Maldives National Skills Development Authority

National Competency Standard for Renewable Energy Installation & Maintenance (Solar PV)

Standard Code: SOC-23L3-V1-25

Qualification Name: National Certificate III in Renewable Energy Installation & Maintenance (Solar PV)

FOREWORD

The pivotal role of the Maldives National Skills Development Authority (MNSDA) in meticulously implementing and expanding Technical and Vocational Education & Training (TVET) exemplifies the steadfast commitment of the Maldives to build a skilled and resilient workforce. This commitment is evident from the strategic formulation of National Standards and the establishment of a comprehensive framework for training and certification.

Under the Higher Education and Training Act 7/2021, the MNSDA assumes an instrumental role, reflecting the government's unwavering dedication to streamlining TVET policies and procedures. This includes the establishment of a robust system for accrediting and registering both Institution Based Training (IBT) and Employer Based Training (EBT) providers. The MNSDA's active involvement in conducting the National Apprenticeship Program (NAP), National Trade Testing and Certification (NTTC), and the issuance of National Certificates reflects a comprehensive approach to ensure elevated quality standards and competency within the workforce.

The National Competency Standards (NCS) revised through the Sustainable and Integrated Labour Services Project (SAILS) accentuates the commitment to updating and sustaining contemporary skill sets aligned precisely with industry demands. Deliberate efforts to revise existing NCS, coupled with the development of curriculum, teaching materials, resource books, and logbooks, attest to our dedication to ensuring the ongoing relevance and currency of the TVET system in the Maldives.

The active engagement of Technical Panels and Employment Sector Councils in the NCS development and approval process, coupled with alignment to the Maldives National Qualification Framework (MNQF) and accreditation by the Maldives Qualifications Authority (MQA), certifies that the TVET system not only remains highly responsive but also ensures the quality standards demanded by industries. This approach enables the system to effectively meet the diverse needs of industries and adapt to the evolving economic landscape.

The collaborative development of the National Certificate III in Renewable Energy Installation & Maintenance (Solar PV) by the MNSDA, SAILS, and the Maldives Institute of Technology exemplifies the practical implementation of TVET initiatives. This training package represents a critical stride towards addressing the requisite skills while fostering opportunities to integrate sustainable economic development within the TVET framework.

Dr. Zahra Mohamed

Chief Executive Officer

Maldives National Skills Development Authority

EMPLOYMENT SECTOR COUNCILS			
#	Name	Designation	Organisation
01	Ahmed Thalhath	Director General	Ministry of Construction and Infrastructure
02	Zeeniya Ahmed Hameed	Permanent Secretary	Minister of Housing, Land and Urban Development
03	Adnan Haleem	Secretary General	Maldives National Association of Construction Industry
04	Mohamed Rasheed	Director	Housing Development Corporation
05	Mohamed Waheed	Lecturer	Maldives Polytechnic
06	Hussain Shiyam	Civil Engineer	Civil Engineers Association
07	Ibrahim Shareef Hassan	Training Expert	Ibrahim Shareef Hassan
08	Mohamed Yoosuf	Professional Member	Architects Association of Maldives
09	Shakeeba Ali	Director General	Maldives National Skills Development Authority

National Occupational Standard has been endorsed by:

Adnan Haleem
Chair person
Construction Sector Council

Maldives National Skills Development Authority
Umar Zahir Office Building, 5th Floor,
OrchidMaa Hingun, Hulhumale', Republic of Maldives.

Date of Endorsement:08-05-2025

TECHNICAL SUPPORT			
#	Name	Designation	Organisation
01			
02			

TECHNICAL PANEL MEMBERS			
#	Name	Designation	Organisation
01	Dr. Furugaan Ibrahim	Assistant General Manager	Male' Water and Sewerage Company
02	Ibrahim Nizam	General Manager	State Electric Company Limited
03	Mohamed Rasheed	Industry Expert	-
04	Ahmed Naufal	Engineer	Utility Regulatory Authority
05	Hussain Solah	Engineer / Unit Head - Renewable Energy Department	State Electric Company Limited

VERSION	DEVELOPER	DATE	STANDARD CODE
V1	Maldives Institute of Technology	15.04.2025	SOC-23L3-V1-25

Standard Development Process

The development of the "National Certificate III in Renewable Energy Installation & Maintenance (Solar PV)" Standard involved a comprehensive study of Renewable Energy Intsallation and Maintenance occupations in Maldivian workplaces. Job descriptions and international occupational trends were analysed to draft an initial Occupational Standard. This draft will undergo further refinement through a Technical Panel (TP) from Maldivian workplaces, ensuring incorporation of competencies and edits. The TP will provide technical input, suggesting changes to the standard, until a final draft is agreed upon. The approved Final Draft will then be submitted to the Construction Sector Council for endorsement and validation. A brief report detailing the compilation process will accompany the Standard for the Council's review, and any recommended changes will be addressed before final endorsement.

