
DISTRIBUTION CODE OF SRI LANKA

Public Utilities Commission of Sri Lanka

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THE DISTRIBUTION CODE OF SRI LANKA

The Distribution Code of Sri Lanka (hereafter referred to as "Distribution Code") has been formulated in terms of the provisions of Clause 18 (c) and 3.1 (c) of the Sri Lanka Electricity Act, No 20 of 2009 (SLEA 2009), which require the licensees to develop, implement and maintain technical or operational codes; the Public Utilities Commission of Sri Lanka (PUCSL) to approve and regulate the implementation of such codes.

It specifies criteria, guidelines, basic rules, procedures, responsibilities, standards and obligations for the operation, maintenance and development of the Distribution System to ensure a safe, reliable and efficient operation of the Distribution System to provide a quality and secure electricity supply as reasonably as practicable.

The provisions of the Distribution Code shall also apply to organizations which interface with each Distribution Licensee, including the Transmission Licensee, Users including the customers who are connected to the Distribution System, embedded generators, and other Distribution Licensees interconnected to the system of each Distribution Licensee.

Distribution Code has to be revised and amended from time to time as and when the situations demand to reflect the changes in the regulatory framework and the development of the distribution system to comply with legislations and good industry practices

Each Distribution Licensee is responsible for developing and maintaining the Distribution Code in coordination with other Distribution Licensees, the Transmission Licensee, PUCSL, and the Users of the Distribution System, as applicable. All Distribution Licensees, the Transmission Licensee and the Users have a binding responsibility to comply with the requirements of the Distribution Code.

The primary objectives of the Distribution Code are,

- (a) To establish an equitable and coordinated approach to connect, supply and maintain the supply of electricity to consumers of the Distribution Licensees.
- (b) To establish an effective and coordinated approach for operation, maintenance and development of the electricity distribution networks.
- (c) To ensure equitable management of technical matters in the interest of all parties connected to the Distribution System, including customers, the Transmission Licensee, Distribution Licensees and other Users of the Distribution System.

This Distribution Code has to be read in conjunction with the Grid Code for complete and proper understanding of overall requirements, especially with respect to interconnected or overlapping matters between the Grid Code and the Distribution Code.

In the event of any conflict, provisions of the Grid Code shall prevail in general. However, in situations where requirements of the Distribution Code need to be implemented by other parties owing to regulatory or legal requirements, such provisions shall have the priority over any other requirements.

The Distribution Code currently consists of (but not limited to) the following Codes, which individually and collectively form the framework of policies, procedures, practices and requirements of this Distribution Code.

1. General Code

Cites the legal and regulatory framework for the enforcement of the Distribution Code and also specifies the general terms and conditions and definitions applicable for the Grid Code.

2. Distribution Planning Code

Describes the technical and design criteria, and procedures to be followed by Distribution Licensees in the planning and development of their respective Distribution Systems.

3. Distribution Connection Code

Specifies information to be provided by the customers, application procedures and applicable technical requirements for the provision or modification of a connection to the Distribution System. The Connection Code also covers connection of embedded generators.

4. Distribution Operations Code

Describes the procedures, guidelines and requirements to be followed by Distribution Licensees, Customers and Users of the Distribution System, to ensure safe and efficient operation of the respective systems.

5. Distribution Metering Code

Lays down the minimum requirements related to the measurement of energy and demand associated with the supply of electricity to the Users of the Licensee's Distribution System.

6. Distribution Planning and Operations Standards Code

Provides criteria and guidelines to be followed by Distribution Licensees with respect to planning and operation of the Distribution System.

7. Distribution Code: Information and Data Exchange

Provides a summary of information and data requirements as required by the Distribution Code.

1 GENERAL CODE

1.1 INTRODUCTION

This Code contains provisions which are of general nature that applies to the entirety of the Distribution Code. These include legal and regulatory provisions and definition of common terms.

1.2 APPLICABILITY

The Distribution Code is primarily applicable to Distribution Licensees in their capacity as the Asset Manager and Operator for the Distribution System in their respective territories. This has been clearly defined under each code.

1.3 OBJECTIVES

Primary objectives of the General Code are to

- (a) Cite the legal and regulatory framework for implementation and enforcement of the Distribution Code
- (b) Define the procedures for revising/amending the Distribution Code
- (c) Define the common terms and abbreviations used in the Distribution Code
- (d) Specify the general rules for interpreting the provisions in the Distribution Code
- (e) Specify the rules on communication between the Distribution Licensee and the distribution System Users.

1.4 RESPONSIBILITIES AND IMPLEMENTATION

1.4.1 PUCSL

PUCSL shall be responsible for the enforcement of the Distribution Code and also amend it as and when necessary to reflect the changes in the regulatory framework and the development of the distribution systems to comply with legislations and good industry practices.

1.4.2 DISTRIBUTION LICENSEE

Each Distribution Licensee shall be responsible for the implementation of the Distribution Code and act in accordance with the established good industry practices.

1.4.3 USERS

Users shall be required to abide by the Distribution Code, comply with the instructions and requests as the Distribution Licensee may require in discharging his duty during the implementation of the provisions of the Distribution Code and act in accordance with the established good industry practices

Specific responsibilities of all parties, Distribution Licensee, Distribution System Users and the PUCSL in respect of each Code have been clearly specified and listed under each code.

1.5 HIERARCHY OF AUTHORITY

The authority of the Distribution Code is derived from a hierarchy consisting of parliamentary legislation, Ministerial Regulations and Rules, Licenses and Guidelines issued by the Public Utilities Commission of Sri Lanka (PUCSL). The hierarchy is presented in top-down order below:

1. Legislation
 - The Public Utilities Commission of Sri Lanka (PUCSL) Act, No. 35, 2002
 - Sri Lanka Electricity Act, No 20, 2009
2. Regulations issued by the Minister
3. Rules issued by PUCSL
4. Grid Code

-
5. Distribution Code
 6. Contracts between parties
 - Power Purchase Agreement (PPA) between Generation Licensees and the Transmission Licensee.
 - Power Sales Agreement (PSA) between the Transmission Licensee and Distribution Licensees
 - Connection agreements between Distribution Licensees and Customers
 -
 7. Internal Codes of the Transmission Licensee and Distribution Licensees

The above hierarchy shall be applicable with respect to the technical and normal or emergency functions covered by the Distribution Code, but excluding matters of commercial nature, which have no technical implications.

1.6 PROCESS OF REVIEW AND REVISION OF THE DISTRIBUTION CODE

Distribution Code Enforcement and Review Panel (DCERP) is responsible for the review and revision of the Distribution Code. Review of the Distribution Code shall be carried out periodically and as and when required.

Recommendations of the DCERP comprising suggestions, changes, and amendments shall be submitted to the PUCSL for their review and concurrence. Any changes or additions proposed by PUCSL will also be referred to the DCERP and processed similarly for incorporation in the Distribution Code.

1.6.1 DISTRIBUTION CODE ENFORCEMENT AND REVIEW PANEL (DCERP)

PUCSL shall establish a Distribution Code Enforcement and Review Panel (DCERP) to carry out the following functions:

- (a) Positively contribute to the effective enforcement of the Distribution Code
- (b) Monitor and evaluate the working of the Distribution Code and make recommendations to PUCSL for effective implementation.
- (c) Review all suggestions and amendments proposed by any party and make suitable recommendations to PUCSL.
- (d) Initiate and coordinate revisions and regular reviews to the Distribution Code and make suitable recommendations to PUCSL for incorporation.
- (e) Facilitate the publishing of the proposed amendments and the reasons for the recommendations.
- (f) Facilitate the resolution of issues brought up by the members of the DCERP or by the PUCSL and submit its recommendations to the PUCSL.
- (g) Produce an annual report on the activities of the Panel.

The DCERP shall consist of nine members as follows:

- (a) One member representing each Distribution Licensee of whom at least one member shall be a member of the Grid Code Review Panel
- (b) One member representing the Transmission Licensee
- (c) One member representing the distributors/suppliers authorized to carry out distribution/supply activities under Section 10 of the SLEA 2009.
- (d) One member representing the embedded generators
- (e) The Chairman of the Consumer Consultative Committee representing customers.
- (f) Director – Licensing of PUCSL shall function as the Secretary to the panel.

The rules and procedures to conduct the business of the DCERP are given in Appendix 1 and the DCERP shall be required to comply with it at all times.

PUCSL shall ensure that the DCERP is functional within 30 days from the PUCSL approving the Distribution Code.

1.7 RESPONSIBILITIES IN UNFORESEEN CIRCUMSTANCES

The Distribution Code contains procedures to permit effective and equitable management of the Distribution System.

However, in unforeseeable and extraordinary circumstances, Distribution Licensees will be required to act decisively in pursuance of any one or a combination of the following general requirements.

- (a) The requirements of safety under all circumstances, including prevention of personal injury;
- (b) The prevention of serious damage to Plant and/or Apparatus;
- (c) Implementation of corrective or preventive measures based on national policy requirements for avoidance/minimization of undesirable occurrences;

All users shall provide reasonable cooperation and assistance as required by Distribution Licensees in such circumstances. However, such action by the Distribution Licensees shall be in coordination with the Transmission Licensee and other users.

The above shall also apply in the event of emergency situations such as fuel/energy shortage, war, national calamities and abnormal law and order situations.

1.8 PARTIAL INVALIDITY

If any provision or part of a provision of the Distribution Code should become or be declared unlawful for any reason, the validity of all remaining provisions or parts of provisions of the Distribution Code shall not be affected.

1.9 ACCURACY OF INFORMATION

Distribution Licensees and Users of the Distribution System have a duty to provide such information and resources as are necessary to facilitate compliance with requirements of the Distribution Code. Therefore, all parties are responsible to ensure accuracy of such information provided by them in accordance with the requirements of the Distribution Code.

Distribution Licensees have the right to verify such information provided by the Users and to request calculation methodologies, references, and error estimations, where necessary, to ensure proper planning and operation of the Distribution System.

Failure by any party to provide reasonably accurate information or any deliberate attempt to withhold such information or provide inaccurate information shall be considered as non-compliance with the requirements of Distribution Code.

1.10 CONDITIONS OF DISCLAIMER

A Distribution Licensee, in planning and operating the Distribution System, has to rely on action and information provided by other participants of the Power System including the Transmission Licensee as specified in respective clauses of this Code. A Distribution Licensee shall not be held responsible for any consequence, which arises from its reasonable and prudent actions on the basis of such information or actions by other parties.

1.11 CONFIDENTIALITY

Under the terms of the Distribution Code, Distribution Licensees will receive information from the Transmission Licensee, the Users and vice versa. Distribution Licensee or any User shall not, other than as required by the provisions of Grid and Distribution Codes or other applicable rules, disclose such information to any other person without the prior written consent of the provider of the information.

1.12 PROCEDURE FOR SETTLEMENT OF DISPUTES

In the event of a dispute between a Distribution Licensee and another licensee such as the Transmission Licensee or another Distribution Licensee or any other party, on a matter covered in the Distribution Code, the following procedure shall be followed.

The concerned parties shall discuss and attempt to arrive at an amicable settlement in terms of applicable rules/regulations. If an agreement cannot be reached, the parties shall, after deliberations

- (a) Formulate a provisional working arrangement, which shall be implemented until a valid ruling is issued by the PUCSL.
- (b) Keep DCERP informed of the provisional working arrangement within three days from the day such a decision has been taken.
- (c) Follow the applicable rules and regulations and refer the unresolved dispute to the PUCSL
- (d) DCERP shall submit its observations on the issue to the PUCSL.

The costs and expenses incurred by the DCERP in this regard shall be shared equally by the relevant Licensees.

1.13 COMMUNICATION BETWEEN A DISTRIBUTION LICENSEE AND USERS

All communication between a Distribution Licensee and Users shall be in accordance with the provisions of the relevant Section of the Distribution Code.

Unless otherwise specifically required by the Distribution Code, all communications shall be in writing, except where operation time-scales require oral/facsimile or electronic communication.

1.14 INTERPRETATION

1.14.1 DEFINITIONS

When a word or a phrase that is defined in the "Definitions and Abbreviations" is more particularly defined in another Code of the Distribution Code and if there is any inconsistency between the two definitions, the latter or that particular definition shall prevail.

1.14.2 GENDER

Any reference to a gender shall include both genders.

1.14.3 PERSON OR ENTITY

Any reference to a person or entity shall include an individual, partnership, company, corporation, association, organization, institution, or other similar groups.

1.14.4 SINGULARITY AND PLURAILITY

Unless otherwise specified, singular shall include the plural and vice-versa.

1.14.5 INCLUDING

The word including or a grammatical variation thereof means "including but not limited to".

1.14.6 AMENDMENT OF STANDARDS

A reference to a standard means shall include any revision, update or a replacement of that standard.

1.15 DEFINITIONS AND ABBREVIATIONS

In the Distribution Code, the following words/abbreviations and expressions shall bear the following meanings as indicated in the Table 1.1.

1.1- Definitions and Abbreviations

TERM	DEFINITION
Accredited Electrician	A person qualified and experienced in design, installation and testing the electricity distribution system of Retail Customers, accredited by a due process established by the Distribution Licensee. A list of Accredited Electricians shall be available for the information of customers, upon request and would be published in the Licensee's website.
Accredited Chartered Electrical Engineer	A person qualified and experienced in design, installation and testing the electricity distribution systems of Retail and Bulk Customers, accredited by a due process established by the Distribution Licensee. A list of Accredited Chartered Electrical Engineer shall be available for the information of customers, upon request and would be published in the Licensee's website.
Active Power or MW	Product of voltage and current and cosine of the phase angle between them measured in units of Watt (W) kilowatt (kW) = 10^3 W Mega Watt (MW) = 10^6 W Giga Watt (GW) = 10^9 W Tera Watt (TW) = 10^{12} W
Active Energy	The electrical energy produced, flowing or supplied by an electrical circuit during a time interval, being the integral with respect to time of Active Power, measured in units of watt-hours or standard multiples thereof, that is :- 1000 Wh = 1kWh 1000 kWh = 1MWh 1000 MWh = 1GWh 1000 GWh = 1 TWh = 10^{12} Wh
ac	Alternating Current
Allowed Charges	Approved charges, Licensee are permitted to levy from customers, prospective customers and the general public for carrying out work requested by them.
Alternator	The electrical machine which is driven by a prime mover and generates ac electric power. The term Generator is reserved for another meaning to avoid confusion (see definition of Generator)
Apparent Power	$S = P + jQ$. Magnitude is calculated by the formula $S = \sqrt{P^2 + Q^2}$ expressed in units of Volt-ampere (VA) or multiples like kVA, MVA
Apparatus	All equipment in which electrical conductors are used, supported or of which they may form part.
Authorized Person	A competent person adequately trained and possessing knowledge and appointed in writing by a Distribution Licensee or the Transmission Licensee to carry out specific tasks and/or work on their systems or apparatus. The certificate of appointment shall state the class of operation and/or work the person is authorized to carry out and the part of the system to which it applies.
Automatic Load Shedding	A Load shedding scheme implemented by the Transmission Licensee to prevent frequency collapse or other problems and to restore the balance between generation output and demand on the Transmission System
Automatic Voltage Regulator (AVR)	A continuously acting automatic excitation system to control the voltage of a Generating Unit measured at the Generator terminals
Black Start	The process followed to restore power after a total or a partial shutdown.
Breakdown	An occurrence relating to equipment of the supply system which prevents its normal functioning
Bulk Customer	A customer whose contract demand exceeds 42kVA
CCGT	Combined Cycle Gas Turbine
CCGT Unit	A Generating Unit within a CCGT module
Competent Person	A person who has sufficient technical knowledge or experience to enable him to avoid danger
Connected Load	Aggregate of rated capacity of all apparatus including portable apparatus in the Customer's premises which are supplied or declared by the Customer to be taking supply from the system. This shall be

TERM	DEFINITION
	expressed in kW, kVA
Connection Point	A point at which a User's Plant and/or Apparatus connects to the Distribution System.
Consumer/Customer	Any person or entity, either as the owner or lawful occupier, supplied with electricity by the Licensee/Supplier, and whose premises are for the time being, connected to the Licensee's Distribution System having accepted to receive the electricity supply on the terms and conditions laid down by the Licensee
Contract Demand	Maximum real (kW) or apparent (kVA) power demand agreed to be supplied by the Licensee/Supplier as stated in the declaration made by the customer.
Control Person	A person who has been authorized to carry out the work in DNCC or a person who has to carry out similar tasks in a User installation.
DCERP	Distribution Code Enforcement and Review Panel
Declared Voltage	A voltage or voltages declared by a Distribution Licensee for the supply of electricity to a Customer
Demand	The requirement for active power and reactive power unless otherwise stated
Demand Forecast	The process which specifies procedures to be followed and data to be supplied to forecast future electricity demand.
Dispatch	The issue of instructions by the Transmission Licensee to Generating plant pursuant to Scheduling and Dispatch under the Operations Code and the term "Dispatched" shall be construed accordingly.
Dispatch Instructions	An instruction by the Transmission Licensee to a Generator to operate, issued in accordance with Grid Operation Code.
Disconnect	The act of physically separating User's (or Customer's) equipment from the Distribution Licensee's system.
Distribution Code	The document produced by Distribution Companies pursuant to condition of the Electricity Supply License
Distribution Network Control Centre (DNCC)	The centre established by a Distribution Licensee to monitor, control and coordinate the Distribution System operations. With its own operating personnel, Transmission Licensee, other distribution licensees and all Distribution System Users. Its responsibilities include collection/ recording of system operational data and publication of the same.
Distribution Licensee	A person appointed through a license issued by PUCSL for the operation of a part of the Distribution System.
Distribution System	The system consisting of lines owned and/or operated by a Distribution Licensee for the purposes of distribution of electricity from a grid substation to another substation, or to or from any External Interconnection, or to deliver to customers, including any plant and Apparatus and meters owned or used by the Distribution Licensee in connection with the distribution of electricity.
Earthing	A way of providing a connection between conductors and earth by an Earthing Device.
Earthing Device	A means of providing a connection between a conductor and earth being of adequate strength and capability, and conforming to applicable standards.
Energy	Quantity of electrical energy measured in units equal to one Kilowatt hour (kWh) or multiples thereof such as: 1000 Wh = 1 kWh 1000 kWh = 1 MWh 1000 MWh = 1 GWh
Embedded Generator	A single generator, or a group of generators, connected to the distribution network, at voltages between 400 V and 33 kV.
Event	An unscheduled or unplanned occurrence in a system including faults, incidents and breakdowns.
Event Logger (EL)	A device provided to record the sequence of operation in time, of the relays/equipment at a location during an event.
Event Recorder	A device provided to record the sequence of operation in time, of the relays/equipment at a location during an event.
External Interconnection	A connection to a network outside the network of a Licensee
Forced Outage	An outage of an equipment/system of which no notice can be given beforehand.

