SOLAR ENERGY PRODUCTS TECHNICAL REGULATIONS

NOVEMBER 2022

Table of Contents

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REPUBLIC OF LIBERIA
STATUTORY RULES AND ORDERS

Published on 22nd November 2022
Liberia Electricity Regulatory Commission

IN EXERCISE of the powers conferred by chapters 3,6, and 8 of the 2015 Electricity Law of Liberia, the Liberia Electricity Regulatory Commission (the Commission) makes the following Regulations this 22nd day of November 2022.

SOLAR ENERGY PRODUCTS TECHNICAL REGULATIONS

LERC - REG. – 007
2022

PART I - PRELIMINARY PROVISIONS

1. CITATION

(1) These Regulations may be cited as the Solar Energy Products Technical Regulations, 2022.
(2) These Regulations come into force on the 22nd day of November 2022.

2.0 PURPOSE AND SCOPE

1. These Regulations apply to suppliers of all solar energy products.

2. The Regulations specify:

(a) the essential quality and safety requirements for solar systems that generate electricity, solar thermal systems that generate heat and their components;
(b) the requirements for labelling of solar energy product and submission of technical documentations; and
(c) the conformity assessment procedures with which the suppliers shall comply.

3. If any provision in these Regulations shall for any reason be held invalid or unenforceable, the other provisions not affected thereby shall remain in full force and effect.

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3.0 DEFINITION OF TERMS

Unless the context otherwise requires, the following terms whenever used in these Regulations have the following meanings:

Approved PVoC Service Provider	A company approved by the Government of Liberia to provide Pre-Export Verification of Conformity (PVoC) on its behalf.
Airway bill	A document that accompanies goods shipped by an international courier or airline, which allows tracking and serves as a contract of carriage between the shipper and carrier.
Bill of lading	A document issued by a carrier to acknowledge receipt of cargo for shipment, contains a detailed list of a ship's cargo in the form of a receipt given by the master of the ship to the person consigning the goods and constitutes a contract of carriage.
CE	Conformite Europeenne, the European Union's (EU) mandatory conformity marking which, certifies that a product has met EU health, safety, and environmental requirements, which ensure consumer safety.
Certificate of Conformity (CoC)	A document issued by approved PVoC Service Provider and any recognized certification body(ies) to confirm that products to be imported comply with the relevant standards and technical regulations. A CoC is a mandatory document required for every consignment to be imported to Liberia.
Commission	The Liberia Electricity Regulatory Commission (LERC).
Consignment	This refers to a batch of goods destined for or delivered to an entity.
Consignee	A person to whom goods is to be delivered to under a shipping arrangement.
Consumer device or appliance	off-the-shelf, ready-made kits that do not require installation, and may include PV lanterns, dc phone chargers, complete solar PV kits or home systems, battery chargers or fans (extended list in the Executive Order No. 107).

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Court	Court of competent jurisdiction.
Custom User Fees (CUF)	A sum of money imposed by the government which is paid as a necessary condition to gain access to a particular service or facility in the state/country.
Day	Working days Monday to Friday excluding public holidays.
Delivery Order	This is a document that can be issued by the owner of freight, consignee, shipper, or a carrier to deliver goods to another party.
Dwelling place	Place of residence.
Duty waiver authorization	A formal permission that confirms the eligibility of a product to the import duty waiver as per the Executive Order No. 107 or such other Order that may be in force.
ECOWAS Trade Levy (ETL)	Levy imposed on goods from non-ECOWAS Member States used in financing the activities of the ECOWAS Commission and Community institutions.
EN	European Norms, technical standards drafted and maintained by European Committee for Standardization, European Committee for Electrotechnical Standardization and European Telecommunications Standards Institute.
Executive Order No. 107	An Order given by the President of Liberia that suspends tariff on off-grid solar renewable energy products.
Harmonized System (HS) Code	A standardized numerical method of classifying traded products. It is used by customs authorities around the world to identify products when assessing duties and taxes and for gathering statistics.
Hybrid system	A solar PV system incorporating other electricity generation sources such as diesel, wind, or biomass generator.
IEC	The International Electrotechnical Commission is an international standards organization that prepares and publishes international standards for all

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	electrical, electronic, and related technologies – collectively known as "electrotechnology" and manages conformity assessment activities such as, IECEE, IEC Ex, and IECRE.
IECEE	IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components.
IECRE	IEC System for Certification to Standards Relating to Equipment for Use in Renewable Energy Applications.
IECEx	IEC System for Certification to Standards Relating to Equipment for Use in Explosive Atmosphere.
Importer	An entity or person holding an importation authorization from RREA.
INF	Import Notification or Declaration Fees.
LS	Liberian Standards, the specification or code of practice declared by the National Standards Laboratory of Liberia.
Manufacturer	An entity that manufactures solar products, components or consumer devices through a process involving converting of raw materials or assembling of parts or components into finished solar products, components, or consumer devices.
Market Surveillance Authorities	MOCI, NSL or other designated government agency responsible for carrying out market surveillance.
Market Surveillance	Activities and measures carried out by the market surveillance authorities to verify that products on the market meet the requirements stipulated in the relevant Technical Regulations, and to ensure that they do not pose a risk to health, safety, environment, or any other aspect related to the protection of the public interest.
MOCI	Ministry of Commerce and Industry.
MTS	MedTech Scientific-Current approved PVoC service provider in Liberia.