With the endorsement from the Construction Employment Sector Council, the finalised National Occupational Standard for Renewable Energy Installation and Maintenance will be submitted to the Maldives Qualification Authority (MQA) for final approval. Upon receiving MQA approval, the standard will be officially published on the Maldives National Skills Development Authority (MNSDA) website. This publication will enable training providers in the Maldives to utilise the standard for delivering the Renewable Energy Installation and Maintenance program, ensuring its widespread implementation across the country

Description of "Renewable Energy Installation & Maintenance (Solar PV)"

The "Renewable Energy and Maintenance" standard serves as a foundational guideline aimed at developing essential skills in the installation, maintenance, and troubleshooting of renewable energy systems, specifically in photovoltaic (PV) technology. This programme is dedicated to equipping individuals with the core competencies required to ensure the efficient and reliable operation of renewable energy systems, with a strong focus on safety, technical proficiency, and system performance optimisation.

Participants will gain practical knowledge in handling and maintaining solar energy systems, including PV modules, inverters, batteries, and other key components. They will also develop the skills necessary to diagnose and rectify system faults, ensuring that renewable energy systems continue to perform optimally and sustainably.

The certification acts as an entry point for professionals entering the renewable energy sector, providing a robust framework for understanding the principles and practices essential for the installation, maintenance, and management of solar energy systems.

Job opportunities upon completion of "National Certificate III in Renewable Energy Installation & Maintenance (Solar PV)"

Upon successful completion of the National certificate III in Renewable Energy Installation & Maintenance (Solar PV), students can work in the following jobs.

1. *Assistant Solar PV Technician*

KEY FOR CODING

Coding Competency Standards and Related Materials

DESCRIPTION	REPRESENTED BY
Industry Sector as per ESC (Three letters)	Construction Sector (CON) Fisheries and Agriculture (FNA) Information, Communication and Technology (ICT) Transport Sector (TRN) Tourism Sector(TOU) Social Sector (SOC) Foundation (FOU)
Standard Number - Occupation with in an industry sector	Two digits 01-99
Common Competency	CM
Core Competency	CC
Unit Number - Occupation within a Standard	Three digits 01-99
MNQF level of qualification	L1, L2, L3, L4 etc.
Version Number	V1, V2 etc.
Separator	-
Year of Last Review of standard, qualification	Two digits responding to the year of last review, example 23 for the year 2023
Qualification Code	Refers to Standard code in cover page

1. Endorsement Application for Qualification 01		
2. NATIONAL CERTIFICATE III IN RENEWABLE ENERGY INSTALLATION & MAINTENANCE (SOLAR PV)		
3. Qualification code: SOC-23L3-V1-25	**Total Number of Credits: 58**	
4. Purpose of the qualification The purpose of the "National Certificate III in Renewable Energy Installation & Maintenance (Solar PV)" is to equip individuals with the essential skills and knowledge required to install, maintain, and troubleshoot renewable energy systems, specifically in photovoltaic (PV) technology.		
5. Regulations for the qualification	National Certificate III in Renewable Energy Installation & Maintenance (Solar PV) will be awarded to those who are competent in units 1+2+3+4+5+6+7+8+9+10+11+12+13	
6. Schedule of Units		
Unit No.	**Unit Title**	**Code**
Common Competencies		
01	Apply occupational health and safety requirements	SOC-02-CM01-V2-24
02	Apply work ethics and optimise professionalism	SOC-01-CM02-V2-24
03	Practice effective workplace communication	SOC-01-CM03-V2-24
04	Perform computer operations	SOC-01-CM06-V2-24
05	Respond to emergency situations	SOC-01-CM04-V2-24
Core Competencies		
06	Perform workshop practices	SOC-23-CC01-V1-25
07	Understand renewable energy systems	SOC-23-CC02-V1-25
08	Apply electrical basics for PV technicians	SOC-23-CC03-V1-25
09	Install solar PV system components and configuration	SOC-23-CC04-V1-25
10	Wire, test and troubleshoot PV systems	SOC-23-CC05-V1-25
11	Install and maintain battery systems	SOC-23-CC06-V1-25
12	Perform preventive and corrective maintenance	SOC-23-CC07-V1-25
13	Document and report field work	SOC-23-CC08-V1-25
7. Accreditation requirements	The training provider should have made arrangements to ensure students are provided with adequate theory and practicals for them to develop all the required knowledge and skills stipulated in the National Competency Standard.	
8. Recommended sequencing of units	As appearing under the section 06	

Unit Details

Unit No.	Unit Title	Code	Level	No. of credits	Credit hours	Contact hours
01	Apply occupational health and safety requirements	SOC-02-CM01-V2-24	III	04	40	20
02	Apply work ethics and optimise professionalism	SOC-01-CM02-V2-24	III	03	30	15
03	Practice effective workplace communication	SOC-01-CM03-V2-24	III	03	30	15
04	Perform computer operations	SOC-01-CM06-V2-24	III	03	30	15
05	Respond to emergency situations	SOC-01-CM04-V2-24	III	05	50	25
06	Perform workshop practices	SOC-23-CC01-V1-25	III	05	50	25
07	Understand renewable energy systems	SOC-23-CC02-V1-25	III	05	50	25
08	Apply electrical basics for PV technicians	SOC-23-CC03-V1-25	III	05	50	25
09	Install solar PV system components and configuration	SOC-23-CC04-V1-25	III	05	50	25
10	Wire, test and troubleshoot PV systems	SOC-23-CC05-V1-25	III	06	60	30
11	Install and maintain battery systems	SOC-23-CC06-V1-25	III	06	60	30
12	Perform preventive and corrective maintenance	SOC-23-CC07-V1-25	III	04	40	20
13	Document and report field work	SOC-23-CC08-V1-25	III	04	40	20
Total				58	580	290

