

سلطة الطاقة والموارد الطبيعية

Palestinian Energy & Natural Resources Authority



DISTRIBUTION CODE



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سلطة الطاقة والموارد الطبيعية Palestinian Energy & Natural Resources Authority



سلطة الطاقة والموارد الطبيعية الفلسطينية

استناداً لأحكام القانون الأساسي المعدل لسنة 2003م وتعديلاته، لا سيما أحكام المادة (71) منه
ولأحكام القرار بقانون رقم (13) لسنة 2009م بشأن قانون الكهرباء العام وتعديلاته، لا سيما أحكام
المادة (4) منه

ولأحكام القرار بقانون رقم (14) لسنة 2015م بشأن الطاقة المتجددة وكفاءة الطاقة، لا سيما أحكام
المادة (4) منه

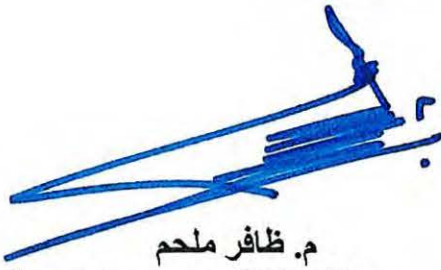
وبناءً على الصلاحيات المخولة لنا

وتحقيقاً للمصلحة العامة

وبعد مناقشة جميع الجهات ذات العلاقة

تصدر سلطة الطاقة والموارد الطبيعية كود التوزيع لعام 2020

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م. ظافر ملحم

رئيس سلطة الطاقة والموارد الطبيعية







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DISTRIBUTION CODE

PART 1: GENERAL CONDITIONS (GC)

1.1. SECTION: ORGANISATION AND OBJECTIVES

1.1.1. SCOPE AND PURPOSE

1.1.1.1. The Distribution Code (this Code) establishes the technical aspects of the connection, operation and use of a Distribution System, and the relationships between the Distributor and the Users of the Distribution System.

1.1.1.2. The Distributor must provide connection and deliver electric Energy to the Users in accordance with applicable Laws, its license, concession or service area and the Distribution Code, at a level of service quality consistent with the applicable Distribution Performance Standards.

1.1.1.3. The Users of the Distribution System must comply with the conditions and standards specified in this Code, to avoid adverse effect on the Distribution System or other User Systems.

1.1.1.4. The objective of these General Conditions is,

- (a) To establish the conditions applicable to all the Distribution Code and , to the extent possible, ensure that the various parts and sections of the Distribution Code work together for the benefit of the Distributor and all Users, and apply consistently to all Users;
- (b) To provide the principles and procedures for the development and application of the Distribution Code.

1.1.1.5. The Distribution Code contains procedures and provisions to permit equitable management of day-to-day technical situations encountered by Distributors and Users, taking account of a wide range of operational conditions likely to be encountered under both normal and exceptional circumstances.

1.1.2. UNFORESEEN CIRCUMSTANCES

1.1.2.1. The Distribution Code cannot predict and address all possible operational situations. In case of circumstances unforeseen in this Code, or in the case of difference in interpretation, the Distributor has the right (and all Users must accept) to act in the course of the reasonable and Prudent Industry Practice discharge to its responsibilities within the following general principles and priorities:

- (a) As first priority, preserve or restore the integrity of the Distribution System or the Transmission System, including the avoidance of breakdown, separation or collapse (total or partial).



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- (b) Compliance by the Distributor with the General Electricity Law, conditions in its Distribution License or Concession agreement, as applicable, and the Grid Code.
 - (c) Preserve the safety of equipment, to prevent damage to Plant and/or Apparatus, and public safety to prevent personal injury.
 - (d) The achievement of objectives specifically identified in the Distribution Code.
- 1.1.2.2. In case of an unforeseen circumstance that cannot be resolved with the general principles defined in the previous condition, the Distributor shall act according to the following:
- (a) The application of a policy aimed at the equitable sharing amongst Users of any temporary restriction that might be necessary in exceptional circumstances, and (b) The application of Prudent Industry Practice.
- 1.1.2.3. If circumstances not envisaged by the provisions of the Distribution Code should arise, the Distributors shall, to the extent reasonably practicable in the circumstances, consult promptly and in good faith with the Panel or/and affected Users in an effort to reach agreement as to what should be done. If agreement between the Distributor and the Panel or affected Users cannot be reached in the time available, the Distributor shall determine what shall be done in accordance to this Distribution Code
- 1.1.2.4. The Distributor shall promptly refer any unforeseen circumstance identified, together with the determinations and interpretations made, to the Distribution Code Review Panel for consideration.
- 1.1.2.5. Each User shall comply with all instructions given to him by the Distributor following a determination for an unforeseen circumstance or a difference in interpretation, provided that such instructions are consistent with the technical characteristics of the User's System and the principles established in the Distribution Code, and do not endanger the safety of its equipment or staff.
- 1.1.3. APPLICABILITY**
- 1.1.3.1. This Distribution Code must be applied and used together with the Grid Code and the Distribution Performance Standards Code once available.
- 1.1.3.2. All the Codes mentioned in this distribution code will be applicable once issued.
- 1.1.3.3. The General Conditions apply to:
- (a) All Distributors
 - (b) All Users



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1.1.4. PENRA ROLE

1.1.4.1. The General Electricity Law assigns to the PENRA the authority to establish the appropriate operating codes and safety, security, and reliability standards. Within such powers, the PENRA has the authority to establish the Distribution Code and to approve amendments from time to time, as reviewed with the Distributors and affected Users.

1.1.4.2. The Distributor shall monitor compliance of Users with this Distribution Code. The PERC will monitor compliance of the Distributor with the provisions of this Distribution Code.

1.1.5. DEFINITIONS

1.1.5.1. Any word or expression defined in the General Electricity Law or the Grid Code and that is not defined otherwise in this Distribution Code shall have, unless the contrary intention appears, the same meaning and interpretation when used in this Distribution Code, including its Annexes.

When applying the provisions contained in this Distribution Code, and unless otherwise specified or the subject matter or context otherwise requires:

- **General Electricity Law** means the General Electricity Law No. 13 of the Year 2009 or any amendments thereto or any other law that replaces the said law.
- **PENRA** means the Energy and Natural Resources Authority constituted under the General Electricity Law.
- **PERC** means the Electricity Sector Regulatory Council constituted under the General Electricity Law.
- **PETL** means the Palestinian Electricity Transmission Company constituted under the General Electricity Law.
- **PSI** means the Palestinian Standard Institute constituted under law.
- **Distribution Code** means this Distribution Code established by the PENRA; as revised and amended from time to time with the approval of, or by the direction of, the PENRA.
- **Grid Code** has the meaning given to it in the General Electricity Law.
- **Active Power**, the instantaneous power derived from the product of voltage and current and the cosine of the voltage-current phase angle which is measured in watts or multiples.
- **Ancillary Services** means electrical services that enhance the stability and reliability of Transmission System or Distribution System, including frequency regulations, spinning reserves, voltage control and black start capability. Ancillary Services will be under the control of the System Operator, or the Distributor in those cases that the Generator does not have an impact on the Transmission System.



- **Annex** means an annex of this Distribution Code.
- **Apparatus** means electrical apparatus and includes all machines, fittings, accessories and appliances in which conductors are used;
- **AVR** stands for the Automatic Voltage regulator.
- **Black Start Generator** means a Generator having an ability to start up from Shutdown without connections to external power supplies.
- **Bulk Supplier:** means the authorized entity to provide energy in bulk.
- **Business Day** means any day other than Friday, Saturday or a public holiday in Palestine.
- **Condition** means a condition in this Distribution Code.
Connection Agreement means an agreement between a User and the Distributor, which specifies the terms and conditions pertaining to the connection of the User's system or Equipment to the Distribution System.
- **Connection Capacity** means the capacity of a Connection Point as specified in the Connection Agreement.
- **Connection Point** means the point of connection of a User's System or Equipment to the Distribution System.
- **Connection Point Drawing** means the drawings prepared for each Connection Point, which indicates the Equipment layout.
- **Consumer** means a natural or juridical person or entity connected to the Distribution System, supplied and purchasing electric power for its own needs under a contract with a Distributor
- **Control Person** means a person who has been nominated by an appropriate officer of the Distributor, PETL or a User to be responsible for controlling and coordinating safety activities necessary to achieve Safety from the System.
- **Demand** means the demand of MW or MVA_r of electricity (i.e. both Active Power and Reactive Power respectively) unless otherwise stated.
- **Detailed Planning Data** means detailed additional data that the Distributor requires under the DPCC in support of the Standard Planning Data.
- **Distribution Code Review Panel or Panel** means the standing body established under the Distribution Code Glossary and Definitions.
- **Distribution Code Standards** means the standards identified in Annex 1 of this Distribution Code.



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- **Distribution Performance Standards** means the Distribution Performance Standards Code issued by the PENRA and reviewed from time to time by the PERC.
- **Distribution System** means a system consisting of cables, overhead lines, electrical Plant and Apparatus, having a design voltage of 36 kV or lower, used for the distribution of electric power from Connection Points between the Transmission System and the Distribution System to the point of delivery to Consumers or other Users, but shall not include any part of a Transmission System, as defined in the General Electricity Law. Distributor means a holder of a Distribution Licensee and Temporary Distributors without license until legalized.
- **DMC** is the Distribution Metering Code; Part 4 of this code.
- **DPCC** is the Distribution Planning and Connection Code; part 2 of this code.
- **DPD** stands for the Distribution Planning Data
- **OD** stands for Operational Data
- **SPD** stands for System Planning Data
- **Electric System** has the meaning given to it in the General Electricity Law
- **Electrical Diagrams** means a schematic representation, using standard electrical symbols, which shows the connection of Equipment's to each other or to the external circuits.
- **Energy** means, unless otherwise qualified, active Energy.
- **Equipment** means all Plant and/or Apparatus, machines, conductors, etc. used as part of, or in connection with, an electrical installation...
- **Fluctuating Load** means a load that causes a series or cyclical voltage changes.
- **Force Majeure** means any circumstance not within the reasonable control of the affected party, but only if and to the extent that (i) such circumstance, despite the exercise of reasonable diligence and observing Prudent Industry Practice, cannot be, or be caused to be, prevented, avoided or removed by such party, and (ii) such circumstance materially and adversely affects the ability of the affected party to comply with its performance obligations under this Code, and such party has taken all reasonable precautions, due care and reasonable alternative measures in order to avoid the effect of such event on the affected party's ability to perform its obligations under its performance obligations under this Code and to mitigate the consequences thereof.
- **Generating Plant** means a facility, consisting of one or more Generating Units, where electric Energy is produced from some other form of Energy by means of a suitable Apparatus.



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- **Generating Unit** means a conversion Apparatus including auxiliaries and associated Equipment functioning as a single unit, which is used to produce electric Energy from some other form of energy.
- **Generator Connected to Distribution** means any Generator connected to the Distribution System. It includes Embedded Generators and any other Generating Unit connected to the Distribution System regardless of whether it holds or not a generation license, concession, or service area.
- **Grid Code Review Panel** means the review panel established under the Grid Code for the review and amendment proposals to such code.
- **Harmonics** means sinusoidal voltages and currents having frequencies that are integral multiples of the fundamental frequency.
- **High Voltage (HV):** means a voltage level exceeding 36 kV.
- **Medium Voltage (MV)** means a voltage level greater than one (1) kV up to 36kV.
- **Low Voltage (LV)** means a voltage level not exceeding 1000 volts.
- **Individual Current Harmonic Distortion (I_{IHD})** means the ratio of the RMS current of the specific harmonic to the RMS value of the fundamental current.

$$I_{IHD} = \frac{I_i}{I_1} * 100\%; \text{ where}$$

I_i = Current component of harmonic order i

I_1 = Current component of fundamental frequency (50 Hz)

- **Interruption** means the interruption of electricity supply to a User or to a group of Users.
- **Small Connection** means a Low Voltage connection with a Connection Capacity of up to and including [70 kVA].
- **Medium Connection** means a connection where the Connection Capacity is greater than [70KVA] and up to and including [1MVA].
- **Large Connection** means a connection where the Connection Capacity is greater than [1MVA].
- **Load** means an entity or electrical Equipment that consumes Energy.
- **Long Duration Voltage Variation** means a variation of the RMS value of the voltage from nominal voltage for a time greater than one minute.
- **Maximum Load** (in the Distribution Metering Code –DMC) means the monthly maximum load in kW which occurs and continues for a period of at least 30 minutes during



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the pre-specified periods or system conditions, as indicated in the approved electricity tariffs.

- **Meter** means a device for measuring active Energy, reactive Energy or Maximum Demand.
- **Metering Equipment** means Meters, measurement transformers (voltage, current or combination units), metering protection equipment including alarms, circuitry, associated communications equipment and outstations and wiring.
- **Metering Point** means the point on a Distribution System at which electrical energy and/or Maximum Demand:
 - (a) is measured or is intended to be measured; or
 - (b) was measured or was intended to be measured; or
 - (c) In the case of an un-metered Connection Point, is deemed to be measured
- **Metering System** means particular commissioned Metering Equipment
- **Normal Conditions** means the condition in the Transmission or Distribution System, as applicable, when the system frequency, voltage, and transmission and/or distribution lines and equipment loading are within their Normal Operation limits.
- **Normal Operation** has the same meaning given to it in the Grid Code.
- **Operation** means a scheduled or planned action relating to the operation of the System.
- **Operational Boundary** means the boundary between the Apparatus operated by the Distributor or a User and the Apparatus operated by Other Distributor(s) or other User(s), as specified in the relevant Connection Agreement.
- **Output Usable (for a generator)** means the portion of Registered Capacity which is available due to a Planned Outage or breakdown.
- **PENRA Metering Code** means the State of Palestine Metering Code
- **Plant** means fixed and movable items used in the generation and/or supply and/or transmission of electricity other than Apparatus.
- **Power quality** means the quality of the voltage, including its frequency and the resulting current that exists at the connection point during Normal Conditions.
- **Prudent Industry Practice** means those standards, practices, methods and procedures conforming to safety and legal requirements which are attained by exercising that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in the same type of power sector activities under the same or similar circumstances;
- **Reactive Power** means the product of voltage and current and the sine of the phase angle between them, measured in Kilovar (kVAr) or Megavar (MVar).
- **RMS** means the root-mean-square.
- **Safety from the System** means that condition which safeguards persons working on or testing Apparatus from the dangers that are inherent in working on items of Apparatus, which are used separately or in combination in any process associated with the generation, transmission or distribution of electricity.



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- **Safety Management System** means the procedure adopted by the Distributor or a User to ensure the safe Operation of the System and the safety of personnel required to work on that System.
- **SCADA** means Supervisory Control and Data Acquisition
- **Schedule Outage** means an outage to a Consumer decided by the Distributor, provided that it has been advertised to the affected Consumers at least [48 hours] in advance.
- **Section** means a section of this Distribution Code.
- **Site Responsibility Schedule** means a schedule defining the ownership, operation and maintenance responsibility of Plant and Apparatus at a Connection Point between a Distribution System and a User's System. The Site Responsibility Schedule will be included in the Connection Agreement
- **Standard Planning Data** means the general information required by the Distributor under the Distribution Planning Code.
- **System** means an electrical network running at various voltages.
- **System Losses** means in a Distribution System, the difference between the Energy purchased plus the energy generated by the Distributor and the Energy sold by the Distributor or exported to other distribution networks.
- **System Operator** means the lawful entity that authorizes system operation granted under the relevant laws.
- **Tariff Methodology** means the principles for tariff calculation and review mentioned in general electricity law.
- **Total Current Harmonic Distortion (I_{THD})** means the ratio of the RMS current of the harmonic content to the RMS value of the fundamental current, expressed in percent.

$$I_{THD} = \sqrt{\frac{\sum I_i^2}{I_1^2}} * 100\%, \text{ where}$$

I_i = Current component of harmonic order i

I₁ = Current component of fundamental frequency (50 Hz)

- **Total Voltage Harmonic Distortion (V_{THD})** means the ratio of the RMS voltage of the harmonic content to the RMS value of the fundamental voltage, expressed in percent.



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$$V_{THD} = \sqrt{\frac{\sum Vi^2}{V_1^2}} * 100\% \text{ where.}$$

V_i = Voltage component of harmonic order i

V_1 = Voltage component of fundamental frequency (50 Hz)

- **Total System** means the Transmission System to which the Distribution System is connected and all Systems of Transmission System Users within Palestine.
- **Transmission System** has the meaning given to it in the General Electricity Law.
- **Transmission System User** means any person or entity other than the Transmission System Operator making use of the Transmission System.
- **Urgent Metering Services** means urgent unplanned work by a Distributor on a Metering System as a result of actual or potential equipment failure or suspected theft
- **User** means a person or entity that uses or seeks to use the Distribution System, including another Distributor but excluding PETL.
- **Voltage Unbalance** means the absolute value of the maximum deviation of the line voltage from the average voltage on a three-phase System, divided by the average voltage.

1.1.6. INTERPRETATION

1.1.6.1. In this Distribution Code (including the Annexes), unless the context otherwise specifies or requires:

- (a) references to "the Distribution Code" or "this Distribution Code" or "this Code" are a reference to the whole of the Distribution Code, including any Annexes or other documents attached to any part of this Distribution Code;
- (b) the Annexes shall be deemed to be part of this Distribution Code;
- (c) capitalized words used shall have the meanings assigned to them in the Definition chapter of the General Conditions Section;
- (d) words corresponding to persons or parties shall include any individual, firm, joint venture and corporation, and all references to persons shall include their legal successors and permitted assignees;
- (e) words in singular only also include the plural and vice versa where the context requires;
- (f) words in the masculine shall include the feminine and vice versa;



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- (g) any reference to a day, month or year shall be construed as reference to a calendar day, month or year, as the case may be, and all references to specific dates shall be to the day commencing on such date at 00:00 hours;
- (h) the headings are for ease of reference only and shall not be deemed part of and shall neither affect nor be used in the interpretation or construction of this Distribution Code;
- (i) the word “include” or “including” shall be construed without limitation;
- (j) the word “shall” refers to a rule, procedure, requirement or any provision of this Distribution Code that requires mandatory compliance;
- (k) Where reference is made to an amount or sum, it is to an amount or sum denominated in local currency.
- (l) all references to a numbered Annex, Section or Condition is respectively a reference to the Annex, Section or Condition bearing that number in this Distribution Code as well as the case for a numbered table or section in a Condition or Annex
- (m) references to the consent or approval of the PENRA shall be references to the approval or consent of the PENRA in writing, which may be given subject to such conditions as may be determined by the PERC, as that consent or approval may be amended, modified, supplemented or replaced from time to time and to any proper order, instruction or requirement or decision of the PENRA given, made or issued under it; and
- (n) reference to any law, by-law, code, regulation made under any law, directive or other document issued by the PENRA shall be construed to refer to such law, by law, code, regulation made under any law, directive or other document issued by the PENRA as amended, modified or replaced from time to time. In particular, any reference to a license shall be to that license as amended, modified or replaced from time to time and to any rule, document, decision or arrangement promulgated or established under that license.

1.1.7. HIERARCHY

- 1.1.7.1. In the event of any inconsistency between this Distribution Code and the General Electricity Law or the license, concession, or service area of a Distributor or a Licensee that is a User, the General Electricity Law or the license, concession, or service area respectively shall prevail to the extent of such inconsistency.
- 1.1.7.2. In the event of any inconsistency between this Distribution Code and the Grid Code, the latter shall prevail to the extent of such inconsistency unless the contrary intention is explicit in this Distribution Code.
- 1.1.7.3. Nothing in this Distribution Code is intended to or shall derogate from a Distributor or a Licensee any license, concession, or service area obligation.



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1.1.7.4. If any provision of this Distribution Code should be found to be unlawful or wholly or partially invalid for any reason, the validity of all remaining provisions of this Distribution Code shall not be affected.

1.1.7.5. If part of a provision of this Distribution Code is found to be unlawful or invalid but the rest of such provision would remain valid if part of the wording were deleted, the provision shall apply with such minimum modification as may be:

- (a) necessary to make it valid and effective; and
- (b) Most closely achieves the result of the original wording but without affecting the meaning or validity of any other provision of this Distribution Code.

1.1.7.6. In the event of any conflict between the provisions of this Distribution Code and any contract, agreement or arrangement between the Distributor and a User, the provisions of this Distribution Code shall prevail unless this Distribution Code expressly provides otherwise, provided that in the case of Connection Agreements with Consumers or Users signed prior to the approval of this Distribution Code, the conditions in such agreement shall prevail unless

- (a) the parties agree an amendments: or
- (b) The User registers a non-compliance situation that negatively affects the security of the Distribution System, in which case the User must accept the necessary amendments to ensure full compliance with this Distribution Code, except for any derogation.

1.1.8. DEROGATIONS

1.1.8.1. If a User finds that it is, or will be, unable to comply with any provision of this Distribution Code, then the User shall, without delay, report such non-compliance to its Distributor (to whose Distribution Network the User is connected) and shall make such reasonable efforts as are required to remedy such non-compliance as soon as is reasonably practicable.

1.1.8.2. When the non-compliance described in the previous Condition arises upon the issuance of this Distribution Code, or a revision to this Distribution Code or the Grid Code relating to Equipment already connected to the Electric System or Equipment approved to be connected to the Distribution System where the User has commenced the procurement or works prior to the issuance of this Distribution Code or the revision to this Distribution Code, and the User believes either that it would be unreasonable (including on the grounds of cost and technical considerations) to remedy such non-compliance or that it should be granted an extended period to remedy such non-compliance, the User shall promptly submit to the Distributor a request for derogation from such provision in accordance with this Section. The burden of proof shall rest with the User to show good reason why it cannot comply.