TERM	DEFINITION
Frequency	The number of alternating current cycles per second (expressed in Hertz or Hz) at which a System is running.
Generating Unit	Any Apparatus which produces electrical energy.
Generator	A person or agency who generates electricity and who is subject to the Grid Code.
Grid Code	The Grid Code of Sri Lanka.
Grid System	The entire interconnected electric power transmission network of Sri Lanka.
Grid System or Transmission System	The system consisting of HV lines owned and/or operated by Transmission Licensee for the purposes of the transmission of electricity from a Power Station to a Substation or to another Power Station or between Substations or to or from any External Interconnection including any plant and Apparatus and meters owned or used by the Transmission Licensee in connection with the transmission of electricity
High Voltage or HV	Voltage exceeding 33,000 Volts
HV Apparatus	High Voltage electrical circuits forming part of a System
Hydro Station	A Hydroelectric Power Station
IEC	International Electrotechnical Commission
Interconnection Point	In relation to a generating station the point at which the generating station is connected to the Transmission System and at which energy is delivered to the Transmission Licensee, as specified in the relevant PPA.
Isolation Request	A form detailing the circuits to be isolated, which may be used where the apparatus of one Licensee is situated on the premises of, or controlled by another Licensee.
kV	kilovolt or 1000 volt
kVA	kilovolt ampere
License	A License granted by PUCSL for the purpose specified
Licensee	Licensee or License Holder is a person or business entity to whom a License or Authorization is issued by PUCSL, under the Public Utilities Commission of Sri Lanka Act No 35 of 2002 and Sri Lanka Electricity Act No 20 of 2009, for carrying out Generation, Transmission, Distribution and Supply of electrical energy.
Limitation of Access	A form issued by a senior Authorized Person or Authorized Person specially authorized to do so, defining the limits and nature of work which may be carried out in the vicinity of live apparatus.
Licensee Information Submission System or LISS	A facility through which all Licensees are required to submit the required information on line to the PUCSL.
Live	Electrically charged
Live Line Work	Work on high voltage apparatus, overhead line or underground cables with the conductors live using approved insulated tools or equipment.
Load	The Active and Reactive Power, as the context requires, generated, transmitted or distributed, and all similar terms shall be construed accordingly.
Load Factor	Ratio of total amount of energy delivered during a given period to the total amount of energy that could have been delivered, had the maximum demand been maintained throughout the same period. It is usually expressed as a percentage.
Low Voltage or LV	A voltage level of 230 /400 Volt
Medium Voltage	A voltage level of 11,000 volt or 33,000 Volt
Metering	Tariff Metering and Operational Metering
Metering Code	That part of Grid Code or the Distribution Code identified as the Metering Code.
Minimum Demand Regulation	That margin of Active power sufficient to provide a regulating margin for adequate frequency control
Minimum Generation	The minimum output, which a Generating Unit can generate continuously.
MVA	Mega Volt Ampere = 1000 kVA
Operating Reserve	The additional output from the Generating plant and/or the reduction in Demand which is available to respond/contribute to containing and correcting any Transmission System frequency deviation to an acceptable level in the event of a loss of generation, or a loss of import

TERM	DEFINITION
	from an External Interconnection, or mismatch between generating output and Demand.
Operational Boundary	The boundary between the systems of any two entities in the total system or network. It divides the responsibilities and facilities between the entities and defines jurisdiction.
Outage	In relation to Distribution Licensee's Distribution System, the removal of any part of the Distribution Licensee's Distribution System due to breakdown or maintenance.
Output	The actual output at the Interconnection Point of a Generating Plant derived from data measured pursuant to the Metering Code.
Overall Accuracy	The combined accuracy of meters and instrument transformers whose secondary circuits feed the meters
Overloading	The condition under which part of a system is subject to a demand in excess of the normal design rating of that part of the system and not directly due to system fault current.
Partial Shutdown	The condition existing when all generation as well as electricity supply from all external connections to a part of the total system has ceased. That part of the system is therefore shutdown and cannot begin to function without Transmission Licensee's directions relating to Black Start
Part Load	Condition of a Generating Unit which is loaded but is not running at its declared full Energy output.
Party	Any person, corporate body, company, organization, authority, firm or association subject to the provisions of the Distribution Code.
Permit to Work (PTW)	A form of declaration signed and given by a Senior authorized person to a person in charge of work to be carried out on any earthed high voltage apparatus for the purpose of making known to such person exactly what apparatus is dead, isolated from all live conductors, discharge, connected to earth, and on which it is safe to work.
Power Factor	Ratio of active power (kW) to apparent power (kVA)
Power Purchase Agreement or PPA	The Agreement entered into between a Generator and Transmission Licensee pursuant to which Transmission Licensee amongst other matters, agrees to purchase from the Generator the capacity of its Generating Units.
Planned Outage	Planned Outage means an outage of any part of the Distribution System, which has been planned in advance by the Distribution Licensee or planned and agreed in advance with the Transmission Licensee or other Distribution Licensees.
Power Sales Agreement	The Agreement entered into by a Distribution Licensee and the Transmission Licensee pursuant to which Distribution Licensee amongst other matters agrees to purchase electrical energy at identified interconnection points between the Distribution Licensee's Distribution System and the Transmission System.
Power Station	An installation comprising one or more Generating Units (even where sited separately) owned and/or controlled by the same Generator, which may reasonably be considered as being managed as one Power Station.
Protection	Provisions for detecting abnormal conditions on a System and initiating fault clearance and activating alarms and indications.
PTW	Permit to Work: A form of declaration signed and given by a Senior Authorized Person to a person in charge of work to be carried out on any earthed high or medium voltage apparatus for the purpose of making known to such person exactly what apparatus is dead, isolated from all live conductors, discharged, connected to earth, and on which it is safe to work.
PUCSL	Public Utilities Commission of Sri Lanka incorporated under PUCSL Act No 35 of 2002.
Reactive Power or MVAR	The product of voltage and current and the sine of the phase angle between them measured in units of volt-amperes reactive (Var) and standard multiples thereof i.e. 1000 VAr = 1kVAr 1000 kVAr = 1MVAR
Reactive Energy	The integral with respect to time of the Reactive Power measured in units of volt ampere hours reactive or standard multiples thereof, that is:

TERM	DEFINITION
	1000 VARh = 1 kVARh 1000 kVARh = 1 MVARh
Recorder	An apparatus that stores a series of instantaneous readings at different times and intervals, and records the data obtained through a direct internal or external connection, feeding all such data into an instrument that allows such internal data to be retrieved at a future point in time.
Retail Customer	A customer whose contract demand is less than 42kVA
Rotational Load Shedding or Load Shedding	Planned Disconnection of Customers on a rotational basis during periods at which the total demand cannot be met.
Sanction for Test	A form of declaration signed and given by a Senior authorized person to a person in charge of testing any apparatus connected to the transmission or Distribution System for the purpose of making known to such person exactly what apparatus is to be tested, and the condition under which the testing is to be carried out.
Safety Precautions	Methods and procedures adopted to ensure safety and avoid danger when working in a hazardous environment. In relation to working on HV apparatus, this entails but is not limited to Isolation and/or Earthing.
Safety Procedures	The procedures specified within a safety management system.
SCADA	See "Supervisory Control and Data Acquisition"
SCC	System Control Centre of the Transmission Licensee performing functions of a load dispatch centre and associated activities in planning, operations and control.
Senior Authorized Person	An authorized person who has been appointed in writing by a Distribution Licensee or a Transmission Licensee to issue and cancel a PTW, Sanction for Tests, Limitation of Access and Isolation requests. The certificate of appointment shall state the class of operation and/or work the person is authorized to carry out and the part of the system to which it applies.
Settlement Values	Values of Active Energy and Reactive Energy delivered, and the maximum demand occurring over a settlement period, as recorded by metering required by and operating in accordance with the Metering Code, or as estimated or submitted in accordance with the Metering Code. Settlement values are identified by the time at the end of the relevant settlement period
Shutdown	The condition of the equipment when it is de-energized or disconnected from the Transmission or Distribution System.
Significant Incident	An event with a significant effect on either the Distribution System or a User's system and usually entails one or more of the following operational effects: Tripping of plant and/or apparatus manually or automatically Voltage outside statutory limits System frequency outside statutory limits System instability System overload Whether an event has a significant effect on a system is determined by the entity (Distribution Licensee or User) that owns that system.
SLEA	Sri Lanka Electricity Act no 20 of 2009
Spinning Reserve	Unloaded generating capacity, which is synchronized to the system and is ready to provide increased generation at short notice pursuant to Dispatch Instructions or instantaneously in response to a Frequency drop.
Static Var Compensator (SVC)	An electronically controlled electrical device for providing fast-acting reactive power, lagging or leading, on high-voltage electricity transmission networks.
Statutory Limits	Limits defined by regulations enacted under the SLEA.
Substation	An assembly of equipment including any necessary housing for the conversion, transformation, switching or control of electrical power.
Subsystem	Part of a System which by itself constitutes a system such as a type of equipment in a generating plant
Supervisory Control and Data Acquisition or SCADA	A real time control and monitoring system in which the control and data collection functions are carried out from a central station through a communications system. System data is monitored and fed back to the central terminal continually, based on which control instructions are issued to all parts the system. The communication system can be

TERM	DEFINITION
	telephone lines, radio, microwave or any other means of communication.
Synchronized	The condition where an incoming Generating Unit or system is connected to another system so that the frequencies and phase relationships of that Generating Unit or System, as the case may be, and the system to which it is connected are identical and the terms "Synchronize" and "Synchronization" shall be construed accordingly.
Synchronous compensation	The operation of rotating synchronous Apparatus for the specific purpose of either the generation or absorption of Reactive Power.
Total Shutdown	The condition of complete loss of generation in the total system with no electricity supply from any External Interconnection. The total system will not begin to function again without the Transmission Licensee's directions relating to Black Start.
Total System	The Transmission System and all systems of Users of the Transmission System
Transmission System or Grid System	The system consisting of HV lines owned and/or operated by Transmission Licensee for the purposes of the transmission of electricity from a Power Station to a Substation or to another Power Station or between Substations or to or from any External Interconnection including any plant and Apparatus and meters owned or used by the Transmission Licensee in connection with the transmission of electricity.
Under Frequency Relay	An electric measuring relay intended to operate when its characteristic quantity (frequency) decreases below the relay setting by decrease in frequency.
Unit Load Controller	A device which regulates the generation level when the Generating Unit is operating in a Frequency Sensitive Mode to ensure (so far as possible) that it does not exceed or fall short of previously set limits.
User	Person or entity that uses the Distribution Licensee's Distribution System. More specific definitions are identified in The Distribution Code.
User System	Any System owned or operated by a User including Generating Units, Distribution Systems and Customer equipment together with plant and/or Apparatus connecting them to the Transmission System.
Utility	Any person or entity engaged in the generation, transmission, sale, distribution or supply of electrical energy, as the case may be.
Var	A single unit of Reactive Power (Volt-Ampere reactive)
Virtual Metering Point	An effective point of measurement that may or may not be physically locatable, where active energy or reactive energy deemed to have been transferred through the point is derived from an algorithmic manipulation of the active energy and reactive energy data of one or more metering points. The phrases "Virtual measurement point", "real metering point" and "real measurement point" are to be construed accordingly.

2 DISTRIBUTION PLANNING CODE

2.1 INTRODUCTION

This Distribution Planning Code specifies the technical and design criteria, and the procedures to be followed in planning and development of the Distribution System.

2.2 APPLICABILITY

The Distribution Planning Code applies to all Distribution Licensees, all system Users including the embedded generators and parties who are authorized to carry out distribution/supply activities and are connected to a Licensee Distribution System.

2.3 OBJECTIVES

Objectives of this Distribution Planning Code are to

- (a) Enable the Distribution System to be planned, designed and constructed to operate in an economical, safe and reliable manner conforming to the relevant Acts of Parliament, Regulations, Rules, Licenses and Guidelines, standard specifications including other relevant manuals and construction standards;
- (b) Facilitate the use of the distribution system by any person connected or seeking connection to it.
- (c) Establish technical conditions and standards for acceptable performance at the interface between the Licensee's system and Users' systems
- (d) Facilitate the exchange of system data between Users and Distribution Licensees, between Distribution Licensees and Transmission Licensee, and between the various Distribution Licensees.
- (e) To provide sufficient information for a User to assess opportunities for connection, and to plan and develop its system so as to be compatible with the Licensee's Distribution System.

2.4 RESPONSIBILITIES

A Distribution Licensee shall be responsible for

- (i) Identifying the problems of the Distribution System and proposing solutions in respect of voltage levels, loading of equipment, switchgear ratings, power quality, system loss, reliability and security of supply.
- (ii) planning the expansion of the Distribution System to meet the forecast demand taking into consideration the impact of the connection of new Users to the system such as large customers, embedded generators, any other Licensees or any other parties connected to the system who carry out distribution/supply activities on exemptions.
- (iii) To plan the system ensuring that the Distribution System will have the capability to meet the laid down standards in relation to voltages, loading of switchgear, equipment ratings, power quality, system loss, reliability, and security of supply.
- (iv) Preparation of Distribution System Development Plan as laid down in this Code
- (v) Reviewing and recommending the changes in planning standards contained in this Distribution Planning Code on a periodic basis.
- (vi) Monitor the implementation of the planned proposals

Distribution System Users shall be responsible for,

- (i) Providing all data requested by the Distribution Licensee to carry out its planning and development activities
- (ii) Making submissions for improving the planning function.

2.5 SYSTEM STUDIES

The Distribution Licensee shall carry out the following system studies.

- (a) Sales and demand forecasting studies
- (b) Load flow studies

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- (c) Short circuit studies
 - (d) Reliability and security studies
 - (e) System loss studies
 - (f) Power quality studies

The outcome of each of these studies should be included in the report on Distribution Development Plan, described in section 2.7.

2.5.1 SALES AND DEMAND FORECASTING STUDIES

Distribution Licensee shall prepare annually a sales and demand forecast for each area/branch of its operational area for five years (commencing from the year during which the forecast is prepared) incorporating demand growth patterns, future development plans and proposed large scale projects in the respective localities, effect of Demand-side Management (DSM) measures, etc.

It shall include the following, but not limited to,

- (a) Number of customers in each customer category
- (b) Forecast annual sales and individual demands for each customer category
- (c) Load factors, power factors, contribution to peak factors for each customer category
- (d) Monthly specific consumption of each customer category
- (e) Energy sales during the Time of Use (TOU) tariff intervals
- (f) Energy losses for LV retail, LV Bulk and MV Bulk customer categories, and the total losses for the Licensee's Distribution System
- (g) Energy and Demand purchases in each interval of the TOU tariff
- (h) Historical data of (a-g) for the two preceding years

Combining the sales and demand forecast of such entities, the Distribution Licensee shall prepare a forecast for each Division and then for the entire Authorised Area.

A basic spreadsheet model is considered to be adequate for the preparation of sales and demand forecast.

2.5.2 LOAD FLOW STUDIES

2.5.2.1 MV System

Load flow studies shall be carried out for the MV system once in two years, for a planning window of 10 years. Based on the above analysis the Distribution System Development Plan described in section 2.7, shall include;

- (i) Analysis of the existing system
- (ii) Demand forecast
- (iii) Future requirement analysis with forecast demand to meet the voltage standards, thermal load standards, security standards, system loss criteria and economic criteria given in Distribution Planning and Operations Standards Code
- (iv) Future development proposals for expansion, reinforcement and augmentation of the existing MV networks which shall include but not limited to the following;
 - Proposed new grid/primary substations and substation augmentations
 - Proposed MV express lines and distribution gantries, if any
 - Proposed re-conductoring of MV lines
 - Network expansion and reconfiguration
 - Reactive power compensation (MV capacitors)
 - Any other improvements.
- (i) Financial and economic evaluation of the future development proposals, based on discount rates published by PUCSL.
- (ii) Recommendations for implementation of development proposals

2.5.2.2 LV System

The Distribution Licensee shall model typical LV schemes for metropolitan, urban, semi-urban and rural areas and conduct related system studies to determine the standard transformer capacities, types of conductors, number and length of LV feeders, etc. to ensure that all customer installations fed from such schemes are provided with an electricity supply within the statutory requirements. Energy/demand losses in such schemes can be considered as technical losses of LV networks.

With such typical systems as the base, the Distribution Licensee shall prepare 'LV network design guidelines' which shall be used for planning, expansion and development of the LV system.

Based on the above 'LV network design guidelines' and localized demand growth rates established through trend analysis or similar forecasting techniques, an LV System Development Plan shall be prepared for a planning window of five years, formulating programs for expansion, reinforcement and augmentation of existing LV networks, addition of new distribution transformers to achieve the standards laid down in this Code.

This plan shall separately identify the rural electrification projects to be undertaken by the Distribution Licensee in compliance with the Government's rural electrification policy.

2.5.3 SHORT CIRCUIT STUDIES

The Distribution Licensee shall perform short circuit studies at least once in five years or when a substantial rise in fault level at the transmission/medium voltage is forecast. The Distribution Licensee shall obtain such information from the Transmission Licensee. Fault level increases can be caused due to the addition of new generation to the transmission network, transmission network expansion, addition of embedded generation in the Distribution Licensee network or due to enhancement of grid substation capacities. With these studies, the Distribution Licensee shall determine the three phase maximum and minimum fault levels for all system nodes and single phase fault levels for critical nodes. The main objective of these studies is to identify any under-rated switchgear, carry out necessary protection studies and to formulate action plans to remedy the situation. The Distribution Licensee shall keep relevant system Users informed of the fault level details.

Based on the above studies, the Distribution Licensee shall provide in the Distribution System Development Plan, the effect of fault levels on system equipment and the remedial action proposed to ensure that all equipment used in the Licensee's Distribution System are within the design limits.

2.5.4 RELIABILITY STUDIES

The Distribution Licensee shall perform studies to determine the frequency and duration of customer interruptions in the Distribution System, as defined in the Distribution Planning and Operations Standards Code. Such data shall be segregated according to the outage caused due to Distribution System faults, planned interruptions and upstream (Transmission) failures.

It is preferable to compile this information for each operational entity within the Distribution Licensee's authorised area, i.e. Area, Branch, Division, and also for the entire Distribution Licensee network. The loss of sales and economic cost due to loss of supply¹ shall be evaluated.

The Distribution Licensee shall calculate the relevant indices, loss of sales and cost of unserved energy on a monthly basis and prepare a report annually, analyzing the reliability indices, revenue losses and economic losses, and proposing recommendations to improve the same along with the targeted indices for the ensuing year. This report shall be included in the Distribution System Development Plan described in section 2.7.

2.5.5 POWER SUPPLY SECURITY STUDIES

Security standards define the ability of the Distribution System to provide electricity to end-users with a specified level of continuity and quality of supply.

Planning and Operations Standards Code sets out the levels of security required, classified in a range of Group Demands, connection types and the maximum interruption times permissible.

The Distribution Licensee shall analyze the failures every quarter and identify the instances where security criteria have not been met, and examine whether such situations have arisen due to deficiencies in system design.

Annually, the Distribution Licensee shall be required to prepare a report (and include it in the Distribution System Development Plan) identifying the instances where security criteria have not been met due to system inadequacies and actions proposed to remedy the situations along with the proposed plan to improve the security of supplies in the Licensee's Distribution System.

¹ The cost of unserved energy for each province will be determined by the Transmission Licensee. Please see the "Least-cost Generation Planning Guidelines".

2.5.6 SYSTEM LOSS STUDIES

The level of power and energy losses within the distribution network is a measure of the efficiency of the system. The Distribution Licensee shall perform studies to identify, classify and quantify the losses (i) at MV level, (ii) Bulk Customer transformer level, and at (iii) retail customer level. Losses in each of these levels shall be segregated into technical losses and non technical losses.

In each Tariff Order issued by the Commission, the caps on distribution technical losses and non technical losses (allowed losses) that could be passed on to customers during a tariff period will be prescribed.

The Distribution Licensee shall prepare a report detailing the action program for managing the levels of losses within the allowed losses, through effective network planning and operations. This report shall be included in the Distribution System Development Plan described in Section 2.7.

2.5.7 POWER QUALITY STUDIES

The Distribution Licensee is responsible for monitoring power quality within its franchise area, and for managing its system to achieve conformity to accepted industry standards for power quality.

Power quality shall be defined by the variations of voltage, current and frequency with respect to the accepted industry standards which are laid down in the Distribution Planning and Operations Standards Code.

Power quality of the Licensee's Distribution System shall be assessed by monitoring

- (a) System frequency
- (b) Voltage magnitudes
- (c) Harmonic frequencies
- (d) Voltage imbalances
- (e) Short duration and long duration voltage variations
- (f) Phase displacement between the phases deviating from 120° at different points in the Distribution System.

Voltage Imbalances

The degree of voltage unbalance in a three-phase system is defined as the ratio between the RMS values of the negative sequence component and the positive sequence component of the voltage. Additionally, the degree of voltage imbalance is also defined as:

$$\text{Voltage unbalance (\%)} = \frac{\text{Maximum deviation from the average of the three phase voltages}}{\text{Average of the three phase voltages}} \times 100$$

If phase voltages are V_1, V_2, V_3

Average of the voltages, $V_{\text{avg}} = (V_1 + V_2 + V_3)/3$

Deviation of phase 1 voltage, $\Delta V_1 = |V_1 - V_{\text{avg}}|$, similarly for phase 2 and phase 3.

