

Model Curriculum

Solar PV Installer - Electrical

SECTOR: GREEN JOBS
SUB-SECTOR: RENEWABLE ENERGY
OCCUPATION: Solar Panel Installation Technician
REF ID: SGJ/Q0102, V1.0
NSQF LEVEL: 4



Certificate

CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

SKILL COUNCIL FOR GREEN JOBS

for the

MODEL CURRICULUM

Complying to National Occupational Standards of
Job Role/ Qualification Pack: **'Solar PV Installer– Electrical' QP No. 'SGJ/Qo102 NSQF Level 4'**

Date of Issuance: **May 27th, 2021**

Valid up to: **May 26th, 2024**

** Valid up to the next review date of the Qualification Pack*

Authorised Signatory
(Skill Council for Green Jobs)

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Solar PV Installer- Electrical

CURRICULUM / SYLLABUS

This program is aimed at training candidates for the job of a “Solar PV Installer -Electrical”, in the “Green Jobs” Sector/Industry and aims at building the following key competencies amongst the learner

Program Name	Solar PV Installer – Electrical		
Qualification Pack Name & Reference ID. ID	SGJ/Q0102, v1.0		
Version No.	1.0	Version Update Date	27 th May 2021
Pre-requisites to Training	10th + I.T.I (Electrical and Electronics)/ Diploma (Electrical, Electronics)/ or 10 pass+3 years of experience as Electrician		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"> • Carry out the site survey for installation of Solar PV system • Identify and Use the Tools & tackles used for Solar PV system installation • Install the Electrical components of a Solar PV system • Test and Commission Solar PV system • Maintain personal Health & Safety at project site 		

This course encompasses 4 out of 4 National Occupational Standards (NOS) of “Solar PV Installer – Electrical” Qualification Pack issued by “Skill Council for Green Jobs”.

Sr. No.	Module	Key Learning Outcomes	Equipment Required
1	Introduction to Solar PV Installer – Electrical Course Theory Duration (hh:mm) 03:00 Practical Duration (hh:mm) 03:00 Corresponding NOS Code Bridge Module	<ul style="list-style-type: none"> • Demonstrate general Discipline in the class room and during the training program; • Understand the role of Solar PV Installer and job opportunities; • Understand the advantages of doing this course; • Acquire basic skills of communication; • Acquire basic reading capabilities to enable reading of signs, notices and/or cautions at site. • Acquire basic skills of communication; along with skills for working effectively with others while respecting gender and disability concerns 	
2	Basics of Solar energy and Electrical concepts. Theory Duration (hh:mm) 06:00 Practical Duration (hh:mm) 06:00 Corresponding NOS Code SGJ/N0101	<ul style="list-style-type: none"> • Understand Ohm’s Law; • Understand the basics of electricity and electrical concepts; • Perform simple calculations to derive power and energy • Explain and understand DNI, GHI and Diffused Irradiance & Irradiation; • Understand the movement of the sun and its effect on the performance of the plant; • Understand Terminology used in the Solar Industry; 	Pyranometer, Multimeter, Clamp meter,
3	Basics of Solar Photovoltaic systems and its components. Theory Duration (hh:mm) 14:00 Practical Duration (hh:mm) 20:00 Corresponding NOS Code SGJ/N0101	<ul style="list-style-type: none"> • Identify the different components of Solar PV system and understand the working and operations of different types of Solar PV systems • Understand and acquire know-how of different Types, sizes and specifications of , Modules, Solar Inverters, Charge Controllers, Cables, Conduits, Junction Boxes, Solar Batteries and allied accessories. • Read and Interpret the manufacturing data specification sheets of different Types, sizes and specifications of , Modules, Solar Inverters, Charge Controllers, Cables, Conduits, Junction Boxes, Solar Batteries and allied accessories 	Pyranometer, Multimeter, Clamp meter, 1 kWp Solar PV system with 2 number of solar batteries

