

NATIONAL ELECTRIC POWER REGULATORY AUTHORITY

(NEPRA)

NOTIFICATION

6th July,

Islamabad, the [•], 2022

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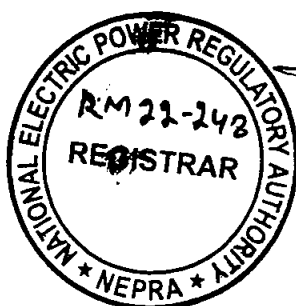
S.R.O. [•]/2022 — In exercise of the powers conferred by section 47 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (Act No. XL of 1997) read with all other enabling provisions thereof, the National Electric Power Regulatory Authority is pleased to make the following regulations.—

1. **Title and commencement.**— (1) These regulations shall be called the National Electric Power Regulatory Authority Licensing (Microgrid) Regulations, 2022.

(2) They shall come into force at once.

2. **Definitions.**— (1) In these regulations, unless there is anything repugnant in the subject or context,—

- (a) "Act" means the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (Act No. XL of 1997) as amended from time to time;
- (b) "host distribution licensee", for the purposes of these regulations, means the distribution licensee within whose service territory the microgrid is established;
- (c) "microgrid licence" for the purpose of these regulations, means a unified licence granted by the Authority under these regulations to:
 - i) construct, own or operate a generation facility of the microgrid;
 - ii) engage in the distribution of electric power from the microgrid; and
 - iii) engage in the supply of electric power to a consumer from the microgrid;
- (d) "licensee", for the purposes of these regulations, means a person granted a licence under these regulations;
- (e) "microgrid" means a localized energy system that fulfills the following criteria:
 - i) it is a self-contained distribution system operating at a voltage not exceeding



33 kV for distribution of electric power with peak distribution load not exceeding five megawatt;

- ii) it is intended to serve an unserved market; and
- iii) it is not connected directly or indirectly to the national grid;
- (f) "microgrid application" means a single application for grant of a microgrid licence under these regulations; and
- (g) "unserved market" means a service territory of the host distribution licensee which is:
 - i) not served by the host distribution licensee at the time of the application for a license under these regulations;
 - ii) outside five kilometers on either side and tail end points of existing distribution facilities of the host distribution licensee; and
 - iii) where the host distribution licensee's service is not projected to extend under its investment plan approved by the Authority.

(2) Words and expressions used but not defined in these regulations shall have the same meanings as assigned to them in the Act and in the rules and regulations framed thereunder.

3. Microgrids.-- (1) Any person interested in constructing, owning and operating a microgrid, may apply to the Authority for grant of a microgrid licence through a microgrid application.

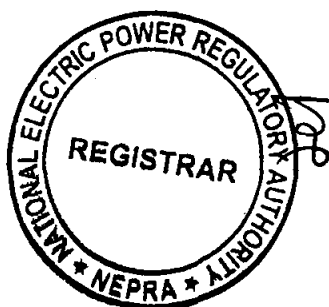
(2) A microgrid applicant may be.—

- (a) an individual, or
- (b) a company, a cooperative society, a partnership or a social welfare organization, in each case duly formed and registered under the applicable law.

(3) Subject to such conditions as the Authority may deem appropriate, the Authority may grant a microgrid licence to the eligible applicant to construct, own and operate a microgrid on non-exclusive basis and to perform all activities incidental or ancillary thereto, including, without limitation, connection, metering, billing, collection and disconnection for payment default by a consumer.

(4) A licensee may generate electric power up to five megawatt..

(5) A licensee shall connect and supply electric power to all consumers within its



service territory on a non-discriminatory basis, except where:

- (a) the requested supply shall result in the licensee exceeding the limit of total distribution load of five megawatt; or
- (b) the new supply request is technically or commercially unfeasible,

provided that, the Authority may on receipt of a complaint by a person denied service conduct an inquiry on the basis of the principles set out in Schedule-I to these regulations and pass an order accordingly.

(6) A microgrid shall not be connected to the national grid or provincial grid, directly or indirectly except as provided in sub-regulation (1) of regulation 7 of these regulations.

4. Application Process - (1) A microgrid application in the form available on the Authority's website for a license may be filed:

- (a) electronically, using the electronic form submission facility on the Authority's web-site, or
- (b) by email or by courier addressed to the Registrar.

(2) The application shall be processed by the Authority within sixty days of its admission, provided that, the said period shall be extended by such number of days taken by the applicant to respond to the Authority with information missing in its application.