If $\Delta V_m = \text{Max}(\Delta V_1, \Delta V_2, \Delta V_3)$ then

Voltage unbalance $= \Delta V_m / V_{\text{avg}}$

This type of imbalances generally will occur owing to large single phase loads, and monitoring/measurement will require recording devices and further analysis.

Conducting such measurements shall be limited to new large customer (contract demand ≥ 1 MVA) loads that are to be connected to the system. Measurements on other customer loads shall be at the discretion of the Distribution Licensee.

Voltage Fluctuations

Historically, incandescent lamps have been taken as a reference for flicker that is noticeable to the human eye. With most incandescent lamps being replaced with discharge lamps, a standard based on the above concept is considered adequate for ensuring power quality with regard to voltage fluctuations.

Conducting detailed studies and measurements of voltage flicker in the Licensee's Distribution System is recommended, and shall be at the discretion of the Licensee.

Harmonics

Presence of harmonics can cause damages to the equipment of the system users and will also affect the performance of the Licensee's equipment. To minimize the likelihood of such disturbances and damages, the Distribution Licensee shall undertake studies to assess the harmonic contents especially of large customers to ensure that maximum harmonic currents/voltages are within the standards laid down in Distribution Planning and Operations Standards Code.

The Distribution Licensee shall prepare a report and include it in the Distribution System Development Report described in section 2.7, on the quality of supply by measuring the harmonic levels at the point of common coupling with large customers (contract demand ≥ 1 MVA) and proposing actions to bring those to be within permitted levels.

2.6 DATA FOR STUDIES

2.6.1 DISTRIBUTION SYSTEM DATA

The Distribution Licensee shall commission and maintain a Geographic Information System (GIS) to store the Distribution System data. This shall be linked to the billing database and shall have the facility to collect system data through GPS receivers.

The Distribution Licensee may acquire/develop software to extract information from the GIS to carry out the relevant system studies detailed in Section 2.5.

2.6.2 SALES DATA

The Distribution Licensee's billing database shall be the sources for historical sales data for different categories of customers.

2.6.3 LOAD DATA

Energy/demand meters installed at (i) the boundaries of the Licensee's Distribution System, and (ii) the Licensee's Bulk Customer installations shall be the sources for determining the load characteristics of the Licensee's Distribution System and the Bulk Customer categories.

Until such time the energy meters in retail customer installations are equipped with the facility to acquire load data, the Distribution Licensee shall conduct load research studies to determine the load characteristics of each such customer category.

2.6.4 DATA REQUIREMENTS

2.6.4.1 Data to be provided by System Users

Large Customers

Upon a written request issued by the Distribution Licensee, all customers with a contract demand exceeding 250 kVA shall provide the Distribution Licensee annually, the customer's energy and demand forecasts for five succeeding years. If the customer has self generating facilities, standby or otherwise, then such data shall be shown separately.

Such customers shall also specify the types of loads to enable the Distribution Licensee to categorize such loads as constant current, constant power or constant impedance.

If the customer has (i) an embedded generation facility or (ii) large motors ($>100\text{kW}$) or (iii) reactive compensation equipment connected at 33 kV or 11 kV, then details of such equipment shall also be provided upon request.

Embedded Generators

Embedded generators shall provide information relating to each of its embedded generating plant connected to the Distribution System as laid down in the "CEB Guide for Grid Interconnection of Embedded Generators" (provided as Appendix 3 to this Distribution Code). It shall be the responsibility of the embedded generator to inform the Distribution Licensee whenever changes are effected to its operation, switching or grounding arrangements.

2.6.4.2 Data to be provided by the Distribution Licensee to System Users

The Distribution Licensee shall publish its approved Distribution System Development Plan in the Licensee's website to enable the Users or prospective Users to extract information to plan/design their Distribution Systems.

However, if any customer seeks clarification on the system design parameters, the Distribution Licensee shall provide such customer with all the necessary information such as design/existing fault levels, grounding requirements, maximum allowable fault clearing times, etc.

2.7 REPORTS

2.7.1 REPORTING FREQUENCY AND PERIOD COVERED

2.7.1.1 Load-related Capital Expenditure

Distribution Licensee shall submit a Distribution System Development Plan (the Plan) once in two years to PUCSL by 30th April of each year. This plan will cover load-related capital expenditure. In accordance with the Tariff Methodology or such other requirement, PUCSL may require a Distribution Licensee to make an additional submission of a Plan in any year. Reports prepared at frequencies other than once in two years, have to be submitted to the PUCSL, as specified in the Code.

2.7.1.2 Non Load-related Capital Expenditure

Distribution Licensee shall submit a non-load related capital expenditure plan. These investments include the establishment of offices, stores, customer service centres, and similar facilities and services to facilitate the efficient management of the capital expenditure program and the efficient maintenance of existing and new assets. This plan shall be prepared and submitted to PUCSL once in two years by 30th April of each year. In accordance with the Tariff Methodology or such other requirement, PUCSL may require a Distribution Licensee to make an additional submission of a Plan in any year.

2.7.2 CONTENTS OF REPORTS

Distribution Licensee may, if they so desire, combine the Distribution Development Plan (load-related) and the load-related development plan, and submit as a single document.

2.7.2.1 Contents of the Distribution System Development Plan

This Plan shall comprise, but shall not be limited to, the following:

- (a) Executive summary
- (b) Reports described in Section 2.5 and its subsections, which shall include
 1. Energy and demand forecast
 2. MV system development plan
 3. Reactive power compensation plan
 4. LV development Plan including rural electrification
 5. Standard ratings of equipment, distribution substations/ networks
 6. Reliability assessment
 7. Security level assessment
 8. Financial evaluation of development proposals
 9. Capital expenditure plan, in the format provided by PUCSL along with supporting documentation and clarification notes
- (c) Progress review of the implementation of planned proposals for the previous two years.
- (d) Changes/amendments proposed for the Distribution Planning Code.

2.7.2.2 Contents of the Non Load-related Capital Expenditure Plan

- (a) Executive Summary
- (b) Details and justification of capital expenditure for investments that are not load-related
- (c) Capital expenditure plan, in the format provided by PUCSL along with supporting documentation and clarification notes

3 DISTRIBUTION CONNECTION CODE

3.1 INTRODUCTION

The Distribution Connection Code (DCC) of the Distribution Code specifies the

- (a) Information that needs to be provided by the Licensee to the User, and vice versa, and
- (b) Procedures that need to be followed by the Licensee and the User

for providing/obtaining a new connection or modification of the existing connection to fulfil the Licensee's obligations to supply electricity to a User.

3.2 APPLICABILITY

DCC applies to all Distribution Licensees, all system Users including embedded generators and all parties who are authorized to carry out distribution/supply activities and are connected to a Licensee Distribution System.

However, the DCC will not apply to retail customers provided with electricity supplies by parties who have been exempted from the requirement of obtaining a license to carry out the distribution/supply activities, through an exemption order by the PUCSL. Such customers shall be governed by the conditions stipulated by PUCSL in the exemption order.

3.3 OBJECTIVES

Objectives of the DCC are to

- (a) Specify the technical, design and operational criteria at the point of connection,
- (b) Specify the data required by the Licensee from the User,
- (c) Specify the data required by the User from the Licensee
- (d) Ensure that the basic rules for connection to the Licensee's Distribution System are clear and unambiguous, and
- (e) Guarantee fairness and equality of treatment to all who request connections or modifications to existing connections.

3.4 TECHNICAL, DESIGN AND OPERATIONAL CRITERIA

3.4.1 POWER QUALITY AND SECURITY STANDARDS

The Distribution Licensee shall ensure that its system will operate in compliance with the standards given in the Distribution Planning and Operations Standards Code and the customers who request new connections or modification of existing connections shall ensure that all their equipment can be operated safely and reliably meeting the conditions specified in the Code referred to above. For installations where an electricity supply of higher security levels than specified in the Code is required, customers may arrange standby supplies or generators.

3.4.2 PROTECTION ARRANGEMENTS AND FAULT LEVEL CONSIDERATIONS

The Distribution Licensee shall ensure that its system is designed and operated in a manner to clear the abnormal conditions that may occur in the system in the minimum possible time without causing any damages to the User's system or equipment.

The Distribution Licensee will, on request, provide details of the maximum/minimum fault levels, maximum clearance times, auto re-closing or sequential switching features in order that the User may take this into account in the design of its system. The User should also be aware that the protection arrangements may cause disconnection of one phase only of a three phase supply for certain types of faults.

Taking all the above into consideration, User shall ensure that all equipment used in its system have ratings compatible with the Licensee's design fault levels and also that the equipment protection system shall operate discriminatively with the Licensee's protection system. User and the Licensee shall agree upon the protection settings during the application for connection process.

3.4.3 GROUNDING ARRANGEMENTS

On request, Licensee shall inform the User of the relevant details of its grounding system.

Grounding of the User's System that is connected to the Licensee's Distribution System shall comply with the arrangements specified in the Distribution Planning Code.

When there are multiple sources of power, User shall ensure that circulating neutral currents are prevented or minimized.

3.4.4 EQUIPMENT STANDARDS

All equipment used at the connection point, overhead lines, underground cables, substations and the customer installations shall conform to applicable statutory obligations and comply with relevant IEC standards. Where IEC standards are not available, the Licensee specifications and publications shall be applicable. Prospective customers shall seek advice from the Distribution Licensee when necessary in this regard and the Licensee is required to comply with such requests.

The standards, publications and specifications referred to the above shall be those prevailing at the time the plant or equipment was designed or manufactured. However, if any such equipment is reused or moved to a different location, then such standards, publications or specification current at the time, shall become applicable.

3.4.5 MAINTENANCE STANDARDS

Licensee and the User shall maintain all switchgear and equipment installed at the connection point according to well laid down programs. These shall not pose any threat to the safety of personnel or cause damage to other equipment.

Both the Licensee and the Users excepting retail customers shall be required to keep maintenance records relating to the equipment installed by each party and shall make such records available whenever a request is made by the other party.

3.4.6 VOLTAGE LEVELS, CONNECTING POINT AND OWNERSHIP BOUNDARIES

3.4.6.1 Voltage Level

Voltage level at which the User's installation is connected to the Licensee's Distribution System will be agreed upon between the Licensee and the User as required. However, if Distribution System Impact Assessment studies show that connection at a certain voltage level will lead to the degradation of the Distribution System performance, the Licensee shall propose the appropriate voltage level for the connection.

3.4.6.2 Connection Point

The connection point shall be the User's load side terminals of the Licensee-owned metering equipment. The connection point shall be controlled by the appropriate switchgear, which shall be capable of withstanding the prospective short-circuit current at the connection point.

3.4.6.3 Ownership Boundaries

The ownership of plant or apparatus beyond the connection point will be the responsibility of the Users.

3.5 PROCEDURES FOR APPLICATION TO CONNECT TO A LICENSEE DISTRIBUTION SYSTEM

3.5.1 APPLICATION PROCEDURE FOR A NEW CONNECTION OR A MODIFICATION

Any User seeking a new connection or modification of the existing connection shall submit a completed connection application form obtainable from the Distribution Licensee, which shall include the following:

- (a) The premises for which the connection is required
- (b) The purpose for which electricity is to be used
- (c) Maximum power requirements (kVA)
- (d) Type and electrical loading of equipment to be connected,
- (e) The date when the connection is required

-
- (f) The minimum period for which the supply is required, if applicable.
 - (g) Declaration by the Applicant that he is the owner/occupier of the premises
 - (h) Contact details and relevant personal information of the Applicant

In addition, the Bulk Customers will be required to submit the following data and also the relevant standard Planning data as listed in Section 2.6.4 (Distribution Planning Code).

1. Single line diagram of the installation
2. Maximum active and reactive power requirement
3. Voltage level at which electricity supply is required
4. Type of load and control arrangements
5. Power factor correction capacitors/filter bank information
6. Details of motors and their ratings, methods of starting etc.
7. Total Harmonic Distortion at the connection point
8. Fluctuating loads, if any
9. Any other information requested by the Distribution Licensee

Application forms for all customer categories with adequate and comprehensive instructions to enable customers/prospective customers to complete the form, shall be provided in the Distribution Licensee's website and at all Licensee offices, free of charge. The Distribution Licensee shall assist the Applicants to fill the application forms whenever necessary.

3.5.2 APPLICATION PROCESSING

3.5.2.1 Program for Application Processing

The Distribution Licensee shall establish a procedure to process the applications for new connections/modifications. It shall clearly identify the important events in the process from the time of submission up to the time of making the connection and the maximum lead time for completion of each event. This program shall be published in the Licensee website and displayed prominently at all Licensee offices.

Broadly, the program for processing the application will include the following events.

- (a) Preliminary evaluation
- (b) Assessment of impacts on the Distribution System
- (c) Submission of the offer to the Applicant
- (d) Applicant's acceptance of the offer
- (e) Declaration by the Applicant
- (f) Submission of the information pursuant to the Declaration made.
- (g) Commissioning tests
- (h) Commissioning and connection
- (i) Connection records

3.5.2.2 Evaluation of the Application

The Distribution Licensee shall commence processing the applications within 3 days from the submission of the duly completed application form and request the applicant to submit any relevant information he has not forwarded. If the Licensee does not communicate with the Applicant within ten days from the submission of the application, the applicant can presume that the application has been accepted for processing.

3.5.2.3 Distribution System Impact Assessment Studies (DSIAS)

The Distribution Licensee shall conduct Distribution System Impact Assessment Studies (DSIAS) for all new applications/modifications, except for the applications for new connections/modifications in respect for retail supplies, located within 50 m of the Licensee's network. The study is to ascertain whether the proposed User development will adversely affect the Distribution System performance and also whether the Licensee will be able to satisfy the required standards as specified in the Planning and Operating Standards.

This study will mainly focus on the following:

- (a) Protection system coordination
- (b) Increase in fault levels
- (c) Power quality

If the DSIAS shows that any proposed connection/modification will result in the degradation of the Distribution System or inability to meet the minimum requirements related to power quality at the

connection point, then the Distribution Licensee shall inform the applicant accordingly, indicating the reasons for rejection, and where possible proposing suitable alternative measures to eliminate or to mitigate the adverse effects to acceptable levels.

3.5.2.4 Submission of the Offer

If the Licensee is satisfied that the application for new connection/modification is in compliance with the requirements stated above, the applicant shall be informed of the acceptance of the proposed development along with the priced proposal in accordance with the "Allowed Charges" approved by PUCSL and published by the Distribution Licensee, and specify the terms and conditions under which the connection will be provided.

In the case of application for new connections/modifications for retail supplies located within 50m of the Distribution Licensee network, the applicants will pay the required connection charge at the time of submitting the application and hence the question of acceptance of the proposed development will not arise. At all time, the Licensee shall abide by the rates stated in the published "Allowed Charges".

3.5.2.5 Applicant's Acceptance of the Offer

The Applicant shall accept the offer by making the payment within the stipulated period which shall not be less than thirty days from the date of the offer. The applicant shall submit to the Licensee (i) a copy of the receipt of payment and (ii) the declaration, on a standard form provided by the Licensee, accepting the terms and conditions laid down by the Licensee to provide the electricity supply connection.

The Applicant may personally hand over the said receipt and declaration to the relevant Licensee office, where the Licensee will verify his identity and accept the declaration. If these documents are sent by post or sent to the Licensee office through a representative of the Applicant, the said declaration must be attested by a person described in Appendix 2.

If the payment is not made within the period specified, the Licensee's proposal will lapse automatically. However, in cases where the offer is not acceptable to the Applicant, he shall negotiate with the Licensee and still if agreement cannot be reached, the applicant should refer the matter to PUCSL for resolution.

3.5.3 SUBMISSION OF THE INFORMATION PRIOR TO CONNECTION

3.5.3.1 LV Retail Supplies

The applicant shall submit a Certificate of Compliance issued by an Accredited Electrician that

- (a) The electrical installation of the said premises has been inspected, tested and it complies with the applicable regulations and
- (b) Is safe and ready for energization.

3.5.3.2 Bulk Supplies

The Applicant shall submit the following information

- (a) Specifications of the major equipment as detailed in Section 2.6.4 (Distribution Planning Code).
- (b) Details of the protection system, proposed settings and calculations
- (c) Single line diagram showing the equipment at the connection point up to the Applicant's main switchboard and outgoing feeders.
- (d) Grounding arrangements and relevant calculations
- (e) Testing and commissioning program for the connection
- (f) List of names and telephone numbers of the authorized representatives
- (g) Certificates issued by an Accredited Chartered Electrical Engineer/s that the design and the installation comply with the requirements of the applicable regulations, standards, codes etc. and the installation is safe and ready for energization.

3.5.3.3 Commissioning and Connection

Upon acceptance of the information/certificates submitted by the Applicant, commissioning tests shall be carried out and on the successful completion of the same, the Licensee shall issue a certificate of approval for the connection and the physical connection from the Licensee's network shall be effected.

In cases where the applicant is required by the Licensee to pay the connection fee at the time of submission of the application (section 3.5.2.4), and if the Licensee finds that the connection requested does not fall into the appropriate category, then, the applicant will be required to pay additional costs in accordance with the estimates prepared by the Distribution Licensee.. The connection will be given only after the payment of the additional cost. If the applicant does not agree to the new terms and conditions, the Licensee shall refund the connection fee less the costs, which shall be calculated in accordance with the published "Allowed Charges".

3.5.3.4 Connection of Embedded Generators

Embedded generators at or below 33 kV and with an output not in excess of 10 MW shall obtain the grid connection from the respective Distribution Licensees. The Transmission Licensee will provide the details of the embedded generators to prepare the technical proposal by the Distribution Licensees.

The Distribution Licensee will use the information provided to carry out Distribution System Impact Assessment Studies (DSIAS) to decide what method of connection will need to be employed and the voltage level to which the connection should be made.

If the Distribution Licensee concludes that the nature of the proposed connection or changes to an existing connection requires reinforcement of the Distribution System, the costs based on the published "Allowed Charges" shall be included in the cost estimate.

If agreement cannot be reached on the method of connection, voltage level or the cost estimates, then the Applicant should refer the matter to PUCSL for resolution.

Detailed guidance on the connection of embedded generators is given in to the "CEB Guide for Grid Interconnection of Embedded Generators". (Appendix 3)

3.5.3.5 Connections of Net-Metered Generating Facilities

Customers may obtain the net metering facility for new connections or convert the existing connections to include such facilities. Detailed guidance in this regard is given in the "Sri Lanka Guide for Net-metered Generating Facilities" (Appendix 4).

3.6 CONNECTION POINT INFORMATION

3.6.1 LV RETAIL CONNECTIONS

Distribution Licensee shall store all data related to the connection point in the Licensee's GIS.

3.6.2 BULK SUPPLY CONNECTIONS

In addition to the records that are kept, as detailed in Section 2.6.1 (Distribution Planning Code) both the Distribution Licensee and the User shall compile a Connection Point Document (CPD). It shall include the following.

- (a) Single line diagram of the connection point
- (b) Equipment and their ownership at the connection point
- (c) Ratings of the equipment used at the connection point
- (d) Authorized officers for operation and safety
- (e) Operational procedures and the parties responsible for operation
- (f) Names of Officers who prepared the CPD, the dates and their signatures

Whenever changes are effected at the connection point, appropriate entries have to be made in the CPD, with the names, signatures of the officers who have done such changes and the dates on which such changes have been introduced.

The above information shall also be stored in the Licensee GIS.

4 DISTRIBUTION OPERATIONS CODE

4.1 INTRODUCTION

The Distribution Operations Code (DOC) of the Distribution Code specifies criteria, guidelines, procedures and requirements to be followed by the Distribution Licensee and all Users for coordinated operation of the Distribution system.

