

# Model Curriculum

## Rooftop Solar Grid Engineer

SECTOR: GREEN JOBS  
SUB-SECTOR: RENEWABLE ENERGY  
OCCUPATION: Inspection, Interconnection and Post –  
Commissioning Testing  
REF ID: SGJ/Q0106, V1.0  
NSQF LEVEL: 5



## Certificate

### CURRICULUM COMPLIANCE TO QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

**SKILL COUNCIL FOR GREEN JOBS**

for

**MODEL CURRICULUM**

Complying to National Occupational Standards of  
Job Role/Qualification Pack: **'Rooftop Solar Grid Engineer'** OP No. **'SGJ/ Qo1o6 NSQF Level 5'**

Date of Issuance: 15/02/2017  
Valid up to\*: 01/06/2019

\*Valid up to the next review date of the Qualification Pack or the  
'Valid up to' date mentioned above (whichever is earlier)



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Authorised Signatory  
(Skill Council for Green Jobs)

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# Rooftop Solar Grid Engineer

## CURRICULUM / SYLLABUS

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

Program Name	Rooftop Solar Grid Engineer		
Qualification Pack Name & Reference ID. ID	SGJ/Q0106, v1.0		
Version No.	1.0	Version Update Date	15 <sup>th</sup> February 2017
Pre-requisites to Training	Diploma (Electrical, EEE)		
Training Outcomes	After completing this programme, participants will be able to: <ul style="list-style-type: none"><li>• Pre-Commissioning Inspection of the Grid Connected Rooftop Solar PV Power Plant</li><li>• Post Commissioning Testing of the Grid Connected Rooftop Solar PV Power Plant</li><li>• Maintain Personal Health &amp; safety at project site</li></ul>		

This course encompasses 3 out of 3 National Occupational Standards (NOS) of “Rooftop Solar Grid Engineer” Qualification Pack issued by “Skill Council for Green Jobs”.

S. No	Module	Key Learning Outcomes	Equipment Required
1	<b>Introduction to Solar PV Sector in India</b>  <b>Theory Duration</b> (hh:mm) 4:00 <b>Practical Duration</b> (hh:mm) 4:00  <b>Corresponding NOS Code</b> SGJ/No118	<ul style="list-style-type: none"> <li>overview of Rooftop Solar Sector in India</li> <li>overview of Solar PV Technology</li> <li>type of Rooftop Solar PV Power Plants and working principles</li> <li>system components and operating principles</li> <li>metering arrangement for Rooftop Solar</li> <li>policy and regulatory framework</li> </ul>	
2	<b>Pre-Commissioning Inspection of the Grid Connected Rooftop Solar PV Power Plant</b>  <b>Theory Duration</b> (hh:mm) 10:00 <b>Practical Duration</b> (hh:mm) 16:00  <b>Corresponding NOS Code</b> SGJ/No118	<ul style="list-style-type: none"> <li>Identify the key regulatory parameters for interconnection and metering arrangement including power quality of the grid at the project site</li> <li>Verify the capacity of the rooftop solar PV power plant as per the relevant policy/regulation</li> <li>Identify and verify the documents required for connecting the rooftop solar PV power plant to the grid</li> <li>Verify that the inverters, panels, protection devices, etc. Are conforming to IEC standards or relevant Indian standards</li> <li>Verify and assess the safety of earthing and lightning protection of the rooftop solar PV power plant</li> <li>Ensure that the single line diagram of a rooftop solar PV power plant is as per the regulatory specifications</li> </ul>	Site visit for practical learning
3	<b>Post Commissioning Testing of the Grid Connected Rooftop Solar PV Power Plant</b>  <b>Theory Duration</b> (hh:mm) 10:00 <b>Practical Duration</b> (hh:mm) 24:00  <b>Corresponding NOS Code</b> SGJ/No119	<ul style="list-style-type: none"> <li>Verify the operation of the installed Solar metering system including import and export of energy</li> <li>Test and verify the inverter operation including anti-islanding functionality, overload, etc.</li> <li>Verify the operation of the disconnect protections/isolation devices</li> <li>Test, record and verify the power quality of rooftop PV power plant at time of interconnection including harmonics, current, voltage etc.</li> <li>Test and verify the power factor</li> <li>Test and verify the Rooftop Solar PV power plant for any phase imbalance</li> </ul>	Site visit for practical learning