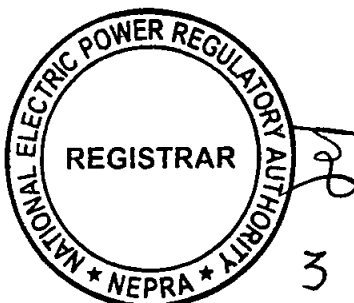
(3) Subject to an opportunity of hearing to the applicant, the Authority may decline an application for inconsistency with the Act or any of the rules or regulations thereunder.

(4) A license under these regulations shall be in the form set out in Schedule-II to these regulations.

(5) Notwithstanding anything contained in any other regulations, a licence under these regulations shall be granted for a maximum term of ten years.

(6) The Authority shall provide an opportunity of hearing to the host distribution licensee, concerned supplier of last resort and respective provincial energy department before granting a microgrid licence and may also conduct a public hearing to process the microgrid application under these regulations.

5. Minimum Standards. -- (1) The microgrid shall be designed, constructed and operated in compliance with the applicable documents, distribution code, applicable laws and international standards set forth in schedule-IV to these regulations, each as amended or substituted from time to time:



Provided that the microgrid equipment and specifications shall comply with those being widely used by the host distribution licensee in order to ensure that integration with the network of the host distribution licensee is not hampered in the event of expansion of host distribution licensee's network to the area served by the microgrid.

(2) A licensee may apply to the host distribution licensee to provide the relevant specifications relating to cable, conductor, poles, transformers, safety requirements and other related aspects and the host distribution shall provide the requested specifications without any delay but in any event within seven days of receipt of the application.

(3) A licensee shall not commence commercial operations until the day after the licensee has filed with the Authority a certificate certifying that the microgrid, as built, complies with:

(a) these regulations, and

(d) such other laws applicable to electrical systems of the size and specifications as the microgrid in question.

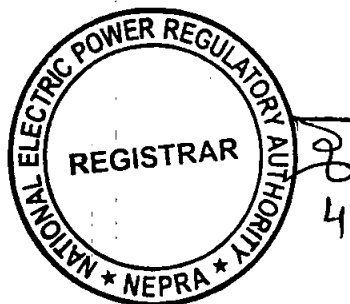
6. **Tariff.**— (1) A licensee shall supply electric power to the consumers on a reasonable tariff which is fair and equitable between the consumers and the licensee, and shall submit a copy of contract containing the tariff agreed with the consumers, or any subsequent change therein, to the Authority within thirty days of such contract or revisions therein.

(2) The Authority may carry out a tariff reassessment where it has reason to believe that the licensee's tariff is unjustified.

7. **Miscellaneous.**— (1) Grid Arrival — Where a host distribution licensee extends its distribution network to the area served by the microgrid, it shall make an application to the Authority whereupon the Authority shall conduct a public hearing and shall make an order whereby any of the following options may be given to the parties:

(a) subject to the consent of the licensee the concerned supplier of last resort may take over the function of supply of electric power and the distribution and generation functions may be retained by the microgrid, or the host distribution company may take over all the microgrid function and assets subject to payment of appropriate compensation to be agreed bilaterally between host distribution company and microgrid licensee, on such terms and conditions as may be approved by the Authority; or

(b) the Authority may order that the acquisition of the microgrid shall be deferred for a period to be specified by the Authority.



(2) Standard Operating Procedures – The Authority may in the consumer interest from time to time specify standard operating procedures which shall be followed by the licensee. Such standard operating procedures may include, but shall not be limited to, the following topics:

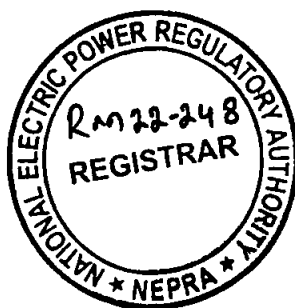
- (a) billing and collection from consumers;
- (b) connection and disconnection of consumers;
- (c) suspension of service;
- (d) consumer deposits;
- (e) consumer complaints management system;
- (f) service contract with consumers; and
- (g) consumer complaints resolution procedure:

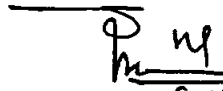
Provided that, pending the development of the standard operating procedures by the Authority, the licensee shall ensure that it enters into a service contract with each consumer and that the service contract addresses the topics listed in Schedule-III to these regulations in a manner which is fair and equitable between the consumers and the licensee.