4.2 APPLICABILITY

The Distribution Operations Code applies to all Distribution Licensees, all system Users including the embedded generators and all parties who are authorized to carry out distribution/supply activities and are connected to a Licensee Distribution System.

4.3 OBJECTIVES

Objectives of the Distribution Operations Code are to ensure

- (a) safe and efficient operation of the Licensee's Distribution System under both normal and abnormal situations in accordance with the statutory requirements and standards specified in this Code
- (b) that the Distribution System is operated with the maximum possible security and system stability
- (c) that the performance of the Licensee assets meet the needs of the Users
- (d) that operation of User's plant and equipment will have no adverse effect on the Licensee Distribution System
- (e) Licensees and Users have an unambiguous understanding of each other's roles and responsibilities in relation to the operation of the Licensee's Distribution System.

4.4 RESPONSIBILITIES

4.4.1 DISTRIBUTION LICENSEE

Distribution Licensee, shall be responsible for,

- (a) Operating the Distribution System at optimum economic efficiency and in accordance with the standards specified in the Distribution Code and also the statutory requirements.
- (b) Preparing and implementing planned maintenance programs to ensure that all plant and equipment installed in the Distribution System are maintained in a good working order providing a safe and secure environment for the workforce, Users and the public
- (c) Ensuring that the plant and equipment will remain functional throughout the declared lifetime with no value degradation
- (d) Designing, installing, commissioning and operating the protection systems ensuring discriminative fault clearance and safety of plant and equipment at all times.
- (e) Investigating instances where standards specified in the Distribution Code are not met and proposing/implementing solutions to meet the requirements.

4.4.2 USERS

Users shall,

- (a) Ensure that plant and equipment at the User's facility meet the requirements of the standards specified in this code.
- (b) Ensure that all operations at the connection point are done in accordance with the agreed procedures.
- (c) Take timely action to remedy situations that may arise in the User's plant and equipment which adversely affect the Licensee's system.
- (d) Cooperate with the Licensee to mitigate/overcome abnormal operating situations of the system by carrying out Licensee's instructions with regard to the operation of User's plant and equipment.
- (e) Users, including embedded generators, shall ensure that all operational data and operational planning data are submitted as specified in this Code.

4.5 MAINTENANCE PROGRAMS

The planned maintenance program of the Licensee Distribution System shall be based on the following

- (a) Preventive maintenance program:
Systematic inspection of the Distribution System assets and identification of incipient failures, equipment condition recording, partial or complete refurbishment undertaken on a quarterly basis.
- (b) Follow up maintenance program:
Corrective action as a result of inspection, condition monitoring, remedial measures
- (c) Remedial maintenance program:
Unplanned maintenance that needs immediate attention.
- (d) Network development program:
This aspect has been discussed under the Distribution Planning Code

4.5.1 PREVENTIVE MAINTENANCE PROGRAM

Distribution Licensees shall prepare and implement a maintenance program to ensure that all plant and equipment installed in the Licensee's Distribution System are maintained in good working order so that the performance of the assets meets the needs of the Users.

The following shall be taken into consideration when preparing the maintenance program:

- (a) Plant and equipment database
- (b) Maintenance tasks in respect of each item in the database
- (c) Maintenance frequency
- (d) Work standards
- (e) Check lists
- (f) Collection of system data
- (g) Reporting procedures

The maintenance program shall be implemented, monitored and its progress shall be reported through a reporting scheme where the information shall flow from the lowest level to the highest level of the Licensee management.

A GIS coupled to a customized asset management software shall be used to ensure effective implementation of the Distribution System maintenance programs.

4.5.1.1 Plant and equipment database

The plant and equipment database will include the details of all plant and equipment installed in the Licensee Distribution System. All the apparatus starting from a pole will have a unique identification address. Distribution lines will be identified by sections preferably from one switching point to another.

4.5.1.2 Maintenance tasks

Maintenance tasks to be performed in respect of each item shall be identified.

4.5.1.3 Maintenance frequency

Frequency at which a maintenance task has to be carried out will vary according to the task, apparatus and at times, on location as well. Hence the frequency at which maintenance has to be carried out for identified tasks shall be determined.

4.5.1.4 Work standards

The Licensee shall establish work standards specifying man hours required to complete each maintenance task.

4.5.1.5 Check Lists and Reporting Formats

To ensure that all maintenance tasks are properly carried out, workmen on duty will be issued with checklists to report the status of the apparatus and the work carried out. These shall be filled by the workmen and handed over to the officer in charge of the job.

Check list will depend on the maintenance task and at times a simple check list will not provide a complete picture. In such instances, in addition to the check lists, all necessary test data need to be collected.

4.5.1.6 Collection of System Load Data

The Licensee will collect the system operational data such as feeder end voltages and load currents, to ascertain whether the Distribution System is operated in accordance with the standards specified in the Distribution Code and the statutory requirements.

As in the case of other maintenance tasks, frequency, work standards and the reporting formats have to be prepared.

4.5.1.7 Reporting Procedures

Reporting procedure shall ensure that information flow shall be established from the lowest levels to the highest levels of Licensee management at pre-determined time intervals.

4.5.1.8 Preventive Maintenance Program Costs

With all described above being identified, total man hours required to carry out the preventive maintenance program and hence the total cost can be determined.

4.5.1.9 Preparation, Submission and Approval of the Maintenance Program

Preparation of the planned maintenance program shall begin at the lowest unit of the Licensee management i.e. Depot or the Customer service Centre. It has to be submitted to the officer at the next level in the management, who will approve the program and submit the same to his superior officer for information.

Progress of the maintenance program shall be submitted on agreed formats to enable the officer in charge of the operations in the Licensee to receive a concise summary, to enable him to assess the progress of the maintenance work in relation to the planned program.

4.5.2 FOLLOW-UP MAINTENANCE PROGRAM

Defects, abnormal conditions of system assets will be identified during the preventive maintenance program, some of which the maintenance staff will rectify. Defects that cannot be rectified through the preventive maintenance program and any other defects that have been found through other means shall be rectified systematically by preparing a follow up program.

4.5.3 REMEDIAL MAINTENANCE PROGRAM

The Licensee's Distribution System assets can fail due to various reasons such as manufacturing defects, accidents and deterioration. Mostly such failures will take place without any prior indications.

The Licensee shall attend to these failures and restore the electricity network to normal condition with the least possible delay and for this purpose, maintenance staff shall be assigned to operate round the clock.

4.5.4 MAINTENANCE PLANNING

The maintenance personnel shall prepare the following maintenance plans.

- (a) Three year Maintenance Plan
- (b) Annual Maintenance Plan
- (c) Monthly Maintenance plan
- (d) Weekly operations/outage plan

The three year maintenance plan shall be a rolling plan prepared for three succeeding years. The annual maintenance plan will be developed based on the schedule of the first year of the three year plan. These shall be ready by 31st December, each year.

The monthly maintenance plan will be based on the annual maintenance plan, follow up maintenance plan and the remedial maintenance plan, and shall identify all maintenance tasks to be undertaken in each week of a calendar month, and shall be prepared at least two months ahead. This plan shall be submitted to the Transmission Licensee and other Distribution Licensees, and finalized.

The weekly operations/outage plan will comprise the detailed plans of switching operations/outages to be undertaken to complete the maintenance tasks planned for the week under the monthly plan. Outage plans will have to be prepared at least six weeks in advance, whereas the plans for other switching operations have to be ready at least a week ahead.

4.5.5 PLANNED TRANSMISSION SWITCHING/OUTAGES

The Transmission Licensee will make its monthly switching/outage plans and inform the Distribution Licensees on the services that would be affected at the respective Points of Interconnection as laid down in the Grid Code.

4.6 PLANNING SWITCHING OPERATIONS AND OUTAGES

Live-line techniques shall be used for maintenance work wherever and whenever feasible. However, all maintenance work will not be possible with live line techniques and hence outages/switching operations are inevitable. In such situations, switching operations have to be planned meticulously to ensure

- a. Minimal inconvenience to the consumers.
- b. Safety of personnel
and,
- c. Security of the system

DNCC will play the coordinator's role in the execution of the switching operations and outages. Maintenance personnel shall submit their monthly plan to the DNCC for its study and approval.

Switching operations/outages planned by one Licensee may affect another Licensee. Proposed switching operations for such work shall be decided at a meeting attended by the control engineers of the relevant Licensees, representatives of their maintenance departments and a representative of the Transmission Licensee, whenever his participation is required. It is essential that Licensees agree on the number and the frequency of such meetings, which may be weekly, fortnightly or monthly.

The Licensee shall inform all Users of any planned outage at least 48 hours in advance, by newspaper advertisements, loudspeaker announcements, letters or notices.

The Licensee shall not undertake any switching operations/outages outside the announced plan unless the removal of any circuit or equipment becomes necessary under emergency situations or if there is any violation in the agreements entered into with Users.

4.7 OPERATIONAL DATA AND OPERATIONS PLANNING DATA

The Distribution Licensee may require the operational information from very large customers (exceeding 5 MW) and embedded generators to ensure efficient operation of the Distribution System. Accordingly, the Licensee may request such Users to forward their demand forecasts, outage planning schedules as and when necessary.

4.8 CONTINGENCY PLANNING

A contingency in the Distribution System may arise due to following:

1. Transmission System or Generation failure.
2. Generation deficiencies
3. Inter Licensee Distribution System Failure.
4. Licensee Distribution System failures

4.8.1 TRANSMISSION SYSTEM FAILURES

Transmission System failures or generation failures could give rise to, total shutdowns partial shutdowns or even islanding. Restoration of the system is the responsibility of the Transmission Licensee, but the Distribution Licensee shall consider itself an important partner in the restoration process and extend its fullest cooperation to the Transmission Licensee, by carrying out SCC instructions and providing necessary information.

The Transmission Licensee will develop programs to restore the supply in the case of transmission/generation failures, giving due consideration to all aspects of power system behaviour, power station capabilities/availability, operational constraints, complexities and uncertainties of recovery from a total or partial shutdown to ensure that the total system is brought back to normalcy within the shortest possible time. During a total or a partial shutdown or during the subsequent recovery process, the total system may be operated outside the normal voltage and frequency standards.

Generally, in the case of a total or at times even in a partial shutdown, restoration will commence on many fronts through the creation of several small independent mini-grids, using certain identified generators and loads. These will then be synchronised with each other in a step by step process. However, the Transmission Licensee may depart from the laid down plans depending on the situations.

Demand control is an extremely important aspect in the restoration process and the Distribution Licensee will play a dominant role in this regard by executing the demand control programs through their DNCCs and provision of the required information to the SCC.

4.8.2 GENERATION DEFICIENCIES

Shortage of generation also could give rise to Distribution System contingencies as it would disturb the load-generation balance. However, generation deficiencies are known beforehand and the Transmission Licensee will prepare the necessary demand control programs well in advance based on the requirements of the information provided by the Distribution Licensees.

4.8.3 INTER LICENSEE DISTRIBUTION SYSTEM FAILURES

Partial or total Distribution System contingencies could also arise due to the failures of inter-licensee Distribution Systems. It is possible that such failures could affect a large number of customers and hence the relevant Distribution Licensee shall take all necessary measures to ensure the operation of inter licensee distribution feeders at the stipulated reliability levels and security levels. The Distribution Licensee responsible for the maintenance of such systems shall accord highest priority to restore the affected Distribution Systems, when such systems serve as source supplies for the primary substations feeding another Licensee Distribution System.

4.8.4 LICENSEE DISTRIBUTION SYSTEM FAILURES

Local failures in the Distribution Systems will create contingency situation in the Distribution System, and the Distribution Licensee shall develop programs to ensure restoration of supply in accordance with the electricity supply security levels defined in the Distribution Code.

4.8.5 DEMAND CONTROL

Power system behaviour during a restoration process depends on its characteristics as related to its active and reactive power balance, and hence demand control programs are of great importance.

Demand control methods to be implemented will be as follows:

1. Automatic load shedding
2. Manual load shedding
3. Demand control through other measures

4.8.5.1 Automatic Load Shedding

An automatic under-frequency load shedding program will be implemented by the Transmission Licensee to control the system demand in order to limit the consequences of transmission or generation failures. The load shedding program will be executed in a number of stages and the selection of the loads to be shed will be based on the information provided by the Distribution Licensees.

Accordingly, each Distribution Licensee shall be required to submit a schedule annually to the Transmission Licensee identifying feeders at each grid substation as essential and non essential loads with feeders having non essential loads being further categorized in the order of priority. The schedule will also include the range of loading on the feeders during the Day, Peak and Off-peak periods. The Transmission Licensee will finalize the load shedding program in consultation with the Distribution Licensees.

Each Distribution Licensee shall ensure that permanent load transfers from one feeder to another are not done without the Transmission Licensee being informed.

Once a feeder is disconnected on under-frequency load shedding it shall not be reconnected to the system without permission from the SCC.

4.8.5.2 Manual Load Shedding

Manual load shedding may become necessary in all forms of distribution contingencies described above.

Distribution Licensees shall make arrangements to shed load on the advice of the SCC in case of upstream system failures/deficiencies or inter-licensee Distribution System failures. Such load shedding has to be based on a schedule prepared considering the criticality of loads, load shedding history and the loading levels. Additionally, the Distribution Licensee shall ensure that the load shedding programs are implemented uniformly across the system and the effect of such programs on essential services is minimal. Ideally this schedule will have four stages, with load shedding at each stage targeting a certain percentage of the total load, which shall be decided in consultation with the Transmission Licensee.

In case of other contingencies, load shedding may be done in accordance with the restoration programs prepared by the Distribution Licensee.

As far as possible, the Distribution Licensee shall advise the essential services such as hospitals, other licensees who will be affected and large customers with contract demands exceeding 1 MVA or even lower as decided by the Licensee, when a manual load shedding programs is to be executed.

4.8.5.3 Demand Control through other Measures

The Distribution Licensee may resort to control the demand through voltage reduction on the advice of the SCC.

Also, it may implement programs to shed non-essential customer loads such as air-conditioners, water heaters etc. by requiring customers to install time delayed under voltage trips for such equipment.

4.8.5.4 Interface with Embedded Generating Units

If the Distribution Licensee has an interface with any generating unit, it shall be responsible for ensuring adherence with the relevant clauses in the "CEB Guide for Grid Interconnection of Embedded Generators".

4.9 PROTECTION COORDINATION

Protection of the Distribution System, the Transmission System and the User's System shall be well coordinated. Individual protection schemes shall be capable of speedily, selectively and reliably disconnecting the faulty section from the rest of the system, whilst backup protection shall be able to clear the faults under minimum fault conditions. The Distribution Licensee is responsible for ensuring that protective devices on the Licensee's system and User's systems are coordinated with the protective devices of the Transmission System. No item or apparatus shall be allowed to remain connected to the Distribution System unless it is provided with appropriate protection.

The Licensee shall comply with protection requirements applicable to the Distribution System as specified in the Section 3.5 of the Grid Code i.e. Protection Arrangement and Fault Level Considerations.

The Licensee is responsible for securing relevant details of the protection schemes installed by Users on all User Systems supplied at 33kV or 11kV, and all User systems as specified in the Distribution Connection Code.

The Distribution Licensee shall attend the protection co-ordination meetings as and when called for by the Transmission Licensee to discuss all related issues and take remedial measures as discussed and agreed to at such meetings. The Distribution Licensee shall also arrange the attendance by specific Users at such meetings, as required.

4.10 VOLTAGE/FREQUENCY/POWER FACTOR MONITORING AND CONTROL

The Licensee shall monitor the Voltage/Frequency/Power Factor in the Distribution System at different points at peak and off peak hours, and take reasonable measures for improvement of the same in coordination with the Users with a contract demand of 1 MW and above.

4.10.1 VOLTAGE

The voltage in the Distribution System may vary depending upon available generation, system demand and configuration of the Transmission System and the Distribution System at any time. Under normal operating conditions, the Distribution Licensee shall exercise proper voltage management in its Distribution System to maintain voltage at all levels within the limits defined in the Distribution Planning Code. Where necessary, reactive power control should be achieved using synchronous generators, voltage regulators, shunt capacitors, reactors, SVCs, auto tap changing transformers, etc. or other internationally accepted practices

4.10.2 FREQUENCY

The Licensee shall abide by the instructions issued from SCC from time to time on demand control measures for maintaining the frequency of supply within statutory limits.

4.10.3 POWER FACTOR AND HARMONIC DISTORTION

The Licensee shall take power factor improvement measures at strategic points in the Distribution System by carrying out system studies and installing required reactive power control equipment.

Users with loads generating a high harmonic content, low Power Factor and fluctuations, shall be directed by the Licensee to install appropriate equipment for correction.

4.11 COMMUNICATIONS

The Distribution Licensee shall establish communication channels with the other Licensees, PUCSL and the Users for effective exchange of information related to, but not limited to

- (a) Operational and system data
- (b) operating instructions between Licensees and between Licensees and Users
- (c) Significant incidents/events that has taken place in the Licensee's system or User's system that may affect the operation of the Distribution System
- (d) Significant events that are being planned in the Licensee's system or User's system that may affect the operation of the Distribution System
- (e) Incidents/events that have affected the operation of the Distribution System due to incidents/events that have taken place in the Transmission System
- (f) Incidents/events that are being planned in the Transmission System which may affect the operation of the Distribution System.

The main objective of the exchange of above information is to ensure that Licensees and Users are aware of the operations, events or incidents that will take place or have taken place in the Licensees' systems or User systems, which will enable them to assess the risks arising from the same and prepare themselves for appropriate action to maintain integrity, security and reliability of the Distribution System as well as the User's System. Such information shall be exchanged on reasonable requests of either party or in accordance with prior agreements.

The Distribution Licensee shall also establish an enquiry service for dealing with incidents on the system and interruption of supply.

4.11.1 OPERATIONAL AND SYSTEM DATA

Distribution Licensee shall exchange the operational data with PUCSL through LISS and also with other Licensees and Users as and when required or agreed.

Exchange of system data has been dealt fully in the Distribution Planning Code.

4.11.2 OPERATING INSTRUCTIONS AMONG LICENSEES AND LICENSEES & USERS

Operations in the Transmission System, Users' System or the Distribution System could have an operational effect on each others' systems. It shall be the responsibility of each party to bring such information to the notice of all relevant parties whose systems may have an operational effect as a result of such operations.

4.11.3 SIGNIFICANT EVENTS/INCIDENTS

Licensees may be faced with situations that will require system operations to be carried out with known weaknesses that will have an operational effect on the system, and it shall be the duty of the Distribution Licensee to notify the Users to keep them informed of such risks. These notifications shall be of sufficient detail to enable the Users to take appropriate action to mitigate the effects of lowering of quality or facing outages. Examples for such situations are listed below:

- (a) Operating the system or part of the system with system security, reliability and power quality levels lower than specified
- (b) Certain plant or equipment being operated above their rated capacities (capabilities)
- (c) Operating the system with alarms being actuated indicating abnormal operating conditions
- (d) Adverse weather conditions
- (e) Breakdowns, faults and temporary changes in the capabilities of plant/equipment
- (f) Increased risks of inadvertent or non discriminatory protection relay operations
- (g) Planned outages
- (h) Maintenance work that may increase the risks of causing electricity supply failures
- (i) Shortcomings in communications and metering equipment

4.12 SAFETY

4.12.1 SAFETY MANUAL

Each Distribution Licensee shall prepare a Safety Manual incorporating all safety rules and safety precautions applicable to its Distribution System. The Transmission Licensee will also prepare its Safety Manual and so will be all Users. Objective of the Safety Manual will be to lay down the requirements to ensure safety of persons working at or across the operational and ownership boundaries between the Licensee's Distribution System and those of its Users and other Licensees.

The manual will specify the procedures to be applied to ensure the health and safety of all who are liable to be working on or testing the Distribution System or on plant and equipment connected to it. The Licensee shall submit a copy of the Safety Manual, and any modifications thereto, to the PUCSL for its record purpose, and shall make the same available to all authorized persons, competent persons and all Users for compliance.