Sr. No.	Module	Key Learning Outcomes	Equipment Required
		<ul style="list-style-type: none"> Understand and acquire know-how of different types, sizes and specifications of foundations/ footings; Select the right footing/foundation as per site location including suitability of roof condition or suitability of soil Read and Interpret various certification requirements of solar PV system components 	
4	<p>Identification and Use of different tools and tackles used for installation of solar PV system</p> <p>Theory Duration (hh:mm) 03:00</p> <p>Practical Duration (hh:mm) 06:00</p> <p>Corresponding NOS Code SGJ/Q0104</p>	<ul style="list-style-type: none"> Identify and acquire the know-how of the different tools & tackles used for specific purpose in an installation of Solar PV system 	<p>Tool kit, Double ended flat spanner, Double ended ring spanner, Combination pliers, Side cutting pliers, Nose pliers, Hack saw ,frame with blade, Screw driver, Water level Measuring tape, Centre punch, Standard wire gauge, Vanier caliper, Line Dori, Chisel, Drill m/c, Plumb bob, Sprit level, Flat file, Round file, Triangle file, Hand saw, PVC mallet, Ball pin, hammer, Safety helmet, Safety souse, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Safety Gloves</p>

Sr. No.	Module	Key Learning Outcomes	Equipment Required
5	Site Survey for Installation of Solar PV System . Theory Duration (hh:mm) 06:00 Practical Duration (hh:mm) 9:00 Corresponding NOS Code SGJ/N0101	<ul style="list-style-type: none"> Understand how to observe Sun path diagram and shading analysis; Understand and assess the site conditions for safe installation of Solar PV system; Identify the load to be connected to the Solar PV system; Prepare load profile Engage with customers for any specific requirement and budget constraints; while identifying opportunities for deploying innovative energy solutions like plug & play system. Calculate system size Calculate size of the system with basic mathematical tools; 	Tool kit, Measuring tape, wire gauge, Line Dori Water testing instrument (TDS meter),
6	Installation of Electrical Components of Solar PV Systems. Theory Duration (hh:mm) 18:00 Practical Duration (hh:mm) 46:00 Corresponding NOS Code SGJ/N0104	<ul style="list-style-type: none"> Read and Interpret the Single Line Diagram, Layouts and drawings Understand the DO's and Don'ts of material handling Read and interpret the Bill of Material to verify with the delivery of components on site and understand performing quality checks of material Understand and acquire know-how of installing the electrical components including inverter, batteries, junction boxes, energy meters and other electrical components along with performing pre-installation checks Identify and acquire know-how of installation of cables and conduits; Understand Do's and Don'ts of DC wiring; Identify and understand use of tools & tackles used for cable and conduit installation Understand Different types of Earthing and its installation; Understand and identify significance and types of earth faults as per standards 	1 kW Solar PV system and tool kit
7	Test and Commission Solar PV system Theory Duration (hh:mm) 08:00 Practical Duration (hh:mm) 16:00 Corresponding NOS Code SGJ/N0105	<ul style="list-style-type: none"> Describe and conduct the testing of all the solar components of the Solar Describe and conduct the testing of all the solar components of the Solar PV system including fault finding and analysis including continuity checks, polarity check and other commissioning activities; Understand Regulations & Standards for interconnection; Describe the Commissioning process for the Solar PV System 	Tool kit, 1kWp Solar PV system, Side cutting pliers, Nose pliers, Wire stripper, Electrician knife, Hand crimping tools, Cable cutter , Screw driver, Water level Measuring tape, Centre punch,