1.1.8.3. If a Distributor finds that it is, or will be, unable to comply with any provision of this Distribution Code, then it shall, without delay, report such non-compliance to the PENRA

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And shall make such reasonable efforts as are required to remedy such non-compliance as soon as is reasonably practicable.

1.1.8.4. When the non-compliance described in the previous Conditions arises upon the issuance of this Distribution Code, or a revision to this Distribution Code or the Grid Code relating to Equipment already connected to the Electric System or Equipment approved to be connected to the Distribution System where the Distributor has commenced the procurement or works prior to the issuance of this Distribution Code or the revision to this Distribution Code, and the Distributor believes either that it would be unreasonable (including on the grounds of cost and technical considerations) to remedy such noncompliance or that it should be granted an extended period to remedy such noncompliance, the Distributor shall promptly submit to the PENRA a request for derogation from such provision in accordance with this Section. The burden of proof shall rest with the Distributor to show good reason why it cannot comply.

1.1.8.5. A request for derogation from any provision of this Distribution Code shall contain:

- (a) the detail of the Equipment and Connection Point in respect of which derogation is sought and if relevant, the nature and extent of non-compliance;
- (b) the provision of this Distribution Code with which the Distributor or User that requests the derogation is, or will be, unable to comply;
- (c) the reason for the non-compliance; and
- (d) The remedial actions and the date by which compliance could be achieved (if remedy of the non-compliance is possible).

1.1.8.6. Every six months, the Distributor shall report to the PERC:

- (a) the list of derogations requested during the last quarter, including requests by the Distributor, and the status of each request;
- (b) the list of approved derogations during the last quarter indicating type of derogation and party; and
- (c) For each approved derogation, the progress of remedial actions in achieving compliance.

1.1.8.7. On receipt of any request for derogation, the Distributor or the PERC, as applicable, shall promptly consider such a request provided that the Distributor or the PENRA considers that the grounds for the derogation are reasonable. In its consideration of a derogation request, the Distributor, PERC or the PENRA as applicable may contact the relevant Distributor or User to obtain clarifications of the request or request additional information or to discuss changes to the request, and review possible remedial actions to achieve compliance as soon as reasonably practicable.

1.1.8.8. The Distributor shall:



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- (a) keep a register of all derogations which have been granted, identifying the name of the User in respect of whom the derogation has been granted, the relevant provision of this Distribution Code and the period of the derogation; and
- (b) On request from the PENRA or any User, provide a copy of such register of derogations.

1.1.8.9. The PERC shall keep a register of all derogations that have been granted to Distributors, identifying the name of the Distributor in respect of whom the derogation has been granted, the relevant provision of this Distribution Code and the period of the derogation.

1.1.8.10. The PERC may initiate at its own initiative or at the request of a Distributor, or in view of a User complaint, a review of any existing derogations, and any derogations under consideration where a relevant and material change in circumstance has occurred.

1.1.9. DATA AND NOTICES

1.1.9.1. Submission of data under this Distribution Code shall be in electronic format or any suitable format established by the Distributor.

1.1.9.2. Submission of notice(s) under this Distribution Code shall be by hand delivery, registered first-class mail, telex or facsimile transfer or e-mail. Exceptions to this requirement may be made with the agreement of the party with the Distributor or the PERC.

1.1.9.3. Any notice required to be given by this Distribution Code shall be deemed to have been given or received:

- (a) if sent by hand, at the time of delivery;
- (b) if sent by post, from and to any address within Palestine, [four (4) Business Days] after posting unless otherwise proven; or
- (c) if sent by facsimile, subject to confirmation of uninterrupted transmission report, or by e-mail, [one hour] after being sent, provided that any transmission sent after [14:00 hours] on any day shall be deemed to have been received at [08:00 hours] on the following Business Day unless the contrary is shown to be the case.

1.1.10. CONFIDENTIALITY

1.1.10.1. The Distribution Code contains procedures under which a Distributor, in pursuance of its obligations as a Distributor, will receive information from Users relating to the intentions of such Users. Unless otherwise specifically stated in this Distribution Code, the Distributor shall be at liberty to share all data with Users likely to be affected by the matters concerned and for the specific technical matters and uses provided in this Distribution Code. In all cases the Distributor shall and may be required to share the data with the PERC.

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1.1.10.2. The Distributor shall not, except in pursuance of specific requirements of the Distribution Code or other applicable codes approved by the PENRA or conditions in its license, concession, or service area, disclose such information for other uses than those provided in this Distribution Code to any other User or other person without the prior written consent of the provider of the information, provided that this inhibition shall not apply to information required by the PERC.

1.2. SECTION: REVIEW PROCESS AND CODE DISPUTES

1.2.1. DISTRIBUTION CODE REVIEW PANEL

1.2.1.1. The PENRA shall establish and maintain a Distribution Code Review Panel ("the Panel")

1.2.1.2. The Panel shall:

- (a) Maintain and ensure publication of the current version of the Distribution Code;
- (b) Keep the Distribution Code and its working under review;
- (c) Review all proposals for amendment of the Distribution Code that any User may submit for consideration by the Panel;
- (d) Submit to the PENRA recommendations to each proposal for amendment to the Distribution Code and the reasons for the recommendations;
- (e) Issue guidance in relation to the Distribution Code and its implementation, unforeseen circumstances and interpretation when asked to do so by the PERC, any Distributor or User;
- (f) Consider what changes are necessary to the Distribution Code arising out of any unforeseen circumstances referred to it by a Distributor and submit to the PERC the relevant amendment proposal;
- (g) Establish and maintain joint coordination arrangements with the Grid Code Review Panel to coordinate changes to and consistent development of the Grid Code and the Distribution Code.

1.2.1.3. The Panel shall consist of:

- (a) One member from the PENRA who will act as Chairman, with no voting rights
- (b) One member from each of the Distribution companies.
- (c) One member representing Generators Connected to Distribution.
- (d) One member representing the commercial consumers, appointed by the Palestinian Commercial Chamber.
- (e) One member representing the industrial consumers, appointed by Palestinian Federation of Industry.





- (f) One member representing the residential consumer, appointed by Consumer's protection associations.
- (g) One member from PETL.
- (h) One member from PERC as observer with no voting rights.

1.2.1.4. As possible, the representative appointed by a Distributor shall also be a member of the Grid Code Review Panel.

1.2.1.5. The Panel shall establish, publish and comply with its own internal rules. These internal rules shall be approved by the PERC.

1.2.2. DISTRIBUTION CODE AMENDMENTS

1.2.2.1. All revisions to the Distribution Code must be first reviewed by the Distribution Code Review Panel prior to submission to the PENRA for approval. All proposed revisions from Users, the PERC, a Distributor or the System Operator shall be sent to the Chairman of the Distribution Code Review Panel for consideration by the Panel. The Chairman will advise the Panel of all proposed revisions to the Distribution Code with notice of no less than [20 Business Days] in advance of the next scheduled meeting of the Distribution Code Review Panel.

1.2.2.2. Following the review of a proposed revision by the Distribution Code Review Panel, the PENRA shall review the Panel recommendation. The PENRA shall consider the proposed revision, other views, and any further representations and shall determine whether the proposed revision should be made and, if so, whether in the form proposed or in an amended form.

1.2.2.3. If the PENRA decides that the revision shall be made, the Chairman shall notify each Distributor, in a manner approved by the PERC, of the revision at least [10 Business Days] prior to the revision taking effect. The revision shall take effect with this Distribution Code deemed to be amended accordingly from [and including] the date specified in such notification or other such date as directed by the PERC. The representatives of Distributors in the Panel shall have the responsibility of drafting the amended Conditions, unless the PENRA specifies that such amendment shall be drafted by the PERC.

1.2.2.4. After any amendment to the Distribution Code, each Distributor shall publish the revised version.

1.2.3. DISTRIBUTION CODE DISPUTES

1.2.3.1. If any dispute arises between Users or between a Distributor and any User in relation to this Distribution Code, the parties in dispute shall use their best endeavors to resolve the dispute amicably between them.



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1.2.3.2. If one or more of the parties is not a license holder, the party or parties may refer the dispute to the PERC for determination, unless a contract between the parties in dispute provides otherwise.

1.2.3.3. If the dispute is between Distributors only, the dispute may be referred to the PERC for determination if a contract so requires, or if all parties in dispute agree to such action.

PART2:DISTRIBUTION PLANNING and CONNECTION CODE (DPCC)

2.1. SECTION: PURPOSE AND SCOPE

2.1.1. INTRODUCTION

2.1.1.1. The Distribution Planning and Connection Code (DPCC) specifies the technical and design criteria and the procedures to be complied with by the Distributor in the planning and Development of the Distribution System. It also applies to Users in the planning and development of their installations in so far as they affect the Distribution System

2.1.1.2. The User's requirement may necessitate the reinforcement of, or extension to the Distribution System and in some cases may require the Distributor to seek the reinforcement or extension to the capacity of the relevant point of interconnection, between the Distribution System and the Transmission System. This may arise for a number of reasons including but not limited to:

- (a) A development on a User's System already connected to the Distribution System;
- (b) Introduction of a new Connection Point between the User's System and the Distributor's System;
- (c) To increase the System capacity, remove operating constraints and maintain standards of security to accommodate a general increase in electricity Demand.

2.1.1.3. Accordingly the reinforcement or extension of the Distribution System may involve work at the following locations:

- (a) At a Connection Point between a User's System and the Distribution System;
- (b) On the Distribution System or other facilities which join a Connection Point to the remainder of the Distribution System;
- (c) At or between points on the Distribution System remote from the Connection Points.

2.1.1.4. The time required for the planning and development of the Distribution System and any consequential development of the Transmission System will depend on the type and extent of the necessary reinforcement and / or extension work, and the degree of complexity of the new work, while maintaining satisfactory security and quality of supply. Development of the Distribution System shall be planned with sufficient lead time to allow for any foreseeable delay in the obtaining of any necessary statutory consents or way leaves including any associated hearing if required.

2.1.1.5. An offer by a Distributor to a User for connection to or use of the Distribution System may be conditional upon the grant of consents or other external factors. In such circumstances, the Distributor shall do all that is reasonably practicable to progress the matter expeditiously.

2.1.1.6. Reference is made in the DPCC to the Distributor supplying information or advice to Users. For avoidance of doubt, unless the context otherwise requires, such information or advice shall be provided by the Distributor as soon as is reasonably practicable following a request by the User (whether during the application for connection process or otherwise).

2.1.2. PURPOSE

2.1.2.1. The purpose of the DPCC is:

- (a) to specify the technical, design, and operational criteria at each Connection Point;
- (b) to ensure that there is no undue discrimination in the application of the Distribution Code between Users, classes of User or other Distributors;
- (c) to facilitate the use of the Distribution System by any User connected to or seeking connection to the Distribution System, in accordance with a Connection Agreement;
- (d) to define the requirements for a User seeking connection and/or for a modification of the current connection, and to define the procedures for the exchange of System planning data between the Distributor and Users;
- (e) to list and collate the data to be provided by the User to the Distributor and to list the data to be provided by the Distributor to the User;
- (f) to enable the Distributor to develop, maintain and operate the Distribution System in a coordinated and economic manner in compliance with the Distributor's license;
- (g) 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 Distribution System.

2.1.3. SCOPE

2.1.3.1. The (DPCC) applies to the following:

- (a) The Distribution Licensees (Distributors)
- (b) Users connected or seeking connection to the Distribution System.
- (c) Temporary Distributors who cannot obtain license nowadays until legalized.

2.2. SECTION: PROCEDURES FOR CONNECTION OR MODIFICATION

2.2.1. APPLICATION FOR CONNECTION

- 2.2.1.1. Any User seeking a new or modified connection to the Distribution System will submit to the Distributor a connection application. Suitable forms shall be provided by the Distributor, depending on the required Connection Capacity and the nature of the User's Equipment to be connected.
- 2.2.1.2. When requested by the User seeking a new or modified connection, the Distributor shall furnish relevant System data. Detailed data relating to the interface between the Distribution System and that of the User, covering circuit parameters, switchgear and Protection arrangements of equipment directly connected to or affecting the Distribution System to enable the Distributor to assess any implications associated with these points of connection. All Connections
- 2.2.1.3. Users shall contact the Distributor in advance if it is proposed to make any significant change to the connection, electric lines or electrical Equipment, install or operate any generating equipment or do anything else that could affect the Distribution System or require alterations to the connection.
- 2.2.1.4. Users shall provide the Distributor with any information requested about the nature, or use by the User, of electrical equipment on the User's premises. The Distributor will only ask for information that is needed by it in relation to its distribution license distribution concession, service area or the Distribution Code.
- 2.2.1.5. Should a preliminary examination of this data indicate that more detailed information is required then it shall be provided to the Distributor on request. The Distributor will only ask for information that is needed by it in relation to its Distribution License or the Distribution Code.
- 2.2.1.6. In some cases, more detailed information may need to be provided to permit a full assessment of the effect of the User's load on the Distribution System. Such information may include an indication of the pattern of buildup of load and a proposed commissioning program. This information will be specifically requested by the Distributor when necessary.

Small Connections

- 2.2.1.7. For new or modified Small Connections, it is possible in most cases to assess whether a proposed connection is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited Standard Planning Data provided by the User:
- (a) The requested Connection Capacity in kVA or in (Amp)
 - (b) Date when the new or modified connection is required.



Medium Connections

2.2.1.8. For new or modified Medium Connections the required Standard Planning Data provided by the User will include, in addition to that required by DPCC 2.1.7:

- (a) Expected Point of Connection to the Distribution System (geographical and electrical).
- (b) Single line diagrams of existing and proposed arrangements of main Plant and Apparatus showing equipment rating and operating parameters.
- (c) Type and electrical loading of equipment to be connected, e.g. number and size of motors, electrical heating arrangements, etc.
- (d) For all types of load:
 - (i) Requested Connection Capacity (kVA) or (Amp).
 - (ii) Maximum Active Power Demand (kW)
 - (iii) Maximum Reactive Power requirements (kVAr).
- (f) For Fluctuating Loads:
 - (i) The rate of change of the Demand;
 - (ii) The switching interval; and
 - (iii) The magnitude of the largest step change.
- (g) The maximum phase unbalance which the User would expect the Demand to impose on the Distribution System.
- (h) The maximum flicker and/or harmonic content which will be imposed on the Distribution System.
- (i) Details of any load management scheme to be applied by the User on the User System.
- (j) Three phase short circuit infeed from all sources within the User's System based on Generation Set sub-transient reactance and the minimum zero phase sequence impedance of the User's System.
- (k) Reactive Power switching arrangements:
 - (i) Rated Capacity (MVAR);
 - (ii) Rated Voltage (kV);
 - (iii) Type (e.g., shunt inductor, shunt capacitor, static var compensator); and
 - (iv) Operation and control details (e.g. fixed or variable, automatic, or manual).
- (l) Grounding arrangements
- (m) Standard load profiles



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- (n) In the cases the User is connected to the Distribution System through a step up transformer:
- (i) Rated MVA;
 - (ii) Rated voltages (kV);
 - (iii) Winding arrangement;
 - (iv) Positive and zero sequence resistance and reactance
 - (v) Tap changer range, step size and type (on-Load or off-Load); and (vi) Basic Lightning Impulse Insulation Level (kV).

Large Connections

2.2.1.9. For new or modified Large Connections the Standard Planning Data supplied by the User will include, in addition to that required by DPCC 2.1.8:

(a) Load data

- (i) Type of load and control arrangements (e.g. controlled rectifier or large motor drives and type of starter employed).
- (ii) Maximum load on each phase at the time of Peak Demand
- (iii) Demand profiles (48 x half hour average estimates) for Active and Reactive Power Demand for the day of Distribution System Peak Demand and for the day of the Transmission System Peak Demand.
- (iv) In relation to Fluctuating Loads
 - o The rates of change of Demand (Active Power and Reactive Power) both increasing and decreasing.
 - o The shortest repetitive time interval between fluctuations in Demand (Active Power and Reactive Power).
 - o The magnitude of the largest step changes in Active Power and Reactive Power, both increasing and decreasing
 - o Sensitivity of Demand to fluctuations in voltage and frequency of supply at the time of Peak Demand: Voltage sensitivity (kW/kV and kVAr/kV) and Frequency sensitivity (kW/Hz and kVAr/Hz).

(b) Equipment data

- (i) Circuit parameters (positive and zero sequence resistance and reactance; positive and zero sequence shunt susceptance) of the overhead lines and/or underground cables from the User's substation to the Connection Point in the Distribution System (if they are different)
- (ii) for the switchgear, including circuit breakers, Load break switches, and disconnect switches at the Connection Point and at the substation of the User (if they are different):
 - o Rated voltage (kV);
 - o Rated current (A);

- Rated symmetrical RMS short-circuit current (kA); and
- Basic Lightning Impulse Insulation Level (kV).
- Equipment data sheet and test certificates.

Generators

2.2.1.10. Users seeking connection to the Distribution System for Generation Connected to the Distribution System greater than 50 kW shall provide the following additional information of each Generation Unit:

- (a) Rated Capacity (MW) on a monthly basis if applicable;
- (b) Minimum Stable Loading (MW);
- (c) Reactive Power capability;
- (d) Stator armature resistance;
- (e) Direct axis synchronous, transient, and subtransient reactances;
- (f) Quadrature axis synchronous, transient, and subtransient reactance's;
- (g) Direct axis transient and subtransient time constants;
- (h) Quadrature axis transient and subtransient time constants;
- (i) Turbine and Generating Unit inertia constant (MWsec/MVA);
- (j) Rated field current (amps) at rated MW and MVAR output and at rated Terminal voltage; and
- (k) Short circuit and open circuit characteristic curves.
- (l) Information on Step-up Transformers:
 - (i) Rated MVA;
 - (ii) Rated voltage (kV);
 - (iii) Voltage ratio;
 - (iv) Positive sequence resistance and reactance (maximum, minimum, and nominal tap);
 - (v) Zero sequence resistance and reactance;
 - (vi) Tap changer range;
 - (vii) Tap changer step size; and
 - (viii) Tap changer type: on Load or off circuit.

2.2.1.11. In addition with the data specified in DPCC 2.1.10, the following data could be required by the Distributor for all Generating Units with Rated Capacity greater than 1 MW:

- (a) Parameters for the excitation control System:

- (i) DC gain of Excitation Loop;
 - (ii) Rated field voltage;
 - (iii) Maximum field voltage;
 - (iv) Minimum field voltage;
 - (v) Maximum rate of change of field voltage (rising);
 - (vi) Maximum rate of change of field voltage (falling);
 - (vii) Details of Excitation Loop described in diagram form showing transfer functions of individual elements;
 - (viii) Dynamic characteristics of over excitation limiter; and (ix) Dynamic characteristics of under excitation limiter.
- (b) Parameters for the speed-governing control system:
- (i) Governor average gain;
 - (ii) Speeder motor setting range;
 - (iii) Speed droop characteristic curve;
 - (iv) Time constant of steam or fuel governor valve or water column inertia;
 - (v) Governor valve opening limits;
 - (vi) Governor valve rate limits; and (vii) Time constant of turbine.
 - (viii) A governor block diagram showing the transfer functions of individual elements.
- (c) Auxiliaries data:
- (i) Normal unit-supplied auxiliary Load for each Generating Unit at rated MW output; and
 - (ii) Each Generation Unit auxiliary Load other than (a) above and where the station auxiliary Load is supplied from the Distribution System.

2.2.1.12. The following Plant flexibility performance data for each Generating Plant shall be submitted:

- (a) Existence of Black Start Capability
- (b) Rate of Loading following Shutdown
- (c) Rate of Load Reduction from normal rated MW; and
- (d) Regulating range

2.2.2. PROCESSING OF APPLICATIONS

2.2.2.1. The Distributor shall establish the procedure for the processing of applications for connection or Modification of an existing connection to the Distribution System. The Distributor shall process the application for connection or Modification to an existing



connection within the time frames indicated in the Distribution Performance Standards Code. Large connections must be as per PETL approved procedures.

2.2.2.2. Any User applying for connection or a Modification of an existing connection to the Distribution System shall take all necessary measures to ensure that its proposed connection or Modification fulfils all the requirements stated on the "Technical Conditions at the Connection Point" section of this Code, and shall not result in the Degradation of the Distribution System.

2.2.2.3. Based on the data supplied by the User, the Distributor shall conduct Distribution Impact Studies it considers appropriate, to evaluate the impact of the proposed connection or modification to an existing connection on the Distribution System. The evaluation should include:

- (a) Impact of short circuit in feed to the Distribution Equipment;
- (b) Coordination of Protection System; and
- (c) Impact of User Development on Power Quality.

2.2.2.4. Upon request of the User, the Distributor shall provide to the User adequate and sufficient information regarding the Distribution System, to enable the User conduct Impact Studies on the User's system, and/or the Distribution System it considers appropriate.

2.2.2.5. During the application for connection process, based on the results of the Impact Studies, the Distributor will propose and agree with the User the voltage level for connection and point in the Distribution System to which a User will be connected in accordance with its normal practice for the type of load to be supplied. The Distributor may on occasion specify a different Connection Point or connection voltage from normal in order to avoid potential disturbance caused by the User's Equipment to other Users of the Distributor or for other technical reasons or may agree alternative methods for minimizing the effects of disturbing loads.

2.2.2.6. After evaluating the application submitted by the User, the Distributor shall inform the User whether the proposed User Development is acceptable or not. The Distributor may disapprove an application for connection or a Modification of an existing connection to the Distribution System if it is determined through the Distribution Impact Studies that the proposed connection or Modification will do not fulfil the technical requirements or result in the Degradation of the Distribution System.

2.2.2.7. If the application of the User is not acceptable, the Distributor shall notify the User as to why its application is not acceptable. The Distributor shall include in its notification details of the amendments required to make the User's application acceptable to the Distributor. The Distributor shall report this situation to the PERC.