Packaging of National Qualifications:

National certificate III in Renewable Energy Installation & Maintenance (Solar PV) will be awarded to those who are competent in units 1+2+3+4+5+6+7+8+9+10+11+12+13

Qualification Code: SOC-23L3-V1-25

COMPETENCY BASED ASSESSMENT

The final assessment of the National Competency-Based Programmes conducted by the Maldives National Skills Development Authority (MNSDA) is a competency-based assessment.

The Competency-Based Assessment ensures that the students' performance meets the requirements specified in the National Competency Standards (NCS). This assessment approach is designed to verify that graduates are job-ready and meet established occupational competency requirements within their respective fields.

Eligibility for Final Assessment

To be eligible for the final Competency-Based Assessment, students must fulfil the following conditions:

- achieve a **minimum of 80%** attendance
- deemed competent in each of the units of the programme in the pre-assessment

Competency-Based Assessment Process

Upon submission of the Pre-assessment report by the training provider, MNSDA will check for all the necessary supporting documents and conduct Competency-Based Assessment through a National Assessor registered with MNSDA. It is important to note that any trainer involved in the training process is **not permitted** to conduct the assessment to maintain impartiality and integrity of the process.

The final Competency-Based Assessment conducted by MNSDA includes both:

- **Theory**: Evaluating students' knowledge and understanding of key theoretical aspects of the competency.
- **Practical:** Assessing hands-on skills and application of knowledge in real-world or simulated environments.

Once the assessment is completed, the National Assessor will send the Competency-Based Assessment Report to MNSDA.

Competency Status Requirement

For certification to be granted, the student must be officially declared **"Competent"** in each of the units of the programme by the National Assessor.

Conclusion

Competency-Based Assessment is a critical component in ensuring the quality and credibility of technical and vocational skills-based training. By adhering to the outlined procedure, MNSDA upholds the standards required to certify students who are fully prepared to meet industry demands.

Materials list—quantities and specifications—for training one student in the National Certificate- III in Renewable Energy Installation & Maintenance (Solar PV)

Category	Item	Qty	Specification / Details
TOOLS	Digital multimeter	1	600 V DC/AC, 10 A, True RMS
	Clamp meter	1	0–100 A AC/DC
	Insulation tester (megger)	1	250 V–1000 V range
	Wire stripper	1	For 2.5–10 mm² PV cables
	Crimping Tool	1	For 2.5–10 mm² PV cables
	Insulated pliers & side cutters	1 each	1000 V rated
	Screwdriver set (flat & Phillips)	1 set	Insulated handles
	MC4 Disconnection Tool	2	
	Allen Key Set	1 set	Up to 10 mm
	Adjustable wrench / spanner set	1 set	8–19 mm
	Torque wrench	1	5–25 Nm
	Electric drill + masonry & metal bits	1	500 W, 0–2 200 rpm
	Label printer or cable tag kit	1	For marking cables & components
	PPE kit	1	Helmet, safety glasses, insulated gloves, harness, safety boots
CONSUMABLES	Solar DC cable (PV-rated)	20 m	4 mm², UV-resistant
	AC cable	5 m	2.5 mm², 600/1 kV rated
	MC4 connectors	10 pairs	IP67-rated
	Label Printer Tape		
	Junction box	1	2-string, IP65
	Cable ties	100	UV-stable, 4.6 × 370 mm
	Screws, bolts & anchors	100	M6–M8 stainless steel
	Fuses & miniature circuit breakers AC (MCBs)	10 pcs	10 A, 16 A, 32 A ratings
	Miniature Circuit Breaker DC (MCB)		2-Pole, 16 A, 500V
	Surge Protection Device AC (SPD), Type 2/3		2/4 Pole, 230/400 V, 10 kA

	Surge Protection Device DC (SPD), Type 1		2-Pole, 500V, 10 kA
	Battery terminal connectors	1 set	For 12 V battery terminals
	Grounding rod & clamp	1	1.2 m copper-clad steel rod
	Cleaning kit	1	Microfiber cloth, soft brush, isopropyl wipes
EQUIPMENT	Solar PV module	1	50 W, 12 V polycrystalline
	Mini PV mounting stand (bench demo)	1	Adjustable tilt, aluminum
	Inverter (grid-tied and off-grid demo)	1	500 W pure sine-wave
	Battery bank (lead-acid, 12 V/100 Ah)	1	Sealed AGM
	Charge controller	1	20 A PWM, 12 V/24 V auto
	Battery Management System (for Li-ion)	1	4-c ell, 100 A max
	Data logger / monitoring device	1	4-channel PV logger with LCD
	Simulated load (resistive)	1	100 W bulb or heating element