Sr. No.	Module	Key Learning Outcomes	Equipment Required
8	Maintain Personal Health & Safety at project site Theory Duration (hh:mm) 04:00 Practical Duration (hh:mm) 12:00 Corresponding NOS Code SGJ/N0106	<ul style="list-style-type: none"> Identify the requirements for safe work area; Administer first aid; Identify the personal protective equipment used for the specific purpose; Identify the hazards associated with PV installations including electric Shock and its mitigations. Identify work safety procedures and instructions for working at height; Understand Occupational health & safety standards and regulations for installation of Solar PV system 	Safety Safety souse, belt, Ear plug, hand glove, hand glove, Reflective Safety Gloves
9	Communication & Soft Skills Theory Duration (hh:mm) 05:00 Practical Duration (hh:mm)	<ul style="list-style-type: none"> Oral/spoken communication skill & testing – voice and accent, voice clarity Study of different pictorial expression of non-verbal communication and its analysis Barriers to Communication 	
10	Promotion of Entrepreneurship Theory Duration (hh:mm) 16:00 Practical Duration (hh:mm) 04:00	<ul style="list-style-type: none"> Identify various vendors, suppliers and manufacturers of solar PV system components; Understand opportunities for offering installation along with repair and maintenance services Understand various Product-Oriented Solar Business Opportunities Understand new technologies and the evolving market landscape Understand the need of the various customers and the available technical and market solutions to meet those Understand & calculate trade margin; Describe the process for setting up a new venture Distinguish between fixed and working capital requirements Describe the components of a loan application for accessing funds Demonstrate the importance of time management and resource management techniques Demonstrate appropriate communication etiquette and active listening skills while interacting with all stakeholders Identify the challenges and risks for new entrepreneurs Apply concepts related to the digital literacy like managing E-mails Demonstrate use of internet, smartphones for reporting and documentation 	

Sr. No.	Module	Key Learning Outcomes	Equipment Required
	Corresponding NOS Code SGJ/NXXXX	<ul style="list-style-type: none"> Importance of Listening, Good and bad listening Non-Verbal Communication – its importance and Nuances like Facial Expression, Posture, Gesture, eye contact, Appearance (Dress Code), etc. Handling Interview Situations 	
	Total Duration Theory Duration 83:00 Practical Duration 137:00	Unique Equipment Required: Tool kit, Double ended flat spanner, Double ended ring spanner, Combination pliers, Side cutting pliers, Nose pliers, Wire stripper, Electrician knife, Hack saw frame with blade, Hand crimping tools, Cable cutter, Screw driver, Water level, Measuring tape, Centre punch Standard wire gauge, Vanier caliper, Line Dori, Chisel, Drill m/c, Plumb bob, Sprit level, Flat file, Round file, Triangle file, Hand saw, PVC mallet, Ball pin hammer, Fuse puller, Safety helmet, Safety souse, Safety belt, Nose mask, Safety goggles, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Clamp meter, MULTIMETER, Megger, Earth tester, Water testing instrument (TDS meter), Earthing Rod, Soldering Iron & Flux, Magnetic Compass, Ratchet spanner, Thermal imaging Camera, Insulation tester etc	

Grand Total Course Duration: **220 Hours, 0 Minutes**

(This syllabus/ curriculum has been approved by [Skill Council for Green Jobs](#))

Trainer Prerequisites for Job role: “Solar PV Installer - Electrical” mapped to Qualification Pack: “SGJ/Q0102, v1.0”

Sr. No.	Area	Details
1	Description	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “SGJ/Q0102, Version 1.0”.
2	Personal Attributes	Aptitude for conducting training, and pre/ post work to ensure competent, employable candidates at the end of the training. Strong communication skills, interpersonal skills, ability to work as part of a team; a passion for quality and for developing others; well-organised and focused, eager to learn and keep oneself updated with the latest in the mentioned field.
3	Minimum Educational Qualifications	ITI /Diploma (Electrical, Electronics) or B.Tech (Civil / Electrical / Electronics / Electrical and Electronics Eng.) or MSc Physics or The education qualification can be relaxed in case of extraordinary relevant field experience.
4a	Domain Certification	Certified for Job Role: “Solar PV Installer- Electrical” mapped to QP: “SGJ/Q0102, Version 1.0”. Minimum accepted score as per respective SSC guidelines. Minimum accepted score as per SCGJ is 70%.
4b	Platform Certification	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q2601”. Minimum accepted score as per SCGJ is 80%.
5	Experience	Minimum 3 years of relevant industry experience for ITI /Diploma (Electrical, Electronics) or Minimum 2 years of relevant industry experience for B.Tech (Civil/ Electrical / Electronics / Electrical and Electronics Engineering)

CRITERIA FOR ASSESSMENT OF TRAINEES

Please refer to the QP-NOS for Assessment Criteria