2.2.2.8. The User shall accept the proposal of the Distributor within [30 days] or a longer period specified in the Distributor proposal, after which period the proposal will lapse.



2.2.3. CONNECTION AGREEMENTS

- 2.2.3.1. The acceptance by the User of the Distributor proposal shall lead to the signing of a Connection Agreement or an amended Connection Agreement. If the Distributor and the User cannot reach agreement on the proposed connection, or Modification to an existing connection, the User shall have the right to bring the matter before the PERC for resolution. The PERC have the right of access to any information that it deems fit in order to resolve such disagreement.
- 2.2.3.2. Before entering into a Connection Agreement and before connecting a User's System at a Connection Point, it will be necessary for the Distributor to be reasonably satisfied that the User's System at the boundary with the Distribution System will comply with all appropriate requirements of the Distribution Code.
- 2.2.3.3. The Connection Agreement shall include, and shall not be limited to, provisions for the submission of information and reports, Safety Rules, Test and Commissioning programs, Electrical Diagrams, statement of readiness to connect, certificate of approval to connect, and other requirements agreed between the parties..
- 2.2.3.4. If a Connection Agreement or an amended Connection Agreement is requested, the User shall submit to the Distributor the Standard Planning Data describing the proposed User Development.
- 2.2.3.5. Any User seeking to modify an existing connection to the Distribution System shall request an amended Connection Agreement with the Distributor prior to any modification to the User's System. The amended Connection Agreement shall include provisions for the submission of additional information required by the Distributor.
- 2.2.3.6. Submittals Prior to the Commissioning Date. The following shall be submitted by the User prior to the Commissioning date, pursuant to the terms and conditions and schedules specified in the Connection Agreement:
- (a) Specifications of major Equipment not included in the Standard Planning Data and Detailed Planning Data;
 - (b) Details of the Protection arrangements and settings referred to in Section "Technical Conditions at the Connection Point" of this Code.
 - (c) Electrical Diagrams of the User's Equipment at the Connection Point as described in DPCC 2.6.1 and DPCC 2.6.2;
 - (d) Information that will enable the Distributor to prepare the Connection Point Drawings, referred to in DPCC 2.6.3;
 - (e) Copies of all Safety Rules and Local Safety Instructions applicable to the User's Equipment and a list of Safety Coordinators, pursuant to the requirements of Section 3.8.

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- (f) A list of the names and telephone numbers of authorized representatives, including the confirmation that they are fully authorized to make binding decisions on behalf of the User,
- (g) for Significant Incidents pursuant to the procedures specified in Section 3.7;
- (h) Proposed Maintenance Program ; and
- (i) Test and Commissioning procedure for the Connection Point and the User Development.

2.2.4. COMMISSIONING OF EQUIPMENT AND PHYSICAL CONNECTION TO THE DISTRIBUTION SYSTEM.

- 2.2.4.1. Upon completion of the User Development, including work at the Connection Point, the Equipment at the Connection Point and the User Development shall be subjected to the Test and Commissioning procedure specified in DPCC 2.3.6 (h). The User shall then submit to the Distributor a statement of readiness to connect. The Distributor shall conduct the tests and the user or anyone on behalf of him shall be entitled to witness the tests. The Distributor may withhold agreement to energize the User's Equipment where test results do not demonstrate compliance with the DPCC.

The physical connection to the Distribution System shall be made only after the facility passed the tests done by the distributor within the timeframes specified in the Distribution Performance Standards Code.

2.2.5. OWNERSHIP BOUNDARIES

- 2.2.5.1. The point or points at which supply is given or taken between the Distribution System and Users will be agreed between the Distributor and the User as required. For MV connections, including connections between the Distributor and User, and where necessary bus bar connected supplies at LV, the Connection Points will be subject to specific agreement between the parties in each case.
- 2.2.5.2. The respective ownership of Plant or Apparatus will be recorded in a written agreement between the Distributor and the User as required. In the absence of a separate agreement between the parties to the contrary, construction, commissioning, control, operation and maintenance responsibilities follow ownership.
- 2.2.5.3. For supplies to Generators Connected to Distribution that operate in parallel with the Distribution System and all supplies at MV the Distributor will with the User's agreement prepare a Site Responsibility Schedule, included in the Connection Agreement and, where determined by the Distributors during the application for connection process, Operation Diagrams showing the agreed Ownership Boundary.

2.2.5.4. The Site Responsibility Schedule shall detail the demarcation of responsibility for safety of persons carrying out work or testing at sites having a Connection Point to the Distribution System and/or circuits which cross an Ownership Boundary at any point.

2.2.5.5. More detailed information on procedures and responsibilities involved in the provision of safety at interfaces between the Distribution System and a User's System is set out in Distribution Operating Code Section 3.8. Copies of these documents will be retained by the Distributor and the User. Changes in the boundary arrangements proposed by either party must be agreed in advance and will be recorded on the Distributor's Operation Diagrams.

2.2.6. ELECTRICAL DIAGRAMS AND DRAWING REQUIREMENTS

2.2.6.1. The Distributor shall specify the procedure and format to be followed in the preparation of the Electrical Diagrams and/or Connection Point Drawings as suitable required, for any Connection Point. The User shall prepare and submit to the Distributor an Electrical Diagram and/or Connection Point Drawings for all the Equipment on the User's side of the Connection Point, in accordance with the schedule specified in the Connection Agreement or amended Connection Agreement.

2.2.6.2. If the Connection Point is at the User's Site, the User shall prepare and distribute a composite Electrical Diagram and Connection Point Drawing for the entire Connection Point. Otherwise, the Distributor shall prepare and distribute the composite Electrical Diagram and Connection Point Drawing for the entire Connection Point.

Preparation of Electrical Diagrams

2.2.6.3. The Electrical Diagrams and the Connection Point Drawing shall provide an accurate record of the layout and circuit connections, ratings and identification of Equipment, and related apparatus and devices at the Connection Point. The Connection Point Drawing shall represent, as closely as possible, the physical arrangement of the Equipment and their electrical connections. If possible, all the Equipment at the Connection Point shall be shown in one Electrical Diagram. When more than one Electrical Diagram is necessary, duplication of identical information shall be minimized. The Electrical Diagrams shall represent, as closely as possible, the physical arrangement of the Equipment and their electrical connections.

Changes to Electrical Diagrams and Connection Point Drawing

2.2.6.4. If the Distributor or a User decides to add new Equipment or change an existing Equipment Identification, the Distributor or the User, as the case may be, shall provide the other party a revised Electrical Diagram and Connection Point Drawing, at least one [(1) month] prior to the proposed addition or change.

2.2.6.5. If the modification involves the replacement of existing Equipment, the revised Electrical Diagram and/or Connection Point Drawing, as suitable, shall be provided to the other party in accordance with the schedule specified in the amended Connection Agreement. The revised Electrical Diagram and/or Connection Point Drawing shall

incorporate the new Equipment to be added, the existing Equipment to be replaced or the change in Equipment Identification.

Validity of Electrical Diagrams and Drawings

- 2.2.6.6. The composite Electrical Diagram prepared by the Distributor or the User, in accordance with the provisions of DPCC 2.6.1, shall be the Electrical Diagram to be used for all operational and planning activities associated with the Connection Point.
- 2.2.6.7. If a dispute involving the accuracy of the composite Electrical Diagram arises, a meeting between the Distributor and the User shall be held as soon as possible, to resolve the dispute.



2.3. SECTION: DISTRIBUTION PLANNING PROCEDURES

2.3.1. DISTRIBUTION PLANNING RESPONSIBILITY

2.3.1.1. The Distributor shall be responsible for Distribution Planning, including:

- (a) Forecast the future Demand on its distribution area
- (b) Analyzing the impact of the connection of new facilities such as Generation Connected to the Distribution System, Loads, distribution lines, or substations.
- (c) Planning the expansion of the Distribution System to ensure its adequacy to meet forecast Demand and the connection of new Generation Connected to the Distribution System, Loads ; and
- (d) Identifying and correcting problems on Supply Quality, Power Quality and System Losses in the Distribution System

2.3.1.2. The Users of the Distribution System, including Generation Connected to Distribution and other entities that have a System connected to the Distribution System shall cooperate with the Distributors in maintaining the Distribution Planning data.

2.3.1.3. The Distributor shall develop and submit annually to the PENRA and PERC a [5 Year] Distribution Plan, as required in the Tariff Methodology section of its License.

- (a) Energy and Demand Forecasts;
- (b) Distribution feeder routing and sizing
 - (i) Detailed at above 6kv
 - (ii) Outline for 6 kV;
- (c) Distribution Reactive Power compensation plan;
- (d) Distribution Losses reduction plan;
- (e) Other Distribution reinforcement plans; and
- (f) A summary of the technical, economic and financial proposal performed to justify the [5 Year] Distribution Plan.

2.3.2. SUBMISSION, CONSOLIDATION AND MAINTENANCE OF PLANNING DATA

2.3.2.1. Any User applying for connection or a modification of an existing connection to the Distribution System shall submit to the Distributor the relevant Standard Planning Data and the Detailed Planning Data, in accordance with the requirements prescribed in the DPCC. If this maintenance will affect the Distributer demand, coordination with PETL is required.

2.3.2.2. When requested, Users shall submit to the Distributor the relevant historical planning data for the previous year and/or the forecast planning data for the [three (3)] succeeding



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years. These shall include the updated Standard Planning Data and the Detailed Planning Data.

2.3.2.3. The required Standard Planning Data shall consist of information necessary for the Distributor to evaluate the impact of any User Development on the Distribution System.

2.3.2.4. The Detailed Planning Data shall include additional information necessary for the conduct of a more accurate Distribution Planning study. This shall cover circuit parameters, switchgear, and Protection arrangements of Equipment directly connected to or affecting the Distribution System. The data shall be adequate to enable the Distributor to assess any implication associated with the Connection Points.

2.3.2.5. The Standard Planning Data and Detailed Planning Data shall be submitted by the User to the Distributor according to the following categories:

- (a) Forecast Data;
- (b) Estimated Equipment Data; and (c) Registered Equipment Data.

The Forecast Data shall contain the User's best estimate of the data, including Energy and Power, being projected for the [five (5)] succeeding years.

The Estimated Equipment Data shall contain the User's best estimate of the values of parameters and information pertaining to its Equipment.

The Registered Equipment Data shall contain validated actual values of parameters and information about the User's Equipment, usually required at the time of connection.

2.3.2.6. All Users with Large Connections connected at MV shall provide yearly to the Distributor with its Energy and Demand Forecasts at each Connection Point for the 5 succeeding years. The Forecast Data for the first year shall include monthly Energy and Power Forecasts, while the remaining four years shall include only the annual Energy and Power Forecasts. All other Users with Large Connections shall provide the same type of data if so instructed by the Distributor.

2.3.2.7. In the case of Users having Generation Connected to the Distribution System, they shall provide the net values of Energy and Power Forecast after any deductions to reflect the output of the Generating Plant. Such deductions shall be stated separately in the Forecast Data, including the projected Energy and Demand to be generated by each Generating Unit in the Generating Plant.

2.3.2.8. The Distributor shall consolidate and maintain the Distribution planning data according to the following categories:

- (a) Forecast Data;
- (b) Estimated Equipment Data; and (c) Registered Equipment Data.



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2.3.2.9. If there is any change to its planning data, the User shall notify the Distributor of the change as soon as practicable. The notification shall contain the time and date when the change took effect, or is expected to take effect, as the case may be. If the change is temporary, the time and date when the data is expected to revert to its previous registered value shall also be indicated in the notification.

2.3.2.10. The User shall give [48 hours] notice to the Distributor in the event that the Connection is no longer required.

2.3.3. LOAD FORECAST

2.3.3.1. The Distributor shall forecast the Demand for Power and Energy within the area of supply annually. The Distributor shall formulate its long term Load Forecast taking the previous financial year ending December 31st as the Base Year and projecting the Demand over the succeeding five years.

2.3.3.2. The Distributor shall forecast Demand using Prudent Industry Practice.

2.3.3.3. In conducting this Load Forecast the Distributor shall consider:

- (a) Energy Sales per Tariff Class, adopting a suitable methodology to assess its trend, taking into account electricity prices, the growth in population, trends on the national economy, or any other parameter the Distributor consider suitable to forecast it.
- (b) Assumed normal growth for non-specific loads, specific and identified loads of 1 MW and above, and the effects if any, due to Demand side management and loss reduction.
- (c) Specific project, either Government or private sponsored (as for example free zones, large tourist complex, etc.) that will imply the appearance of new loads in the Distributor's license or concession and service area.
- (d) Conservation programmes, Demand side management or off-peak usage programmes which the Distributor may be sponsoring, which are intended to reduce the User's future Energy and peak Demand.
- (e) Significant public Events;
- (f) Expected schedules for Generators Connected to Distribution;
- (g) Interconnection with adjacent Distributors, if exists; and
- (h) Any other information under the Distributor's knowledge that could have some influence in the Load Forecast.

2.3.3.4. The Distributor shall create a data base of loads for each User category and for each distribution substation connected to its Distribution System and update it on an annual basis.



2.3.3.5. The Distributor shall develop a load research program with the objective of obtaining User load profile data that describes the usage characteristics of specific appliances, Users and group of Users. The load research will facilitate obtaining the following information:

- (a) Demand according to end use at the hour of System peak, daily, monthly, seasonally or annually.
- (b) Hourly end use Demand for the day of the System peak, monthly, seasonally or hourly end use Demand for the average day of the System peak, monthly, seasonal or annually.
- (c) Category wise diversity or coincidence factors and load factors.
- (d) Total Energy consumption for each category by day, month, season or year.
- (e) Category wise non-coincident peak Demands.
- (f) Hourly Demand for end use appliances

2.3.3.6. The Distributor shall compute the aggregate Energy requirement at each of the Connection Points with the Transmission System after accounting for System losses. Based on the metering data at each Connection Point with the Transmission System, the Distributor shall develop load curves for the area fed by the concerned HV/MV substation. By compiling data from each HV/MV substation feeding its Distribution System, the Distributor shall develop a System load curve for its area of supply by applying a suitable diversity factor. By reconciling actual Energy sales figures with the metering data at each substation, approximate losses in the System may be computed for any period. This data shall be furnished to PENRA, PERC and PETL as stated in the Distribution Performance Standards Code.

2.3.3.7. If a User Finds that the cohesive forecast prepared by the Distributor does not accurately reflect its assumptions on the planning data, it shall promptly notify the Distributor of its concern. The Distributor and the User shall promptly meet to address the concern of the User.

2.3.4. DISTRIBUTION PLANNING

2.3.4.1. The Distributor shall conduct Distribution Planning studies and evaluations to ensure the safety and reliability of the Distribution System in order to:

- (a) Evaluate the requirement of Distribution System reinforcement projects;
- (b) Assure the requirement stated under the Technical Requirements section and in the Distribution Performance Standards Code are met for all the Users in the Distribution System; and
- (c) Evaluate any proposed User development, which is submitted (or is expected to be submitted) in accordance with the applications and procedures stated in the Connection Code

2.3.4.2. The Distribution Planning studies shall be conducted to assess the impact on the



Distribution System or to any User System, of the Load Forecast or any proposed Equipment change in the Distribution System or the User System, and to identify corrective measures to eliminate the deficiencies in the Distribution System or the User System.

2.3.4.3. The relevant technical studies and the required planning data specified in following sections shall be used in the conduct of the Distribution Planning studies. The Distributor shall conduct distribution planning analysis which shall include:

- (a) The determination of optimum patterns for feeder development; taken into account existing Bulk Supply Points and those proposed in the Transmission Master Plan
- (b) The development of optimum Reactive Power compensation programs; and
- (c) The development of an optimum feeder configuration and switching controls for distribution feeders.
- (d) The cost effectiveness of loss reduction measures without compromising the security standards.

2.3.4.4. The Distribution planning studies shall be performed using lifecycle costing methods. The cost of capital and the discount rate used in such analysis shall be consistent with what is prescribed in the Tariff Methodology

2.3.4.5. In addition to catering for Active Power Demand, Reactive components of power requirement should be studied and adequate measures should be taken by installing Reactive compensation equipment at different voltage levels in a phased manner to improve power factor and cause reduction of losses and other network benefits

2.3.4.6. Location of 33/20,11kV substations and distribution transformer substations shall be rationally determined with the objective of containing voltage regulation and transmission and distribution losses within permissible and reasonable limits.

2.3.4.7. The voltage regulation in the Distribution System shall be maintained at the levels prescribed in the Distribution Performance Standards Code and the distribution losses in the System shall be gradually reduced over the years to meet the targeted figure set out in the Performance Standard Code.

2.3.4.8. The capacity of transformers used in the Distribution System and the layout of bus bars, switchgear, transformers, capacitors, earthing, lightning arrestors, control panels, station battery, fire extinguishers and other accessories required for the safe operation of the substations shall as far as practicable be standardized by the Distributor.

2.3.4.9. Distribution transformers shall be provided with suitable fuses or circuit breakers on the low tension side for protection against overload and short circuit.



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2.3.5. SYSTEM STUDIES

2.3.5.1. Following System studies are expected to be carried out by the Distributor in order to develop the [5 Year] Distribution Plan:

- (a) Voltage Drop Studies: Voltage drop studies shall be performed to determine that the expected voltages at the User's Connection Points comply with the requirements stated on the Technical Requirements section and in the Distribution Performance Standards Code. It shall take into account the connection of new Generation Connected to the Distribution System, the Forecasted Load, and any planned expansion, reinforcement, or development in the Distribution System.
- (b) Short Circuit Studies: Short circuit studies shall be performed to evaluate the effect on the Distribution System Equipment of the connection of new Generation Connected to the Distribution System and other facilities that will result in increased fault duties for the Distribution System Equipment. These studies shall identify the Equipment that could be damaged when current exceeds the design limit of the Equipment. The studies shall also identify the Circuit Breakers and fuses, which may fail when interrupting possible short circuit currents.

Three-phase short-circuit studies shall be performed for the most Demanding scenario (either maximum or minimum generation) and for different System circuit configurations. Single line-to-ground fault studies shall also be performed for critical Distribution System nodes. These studies shall identify the most severe conditions that the Distribution System Equipment may be exposed to, and to determine possible constraints in fulfilling the Power Quality standards set out in the Distribution Performance Standards Code. Alternative Distribution System circuit configurations may be studied to reduce the short circuit current within the limits of existing Equipment. The results shall be considered satisfactory when the short-circuit currents are within the design limits of Equipment and the proposed Distribution System configurations are suitable for flexible and safe operation.

- (c) System Losses Studies: System Losses studies shall be performed to identify, classify, and quantify the losses in the Distribution System, and to propose measures for gradually reduce them if technically and economically feasible. System Loss studies shall be performed to determine the effects of any User Development and any development in the Distribution System on the efficiency of the Distribution System.
- (d) Distribution Reliability Studies: Distribution Reliability studies shall be performed to determine the frequency and duration of User Interruptions in the Distribution System, in order to assure the requirements stated in the Distribution Performance Standards Code are met. The historical Reliability performance of the Distribution System shall be determined from the Interruptions data of the Distribution System.



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2.4. SECTION: TECHNICAL REQUIREMENTS AT THE CONNECTION POINT

2.4.1. SUPPLY QUALITY STANDARDS

2.4.1.1. The Distributor shall plan and operate its System to ensure that at any User's Connection Point, the Supply Quality standards specified in the Distribution Performance Standards Code are complied with. Users seeking connection to the Distribution System or Modification of an existing connection shall ensure that their Equipment does not suffer damage as a result of unscheduled outages that can occur on the Distribution System from time to time.

2.4.2. FREQUENCY VARIATIONS

2.4.2.1. The System frequency variations are as specified in the Grid Code.

2.4.2.2. Users shall ensure that their Equipment can operate reliably and safely within the specified limits during Normal Operation, and can withstand the limits specified under System Stress and extreme System fault conditions.

2.4.3. VOLTAGE LEVELS

2.4.3.1. Nominal and Operational Voltages on the Distribution System are shown in the following Table.

TABLE 1: Distribution Nominal Voltages	
Low Voltage (LV)	230 volts - phase to neutral
	400 volts – phase to phase
Medium Voltage (MV)	6600 Volts (6,6 kV)
	11000 volts (11kv)
	22000 volts (22kv)
	33000 volts (33kv)
	36000 volts (36kv)

2.4.4. VOLTAGE VARIATIONS

2.4.4.1. The Long Duration Voltage Variation at any Connection Point during Normal Conditions shall be within the limits indicated in the Distribution Performance Standards Code (reproduced in the following table). For the purpose of this Section, Voltage Variation shall be defined as the deviation of the root-mean-square (RMS) value of the voltage from its nominal value, integrated through a 15 minutes period, and expressed as a percentage.



Voltage level in kV	Steady state change
< 1.0	$\pm 10 \%$
1.0 and above	$\pm 10 \%$

2.4.4.2. The Distributor shall design the Distribution System in accordance with the “Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment” standard in Annex 1.

2.4.5. TRANSIENT AND SHORT DURATION VOLTAGE VARIATIONS

2.4.5.1. A Short Duration Voltage Variation shall be defined as a variation of the RMS value of the voltage from nominal voltage for a time greater than one-half cycle of the power Frequency but not exceeding one minute.

2.4.5.2. Transient Voltages shall be defined as the high-frequency Over voltage that is generally shorter in duration compared to the Short Duration Voltage Variations.

2.4.5.3. Under fault and circuit switching conditions the rated frequency component of voltage may fall or rise transiently. The fall or rise in voltage will be affected by the method of earthing of the neutral point of the Distribution System and voltage may fall transiently to zero at the point of fault. Sections 2 and 3 of EN 50160 ‘Voltage Characteristics of Electricity Supplied by Distribution Systems’, as amended from time to time, contain additional details of the variations and disturbances to the voltage which shall be taken into account in selecting Equipment from an appropriate specification for installation on or connected to the Distribution System.

2.4.5.4. The Distribution System and the User System shall be designed and operated to include devices that will mitigate the effects of transient over voltages on the Distribution System and the User System. The Distributor and the User shall take into account the effect of electrical transients when specifying the insulation of their electrical Equipment.

2.4.6. VOLTAGE UNBALANCE

2.4.6.1. The Distribution System shall be planned in accordance with the standard specified in Annex 1.

2.4.6.2. The maximum Voltage Unbalance at the Connection Point of any User, excluding the Voltage Unbalance passed on from the Transmission System shall not exceed the limits prescribed in Sections 2 and 3 of EN 50160 ‘Voltage Characteristics of Electricity Supplied by Public Distribution Systems’, as amended from time to time normal operating conditions.



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2.4.6.3. The User shall ensure that its System shall not cause the Voltage Unbalance in the Distribution System to exceed the limits specified in this Section.

2.4.7. HARMONICS

2.4.7.1. Distributors shall ensure that the Individual Harmonic Content and the Total Harmonic Distortion of the voltage at any Connection Point, shall not exceed the limits prescribed in Section 5 of IEEE 519 'IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems', as amended from time to time. Following table reproduced such values.

At the PCC, system owners or operators should limit line-to-neutral voltage harmonics as follows:

- Daily 99th percentile very short time (3 s) values should be less than 1.5 times the values given in Table 1.
- Weekly 95th percentile short time (10 min) values should be less than the values given in Table 1.

All values should be in percent of the rated power frequency voltage at the PCC. Table 1 applies to voltage harmonics whose frequencies are integer multiples of the power frequency.

Table 1—Voltage distortion limits

Bus voltage V at PCC	Individual harmonic (%)	Total harmonic distortion THD (%)
$V \leq 1.0$ kV	5.0	8.0
$1 \text{ kV} < V \leq 69$ kV	3.0	5.0
$69 \text{ kV} < V \leq 161$ kV	1.5	2.5
$161 \text{ kV} < V$	1.0	1.5 ^a

^aHigh-voltage systems can have up to 2.0% THD where the cause is an HVDC terminal whose effects will have attenuated at points in the network where future users may be connected.

2.4.7.2. Distortion of the System voltage waveform, caused by certain types of Equipment, may result in annoyance to Users or damage to connected Apparatus. In order to limit these effects Users' Equipment connected to the Distribution System shall comply with the emission limits indicated in IEEE-519- SECTION 5 Standards.

2.4.7.3. The level of Current harmonics generated by total User's connected Equipment at the Connection Point shall not exceed the limits prescribed in the following table:

- Daily 99th percentile very short time (3 s) harmonic currents should be less than 2.0 times the values given in Table 2.
- Weekly 99th percentile short time (10 min) harmonic currents should be less than 1.5 times the values given in Table 2.
- Weekly 95th percentile short time (10 min) harmonic currents should be less than the values given in Table 2.



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Table 2—Current distortion limits for systems rated 120 V through 69 kV

Maximum harmonic current distortion in percent of I_L						
Individual harmonic order (odd harmonics) ^{a, b}						
I_{sc}/I_L	$3 \leq h < 11$	$11 \leq h < 17$	$17 \leq h < 23$	$23 \leq h < 35$	$35 \leq h \leq 50$	TDD
$< 20^c$	4.0	2.0	1.5	0.6	0.3	5.0
$20 < 50$	7.0	3.5	2.5	1.0	0.5	8.0
$50 < 100$	10.0	4.5	4.0	1.5	0.7	12.0
$100 < 1000$	12.0	5.5	5.0	2.0	1.0	15.0
> 1000	15.0	7.0	6.0	2.5	1.4	20.0

^aEven harmonics are limited to 25% of the odd harmonic limits above.

^bCurrent distortions that result in a dc offset, e.g., half-wave converters, are not allowed.

^cAll power generation equipment is limited to these values of current distortion, regardless of actual I_{sc}/I_L

where

I_{sc} = maximum short-circuit current at PCC

I_L = maximum demand load current (fundamental frequency component)
at the PCC under normal load operating conditions

*Under certain circumstances, the Distributor may agree to other limits or levels.

2.4.7.4. Measurements may be taken by the Distributor at the User's Connection Point. Measurements shall be taken in accordance with methodologies of IEEE-519-SECTION 4

2.4.7.5. In the event that the User's Equipment operates outside the above specified limits causing annoyance or other injurious effects either to another User, or to the Distribution System, the Distributor shall give reasonable notice to remedy the defect and the User shall remedy the defect at its own expense. In determining the period of notice, the Distributor shall have regard to the nature and degree of non-compliance, the nature and degree of annoyance or other injurious effects as well as the prescriptions stated in the Distribution Performance Standards. The Distributor shall have the right to disconnect the User's Equipment in the event that the User does not comply with such notice.

2.4.8. FLICKER

2.4.8.1. For the purpose of this Section, Flicker shall be defined as the impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.

2.4.8.2. The Flicker Severity at the Connection Point of any User shall not be above the maximum values stated in IEEE-519- ANNEX A

4.8.3. The maximum emission limits produced by any User shall be below the maximum values stated in IEEE-519- ANNEX A



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4.8.4. In the event that the User's Equipment operates outside the above specified limits causing annoyance or other injurious effects either to another User, or to the Distribution System, the Distributor shall give reasonable notice to remedy the defect and the User shall remedy the defect at its own expense. In determining the period of notice, the Distributor shall have regard to the nature and degree of noncompliance, the nature and degree of annoyance or other injurious effects as well as the prescriptions stated in the Distribution Performance Standards. The Distributor shall have the right to disconnect the User's Equipment in the event that the User does not comply with such notice.

2.4.9. PROTECTION

- 2.4.9.1. The Distribution System shall be designed and operated with sufficient Protection to ensure safety and to limit the frequency and duration of Interruptions to User's.
- 2.4.9.2. The requirements for the Protection System at the Connection Point shall be agreed upon by the Distributor and the User during the application for connection or Modification of an existing connection and shall be reviewed from time to time by the Distributor, with the concurrence of the User.
- 2.4.9.3. The User System shall be designed and operated and tested to achieve the desired level of speed, sensitivity, and selectivity in fault clearing in order to minimize the impact of faults on the Distribution System and in accordance with the requirements of the Distributor. Unless the Distributor advises otherwise, the User shall not use current limiting protective devices to limit the fault current in feed to the Distribution System.
- 2.4.9.4. The Fault Clearance Time shall be within the limits established by the Distributor in accordance with the Protection policy adopted for the Distribution System.
- 2.4.9.5. The Distributor shall provide the User with the details of any Auto reclosing or sequential switching features in the Distribution System that could have some impact in the User's System. The User should take this information into account in the design of its Protection System.
- 2.4.9.6. The User shall consider in the design of its Protection System the possible disconnection of only one phase or two phases during fault conditions on the Distribution System. For example, three phase motors shall be designed to withstand single phasing either by design or by suitable protection.

2.4.10. GROUNDING REQUIREMENTS

- 2.4.10.1. The method of Grounding at the User System shall comply with the Grounding standards and specifications of the Distributor. The Distributor shall supply to the User about these standards when applying for connection. Where there are multiple sources of power, the User shall ensure that the effects of circulating currents with respect to the grounded neutral are either prevented or mitigated.



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2.4.11. EQUIPMENT SHORT CIRCUIT RATING

2.4.11.1. The Distributor shall inform the User of the design maximum Short Circuits Levels of the Distribution System at the Connection Point. The User shall consider the design maximum Short Circuits Levels at the Connection Point in the design and Operation of the User System.

2.4.12. MONITORING AND CONTROL EQUIPMENT REQUIREMENTS

2.4.12.1. The Distributor and the User shall agree on the mode of monitoring and control. If required, the Distributor shall provide, install, and maintain a telemetry outstation and all associated Equipment needed to monitor the User System. If the User agrees that the Distributor shall control the switchgear in the User System, the Distributor shall install the necessary control outstation, including the control interface for the switchgear.

2.4.13. EQUIPMENT AND MAINTENANCE STANDARDS

2.4.13.1. All Equipment at the Connection Point shall comply with the requirements of the IEC Standards or their equivalent national standards. All Equipment at the Connection Point shall be designed, manufactured, and tested in accordance with the quality assurance requirements of the ISO9001 or equivalent.

2.4.13.2. All Equipment at the Connection Point shall be operated and maintained in accordance with Prudent Industry Practice and in a manner that shall not pose a threat to the safety of any personnel or cause damage to the Equipment of the Distributor or the User.

2.4.13.3. The Distributor shall maintain an appropriate log containing the test results and maintenance records relating to its Equipment at the Connection Point and shall make this log available when requested by the User or PERC.

2.4.13.4. User shall maintain a log containing the test results and maintenance records relating to its Equipment at the Connection Point and shall make this log available when requested by the Distributor.

2.4.14. POWER FACTOR

2.4.14.1. All MV Users (or other Users as may be determined by the PENRA from time to time) of the Distribution System shall maintain a Power Factor not less than the figure that set in the tariff instructions which set by the PENRA and PERC at the Connection Point, unless a different value have been agreed in the Connection Agreement.

2.4.14.2. The Distributor shall correct feeder and substation feeder bus Reactive Power Demand to a level, which will economically reduce feeder loss. The Distribution System shall be designed to have a Power Factor of not less the figure that set in the tariff instructions which set by the PENRA and PERC with the Transmission System, unless a different value have been agreed in the Connection Agreement.



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2.4.15. UNDER FREQUENCY RELAYS FOR AUTOMATIC LOAD SHEDDING

2.4.15.1. The Connection Agreement or amended Connection Agreement shall specify the manner in which Demand, subject to Automatic Load Dropping, will be split into discrete MW blocks to be actuated by Under Frequency Relays.

2.4.16. REQUIREMENTS FOR GENERATORS

2.4.16.1. Generators Connected to Distribution shall be connected to the Distribution System at the voltage level agreed to by the Distributor, based on the Distribution Impact Studies and in accordance with the standards specified in Annex 1. The Connection Point shall be controlled by a Circuit Breaker that is capable of interrupting the maximum short circuit current at the point of connection. Means shall also be provided for Circuit Breaker isolation for maintenance purposes.

2.4.16.2. The Generator Connected to Distribution shall be capable of continuously supplying its Active Power output, as specified in the Generator's declared data, within the System Frequency range specified in the Grid Code. Any decrease of power output occurring in the Frequency range of 48.75 to 51.25 Hz shall not be more than the required proportionate value of the System Frequency decay.

2.4.16.3. If the System frequency momentarily rises up to the value of 51.5 Hz or falls up to the value to 47.5 Hz, Generators Connected to Distribution shall remain in synchronism with the Distribution System, unless something different has been agreed in the Connection Agreement.

2.4.16.4. The User shall be responsible for protecting its Generator Connected to Distribution against damage for frequency excursions outside the range of 51.5 Hz and 47.5 Hz. The User shall decide whether or not to disconnect its Generation Unit from the Distribution System.

2.4.16.5. Generators Connected to Distribution shall be capable of supplying its Reactive Power outputs, as specified in the Generator's declared data, within the Voltage Variation specified in this Code, during Normal Conditions.

2.4.16.6. The Generators Connected to Distribution shall meet the requirements for Voltage Unbalance as specified in this Distribution Code. The Generators Connected to Distribution shall also be required to withstand without tripping, the unbalance loading during clearance by the Backup Protection of a close-up phase-to-phase fault on the Distribution System.

2.4.16.7. The Protection of Generators Connected to Distribution, associated Equipment and the connection to the Distribution System shall be designed, coordinated, and tested to achieve the desired level of speed, sensitivity, and selectivity in fault clearing and to minimise the impact of faults on the Distribution System. The Distributor and the Generator Connected to Distribution shall be solely responsible for the Protection System of the electrical Equipment and facilities at their respective sides of the



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Connection Point. Table 1 and 2 summarises typical protection requirement of Generator of different types and sizes. As protection requirements could widely vary depending on the Generator and Distribution System characteristics, the information on the tables shall be used only as a guide. Detailed protection schemes should be arranged between the Distributor and the User, and stated in the Connection Agreement.



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Table 1 – Protection for Single Phase Generators	
Interconnection Control, Protection and Safety Equipment ¹ YES denotes a requirement for this Guideline	
Generation Size	
15 kW or less ³	
Interconnection Disconnection Device	YES
Generator Disconnect Device	YES
Under voltage Trip	YES
Overvoltage Trip	YES
Over & Under Frequency Trip	YES
Over current Trip	YES
Synchronising Control ²	Manual or Automatic
Synch-Check ² (At the Connection Point)	YES
Notes: 1. Exporting power to the Distribution System may require additional operational/Protection devices and will require coordination of operations with the Distributor. 2. For synchronous and other types of Generators with standalone capability. 3. For single-phase Generators larger than 50 kW, consult with Distributor on the required interconnection control, Protection and safety equipment.	



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Table 2 – Protection for Three-Phase Generators

Interconnection Control, Protection and Safety Equipment ⁸ YES denotes a requirement for this Guideline - All devices are three-p unless otherwise specified.					
Generator Size Classifications	Small	Medium			Large
Device	<50 kW	50 - 499 kW	500 - 2000 kW	2001 - 10000 kW	>10000 Kw
Interconnect Disconnect Device	YES	YES	YES	YES	YES
Generator Disconnect Device	YES	YES	YES	YES	YES
Synchronising Control ¹ Manual (M) or Automatic (A)	M or A	M or A	A	A	A
25 Synch-Check (at the Connection Point)	YES	YES	YES	YES	YES
Automatic Voltage Regulation (AVR) ¹				YES	YES
Under voltage	YES	YES	YES	YES	YES
Overvoltage	YES	YES	YES	YES	YES
Neutral Overvoltage ²	YES ³	YES	YES	YES	YES
Instantaneous/Timed Over current	YES ⁴	YES ⁴	YES ⁴	YES ⁴	YES ⁴
Instantaneous/Timed Neutral Over current	YES ³	YES	YES	YES	YES
Over and Under Frequency	YES	YES	YES	YES	YES
Directional Power	YES ⁵	YES ⁵	YES ⁵	YES ⁵	YES ⁵
Intertrip or Equivalent Relay		YES ⁶	YES ⁶	YES ⁶	YES ⁶
Telemetry Data Communication			YES ⁷	YES ⁷	YES
Anti-Islanding for Inverters (Loss of mains)	YES	YES	YES	YES	YES

(IEEE Std. 929)



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Notes:

1. For synchronous and other types of Generators with standalone capability.
2. Only required for Generators that have their interconnection transformer's primary winding ungrounded. Used in conjunction with three PT's in broken delta configuration rated for line-to-line voltage. For detecting ground faults on the Distribution System.
3. May not be required if the Generator is an inverter type voltage-following System of less than 50 kW aggregate. In this case, the Distributor will inform the Power Producer if this Protection is required.
4. A timed over current relay with voltage restraint may also be required to prevent nuisance trips.
5. Only required for non-exporting or export limited Generators.
6. Transfer trip or equivalent protective relay function required for all synchronous Generators rated 500 kW and larger with export capability. May also be required for exporting synchronous Generators under 500 kW, depending upon characteristics of the distribution circuit. Distributor will advise.
7. System Controller requirement for all Generators 5 MW and larger. Distributor may also require telemetry for smaller Generators depending upon location and distribution circuit characteristics.
8. Exporting to Distribution System may require additional operational/protection Devices and will require coordination of operations with the Distributor.

2.4.16.8. If designed to support islanding operation, the Generator Connected to Distribution could operate in an islanding mode even over its own Auxiliaries, of supplying other User's load or Equipments. If this kind of operation is allowed, the User shall be responsible for:

- (a) Adequately design the protection and control schemes of the Generator, both for islanding and connected to the grid modes;
- (b) Assure the protection schemes of the Generator and the rest of the User System are able to detect and trip internal faults, under the islanding situation (probably reduced short circuit power); and
- (c) Assure adequate grounding when islanding operation.

2.4.16.9 A fault or maintenance Outage, could result in the disconnection of the Generation Connected to Distribution together with an associated section of the Distribution System, from the remainder of the Total System. Unless explicitly arranged with the Connection Agreement, the Generator connected to Distribution should never supply load and/or maintain voltage in any part of the Distribution System if this part is isolated from the Transmission System, and if the Generator is capable of maintaining this



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voltage because it is equipped with synchronous or self excited Distributor, and clearly stated on the Connection Agreement or amended asynchronous Generators, the User should install adequate protection devices (that could include inter-tripping schemes) to assure the disconnection either of the Generator or the whole User's facilities at the Connection Point.

2.4.16.10 In case the User facilities are connected to a feeder of the Distributor equipped with auto-reclosing, the protection System and switching arrangements should be designed to separate the Generator (or the Generator and other User's facilities below the Connection Point) following the first Distributor's Main Breaker, Recloser or Sectionalizer opening, and to remain disconnected until the System has completely restored.

2.4.16.11 The Generators Connected to Distribution providing Ancillary Services for Reactive Power supply shall be capable of contributing to Voltage Control by continuous regulation of the Reactive Power supplied to the Distribution System. The Generators Connected to Distribution providing Ancillary Services for Reactive Power supply shall be fitted with a continuously acting automatic excitation control System to control the terminal voltage without instability over the entire operating range of the Generators Connected to Distribution. The performance requirements for excitation control facilities, including power System stabilizers, where necessary for System operations shall be specified in the Distribution Connection Agreement or Amended Connection Agreement.

2.4.16.12 The Generator Connected to Distribution shall specify in its Application for a Connection or an Application for Modification if its Generator Connected to Distribution has a Black Start capability. In the case the Generator Connected to Distribution wishes to provide Ancillary Services for Black Start to the System Operator, it shall develop and sign the necessary agreements with it, and comply with the Grid Code.



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PART 3: DISTRIBUTION OPERATING CODE (DOC)

3.1. SECTION: PURPOSE AND SCOPE

3.1.1. PURPOSE

3.1.1.1. The purpose of the Operating Code is:

- (a) To define the operational responsibilities of the Distributor and all Users;
- (b) To specify the requirements and procedures for Load Forecast;
- (c) To specify the maintenance programs for the Equipment and facilities in the Distribution System;
- (d) To describe the Demand control strategies used for the control of the Total System frequency and the methods used for voltage control;
- (e) To specify the requirements for communication and the notices to be issued by the Distributor to Users and the notices to be issued by Users to the Distributor and other Users.
- (f) To specify the procedures to be followed by the Distributor and Users during emergency conditions;
- (g) To specify the Safety Management System criteria to be applied by the Distributors and Users for the co-ordination, establishment and maintenance of necessary Safety Precautions when work or testing is to be carried out on Plant and/or Apparatus of a Distributor or a User
- (h) To establish a procedure for the conduct of System Tests which involve the simulation of conditions or the controlled application of unusual or extreme conditions that may have an impact on the Distribution System or the User System;
- (i) To identify the tests and the procedures that needs to be carried out to confirm the compliance of a Generator Connected to Distribution with its registered parameters and its ability to provide Ancillary Services; and
- (j) To specify the requirements for Site and Equipment Identification at the Connection Point

3.1.2. SCOPE

3.1.2.1. This section applies to the following:

- (a) The Distributor
- (b) Other Distributors connected to the Distribution System until legalized
- (c) Generators Connected to the Distribution System greater than or equal to 1 MVA output or with a single Generating Unit over 500kVA;



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- (d) Others Generators Connected to the Distribution System if so instructed in the Connection Agreement;
- (e) All Users with a contracted demand equal to or greater than 4 MVA, unless differently stated in the Connection Agreement.
- (f) Other Users, if so instructed in the Connection Agreement.



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3.2. SECTION: OPERATIONAL RESPONSIBILITIES

3.2.1. OPERATIONAL RESPONSIBILITIES OF THE DISTRIBUTOR

- 3.2.1.1. The Distributor is responsible for operating and maintaining Supply and Power Quality in the Distribution System during Normal Conditions, in accordance with the provision indicated in the Distribution Performance Standards Code, and in proposing solutions to Supply or Power Quality problems.
- 3.2.1.2. The Distributor is responsible for providing and maintaining all distribution Equipment and facilities within its licensed area.
- 3.2.1.3. The Distributor is responsible for preparing the Annual, Monthly Maintenance Plans for the adequate maintenance of its Equipment and facilities, as is described in this Code.
- 3.2.1.4. The Distributor is responsible for designing, installing, and maintaining distribution protection that will ensure selective and timely disconnection of faulted facilities and Equipment.
- 3.2.1.5. The Distributor has a responsibility for maintaining an Automatic Load Shedding scheme to meet the targets agreed to with the System Operator as defined in the Grid Code and also has responsibilities under the Defense Plan.

3.2.2. OPERATIONAL RESPONSIBILITIES OF GENERATION CONNECTED TO DISTRIBUTION

- 3.2.2.1. The Generator Connected to Distribution is responsible for ensuring that its Generating Units can deliver the capabilities declared in its Connection Agreement.
- 3.2.2.2. The Generator Connected to Distribution is responsible for providing accurate and timely planning and operations data to the Distributor.
- 3.2.2.3. The Generator Connected to Distribution is responsible for executing the instructions of the Distributor during emergency conditions.

3.2.3. OPERATIONAL RESPONSIBILITIES OF OTHER DISTRIBUTION USERS

- 3.2.3.1. The User is responsible for assisting the Distributor in maintaining Power Quality in the Distribution System during Normal Conditions by correcting any User facility that causes Power Quality problems. 2.3.2. The User shall be responsible for ensuring that its System will not cause any Degradation of the Distribution System. It shall also be responsible in undertaking all necessary measures to remedy any degradation that the User System has caused to the Distribution System. 2.3.3. The User is responsible for executing the instructions of the Distributor during emergency conditions.



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3.3. SECTION: OPERATIONAL PLANNING

3.3.1. LOAD FORECAST

Introduction

- 3.3.1.1. In order for the Distributor to operate the Distribution System efficiently and to ensure maximum System security, there is a need for those Users specified in Section 3.1.2. to provide loading and generation output information to the Distributor. The information, required to be provided by Users under this Distribution Operating Code, will enable the Licensee to comply with these requirements of the Grid Code.
- 3.3.1.2. The Grid Code specifies the PETL's requirements for Demand forecasting for Centrally Dispatched Generation Units. This section of the Distribution Operating Code specifies the information to be provided by other Generation Units and the Users specified in Section 3.1.2.
- 3.3.1.3. This Demand forecasting information is required to enable the Distributor to maintain the integrity of the Distribution System. The Distributor under its Distribution Licence has an obligation under the Grid Code to provide Demand forecast information to the System Operator in order that generation output can be matched with Demand.
- 3.3.1.4. Where Demand data is required from the User, this means the MW Demand of electricity at the Connection Point. The Distributor may, in certain cases, specify that the Demand data shall include the MVAr Demand.
- 3.3.1.5. In this sub-section of the Distribution Operating Code Year 0 means the current calendar year at anytime, Year 1 means the next calendar year at anytime, Year 2 means the calendar year after Year 1.

Demand Forecast Information

- 3.3.1.6. Information shall be supplied by Users to the Distributor for the following rolling timescales is required by the Distributor:
- (a) Operational Planning Phase – next year ahead
 - (b) Programming Phase – 24 hours to 8 weeks ahead
 - (c) Control Phase – 0 to 24 hours ahead
 - (d) The information supplied will be as specified below and as set out in the relevant Schedules of the Distribution Data Registration Code.

Operational Planning Phase (next year ahead)

- 3.3.1.7. The information required to be provided to the Distributor during the Operational Planning Phase is specified in Annex 3. The information shall be provided to the Distributor by Calendar week 35 each year.



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Programming Phase (24 hours to 8 weeks ahead inclusive)

3.3.1.8. The following information shall be provided to the Distributor in the timescales specified in Annex 4

- (a) Schedules for the operation of any Generating Unit with output greater than 1MW on an hourly basis where the Distributor reasonably considers it appropriate;
- (b) From the Distributor's supply business, details of their proposed use of Demand Control measures aggregated to [3 MW] or more (averaged over any hour) on an hourly basis for each of the Distributor's Connection Points;
- (c) From Users and Other Distributors connected to the Distribution System whose operations are likely to result in an aggregated change in Demand at the Connection Point of greater than [3 MW] of Demand at that time on an hourly basis;
- (d) Any other relevant Demand forecast information reasonably required by the Distributor.

Control Phase (0 to 24 hours ahead)

3.3.1.9. The following information shall be supplied to the Distributor at reasonable times to be specified by the Distributor for the un-expired period covered by the Control Phase:-

- (a) Details of any differences of greater than [2 MW] from the schedules of operation of any Generation Connected to Distribution on an hourly basis which were supplied under Section 3.3.1.7.
- (b) Details from each User connected to the Distribution System of any change in aggregated Demand at the Connection Point of greater than [3 MW] of the Demand.

3.3.2. MAINTENANCE PLANS AND TIME SCALES

3.3.2.1. In this Section Year 0 means the current calendar year at any time, Year 1 means the next calendar year, Year 2 means the calendar year after Year 1, etc. Where Week 52 is specific read Week 53 in the appropriate years.

3.3.2.2. The Distributor shall prepare the following Distribution Maintenance Programs:

- (a) Long Term Maintenance Plan (Annual Maintenance Plan): Year 1 and 2
- (b) Medium Term Program: 9 to 52 weeks in advance
- (c) Short Term Program (Programming Phase): 2 to 8 weeks in advance.
- (d) Outage Schedule.

Annual Maintenance Plan

3.3.2.3. Each year, the Distributor will prepare a Long Term Maintenance Plan, covering at least the next calendar year (Year 1). Users and Embedded Generators (not subject to



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Central Dispatch) will provide the Distributor with information in accordance with Annex 4.

3.3.2.4. The Annual Maintenance Plan and its proposed outage program shall be submitted to the PERC and to PETL on a year ahead basis (January to December) by November 1st each year.

3.3.2.5. The Annual Maintenance Plan shall be developed taking into account the following:

- (a) The forecast Demand;
- (b) The Maintenance Plan actually implemented;
- (c) The requests by Users for changes in their maintenance schedules;
- (d) The requirements for the maintenance of the Grid;
- (e) The need to minimise the total cost of the required maintenance; and
- (f) Any other relevant factor.

3.3.2.6. Users and Generators Connected to Distribution shall provide to the Distributor information regarding their provisional Maintenance Plan for the next year. The following information shall be included in the User's provisional Maintenance Program for its System or Equipment.

- (a) Identification of the Equipment and the MW capacity involved;
- (b) Reasons for the maintenance;
- (c) Expected duration of the maintenance work;
- (d) Preferred start date for the maintenance work and the date by which the work shall have been completed; and
- (e) If there is flexibility in dates, the earliest start date and the latest completion date.

3.3.2.7. If a User is not satisfied with the Maintenance Schedule allocated to its Equipment, the User may notify the Distributor to explain its concern and request changes in the Annual Maintenance Plan. The Distributor shall endeavor to accommodate the User's request in preparing the Annual Maintenance Plan.

3.3.2.8. The Distributor shall advise Users or Generators Connected to Distribution who may be significantly affected by particular outages of Distribution Plant or Apparatus, of the dates and duration of the outages. If there are objections from Users the Distributor and the User shall attempt to resolve the problem. The Distributor shall make all reasonable attempts to revise the Annual Maintenance Plan to accommodate the User's concerns. If no reasonable alternative exists, then the Distributor may take the outage despite that Large User's or Generator's concerns.



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Medium Term Program

- 3.3.2.9. The Annual Maintenance Plan shall be updated to form the basis of the Medium Term Program. The Distributor shall continually review this Plan as necessary and periodically discuss it with the relevant parties as appropriate the availability of Generators Connected to Distribution not subject to Central Dispatch will also be updated.
- 3.3.2.10. Users and Generators Connected to Distribution will provide the Distributor with information in accordance with Annex 5.
- 3.3.2.11. In addition with the information supplied in accordance with the provisions in Annex 5, at any time and from time to time during the current calendar year up to the Programming Phase (8 weeks ahead), Users may notify reasonable changes and additions to the Outages previously notified. The Distributor shall consider whether the changes will adversely affect Distribution System security, or to other parties, and will discuss with the User in question. Where necessary, the Distributor shall inform other affected Users about changes or additions.

Short Term Program

- 3.3.2.12. The Medium Term Maintenance Plan shall be updated to form the basis of the Short Term Program and a rolling suggested program for the following week and subsequent 7 weeks period respectively will be prepared weekly by the Distributor
- 3.3.2.13. Short Term Program shall provide the details required by the System Operator for the preparation of the Grid Operating Program, as specified in the Grid Code.
- 3.3.2.14. To develop the Short Term Program, the Distributor will obtain Scheduling information from the Generators Connected to Distribution where it considers it appropriate.
- 3.3.2.15. The Scheduling information will specify the following on an individual Generating Unit basis:
- (a) The period the unit is required;
 - (b) The planned half-hourly output; and
 - (c) Any other information the Distributor reasonably considers necessary.
- 3.3.2.16. The Short Term Program shall contain at least identification of electric lines and equipment of the Distribution System that will be taken out of service, outage start date, duration of outage, and quantum of load not to be drawn at any interconnection during the outage.



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3.3.3. OUTAGE SHEDULE

3.3.3.1. Notwithstanding any approved outage plan, the Distributor shall not take any circuit/equipment out of service at any interconnection without specific release from the System Operator. This shall however, not apply under the following circumstances:

- (a) If the import or export at each interconnection point with PETL is not affected.
- (b) If removal of any circuit from service becomes necessary under emergency conditions or disconnection for violation of the Connection Agreement. In all cases the National Control Centre must be kept fully informed.

3.3.3.2. Maintenance of the Distribution System may require outages that interrupt the supply to a User or group of Users. In such cases, the Distributor shall:

- (a) Notify the affected Users at least [48 hours] in advance. Longer notice periods may be agreed between a User and a Distributor. This notification could be made by advertising the interruption in at least two newspapers of major distribution. The notification should contain, as a minimum, a clear indication of the zone affected by the interruption, the interruption starting date, the expected duration, and the reason of the interruption, including the Plant or Equipment to be maintained.
- (b) Notify, utilizing the procedures indicated in 3.6.(Operational Liaison), to Large Users, Generators Connected to Distribution, and Users with Essential Loads.

3.3.3.3. If the above mentioned notification procedures are not fulfilled, the interruption produced to the affected Users should be classified and accounted as Unscheduled Interruption.



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3.4. SECTION: CONTINGENCY PLANNING

3.4.1. TYPES OF CONTINGENCIES

3.4.1.1. A contingency in the Distribution System may arise in the event of Total or Partial System Blackouts of the Transmission System. A Contingency may also affect a part of the Distribution System due to local breakdowns in the Distribution System itself or in the Apparatus of PETL at the interconnection Point. This subsection lays down procedures which the Distributor shall follow under such contingencies to quickly and efficiently restore and maintain power supply to its Users.

3.4.1.2. These Contingencies are classified as:

- (a) System Blackout (Total or Partial).
- (b) Failure of Equipments of PETL at the interconnection points (the tie line).
- (c) Distribution System failure.

3.4.2. SYSTEM BLACKOUT

3.4.2.1. Total System Blackout is a situation when all generation has ceased with no electricity supply from External Interconnections.

3.4.2.2. Partial Blackout is a situation where all generation has ceased in a separate part of the Total System and there are no available interconnections to the other parts of the Total System.

3.4.2.3. In case of Total System Blackout or Partial Blackout at any point of interconnection, the

Distributor shall abide by the black start procedures framed by system operator Licensee and incorporated in the Grid Code.

3.4.2.4. The Distributor shall be responsible for sectionalizing the Distribution System into discrete, unconnected blocks of Demand. It shall advise the System Operator regarding the amount of MW likely to be picked up when switching on each block of Demand.

3.4.2.5. The Distributor shall prepare a schedule of Essential and non-Essential loads in order of priority at each Connection Point to the Transmission System to be picked up during the restoration process. The schedule is to be approved by the System Operator and forwarded to the PERC. Such schedule shall be updated continually. The schedule shall conform to provisions of the Grid Code.

3.4.2.6. The Distributor shall maintain direct communications links with the System Operator and/or proposed area load dispatch Centre, as the case may be, throughout the restoration process until the System is restored to normal.



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3.4.2.7. To co-ordinate activities, Users and the Distributor will ensure that there are suitable communication paths available and that where appropriate senior members of staff are appointed to manage these abnormal situations. The Distributor shall furnish to the System Operator the name and designation of person/persons, along with their telephone number/s and location, authorized to deal with any contingency operations. This list shall always be kept up to date.

3.4.3. SYSTEM RECOVERY

3.4.3.1. The Distributors will segregate its total Demand into suitably sized components to allow progressive re-energization of the Distribution System from black start Generators. The size of the areas of Demand of these will be determined by the System Operator and will be commensurate with the size of the Generators being re-started.

3.4.3.2. The overall strategy of recovery will be to re-establish stable Islands of Supply and Demand and to re-synchronise these islands progressively. Generators Connected to Distribution other than Embedded Generators will be required to operate under the Distributor directives, to enable the Distributor to comply with its Grid Code and/or license/concession obligations.

3.4.3.3. Where there are no Generators with a Black Start Capability within the Distribution System, then restoration of supply may be substantially delayed while PETL reestablishes the Transmission System from a restored island or part of the Total System. The Distributor will re-appraise its priorities in these situations and restore supplies in accordance with its Grid Code and/or license/concession obligations.

3.4.4. FAILURE OF EQUIPMENTS OF THE TRANSMISSION Company

3.4.4.1. In all cases that failures exists on lines or Equipments of the Transmission Company that origin, or may origin, an Incident in the Distribution System, the Distributor shall immediately contact the System Operator and/or the person authorized for such purpose at the substations of the Transmission Company and assess the probable time period needed for restoration and/or probable restriction on load drawl from the affected substation. The Distributor may exercise Demand Control as necessary.

3.4.5. DISTRIBUTION SYSTEM FAILURE

3.4.5.1. If a part of the Distribution System to which a Generator Connected to Distribution is connected becomes isolated from the Distribution System, the Distributor shall decide if it is desirable for the Generator Connected to Distribution to continue operating.

3.4.5.2. If no facilities exist for the subsequent resynchronization with the rest of the Distribution System, the Distributor shall issue an instruction to the Generator Connected to Distribution to disconnect its Generating Unit to enable a reconnection to the rest of the Distribution System.



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3.5. SECTION: DEMAND CONTROL

3.5.1. OBJECTIVE AND SCOPE

3.5.1.1. The objective of this section is to establish procedures to enable the Distributor, following an instruction of System Operator, to achieve a reduction in Demand in order to avoid a Breakdown or Overloading of any part of the Total System in a manner that does not unduly discriminate against or unduly prefer anyone or group of Users.

3.5.1.2. This section applies to the Distributors and to Users, which in this section means Generators Connected at Distribution, and Users connected to the Distribution System.

3.5.1.3. The term "Demand Control" is used to describe any or all of these methods of achieving a Demand Reduction:

- (a) Voluntary User Demand Management initiated by Distributor;
- (b) Automatic under frequency load shedding;
- (c) User Demand reduction including Voltage Reduction.
- (d) Emergency manual User Demand reduction.

3.5.2. METHODS OF DEMAND CONTROL

3.5.2.1. Where instructed by the System Operator, temporary load shedding shall be carried out to maintain the load generation balance. This may also be necessary due to lack of generation, loss of any circuit, equipment or any other operational contingency.

3.5.2.2. User Demand may be disconnected automatically at selected location in accordance with the requirements of the Grid Code, in the event of a sudden fall in frequency. Such an arrangement shall be carefully co-ordinate as part of an overall scheme and may take into account any operational requirements or essential load.

3.5.2.3. The Distributor shall estimate loads that may be shed in discrete blocks at each Connection Point to the Transmission System in consultation with the Users as required and submit the information to the System Operator. The Users shall cooperate with the Distributors in this regard.

3.5.2.4. Automatic disconnection by under voltage relay may be used to discriminately disconnect load at either HV or MV in order to maintain voltage within acceptable limits, in order as to avoid widespread shedding. Deliberate reduction of voltage may be used to achieve a temporary reduction in load Demand.

3.5.2.5. In the event of a sustained period of shortfall, due to any constraint in the Transmission System and/or Distribution System, then planned rotational load shedding may be used to share the available power among affected Users.



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3.5.2.6. In addition, Generators Connected to Distribution may wish to disconnect, automatically or manually, their Plant from the System to which it is connected at certain frequency

levels. Any such disconnection will be agreed with the Distributor or the System Operator, as required, in accordance with the DPCC.

3.5.3. IMPLEMENTATION OF DEMAND CONTROL

3.5.3.1. Deliberate reduction in System frequency may also be used to achieve a temporary reduction in load Demand in accordance with the Grid Code. Emergency manual load shedding may be also carried out on the Distribution System if so instructed by the System Operator.

3.5.3.2. Where Demand Control is exercised by the Distributor on instruction or request from the System Operator in order to safeguard the System Security, then the Distributor is required to respond to these requests promptly but shall liaise with and inform other Users so far as is reasonable practicable.

3.5.3.3. Where Demand Control is exercised by the Distributor, either instructed by the System Operator or in order to safeguard the Distribution System, the Distributor shall liaise with and inform Users accordingly as far as is reasonably practicable.

3.5.3.4. Detailed load shedding procedures shall be established by the Distributor and a detail procedure shall be furnished to the System Operators and persons in charge of downstream substations of the Distributor, where such load shedding has to be carried out. Where automatic load shedding will be carried out using under frequency relays the circuits involved and the amount of load to be interrupted, complete with corresponding relay settings, shall be submitted to the System Operator and persons in charge of downstream substations of the Licensee as necessary.

3.5.3.5. In the event of load shedding under the Distributor's planned load shedding rotas, the public shall be promptly notified of such Distributor's arrangements through the media or on a web site. Large Users with contract Demands of [1 MW] and above and essential services such as hospital, public water works etc. shall be notified also by telephone.

3.5.3.6. Once an automatic or manual disconnection, either due to low frequency or voltage problems, has taken place, it shall not be reconnected until the Distributor instructs to do so in accordance with this Code. Each Distributor shall abide by the instructions of the System Operator with regard to reconnection without delay.

3.5.3.7. All the Standards and Procedures related with the Load Shedding, including automatic load shedding, load shedding exemption policies, rotational load shedding and User's communications should be contained and documented in a Distribution Load Shedding Plan. Distributors shall permanently maintain and update this document, which should be submitted to the PENRA for revision and approval, if instructed to do so.



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3.6. SECTION: OPERATIONAL LIAISON

3.6.1. INTRODUCTION

3.6.1.1. This section sets out the requirements for the exchange of information in relation to Operations and/or Incidents on the Distribution System or the System of any User connected to the Distribution System which have had or may have had, or will have or may have an Operational Effect on the Distribution System or the System of any other User.

3.6.1.2. This Section applies to the Distributor and to Users, which in this Section means:

- (a) Any other Distributor connected to the Distribution System
- (b) MV Users
- (c) Generators Connected to Distribution at LV and rated above 50kW.

3.6.2. PROCEDURES

3.6.2.1. The Distributor and each User connected to its Distribution System will nominate officers and agree communication channels to make effective the exchange of information required by this Section. Communication should, as far as practicable, be direct between the User and the operator of the Distribution System to which that User is connected. However, this does not preclude communication with the User's nominated representative.

3.6.2.2. Any communication from the Distributor and the User utilizing the agreed communication channels, including telephone communications, should be considered to be acknowledge by the User pursuant to 3.3.3. (Outage Schedule)

3.6.2.3. If the Distributor decides that a backup or alternative route of communication and/or emergency communication is necessary for the safe operation of the Distribution System, the additional means of communication shall be agreed between the Distributor and the User.

3.6.2.4. A list of duly authorized personnel and their telephone numbers shall be exchanged between the Distributor and the User so that control activities can be efficiently coordinated. The Distributor and the User shall maintain 24-hour availability for these duly authorized personnel when necessary.

3.6.2.5. In the case of an Operation on the System of a User connected to the Distribution System, which will have or may have an Operational Effect on the Distribution System, the User will notify the Distributor in accordance with the procedures established in this Section.



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- 3.6.2.6. In the case of an Operation on the Distribution System or on receipt of notification of an Operation on the Transmission System, which will have or may, in the opinion of the Distributor, have an Operational Effect on the System of a User connected to the Distribution System, the Distributor will notify the User.
- 3.6.2.7. An Operation may be caused by another Operation or an Incident on another's System and in that situation the information to be notified is different from that where the Operation arose independently of any other Operation or Incident. Whilst in no way limiting the general requirement to notify in advance, the following are examples of situations where, in as much as they may have or have had an effect on the Operation of the Distribution System or another System, notification will be required of:
- (a) The implementation of a Schedule Outage of lines and/or Equipments which has been arranged pursuant to Section 3.3. (Operational Planning);
 - (b) The Operation of any Circuit Breaker or Isolator or any sequence or combination of the two including any temporary over-stressing, System parallels, or Generating Unit synchronising; and (c) Voltage control.

3.6.3. FORM OF NOTIFICATION AND TIMING

- 3.6.3.1. The notification (other than in relation to the information which the Distributor is merely passing on from a User) will be of sufficient detail to enable the recipient of the notification reasonably to consider and assess the implications and consequences arising from the Operation on the Distribution System and will include the name of the individual reporting the Operation on behalf of the Distributor. The recipient may ask questions to clarify the notification.
- 3.6.3.2. A notification by the Distributor of an Operation which has been caused by another Operation (the "First Operation") or by an Incident on a User's System, will describe the Operation and will contain the information which the Distributor has been given in relation to the First Operation or that Incident by the User.
- 3.6.3.3. Where a User is reporting an Operation or an Incident which itself has been caused by an Incident or scheduled or planned action affecting (but not on) its System the notification to the Distributor will contain the information which the User has been given by the person connected to its System in relation to that Incident or scheduled or planned action (which the User must require, contractually or otherwise the person connected to its System to give it) and the Distributor may pass on the information contained in the notification.
- 3.6.3.4. A notification by the Distributor of an Operation under this Section which has been caused by an Operation or an Incident on the Transmission System, may describe the Operation on the Distribution System and will contain the information which the Distributor has been given in relation to the Operation or an Incident on the Transmission System by the System Operator. The notification (other than in relation to the information which the Distributor is merely passing on from the System Operator)



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will be of sufficient detail to enable the recipient of the notification to consider and assess the implications and consequences arising from the Operation on the Distribution System and will include the name of the individual reporting the Operation on behalf of the Distributor. The recipient may ask questions to clarify the notification.

3.6.3.5. A notification under this Section will be given as far in advance as practicable and in any Incident shall be given in sufficient time as will reasonably allow the recipient to consider

and assess the implications and risks arising. The notification will be dictated to the recipient who shall record it and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.

3.6.4. REQUIREMENT TO NOTIFY INCIDENTS

3.6.4.1. In the case of an Incident on the System of a User connected to the Distribution System, which has had or may have had an Operational Effect on the Distribution System or on the Transmission System, the User will notify the Distributor as soon as practicable.

3.6.4.2. In the case of an Incident on the Distribution System or on receipt of notification of an Incident on the Transmission System, which will have or may, in the opinion of the Distributor, have an Operational Effect on the System of a User connected to the Distribution System, the Distributor will notify the User in accordance with this Section. This does not preclude any User asking the Distributor, to whose System he is connected, for information regarding the Incident which has affected the User's System.

3.6.4.3. An Incident may be caused by (or exacerbated by) another Incident or by an Operation on another's System and in that situation the information to be notified is different from that where the Incident arose independently of any other Incident or Operation.

3.6.4.4. The following are examples of situations where notification will be required if they have an Operational Effect:

- (a) The actuation of any alarm or indication of any abnormal operating condition;
- (b) Adverse weather conditions being experienced;
- (c) Breakdown of, or faults on, or temporary changes in the capabilities of, Plant and/or Equipment including Protection; and
- (d) Increased risk of inadvertent Protection Operation.

3.6.4.5. A notification of an Incident which has arisen independently of any Incident or of an Operation, will describe the Incident (although it need not state the cause of the Incident) and subject to that will be of sufficient detail to enable the recipient of the notification to consider and assess the implications and risks arising. The recipient may ask questions to clarify the notification.



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- 3.6.4.6. A notification by the Distributor of an Incident which has been caused by (or exacerbated by) another Incident (the "first Incident") or by an Operation on a User's System will describe the Incident and will contain the information which the Distributor has been given in relation to the first Incident or that Operation by the User. The notification (other than in relation to the information which the Distributor is merely passing on from a User) will be of sufficient detail to enable the recipient of the notification reasonably to consider and assess the implications and risks arising from the Incident on the Distribution System and will include the name of the individual reporting the Incident on behalf of the Distributor. The recipient may ask questions to clarify the notification.
- 3.6.4.7. Where a User is reporting an Incident or an Operation which itself has been caused by (or exacerbated by) an Incident or scheduled or planned action affecting (but not on) its System the notification to the Distributor will contain the information which the User has been given by the person connected to its System in relation to that Incident or scheduled or planned action (which the User must require the person connected to its System to give to it) and the Distributor may pass on the information contained in the notification.
- 3.6.4.8. Except in an emergency situation the notification will be dictated to the recipient who shall record it and on completion shall repeat the notification in full to the sender and check that it has been accurately recorded.
- 3.6.4.9. Where an Incident has been reported to the Distributor by a Generator Connected to Distribution relating to a Generating Unit and in order for the Generator to assess the implication of the Incident on its System more accurately, it may ask the Distributor for details of the Fault Levels on in feeds from the Distribution System to that Generating Unit at the time of the Incident, and the Distributor will, as soon as reasonably practicable, give the Generator that information provided that the Distributor has that information.
- 3.6.4.10. Where a part of a Distribution System is, by agreement, under the control of the System Operator then the requirements and provisions of the Grid Code shall apply to that situation as if that Distribution System was the Transmission System.
- 3.6.5. SIGNIFICANT INCIDENTS**
- 3.6.5.1. Where an Incident on the Distribution System or the System of a User has had or may have had a significant effect on the System of any of the others, the Incident shall be reported in writing to the owner of the System affected in accordance with the provisions of 3.7.3. This incident will be termed a "Significant Incident".
- 3.6.5.2. Where a Distributor notifies a User of an Incident, which the User considers has had or may have a significant effect on that User's System, that User will require the Distributor to report that Incident in writing and will notify the Distributor accordingly. Such an Incident will also be termed a "Significant Incident".



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3.6.5.3. A Significant Incident will include Incidents which result in, or may result in, the following:

- (a) Operation of Apparatus either manually or automatically;
- (b) Voltage outside statutory limits;
- (c) System frequency outside statutory limit, or (d) System Stability failure.

3.7. SECTION: OPERATIONAL INCIDENT REPORTING AND INFORMATION SUPPLY

3.7.1. INTRODUCTION

3.7.1.1. This Section sets out the requirements for reporting in writing those Incidents termed "Significant Incidents" which were initially reported verbally and those statutory specified Incidents to be reported under the request of the PERC. It also provides for the joint investigation of Significant Incidents by the Users involved.

3.7.2. INCIDENT REPORTING

3.7.2.1. If and subsequently has been determined by the Distributor to be a Significant Incident, a written report will be given to the Distributor by the User in accordance with this Section. The Distributor will not pass this report on to other affected Users but may use the information contained therein in preparing a report to a User in relation to a Significant Incident on the Distribution System which has been caused by (or exacerbated by) the Significant Incident on the User System.

3.7.2.2. In the case of an Incident which has been reported verbally to the User and subsequently has been determined by the User to be a Significant Incident, a written report will be given to the User by the Distributor in accordance with this Section.

3.7.2.3. A report will be in writing and shall be sent to the Distributor or User, containing written confirmation of the verbal notification given under 3.7. together with more details relating to the Significant Incident, although it need not state the cause of the Incident. The report should, as a minimum, contain following matters, which is not intended to be exhaustive.

- (a) Date and time of Significant Incident;
- (b) Location;
- (c) Apparatus involved;
- (d) Brief description of Significant Incident;
- (e) Duration of incident;
- (f) Estimated date and time of return to normal service, and
- (g) Details of any Demand Control undertaken.



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- (h) In case of Generators Connected to Distribution, effects on generation including, where appropriate:
- (i) generation interrupted;
 - (ii) frequency response achieved;
 - (iii) MVAR performance achieved; and

3.7.2.4. The recipient may raise questions to clarify the notification, and the giver of the notification will, in so far as it is able, answer any questions raised.

3.7.3. JOINT INVESTIGATION INTO SIGNIFICANT INCIDENTS

3.7.3.1. Where a Significant Incident has been declared and a report submitted either party or parties may request in writing that a joint investigation be carried out.

3.7.3.2. The composition of such an investigation panel will be appropriate to the Incident to be investigated and agreed by all parties involved.

3.7.3.3. Where there has been a series of Significant Incidents (that is to say, where a Significant Incident has caused or exacerbated another Significant Incident) the parties involved may agree that the joint investigation should include some or all of those Significant Incidents.

3.7.3.4. A joint investigation will only take place where all parties affected by a Significant Incident agree to it. The form and rules of the procedure for, and all matters relating to the joint investigation will be agreed at the time of a joint investigation and in the absence of agreement the joint investigation will take place.

3.7.3.5. Any joint investigation occurs only when both parties agree. It shall form part of any dispute resolution procedure.

3.7.4. REPORT TO THE PERC

3.7.4.1. The Distributor shall submit a written report to the PERC detailing all the information, findings, and recommendations regarding the Distribution System Incident. The following minimum information shall be included in the written report following the joint investigation of the Significant Incident:

- (a) Time and date of the Significant Incident;
- (b) Location of the Significant Incident;
- (c) Equipment directly involved and not merely affected by the Event;
- (d) Description of the Significant Incident; and
- (e) Demand (in MW) and generation (in MW) interrupted and the duration of the Interruption.



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The PERC shall have the right to request any information and explanations that it reasonably sees fit about any incident, significant incident or event.

3.8. SECTION: SAFETY COORDINATION

3.8.1. INTRODUCTION

3.8.1.1. This Distribution Operating Code specifies the Safety Management System criteria to be applied by the Distributor and Users for the co-ordination, establishment and maintenance of necessary Safety Precautions when work or testing is to be carried out on Plant and/or Apparatus of the Distributor or a User and where for this to be done safely, isolation, earthing, and/or some other precautions of the other's System is needed. This Distribution Operating Code does not apply to the situation where Safety Precautions need to be agreed solely between Users.

3.8.1.2. This Distribution Operating Code does not seek to impose a particular set of Safety Rules on the Distributor and Users. The Safety Rules to be adopted and used by the Distributor and each User shall be those chosen by each.

3.8.2. OBJECTIVES

3.8.2.1. To lay down requirements with a view to ensuring safety of facilities and persons working at or across Operational and Ownership Boundaries between the Distribution System and Users' Systems..

3.8.3. SCOPE

3.8.3.1. This Distribution Operating Code specifies the Safety Management System criteria to be applied by the Distributor and all Users of the Distribution System at or across an Operational Boundary, Users for the purposes of this Distribution Operating Code being:

- (a) Medium Voltage Users.
- (b) Generators Connected to Distribution.
- (c) Other Distributors connected to the Distribution System.
- (d) Any other party reasonably specified by the Distributor including Users with un-metered supply and those connected at LV.

3.8.4. OPERATIONAL SAFETY

Approved Safety Management Systems:

3.8.4.1. At each site or location where an Operational Boundary exists, a Safety Management System specifying the principles and procedures to be applied so as to ensure the health and safety of all who are liable to be working or testing on the Distribution System, or



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on Plant and Apparatus connected to it, will be established by the Distributor and Users. For interfaces involving MV Systems this shall include the provision for Control Person(s), a system of documentation and the establishment of Safety Precautions.

3.8.4.2. Safety Management System must include the provision for written authorisation of personnel concerned with the control, Operation, work or testing of Plant and Apparatus forming part of, or connected to, the Distribution System. Each individual Authorization shall indicate the class of Operation and/or work permitted and the section of the System to which the authorization applies.

3.8.4.3. The Distributor and every User shall at all times have nominated a person or persons to be responsible for the co-ordination of safety pursuant to this Distribution Operating Code, those persons being referred to in this Distribution Operating Code as Control Persons. (Under the conditions of the Distributor's Safety Rules a Control Person may either be at the Distributor's Distribution Control Centre or be a person authorised in accordance with 3.8.4.4, who is at the site or location of the Operational Boundary).

Nomination of Control Persons:

3.8.4.4. The Distributor and each User shall at all times have nominated a Control Person or Control Persons responsible for co-ordination of Safety from the System pursuant to this Distribution Operating Code. Control Persons and persons concerned with the carrying out of Safety Precautions and work on or testing of Plant and Apparatus forming part of, or connected to, the Distribution System shall have a written authorisation designating their role in implementing the Safety Management System.

System of Documentation.

3.8.4.5. A system of documentation shall be maintained by the Distributor and the appropriate Users which will record the inter-system Safety Precautions taken when:-

- (a) Work and/or testing is to be carried out on MV Plant and/or Apparatus across the Operational Boundary.
- (b) Isolation and/or earthing of the other's System is required.

3.8.4.6. Where relevant, copies of the Safety Management Systems and related documentation shall be exchanged between the Distributor and Users for each Operational Boundary.

3.8.4.7. The Distributor and Users shall maintain a suitable system of documentation which records all relevant operational events that have taken place on the Distribution System or any other System connected to it and the co-ordination of relevant Safety Precautions for work.

3.8.4.8. All documentation relevant to the Operation of the Distribution System, and Safety Precautions taken for work or tests, shall be held by the Distributor and the appropriate User for a period of not less than six months.



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Safety Precautions

3.8.4.9. The establishment of Safety Precautions involves:

- (a) The isolation from the remainder of the System of Plant and/or Apparatus, including from Low Voltage in feeds, either by an Isolating Device in the isolating position and immobilized and locked or by other means of rendering the Plant or Apparatus Isolated, and/or
- (b) The earthing by way of providing a connection between a conductor and earth by using an earthing device which is applied and where reasonably practicable, immobilized and locked, the extent of the Safety Precautions required being determined pursuant to this Distribution Operating Code.

3.8.5. ENVIRONMENTAL SAFETY

3.8.5.1. Site Safety and Security Arrangements shall be made by the Distributor and Users to ensure site safety and security.

3.8.5.2. Suitable arrangements shall be agreed between the Distributor and the relevant Users to provide free and unrestricted access to the Distributor's Plant and Apparatus at substations or similar by the Distributor's personnel or their designated representatives at all times.

3.8.5.3. Site Specific Hazards; Suitable arrangements shall be made by the Distributor and/or the relevant Users to ensure that personnel are warned by an appropriate means of hazards specific to any site, before entering any area of the site. This shall include hazards that may be temporary or permanent. Where these risks include contamination or similar, suitable decontamination facilities and procedures shall be provided.

3.8.6. INFORMATION FLOW AND CO-ORDINATION

3.8.6.1. Schedules of Responsibility: The Distributor and Users shall jointly agree and set down in writing schedules specifying the responsibilities for System Control of Equipment. These shall ensure that only one party is responsible for any item of Plant or Apparatus at any one time.

3.8.6.2. Pursuant to the DPCC, Site Responsibility Schedules specifying the responsibilities for ownership, operation and maintenance shall be jointly agreed by the Distributor and the appropriate User(s) for each site or location where an Operational Boundary or joint responsibility exists. This will include Operation Diagrams illustrating sufficient information for Control Persons to carry out their duties which shall be exchanged by the Distributor and the appropriate User.

3.8.6.3. A copy of the Site Responsibility Schedules and Operation Diagrams shall be retained by the Distributor and the appropriate User(s). Site Responsibility Schedules and



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Operation Diagrams shall be maintained by the Distributor and the appropriate User(s) and exchanged as necessary to ensure that they reflect the current agreements.

3.8.6.4. Outage Co-ordination: For those Users connected at MV and having firm supply connections (provided by more than one circuit) and where the User so requests to the Distributor, these schedules shall identify those specified Distributor circuits on which Planned Outages by the Distributor shall be notified to the User. These specified circuits will be those where the Distributor and the User have agreed that during outages of the specified circuits the User can introduce measures to manage critical processes or safety aspects. These specified circuits will usually operate at the voltage level at which the supply is provided and will have a significant effect on the security level of the User's supply

Those Users connected at MV and not having firm supply connections (provided by more than one circuit) may seek to obtain outage planning information through arrangements with the Distributor.

Communications:

3.8.6.5. Where the Distributor reasonably specifies the need, suitable communication systems shall be established between the Distributor and other Users to ensure the control function is carried out in a safe and secure manner. Where the Distributor reasonably decides a backup or alternative routing of communication is necessary to provide for the safe and secure Operation of the Distribution System the means shall be agreed with the appropriate Users. Schedules of telephone numbers/call signs shall be exchanged by the Distributor and appropriate User to enable control activities to be efficiently co-ordinated.

3.8.6.6. The Distributor and appropriate Users will establish 24-hour availability of personnel with suitable authorisation where the joint operational requirements demand it.

Procedures

3.8.6.7. Pursuant to this Distribution Operating Code the Control Person and/or Authorised Persons for each of the Distributor and a User relating to the place where Safety Precautions are required will contact each other to coordinate the Safety Precautions, and the Control Person requesting Safety Precautions shall be referred to as the "Requesting Control Person" and the Control Person being requested and implementing the Safety Precautions shall be referred to as the "Implementing Control Person".

3.8.6.8. Procedures shall be maintained by the Distributor and the appropriate Users which clearly specify the responsibility for System Control of Plant and Apparatus and these shall ensure that only one Control Person is responsible for any item of Plant and Apparatus at any one time. The operational procedures shall be in accordance with the Safety Management System agreed between the Distributor and the User(s).



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3.9. SECTION: TESTING, MONITORING AND INVESTIGATION

3.9.1. INTRODUCTION

3.9.1.1. In order to properly discharge its responsibilities in respect of safe, secure, reliable and economic operation of the Distribution System in accordance with its license conditions and the Distribution Performance Standards Code, the Distributor shall organize and carry out monitoring, testing and investigation on the effect of User's electrical Equipments or electrical installation on the Distribution System. The testing and/or monitoring procedures will be specifically related to the technical criteria detailed in this

Distribution Code as per related to IEC site testing guideline and/or manufactures recommendations.

3.9.2. TESTING REQUIREMENTS

3.9.2.1. The Distributor shall, from time to time, test and/or monitor the Power Quality at various points on its Distribution System, including monitoring the effect of the User System on the Distribution System.

3.9.2.2. The specific testing and/or monitoring by a Distributor may be initiated by the receipt of a complaint relating to power quality in the Distribution System and/or in accordance with the provisions of the Distribution Performance Standards Code. .

3.9.2.3. In certain situations, the Distributor may require the testing and/or monitoring to take place at the Connection Point of a User to be witnessed by a User representative.

3.9.2.4. If testing and/or monitoring are required at the Connection Point, the Distributor shall advise the User involved and shall make available the results of such tests to the User.

3.9.2.5. Where the User requests, a retest will be carried out and the test witnessed by a User representative. The cost of the retest shall be charged to the User

3.9.2.6. If the User is exporting to or importing from the Distribution System an amount of Active Power or Reactive Power in excess of the value specified in the Connection Agreement the Distributor shall inform the User or if the results of the test show that the User is operating outside the technical parameters stated in this Distribution Code, the User shall be informed accordingly. The User shall rectify the situation within a period agreed with the Distributor.

3.9.2.7. If the User is operating outside the limits specified in this Distribution Code and/or the Connection Agreement, the User shall immediately disconnect the Apparatus causing the problem from its electrical System connected to the Distribution System or otherwise ensure operation within the limits specified in this Distribution Code and/or the Connection Agreement. The restriction shall apply until a new Connection Agreement



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is in effect and any necessary changes to the Connection Point and/or Distribution System are completed.

- 3.9.2.8. If the User fails to rectify the situation or fails to comply with any notification in writing from the Distributor, the Distributor may disconnect the User from the Distribution System, in accordance with the Connection Agreement.



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3.10. SECTION: SYSTEM TESTS

3.10.1. SYSTEM TEST REQUIREMENTS

- 3.10.1.1. System Test, which involves the simulation of conditions or the controlled application of unusual or extreme conditions that may have an impact on the Distribution System or the User System, shall be carried out in a manner that shall not endanger any personnel or the general public
- 3.10.1.2. Precautions shall be taken to avoid unexpected outages, and/or damage to Equipment, the Distribution System, and the System of the Users when undertaking a System Test on the Distribution System or the User System.
- 3.10.1.3. Where the System Test may have an impact on the Transmission System, the Grid Code shall apply.

3.10.2. SYSTEM TEST REQUEST

- 3.10.2.1. If a User wishes to undertake a System Test on its System, it shall submit to the Distributor a System Test Request that contains the following:
- (a) The purpose and nature of the proposed System Test;
 - (b) The extent and condition of the Equipment involved; and
 - (c) A proposed System Test Procedure specifying the switching sequence and the timing of the switching sequence.
- 3.10.2.2. The System Test Proponent shall provide sufficient time for the Distributor to plan the proposed System Test. The Distributor shall determine the time required for each type of System Test.
- 3.10.2.3. The Distributor may require additional information before approving the proposed System Test if the information contained in the System Test Request is insufficient or the proposed System Test Procedure cannot ensure the safety of personnel and Reliability of the Distribution System.
- 3.10.2.4. The Distributor shall determine and notify other Users, other than the System Test Proponent, that may be affected by the proposed System Test.
- 3.10.2.5. The Distributor may also initiate a System Test if it has determined that the System Test is necessary to ensure the safety and reliability of the Distribution System.

3.10.3. SYSTEM TEST GROUP

- 3.10.3.1. If the Distributor is the System Test Proponent, it shall notify all affected Users of the proposed System Test. If the Distributor is not the System Test Proponent, it shall notify, within [one (1) month] after the acceptance of a System Test Request, the System Test



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Proponent and the affected Users of the proposed System Test. The notice shall contain the following:

- (a) The purpose and nature of the proposed System Test, the extent and condition of the Equipment involved, the identity of the System Test Proponent, and the affected Users;
- (b) An invitation to nominate representatives for the System Test Group to be established to coordinate the proposed System Test; and
- (c) If the System Test involves work or testing on MV and HV Equipment, the Safety Coordinators and the safety procedure specified in the Section: Safety Coordination shall apply.

3.10.3.2. The Distributor, the System Test Proponent (if it is not the Distributor) and the affected Users shall nominate their representatives to the System Test Group within [one (1) month] after receipt of the notice from the Distributor. The Distributor may decide to proceed with the proposed System Test even if the affected Users fail to reply within that period.

3.10.3.3. The Distributor shall establish a System Test Group and appoint a System Test Coordinator, who shall act as chairman of the System Test Group. The System Test Coordinator may come from the Distributor or the System Test Proponent.

3.10.3.4. The members of the System Test Group shall meet within [one (1) month] after the Test Group is established. The System Test Coordinator shall convene the System Test Group as often as necessary.

3.10.3.5. The agenda for the meeting of the System Test Group shall include the following:

- (a) The details of the purpose and nature of the proposed System Test and other matters included in the System Test Request;
- (b) Evaluation of the System Test Procedure as submitted by the System Test Proponent and making the necessary modifications to come up with the final System Test Procedure;
- (c) Evaluation of the outages that could be caused to the Users (including those which are not represented in the System Test Group);
- (d) The possibility of scheduling simultaneously the proposed System Test with any other test and with Equipment Maintenance which may arise pursuant to the Maintenance Programme requirements of the Distribution System or the System of the Users; and
- (e) The economic, operational, and risk implications of the proposed System Test on the Distribution System, the System of the other Users and the Scheduling and Dispatch of the Generators Connected to Distribution.



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3.10.3.6. The Distributor, the System Test Proponent (if it is not the Distributor) and the affected Users (including those which are not represented in the System Test Group) shall provide the System Test Group, upon request, with such details as the System Test Group reasonably requires carrying out the proposed System Test.

3.10.4. SYSTEM TEST PROGRAM

3.10.4.1. Within [two (2) months] after the first meeting and at least [one (1) month] prior to the date of the proposed System Test, the System Test Group shall submit to the Distributor, the System Test Proponent (if it is not the Distributor), and the affected Users a proposed System Test Program which shall contain the following:

- (a) Plan for carrying out the System Test;
- (b) System Test Procedure to be followed during the test including the manner in which the System Test is to be monitored;
- (c) List of responsible persons, including Safety Coordinators when necessary, who will be involved in carrying out the System Test;
- (d) An allocation of the testing cost among the affected parties; and
- (e) Such other matters as the System Test Group may deem appropriate and necessary and are approved by the management of the affected parties.

3.10.4.2. If the proposed System Test Program is acceptable to the Distributor, the System Test Proponent, and the affected Users, the final System Test Program shall be constituted and the System Test shall proceed accordingly. Otherwise, the System Test Group shall revise the System Test Program

3.10.4.3. If the System Test Group is unable to develop a System Test Program or reach a decision in implementing the System Test Program, the Distributor shall determine whether its is necessary to proceed with the System Test to ensure the safety and reliability of the Distribution System. In this case, the Distributor should communicate this decision to the PERC, asking for proper authorization.

3.10.4.4. The System Test Coordinator shall be notified in writing, as soon as practicable, of any proposed revision or amendment to the System Test Programme prior to the day of the proposed System Test. If the System Test Coordinator decides that the proposed revision or amendment is meritorious, he shall notify the Distributor, the System Test Proponent and the affected Users to act accordingly for the inclusion thereof. The System Test Programme shall then be carried out with the revisions or amendments if the System Test Coordinator received no objections.

3.10.4.5. If System conditions are abnormal during the scheduled day for the System Test, the System Test Coordinator may recommend a postponement of the System Test.



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3.10.5. SYSTEM TEST REPORT

3.10.5.1. Within [two (2) months] or a shorter period as the System Test Group may agree after the conclusion of the System Test, the System Test Proponent shall prepare and submit a System Test Report to the Distributor, the affected Users, and the members of the System Test Group. Copy of this report shall be sent to the PENRA for notification.

3.10.5.2. After the submission of System Test Report, the System Test Group shall be automatically dissolved.

3.11. GENERATING UNITS CAPABILITY TESTS

3.11.1. TEST REQUIREMENTS

3.11.1.1. Tests shall be conducted on Generators Connected to Distribution, in accordance with procedures and standards specified by the Distributor (or the System Operator if applicable), to confirm compliance with the Distribution Code and/or the Grid Code for the following:

- (a) Capability of Generating Units to operate within their registered Generation parameters;
- (b) Capability of the Generating Units to meet the applicable requirements of the Grid Code and the Distribution Code;
- (c) Capability to deliver any Ancillary Services that the Generator has agreed to provide; and
- (d) Availability of Generating Units in accordance with their capability declaration.

3.11.1.2. All tests shall be recorded and witnessed by representatives of the Distributor, the Generator and the System Operator (if applicable).

3.11.1.3. The Generator shall demonstrate to the Distributor (or the System Operator if applicable), the fitness for purpose and accuracy of the test instruments to be used in the test.

3.11.1.4. The Distributor (or the System Operator, if applicable) may at any time issue instructions requiring tests to be carried out on any Generating Unit connected to the Distribution System. All tests shall be of sufficient duration and shall be conducted no more than twice a year except when there are reasonable grounds to justify further tests.

3.11.1.5. If a Generating Unit connected to the Distribution System fails the test, the Generator shall correct the deficiency within a period agreed with the Distributor (or the System Operator if applicable) to attain the relevant registered parameters for that Generating Unit.

3.11.1.6. Once the Generator achieves the registered parameters of its Generating Unit that previously failed the test, it shall immediately notify the Distributor (or the System



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Operator if applicable). The Distributor (or the System Operator if applicable) shall then require the Generator Connected to Distribution to conduct a retest in order to demonstrate that the appropriate parameter has already been restored to its registered value.

3.11.1.7. If a dispute arises relating to the failure of a Generating Unit to pass a given test, the Distributor (or the System Operator if applicable), the Generator Connected to Distribution, and/or User shall seek to resolve the dispute among them.

3.11.1.8. If the dispute cannot be resolved, one or more of the parties may submit the issue to the PERC. Unless specified otherwise in the Connection Agreement or where a contract, license or concession excludes such action.

3.11.2. TESTS TO BE PERFORMED

3.11.2.1. A Generator's production of Reactive Power shall be subject to the agreement with the Distributor and Grid Code compliance (if applicable).

3.11.2.2. The Reactive Power test shall demonstrate that the Generating Unit meets the registered Reactive Power Capability requirements specified in DPCC 2.4. The Generating Unit shall pass the test if the measured values are within ± 5 percent of the capability as registered with the System Operator (if applicable) and the Distributor.

3.11.2.3. The Black Start test shall demonstrate that the Generating Unit with Black Start capability can implement a Black Start procedure, as specified in DPCC 2.4. or in the Connection Agreement. To pass the test, the Generating Unit shall start on its own, synchronise and carry load without the need for external power supply.

3.11.2.4. The Declared Data capability test shall demonstrate that the Generating Unit can be scheduled and dispatched in accordance with the Declared Data. To pass the test, the Generating Unit shall satisfy the ability to achieve the Declared Data.

3.11.2.5. The Dispatch accuracy test shall demonstrate that the Generating Unit meets the relevant Generation Scheduling and Dispatch Parameters. The Generating Unit shall pass the test if:

- In the case of synchronisation, the process is achieved within ± 5 minutes of the registered synchronisation time;
- In the case of synchronising generation (if registered as a Generation Scheduling and Dispatch Parameters), the synchronising generation achieved is within an error level equivalent to 2.5% of Declared Net Capacity;
- In the case of meeting ramp rates, the actual ramp rate is within $\pm 10\%$ of the registered ramp rate;



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- (d) In the case of meeting Load reduction rates, the actual Load reduction rate is within $\pm 10\%$ of the registered Load reduction rate; and
- (e) In the case of all other Generation Scheduling and Dispatch Parameters, values are within $\pm 1.5\%$ of the declared values.

3.11.2.6. The Ancillary Services test, as specified by the Distributor or the System Operator if applicable, shall demonstrate the services in terms of quantity, quality and operational requirements. Generators providing Ancillary Services shall conduct the tests and the Distributor (or the System Operator if applicable) shall have the right to witness the tests.

3.12. SECTION: SITE AND EQUIPMENT IDENTIFICATION

3.12.1. SITE AND EQUIPMENT IDENTIFICATION REQUIREMENTS

3.12.1.1. The Distributor shall develop and establish a standard System for Site and Equipment Identification to be used in identifying any Site or Equipment in all Electrical Diagrams, distribution operation instructions, notices, and other documents.

3.12.1.2. The identification for the Site shall include and be unique for each substation and switchyard where a Connection Point is located.

3.12.1.3. The identification for Equipment shall be unique for each transformer, distribution line, bus, circuit breaker, disconnect switch, grounding switch, capacitor bank, reactor, lightning arrester, and other MV Equipment at the Connection Point.

3.12.2. SITE AND EQUIPMENT IDENTIFICATION LABEL

3.12.2.1. The Distributor shall develop and establish a standard labelling nomenclature, which specifies the dimension, sizes of characters, and colours of labels, to identify the Sites and Equipment.

3.12.2.2. The Distributor and the User shall be responsible for the provision and installation of a clear and unambiguous label showing the Site and Equipment Identification for their respective System.



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PART 4: DISTRIBUTION METERING CODE (DMC)

4.1. SECTION: INTRODUCTION

4.1.1. APPLICABILITY

4.1.1.1. This Distribution Metering Code must be applied and used together with:

- (a) The Distribution Performance Standards Code; and
- (b) the PENRA Metering Code.

4.1.2. PURPOSE AND SCOPE

4.1.2.1. The purpose of this Distribution Metering Code (DMC) is to specify the technical and operational criteria, including the procedures to be complied with by the Distributor, in carrying out its obligation to provide metering services to Users at each Metering Point. It also applies to Users in so far as their Equipment may affect the Distribution System.

4.1.2.2. The Distribution Metering Code applies to the following:

- (a) Distributors
- (b) Users connected to, or seeking connection to, the Distribution System.

4.1.2.3. The Distributor shall:

- (a) Own, install, verify, operate, maintain, inspect and replace all Metering Systems at Metering Points on the Distribution System, except Metering Systems situated at Connection Points to the Transmission System.
- (b) Ensure that each Metering System installed on its Distribution System meets the performance, functional and technical requirements set out in this Distribution Metering Code and applicable standards listed in Annex 2;
- (c) Ensure that each Metering System installed on its Distribution System is certified where so required by the PSI, is in working condition and has been tested for accuracy.
- (d) Retrieve data from each Metering System installed on its Distribution System for the purposes of billing and settlement;
- (e) Process data retrieved from each Metering System installed on its Distribution System for the purposes of billing and settlement; and
- (f) Shall notify the PERC of all Metering Systems where the Distributor cannot comply with this Distribution Metering Code and shall seek derogation from the PERC, and the PERC may or may not grant such derogation and may impose any conditions as it reasonably sees fit.



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4.2. SECTION: OBLIGATIONS

4.2.1. INSTALLATION AND REPLACEMENT OF METERING EQUIPMENT

4.2.1.1. The installation of Metering Equipment shall be in accordance with Part 1 Section 4 of the Distribution Code.

4.2.1.2. The Distributor may replace Metering Equipment for which it is responsible at any time after it has been installed, subject to the provisions of this Distribution Metering Code. The Distributor shall notify the User in advance of any replacement, unless that replacement is provided as part of Urgent Metering Services.

4.2.1.3. The Distributor shall:

- (a) Assign a unique identifier to the Metering System, cross-referenced to the location of the Metering System;
- (b) Record the date of installation of the Metering System;
- (c) Record the functionality of the Meter and the unit of measurement used to measure Energy flowing through the Metering System or Maximum Load, as it corresponds;
- (d) Record the identification of the ancillary equipment;
- (e) Record any site-specific loss adjustment factors to be applied;
- (f) Record redundancy details and sources of check metering data, where required by this Distribution Metering Code, and identification of the meters designated as the main Meter and as the check Meter; and
- (g) Record the initial Meter register reading.
- (h) Ensure that the metering data stored in the Metering System is retrieved and, where a meter is removed, shall ensure that a final Meter reading is obtained.

4.2.1.4. The Distributor shall maintain the following information for each Metering System:

- (a) Location of the Metering System;
- (b) A record of any malfunction of the Metering System including any test results and of repairs made to the Metering System; and
- (c) Documentation of Meter testing prior to installation.

4.2.1.5. The Distributor shall, on request, make available for each Metering System the information listed in DMC Section 2.1.3 and 2.1.4 to:

- (a) The User associated with the metering system;
- (b) The PERC and PSI.



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4.2.2. STANDARD METERING SYSTEMS

- 4.2.2.1. Each Metering Point shall be situated as close as is reasonably practicable to the relevant Connection Point.
- 4.2.2.2. Prior to the installation of any Meter or current transformers and voltage transformers that form part of a Metering System, such Metering Equipment shall be:
- (a) Submitted by the Distributor to a laboratory that has been accredited by the PSI for testing and certification; or
 - (b) Received by the Distributor directly from a manufacturer with a test certificate endorsed by an independent laboratory accredited by the PSI.
- 4.2.2.3. Copies of all test certificates shall be retained by the Distributor whilst the Metering Equipment is in use, and for Metering Equipment that is no longer in use, for a minimum period of six years after the Metering Equipment has been de-commissioned and rendered un-useable or scrapped. The Distributor shall produce these certificates upon notice from the Palestinian Standard Institute.
- 4.2.2.4. No Metering Equipment shall be certified as complying with this Distribution Metering Code unless the Distributor has received the relevant test certificates from the relevant accredited laboratory or manufacturer.
- 4.2.2.5. Standard Medium Voltage Metering Systems:
- (a) Shall contain a Meter or more than one Meter, each of which complies with the standards in this Distribution Metering Code;
 - (b) Shall record Active Energy (kWh);
 - (c) Shall record Reactive Energy (kVARh);
 - (d) Shall record Maximum Load in the cases the applicable tariffs specifies that; and
 - (e) Shall have metering current and voltage transformers that are tested and comply with the standards in Annex2 A.
- 4.2.2.6. The Distributor may agree with the User the use of more accurate Meters or Metering System in particular cases of Medium or Large Connections.
- 4.2.2.7. The rated short-time current rating shall not be less than
- (a) 20kA for 3 seconds for MV Metering Points at above 6.6kV; or
 - (b) 16kA for 3 seconds for MV Metering Points at 6.6kV and below.
- 4.2.2.8. For each circuit, metering voltage transformers of accuracy class 1.0 with 110 volts secondary voltage and 100VA burden per phase for star-star connection or 180VA burden per phase for 'V' connection shall be provided.



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4.2.2.9. Standard Low Voltage Metering Systems:

- (a) Shall contain a Meter or more than one Meter, each of which complies with the standards in this Distribution Metering Code, being either 1-phase, 2-wire or 3-phase, 4-wire type of accuracy class 1.0 and metering current transformers, where applicable, of accuracy class 0.5 with 5 amperes or 1 ampere secondary current and 5VA burden.;
- (b) Shall record Active Energy (kWh);
- (c) Shall record Reactive Energy (kVArh);
- (d) Shall record Maximum Load in the cases the applicable tariffs specifies that;
- (e) Shall contain, where necessary, metering current transformer(s) provided by the Distributor that are tested and comply with the standards in Annex A; and
- (f) Shall contain a suitable facility (including all necessary pre-wiring), provided by the Distributor, in which to house the Metering System.

4.2.3. ALTERNATIVES TO STANDARD METERING SYSTEMS

4.2.3.1. Upon the request of a User, the Distributor may arrange for a Metering System to install a check meter, or to contain features or equipment in addition to those specified in this Distribution Metering Code provided that:

- (a) The User agrees to pay the full costs of the additional features or equipment, including the costs of installation, operation, maintenance, repairs and replacement; and
- (b) The additional features or equipment are compatible with the rest of the Metering System and do not lead to any degradation of the capability of the Metering System that would cause the Metering System to fail to meet any standards contained in this Distribution Metering Code.

4.2.4. FAULTY METERING EQUIPMENT

4.2.4.1. A Metering System shall be considered faulty and not in compliance with this Distribution Metering Code if it is determined that any part of that Metering System does not comply with this Distribution Metering Code.

4.2.4.2. If a Metering System fault occurs, the Distributor shall provide Urgent Metering Services to repair or replace the Metering System as soon as is reasonably practicable and in any event within two working days of the Distributor discovering that the fault exists.

4.2.4.3. The User shall use Metering Equipment in a safe and prudent manner and shall take due care to avoid damage. The User shall notify the Distributor of any damage to the Metering Equipment, however caused.



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4.2.4.4. The Distributor shall ensure that suitable data is obtained or estimated for the period of time commencing when a Meter or Metering Equipment becomes faulty until the completion of the repair or replacement.

4.2.4.5. The Distributor shall record all relevant Meter parameters for a replacement Meter in that Metering System.

4.2.5. TECHNICAL REQUIREMENTS AND ACCURACY OF METERS

4.2.5.1. The Distributor shall ensure that the accuracy of each Meter in each Distributor System is certified by an accredited Meter test laboratory approved by the PSI and meets the applicable accuracy limits.

4.2.5.2. The limits of accuracy for the following classes of Meters shall be:

- (a) $\pm 0.2\%$ for class 0.2 S static watt-hour meters.
- (b) $\pm 0.5\%$ for class 0.5 S static watt-hour meters.
- (c) $\pm 0.5\%$ for class 0.5 watt-hour meters.
- (d) $\pm 1.0\%$ for class 1.0 watt-hour meters.

4.2.5.3. The PSI may issue directives with the procedures to be applied to verify the limits of accuracy of Meters. These directives could specify that, in cases of sampling testing of more than one meter, a pre-defined PSI gauge of Meters shall comply with more stringent accuracy.

4.2.5.4. In the event of non-compliance with the required standards, the Distributor shall ensure that the accuracy of any Meter in that Metering System is restored to comply with the accuracy standards described in Section 2.5.2 as soon as is reasonably practicable.

4.2.5.5. The Distributor shall maintain certification records and test results relating to the accuracy class and compliance with the relevant standards for the particular type and model of Meter in that Metering System.

4.2.5.6. The Distributor shall maintain records of the information referred to in this section for each Metering System, either in use or no longer in use, for at least six years and shall produce these records when required by the PERC.

4.2.6. AUDIT AND INSTALLATION TESTS

4.2.6.1. The Distributor shall ensure that each Metering System is inspected according to the minimum frequencies specified in following Table:

Type of Metering System	Frequency
Medium Voltage	Once every year
Low Voltage, including prepayment	Once every 3 years



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4.2.6.2. The Distributor may, and on the direction of the PERC shall, carry out periodic, random and unannounced inspection and or testing of any Metering System and associated data for the purpose of ascertaining whether the Metering System complies with the requirements of this Distribution Metering Code. The User may request the Distributor to carry out such inspection and or testing, provided that the User pays the cost, unless an error or malfunction not caused by the User is discovered. In addition, the PSI may carry out its own unannounced inspection and or test, in which case the User shall grant access.

4.2.6.3. The Distributor shall, as soon as practicable, make the results of any inspection and or tests conducted pursuant to this section available to the requesting party and to the User associated with the Metering System.

4.2.7. ACCESS TO METERING SYSTEMS

4.2.7.1. The User shall grant access to the Distributor to enable the Distributor to fulfil its obligations under this Distribution Metering Code. This right of access is conditional upon:

- (a) Where practicable, prior notice by the Distributor; and
- (b) The production of identification by the Distributor's staff or contractor.

4.2.7.2. Prior arrangement by the Distributor shall not be required in respect of routine Meter reading, or periodic, random and unannounced audits required by DMC Section 2.6.2, or when the Distributor is performing Urgent Metering Services.

4.2.8. SECURITY OF METERING SYSTEMS

4.2.8.1. The Distributor shall, so far as is reasonably practicable, maintain the security of the metering data stored in or obtained from each Metering System.

4.2.8.2. Appropriate seals shall be applied to each Metering System. Seals shall be replaced following works requiring the removal of any seals. The Distributor's procedures for the control of seals and sealing pliers shall be subject to approval by the PERC.

4.2.8.3. The Distributor shall, so far as is reasonably practicable, ensure that physical access to each Meter contained in each Metering System is protected by:

- (a) Sealing all associated links, circuits, data storage and data processing systems;
- (b) Ensuring that the Metering System meets the requirements for the security of Metering Systems set out in this Distribution Metering Code.
- (c) The Distributor shall use reasonable endeavors to ensure that all metering data within each Metering System is secure.





4.2.9. METER READING

- 4.2.9.1. The Distributor shall schedule a monthly reading for all manually read meters.
- 4.2.9.2. For kilowatt-hour meters, the Distributor shall verify at each Meter reading that the Meter identification number on the Meter matches the Meter identification number on the Meter reading schedule.
- 4.2.9.3. The Distributor shall record:
- (a) The Meter identification number;
 - (b) The Meter reading and read date at the beginning of the Meter reading period;
 - (c) The Meter reading and read date at the end of the Meter reading period;
 - (d) The cumulative Active Energy (kWh) recorded during the Meter reading period;
 - (e) Where the User is billed for Reactive Energy, the cumulative Reactive Energy (kVARh) recorded during the Meter reading period;
 - (f) Where the User is billed for maximum Active Power, the maximum Active Power recorded during the Meter reading period;
 - (g) Where the User is billed for maximum Reactive Power, the maximum Reactive Power recorded during the Meter reading period; and
 - (h) Details of any Meter alarms that were recorded during the period (e.g., system outages, VT failure).

4.2.10. REMOTE METERING EQUIPMENT

- 4.2.10.1. The Distributor shall specify the type of equipment to be used for communication with remote meters.
- 4.2.10.2. The Distributor shall conduct such tests as it deems necessary to verify production or consumption recorded at each Metering Point.

4.2.11. DATA MANAGEMENT

- 4.2.11.1. The Distributor shall:
- (a) Maintain a metering data registry that contains usage data for each User and data required for settlement purposes in respect of each Metering System;
 - (b) Validate metering data for each Metering System;
 - (c) Estimate usage when Meter readings are not available, inaccurate, or otherwise not suitable for settlement purposes;
 - (d) Apply adjustments to metering data to account for system losses and unaccounted for energy;



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- (e) Aggregate metering data for settlement and loss calculation purposes; and
- (f) Use reasonable endeavours to maintain the security and confidentiality of the metering data.

4.2.12. DATA REGISTRATION

4.2.12.1. The Distributor shall establish and maintain a register that contains the following information for each Metering System:

- (a) A unique identifier assigned by the Distributor to the Metering System cross-referenced to the location of the Metering System and cross referenced to the User's account;
- (b) The date of installation of the Metering System;
- (c) The functionality of the Meter and the unit of measurement used to measure Energy flowing through the Metering System (e.g., kWh meter, kVarh meter);
- (d) Identification of the ancillary equipment;
- (e) Any site-specific adjustment factors to be applied, including a cross reference to the unique identifier specified in (a) above;
- (f) The existence of redundancy and sources of check metering data, where required by this Distribution Metering Code, and identification of the meters designated as the main Meter and as the check Meter;
- (g) Data for each Meter following completion of the validation and estimation procedures;
- (h) Billing data for each Meter following completion of adjustments for losses and unaccounted for energy; and
- (i) The data covering a period of not less than twelve months which shall be immediately accessible in electronic form.

4.2.13. DATA VALIDATION AND LOSS ADJUSTMENT FACTORS

4.2.13.1. The Distributor shall:

- (a) Have in place data validation procedures and loss adjustment calculation methodologies approved by the PSI;
- (b) Where necessary, determine site-specific loss adjustment factors for each Metering System;
- (c) Multiply each valid reading by the appropriate loss adjustment factor to produce loss adjusted production or consumption; and
- (d) Shall maintain both unadjusted and loss-adjusted values in the metering data registry in respect of each Metering System.



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4.2.14. METERING DISPUTES

4.2.14.1. The Disputes must Applied referring to the general electricity law and regulation No.2/2018.

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PART 5: DATA REGISTRATION CODE (DDRC)

5.1. SECTION: DATA REGISTRATION CODE

5.1.1. INTRODUCTION

5.1.1.1. The various sections of the Distribution Code require Users to submit data to the Distributor.

5.1.1.2. The Distribution Data Registration Code (DDRC) provides a series of schedules summarizing all requirements for information of a particular type. Each class of User is then referred to the appropriate schedule or group of schedules for a statement of the total data requirements in his case.

5.1.1.3. The DDRC specifies procedures and timings for the supply of data and subsequent updating, where the timings are covered by detailed timetables laid down in other sections of the Distribution Code they are not necessarily repeated in full in the DDRC.

5.1.1.4. In the case of a Generator seeking a connection to the Distribution System then irrespective of the potential arrangements for scheduling and dispatch, discussions on connection will be with the Distributor concerned with the connection arrangements.

5.1.2. SCOPE

5.1.2.1. The Users to which the DDRC applies are:

- (a) Generation Connected to Distribution;
- (b) All Users with a maximum demand equal to or greater than 4 MVA.
- (c) Any other Distributor connected to the host Distributor.

5.1.3. DATA CATEGORIES

5.1.3.1. The data required by the Distributor is divided into three categories, System Planning Data (SPD), Operational Data (OD) and Distribution Planning Data (DPD)

5.1.3.2. In order to assess the implications for making a connection the Distributor will require SPD and OD information, the precise requirements being decided by the Distributor and dependant upon the circumstances. Following an agreement to connect the User must supply data as requested by the Distributor which will be referred to as Registered Data.

5.1.4. PROCEDURES AND RESPONSIBILITIES

5.1.4.1. Unless otherwise specified or agreed by the Distributor each User is required to submit data as defined below.



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5.1.4.2. It is a requirement of the DDRC that data changes are advised as soon as practicable to the Distributor and in any case reviewed annually to ensure continued accuracy or relevance.

The Distributor will initiate this review in writing and the User will respond in writing. Where possible data will be submitted on standard forms forwarded to the User by the Distributor.

5.1.4.3. If a User wishes to change any data item then this must first be discussed with the Distributor concerned in order for the implications to be considered and the change if agreed (such agreement not to be unreasonably withheld), be confirmed by the submission of a revised data form or by verbal means with confirmation by telex or similar if short timescales are involved.

5.1.4.4. From time to time the Distributor may change its data requirements, appropriate Users will be advised of these changes as they occur and will be provided with a reasonable timescale by which to reply.

5.1.5. DATA TO BE REGISTERED

5.1.5.1. Schedules 1A, 1B and 1C - Generator Connected to Distribution Technical Information.

5.1.5.2. Schedule 2 - Demand forecasts - as described in Section 3., time varying output/generation forecasts for the Users defined in the scope.

5.1.5.3. Schedule 3 - Operational Planning - as described in Section 3, outage planning information.

5.1.5.4. Schedule 4 - System Design Information - comprising System technical data.

5.1.5.5. Schedule 5 - Load Characteristics - comprising the forecast data for load points indicating for example, the maximum load, the equipment that comprises the load, and the harmonic content of the load.

5.1.5.6. The schedules applicable to each class of User are:

Schedule Number:	Title	Applicable to
Schedule 1A	Generating Unit Data	All Generators Connected to Distribution
Schedules 1B and 1C	Generating Unit Data	All Generators Connected to Distribution greater than 5 MW



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Schedule2	Demand Forecasts	All Generators Connected to Distribution greater than 5 MW; Any other Distributor connected to the host Distributor System; All Users whose Demand is greater than 4 MVA
Schedule3 (A,B)	Operational Planning	Generators Connected to Distribution whose output is greater than 5MW; Any other Distributor connected to the host Distributor System; All Distributor own supplied Users whose Demand is greater than 4 MVA
Schedule4-5	System Design Information and Load Characteristics	Generators Connected to Distribution; Any other Distributor connected to the host Distributor System; All Users.



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5.1.6. SCHEDULES

SCHEDULE 1A – GENERATION UNIT DATA FOR ALL GENERATORS CONNECTED TO DISTRIBUTION

Data description	Units	Data category
Terminal Volts	kV	SPD
Rated KVA	kVA	SPD
Rated kW	kW	SPD
Maximum Active Power sent out	kW	SPD
Reactive Power required	kVAr	SPD
Type of Generator	Text	SPD
Type of Prime Mover	Text	SPD
Anticipated Operating Regime	Text	SPD
Fault Level Contribution	MVA	SPD
Method of Voltage Control	Text	SPD
Generator Transformer Details	Text	SPD

SCHEDULE 1B – GENERATING UNIT DATA FOR ALL GENERATORS CONNECTED TO DISTRIBUTION
GREATER THAN 5MW

Data description	Units	Data category
Rated MW at Registered Capacity for individual units and the Power Station	MW	SPD
Rated MW at Minimum Generation for individual units and the Power Station	MW	SPD
Auxiliary Demand for individual units and the Power Station at Registered Capacity conditions	MW MVA	SPD



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Auxiliary Demand for individual units and the Power Station under Minimum Generation conditions		MVA MVA _r	SPD
Individual Generator Information			
Rating		MVA	SPD
Generator MW/MVA _r Capability Chart		Text	SPD
Inertia Constant		MWsec/MVA	SPD
Stator Resistance		% on MVA	SPD
Direct Axis Reactance	Sub-transient	% on MVA	SPD
	Transient	% on MVA	
	Synchronous	% on MVA	
Quarter Axis Reactance	Sub-transient	% on MVA	SPD
	Synchronous	% on MVA	
Time Constants	Direct axis sub-transient	sec	SPD
	Direct axis transient	sec	
	Quarter axis sub-transient	sec	

SCHEDULE 1C – GENERATING UNIT DATA FOR ALL GENERATORS CONNECTED TO DISTRIBUTION GREATER THAN 5 MW

Data description		Units	Data category
Zero Phase Sequence	Resistance	% on MVA	SPD
	Reactance	% on MVA	SPD
Negative Phase Sequence	Resistance	% on MVA	SPD
	Reactance	% on MVA	SPD
Generator Transformer	Resistance	% on MVA	SPD
	Reactance	% on MVA	SPD
	MVA rating	MVA	SPD



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	Tap Arrangement	Text	SPD
	Vector Group	Text	SPD
	Earthing	Text	SPD
Automatic Voltage Regulator		Diagram	SPD
A block diagram for the model of the AVR System including data on the gains forward and feedback time constants and voltage control limits		Text	SPD
Speed governor and prime mover data		Diagram	SPD
A block diagram for the turbine control System and turbine time constants together with the turbine rating and maximum power		Text	SPD



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SCHEDULE 2 – DEMAND FORECASTS

	Data description	Units	Time period covered	Update time	Data category
1	Monthly average Energy demand at the Connection Point	MWh	Year 1	Week 35	OD
2	Hourly load profile [hourly Active Power and Power Factor] For typical days,	MWh - MVar	Year 1	Week 35	OD
3	Expected dispatch of Generation Connected to Distribution (not subject to centralized dispatch) For typical days	MW - MVar	Year 1	Week 35	OD
4	Schedules for the operation of Generation Connected to Distribution (not subject to centralized dispatch) whose output is greater than 5MW on a hourly basis	MW Date time	2 weeks to 8 weeks ahead	15:00 hrs each Wednesday	OD
5	Users, and other Distributors connected to the Distribution System shall notify the Distributor where their operations are likely to result in an aggregate change in Demand at the Connection Point of supply of greater than 5MW of the Demand at that time on an hourly basis.	MW Date Time	2 weeks to 8 weeks ahead	15:00 hrs each Wednesday	OD
6	Items 4, and 5 above updated.		2 days to 12 days ahead	0900 hrs each Monday	OD



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7	Details of differences greater than 5MW from the schedules of operation of any Generation Connected to Distribution (not subject to centralized dispatch) on an hourly basis submitted under item 4 above.	MW Date Time	0 - 24 hrs ahead	As specified	OD
8	Details from each User connected to the Distribution System of any change in aggregate Demand at the	MW Date Time	0 - 24 hrs ahead	As specified	OD
	point of surplus of greater than 5 MW of the Demand				

SCHEDULE 3A – OPERATIONAL PLANNING – LONG TERM –
YEARS 1-2

GENERATORS CONNECTED TO DISTRIBUTION NOT SUBJECT TO
CENTRAL DISPATCH (EMBEDDED GENERATION)

Data description	Units	Time period covered	Update time	Data category
1. For individual Generating Units the unit number and Generating Plant capacity. Preferred outage dates earliest start date, latest start date.	MW Date	Year 1	Week 2	OD
2. Generators provide the Distributor with estimates of :				
a. Output Usable.	MW Date	Year 1	Week 10	OD
b. Outage programmed.	Date	Year 1	Week 10	OD
3. Distributor following discussion with Generator provide:				



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	Details of Generating Plant they may withdraw from service for an outage		Year 1	Week 10	OD
	Update of Generator outage programmed		Year 1	Week 10	OD
4.	Distributor notify each Generator of Output Usable requirements.	MW Date	Year 1	Week 12	OD
5.	Generator provide estimates of Output Usable of each Generating Plant	MW Date	Year 1	Week 41	OD

SCHEDULE 3B – OPERATIONAL PLANNING – MEDIUM AND SHORT TERM

GENERATORS CONNECTED TO DISTRIBUTION NOT SUBJECT TO CENTRAL DISPATCH (EMBEDDED GENERATION)

Data description	Units	Time period covered	Update time	Data category
For individual Generating Units the unit number and Generating Plant capacity. Duration of outage, earliest start date, latest finishing date.	MW Date	Weeks 9 - 52	Week 2	OD
Output Usable estimates.	MW Date	Weeks 9 - 52	Week 2	OD
Distributor informs Generators of Output Usable requirements.	MW Date	Weeks 9 - 52	Week 4	OD
Generators provide Distributor with Generating Plant Output Usable estimates.	MW Date	Weeks 18 - 52	Week 10	OD



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Distributor informs Generators of change to Output Usable requirements.	MW Date	Weeks 18 - 52	Week 12	OD
Generators provide Distributor with Generating Plant Output Usable estimates.	MW Date	Weeks 28 - 52	Week 25	OD
Distributor informs Generators of changes to Output Usable requirements	MW Date	Weeks 31 - 52	Week 27	OD
Generator will provide estimates of Generating Plant Output Usable.	MW Date	Weeks 44 - 52	Week 41	OD
Distributor inform contracted Generators of changes to Output Usable requirements.	MW Date	Weeks 44 - 52	Week 43	OD
As changes occur.		Update of Users proposals agreed in the Medium Term Plan.		

SCHEDULE 4 – SYSTEM DESIGN INFORMATION

Data description	Units	Data category
2. Reactive Compensation		
Rating of individual shunt reactors (not associated with cables)	MVAr	DPD
Details of any automatic control logic such that operating characteristic can be determined.	Text/ Diagrams	DPD
Point of connection to the System	Diagram	DPD



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Lumped Network susceptance Details of the equivalent lumped network susceptance of the User's System referred back to the connection with the Distribution System Including: shunt reactors which are an integrated part of a cable System and which are not normally in or out of service independent of the cable. Excluding: independently switched Reactive compensation connected to the User's System and any susceptance of the User's System inherent in the active and Reactive Demand	MVar	DPD
4. Fault In feeds		
Maximum and minimum short circuit in feeds into the Distributor System	MVA	DPD
X/R ratio under maximum and minimum short circuit conditions		DPD
[Contribution from rotating Plant]		DPD
Equivalent network information at the request of the Distributor		DPD
For User interconnections that operate in parallel with the Distribution System details of the interconnection impedance shall be exchanged between the Distributor and User, including Positive Sequence Resistance Zero Sequence Resistance Positive Sequence Reactance Zero Sequence Reactance Susceptance	% on 100 % on 100 % on 100 % on 100 % on 100	DPD
If the impedance in the view of the Distributor is low then more detailed information will be requested.		



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5.	Demand Transfer Capability		
	Information shall be exchanged on Demand transfer capability where the same Demand may be supplied from alternative Distributor or User points of supply including the proportion of Demand normally fed from each point of supply.	MW	DPD
	The arrangements for manual/automatic transfer under planned/outage conditions should be provided		DPD
6.	Non Distributor System Data		
	The Distributor will request information on circuit parameters, switchgear and protection arrangements		DPD

SCHEDULE 5 – LOAD CHARACTERISTICS

Data description	Units	Data category
Types of Demand :		
Maximum Active Power Demand	kW	SPD
Maximum and minimum Reactive Power requirement	kVAr	SPD
Type of load and control arrangements, e.g. variable speed motor type of starter employed	Text	SPD
Maximum load on each phase at the time of maximum Demand	Amps/Phase	DPD
phase unbalance	Amps/Phase at the time	DPD
Maximum harmonic content	% of harmonic number	DPD
Fluctuating Loads:		



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Rate of change of active and Reactive Power both increasing and decreasing	kW/sec kVAr/sec	DPD
Shortest repetitive time interval between fluctuation in active and Reactive Power	Sec	DPD
Largest step change in active and Reactive Power both increasing and decreasing.	kW kVAr	DPD



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Annexes

ANNEX 1 - DISTRIBUTION CODE STANDARDS

1. JS/945/2001 Jordan Institute for Standards and Metrology – Voltage – Standards: Voltage System for Transmission, Distribution and Utilization.
2. Engineering Recommendation G 5/4: Planning levels for harmonic voltage distortion and the connection of non-linear equipment to transmission and Distribution Systems.
3. Engineering Recommendation P 28: Planning limits for voltage fluctuations caused by industrial, commercial and domestic equipment.
4. Engineering Recommendation P 29: Planning limits for voltage unbalance for 132kV and below.
5. Engineering Recommendation G 59/1: Recommendation for the connection of private generating Plant to the Public Electricity Suppliers' Distribution Systems.
6. Engineering Recommendation G 75/1: Recommendations for the connection of embedded generating Plant to public Distribution Systems above 20kV or with outputs over 5MW.
7. Engineering Recommendation G 83/1: Recommendations for the Connection Of Small Scale Embedded Generators (Up To 16 A Per Phase) in Parallel with Public Low-Voltage Distribution Networks.

ANNEX 2 - DISTRIBUTION METERING CODE STANDARDS

**for undated references, the latest edition of the referred document (including any amendment or corrigenda) applies.*

** These standards are already in use in Palestine.*

prEN 60044-1	Current transformers (IEC 60044-1)
IEC 60044-2	Voltage Transformers
IEC 60044-3	Combined Transformers
IEC 60687	Alternating Current Static Watt-Hour Meters for Active Energy
IEC 61036	(Class 0.2S and 0.5 S)
BS EN 61107	Alternating Current Static Watt-hour Meters for Active Energy
IEC 61268	(Class 1 and 2)
BS EN 62053-11	Data Exchange for Meter reading – direct local data exchange.



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ANNEX 3- DEMAND FORECASTS - OPERATIONAL PLANNING PHASE

(Each Year, by Week 35) Forecast

information for:

- Monthly average Energy demand at the Connection Point
- Load profile [hourly Active Power and Power Factor (or Reactive Power)] for a typical working day, non working day (Friday or Holiday) and Saturday.
- Hourly Active Power output of Generation Connected to Distribution, not subject to Centralized Dispatch (Embedded Generation) for a typical working day, non working day (Friday or Holiday) and Saturday.

In addition, where the loading or the generation output of a User may have a particular impact on the security of the System, then the Distributor may on request require the following information from a User.

- Active and Reactive Power Demand at the time of the peak of the Distribution System (or another specific moment the Distributor deems suitable), together with forecasts of Demand to be met and relieved by Generation Connected to Distribution not subject to centralized dispatch and planned Demand Control by other Users.

This additional information will, where requested by the Distributor, be updated throughout the current year (Year 0) in the Programming Phase, the times to be notified by the Distributor where this is necessary.

ANNEX 4- DEMAND FORECASTS - PROGRAMMING PHASE

(24 hours to 8 weeks ahead inclusive) The

following information shall be provided to the Distributor:

- Schedules for the operation of Generation Units whose output is greater than [1 MW] on an hourly basis (but which are not subject to Central Dispatch);
- Consumers and other Distributor connected to the Distribution System shall notify the Distributor where they are likely to result in an aggregated change in Demand at the Connection Point of supply of greater than 5 MW of the Demand at the time on an hourly basis; and
- Any other relevant Demand forecast information reasonably required by the Distributor

The information shall be provided to the Distributor in the following timescales

- For the period 2 to 8 weeks ahead the information shall be supplied to the Distributor by 15:00 hours each Wednesday.



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- b. For the period 2 to 13 days ahead the information shall be updated and supplied to the Distributor by 09:00 hours each Monday.
- c. The Distributor may require the information provided to be updated if it reasonably considers it necessary and to be supplied to the Distributor by 08:00 hours each day (or such other time as specified by the Distributor from time to time) for the next day (except that it may be for the next 3 days on Thursday and 2 days on Fridays) and may be longer (as specified by the Distributor at least one week in advance) to cover holiday periods.

ANNEX 5- OUTAGE PLANNING

ANNUAL MAINTENANCE PLAN (YEAR 1)

EACH CALENDAR YEAR BY:

WEEK 2: Generators shall provide the Distributor with a provisional Generating Plant outage programmed for Year 1 specifying the Generating Unit and MW concerned, the preferred date for each proposed outage, where applicable earliest start date and latest finishing date.

WEEK 10: Generators provide the Distributor with estimates of Output Usable for each Generating Plant for Year 1 and its proposed Generating Unit outage programmed for Year.

WEEK 12: The Distributor will, after discussion with the Generator, provide the appropriate Generator with details of Distribution System constraints and potential Distribution System requirements during each week of Year 1 for an outage, together with any suggested changes to its proposed Generating Unit outage programmed.

The Distributor will notify each Generator of Output Usable requirements for Year 1 weeks 1-52.

WEEK 28: Users within the Distributor area will provide the Distributor with details of outages due to take place during the Years 1 which may affect the performance of the Distribution System.

In addition to outage proposals, the programmed shall include Trip Testing, Risks of Trip, and other information where known which may affect the security of the Distribution System.

WEEK 41: Each Generator will provide the Distributor with revised estimates of the Output Usable of each Generating Plant for Year 1.



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WEEK 48: Following consultation with Users, the Distributor will include their proposals in the Annual Maintenance Plan.

MEDIUM TERM PROGRAMME (CURRENT MAINTENANCE YEAR DOWN TO PROGRAMMING PHASE)

EACH CALENDAR YEAR

- WEEK 2: Generators not included in the Annual Maintenance Plan will provide the Distributor with a provisional Generating Plant outage programmed for the current calendar year specifying the Generating Plant and MW concerned, duration of the outage, earliest start date and latest finishing date where applicable. Generators will also provide the Distributor with revised estimates of Generating Plant Output Usable for weeks 9 - 52.
- WEEK 4: Distributor informs Generators Output Usable requirements for weeks 9 - 52.
- WEEK 10: Generators will provide the Distributor with estimates of each Generating Plant Output Usable for weeks 18 - 52.
- WEEK 12: The Distributor will inform Generators of their desired changes to Output Usable requirements for weeks 18 - 52 and will provide details of Distributor Distribution System constraints and Distributor Distribution System requirements.
- WEEK 25: Generators will provide the Distributor with estimates of each Generating Plant Output Usable for weeks 28 - 52.
- WEEK 27: The Distributor will inform Generators of changes to Output Usable requirements for weeks 31 - 52.
- WEEK 41: Generators will provide the Distributor with estimates of each Generating Plant Output Usable for weeks 44 - 52.
- WEEK 43: The Distributor will inform Generators of changes to Output Usable requirements for weeks 44 - 52.

An update of Users proposals agreed in the Medium Term Plan will be included in the Short Term Programming Phase.



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ANNEX 6: OTHER INTERNATIONAL STANDARDS (NOT PART OF THE DISTRIBUTION METERING CODE)

**for undated references, the latest edition of the referred document (including any amendment or corrigenda) applies.*

BS EN 60514	Acceptance inspection of class 2 alternating-current Watthour meters
BS EN 60044-5	Instrument transformers - Capacitor voltage transformers
BS EN 60044-6, IEC 60044-6	Instrument transformers. Requirements for protective current transformers for transient performance
BS EN 60044-7, IEC 60044-7	Instrument transformers. Electronic voltage transformers
BS EN 60044-8	Instrument transformers - Electronic current transformers
IEC 60186	Voltage Transformers
BS EN 60521	Class 0.5, 1 and 2 alternating current watt-hour meters
BS EN 61038	Specification for time switches for tariff and load control.
BS EN IEC 61358:1996, 61358	Acceptance inspection for direct connected alternating current static watt-hour meters for active energy (classes 1 and 2)
BS EN 62052-11	Electricity metering equipment (AC). General requirements, tests and test conditions. Metering equipment
BS EN 62053-22	Electricity metering equipment (AC). Particular requirements. Static meters for active energy (classes 0,2 S and 0,5 S)



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BS EN 62053-21	Electricity metering equipment (AC). Particular requirements. Static meters for active energy (classes 1 and 2)
BS EN 62053-23	Electricity metering equipment(AC). Particular requirements. Static meters for reactive energy (classes 2 and 3)
BS 7856	Code of Practice for Design of Alternating Current WattHour Meters for Active Energy (Classes 1 and 2)
BS 7951	Electricity meters. Alternating-current single-phase static watt-hour telemeters of accuracy class 1 or 2
IEEE 519	IEEE Recommended Practice and Requirements for Harmonic Control in Electric Power Systems



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