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Non-Conformity Report (NCR)	A document issued by MTS or any other PVoC Service Provider approved by Government of Liberia to specify how products to be imported fail to comply with the relevant standards and technical regulations. An NCR is issued if verification activities such as testing, or inspection show discrepancies versus the verification criteria. Consignments issued with NCR shall not be allowed entry into Liberia. Goods issued with NCR by an approved PVoC Service Provider shall not be presented to another approved PVoC Service Provider for certification.
NSL	National Standards Laboratory
Off-grid solar product	Complete stand-alone renewable energy product or kit, typically including an energy source, power control unit(s), one or more lights or other appliances, wiring, and other accessories, and sold or distributed as a kit. Off-grid solar products are limited to DC (direct current) outputs and are powered by photovoltaic (PV) modules with peak power rating of less than or equal to 350 W. Refer to IEC TS 62257-9-8 for a comprehensive definition.
Permit of importation	A document issued by the Ministry of Commerce and Industries (MOCI) authorizing the importation of solar energy products into Liberia.
Pre-export Verification of Conformity (PVoC)	Conformity assessment program to certify that regulated products that are exported from a country of origin comply with the applicable Liberia Standards and Technical Regulations before shipment into Liberia.
Quality Certificate (QC)	Certificate issued by NSL to confirm product compliance to admissible standards or certificates.
RoHS	Restriction of Hazardous Substances in Electrical and Electronic Equipment, the EU rules restricting the use of hazardous substances in electrical and electronic equipment to protect the environment and public health.
RREA	Rural Renewable Energy Agency.

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Solar energy product or solar product or product	solar system components such as charge controllers, inverters, solar batteries (lead acid or lithium ion) and solar PV modules, solar water heaters and solar appliances.
Supplier	In relation to the supply of solar products for use in Liberia, Supplier means the following: (a) A Manufacturer, (b) An Agent or Importer, (c) A Wholesaler or Retailer
Technical regulation	Document approved by a central or local Liberian governmental body, which lays down product characteristics or their related processes and production methods, including the applicable administrative provisions, with which compliance is mandatory. It may also include or deal exclusively with terminology, symbols, packaging, marking, or labelling requirements as they apply to a product, process, or production method.
UL	Underwriters Laboratories, an approved standard developer in the United States of America and Canada.
Value Added Tax (VAT)	A flat consumption tax assessed on the value added to goods and services.
Warranty	An assurance or guarantee given to the purchaser by a manufacturer/importer/distributor or its agent stating that a product will perform as stated, is reliable and free from known defects and that the manufacturer shall, without charge, repair or replace defective parts within a given time limit and under certain conditions.

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4.0 SOLAR ENERGY PRODUCT STANDARD

4.1 A supplier shall not introduce solar energy products into Liberia unless**:**

(a) the product conforms to the prescribed Liberian standards, or any other international technical standards adopted or recognized by Liberia; and

(b) is covered by a National Standards Laboratory, NSL quality certificate.

4.2 The mandatory requirements for obtaining an NSL quality certificate are specified in Schedule 3.

5.0 OBLIGATION OF SUPPLIER

5.1 A supplier of solar products shall first register with the RREA and then submit a request for an Import Permit declaration for the solar products to the MOCI.

5.2 The supplier must obtain the Permit of Importation prior to the shipment of the consignment and ensure that each consignment of solar products:

(a) is covered by separate Permit of importation; and

(b) conforms to the standards in Schedule 1 and Schedule 2 where applicable.

5.3 Where the application for a Permit of Importation of a product is not covered by the applicable standard or certification as listed in Schedule 2, MOCI shall issue the Permit of Importation only if the NSL has assessed the product and issued a quality certificate considering safety requirements and quality markings as applicable such as RoHS, CE, EN, UL.

5.4 A Supplier shall ensure that prior to shipment of the solar products to be imported into Liberia it obtains:

(i) a Certificate of Conformity (CoC) from an approved PvoC Service Provider's web platform or directly from the appropriate office of an approved PvoC Service Provider in exporting region; and

(ii) a Quality Certificate (QC) from the NSL.

5.5 The supplier shall be responsible for the management of solar product wastes consistent with the requirements of the Environmental Management and Protection Law, the Environmental and Social Management Plan and Environmental Permit, where applicable including:

(a) establishment of facilities for disposal, recycling;

(b) facilitate collection and disposal; and

(c) providing consumer awareness on dangers of unsafe handling and procedures for return of waste.

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6.0 DUTY WAIVER

6.1 A supplier may apply to the Liberia Revenue Authority (LRA) for duty waiver authorization in respect of solar products covered under Executive Order 107.

6.2 LRA shall within fifteen days grant the authorization or inform the supplier of its refusal with reasons.

6.3 The supplier shall ensure that the duty waiver authorization is granted for ease of custom clearing of each consignment.