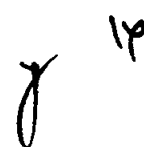
(3) Accounting.– A licensee shall keep proper books of account and shall cause its accounts to be audited annually by a chartered accountant and shall file the audited accounts with the Authority within one hundred twenty days of the close of its financial year if it is a juridical person and within one hundred twenty days of the end of a calendar year if it is a natural person.

(4) Exemption.— (a) A licensee (other than a company) shall be deemed exempted from operation of Section 24 of the Act.

(b) The National Electric Power Regulatory Authority Licensing (Application, Modification, Extension and Cancellation) Procedure Regulations, 2021 shall not apply to the grant of licence issued under these regulations.



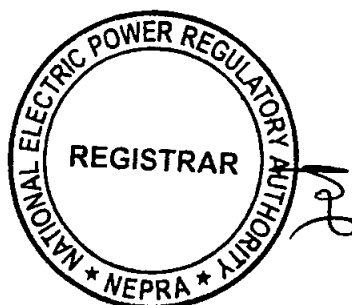

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[Syed Saifur Hassan]
Registrar



Schedule-I
See regulation 3

Principles of inquiry into refusal to serve

- A. The licensee shall not unduly discriminate against consumers in the immediate vicinity of a microgrid if such person wishes to receive service from the microgrid.
- B. There shall be a presumption of undue discrimination if the consumer refused service is within the microgrid boundaries or in the vicinity thereof.
- C. The presumption of undue discrimination may be rebutted if the licensee demonstrates that:
 - 1. it is not feasible to connect the applicant based on cost, where the cost of connection and service to the applicant would exceed the average cost plus a reasonable return of providing service to other consumers of the same consumer-class, with the reasonable return derived from the tariff pursuant to regulation 6(1) of these regulations, or
 - 2. it is technically not feasible to connect the applicant, for which the licensee shall submit an affidavit signed by an engineer licensed by the Pakistan Engineering Council describing the technical barriers that prevent delivery of service to the applicant.



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Schedule-II

See regulation 4 (4)

Form of License for Microgrids

National Electric Power Regulatory Authority (NEPRA)

Microgrid License

No. [●]

In exercise of the powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under sections 14B, 20 and 23E of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 read with the National Electric Power Regulatory Authority Licensing (Microgrid) Regulations, 2022, the Authority hereby grants the microgrid licence to :

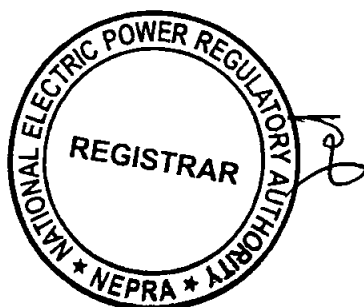
[insert the licensee name]

For its microgrid located at

[location of microgrid]

to generate electricity up to [●] megawatt and to distribute and supply electric power to the consumers connected to the microgrid and to perform all activities incidental or ancillary thereto subject to and in accordance with the Articles and Schedules [●] of this licence.

Given under my hand this [●] day of [●] and expires on [●] day of [●].



Registrar

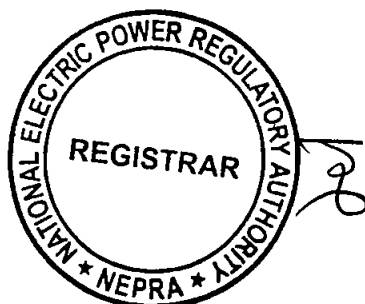
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Schedule-III
See regulation 7 (2)

Terms for contract of electrical service supply by microgrids

The licensee shall develop a standard form contract to be used for all consumers with the exception that rates may vary for each consumer-class. The contract shall be written in plain regional language and shall be drawn to represent a fair and equitable agreement comprising but not limited to the following terms:

- i) the effective date of the contract
- ii) the contract to continue until terminated by the consumer with notice, by the licensee on consumer's payment default or on grid arrival
- iii) all rates and charges for which the consumer shall be charged, including late payment fees and reconnection fees, as applicable, but subject always to the tariff and conditions approved by the Authority generally or specifically
- iv) the billing cycle
- v) the terms and conditions for the suspension of service and reconnection
- vi) the assignment of the contract to a successor/lessee/licensee to the consumer's premises
- vii) force majeure provisions
- viii) terms and conditions for the licensee's right to enter the consumer's premises
- ix) provisions against theft of electricity
- x) consumer inquiries and complaints office with address and contact details
- xi) consumer complaints resolution procedure
- xii) transfer of contract on grid arrival
- xiii) a dispute between a consumer and the licensee shall not be subject to arbitration but shall be processed under section 39 of the Act, provided that, the contract may provide for a conciliation or mediation process not exceeding 15 days before filing of a complaint with the Authority, and in such case the mediation shall be conducted either by a mediator duly accredited under the relevant legislation or by a conciliation committee comprising equal representation of the licensee and the association of consumers of the licensee
- xiv) the standard operating procedures specified by the Authority from time to time pursuant to the regulations to prevail in case of inconsistency with the contract terms, and
- xv) such other provisions as the Authority may specify from time to time.



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Schedule-IV

See regulation 5 (1)

International Standards for Microgrid Systems

A. IEEE 1547.4 – 2011

IEEE Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems

Summary:

Alternative approaches and good practices for the design, operation, and integration of Distributed Resource (DR) island systems with Electric Power Systems (EPS) are provided. This includes the ability to separate from and reconnect to part of the area EPS while providing power to the islanded EPSs. This guide includes the DRs, interconnection systems, and participating EPSs.

1. Clauses 4-5 are helpful. Clause 6 can be useful for studying different operational studies.
2. Clause 4 gives an overview of the general considerations for design and operation of DR island systems and describes the various types of DR island systems. This clause also discusses the modes of operation of the DR island systems, including normal parallel mode, transition-to-island mode, island mode, and reconnection mode.
3. Clause 5 explains the planning and engineering of DR island systems with detailed discussions about the considerations and solutions.
4. Clause 6 describes the operations of the DR island system.

B. IEEE Std 2030.10™□2021

IEEE Standard for DC Microgrids for Rural and Remote Electricity Access Applications

Summary:

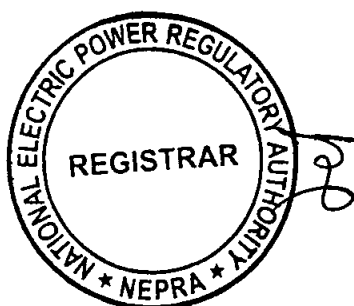
The design and operation of a DC Microgrid for rural or remote applications based on Extra Low Voltage DC (ELVDC) to reduce cost and simplify stability are discussed in this standard. Such Microgrids are typically operated without connecting to a nation's electric power system.

This standard consists of two parts. The first part specifies normative requirements and defines the operating parameters for components used to construct the Microgrid. These requirements are intended to enable conforming Microgrids to be constructed from components with minimal constraints.

The second part, comprising the bulk of the document, consists of recommendations addressing the practical concerns needed to design and operate such a Microgrid. These include important safety suggestions.

C. IEEE Std 1013™-2019

IEEE Recommended Practice for Sizing Lead-Acid Batteries for Stand-Alone Photovoltaic (PV) Systems



Summary:

A method for determining the energy-capacity requirements (sizing) of both vented and valve-regulated lead-acid batteries used in terrestrial stand-alone photovoltaic (PV) systems is described in this recommended practice. Sizing batteries for hybrid or grid-connected PV systems is beyond the scope of this recommended practice. Installation, maintenance, safety, testing procedures, and consideration of battery types other than lead-acid are beyond the scope of this recommended practice. Recommended practices for the remainder of the electrical systems associated with PV installations are also beyond the scope of this recommended practice.

Section 3 -8 are helpful for different aspects of determining the battery size, load data, and data analysis.

Section 9.1 Worksheet 1 – Battery Sizing

Section 9.2 Worksheet 2 – Supplemental battery sizing for duty cycle periods > 24h

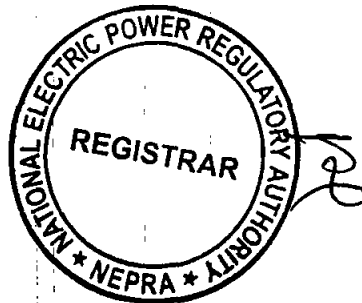
Section 9.3 Worksheet 3—Load-Data Summary

D. IEEE Std 1526™ □ 2020

IEEE Recommended Practice for Testing the Performance of Stand-Alone Photovoltaic Systems

Summary:

Tests to determine the performance of stand-alone photovoltaic (PV) systems and for verifying PV system design are presented in this recommended practice. These tests apply only to complete systems with a defined load. The methodology includes testing the system outdoors in prevailing conditions and indoors under simulated conditions. The tests are intended to assist designers, manufacturers, system integrators, system users, and laboratories that will conduct the tests. System safety and component reliability issues are not addressed in this recommended practice.



