Model Curriculum

QP Name: Solar PV Installation Helper

QP Code: SGJ/Q0111

QP Version: 4.0

NSQF Level: 2

Model Curriculum Version: 4.0

Skill Council for Green Jobs (SCGJ)
3rd Floor, CBIP Building, Malcha Marg, Chanakyapuri, New Delhi - 110021

Contents

Training Parameters

Sector	Environment Science
Sub-Sector	Renewable Energy
Occupation	Helper Electrician
Country	India
NSQF Level	2
Aligned to NCO/ISCO/ISIC Code	NCO-2015/9313.0501
Minimum Educational Qualification and Experience	Ability to read and write with 1 year relevant experience in solar/power sector
Pre-Requisite License or Training	NA
Minimum Job Entry Age	16 years
Last Reviewed On	30th May 2024
Next Review Date	29th May 2027
NSQC Approval Date	30th May 2024
QP Version	4.0
Model Curriculum Creation Date	30th May 2024
Model Curriculum Valid Up to Date	29th May 2027
Model Curriculum Version	4.0
Minimum Duration of the Course	Total 270 notional hours (including Theory : 150 hours +Practical: 90 hours+ OJT: 30 hours)
Maximum Duration of the Course	Total 270 notional hours (including Theory : 150 hours +Practical: 90 hours+ OJT: 30 hours)

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner will be able to:

- Verify the grid connected regulation and interconnection
- Perform Pre-commissioning Inspection
- Perform Post Commissioning Testing of the Grid Connected Rooftop Solar PV Power Plant
- Maintain Personal Health & safety at project site
- Employable at work place

Compulsory Modules

The table lists the modules, their duration and mode of delivery.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
SGJ/N0130: Assist in installation and maintenance of solar PV power plant **NOS Version No.4** **NSQF Level 2**	**45:00**	**45:00**			**90:00**
Module 1: Introduction to Solar PV Sector in India	15:00	15:00			30:00
Module 2: Assist in installation and maintenance of Solar PV Power Plant	30:00	30:00			60:00
SGJ/N0131: Assist in installation and maintenance of off- grid solar systems **NOS Version No.4** **NSQF Level 2**	**60:00**	**30:00**			**90:00**
Module 3: Assist in installation and Maintenance of off- grid solar systems	60:00	30:00			90:00
SGJ/N0106: Maintain Personal Health & Safety at project site **NOS Version No.5** **NSQF Level 5**	**15:00**	**15:00**			**30:00**

Module 4: Maintain Personal Health & Safety at project site	15:00	15:00	**30**		30:00
DGT/VSQ/N0101: Employability Skills (30 hours) NOS Version No.1					**30:00**
Module 5: Employability Skills (ES)	30				30:00
On the Job training					**30:00**
Total Duration	**150:00**	**90:00**	**30:00**	**00:00**	**270:00**

Module Details

Module 1: Introduction to Solar PV Sector in India

Mapped to SGJ/N0130: Assist in installation and maintenance of solar PV power plant, V4.0

Terminal Outcomes:

- Discuss the role and responsibilities of a Solar PV Project Helper along with the importance of doing this course.
- Provide broader overview of the Solar PV sector.

Duration: 15*:00*	**Duration**: *15:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the role of Solar PV Project helper, its importance in the sector and the advantages of doing the course. • Discuss the basic aspects of solar energy and power generation. • Discuss the broader overview of solar PV technology and sector in India. • Explain the types of solar PV Power plants including rooftop and ground mounted PV Power Plants and their working principles. • Identify various tools used in solar power plants. • Discuss the precautions to be followed while using electrical and mechanical components. • Explain the importance of basic skills for communication; along with how to work effectively with others while respecting gender and disability concerns. • Explain the importance of reading and interpreting signs, notices and/or cautions at project site.	• Identify and demonstrate the functions of various tools used in solar power plants. • Demonstrate the precautions to be followed while using electrical and mechanical components at solar project site. • Demonstrate general discipline during the training program. • Demonstrate how to interpret signs, notices and/or cautions at project site. • Show how to read and interpret signs, notices and/or cautions at project site.
Classroom Aids	
Laptop, white board, marker, projector, charts	
Tools, Equipment and Other Requirements	
Sample signs, notice, cautions used at project sites	

Module 2: Assist in installation and maintenance of Solar PV Power Plant

Mapped to SGJ/N0130: Assist in installation and maintenance of Solar PV Power Plant, V4.0

Terminal Outcomes:

- Explain to identify key components and tools of solar PV power plants
- Discuss how to carry out cleaning of modules along with other maintenance activities as perschedule and standard procedure
- Explain how to assist in taking measurement and recording of readings from various equipment