The Distribution Licensee shall furnish a copy of its Safety Manual to all parties having an electrical interface at medium voltage or at higher voltages with its Distribution System. The said parties also shall furnish a copy of their Safety Manuals to the Distribution Licensee. Any party who wants to revise any provision of its Safety Manual shall inform all other parties who have an electrical interface at MV/higher voltages with them, of the intended revisions and agree upon.

4.12.2 SAFETY MANAGEMENT SYSTEM

The Distribution Licensee shall establish a safety management system at all locations where an electrical interface exists with any party referred to above. The Safety Manual will contain the necessary provisions for ensuring safety for operation on the Licensee's Distribution System.

For all work on systems operated at medium voltage or above

- (a) Nomination of safety coordinators
- (b) A suitable system of documentation to record all operational events

are required. The Distribution Licensee's safety coordinator will be the DNCC control person and when tests are carried out at site, the Distribution Licensee's authorized person at site will be the safety coordinator. All oral communications in respect of all operational events shall be recorded. Relevant

records and documentation shall be kept in safe custody for a period of at least two months after such communication.

4.12.3 SAFETY PRECAUTIONS

All circuit breakers, isolators, reclosers, load break switches, sectionalizers and Distribution Licensee substations shall be kept under lock and key. Only the authorized persons who are provided with a master key shall have access to them.

Following are the most important safety precautions that need to be taken, when working on apparatus/equipment connected to a medium/higher voltage system, considered as dead:

- (a) Isolation of the system/plant/apparatus on which work is to be carried out from the remainder of the system and also from all infeeds such as embedded generators, self generating plants/equipment, using visible isolation devices that have to be kept locked in the isolated position
- (b) Discharging and earthing the system/plant/apparatus on which work is to be carried out, by way of providing a connection with an approved earthing device, where practicable keeping the same locked and immobilized.

4.12.4 SAFETY ON LV

It is not always possible to make LV equipment/apparatus dead and hence work on such apparatus shall be carried out as if they are live, unless such equipment is proved dead. Where applicable, suitable precautions shall be taken by screening or other means to avoid danger from inadvertent contact with live conductors. Work on live apparatus shall only be undertaken by competent persons.

4.13 DISTRIBUTION NETWORK CONTROL CENTRE (DNCC)

Each Distribution Licensee shall establish a Distribution Network Control Centre and its main responsibilities will be as follows, but not limited to,

- (a) Directing all switching operations in the Distribution System and carrying out such operations where possible, other than at LV
- (b) Making arrangements for alternate supplies during failures and planned outages
- (c) Accepting new apparatus to the Distribution System
- (d) Consenting to issue of "permit to work", "sanction for tests" and "limitation of access"
- (e) Recording, archiving operational information and making the same available in appropriate formats.
- (f) Analyzing all system failures and preparing reports with recommendations for performance improvement
- (g) Maintaining an up to date single line diagram of the Distribution System with the section loadings marked.
- (h) Extracting relevant data from the Licensee's GIS for carrying out the assigned duties.

4.13.1 SWITCHING OPERATIONS

The Distribution Licensee shall ensure that switching operations shall be carried out only by authorized persons. Switching programs for planned switching operations shall be prepared by the authorized persons who will be carrying out the switching and forward the same to the DNCC for its study and approval, as explained in Section 4.5.4.

All switching operations in the Distribution System at voltages other than at LV shall be carried out under the direction of DNCC. However, in extreme emergencies where there is a threat to human life or to system equipment, switching operations may be carried out without being directed by the DNCC.

Details of all such operations shall be reported to the DNCC by the relevant officers immediately after the operation is carried out.

4.13.2 DNCC RECORDS

DNCC shall record events, incidents that take place or may affect the Licensee Distribution System. These shall include but not limited to,

- (a) All switching operations
- (b) Outages, restorations, and demand control activities
- (c) Issue and cancellation of the Permit to Work, Sanction for Tests and Limitation of Access
- (d) Commissioning and decommissioning of Distribution System plant and equipment
- (e) Failure of any Distribution System plant and equipment
- (f) Any dangerous or abnormal occurrences with implications on the Distribution System operations, including any occurrences in User Systems that have an effect on the Licensee's Distribution System.
- (g) All messages received or transmitted in connection with system operations.
- (h) Accidents and fatalities

4.13.3 DNCC REPORTS

Information so collected shall be made available in the following formats.

- (a) Daily report
- (b) Outage report
- (c) Monthly report

4.13.3.1 Daily Report

The daily report will include a summary of system operations, incidents, events such as system loadings (night peak), system failures at all levels, customer complaints, demand control activities, planned outages, etc. for the preceding 24 hour period from 0600 on each day. This shall be made available by 0900 on the following day.

4.13.3.2 Outage Report

Whenever a total system outage or a partial outage exceeding a demand loss of 100 kVA occurs, DNCC shall submit a detailed report, along with the daily report. At times, this may not be practicable, but in such instances, the submission of the report shall not be delayed by more than three days from the day of the incident.

4.13.3.3 Monthly Report

DNCC shall carry out a statistical analysis of the system performance on a monthly basis, which will include data relating to system outages, demand control measures, quality of supply indicators, etc. a copy of which shall be submitted to PUCSL.

4.14 TOOLS AND SPARES

The Distribution Licensee shall ensure availability of proper tools and testing equipment at all work places for carrying out maintenance. Serviceability of tools and testing equipment must be checked periodically, at intervals recommended by equipment vendors.

The Licensee shall maintain a minimum inventory of spares required for maintenance and replacement purposes at suitable locations according to a clear policy to be laid down by the Licensee and submitted to PUCSL.

4.15 TRAINING

The Distribution Licensee shall make appropriate arrangements for imparting training to its workforce and supervisory staff in modern and state-of-the-art distribution practices and maintenance techniques, and shall adopt a syllabus suitable for the intended purpose.

5 DISTRIBUTION METERING CODE

5.1 INTRODUCTION

This Distribution Metering Code (DMC) of the Distribution Code,

- (a) Defines the responsibilities of the metering service providers (Distribution Licensees) and the Users with respect to metering of energy and demand
- (b) Specifies the minimum requirements for energy/demand metering
- (c) Lays down the procedures Licensees have to adopt on maintenance, validation, collection, processing and verification of metering data.

5.2 APPLICABILITY

Distribution Metering Code applies to all Distribution Licensees, all system Users including the embedded generators and all parties who are authorized to carry out distribution/supply activities and are connected to a Licensee's Distribution System.

However, the Distribution Metering Code will not apply to retail customers provided with electricity supplies by parties who have been exempted from the requirement of obtaining a license to carry out the distribution/supply activities. Such customers shall be governed by the conditions stipulated by PUCSL in such exemption orders.

5.3 OBJECTIVES

Objectives of the DMC are to ensure that,

- (a) The Licensee as well as the metered Users are aware of their responsibilities in respect of the metering services
- (b) Metering of the active and reactive energy and demand on the Licensee's Distribution System are done in accordance with the requirements specified in the Distribution Code.
- (c) Appropriate procedures are followed in providing metering data for billing and settlement
- (d) A dispute settlement process is in operation for resolving any billing and payment disputes quickly and satisfactorily.
- (e) The energy/demand metering function is done in a just, fair and an unbiased manner

5.4 RESPONSIBILITIES

5.4.1 DISTRIBUTION LICENSEE

The Distribution Licensee, as the metering service provider shall be responsible for,

- (a) Supplying, installing, commissioning, maintaining, repairing, replacing, testing and inspecting all meters and associated equipment in the Licensee's operational area in accordance with the provisions specified in this Metering Code and the applicable standards.
- (b) Ensuring that meters installed in retail customer installations have been tested by the meter manufacturers in accordance with the applicable standards.
- (c) Ensuring that meters and associated equipment for Bulk Customers and at boundary points with other Licensees are tested at a laboratory approved by the PUCSL prior to installation
- (d) Ensuring that all meters, associated equipment and accessories are installed in a manner preventing unauthorized interference
- (e) Ensuring that meters or any associated equipment which do not meet the minimum requirements stipulated by the applicable standards are removed and replaced with the least possible delay, thus guaranteeing the integrity and accuracy of the metering function.
- (f) Retaining the test certificates/records for a period stipulated by PUCSL
- (g) Providing all necessary information on the preparation needed at the customer end for the installation of the metering equipment.
- (h) Informing the User of the meter reading dates, cumulative active, reactive energy usage and demand as applicable, for the billing period.

5.4.2 USERS

Users shall,

- (a) Ensure the safety of the meters and associated equipment installed in their premises and shall provide unrestricted access to authorized representatives of the Distribution Licensee at all times. Where metering equipment has been installed in a restricted area, the User shall agree on a procedure for the Distribution Licensee to gain access to the same.
- (b) Notify the Licensee of any suspected malfunctioning, defects, damages or any potential dangers to the metering equipment within five working days from the User becoming aware of such situations.
- (c) Not tamper or permit tampering of any meters or related equipment.

5.5 METERING EQUIPMENT

Metering equipment supplied by a Distribution Licensee under Clause 5.1 shall

- (a) Be capable of measuring and recording the consumption of electricity on the premises of the customer in accordance with the applicable tariff or other charging arrangements agreed between the Licensee and the User
- (b) Be sealed
- (c) Have appropriate protective devices,

and, the Licensee shall,

- (d) Keep records signed by both parties on the removal or replacement of the seals
- (e) Take all pragmatic measures to prevent and detect interference by unauthorized parties.

5.5.1 DESIGN REQUIREMENTS

The Distribution Licensee shall ensure that the design of all meters and the related equipment are in compliance with the applicable standards. It shall also ensure that:

- (a) Full four quadrant metering are installed and operated, where active and reactive energy flow is possible in both directions
- (b) Burden requirements of the current and voltage transformers are correctly determined and used in a manner to enhance accuracy of the measurements

5.5.2 ACCURACY OF METERS

Prescribed limits of accuracy for the customer installations shall be as follows:

5.5.2.1 Low Voltage Retail Customers

All meters at the connection point shall be Class 2.0 (IEC) watt-hour meters or higher. If electronic meters are used then the display shall have the facility of displaying the readings even when electricity is not available.

If pre-paid meters are used, it shall have the same accuracy or higher.

5.5.2.2 Low voltage Bulk Customers

- (a) Energy/demand meters used at the connection point shall be of electronic type and of Class 1.0 (IEC) accuracy or higher, with facilities for remote reading enabled and operational.
- (b) Current transformer and voltage transformer accuracies shall be compatible with the accuracy of the meters used.
- (c) Where possible, voltage transformers shall be made to operate at the point at which maximum accuracy can be achieved.

5.5.2.3 Medium Voltage Customers

- (a) Energy/demand meters used at the connection point shall be of electronic type and of Class 0.5 (IEC) accuracy or higher, with facilities for remote reading enabled and operational.
- (b) Current transformer and voltage transformer accuracies shall be compatible with the accuracy of the meters used.
- (c) Where possible, voltage transformers shall be made to operate at the point at which maximum accuracy can be achieved.

5.5.2.4 Embedded Generators

Accuracy shall be in accordance with the CEB Guide for Grid Interconnection of Embedded Generators (Appendix 4).

In the event of non-compliance with the accuracy limits prescribed above, the Distribution Licensee shall take all possible measures to restore the accuracy and other features to the specified levels and status as soon as is reasonably practicable.

5.5.3 PROGRAMMING REQUIREMENTS OF METERS

All meters of (i) LV Bulk Customers, (ii) MV Bulk Customers, and (iii) embedded generators shall be programmed to comply with the criteria listed below, in accordance with the relevant values stipulated in the applicable Tariff Decision issued by PUCSL or the Power Purchase Agreement, as relevant.

5.5.3.1 Maximum Demand

The average demand over each averaging period, commencing at 00:00 each day shall be recorded and the highest value of such recorded demand over the billing cycle, shall be recorded as the maximum demand. Unless otherwise stated in the Tariff Decision issued by PUCSL, (i) the averaging period shall be 15 minutes, and (ii) demand shall be measured and recorded in kilovolt ampere.

5.5.3.2 Time of Use

Licensees shall ensure that the meters are programmed to comply with the time intervals of the Time of Use (TOU) tariff regime, specified in the applicable Tariff Decision issued by PUCSL for the purpose of measuring active and reactive energy, or any other quantity. The accuracy of the boundaries of each time interval shall be within ± 5 minutes.

5.5.4 METERING EQUIPMENT MAINTENANCE

5.5.4.1 Maintenance, Testing and Auditing Program

The Licensee shall maintain all metering equipment according to a planned program and shall keep all test results, maintenance records and sealing records in respect of all items tested/inspected. On request, relevant information shall be made available to the User.

When carrying out maintenance, testing or auditing, prior notice shall be given to the Users in accordance with the SLEA 2009. This will provide the opportunity for the Customer to witness the testing as well. The Customer or his authorized representative's signature shall be obtained to certify the meter readings before and after the testing.

As explained in Section 5.4.2, it is the User's responsibility to provide unhindered access for the Licensee to read/test/inspect the metering equipment. If any User fails to provide unhindered access to the Licensee as agreed and if it causes the Licensee to make additional visits to the User's premises, then the Licensee will be entitled to recover reasonable costs of such visits.

The Distribution Licensee shall test each type of meter in accordance with the accepted standard international practice. The Licensee shall publish such information in its website and shall make the details available to Users on request. The Licensee shall ensure that each meter installation shall be inspected and tested as given in the Table 5.1:

Table 5.1- Frequency of Meter Testing

Installation	Inspection and Testing Frequency
Low voltage retail customer, 1-phase	Once every ten years
Low voltage retail customer 3-phase/2 phase	Once every five years
Low voltage Bulk Customer	Once every year
Medium Voltage Customer	Once every year
Embedded Generators	As stipulated in CEB Guide for Grid Interconnection of Embedded Generators, subject to a minimum frequency of once every year.

5.5.4.2 Announced Testing of Metering Installations

The Distribution Licensee may be requested by Customers to perform tests on accuracy of the metering equipment on payment of the necessary charges². Sufficient notice shall be given by the Licensee announcing the test date/time and agreement shall be reached with the Customer on the same, to enable the customer or his representative to witness testing. As soon as practicable, the Distribution Licensee shall make the test results available to the requested party.

If the tests show that the meter is defective/erroneous then procedures developed as detailed in Section 5.5.5 shall be followed.

5.5.4.3 Unannounced Testing of Metering Installations

The Distribution Licensee may be required to test a metering installation due to suspected tampering of the metering equipment. The Licensee shall consider all such unauthorized tampering as a cause for damaging the equipment, fire, injuries or even loss of human life due to electrocution.

In such situations, the Licensee shall use the powers granted to it under the SLEA 2009 and carryout the inspections/tests unannounced and take appropriate action as detailed in Section 5.5.5.

5.5.4.4 Metering Data during Tests/Audits

The Distribution Licensee shall ensure that proper coordination exists between the department responsible for carrying out the testing/auditing and the department responsible for billing, and all necessary measures have to be taken to guarantee the integrity of the meter data.

5.5.4.5 Repairs of Meters and Associated Equipment

The Distribution Licensee shall repair or replace any meter or associated equipment as soon as practicable after being informed through User notification or otherwise, that the meter is defective/erroneous (section 5.4.2).

If the Licensee can establish that a User has damaged any metering equipment or broken seals, then the cost of all such repairs shall be recovered from the User.

5.5.5 REMOVAL AND REPLACEMENT OF METERS

No person other than a person authorized by the Distribution Licensee shall remove a meter from a User installation or replace a meter at a User installation.

A meter or any associated equipment may be removed due to any of the following reasons:

- (a) Findings during an audit
- (b) Request by a User
- (c) Information provided by a User
- (d) Findings during unannounced testing

The Distribution Licensee shall develop procedures on the removal/replacement/surcharges/fines where applicable, and make such information available to the Users.

5.6 READING OF METERS

All meters, other than pre-paid meters may be read manually or remotely by the Distribution Licensee according to a scheduled program. The manual reading program shall be prepared giving due consideration to route efficiency. The Licensee shall decide on the frequency of meter reading, which may be equal to or more than the time stipulated in the Tariff Decision issued by PUCSL at any given time. The Licensee shall make all Users aware of the frequency of meter reading.

5.6.1 MANUAL READING OF METERS

Meter reading has to be carried out by an authorized representative of the Distribution Licensee, who shall be suitably qualified and trained to carry out the task. The Licensee shall decide on the qualifications of the representative according to the meter reading tasks entrusted to them.

² Allowed Charges

At the time of reading the meter, it shall be the responsibility of the Distribution Licensee's authorized representative for reading the meters to carry out all necessary checks for ensuring the security of the metering installation and report any evidence that may affect the normal functioning of a meter to a responsible officer, which shall include the following:

- (a) Ascertaining whether meter identification number on the meter is the same as that of the bill/schedule
- (b) Meter seals are intact
- (c) Any damages to the metering installations
- (d) Any tampering with the wiring
- (e) Any other actions that prevent/hamper the normal operation of the meter
- (f) Abnormal variations of consumption, which the User cannot explain
- (g) Meter alarms

Installations where Time of Use (TOU) metering is employed, additional checks/work need to be carried out which shall include the following:

1. Comparison of the meter clock time with the actual time.
2. If the difference is more than five minutes, to take immediate action to correct the error or to replace the meter within two weeks of detecting such error
3. If the difference is less than 5 minutes to ignore the mismatch for the purpose of readings and associated billing, but resetting the time to match with the actual time.

5.6.1.1 Remote Reading of Meters

Remote reading of meters shall be carried out according to a planned program. If it is found that the meter cannot be read remotely, the Distribution Licensee shall take immediate action for its authorized representative to read/inspect/report the meters as detailed in sections 5.5.4.2 and 5.5.4.3.

5.6.1.2 Data Delivery and Storage

The Distribution Licensee's representative shall deliver the data so collected according to the procedures laid down by the Distribution Licensee, to be stored in a secure and a well maintained database.

All data collected manually shall be transferred to the database within seven days from the reading of the meters. However, the Distribution Licensee shall propose and implement programs to transfer such data electronically, which will enable the updating of the database on the same day the meters are read.

In the event that the Distribution Licensee arrives at a decision that the meter data is inaccurate/erroneous, data may be substituted by estimation according to a declared procedure. The User shall be informed of the substitution and the basis on which the substitution is made.

User meter data is confidential and shall not be released to third parties without obtaining written consent from the User.

The database shall be used to upload the required data to the LISS.

5.7 DISPUTES

The Distribution Licensee shall take all efforts to resolve disputes on matters related to metering and reach agreement with the User. However, if the User is not satisfied with the solution offered, the matter can be placed before the PUCSL for resolution.

6 DISTRIBUTION PLANNING AND OPERATION STANDARDS CODE

6.1 INTRODUCTION

Distribution Planning and Operations Standards Code (DPOSC) defines the standards the

- (a) The Distribution Licensees has to comply with when planning, developing and operating its Distribution System, and
- (b) System Users have to abide by when they are connected to or seek connection to the Licensee's Distribution System.

6.2 APPLICABILITY

This DPOSC applies to all Distribution Licensees, all system Users including the embedded generators, and all parties who are authorized to carry out distribution/supply activities and are connected to a Licensee's Distribution System.

However, this DPOSC will not apply to retail customers provided with electricity supplies by parties who are being exempted from the requirement of obtaining a license to carry out the distribution/supply activities. Such customers shall be governed by the conditions stipulated by the PUCSL in such exemption orders.

6.3 OBJECTIVE

The objective of the DPOSC is to ensure that the Distribution Licensee will plan, develop and operate a coordinated and a secure electricity Distribution System that will provide a safe, economical and a reliable electricity supply.

6.4 RESPONSIBILITIES

It is the responsibility of the Distribution Licensee to plan, develop and operate its Distribution System in accordance with the standards specified in this Code. The Users also have to ensure that their systems are operated, where applicable within the limits specified in this Code.

6.5 SYSTEM PLANNING STANDARDS

6.5.1 DECLARED FREQUENCY AND VOLTAGES OF SUPPLY

Declared frequency of supply shall be 50 cycles/second.