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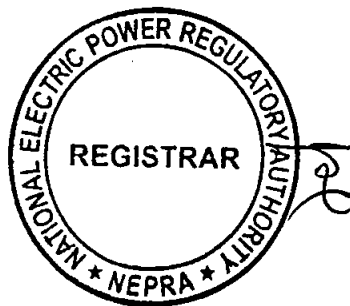
E. IEC TS 62898

AC microgrids

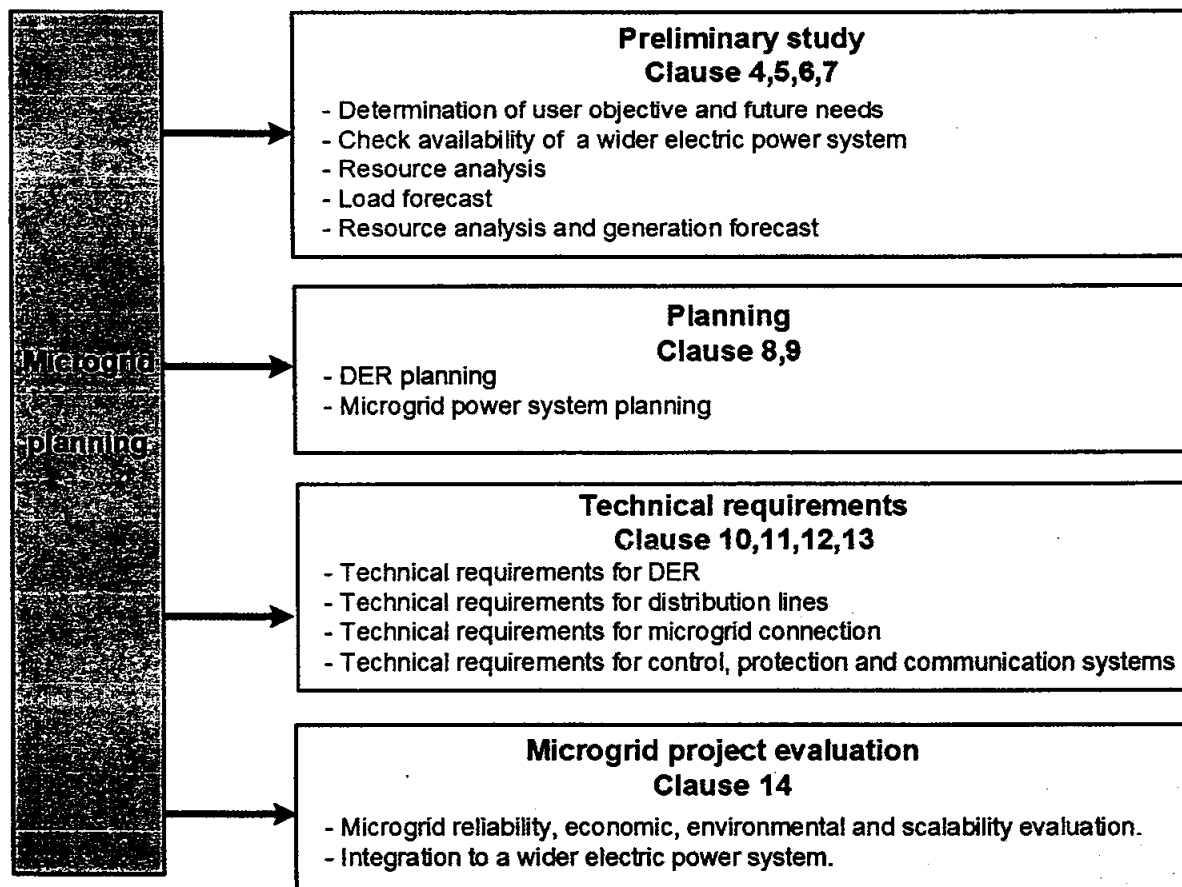
Summary

IEC TS 62898-1 defines the guidelines for the general planning and design of Microgrids. IEC TS 62898 (all parts) intends to provide general guidelines and technical requirements for Microgrids.