7.0 LABELING

7.1 A supplier of solar products for use in Liberia shall ensure that the packaging meets the following requirements:

(a) the solar products shall bear a label/data card providing minimum information as specified in sub-regulation 7.2;

(b) the information in respect of the label/data card on the solar product and the package shall be written in the English language; and

(c) the data/label card shall be affixed to the solar product and on the carton that contains the boxes containing the solar products and shall indicate conspicuously the information specified in sub-regulation 7.2.

7.2 The data card/label of the solar product prepared for placement and display on the market shall at the minimum include the following data and marks as specified in Table 1:

Table 1: Data on Label

Required Nominal Properties	Remarks
a) Name of Solar Product	
b) Product Type	
c) Model Identifier	
d) Year of Manufacture	
e) Supplier's name/Trademark	
f) Country of origin	
g) Rated (Input/Output) Voltage	Where applicable
h) Rated frequency (marked in "Hz")	Where applicable
i) Rated current(marked in "Amps")	Where applicable
j) Rated Capacity (Input/Output)	Where applicable
k) Energy Efficiency	Where applicable
l) Ambient Temperature	Where applicable
m) Ingress Protection (IP) rating (or other)	Where applicable

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7.3 Where the MOCI on its own or on receiving notice that information on a label or data card is incorrect, the MOCI may serve a notice requesting the supplier to within 10 days comply with the requirements in sub-regulation 7.1 and 7.2.

8.0 TECHNICAL DOCUMENTATION

8.1 A supplier shall not import, store, offer for sale, sell or distribute a solar product unless the MOCI or RREA has been provided with sufficient technical documentation to enable the MOCI or RREA ascertain the accuracy of the information contained on the product data card.

8.2 The technical documentation referred to in sub-regulation 8.1 shall be in the English language.

8.3 In addition to the information provided on the label/data card, the technical documentation prepared for each model solar product placed on the market, in storage or samples meant as demos shall include the following:

- **(a)** relevant drawings on the main design features of the model and parameters of the solar product that affects their energy consumption;
- **(b)** reports of relevant measurement tests carried out in compliance with the Standards;
- **(c)** details of calculations, extrapolations and tests carried out to verify the accuracy of calculations;
- **(d)** the installation guidelines and instructions; and
- **(e)** operating and safety instructions.

8.4 The information required under this regulation 8 shall be obtained in accordance with the test procedures specified in the relevant Standards.

8.5 Information obtained in a manner other than in accordance with sub-regulation 8.4 shall, for the purposes of these Regulations, be considered as invalid.

8.6 A supplier shall, within 3 working days after a request by the MOCI, provide the MOCI with technical documentation in respect of a solar product for inspection.

8.7 Where a supplier fails to provide technical documentation in respect of a solar product within 3 working days, the MOCI or RREA may act in keeping with statutory power including but not limited to seizure of the solar product.

8.8 A supplier shall keep and maintain technical documentation in respect of a solar product for a period of not less than **36 MONTHS** after the date of sale.

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9.0 MINIMUM EFFICIENCY PERFORMANCE REQUIREMENTS

9.1 A supplier of solar products shall ensure that the products meet minimum efficiency performance standards established by the Commission.

9.2 The mandatory minimum efficiency performance requirements for some major solar products are specified in Schedule 4.

10.0 WARRANTY ON SOLAR ENERGY PRODUCTS

10.1 A supplier of solar products shall provide the minimum warranty periods specified in Table 2 to customers except that in the case of products not covered in Table 2, the minimum warranty period shall be one (1) year.

10.2 The warranty period shall commence from the date of sale in the case of a sale only agreement or the date of commissioning in the case of a sale and install arrangement.

Table 2: Warranty requirements for solar products

Component	Minimum warranty period
Controller/regulator	3 years
Inverter	3 years
Battery – lead acid	1 year
Battery Lithium – Ion	5 years
Solar module	10 years
Consumer devices/Pico solar products up to 10W	1 year
Solar home system kits between 10W and 350W	2 years
Solar water heaters	5 years

11.0 COMPLAINTS AND DISPUTES RESOLUTION

11.1 A supplier shall establish and implement a Complaints and Dispute Resolution Procedures which shall conform to guidelines prescribed by the Commission for addressing consumer complaints.

11.2 A customer that is dissatisfied with the level and quality of service, may complain orally or in writing to the service provider.

11.3 In the event the supplier fails or is unable to resolve the consumer complaint, the consumer may petition the LERC for redress.

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11.4 In considering a petition, LERC may award compensation to the consumer if deemed meritorious.

11.5 For purposes of monitoring, the supplier shall maintain a database of customers' complaints and shall no later than one month after the end of each quarter submit related quarterly reports to MOCI, RREA and LERC.

11.6 A supplier shall be required to maintain a Customer Care Hotline to assist with customer care and complaints.

12.0 MARKET SURVEILLANCE

12.1 A supplier of solar products to the Liberian market shall be subject to market surveillance activities by the NSL to ensure that their solar products are compliant with the provisions of this regulation.