Declared distribution voltages shall be 230 V (single phase) between the live conductor and the neutral conductor, 400 V (three phase) between any two phases, 11kV and 33kV between any two phases.

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6.5.2 VOLTAGE REGULATION

The voltage profile shall be planned within the following limits under normal operating conditions;

Metropolitan	± 6% from the Declared Voltage
Urban areas	± 6% from the Declared Voltage
Rural Areas	± 6% from the Declared Voltage

Supply voltage levels under all three categories above shall be maintained within ±10% in all areas under emergency conditions.

6.5.3 RELIABILITY CRITERIA

The system shall be planned to maintain voltages and thermal loading in networks in city areas and rural areas to provide performance of the network, as stated below;

	Medium Voltage (33, 11 kV)	Low Voltage (230/400 V)
Metropolitan	N-1	N-0
Urban Areas	N-1	N-0
Rural Areas	N-0	N-0

6.5.4 THERMAL LOAD LIMITS

Under normal operating conditions, overloading of conductors and transformers shall be avoided. Under emergency conditions, the loading of the remaining elements should not exceed their emergency ratings specified and overloading of transformers shall be as defined in the IEC 60354, Guide for Overloading of Transformers.

The Distribution Licensee is responsible for documenting the emergency thermal limits of conductors and transformers, available for submission to the PUCSL on request, and for managing system loading within these prescribed limits.

6.5.5 ECONOMIC CRITERIA

- Establishment of cost of losses
- Reliability: loss of sales and economic cost of unserved energy
- Economic selection of conductors and cables
- Economic selection of distribution transformers

6.6 OPERATING STANDARDS

6.6.1 RELIABILITY GUIDELINES

The reliability levels shall be assessed using the internationally accepted standard reliability indices given below;

- System Average Interruption Duration Index (SAIDI)
- System Average Interruption Frequency Index (SAIFI)
- Customer Average Interruption Duration Index (CAIDI)

6.6.2 POWER QUALITY GUIDELINES

Voltage Imbalance (recommended, not for immediate implementation)

Unbalance caused by individual loads should be kept within 1.3%, although short term deviations (less than 1 minute) may be allowed up to 2%.

Voltage Fluctuation (recommended, not for immediate implementation)

A 3% general limit on the allowable magnitude of voltage changes, regardless of shape,

Harmonics

For harmonics IEEE 519 shall be used as the applicable standard.

6.6.3 GUIDELINES FOR SYSTEM LOSSES

For each Tariff Period³, the PUCSL shall impose a cap on technical and non technical losses for the medium voltage network, LV bulk transformers and the LV retail network.

³ Please see the current version of the "Methodology for Tariffs", PUCSL.

6.6.4 GUIDELINES FOR CUSTOMER & SYSTEM POWER FACTOR

Power factor at customer points and in general within the system shall be monitored using the energy/demand meters. It is necessary to maintain the power factor close to unity to improve the effective utilization of the network, reduce power losses and improve the supply voltages.

6.6.5 SYSTEM SECURITY GUIDELINES

Area	Voltage	Group Demand	Restoration Time after an Outage	Remarks
Distribution Substations				
Metropolitan	11 kV/400V	1 MVA	Repair time	
Urban	11 kV/400V, 33 kV/400	400 kVA	Repair time	
Rural	11 kV/400V, 33 kV/400	160 kVA	Repair time	
132 kV, 33 kV Incomers to Primary Substations				
Metropolitan	132 kV, 33 kV	60 MVA	Immediately	Where double circuits are available
Urban	33 kV	20 MVA	-do-	-do-
Rural	33 kV	20 MVA	-do-	-do-
132 kV, 33 kV Incomers to Primary Substations				
Metropolitan	132kV, 33kV	60 MVA	50% within 30 minutes, Balance within 1 hour	Fed from single circuits
Urban	33 kV	20 MVA	-do-	-do-
Rural	33 kV	20 MVA	50% within 1 hour, Balance within 3 hours	-do-
11 kV/33 kV feeder from Primary Substation to open point				
Metropolitan	11 kV/33 kV	Up to 6 MVA	50% within 30 minutes, Balance in repair time	Where at least one other substation or switching point is available
Urban	11 kV/33 kV	Up to 6 MVA	50% within 45 minutes, Balance in repair time	-do-
Rural	11 kV	Up to 6 MVA	50% within 2 hours, Balance in repair time	-do-
Primary Substations 33 kV/11 kV or 132 kV/11 kV				
Metropolitan	33 kV and 132 kV	Up to 60MVA	Immediately	Where more than one transformer is available.
Urban	-do-	-do-	-do-	-do-
Rural	-do-	-do-	-do-	-do-

7 DISTRIBUTION CODE: INFORMATION AND DATA EXCHANGE

7.1 INTRODUCTION

Distribution Code requires the Licensees, Users and the PUCSL to exchange and update information/data from time to time. Purpose of this part of the Distribution Code is to summarize such information/data requirements.

7.2 APPLICABILITY

This part of the Distribution Code applies to all Distribution Licensees, all system Users including the embedded generators and parties who are authorized to carry out distribution/supply activities and are connected to a Licensee Distribution System.

7.3 OBJECTIVES

Objective of this part of the Distribution Code is to collate and list all data/information to be submitted by the Licensee/Authorized distributor/User/PUCSL and vice versa.

7.4 RESPONSIBILITIES

Embedded generators, customers, authorized distributors and all system Users shall be responsible for submitting all necessary data/information as required by this Code. Accuracy of the data/information submitted will be the responsibility of the system Users who submit the data.

The Distribution Licensee shall provide all information and data as required by this Code to the system Users, prospective Users, other Licensees and the PUCSL.

Any data, which system Users fail to provide as required by the Distribution Code, may be estimated by the Licensee, based on data previously supplied. Responsibility of accuracy of such data rests with the relevant system Users and the Distribution Licensee will in no way be held responsible for whatever decisions taken on results of studies carried out using such data.

7.5 DATA AND INFORMATION

This Distribution Code specifies the data required by the

- (a) Distribution Licensees from the system Users
- (b) System Users from the Licensees
- (c) PUCSL from the Distribution Licensees

Data so required can be allocated to the following categories:

1. Planning Data
2. Connection Data
3. Operational Data

7.5.1 DATA REQUIRED BY THE DISTRIBUTION LICENSEES FROM THE SYSTEM USERS

7.5.1.1 Planning Data

(a) Large Customers

- (i) Customer and Installation Data

To be submitted by all Bulk Customers whose contract demand exceed 250kVA

Information Description	DC Section
Customer Name	2.6.4.1
Contact Address	-do-
Reference no/Account no:	-do-
Telephone	-do-
Email Address	-do-
Authorized Officer's Name	-do-
Connection Point Coordinates	-do-
Equipment Specifications	-do-

(ii) Load Forecast

Information Description	DC Section
Date Submitted	2.6.4.1
Connection Point Voltage	-do-
Transformer Capacity (kVA) & Voltage Transformation Ratio	-do-
Installed Capacity – Self Generation (kW)	-do-
Type of Load (motors, heating, lighting)	-do-
Contract Demand	-do-
Forecast for a five year period giving the values for the following for each year	
Energy (MWh) Purchases from Licensee	-do-
Self Generation	-do-
Total	-do-
Demand (kW) Served by Self Generation	-do-
Served by Licensee System	-do-
Maximum Demand	-do-
Demand at the Time of Licensee System Peak	-do-

(b) Embedded Generators

(i) Power Station Data

To be submitted by all embedded generators and all prospective embedded generators

Information Description	DC Section
Power Station Name	2.6.4.1
Reference	-do-
Telephone	-do-
Email address	-do-
Contact address	-do-
Authorized officer - name	-do-
Power station coordinates	-do-

(ii) Generator Information

Synchronous generators with an installed capacity above 500 kW

Information Description	DC Section
Date Submitted	2.6.4.1
Power Station Standby Import Requirements	
Max Active Power Import (kW)	-do-
Max Reactive Power Import (kVAr)	-do-
Max Reactive Power export (kVAr)	-do-
Power Factor Operating Range	-do-
Power Plant Export Capability	
Total Capacity (MW)	-do-
Maximum Active Power Export (MW)	-do-
Maximum Reactive Power Import (MVar)	-do-
Maximum Reactive Power Export (Mvar)	-do-

Individual Generator Information	
For each Generator in the Power Plant	-do-
Prime mover(eg: pelton turbine, Francis turbine, steam turbines)	-do-
Generating Voltage (kV)	-do-
Generator Rating (MVA)	-do-
Stator Resistance (pu) & Tolerance (%)	-do-
Sub-Transient Reactance (pu) & Tolerance %	-do-
Synchronous Reactance (pu) & Tolerance %	-do-
Transient time Constant (ms) & Tolerance (ms)	-do-
Inertia Constant (MW seconds/MVA) or Seconds	-do-
Individual Generator Transformer Information	-do-
Rating (MVA)	-do-
Reactance (pu) Tolerance %	-do-
Resistance (pu) Tolerance %	-do-
Voltage Ratio	-do-
Vector Group	-do-
Transmission Line information	-do-
Cable or Line between the Generator and Point of Common Coupling*	-do-
Voltage (V)	-do-
Reactance (Ohm)	-do-
Resistance (Ohm)	-do-

* Where this cabling distance exceeds 50 m

Synchronous generators with an installed capacity less than 500 kW

Information Description	DC Section
Date Submitted	2.6.4.1
Power Station Standby Import Requirements	
Max Active Power Import (kW)	-do-
Max Reactive Power Import (kVAr)	-do-
Max Reactive Power export (kVAr)	-do-
Power factor operating range	-do-
Power Station Export Requirements	
Total Capacity (kW)	-do-
Maximum Active Power Export (kW)	-do-
Maximum Reactive Power Import (kVAr)	-do-
Maximum Reactive Power Export (kVAr)	-do-
Individual Generator Information	
Prime mover(eg: Pelton turbine, Francis turbine, steam turbines)	-do-
Generating Voltage (kV)	-do-
Generator Rating (kVA)	-do-
Stator Resistance (pu)	-do-
Individual Generator Transformer Information	
Rating (kVA)	-do-
Reactance (pu)	-do-
Resistance (pu)	-do-
Voltage Ratio	-do-
Vector Group	-do-
Cable or Line between the Generator and Point of Common Coupling*	
Voltage (V)	-do-
Reactance (Ohm)	-do-
Resistance (Ohm)	-do-

* Where this cabling distance exceeds 50 metres

Asynchronous generators with an installed capacity above 500 kW

Information Description	DC Section
Date Submitted	2.6.4.1
Power Station Standby Import Requirements	
Max Active Power Import (MW)	-do-
Max Reactive Power Import (MVar)	-do-
Max Reactive Power export (MVar)	-do-
Power factor operating range	-do-

Power Plant Export Capability	
Total Capacity (MW)	-do-
Maximum Active Power Export (MW)	-do-
Maximum Reactive Power Import (MVar)	-do-
Maximum Reactive Power Export (MVar)	-do-
Individual Generator Information (May be for an equivalent synchronous generator)	
Prime mover(eg: Pelton turbine, Francis turbine, steam turbines)	-do-
Generating Voltage (kV)	-do-
Generator Rating (MVA)	-do-
Stator Resistance (pu) & Tolerance (%)	-do-
Sub-Transient Reactance (pu) & Tolerance %	-do-
Synchronous Reactance (pu) & Tolerance %	-do-
Transient Time Constant (ms) & Tolerance (ms)	-do-
Inertia Constant (MWSec/MVA)	-do-
Number of Pole Pairs	-do-
Generator Rotor Speed Range (minimum to rated speed- rpm)	-do-
Gearbox Ratio (no.)	-do-
Slip at rated output (%)	-do-
Shunt Capacitances Connected at % of Rated Output (state whether Capacitance is SVC)	
Starting	-do-
20%	-do-
40%	-do-
60%	-do-
80%	-do-
100%	-do-
Individual Generator Transformer Information	
Rating (MVA)	-do-
Reactance (pu) Tolerance %	-do-
Resistance (pu) Tolerance %	-do-
Voltage Ratio	-do-
vector Group	-do-
Transmission Line Information	
Cable or Line between the Generator and Point of Common Coupling*	-do-
Voltage (V)	-do-
Reactance (Ohm)	-do-
Resistance (Ohm)	-do-

* Where this cabling distance exceeds 50 metres

Asynchronous generators with an installed capacity less than 500 kW

Information Description	DC Section
Date submitted	2.6.4.1
Power Station Standby Import Requirements	
Max Active Power Import (kW)	-do-
Max Reactive Power Import (kVar)	-do-
Max Reactive Power export (kVar)	-do-
Power factor operating range	-do-
Power Plant Export Capability	
Total Capacity (MW)	-do-
Maximum Active Power Export (kW)	-do-
Maximum Reactive Power Import (kVar)	-do-
Maximum Reactive Power Export (kVar)	-do-
Individual Generator Information (May be provided for an equivalent synchronous generator)	
Prime Mover (eg: Pelton turbine, Francis turbine, steam turbines)	-do-
Generating Voltage (kV)	-do-
Generator Rating (MVA)	-do-
Stator Resistance (pu)	-do-
Number of Pole Pairs	-do-
Generator Rotor Speed Range (minimum to rated speed- rpm)	-do-

Gearbox Ratio (no.)	-do-
Slip at Rated Output (%)	-do-
Shunt Capacitances Connected at % of Rated Output (state whether Capacitance is SVC/Fixed/otherwise)	
Starting	-do-
20%	-do-
40%	-do-
60%	-do-
80%	-do-
100%	-do-
Individual Generator Transformer Information	
Generator Transformer	-do-
Rating (MVA)	-do-
Reactance (pu) Tolerance %	-do-
Resistance (pu) Tolerance %	-do-
Voltage Ratio	-do-
Vector Group	-do-
Transmission Line Information	
Cable or Line between the Generator and Point of Common Coupling*	
Voltage (V)	-do-
Reactance (Ohm)	-do-
Resistance (Ohm)	-do-

* Where this cabling distance exceeds 50 m

7.5.1.2 Connection Data

(c) New Connections or Augmentations

- (i) General information to be submitted for a new connection by all prospective customers/customers requesting augmentation of existing connection

Information Description	DC Section
Customer Name	3.5.1
Telephone (if available)	-do-
Contact Address	-do-
Email Address (if available)	-do-
Address of the Premises for which Electricity is Required	-do-
Connection Point Coordinates (if available)	-do-
Declaration that the Applicant is the Owner/Occupier of the Premises	-do-
Account no of the Installation (only for Augmentations)	-do-
Account no of the Closest Customer (if available, not required for augmentations))	-do-

- (ii) Information to be submitted by all applicants requesting a retail connection

Information Description	DC Section
Purpose for which electricity is required (Household, Religious, General Purpose, Industrial, Hotel, Govt)	3.5.1
Maximum Power requirements or Required connection capacity (This should be 1ph 15 A, 1ph30 A, 3ph 60 A or 1ph 60 A, and not in kW or kVA)	-do-
Capacity of the existing connection (where applicable)	-do-
The date by which the connection is required	-do-
Minimum period for which the supply is required. This is a requirement in the SLEA2009 Section 25-5-e	-do-
Certificate by a licensed electrician	3.5.3.1
Declaration by the Applicant expressing agreement to the offer made by the Licensee's terms and conditions to provide the electricity supply	3.5.2.5

- (iii) Additional information to be provided by retail customers whose installations are within 50m from the Licensee Distribution System

Information Description	DC Section
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Declaration stating that	3.5.2.5
(i) The distance from the closest pole of the distribution licensee's LV Distribution System to the proposed connection point of the premises for which electricity is required does not exceed 50M	and 3.5.3.3
(ii) The service connection wires can be drawn without going over third party land	
(iii) The Applicant agrees to pay the additional charges required in case the Licensee finds that the distance from the Licensee's Distribution System to the proposed connection point is more than 50 m, but reserves the right to appeal to the PUCSL against the decision of the Licensee.	
(iv) If the Applicant does not agree as stated in (iii), he will accept refund of any monies he has paid to the Licensee.	

- (iv) Additional information to be provided by applicants requesting a bulk supply connection

Information Description	DC Section
Single Line Diagram of the Proposed Installation	3.5.1
Voltage Level at which the Electricity Supply is Required (400V, 11kV, 33kV or 132kV)	-do-
Maximum Active Power Requirement (kW)	-do-
Maximum Reactive Power Requirement (kVAr)	-do-
Type of Load (motive power, heating, lighting, air conditioning, etc)	-do-
Power Factor Correction Capacitor and/or Filter Bank Information	-do-
Details of Motors and their Ratings, Methods of Starting etc.	-do-
Total Harmonic Distortion at the Connection Point	-do-
Fluctuating Load Information (if any)	-do-
Specifications of the Major Equipment	2.6.4 and 3.5.3.2
Details of Protection System, Proposed Settings and Calculations	3.5.3.2
Single Line Diagram showing the Equipment at the Connection Point up to the Applicant's main Switchboard outgoing Feeders.	-do-
Grounding Arrangements and Relevant Calculations	-do-
Testing and Commissioning Program for the Connection	-do-
List of Names and Telephone Numbers of the Authorized Representatives	-do-
Certificates issued by Accredited Chartered Electrical Engineer/s that the Design and the Installation comply with the Requirements of the Applicable Regulations, Standards, Codes etc. and the Installation is Safe and Ready for Energization	-do-

- (v) Additional information to be submitted by applicants for a net-metering connection or converting the existing connection to a net metering connection.

Information Description	DC Section
Type of Renewable Energy Source (hydro, biomass, wind, solar PV, etc)	3.5.3.5
Capacity of the Existing Connection	3.5.3.5

- (vi) Additional information to be submitted by applicants for embedded generation

Information Description	DC Section
Power Station Name	3.5.1
Reference	-do-
Telephone	-do-
Email Address	-do-
Contact Address	-do-
Authorized Officer - Name	-do-

Power Station Coordinates	-do-
Voltage Level at which the Connection is Required	3.5.3.4
Primary Energy Source (Hydro, Biomass, Wind, Solar etc.)	-do-
Details of the Primary Source (summary Stream Flow Data, Biomass Availability Data, Wind Potential Estimates, etc.)	-do-
Expected Rated Capacity (kVA) and Annual Energy (kWh) Contribution to Licensee Network	-do-
Expected Construction Duration (for new developments)	-do-

7.5.1.3 Operational Data

(a) Embedded Generators

(i) Generation Forecast

Power stations where the installed capacity is greater than 5 MW

Information Description	DC Section
Half hourly data for Active Power (MW) and Reactive Power (Mvar) for a period of two weeks (to be submitted at least one week ahead)	4.7

(b) Very Large Customers (5 MW and above)

(i) Demand Forecast

Information Description	DC Section
Half hourly forecast for Active Power (MW) and Reactive Power (MVar) for a period of two weeks (to be submitted at least one week ahead)	4.7

(c) Actual Generation

(i) All Power Stations

Information Description	DC Section
Half hourly Readings of Active Power (MW), Reactive Power (MVar) and Energy (MWh) to be submitted on weekly basis.	