- a. IEC TS 62898-1 mainly covers the following issues:
 - i. Determination of Microgrid purposes and application.
 - ii. Preliminary study necessary for Microgrid planning, including resource analysis, load forecast, DER planning and power system planning.
 - iii. Principles of Microgrid technical requirements that should be specified during planning stage.
 - iv. Microgrid evaluation to select an optimal Microgrid planning scheme.
- b. IEC TS 62898-2 mainly covers the following issues:
 - i. Operation requirements and control targets of Microgrids under different operation modes.
 - ii. Basic control strategies and methods under different operation modes;
 - iii. Requirements of energy storage, monitoring and communication under different operation modes;
 - iv. Power quality.
- c. IEC TS 62898-3-1 mainly covers the following issues:
 - i. Requirements for Microgrid protection;
 - ii. Protection systems for Microgrids;
 - iii. Dynamic control for transient and dynamic disturbances in Microgrids;



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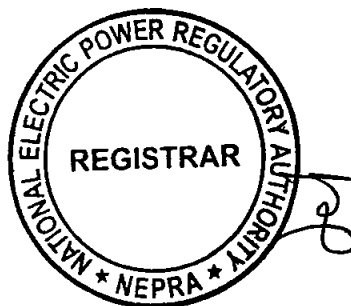
Clause 5.3 (Isolated Grids)

IEC TS 62898 -2 (Guidelines for Operation)

IEC TS 62898-2 defines the general technical requirements for operation and control of Microgrids.

IEC TS 62898 -3 (Technical requirements- Protection & Dynamic Control)

It has content for both grid-connected and isolated Microgrid without separated into clauses. They are separate inside the sub-sub sections



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F. IEC TS 62257

Recommendations for small renewable energy and hybrid systems for rural electrification

Summary

Part 01: General introduction to rural electrification

Part 02: From requirements to a range of electrification

Part 03: Project development and management

Part 04: System selection and design

Part 05: Protection against electrical hazards

Part 06: Acceptance, operation, maintenance and replacement

Part 07: Generators

Part 7-1: Generators - Photovoltaic generators

Part 7-3: Generator set - Selection of generator sets for rural electrification systems

Part 8-1: Selection of batteries and battery management systems for stand-alone electrification systems - Specific case of automotive flooded lead-acid batteries available in developing countries

Part 9-1: Micropower systems

Part 9-2: Microgrids

Part 9-3: Integrated system - User interface

Part 9-4: Integrated system - User installation

Part 9-5: Integrated system - Selection of portable PV lanterns for rural electrification projects

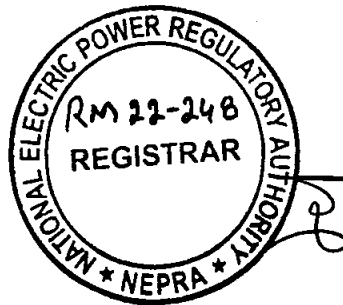
Part 9-6: Integrated system - Selection of Photovoltaic Individual Electrification Systems (PV-IES)

Part 12-1: Selection of self-ballasted lamps (CFL) for rural electrification systems and recommendations for household lighting equipment

Technical specifications – Considerations for rural electrification systems extension part 11.1

Technical specifications – Considerations for rural electrification systems extension- Interconnection of microgrids part 11.2

Technical specifications – Considerations for rural electrification systems extension- Connection of a microgrid or of a cluster of microgrids to a region



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REGISTRAR

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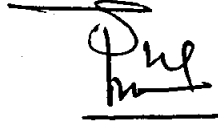
Subject: **PRINTING OF NOTIFICATION REGARDING NATIONAL ELECTRIC
POWER REGULATORY AUTHORITY LICENSING (MICROGRID)
REGULATIONS, 2022**

In exercise of the powers conferred by section 47 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 (Act No. XL of 1997) read with all other enabling provisions thereof; enclosed please find herewith a notification regarding "*National Electric Power Regulatory Authority Licensing (Microgrid) Regulations, 2022*" for immediate publication in the official Gazette of Pakistan .

2. Please provide thirty five (35) copies of the notifications/SROs to this office for information and record after its publication.

Encl:

1. Notification (13 Pages)
2. Soft Copy (01 CD)


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(Syed Safeer Hussain)