12.2 Market surveillance shall be carried out by the NSL at any place trading in solar energy Products or any place where solar energy products are suspected to be stored.

12.3 A Person shall, during market surveillance, produce for inspection an NSL Quality Certificate for solar energy products imported, in storage, being offered for sale, or being otherwise disposed of.

12.4 A supplier of solar energy products shall permit an identified agent of the NSL entrance into premises to carry out an inspection in terms of this section during working hours to ensure the provisions of these regulations are being complied with.

12.5 Where the NSL has reasonable cause to believe that a dwelling place is being used to commit an offence or has been used to commit an offence, the NSL shall obtain a court order for the purpose of inspection of the dwelling place.

12.6 The MOCI may obtain, remove, test or authorise the testing, at the cost of the supplier, of:

(a) a solar product imported, in storage, being offered for sale, or being otherwise disposed of.

(b) a solar product without the required Quality Certificate.

12.7 A person who suspects a solar product manufactured, imported, stored, offered for sale, sold, or supplied does not comply with the provisions of these regulations, may lodge a complaint with the MOCI.

12.8 The MOCI shall, upon receipt of a complaint under sub regulation 12.7, seize the solar product and submit it to the NSL for testing.

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12.9 A product obtained by MOCI under sub regulation 12.6 or seized under sub regulation 12.8 shall be submitted to NSL within seventy-two hours.

12.10 The test to be conducted in respect of a solar product purchased, obtained or seized shall be conducted within 14 days of solar product submission to the NSL.

13.0 PROCEDURE FOR SEIZURE OF A SOLAR ENERGY PRODUCT

13.1 The MOCI shall keep a seized product in a warehouse or other designated secure location reserved for the purpose.

13.2 The MOCI shall within three days upon the exercise of the power of seizure under regulation 12 give a written notice to the supplier against whom the power has been exercised.

13.3 The written notice shall state

(a) precisely what has been seized;

(b) the reason for the seizure; and

(c) where and within what period a petition against the seizure may be brought against the seizure under regulation 14

13.4 The supplier of a solar product against which a seizure power has been exercised shall cover the cost of destruction of the product when testing has revealed the product as not being compliant with these regulations.

14. PETITION

14.1 PETITION AGAINST SEIZURE

14.1.1 Subject to these Regulations, a supplier whose solar product has been seized may, within 21 days after receipt of the written notification specified in sub regulation 13.2, petition the MOCI for release of the seized solar energy product.

14.1.2 The MOCI shall within seven days of the receipt of petition under sub-regulation 14.1.1 confirm the seizure or release the seized solar energy product on a specific day.

14.1.3 A supplier who is dissatisfied with the decision of the MOCI under sub-regulations 14.1.2 shall lodge a complaint with the LERC within seven days of the receipt of the decision.

14.1.4 The LERC shall within thirty days of receipt of a complaint under sub regulation 14.1.3 take a decision on the complaint.

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14.1.5 A supplier who is dissatisfied with the decision of the LERC, or where the LERC does not decide within 30 days, may apply to the Civil Law Court and any other subsequent court of competent jurisdiction in the Republic of Liberia.

15.0 COMPENSATION FOR LOSS OR DAMAGE

15.1 Where the MOCI exercises the power of seizure under these Regulations, the MOCI shall be liable to pay compensation to the supplier of the solar product for a loss or damaged product caused by the exercise of power if:

(a) these Regulations have not been contravened in relation to the solar energy product; and
(b) the loss or damage is not attributed to the neglect or default of the supplier.

15.2 The compensation payable by the MOCI under sub regulation 15.1 shall be equivalent to the declared landed value of the seized product.

15.3 The LERC shall, at the request of a supplier who disputes the amount of compensation payable under sub regulation 15.2, refer the matter for arbitration in accordance with Complaints and Dispute Resolution Regulation.

16.0 BREACHES AND PENALTIES

16.1 A Person who:

(a) fails to ensure that solar products meant for use in Liberia are in conformity to prescribed Liberian standards or any other international technical standards adopted or recognized by Liberia and covered by a NSL quality certificate as specified in regulation 4,

(b) fails to register with RREA and submit a request for a Permit of Importation declaration from the MOCI for the solar products as specified in regulation 5,

(c) ships a consignment and does not ensure that each consignment of solar product is covered by a separate Permit of importation as listed in Schedule 1 and Schedule 2 contrary to regulation 5,

(d) fails to obtain:
(i) a Certificate of Conformity (CoC) from an approved PvoC Service Provider's web platform or directly from the appropriate office of an approved PvoC Service Provider in exporting region;

(ii) a Quality Certificate (QC) from the NSL.

(e) fails to:
(i) establish facilities for disposal, recycling;

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(ii) facilitate collection and disposal; and
(iii) provide consumer awareness on dangers of unsafe handling and procedures for return of waste.