		<ul style="list-style-type: none"> <li>• Test and verify the overall safety of the Grid Connected Rooftop Solar PV power plant</li> <li>• Prepare and complete the relevant documentation</li> </ul>	
4	<p><b>Maintain Personal Health &amp; Safety at project site</b></p> <p><b>Theory Duration</b> (hh:mm) 06:00</p> <p><b>Practical Duration</b> (hh:mm) 06:00</p> <p><b>Corresponding NOS Code</b> SGJ/No106</p>	<ul style="list-style-type: none"> <li>• Identify the requirements for safe work area;</li> <li>• Administer first aid;</li> <li>• Identify the personal protective equipment used for the specific purpose;</li> <li>• Identify the hazards associated with photovoltaic installations;</li> <li>• Identify work safety procedures and instructions for working at height;</li> <li>• Understand Occupational health &amp; Safety standards and regulations for installation of Solar PV system</li> </ul>	Health and Safety kit for Installation, Operation & Maintenance of Rooftop Solar PV Power Plants;
	<p><b>Theory Duration</b> (hh:mm) 30:00</p> <p><b>Practical Duration</b> (hh:mm) 50:00</p>	Site visit for practical learning; Health and Safety kit for Installation, Operation & Maintenance of Rooftop Solar PV Power Plants.	

Grand Total Course Duration: 80 **Hours, 0 Minutes**

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

## Trainer Prerequisites for Job role: “Rooftop Solar Grid Engineer” mapped to Qualification Pack: “SGJ/Q0106, v1.0”

Sr. No.	Area	Details
1	<b>Description</b>	To deliver accredited training service, mapping to the curriculum detailed above, in accordance with the Qualification Pack “SGJ/Q0106, Version 1.0”.
2	<b>Personal Attributes</b>	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	<b>Minimum Educational Qualifications</b>	Diploma (Electrical, EEE) Or B.Tech/B.E. (Civil, Electrical, Mechanical, Energy) or M.Tech. (Electrical, EEE, Renewable Energy)
4a	<b>Domain Certification</b>	Certified for Job Role: “Rooftop Solar Grid Engineer” mapped to QP: “SGJ/Q0106, Version 1.0”. Minimum accepted score as per respective as per SCGJ guidelines is 80%.
4b	<b>Platform Certification</b>	Recommended that the Trainer is certified for the Job Role: “Trainer”, mapped to the Qualification Pack: “MEP/Q0102” or equivalent. Minimum accepted score as per SCGJ is 80%.
5	<b>Experience</b>	<ul style="list-style-type: none"> <li>• Minimum 3 years of relevant industry experience for M.Tech. graduates</li> <li>Or</li> <li>• Minimum 5 years of relevant industry experience for B.E./B.Tech graduates</li> <li>Or</li> <li>• Minimum 6 years of relevant industry experience for Diploma graduates</li> </ul>

### Annexure: Assessment Criteria

Assessment Criteria for Rooftop Solar Grid Engineer	
Job Role	Rooftop Solar Grid Engineer
Qualification Pack	SGJ/Qo1o6, Version 1.0
Sector Skill Council	Green Jobs

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for Qualification Pack has been created based on the NOSs and performance criteria by SCGJ. Each Performance Criteria (PC) has been assigned marks proportional to its importance within NOS and weightages have also been given among the NOSs accordingly. SCGJ has laid down the proportion of marks for Skills, Theory/Knowledge and Behaviour / Attitudes for each PC.
2	The assessment of the theory/knowledge will be based on written test/viva-voce or both while skill test shall be hands on practical. Behaviour and attitude will be assessed while performing the task.
3	The assessment shall be done as per the assessment sheets devised by SCGJ and accordingly the assessment agencies in consultation with SCGJ will create unique question papers for theory/knowledge and attitude for each candidate at each SCGJ accredited testing centres (as per assessment criteria below)
4	The assessment agencies will conduct the assessment as per the guidelines given by SCGJ having unique evaluations for skill practical for every student at each SCGJ accredited testing centre based on this criteria
5	To pass the Qualification Pack, every trainee should score a minimum of 70% in the overall assessment.
6	The marks are allocated PC wise; however, every NOS will carry a weight age in the total marks allocated to the specific QP