(ii) Generation outage program

Information Description	DC Section
Six Monthly Outage Program	4.7

(d) Bulk Customers

Information Description	DC Section
Connection Point Information	3.6
Updated Single Line Diagram of the Connection Point	-do-
Equipment and their Ownership at the Connection Point	-do-
Ratings of the Equipment used at the Connection Point	-do-
Authorized officers for Operation and Safety	-do-
Operational Procedures and the Parties Responsible for Operation	-do-
Names of Officers who prepared the Connection Point Document, the Dates and their Signatures	-do-

7.5.2 INFORMATION TO BE MADE AVAILABLE BY THE LICENSEES TO THE SYSTEM USERS/PROSPECTIVE USERS

(a) Planning Data⁴

(i) System Data

Information Description	DC Section
Maximum Three Phase Fault Level (kA) at MV	2.6.4.2
Minimum Three Phase Fault Level (kA) at MV	-do-
Maximum Single Phase Fault Level (kA) at MV	-do-
Maximum Three Phase Fault Level (kA) at LV	-do-
Minimum Three Phase Fault Level (kA) at LV	-do-
Maximum Single Phase Fault Level (kA) at LV	-do-
Protection Relay Settings of The MV Feeder at the GSS/PSS ⁵	-do-
Protection Relay Settings of The MV Feeder at the First Recloser	-do-
Protection Relay Settings of The MV Feeder at the Second Recloser	-do-

(ii) Circuit Data

Information Description	DC Section
Conductor used in the MV System Backbone	-do-
Other Conductors used in the MV System	-do-
	-do-
Conductors used for the LV System	-do-
	-do-
	-do-
Distribution Transformer Capacity Range (kVA)	-do-
Rated Voltage (LV side) on Principal Tap of Distribution Transformer (Volts)	-do-
Standard Transformer Capacities available for Bulk Suppliers (kVA)	-do-

(iii) Connection Data

To be forwarded by the Licensee to all applicants who have fulfilled the requirements to obtain/augment the electricity supply from the Licensee's Distribution System

Information Description	DC Section
Offer Stating the Terms and Conditions for the Provision of Electricity Supply	3.5.2.4

7.5.3 INFORMATION TO BE SUBMITTED BY THE LICENSEES TO THE PUCSL

(a) Planning Data

Information Description	DC Section
Energy and Demand Forecast	2.5.1
MV System Development Plan	2.5.2.1
Reactive Power Compensation Plan	2.5.2.1
LV Development Plan including Rural Electrification	2.5.2.2
Standard Ratings of Equipment, Distribution Substations/ Networks	2.5.2.2
Short Circuit Study Report	2.5.3
Reliability Assessment	2.5.4
Security Level Assessment	2.5.5
System Loss Study Report	2.5.6
Power Quality Study Report	2.5.7

⁴ System Users are advised to obtain other relevant data from the System Development reports or from the Licensee.

⁵ When providing information on protection relays, CT ratio, relay characteristic, plug setting, time setting and instantaneous setting (where applicable) shall be given.

Financial Evaluation of Development Proposals	2.5.2.1
Progress Review of the Implementation of Planned Proposals for the Previous Year	2.7

(b) Operational data

Information Description	DC Section
Monthly System Performance Report	4.13.3

7.5.4 INFORMATION TO BE PROVIDED BY THE DISTRIBUTION LICENSEES TO THE TRANSMISSION LICENSEE

Information Description	DC Section
Schedules for Demand Control	4.8.5

7.5.5 INFORMATION/DATA TO BE FORWARDED BY THE PUCSL TO THE LICENSEES

Information Description	DC Section
Planning and Operating Standards	6

APPENDICES

APPENDIX 1: RULES AND PROCEDURES FOR DISTRIBUTION CODE ENFORCEMENT AND REVIEW PANEL (DCERP)

Reference in the code: section 1.1.5.1

1. Functions

Functions of the DCERP shall be as follows:

- (a) Positively contribute to the effective enforcement of the Distribution Code
- (b) Monitor and evaluate the working of the Distribution Code and make recommendations to PUCSL for effective implementation.
- (c) Review all suggestions and amendments proposed by any party and make suitable recommendations to PUCSL.
- (d) Initiate and coordinate regular reviews and revisions to the Distribution Code and make suitable recommendations to PUCSL for incorporation.
- (e) Facilitate the publishing of the proposed amendments and the reasons for the recommendations.
- (f) Facilitate the resolution of issues brought up by the members of the DCERP or by the PUCSL, and submit its recommendations to PUCSL.
- (g) Produce an annual report on the activities of the Panel.

2. Membership

2.1 DCERP shall comprise nine members as follows:

- (a) One member representing each Distribution Licensee of whom at least one member shall be a member of the Grid Code Review Panel
- (b) One member representing the Transmission Licensee
- (c) One member representing the distributors/suppliers authorized to carry out distribution/supply activities under Clause 10 of the SLEA 2009.
- (d) One member representing the embedded generators
- (e) The Chairman of the Consumer Consultative Council, representing customers.

2.2 All members representing Licensees shall be electrical engineers serving in senior positions.

3. Chairperson

- (a) DCERP shall elect one of its members as the Chairperson of the DCERP.
- (b) Term of office for a Chairperson shall be for one year.
- (c) Chairperson, on completion of his term may be appointed for a maximum of one more term.

4. Secretary to DCERP

- (a) Director - Licensing of PUCSL shall function as the Secretary of the DCERP (Secretary).
- (b) The Secretary shall not be a member of the DCERP and shall not have voting rights.
- (c) The Secretary shall be responsible for all administrative work of the DCERP and also for keeping PUCSL informed of DCERP activities and progress, as directed by DCERP.
- (d) The Secretary may delegate his duties to another officer of the PUCSL, with the approval of the DCERP.
- (e) The Secretary may use the facilities and human resources available in PUCSL to carry out the duties entrusted to him/her with regard to the DCERP.

5. Appointment of Members to DCERP

- (a) The Secretary shall request the organizations listed in Section 2 to nominate suitable officers having requisite qualifications and experience to be appointed as members of DCERP, within 7 days from the date PUCSL approves the Distribution Code.
- (b) All organizations from which such requests have been made shall be required to nominate suitable officers within two weeks from the receipt of the request under 5(a).
- (c) Within seven days from the receipt of the said nominations, the Secretary shall seek approval of the PUCSL to appoint them as the members of the DCERP.

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- (d) Unless PUCSL has valid reasons to refuse acceptance of the nominations, PUCSL shall approve the same.
 - (e) If PUCSL decides against any of the nominations, the Secretary shall inform the relevant Licensee or organization accordingly and request for new nominations.
 - (f) Within a week from the date PUCSL grants approvals to the nominations, the Secretary shall inform the member and the relevant organization accordingly.
 - (g) Whenever a vacancy occurs in the DCERP, the above procedure shall be followed and vacancies shall be filled within 30 days from the day vacancy/vacancies occurred.

6. Period of Membership

- (a) The term of office of a member of DCERP shall be for two years from the date of appointment.
- (b) Of the first members of the DCERP, four members representing Licensees shall hold office for 6 months, 9 months, 12 months, 18 months respectively.
- (c) DCERP shall decide on the members whose terms will be limited as stated in (b).
- (d) No member shall hold office continuously for a period exceeding four years.

7. Cessation of Membership of DCERP

A person who is a member of DCERP shall cease to be a member if

- (a) he ceases to be an employee of the Licensee which nominated him/her
- (b) he ceases to be holding the position in the organization that nominated him/her to the DCERP in the case of nominees of organizations other than Licensees
- (c) he does not attend more than three consecutive meetings, or more than four meetings in a year, without the approval of the DCERP
- (d) if he resigns from the DCERP on his own accord.

8. Meetings of DCERP

- (a) The Chairperson shall summon all meetings of the DCERP and at least one meeting shall be convened every month.
- (b) Any member of DCERP may request the Chairperson to call a meeting, and the Chairperson shall not turn down such requests, unless he/she has good reason to do so.
- (c) The Chairperson shall preside at all meetings, and in his absence, DCERP shall elect one of its members as Chairperson pro tem.
- (d) At least five days' notice of the date, time and place for the holding of normal meetings shall be given.
- (e) An agenda shall be provided with the Notice of Meeting.
- (f) A quorum shall consist of not less than five members, and the Chairperson shall be considered as a member in a quorum count.
- (g) In the event that all the business contained on the agenda cannot be dealt with judiciously within the time allocated for the meeting an adjournment shall occur.
- (h) The Chairperson with the consent of DCERP may invite guests with relevant expertise to specific meetings.

9. DCERP Decisions

Decisions shall normally be by consensus, except at the request for a vote on specific requests by any member.

10. Reimbursements

All members shall be paid an allowance and reimbursement of traveling expenditure for every meeting a member participates.

11. Expenses, Accounts and the Budget

PUCSL shall bear all expenses of the DCERP and the Secretary shall be responsible for maintaining its accounts.

- (a) Secretary shall prepare the annual budget for the DCERP's consideration.

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- (b) Annual budget for the ensuing year must be adopted by the DCERP on or before 30th July of the current year.
 - (c) The adopted budget shall be forwarded to the PUCSL with the recommendation that it be incorporated in its "statement setting out expenditure" for the next financial year.
 - (d) PUCSL may I accept the budget. In the event any revisions/amendments, are required, PUCSL and DCERP will resolve the issues through discussions.

APPENDIX 2: PERSONS AUTHORISED TO ATTEST APPLICATIONS

Reference in the code: section 3.5.2.5

Persons authorized to attest the declaration by an Applicant for a new connection or a modification, if the declaration is send to the Licensee by post or through a third party.

1. Justice of the Peace
2. An officer of Sri Lanka Administrative Service, Education Administrative Service, Accountant Service, Planning Service OR Engineering Service
3. Attorney at Law
4. Qualified Medical Practitioner
5. A Commissioned officer in Sri Lanka Army/ Navy/Air force or Police
6. OIC of the Police Station of the area
7. Grama Niladhari/Samurdhi Manager/Social Service Officer of the area.
8. A Post Master/A Principal of School/A Labour Officer
9. An Estate Superintendent
10. Chief Incumbent of a religious mission (Temple, Church, Mosque or Kovil).

APPENDIX 3: CEB GUIDE FOR GRID INTERCONNECTION OF EMBEDDED GENERATORS

Reference in the Code: section 2.6.4.1 and other sections

Provided as a Separate Document

APPENDIX 4: SRI LANKA GUIDE FOR NET METERED GENERATING FACILITIES

Reference in the Distribution Code: section 3.5.3.5 and other sections

1. Introduction

The Small Power Producer (SPP) program has been in operation in Sri Lanka since 1996, where a developer is allowed to finance and build a renewable-energy based power plant up to 10 MW, and sell its output to the grid at a standardised price. Such developers are required to install transformers and build dedicated interconnection lines to reach the grid from the power plant location.

In addition to the above program, the Government made a policy decision in year 2008 to allow any electricity customer who generates electricity using a renewable energy source to connect his facility to the distribution network. Unlike in the SPP program, these customer-owned facilities are expected to be of small capacity, and hence they would be allowed to be connected through the existing electricity connection of the customer's premises. However, unlike in the SPP program, there will be no payment for the electricity exported by the customer to the grid. Any exports will be set-off against the customer's own electricity consumption. In other words, the grid would act as an energy bank, accepting customer's energy surpluses and returning the energy back to the customer on demand.

There will be no charge for the energy banking facility. However, there will be initial expenses the customer would be required to pay, for a new two-way metering and other interconnection requirements.

The customer's electricity purchase from the distribution network and the electricity exported by the customer to the distribution network shall both be measured. The customer shall be billed only for the net amount of energy purchased from the Distribution Licensee. If the net energy purchased in any billing month is negative, then the customer shall carry such credits into the subsequent month. Accordingly, the scheme shall hereafter be referred to as the "**Net Energy Metering Program**".

CEB Distribution Licensees and Lanka Electricity Company (Pvt.) Limited have implemented the procedure effective from 1st June 2010.

These guidelines shall be commonly used by all Distribution Licensees in Sri Lanka for the purpose of facilitating, design, commissioning and billing of such net-metered facilities.

2. The Concept

If a tariff customer desires to use this facility, the customer's energy meter needs to be replaced with an import/export energy meter, unless the meter already installed has the facility to monitor imports and exports. The electrical energy purchased from the Distribution Licensee is considered as import energy (energy debit) and electrical energy supplied to the grid through an approved facility for Net Energy Metering Program, is considered as export energy (energy credit). At the end of each billing period (typically one month), the Distribution Licensee shall read the customer's export energy meter and the import energy meter, and the bill shall be prepared to charge the customer for the difference between the import and the export energy readings.

If the export is more than import in any billing period, the customer shall receive a carry forward export energy credit, and it shall be credited towards his next month's consumption. There shall be no payment made to the customer for the excess energy exported by the customer. All exports shall be set off against the customer's own consumption, firstly in the current billing period, and if there are any further credits, in future billing periods.

The following procedure is adopted for the requests by customers to participate in the Net Energy Metering Program.

3. Application Process

- 3.1** The potential applicant initiates contact with the respective Area Engineer or Branch Manager of the Distribution Licensee. The Distribution Licensee shall provide the application (Annex 1 of Net Energy Metering Manual, attached hereto) and Agreement and Interconnection Standard (Annex 2 of Net Energy Metering Manual) including technical information, initial information, metering requirement, etc.
- 3.2** The applicant initiates contact with Sri Lanka Sustainable Energy Authority (SEA) and commence the process of securing an energy permit if the applicant's generating facility is based on a renewable energy technology that requires such a permit or an exemption, as the case may be. The applicant should produce a permit or exemption as relevant along with the application.
- 3.3** The approved types of renewable sources, the electricity output of which may be connected to the distribution network under the Net Energy Metering Program are hydro, wind, biomass (grown), industrial/agricultural/municipal waste, and solar.
- 3.4** The installed capacity of the generating facility shall not exceed the contract demand of the existing contract between the customer and the Distribution Licensee, subject to maximum installed generating capacity of 10MW.
- 3.5** The applicant's electricity service shall be replaced with a two way (import and export) energy meter, and cost of installation of such a meter or metering equipment for the first time, shall be borne by the applicant, if such a meter does not exist at present to measure the applicant's electricity consumption.
- 3.6** Applicant should submit the duly completed application and provide any other relevant additional information requested by the Distribution Licensee. A fee of Rs. 2000 shall be charged as the processing fee, at the time of accepting the application.
- 3.7** The Area Engineer or the Branch Managers shall then conduct an initial review and develop a preliminary cost estimate. The cost estimate shall include the cost of the meter, if an import/export meter does not exist at present, and the costs of other interconnection requirements.
- 3.8** Upon payment of the costs estimated for facilitating the interconnection, the applicant and the Distribution Licensee shall enter into an Interconnection Agreement.
- 3.9** The term of the agreement shall be (20) twenty years from date of signing of the agreement.
- 3.10** The applicant may then purchase equipment that complies with the technical details given in the Net Energy Metering Agreement and IEC 61727 (2004-12), IEEE 1547-2003, or the latest available equivalent standards.
- 3.11** The applicant may then install the generating facility, and arrange the commissioning and testing of the generating facility and the interconnection facilities by an Accredited Chartered Electrical Engineer. Such commissioning tests shall be conducted in accordance with IEC 61727 (2004-12), IEEE 1547-2003, IEE 17th Edition Wiring Regulations or the latest available equivalent standards. All such testing and commissioning shall be conducted at the applicant's cost.
- 3.12** Upon notification by the customer that the facility is ready for parallel operation, the Distribution Licensee shall then issue and authorization for parallel operation, after the Area Engineer or Branch Manager witnesses the successful operation of the interconnection and the protection equipment installed.

4. Metering and Billing

- 4.1** A special electricity bill format is used for customers participating in the Net Energy Metering Program. The bill has to be calculated manually until such time a proper computerized system is developed for Net Energy Metering bill processing. A sample bill format for ordinary and bulk supply consumers are given in Annex 3 and Annex 4 respectively of the Net Energy Metering Manual.
- 4.2** The Distribution Licensee shall read the customer's meter at the end of each billing period, bill the customer for his net energy consumption in the billing period after giving due consideration to the credits from the previous billing period. Energy to be carried over to the next billing period, if any, shall also be credited to the customer's account. The monthly electricity bill shall show the

export energy credit (if any) carried over from the previous billing period, consumption and export in the present billing period, and the energy credit carried over (if any) to the subsequent billing period (all figures will be in kilowatt hours). If no export credits are available, then such information in the bill shall be shown as zero.

- 4.3** The Area Engineer or the Branch Manager shall maintain an “Energy Account Register” at the area or branch office in respect of all net energy metering customers in the area, recording relevant information for each billing period.

Annexes

1. Agreement for customers in CEB Distribution Licensee service areas
2. Application form for customers served by the four Distribution Licensees of Ceylon Electricity Board
3. New bill formats for CEB Licensees’ customers.
4. Schematic Diagram of a Net Energy Metered Facility

It should be noted that Lanka Electricity Company Ltd, holding the Distribution License No EL/D/09-052 is mandated to use the same formats given above for the application, agreement and billing of customers on the Net Energy Metering Program.

Copies of IEC 61727 (2004-12), IEEE1547-2003 Standards and IEE 17th Edition Wiring Regulations are available at the CEB Library for reference.

ANNEX 1 TO APPENDIX 4:

AGREEMENT AND GRID INTERCONNECTION STANDARDS FOR NET METERING OF AN ON-GRID RENEWABLE ENERGY BASE GENERATING FACILITY BETWEEN

CEYLON ELECTRICITY BOARD AND
[ELECTRICITY CONSUMER'S NAME (PERSON OR COMPANY), SAME NAME AS THAT OF THE
ELECTRICITY ACCOUNT]

THIS AGREEMENT is entered into at [Colombo, or location of Branch Office] on this {dddd} day of {mmmm} Two Thousand and {abc} between Ceylon Electricity Board, a body corporate duly constituted by Act No. 17 of 1969 and having its Head Office at 50, Sir Chittampalam A Gardiner Mawatha, Colombo 02 in the Democratic Socialist Republic of Sri Lanka (hereinafter referred to as "CEB", and [Electricity consumer] located at [complete address of the premises, the same address as in the electricity account and Account Number] hereinafter referred to as "Producer"], and collectively, Parties.

WHEREAS

- a) The Producer has entered into an Agreement with the CEB for supply of electricity on under Account No. for the supply of electricity to (address) which is still in force.
- b) The parties agree that they are bound by the conditions of supply contained in the Agreement for supply of electricity dated , for the purposes of this Agreement.
- c) CEB is desirous of providing net metering facilities to allow its electricity consumers to install renewable energy based electricity generation facility such as solar wind, micro-hydro plants to the existing electricity supply network.
- d) The parties are desirous of entering into this Agreement for the purpose given in Clause c above.

NOW IT IS HEREBY AGREED AS FOLLOWS

1. DEFINITIONS

Producer: A person or a company who owns a generating facility to produce and deliver electrical energy to the distribution network of CEB and presently owns a valid account receiving electricity from CEB distribution network.

Import of Electrical Energy: Receipt of Electrical Energy by the Producer from the CEB system.

Export of Electrical Energy: Supply of Electrical Energy by the Producer to the CEB system.

Net Metering: Net Metering means the measurement of the difference between electrical energy supplied through the electricity distribution network of CEB to the Producer and the amount of electrical energy generated by the Producer's Generating Facility delivered to the electricity distribution network of CEB.

Generating Facility: Generating Facility means all of the Producer's equipment and land at a single site or parcel of land utilised to produce and deliver electrical energy, including but not limited to, Producer's generating, metering and protection equipment

Contract Demand: The allocated capacity, as depicted in the electricity agreement, to the Consumer by the CEB expressed in terms of kilovolt ampere.

Billing Period: The period for which the Producer's electricity meter is read by CEB and the Consumer is issued with an electricity bill, usually a period of one month (30 days).

Energy Credit: This shall be the amount of net electrical energy exported to the CEB distribution network during a specified Billing Period, which amount, measured in kilowatt hours, shall be credited to the Producer's electricity account in the subsequent Billing Period.

Parallel Operation: The operation of the Generating Facility and producing electrical energy at the Consumer's premises, while connected to the CEB distribution network.

2. TERM

2.1 This Agreement shall come into effect from the date of execution and continues to be in force until the expiry of twenty (20) years. No extensions shall be allowed, and any new Agreement shall be based on the policies prevailing at that time.

2.2 If for any reason, the Producer's electricity supply given under the agreement dated is partially or fully disconnected by CEB for whatever reason, with or without a request from the Producer, or owing to natural causes, and when there is reasonable hope that the supply will be restored within a reasonable time, this Agreement automatically stands suspended for the period of such disconnection.

3. GENERAL RULES, RIGHTS AND OBLIGATIONS

3.1 The Generating Facility shall use one or any combination of the approved types of renewable sources of energy to generate electricity at the Producer's premises.