(f) imports or places on the market a solar product that is:
(i) not labelled in accordance with requirements of regulations 7;
(ii) not labelled properly in accordance with requirements of regulation 7 and has been issued a 10-day notice of compliance;
(iii) labelled in a deceptive or misleading manner contrary to regulation 7;
(iv) not accompanied by a technical documentation contrary to regulation 8;
(v) not complaint to a requirement in respect of the minimum energy efficiency standard contrary to regulation 9

(g) fails to keep and maintain technical documentation in respect of solar product for a period of not less than **thirty-six months** after the date of manufacture or for as long as the product remains unsold;

(h) fails to provide the minimum warranty periods specified in regulation10;

(i) during market surveillance activities:
(a) fails to subject their solar product to inspection;
(b) obstructs an identified agent of the NSL from entering any premises to carry out an inspection in terms of market surveillance during official working hours;
(c) fails to present an NSL quality certificate; and
(d) product fails to conform to relevant standards after having consulted the relevant parties and done the assessment or testing of the products.

(j) fails to cover the cost of testing by NSL in respect of solar product being offered for sale without the required Quality certificate contrary to sub regulation 12.6, commits an offence and the MOCI may impose fines and penalties for violation and breach of these regulations or other directives as specified in Schedule 5.

17.2 Payment of penalties or fines hereunder shall not absolve or indemnify the supplier from any obligations to compensate a consumer.

17.3 An agent of the MOCI that assists a supplier to contravene these Regulations commits an offence and is liable to payment of a fine as stipulated in Schedule 5.

18.0 TRANSITIONAL PROVISIONS

1. Subject to sub regulation (2) and (3) these regulations shall enter into force on the date of adoption.

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2. A supplier shall achieve the requirements specified in SCHEDULE 1 and SCHEDULE 2 within six months of entry into force of these Regulations.

3. The payment of penalties and fines prescribed in these regulations shall commence six months after the entry into force of these Regulations.

4. Despite sub regulations (1) to (3), products on the Liberian market before the entry into force of the Regulations shall be subject to compliance with only the following:

i. Safety requirements;

ii. Labelling provisions; and

iii. Provision of technical data.

5. Such products are not liable to forfeiture for non-compliance with standards unless the Supplier fails to comply with the requirements in sub regulation (4) and the products are certified to be unsafe by MOCI/NSL.

19. AMENDMENT OR REPEAL OF REGULATIONS

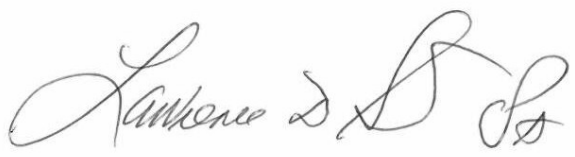
The Commission may amend or repeal the provisions of these regulations as it deems necessary.

THE COMMON SEAL OF

LIBERIA ELECTRICITY REGULATORY COMMISSION

Was affixed pursuant to the ORDER OF THE COMMISSION.

On this 22nd day of November 2022.



Dr. Lawrence D. Sekajipo, **CPA, CFE, DBA, JSM**

CHAIRMAN BOARD OF COMMISSIONERS

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SCHEDULE 1: SOLAR ENERGY PRODUCTS AND APPLICABLE STANDARDS

Product	HS Code	Applicable Standard	Standard Title
Solar Photovoltaic Module	8541.40.10/ 8541.40.90/ 8541.40.90/ 8541.50.00/ 8541.60.00/ 8541.90.00	LS IEC 60364-7-712: 2017	"Low voltage electrical installations – Part 7-712: Requirements for special installations or locations – Solar photovoltaic (PV) power supply system apply to the **electrical installation of PV systems intended to supply all or part of an installation"**
Solar Module	854140.00	IEC 61215-1:2021	"Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1: Test requirements"
Solar Module	854140.00	LS IEC 61215-2:2021	"Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 2: Test procedures"
Solar PV Module	8541.40.10/ 8541.40.90/ 8541.40.90/ 8541.50.00/ 8541.60.00/ 8541.90.00	LS IEC 62258-1	"Semiconductors die products – Part 1: Procurement and Use
Solar Module	854140.00	LS IEC 62941: 2019	"Terrestrial photovoltaic (PV) modules – Quality system for PV module manufacturing"
1.0 Solar Light & Lantern 2.0 Solar Home System 3.0 Solar LED light 4.0 Solar LED sensor light 5.0 Solar Torches 6.0 Pico solar systems	940540.00 940540.00 940540.00 9405.40.00 8513.10.90 9405.40.00	IEC 62257-9-8:2020	"Renewable energy and hybrid systems for rural electrification – Part 9-8: Integrated systems – Requirements for stand-alone renewable energy products with power ratings less than or equal to 350 W"

