification.
- Unsuccessful candidates can retake assessments within 3 months.

D. Grievance & Re-Assessment Policy

- Candidates dissatisfied with results can apply for reassessment within 7 days.
- A different assessor will re-evaluate the written or practical exam.
- Final decision will be made by the assessment body.

Annexure: Occupational Map

Sector	Job Role	Key Responsibilities	NSQF Level	Hierarchy Level
Manufacturing	Solar PV Cell Technician	Fabrication, doping, and coating of PV cells	4	Technician
	Solar PV Module Assembler	Cell interconnection, lamination, and framing	3	Worker
	Solar PV Quality Control Technician	Conducts EL, IV curve, and thermal cycle tests	4	Technician
	Solar PV Production Supervisor	Oversees production, ensures compliance with standards	5	Supervisor
	Solar Manufacturing Engineer	Designs and optimizes PV manufacturing processes	6	Engineer
	Solar R&D Scientist	Develops new materials and technology for solar cells	7	Specialist
System Design & Planning	Solar PV System Designer	Designs on-grid, off-grid, and hybrid solar systems	5	Supervisor
	Solar PV Project Engineer	Conducts feasibility studies, load calculations, and system design	6	Engineer
	Solar PV Structural Engineer	Evaluates roof strength, wind load, and mounting structures	6	Engineer
	Solar Site Surveyor	Conducts site assessments, shading analysis, and BOS placement	4	Technician
Procurement & Logistics	Solar PV Procurement Specialist	Sources and procures solar modules, inverters, and BOS components	5	Supervisor
	Solar PV Supply Chain Manager	Manages logistics, inventory, and vendor coordination	6	Manager
	Solar PV Warehouse Assistant	Handles storage, labelling, and transportation of PV components	3	Worker
Installation & Commissioning	Solar PV Helper	Assists in lifting, unpacking, and basic installation tasks	2	Helper
	Solar PV Installer	Installs solar panels, inverters, and BOS components	4	Technician
	Rooftop Solar PV Technician	Installs and maintains rooftop PV systems	4	Technician
	Ground-Mount Solar PV Technician	Installs utility-scale PV systems	4	Technician
	Solar PV Electrician	Handles wiring, grounding, and electrical safety checks	4	Technician
	Solar PV Commissioning Engineer	Tests system performance and ensures compliance	5	Engineer

Sector	Job Role	Key Responsibilities	NSQF Level	Hierarchy Level
	Solar PV Project Manager	Manages end-to-end execution of solar projects	6	Manager
Operations & Maintenance (O&M)	Solar PV Maintenance Helper	Assists in cleaning, routine maintenance, and inspections	2	Helper
	Solar PV Maintenance Technician	Conducts routine checks, cleaning, and preventive maintenance	4	Technician
	Solar PV Service Technician	Diagnoses and repairs faults in PV systems	4	Technician
	Solar Inverter Technician	Repairs and maintains inverters	4	Technician
	Solar PV SCADA Operator	Monitors real-time data for large-scale PV plants	5	Supervisor
	Solar PV Performance Analyst	Analyses PR, CUF, and energy generation data	5	Officer
Safety & Compliance	Solar PV Safety Assistant	Supports safety officers in enforcing compliance	3	Technician
	Solar PV Safety Officer	Ensures workplace safety, PPE compliance, and risk assessment	5	Officer
	Solar PV Quality Inspector	Checks installation compliance with IEC and NEC standards	4	Technician
	Solar PV Regulatory Compliance Specialist	Ensures adherence to net metering, grid connectivity policies	6	Engineer
Grid Integration & Energy Storage	Solar Net Metering Technician	Installs and configures bidirectional energy meters	4	Technician
	Energy Storage Technician	Installs and maintains solar battery systems	4	Technician
	Solar Hybrid System Specialist	Integrates solar PV with battery, diesel, and grid	5	Supervisor
Entrepreneurship & Business Development	Solar PV Consultant	Provides advisory services for solar adoption and financing	5	Consultant
	Solar PV Sales Executive	Markets and sells solar solutions to residential and commercial clients	5	Officer
	Solar PV Entrepreneur	Establishes and runs a solar installation/service business	5	Business Owner

Progression Pathway as per the OM above

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 defines 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