3.2 The entire Generating Facility and equipment such as solar panels, turbines and associated accessories such as inverters and protective circuits shall be located within the Producer's premises and shall be owned by the Producer.

3.3 A Producer must comply with the conditions imposed by CEB and should comply with the interconnection arrangement imposed by the CEB and receive CEB written permission before parallel operation of its Generating Facility with the CEB distribution system

3.4 The Generating Facility shall be intended to meet all or a part of the Producer's electricity demand (maximum allowable limit 10 MW) and electrical energy requirements. It shall be the responsibility of the Producer to decide on the capacity of Generating Facility with due consideration to the amount of renewable energy available, investment and operating costs of equipment, the Producer's Contract Demand with CEB and the average electrical energy requirements of the Producer.

3.5 Interconnection with CEB distribution system under this agreement does not provide the Producer any rights to utilize CEB distribution system for the transmission, distribution or wheeling of electric power to a third party.

3.6 A Producer shall ascertain and comply with applicable rules, regulations imposed by the Ministry of Power and Energy / CEB / Public Utilities Commission of Sri Lanka (PUCSL)/ Sri Lanka Sustainable Energy Authority (SEA) and any law or standard that applies to the design, construction, installation, operation or any other aspect of the Producers Generating Facility and interconnection facilities.

3.7 CEB shall have the right to review the design of Producer's generating and interconnection facilities and to inspect such facilities prior to the commencement of Parallel Operation with CEB distribution system. CEB may require a Producer to make modification as necessary to comply with the requirements. CEB review and authorization for parallel operation shall not be construed as conforming or endorsing the Producers design or as warranting the Generating and or interconnection facility's safety, durability or reliability. CEB shall not, by reason of such review or lack of review, be responsible for the strength, adequacy or capability of such equipment.

3.8 The installed capacity of the Generating Facility shall not exceed the Contract Demand of the Producer, which is [.....] kVA. If the Producer so wishes to increase or decrease his Contract Demand, he shall first apply to change his Contract Demand as a Consumer, and after fulfilling the requirements specified by CEB, request an amendment to this Agreement. In any event, the Term of this Agreement shall be limited to twenty (20) years from the date of execution.

3.9 The generating facility shall be built and operated according to the relevant standards and other guidelines stipulated in this agreement.

3.10 The Producer shall install all the necessary protective equipment required to ensure safe and reliable operation of the Generating Facility and the Producer shall meet all the expenses of installing such equipment and other associated accessories.

3.11 The Producer shall maintain all the equipment downstream of the metering equipment in good operating condition.

3.12 The Producer shall allow CEB to enter his premises for the inspection of the metering equipment and the Generating Facility, and would promptly attend to and implement any written recommendations or instructions with regard to the Generating Facility.

3.13 Any information pertaining to Generating and/or interconnection facilities provided to CEB by a Producer shall be treated by CEB in a confidential manner.

3.14 A Producer shall operate and maintain its Generating Facility and Interconnection Facilities in accordance with Prudent Electrical Practices.

3.15 CEB may limit the operation or disconnect or require the disconnection of a Producer's Generating Facility from CEB's distribution system at any time with or without notice, in the event of an emergency or to correct unsafe operating conditions. CEB may also limit the operation or disconnect or require the disconnection of a Producer's Generating facility from CEB distribution system upon the provision of reasonable notice.

(1) To allow for routine maintenance, repairs or modifications to CEB distribution system.

(2) Upon CEB determination that a Producer's Generating Facility is not in compliance with the conditions stipulated in this Agreement

(3) Upon termination of Interconnection Agreement.

3.16 Prior to signing the agreement, the Producer shall provide technical literature including Type Test certificates of the protective equipment for Net Energy Metering to the CEB and shall obtain the concurrence of the CEB to procure the same.

3.17 CEB shall promptly install the meters and metering equipment to implement Net Metering, the initial cost of which shall be paid by the Producer.

3.18 CEB shall maintain the distribution network and the metering equipment to supply and meter the electricity requirements of the Producer, and to accept the electricity generated by the Producer, up to the capacity stated in the supply agreement and this Agreement, respectively.

3.19 CEB shall promptly attend to Producer's requests for testing the meters or metering equipment for their accuracy, the fees for which shall be payable by the Producer.

3.20 CEB shall promptly read the Producer's meter at the end of each Billing Period, bill the Consumer for his net consumption in the Billing Period after giving due consideration to the credits from the previous Billing Period, and credit the energy exported to the Consumer's account to be carried over to the next Billing Period. CEB's monthly invoice shall show the export energy credit carried over from the previous Billing Period, consumption and export in the present Billing Period, and the energy credit carried over to the subsequent Billing Period (all figures in kilowatt hours).

4.0 APPLICATION PROCESS

4.1 Potential Producer initiates contact with CEB. Upon request CEB will provide information and documents such as sample agreements, application including technical information, initial review information, metering requirement etc to a potential Producer.

4.2 Applicant initiates contact with Sri Lanka Sustainable Energy Authority (SEA) and commence the process of securing energy permit if the Applicant's Generating Facility is within the Energy Development Area declared by the SEA. If the Applicant's Generating Facility is within the Energy Development Area, Energy Permit should be obtained prior to the parallel operation of the plant.

4.3 Applicant completes an application and files application and supply any relevant additional information requested by CEB. Initial review fee as applicable shall be included with the application.

4.4 CEB performs an Initial Review and develops preliminary cost estimates and interconnection requirements.

4.5 The applicant should purchase equipment as per the technical details given in the Section 6.0 below and IEC 61727 (2004 -12), IEEE 1547 – 2003 or latest available equivalent Standards.

4.6 Applicant and CEB enter into an interconnection Agreement.

4.7 Producer arranges for and completes commissioning testing of generating facility and Producers interconnection facilities at Producers cost. Producers shall develop a written testing plan Certified by a Chartered Electrical Engineer to be submitted to CEB for its review and acceptance. Where applicable the test plan shall include the installation test procedures published by the manufacturer of the generation or interconnection equipment. Facility testing shall be conducted at a mutually agreeable time.

4.8 CEB authorizes parallel operation, after successful testing and execution of agreement.

5. METERING AND BILLING

5.1 The Producers' electricity service shall be metered with a two-way meter, and the cost of installation of such meter or metering equipment for the first time, shall be borne by the Producer.

5.2 During any Billing Period, if the electrical energy supplied by CEB exceeds the electricity exported by the Consumer plus any energy credits carried-over from the previous Billing Period, the charges for the net energy (kWh) consumed will be calculated using the Producer's applicable tariff. The fixed charge and/or the minimum charge applicable for the installation will also be applicable.

5.3 During any Billing Period, if the electricity exported by the Producer plus any energy credits carried-over from the previous Billing Period exceeds the electrical energy supplied by CEB, the Producer shall be billed only for the applicable fixed charge and/or the minimum charge, and the balance of the electricity generated shall be carried over to the next Billing Period and appear as an energy credit, stated in kilowatt hours.

5.4 Energy credits may be carried over from one Billing Period to another, for so long as the Consumer has a legal contract for the supply of electricity by CEB, and during the Term of this Agreement.

5.5 In the event the Producer's electricity supply account and/or the contract for the premises is terminated for whatever reason, any accumulated energy credits on the last day of such termination shall be granted to the CEB with no financial compensation to the Producer. Energy credits shall not be transferable to any other Producer who applies for a new contract for the supply of electricity to the same premises. Energy credits shall not be transferable to the same consumer applying for a contract to another premise.

6.0 GENERATING FACILITY DESIGN AND OPERATING REQUIREMENTS

6.1 The protective function and requirements defined here are designed to protect CEB distribution system and not the Generating Facility. A Producer shall be solely responsible for providing adequate protection for its Generating Facility and interconnection facilities. The Producer's protective functions shall not impact the operation of other protective functions utilized on CEB's distribution system in a manner that would affect CEB capability of providing reliable service to its customers.

6.2 Generating facilities operating in parallel with CEB distribution system shall be equipped with the following protective functions to sense abnormal conditions on CEB distribution system and cause generating facility to be automatically disconnected from CEB distribution system or to prevent the generating facility from being connected to CEB distribution system inappropriately.

CEB Distribution System Parameters are as follows;

a. Nominal Voltage	33 kV	11kV	400 V
b. System Highest Voltage	36 kV	12 kV	440 V
c. No. of Phases	3	3	3ph& Neutral
d. System Frequency	50Hz	50Hz	50Hz
e. Method of Earthing	Non Effectively Earthed	Solidly Earthed	Solidly Earthed

A. Over and under voltage trip functions and over and under frequency trip functions.

B. A voltage and frequency sensing and time delay function to prevent the generating facility from energizing a deenergized distribution system circuit and to prevent the generating facility from reconnecting with CEB distribution system unless CEB distribution system service voltage is within 6% of the nominal supply voltage and frequency is within 47 Hz to 52 Hz and are stable for at least 3 minutes.

C. A function to prevent the generating facility from contributing to the formation of an Unintended Island and cease to energize the CEB system within half a second (0.5 second) of the formation of an unintended island.

D. The generating facility shall cease to energize CEB distribution system for faults on CEB distribution system circuit to which it is connected. (IEEE 1547 – 4.2.1). The generating facility shall cease to energize CEB distribution circuit prior to reclosure by CEB distribution system equipment. (IEEE 1547-4.2.2).

E. The generating facility shall be automatically disconnected from the CEB distribution network within half a second (0.5 second) when the CEB supply is intentionally or automatically switched off

F. The Producer should not change any of the settings stated above without the written permission from the CEB.

6.3 Suitable equipment required. Circuit breakers or other interrupting devices located at the point of common coupling must be certified by CEB as suitable for their intended operation. This includes being capable of interrupting the maximum available fault current expected at their location. Producer's generating facility and interconnection facilities shall be designed so that the failure of any one device shall not potentially compromise the safety and reliability of CEB distribution system.

The generating facility paralleling device shall be capable of with standing 220% of the interconnection facility rated voltage (IEEE 1547 – 4.1.8.3). The interconnection facility shall have the capability to withstand voltage and current surges in accordance with the environments defined in IEEE 1547 – 4.1.8.2

6.4 Visible disconnect required The producer shall furnish and install a ganged manually operated isolating switch near the point of common coupling (PCC) to isolate the generating facility from CEB distribution system. The device does not have to be rated for load break nor provide over current protection.

The device must:

- a. Allow visible verification that separation has been accomplished. (This requirement may be met by opening the enclosure to observe contact separation)
- b. Include marking or signage that clearly open and closed positions.
- c. Be capable of being reached quickly and conveniently 24 hours a day by CEB personnel for construction, maintenance, inspection, testing or reading, without obstacles or requiring those seeking access to obtain keys, special permission, or security clearance.
- d. Be secured in a weather-proof enclosure and capable of being locked in the open position prevent unauthorized or accidental closing.
- e. Be clearly marked on the submitted single line diagram and its type and location approved by CEB prior to installation. If the device is not adjacent to the PCC, permanent signage must be installed at a CEB approved location providing a clear

description of the location of the device

6.5 Drawings: Prior to parallel operation or momentary parallel operation of the generating facility CEB shall approve the Producers protective function and control diagrams. Generating facilities equipped with protective function and control scheme previously approved by CEB may satisfy this requirement by reference to previously approved drawings and diagrams certified by a Chartered Engineer.

6.6 The output voltage wave form of the Generating Facility shall be of 50 Hz, with a sinusoidal wave form.

6.7 The Total Harmonic Distortion (THD) for current and individual harmonic limit should be as follows.

Individual harmonic order h	$h < 11$	$11 < h < 17$	$17 < h < 23$	$23 < h < 35$	$35 < h$	THD
Allowable Limit (%)	4	2	1.5	0.6	0.3	5

Table 1: Current Harmonic Limits

6.8 If the Generating Facility uses a direct current (dc) generator, it should use an inverter to convert the dc to ac, complying with the THD for current and individual harmonic limits as in table 1.

6.9 The inverters used for interconnection shall be only those which have received the Type Approval by CEB.

6.10 The Producer should not change any of the settings stated in section 6.5 without the written permission from the CEB.

6.11 The Power Quality at the Point of Common Coupling (PCC) shall be as follows;

Power quality measurement shall be complied with IEC 61400-21. Emission of inter-harmonic currents from the power electronic converter up to 2 kHz and of current distortions above 2 kHz up to 9 kHz during operations shall be stated. The individual inter-harmonic currents below 2 kHz and the current distortions in the range 2 kHz up to 9 kHz shall be given as ten-minute average data for each frequency at the output power giving the maximum individual inter-harmonic current or current distortion

6.12 Flicker Standard applicable: As per IEC 61000-3-7

7. EVENTS OF DEFAULT AND TERMINATION

7.1 Events of Default by the Producer shall be on each or any of the following events.

7.1.1 If the Producer violates any of the conditions stipulated in Sections 3 and 6.

7.1.2 If the permit issued to the Producer subject to the provisions of Sri Lanka Sustainable Energy Authority Act, No. 35 of 2007 is cancelled for contravening and/or failing to conform to any of the terms and conditions stipulated therein.

7.1.3 If the Producer is in breach or is unable to perform any of his obligations under any approval, license granted or which may be granted to the Consumer for the purpose of the Facility and has not remedied such default within the cure periods provided in such approval, permit or license;

7.1.4 The disconnection of the electricity account due to non-payment of electricity bills or any other reason.

7.1.5 The change of Producer or change of location of the Generating Facility.

7.2 Events of Default by CEB shall be on each or any of the following events.

7.2.1 Failure to meet the obligations in Section 3 of this Agreement.

7.2.2 Failure to read the meter and issue invoices to the Consumer.

7.2.3 Failure to maintain the supply equipment, meters and metering equipment.

7.3 Upon the occurrence of an Event of Default, the aggrieved Party may terminate this Agreement after giving due notice in writing of not less than thirty (30) days to the defaulting Party.

7.4 Notwithstanding the foregoing, this Agreement shall remain in effect after the termination hereof to the extent necessary to provide for final billings, billing adjustments and charges which have accrued up to the time of termination of the Agreement

8. LIABILITIES & INDEMNIFICATION

8.1 The Producer agrees to hold harmless CEB for any damages to equipment as a result of any failure or malfunction thereof. CEB shall not be liable, indirectly or directly for permitting or continuing to allow the interconnection of the facility or for the acts or misuse or omissions of the Consumer or the failure or malfunction of any Consumer-owned equipment that causes loss or injury, including death, to any party. Whenever any liabilities are incurred by either or both the parties for damages caused by injuries to either party (or their employees or agents) or the property of either party then the liabilities for such damages between the parties will be as follows;

8.1.1 Each party will be liable for all damages because of injuries to persons or property caused solely by its negligence or solely by its failure to comply with this agreement.

8.1.2 Each party will be liable for all damages to its own property that are caused by the concurrent negligence of both parties, or that are due to causes that cannot be traced to the sole negligence of the other party, to the extent of its negligence therefore.

8.1.3 Each party will be liable for all damages due to injuries to itself or its own employees or agents that are caused by the concurrent negligence of both parties, or that are due to causes that cannot be traced to the sole negligence of either party provided that in no event will a party be liable for damages because of injuries to itself or its own employees and agents in any amount in excess of applicable workmen's compensation insurance and provided further that this agreement will in no way impair the right of the injured party or its employee or agent to that extent that a third party negligence proximately caused injuries or damages to party or its employee or agent.

8.1.4 In the event of claims brought to recover damages because of injuries to persons not employees of either party and because of injuries to property not belonging to either party that are alleged to be caused by the concurrent negligence of both parties or are alleged to be due to causes that cannot be traced to the sole negligence of either party, the parties agree no right of indemnification will exist, so that in all such claims, the issues of liabilities will be determined as a matter of contribution and not as a matter of indemnity.

8.1.5 Neither party will have any liability whatsoever for any special, indirect, consequential or punitive damages.

09. AMENDMENTS

Any amendment to this Agreement must be in writing and signed by both parties in the same manner and with the same formality as this Agreement is executed

10. SETTLEMENT OF DISPUTES AND ARBITRATION

Any dispute or difference arising out of or in connection with the Agreement shall in the first instance be amicably resolved between the parties and any such disputes that could not be resolved amicably shall be dealt in accordance with the provisions of Section 39 of the Sri Lanka Electricity Act No. 20 of 2009.

In witness WHEREOF the Parties have executed this agreement as of theday of the month of 20....

CEYLON ELECTRICITY BOARD			PRODUCER		
By			By		
Name			Name		
Title			Title		
Date			Date		
	Witness 1			Witness 1:	
	Witness 2:			Witness 2:	

ANNEX 2 TO APPENDIX 4:

Application No.								
-----------------	--	--	--	--	--	--	--	--

Application for Net Energy Metering of an On-Grid Small-Scale Renewable Energy

Facility

For installed capacities up to the Contract Demand of the existing installation,
subject to a maximum installed capacity of 10MW

1. Project Type: Please mark ✓ in the appropriate boxes below. Please select **one or a combination of many types.**

Micro hydro	Wind	Bio mass (grown)	Waste (agricultural, industrial, municipal, waste heat)	Wave	Solar Photovoltaic	Other (please specify) -----
-------------	------	---------------------	---	------	-----------------------	------------------------------------

2. Information about the Applicant:

Electricity Consumer's Account No. _____

Name _____.

Address as specified in the Account No. _____

Contract Demand of the Installation: single/three phase, _____ Ampere

Note: The small-scale renewable energy facility shall be located at the premise served by the electricity account stated above.

Telephone numbers:

0									
0									

Email. _____

3. Facility Information – Please fill-in the information requested under the project type(s) selected in item 1 above.

4. Certification

- I attach the receipt numberdated for the payment of Rs..... as the review fee for this application, charged by CEB.
- I certify that Net Metering Facility is required at the same premise where electricity account is already provided, and that the renewable energy resource is within the property served by the existing electricity supply.
- I have read the Agreement and the Interconnection Standards applicable for Net Metering Facility. I agree to install all the required equipment and to provide information whenever requested by CEB and the Sri Lanka Sustainable Energy Authority.

Name of person signing this application _____

(Should be the registered consumer)

Signature _____

Date: _____

DD-MM-YYYY

ANNEX 3(a) TO APPENDIX 4: (Ordinary)

CEYLON ELECTRICITY BOARD

Month

Area

Tariff

Account No.

Rev/Mr/Mrs;

Total Amount due as indicated in last bill

Prev Balance

+ Last Bill

Rs:

Payments:

Outstanding as at

Rs :

Date

Meter No.

Import

Export

Units B/F

Present reading

--	--

Previous reading

--	--

Unit

--	--

Chargeable units

Monthly Charge

Total Charge

Tel for B/D :

Cashier

ANNEX 3(b) TO APPENDIX 4: (Bulk)

Ceylon Electricity Board

Area Office

Electricity Bill

Vat Reg. No. 409000010 7000

Billing Month	Account Number	Invoice Number
Accounting Date	Tariff	Security Deposit
		Contract Demand

Meter Readings

	Date : Number of Days :		Units	M.F	Rate	Amount
	Present reading	Previous Reading				
Units B/F						
Import						
Export						
Chargeable Units						
KVA						

KVAH/KAarh

Fixed Charge

Vat/Other Charges

Charge for this month

Statement of Account as at

Date	Description	Debits	Credits	Balance

Total Amount Payable

SUPPLY WILL BE DISCONNECTED IF NOT PAID WITHIN 30 DAYS

EE/ES Signature & Date Consumer's Signature & Date

CEYLON ELECTRICITY BOARD

Invoice No.

Billing Month

Please do not make payments of this bill to a Bank or to a Post Office Instructions are given in the overleaf.

Account Number

Amount Paid

--	--	--	--	--	--	--	--	--	--

Cheque No.

--	--	--	--	--	--	--	--	--	--

Signature of Consumer & Date

Cashier's Signature & Date

ANNEX 4 TO APPENDIX 4:

Net Metering Arrangement for Parallel Operation of On-grid Small-Scale Renewable Energy Facilities [Not Intended for Stand alone Operation]