NOS	Performance Criteria	Marks Allocation			
		Total Mark	Out Of	Theor y	Skills Practical
SGJ/No118: Pre-Commissioning Inspection of the Grid Connected Rooftop Solar PV Power Plant.	PC1. Identify the key regulatory parameters for interconnection and metering arrangement including power quality of the grid at the project site.	60	9	4	5
	PC2. Verify the capacity of the Rooftop Solar PV Power plant as per the relevant policy/ regulation		9	4	5
	PC3. Identify and verify the documents required for connecting the Rooftop Solar PV Power plant to the grid.		12	5	7
	PC4. Verify that the inverters, panels, Protection devices, etc. are conforming to IEC standards or relevant Indian standards.		8	4	4
	PC5. Verify and assess the safety of earthing and lightning protection of the Rooftop Solar PV Power Plant		11	5	6
	PC6. Ensure that the single line diagram of a rooftop Solar PV Power Plant is as per the regulatory specifications.		11	5	6
		TOTAL	60	27	33
SGJ/No119: Post Commissioning Testing of Grid Connected Rooftop Solar PV Power Plant	PC1. Verify the operation of the installed Solar metering system including import and export of energy.	90	14	4	10
	PC2. Test and verify the inverter operation including anti-islanding functionality, overload, etc.		12	6	6
	PC3. Verify the operation of the disconnect protections/isolation devices.		10	4	6



	PC4. Test, record and verify the power quality of rooftop PV power plant at time of interconnection including harmonics, current, voltage etc.		10	4	6
	PC5. Test and verify power factor.		10	3	7
	PC6. Test and Verify the Rooftop Solar PV power plant for any phase imbalance.		12	4	12
	PC7. Test and Verify the Rooftop Solar PV power plant.		16	3	13
	PC8. Prepare and complete the relevant documentation.		6	2	4
		<b>TOTAL</b>	<b>90</b>	<b>30</b>	<b>60</b>
SGJ/No106 Maintain work Safety of Solar PV System	PC1. Identify corporate policies required for workplace safety.	<b>50</b>	2	1	1
	PC2. Identify requirements for safe work area and create a safe work environment.		3	2	1
	PC3. Identify contact person when workplace safety policies are violated.		1	1	0
	PC4. Provide information about incident/violation.		1	1	0
	PC5. Identify the location of First Aid materials and administer first aid		2	1	1
	PC6. Identify the personal protection equipment required for specific locations on-site		3	2	1
	PC7. Identify expiry dates and wear & tear issues of specified equipment.		2	1	1
	PC8. Demonstrate safe and accepted practices for personal protection.		3	2	1
	PC9. Identify environmental hazards associated with photovoltaic installations.		2	1	1
	PC10. Identify electrical hazards.		4	2	2
	PC11. Identify personal safety hazards or work site hazards and Mitigate hazards.		4	2	2
	PC12. Select tools, equipment and testing devices needed to carry out the work.		4	2	2
	PC13. Demonstrate safe and proper use of required tools and equipment.		4	2	2
	PC14. Check access from ground to work area to ensure it is safe and in accordance with requirements.		2	1	1
	PC15. Reassess risk control measures, as required, in accordance with changed work practices and/or site conditions and undertake alterations.		2	2	0
	PC16. Inspect/install fall protection and perimeter protection equipment ensuring adequacy for work and conformance to regulatory requirements.		4	2	2
	PC17. Identify approved methods of moving tools and equipment to work area and minimize potential hazards associated with tools at heights		2	1	1
	PC18. Select and install appropriate signs and barricades		2	1	1

	PC19. Place tools and materials to eliminate or minimize the risk of items being knocked down.		1	1	
	PC20. Dismantle safety Power Plant in accordance with sequence and remove from worksite to clear work area.		2	1	1
		TOTAL	50	29	21
		TOTAL	200	86	114