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		LS IEC 62257-9-5	Recommendations for renewable energy and hybrid systems for rural electrification —- Integrated systems— Laboratory evaluation of stand-alone renewable energy products for rural electrification
Solar Module	854140.00	IEC 61730	"Photovoltaic (PV) module safety qualification"
Solar Module	854140.00	IEC TS 62804-1:2015	"Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation – Part 1: Crystalline silicon"
Solar Module	854140.00	IEC TS 62804-1-1:2020	"Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation – Part 1-1: Crystalline silicon – Delamination"
Solar Module	854140.00	IEC TS 62804-2:2022	"Photovoltaic (PV) modules – Test methods for the detection of potential-induced degradation – Part 2: Thin-film"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/850720 8506600.00	IEC 62485-2:2010	"Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC 61427:2009	Secondary cells and batteries for photovoltaic energy systems (PVES) – General requirements and methods of test
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC 62933-1:2018	"Electrical energy storage (EES) systems – Part 1: Vocabulary"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC 62933-2-1:2017	"Electrical energy storage (EES) systems – Part 2-1: Unit parameters and testing metho–s – General specification",
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC 62933-5-2:2020	"Electrical energy storage (EES) systems – Part 5-2: Safety requirements for grid-integrated EES systems -Electrochemical-based systems"
Solar Battery (PbAc, AGM, Gel)	850780/ 850720 8506600.00	IEC TS 62933-2-2:2022	"Electrical energy storage (EES) systems – Part 2-2: Unit parameters and testing

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Li-ion Solar battery			methods – Application and performance testing"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC TR 62933-2-200:2021	"Electrical energy storage (EES) systems – Part 2-200: Unit parameters and testing metho–s – Case study of electrical energy storage (EES) systems located in EV charging station with PV"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC TS 62933-3-1:2018	"Electrical energy storage (EES) systems – Part 3-1: Planning and performance assessment of electrical energy storage systems – General specification"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC TS 62933-4-1:2017	"Electrical energy storage (EES) systems – Part 4-1: Guidance on environmental issues – General specification"
Solar Battery (PbAc, AGM, Gel) Li-ion Solar battery	850780/ 850720 8506600.00	IEC TS 62933-5-1:2017	"Electrical energy storage (EES) systems – Part 5-1: Safety considerations for grid-integrated EES systems – General specification"
DC/AC converter or inverter	854000 85401010	IEC 62109-1: 2011	"Safety of power converters for use in photovoltaic power systems – Part 1: General requirements"
DC/AC converter or inverter	854000 85401010	IEC 62109-2:2011	"Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters"
Charge Control Unit	850680	LS IEC 62509:2010	Units that combine the solar charge controller and the control unit.
Solar PV LED light (as an integral part of a solar product package)	940540.00	IEC 62560:2011	DC Solar LED lights to be powered from solar, including all housing, wiring, switches, and all parts used to focus and amplify the usable light
Solar PV Torches(as an integral part of a solar product package)	8513.10.90	IEC TS 62257-9-8	Portable electric lamps with their own rechargeable battery storage, designed to be charged by an integrated or separate solar panel
Solar PV Radio(as an integral part of	852799.00/ 852719.00	IEC 61204-3	Reception apparatus for radio-telephony radio-telegraphy or radio-broad-casting, whether or not combined, in the same housing, with sound recording or

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a solar product package)			reproducing apparatus, with their own rechargeable battery storage, designed to be charged by an integrated or separate solar panel and coming without a AC/ DC adapter
Solar PV TV(as an integral part of a solar product package)	852872.00	IEC 62368-1	TVs designed for the use for low-voltage (usually 12V) and DC power that are extremely energy efficient and consume a maximum of 0.014W/cm² for TVs with a display smaller than'22'' and a maximum of 0.011W/cm² for those with a display of 22'' and above.
Solar PV Fan (as an integral part of a solar product package)	841459.00	LS IEC 60335-2-80	Fans (excl. table, floor, wall, window, ceiling or roof fans, with a self-contained electric motor of an output ≤125 W), running on DC and powered by solar and coming without AC/ DC adapter
Solar PV water heater (as an integral part of a solar product package)	84199000	IEC 60335-2-73	DC water heating systems and accessories
Solar Nano grids and micro grids	940540.00	IEC 62257-9-8:2020	small solar "energy boxes" which offer DC that can be connected to several productive anchor clients to become a very small electrical grid.
Charge Control Unit	850680	LS IEC 62509:2010	Units that combine the solar charge controller and the control unit.

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SCHEDULE 2: SOLAR ENERGY PRODUCTS COVERED BY APPLICABLE SAFETY REQUIREMENTS AND QUALITY MARKINGS (RoHS, CE, EN, UL)

Product	HS Code	Applicable Standards or Certificates	Product Description
Solar phone charging unit	9405.50.00 / 850440.00		Charges multiple mobile phones at the same time from a battery that is charged by solar.
Solar hair cutters Solar hair clippers	8510.10.00		Shavers, hair clippers and hair-removing appliances, with self-contained electric motor that runs off a rechargeable battery that is charged through solar without any AC charger.
Solar hair straighteners	8516.32.00		Other hair dressing apparatus, whether with self-contained storage unit, charged or powered from solar without any AC charger.
Solar grain miller	84371000		Solar powered equipment to grind grains, cereals, cassava, etc. with a self-contained electric motor of an output <= 125 W), running on DC and coming without AC/DC adapter
Solar dryer	84199000		Installation used to dry agricultural products, powered by solar
Solar egg incubators			Solar powered egg incubators to provide chick-hatching solutions to farmers especially in rural areas where there is no electricity. The incubators ensure that eggs hatch in bulk as opposed to the natural process the farmers currently rely on
Solar sewing machines			Solar DC powered equipment to help in tailoring workshop in offgrid and weak grid settlements
Solar cold rooms			Solar powered cold chambers with sizes varying from few m3 to hundreds m3

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Product	HS Code	Applicable Standards or Certificates	Product Description
Control Unit	853710.00/ 8541.40.00		Boards, cabinets, and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1,000 V. Controls circuit with battery for remote monitoring and control of the system.
Solar LED light	940540.00		DC Solar LED lights to be powered from solar, including all housing, wiring, switches, and all parts used to focus and amplify the usable light
Solar LED sensor light	9405.40.00		DC LED lights powered from solar sensitive to motion, including all housing, wiring, and switches
Solar Torches	8513.10.90		Portable electric lamps with their own rechargeable battery storage, designed to be charged by an integrated or separate solar panel
Solar Radio	852799.00/ 852719.00		Reception apparatus for radio-telephony radio-telegraphy or radio-broad-casting, whether or not combined, in the same housing, with sound recording or reproducing apparatus, with their own rechargeable battery storage, designed to be charged by an integrated or separate solar panel and coming without an AC/ DC adapter
Solar TV	852872.00		TVs designed for the use for low-voltage (usually 12V) and DC power that are extremely energy efficient and consume a maximum of 0.014W/cm² for TVs with a display smaller than 22'' and a maximum of 0.011W/cm² for those with a display of 22'' and above.
Solar powered refrigeration unit	841829.00		DC refrigerators, non-electrical, absorption-type to be powered by solar, coming as a package with accessories (panels, batteries, control units, etc) and coming without an AC/ DC adaptor.

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Product	HS Code	Applicable Standards or Certificates	Product Description
Solar Fan	841459.00		Fans (excl. table, floor, wall, window, ceiling or roof fans, with a self-contained electric motor of an output <= 125 W), running on DC and powered by solar and coming without AC/ DC adapter
Solar PV grain miller (as an integral part of a solar product package)	84371000		Solar powered equipment to grind grains, cereals, cassava, etc. with a self-contained electric motor of an output <= 125 W), running on DC and coming without AC/DC adapter
Solar PV dryer (as an integral part of a solar product package)	84199000		Installation used to dry agricultural products, powered by solar
Solar water heater	84199000	IEC 60335-2-73	DC water heating systems and accessories
Solar PV egg incubators (as an integral part of a solar product package)	8436.21.00		Solar powered egg incubators to provide chick-hatching solutions to farmers especially in rural areas where there is no electricity. The incubators ensure that eggs hatch in bulk as opposed to the natural process the farmers currently rely on
Solar PV sewing machines (as an integral part of a solar product package)	8452.10.00		Solar DC powered equipment to help in tailoring workshop in off grid and weak grid settlements
Solar PV iron (as an integral			

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Product	HS Code	Applicable Standards or Certificates	Product Description
part of a solar product package)			
Control Unit	853710.00/8541.40.00		Boards, cabinets, and similar combinations of apparatus for electric control or the distribution of electricity, for a voltage <= 1,000 V. Controls circuit with battery for remote monitoring and control of the system. Once customer paid regular fee, control unit unlocks flow of electricity whether remotely or though manual entering of a code by customer via a touchpad or through a remote control.
Solar PV Water Pump or Irrigation Pumps with all accessories (panels, batteries, control unit, etc.)	841381.00	Verasol Certificate	Electrical DC Pumps for liquids, solar powered, including all accessories (panels, batteries, control units, etc.)
Solar PV cold rooms (Per project)	9406.00.20	Verasol Certificate	Solar powered cold chambers with sizes varying from few m3 to hundreds m3
Solar PV powered refrigeration unit (as an integral part of a solar product package)	841829.00	Verasol Certificate	DC refrigerators, non-electrical, absorption-type to be powered by solar, coming as a package with accessories (panels, batteries, control units, etc) and coming without an AC/ DC adaptor.

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Product	HS Code	Applicable Standards or Certificates	Product Description
Solar PV LED sensor light (as an integral part of a solar product package)	9405.40.00		DC LED lights powered from solar sensitive to motion, including all housing, wiring, and switches

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SCHEDULE 3: MANDATORY REQUIREMENTS FOR OBTAINING AN NSL QUALITY CERTIFICATE

The below shall constitute minimum requirements for obtaining an NSL quality certificate:

1. A valid certificate of conformity (CoC) issued by MTS
2. A valid business registration certificate with tax identification number (TIN)
3. A valid License from RREA with declaration of indicated solar products

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SCHEDULE 4: MINIMUM EFFICIENCY PERFORMANCE SPECIFICATIONS OF PRODUCTS

RE Product	Efficiency Metric	Definition	Formula	Standard/ Specification
Solar Module/Panel	Solar Module or Panel Efficiency (η)	Ratio of the Maximum Power output of the solar PV panel or module to the total solar irradiance.	$\eta = \frac{P_{max}}{(E_{total} X A)} \; x \; 100\%$ Where: **P_{max}** is the maximum electrical power produced when panel/module is illuminated under standard reference test conditions of 25°C junction temperature with1000 Wm^{-2} total irradiance as specified by the Liberia Standard LS IEC 60904-3 ed.2 global reference spectrum; **A** is the total area of the device including contacts and peripheral bus bars; and **E_{tot}** is the total irradiance at standard reference conditions, 1000 Wm^{-2}	**η ≥ 15%**
Battery	Charge Efficiency at relevant Initial State of Charge ($\eta_{SoC=x\%}$)	Ratio of the quantity of electricity delivered during the discharge of a cell or battery and the quantity of electricity measured in Ampere-hours necessary to restore the initial state of charge under ambient test conditions	$\eta_{SoC=x\%} = \frac{AH_{output}}{AH_{input}} \; x \; 100\%$ Where: **$\eta_{soc=x\%}$** is the Battery Charge Efficiency measured at initial State of Charge (SoC=x%); **AH_{output}** is the quantity of electricity delivered during discharge from an initial State of Charge (SoC=x%) expressed in ampere-hour (Ah); **AH_{input}** is the quantity of electricity needed for restoration to initial State of Charge (SoC=x%) expressed in ampere-hour (Ah)	**$\eta_{soc=50\%}$ ≥ 90%** **AND** **$\eta_{soc=90\%}$ ≥ 85%** **[NB: Charge efficiency is measured for *Initial State of Charge* at both 50% and 90%]**

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Inverter	Power Efficiency (η_{pe})	Ratio of active output power and the active input power.	$\eta_{pe} = \frac{P_{aAC}}{P_{aDC}} x\ 100\%$ Where: η_{pe} is the power efficiency; P_{aAC} is the alternating current (a.c.) active power; and P_{aDC} is the direct current (d.c.) active power	$\eta_{pe} \geq 85\%$
Light Emitting Diode (LED) Lamp	12) Luminous Efficacy (L_{eff}) AND	Ratio of the initial luminous flux of a lamp to the actual measured power, in Lumens per Watt	$L_{Eff} = \frac{\Phi_{useful}}{P_{rated}}$ Where: L_{eff} is the Luminous efficacy; Φ_{useful} is the useful luminous flux of the lamp measured in accordance with the Standard; and P_{rated} is the power rating of the lamp NB: Test measurements per the following standards: (i) IEC 62612-2018 (ii) IEC 62471-2006 (iii) IEC 62717 +AMD2015	**(i)** $L_{eff} \geq 95$ Lm/W **AND** **(ii)** **CRI ≥ 80**
	ii) Colour Rendering Index (CRI)	Quantitative measure of the ability of a light source to reveal the colours of various objects faithfully in comparison with an ideal or natural light source		

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SCHEDULE 5: APPLICABLE PENALTIES AND PAYMENT

No.	Service activity	Reference	Basic Penalty	Additional payment
1	failure to ensure that solar product meant for use in Liberia are in conformity to prescribed Liberian standards or any other international technical standards adopted or recognized by Liberia and covered by a NSL quality certificate.	regulation 4.	Seizure of products and subject to a fine of USD500.00	USD300.00 for destruction
2	failure to register with RREA and submit a request for a Permit of Importation Declaration from the MOCI for the solar products	regulation 5.	Seizure of products and subject to a fine of USD1000.00	
3	Contrary to regulation, ships a consignment and does not ensure that each consignment of solar product is covered by a separate Permit of importation as listed in Schedule 1 and Schedule 2	regulation 5	Seizure of products and subject to a fine of USD750.00 on each consignment	
4	fails to obtain, prior to shipment of solar products to be imported to Liberia, a Certificate of Conformity (CoC) from an approved PvoC Service Provider's web platform or directly from the appropriate office of an approved PvoC Service Provider in exporting region	regulation 5	Seizure of products and subject to a fine of USD1000.00	Payment of declared storage fee daily leading to the date of destruction
5	Fails to be responsible for the management of solar product wastes consistent	regulation 5	subject to a fine of USD2500.00	

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	with the requirements of the Environmental Management and Protection Law, the Environmental and Social Management Plan and Environmental Permit, where applicable including: (a) establishment of facilities for disposal, recycling; (b) facilitate collection and disposal; and (c)providing consumer awareness on dangers of unsafe handling and procedures for return of waste.			
6	An agent of the MOCI who aids a supplier to contravene these Regulation	regulation 5	Subject to a fine of USD250.00	
7	solar product is not labelled in accordance with requirements.	regulations 6	subject to a fine of USD20.00 per product	
8	Solar product is not labelled properly in accordance with requirements.	regulation 6	subject to a fine of USD20.00 per product	
9	Solar product is labelled in a deceptive or misleading manner contrary to the requirement	regulation 6	subject to a fine of USD20.00 per product	
10	solar product not complaint to a requirement in respect of the minimum energy efficiency standard	regulation 6	Seizure of products and subject to a fine of USD500.00	

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11	solar product not accompanied by a technical documentation	regulation 6	subject to a fine of USD20.00 per product	
12	product fails to conform to relevant standards after having consulted the relevant parties and done the assessment or testing of the products	regulation 6	seizure and destruction	

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