Duration: 30:*00*	**Duration**: 30:*00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Identify various components and tools of solar PV power plants. • Explain how to assist in survey of the site for installation of solar power plant. • Discuss to make foundations for module mounting structures and other components under supervision. • Explain how to assist in measurement and recording of readings from various equipment. • Explain how to install the sensor used of temperature and radiation measurement • Discuss how to carry out cleaning of modules as per schedule and standard procedure and remove any shadowing objects. • Discuss the use of Robotic cleaning and its operation and assist in replacing • Explain to assist in replacing defective modules. • Discuss how to assist in repair and replacement of broken foundations for modules, combiner boxes, inverters and transformers, etc. • Explain to clean the work area after completing the installation and maintenance activity. • Explain to remove all the tools, consumables used from the work area and dispose of any waste materials in accordance with safe working practices • Explain how to identify processes where material and resources utilization can be optimized.	• Demonstrate how to identify various components and tools of solar PV power plants. • Demonstrate how to assist in survey of the site for installation of solar power plant. • Demonstrate how to assist in measurement and recording of readings from various equipment. • Demonstrate how to carry out cleaning of modules as per schedule and standard procedure and remove any shadowing objects. • Demonstrate how to perform visual inspection for fault identification as per schedule. • Demonstrate to assist in replacing defective modules. • show how to assist in repair and replacement of broken foundations for modules, combiner boxes, inverters and transformers, etc. • Demonstrate to clean the work area after completing the installation and maintenance activity. • Demonstrate to remove all the tools, consumables used from the work area and dispose of any waste materials in accordance with safe working practices. • Demonstrate how job completion report could be filled.
Classroom Aids	

Laptop, white board, marker, projector, charts
Tools, Equipment and Other Requirements
1 kWp Solar PV power plant, Solar Power Plant Installation toolkit, Solar Power Plant Maintenance toolkit, Site Visit for Practical Learning

Module 3: Assist in installation and Maintenance of off- grid solar systems

Mapped to SGJ/N0131: Assist in installation and Maintenance of off- grid solar systems, V4.0

Terminal Outcomes:

- Explain to assist in site survey for installation of solar modules and pump
- Discuss to assist in installation and regular maintenance of various solar PV system
- Explain to visually inspect of system components

Duration: *30:00*	**Duration**: *30:00*
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain to assist in survey of the site for installation of solar modules and solar pump. • Explain how to visually inspect for physical defects of equipment. • Explain how to mount and fix the structures and modules on the foundations under supervision. • Explain how to assist in laying of cables and pipes under supervision • Discuss to assist in installation and regular maintenance. • Discuss how to read and record different data of solar power generation • Explain to make proper foundation under supervision. • Discuss to assist in erection of the pole under supervision. • Discuss to assist in installation and regular maintenance of street lights. • Discuss to visually inspect all components including batteries, solar modules, cables of small solar systems. • Explain to assist in installation and regular maintenance of solar modules, lights, fan, etc. • Discuss to assist in cleaning of PV module, including Dry/ Wet/ and robotic cleaning. • Discuss to clean the work area after completing the installation.	• Demonstrate how to assist in survey of the site for installation of solar modules and solar pump. • Demonstrate how to visually inspect for physical defects of equipment. • Demonstrate how to assist in laying of cables and pipes under supervision. • Show how to to assist in installation and regular maintenance. • Demonstrate to assist in making foundation and erection of the pole under supervision. • Demonstrate to assist in installation and regular maintenance of street lights. • Discuss to visually inspect all components including batteries, solar modules, cables of small solar systems. • Explain to assist in installation and regular maintenance of solar modules, lights, fan, etc. • Demonstrate how to clean the work area after installation.
Classroom Aids	

Laptop, white board, marker, projector, charts
Tools, Equipment and Other Requirements
Solar Power Plant Installation toolkit, Solar Power Plant Maintenance toolkit, Site Visit for Practical Learning

Module 4: Maintain Personal Health & Safety at project site

Mapped to SGJ/N0106: Maintain Personal Health & Safety at project site, V5.0

Terminal Outcomes:

- Perform steps to maintain personal health, safety and hygiene at solar project site
- Perform good housekeeping and infection control practices
- Explain the usage of Personal protective equipment at solar project site

Duration: 15:00	**Duration**: 15:00
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain to identify the requirements for safe work area. • Identify contact person for reporting the violation of safety policies at workplace and provide information about incident/violation. • Explain the importance of administering first aid. • Identify the personal protective equipment used for the specific purpose. • Identify the hazards associated with photovoltaic installations including electric shock and required mitigating measures; • Identify work safety procedures and instructions for working at height and handling heavy material. • Explain the importance of occupational health & Safety standards and regulations for installation of Solar PV system. • Incorporate good housekeeping practices and infection control guidelines.	• Demonstrate to identify the requirements for safe work area. • Demonstrate how to administer first aid. • Demonstrate the usage of personal protective equipment for ensuring safety during installation and O&M work. • Show work safety procedures and instructions for working at height and handling heavy material. • Demonstrate good housekeeping and infection control & prevention practices.
Classroom Aids	
Laptop, white board, marker, projector, charts	
Tools, Equipment and Other Requirements	

Safety helmet, Safety souse, Safety belt, Ear plug, PVC hand glove, Cotton hand glove, Reflective jacket, Safety Gloves

Module 12: Employability Skills (30 hours)

Mapped to DGT/VSQ/N0101,

Terminal Outcomes:

- Communicate effectively with team members, clients, vendors, visitors and stake holders
- Build personal and professional
- Digital and financial literacy which includes basic components of computer system and related concept, saving money, opening bank account and filing tax return

Duration: *30:00*
Key Learning Outcomes
• Discuss the importance of Employability Skills in meeting the job requirements • Explain constitutional values, civic rights, duties, citizenship, responsibility towards societyetc. that are required to be followed to become a responsible citizen. • Show how to practice different environmentally sustainable practices • Discuss 21st century skills. • Display positive attitude, self -motivation, problem solving, time management skills andcontinuous learning mindset in different situations. • Use appropriate basic English sentences/phrases while speaking • Demonstrate how to communicate in a well -mannered way with others. • Demonstrate working with others in a team • Show how to conduct oneself appropriately with all genders and PwD • Discuss the significance of reporting sexual harassment issues in time • Discuss the significance of using financial products and services safely and securely. • Explain the importance of managing expenses, income, and savings. • Explain the significance of approaching the concerned authorities in time for any exploitationas per legal rights and laws • Show how to operate digital devices and use the associated applications and features, safelyand securely • Discuss the significance of using internet for browsing, accessing social media platforms,safely and securely • Discuss the need for identifying opportunities for potential business, sources for arrangingmoney and potential legal and financial challenges • Differentiate between types of customers • Explain the significance of identifying customer needs and addressing them • Discuss the significance of maintaining hygiene and dressing appropriately • Create a biodata • Use various sources to search and apply for jobs

• Discuss the significance of dressing up neatly and maintaining hygiene for an interview • Discuss how to search and register for apprenticeship opportunities
Classroom Aids
Laptop, white board, marker, projector, charts
Tools, Equipment and Other Requirements
Computer (PC) with latest configurations – and Internet connection with standard operating system

Module 13: On the Job Training

Mapped to SGJ/Q0111

Mandatory Duration: 60 hours
Module Name: On the Job Training **Location: Onsite**

Terminal Outcome

- Demonstrate various tools and equipment used in site survey for solar power plants.
- Demonstrate how to assist in survey of the site for installation of solar power plants.
- Demonstrate how to assist in measurement and recording of readings from various equipment.
- Demonstrate general discipline during the site survey
- Explain different types of civil foundation used in Solar rooftop power plants
- Demonstrate different components of the plant and civil works/hardware
- Demonstrate how to use anchor- fastener during civil foundation casting
- Demonstrate use of template for civil foundation casting
- Explain different types and parts of module mounting structure
- Explain different tools used in installation of module mounting structure
- Demonstrate different types and parts of module mounting structure
- Demonstrate role of Helper in installation of solar PV mounting structure.
- Discuss broad layout of Solar ground mount power plants
- Demonstrate the precautions to be followed while using electrical and mechanical components at solar project site.
- Demonstrate how to interpret signs, notices and/or cautions at project site.
- Demonstrate how to carry out cleaning of modules as per schedule and standard procedure and remove any shadowing objects.
- Demonstrate how to perform visual inspection for fault identification as per schedule.
- Demonstrate to assist in replacing defective modules.
- Discuss how to assist in repair and replacement of broken foundations for modules, combiner boxes, inverters and transformers, etc.

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
10th Pass		2 years of hands-on working experience of Installation and Maintenance of Solar PV power plants				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.
As per the Relevant Craft Instructor Training Scheme (CITS)						

Trainer Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: "Solar PV Installation Helper" mapped to QP: "SGJ/Q0111, Version 4.0". Minimum accepted score as per SCGJ is 80%.	"Recommended that the Trainer is certified for the Job Role: "Trainer (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2601, v2.0". Minimum accepted score is 80%"

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
		Years	***Specialization***	***Years***	***Specialization***	
10th Pass		3 years of hands-on working experience of Installation and Maintenance of Solar PV power plants or training/assessment of solar job roles				Personal Attributes: An 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.
As per the Relevant Craft Instructor Training Scheme (CITS)						

Assessor Certification	
Domain Certification	**Platform Certification**
Certified for Job Role: " Solar PV Installation Helper " mapped to QP: "SGJ/Q0111, Version 4.0". Minimum accepted score as per SCGJ is 80%.	"Recommended that the Assessor is certified for the Job Role: "Assessor (VET and Skills)", mapped to the Qualification Pack: "MEP/Q2701, v2.0". Minimum accepted score is 80%"

Assessment Strategy

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

1. Assessment System Overview:

    - Batches assigned to the assessment agencies for conducting the assessment on 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
    - If the batch size is more than 30, then there should be 2 Assessors.

2. Testing Environment: Assessor must:

    - Confirm that the centre is available at the same address as mentioned on SID
    - 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 should be verified by the other subject Matter Experts along with the approval required from SSC
    - Questions are mapped with NOS and PC
    - Question papers are prepared considering that level 1 to 3 is for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
    - Assessor must be ToA 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
    - Centre 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 and are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do **upon the completion of the training**.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do **upon the completion of a module.** A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards