

Approved by ERE's Board of Commissioners Decision  
No. 39, dated 30.08.2005

## **ELECTRICITY DISTRIBUTION FUNCTIONING CODE**

# Distribution Functioning Code

## INTRODUCTION

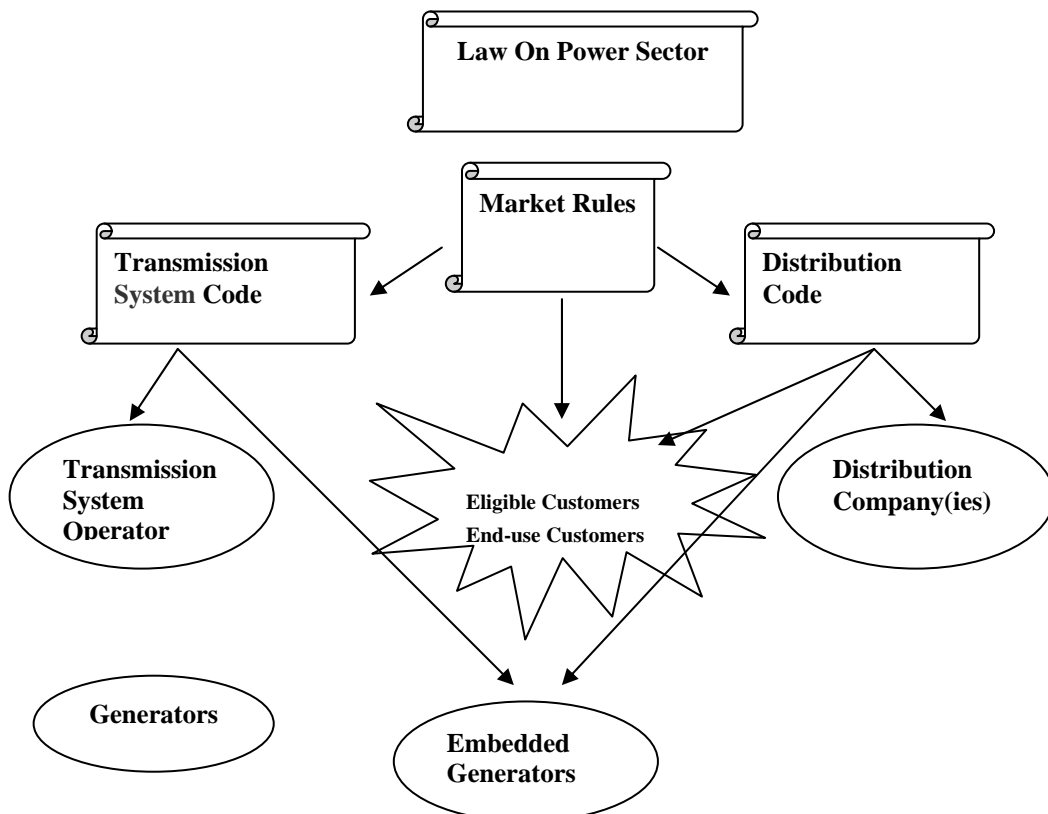
Albanian Distribution Functioning Code (Distribution Code) is part of secondary legislation established under the Law No. 9072, dated 22.05.2003 "On Power Sector" (PSL).

Distribution Code is a set of rules, norms, procedures and technical requirements to Administrators and Users of Distribution Network that establish their relations based on this Code.

Pursuant to legal obligations established by the Law No. 9072, dated 22.05.2003 "On Power Sector" (PSL), the Distribution Code is composed of four chapters parts.

1. **Chapter I: General Provisions**, specifies general technical and procedural issues.
2. **Chapter II: Planning**, specifies the criteria and procedures to be implemented by Distribution Company(ies) as they plan and develop the Distribution System.
3. **Chapter III: Operation**, specifies the terms for the Distribution Company(ies) to operate the Distribution System.
4. **Chapter IV: Connection**, specifies the terms, criteria and deadlines to be fulfilled by Customers in order to connect to the Distribution System or modify their existing connections.

**Figure No. 1 Distribution Code in the framework of Power Sector Legislation**



## CHAPTER I

### GENERAL PROVISIONS

#### 1. General Issues

##### 1.1 Purpose

The purpose of the Distribution Code is to promote and impose the minimal electricity market technical rules and requirements intended to provide the reliable, stable and economic operation of the electricity distribution network, mandatory for the Distribution Company(s) and Users connected to the distribution network.

##### 1.2 The goals of the Code:

- a) Establishment of a set of rules and norms with a view to provide the access of the third parties to electricity distribution networks;
- b) Establishment of responsibilities and obligations for the Distribution Company(s) and for all the Users of the Electricity Distribution Networks;
- c) Specification of the performance standard for the electricity distribution service;
- d) Establishment of technical requirements for the connection of the Users to the Electricity Distribution Networks.
- e) Establishment of requirements for the development of the Electricity Distribution Networks
- f) Establishment of requirements for information exchange between the Distribution Company(s) and Users of the Distribution Network.

##### 1.3 Attributes and Competences of Distribution Company(s)

1. Distribution networks are managed by companies licensed to perform activities in the electricity distribution sector in specified areas.
2. In their areas the distribution companies:
  - a) supply and sale electricity to tariff customers connected to the Distribution Network, except for Eligible Customers;
  - b) manage the Distribution Network;
  - c) maintain the environment and equipment according to technical requirements;
  - d) develop the Distribution Network according to perspectives of economic development and changes of electricity demands in the area;
  - e) provide other services to customers that are necessary to fulfill their obligations according to the legislation in force.

## 1.4 Definition of Terms

Words and phrases used in the Distribution Code shall have the following meanings:

Term	Definition
<b>AC</b>	Alternative Current.
<b>Access to the Distribution System</b>	Right of economic subjects that generate or supply electricity and right of electricity customers to connect and use the distribution network services, according to the legislation in force.
<b>Active Power (W)</b>	The product of voltage and current and $\cos\phi$ of the angle between them. $P = (U \times I) \times \cos\phi$ . Metered with Watt (W) unit or standard multiplications: 1000 W = 1 KW 1000 KW = 1 MW 1000 MW = 1 GW 1000 GW = 1 TW = $10^{12}W$
<b>Active Electricity (MWh)</b>	Electricity is the active power generated or passing in an electric circuit during a time interval, with the defined integral of the active power being in time limits. Metered with Watt-Hour unit or standard multiplications: 1000 Wh = 1 KWh 1000 KWh = 1 MWh 1000 MWh = 1 GWh 1000 GWh = 1 TWh = $10^{12}Wh$
<b>Reactive Power (VAr)</b>	The product of voltage and current and $\sin\phi$ of the angle between them. $P = (U \times I) \times \sin\phi$ . Metered with Volt-ampere reactive unit or standard multiplications: 1000 VAr = 1 kVAr 1000 kVAr = 1 MVar 1000 MVar = 1 GVar 1000 GVar = 1 TVAr = $10^{12}VAr$
<b>Reactive Electricity (VArh)</b>	Reactive Electricity is the defined integral with time limits of reactive power metered with Volt-ampere reactive-hour unit or standard multiplications: 1000 VArh = 1 kVArh 1000 kVArh = 1 MVarh 1000 MVarh = 1 GVarh 1000 GVarh = 1 TVArh = $10^{12}VArh$
<b>AVR</b>	Automatic Voltage Regulation
<b>Back-up Protection</b>	A Protection system which will open a Circuit Breaker or other fault-current interrupting device in the absence of the current Protection operation of another Protection system.
<b>Black Start</b>	The procedure necessary for restoration from a Total or a Partial System Black-out.

<b>Transmission Point</b>	<b>Supply</b>	A point of connection between the Transmission System and the Distribution System or between the Transmission System and a customer directly connected to the Transmission System.
<b>Dispatching</b>		Operation of the Power System taking in consideration the programming and maintenance of operative safety and of quality parameters according to technical conditions.
<b>Circuit Breaker</b>		A mechanical switching device, capable of carrying and breaking currents under normal circuit conditions and also of carrying for specified time and breaking currents under specified abnormal circuit conditions, such as those of short circuit.
<b>Commissioning</b>		The final process of testing part of a System prior to that part of the System being considered suitable for normal use.
<b>Connection Agreement.</b>		An agreement between the DC and each User setting out terms relating to a connection with the Distribution System
<b>Technical Permission for Connection</b>		Document issued by the DC that allows the connection of the applicant to the Distribution System.
<b>Connection point</b>		The physical point at which a User's installation is joined to the Distribution System
<b>End use Customer</b>	<b>(Tariff)</b>	A Customer that purchases electricity for its own use.
<b>Eligible Customer</b>		A Customer that has the right to choose the qualified supplier of electricity for its own needs.
<b>DC</b>		Direct Current
<b>Demand</b>		Unless otherwise stated, the demand expressed in MW or MVar of Active Power and Reactive Power respectively.
<b>Disconnecter</b>		A device which provides in the open position a clear disconnection of an electric circuit.
<b>Distributed Generator</b>		Power Plants with Generation Unit directly connected to the Distribution Network.
<b>Distribution Company(s)</b>		A legal person licensed for electricity distribution in a defined area.
<b>Disturbing Loads</b>		Loads which have the potential to introduce harmonics, flickers or unbalances into the system.
<b>Earthing</b>		A way of providing a connection between conductors or electric equipments and earth through an earthing device.
<b>Earthing Device</b>		A means of providing a connection between a conductor or an electric equipment and earth of adequate strength and capability for the intended purpose.

<b>Event</b>	An unpredicted occurrence relating to the Power System, that causes breakdown of System operation and service parameters .
<b>Event Circumstances</b>	Operation circumstances for a special electric installation with one or more breakdowns that damage the distribution system operation or interrupt the electricity supply.
<b>Short Circuit Current</b>	Currents circulating in a short circuit in a specified point in the System expressed in kA.
<b>Flicker</b>	Impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time.
<b>Autoproducer</b>	A subject that generates electricity mainly for its own needs.
<b>Generator</b>	A person licensed to perform electricity generation activities.
<b>Injection from the Transmission Grid</b>	Delivery of Electricity to the Distribution System from the Transmission System through their interface points.
<b>Harmonics</b>	Sinusoidal currents with a frequency equal to integer multipliers of nominal frequency.
<b>High Voltage</b>	High voltage at a level of 110 kV or above.
<b>Medium Voltage</b>	Medium voltage from 35 kV to 1 kV.
<b>Low Voltage</b>	Low Voltage under 1 kV.
<b>IEC</b>	International Electrotechnical Commission
<b>Isolated</b>	Disconnected from associated Equipment by a Disconnector or adequate physical separation.
<b>kVA</b>	Kilovolt-ampere
<b>Metering Point</b>	Metering Point is the physical point where the metering system is installed and where the metering system fulfills all technical and accuracy conditions according to the Electricity Metering Code. The physical metering point is determined by the agreements between parties.
<b>Nominal Frequency</b>	Number of cycles of Alternative Current per second expressed in Hertz in the normal operation condition the System frequency is, 50 Hertz.
<b>Operation</b>	A planned action carried out on a Distribution System.
<b>Ownership Boundary</b>	The boundary between the Distribution System and Equipment owned by the User.
<b>Planned Outage</b>	An outage of Electricity supply due to the lack of generation, overload of Power System elements, other than a forced outage or outages due to scheduled maintenance.

<b>Plant.</b>	A group of buildings with various equipments used for electricity generation.
<b>Point of Common</b>	The point on the Distribution System which is electrically nearest to the Connection Point and from which other customers' loads are, or may be, connected.
<b>Protection</b>	The provisions for detecting abnormal conditions in a System and initiating fault clearance or actuating signals or indications or disconnection of the breakdown element.
<b>Installed Capacity</b>	Nominal capacity of the active power supplied by plant based on producers documentation (certificate) written in the respective label (passport).
<b>Maximal Power</b>	Maximal potential power supplied by the electricity plant under specific mechanical and electrical conditions.
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>Supplier</b>	A person authorized by license to supply electricity to the customers based on the legislation in force.
<b>Users of Distribution System</b>	Suppliers, Eligible Suppliers, Auto-producers connected to the Distribution Network, End-users and Eligible Customers directly connected to the Distribution Network as well as other physical or legal persons benefiting from distribution network services.
<b>Main User</b>	Main users are: Generators with installed capacity over 100 kW directly connected to the Distribution System as well as all customers connected to the Distribution System in medium voltage.
<b>Voltage Fluctuations</b>	A series of rapid voltage changes which may be regular or irregular.
<b>Transmission System</b>	The Electricity Transmission System is a set of high voltage electric lines (110 kV, 150 kV, 220 kV, 400 kV), electric transformers or any other installation, which function includes electricity transmission or interconnection.
<b>Distribution Code</b>	Is the set of technical rules that regulates the functioning of the distribution network and defines the standard deadlines and service terms between the customers and the Distribution Companies.
<b>Distribution System</b>	The distribution system includes busbars, switching equipment and transformers in 110/35/20/10 kV substations and all elements in less than 110 kV voltage level owned by Distribution Companies.
<b>Distribution</b>	Is the transport of electricity in medium and low voltage distribution systems, including the distribution to the final user.
<b>ERE</b>	Electricity Regulatory Entity
<b>DC</b>	Distribution Company/ies
<b>OST sh.a.</b>	Transmission System Operator

<b>Electricity Market</b>	Wholesale or retail commercial agreement to sale and purchase electricity in the Power System in order to provide a reliable supply for the customers within the territory of the Republic of Albania.
<b>Applications for connection to the Distribution System</b>	Documents filled by potential Users that require access for connection to the Distribution System, or by existing User to modify the existing connection. In order to receive the Distribution Company approval for connection, documents are prepared according to the Code provisions.
<b>Operative Order</b>	Mandatory order for the receiving unit issued by the Dispatch Center according to regulations in force. Orders are transmitted by phone, phonograms and fax or after the installation of SCADA system through digital messages.
<b>Operative Action</b>	Action from the unit receiving the Operative Order issued by the National Dispatch Center or Regional Dispatch Center as well as programmed actions from the Parties affecting the Power System functioning.
<b>Interruptions due to Breakdown in the Power System</b>	Interruption of electricity supply due to breakdown of power system elements (such as lines, substation transformer, generating unit, etc).
<b>Load Curve</b>	Load progress during each hour (00 –24 hours) for one day, or another period for a specified element
<b>Power Distributor</b>	Any person or legal subject holding the Distribution license according to the legislation, with a voltage level lower than 110 kV.
<b>License</b>	Is the authorization issued to a person according to the Law no. 9072, dated 22.05.2003 "On Power Sector".
<b>Maintenance</b>	Coordination of all technical and organizational actions performed on Power System elements during the maintenance period in order to recover their performing capacities for designed functions.
<b>Norms</b>	Standards, codes, rules, decisions and other normative documents established by laws, by-legal acts, regulations, orders, other official documents and contracts.
<b>Power Sector Objects</b>	A set of facilities, buildings and different equipment designed for Electricity Generation, Transmission and Distribution.
<b>Incidents (Breakdowns)</b>	The incident (breakdown) is an event that occurs due to internal and external reasons and causes the breakdown of electricity parameters or the interruption for a specified period of time of one or more elements that on the other side lead to electricity supply interruption.
<b>Power Technical Losses</b>	Technical losses of a network element that are equal to the difference between Electricity injected in the element and Electricity exiting from the element
<b>Independent Power Producers</b>	Power Producers separated from the Power System producing electricity for their use, for selling to specific customers or for selling to the Power System.
<b>Power Transmission Network</b>	Power Transmission Network in 110 kV, 220 kV, 400 kV levels that enables the Transmission of bulk power over long distances

<b>Short Circuit</b>	The short circuit occurs due to different damages or wrong actions that connect the elements between two points with different potentials
<b>Power Sector</b>	The unity of planning, development, construction, use, and maintenance activity to install Generation, Transmission, Distribution plants, systems/objects of Eligible Customers, Electricity Suppliers and Interconnection Lines for import-export and exchanges with neighboring countries
<b>Dispute Procedures</b>	Procedures described by the Code to solve disputes between Distribution Companies and Customers
<b>Parties</b>	DCs and Customers of the Distribution System.
<b>Distribution System Applicants</b>	Legal person, current or future User of the Distribution System applying for permission to connect to or modify the existing connection to the Distribution System.
<b>Transformation Station (Substation)</b>	Electric facilities, which function is to transform and transfer Electricity from one network to another with different voltage levels.
<b>Switch off</b>	Physical act of separation of Users objects/systems from the Distribution System.
<b>Generating Unit</b>	Any facility generating Electricity, connected to the Distribution System.
<b>Power Factor</b>	Ratio of active electric power (W) with absolute electric power (VA) ( $\cos\phi$ ). The allowed minimal value of $\cos\phi$ is 0.9 ( <b><math>\cos\phi - 0.9</math></b> )
<b>Load</b>	Load means a technical indicator in MW that indicates the participation of one or more equipment or customers connected to the electric network.
<b>Peak Load (MW)</b>	Maximum of load value in MW registered within a specific time period.

### 1.5 Distribution Code Administration

The Distribution Company (s) is the administrator of the Distribution Code.

- DC is responsible for the implementation of the Distribution Code.
- Distribution System Users are required to apply the Distribution Code requirements.
- Users shall provide to DC the right of access in their premises for services and necessary facilities according to DC responsibilities.
- Users shall apply the orders and guidelines issued by DC which are required to implement the Distribution Code.
- DC shall review periodically the implementation of the Distribution Code. For this scope, the Distribution Code Review Commission shall be established. No review or modification of the Distribution Code may be performed without prior discussions by the Commission and without ERE's approval.

#### 1.5.1 Distribution Code Review Commission

The Commission shall be managed by the Distribution Company (s) and will be composed by following members:

1. Chairman appointed by the Distribution Company (s)
  2. The Secretary appointed by the Distribution Company (s)
  3. A member representing all Independent Generators directly connected to the distribution network
  4. A member representing Tariff Customers interests
  5. A member representing OST
  6. A member representing all Suppliers including Qualified Suppliers
  7. A member representing the Eligible Customers.
- Within 30 days from the approval of this Code, DC authorizes the Chairman and the Secretary of the Review Commission to officially inform all the members of the Commission for the first meeting, at least seven days before the date established for the Commission meeting.
  - Participants in the Review Commission shall inform the Secretary on names and functions of their representatives no latter than three working days before their first meeting.
  - Within 30 days from the first meeting, the Review Commission shall prepare the regulation of Commission's activity. The Review Commission shall meet every three months or when a Commission participant requires it.
  - The decisions of the Review Commission are taken with consensus. In case a consensus is not reached, all proposals from parties to the Commission shall be submitted to the ERE, which decision shall be binding for all Parties.

### **1.5.2 Functions of the Distribution Code Review Commission**

The Distribution Code Review Commission shall:

1. Continuously observe implementation of the Distribution Code and take initiatives to review it.
2. Analyze every serious breakdown in the distribution network and, based on this analysis continuously review the Distribution Code.
3. Consider all requirements for Distribution Code modifications, submitted by Parties, and send to the ERE for reviewing.
4. Inform the Parties on recommendations for changes to the Distribution Code and the respective reasons or objections, if there are any.
5. Examine issues raised by Users.

## **1.6 Disputes**

### **1.6.1 Dispute Settlement Procedures**

In case of a Dispute between Users and the DC, the dispute shall be solved based on provisions of this Code and the legislation in force. In case of conflict between provisions of this Code and other by-legal acts approved by the ERE, the latter shall decide on provisions to be used.

## 1.7 Emergency Periods

During emergency periods as defined by the Law No. 9072, dated 22.05.2003 "On Power Sector", the Code or special parts of it shall be treated as temporary suspended for as long as the emergency situation lasts.

## CHAPTER II

### PLANNING

**The Planning Chapter** specifies the criteria and the procedures to be complied with by the Distribution Company(s) in the Planning and Development of the Distribution System, and by Users of the Distribution System when planning the development of their installments.

#### 2. Scope

- i) The planning of the Distribution System development has the following objectives:
  - a) to prepare the perspective plan of the Distribution System for electricity distribution in the quantity and quality required by Users;
  - b) to define the operation of the Distribution System according to safety requirements and guarantee the electricity distribution at the required quality levels;
  - c) to orient and encourage efficient investments in the Distribution System, through initiation of required procedures and collection of information required to prepare the development plan.
- ii. The development and modernization of the Distribution System takes in consideration:
  - a) the increase of electricity demand;
  - b) the development and systematization of rural and urban areas;
  - c) the establishment of new points or modification of the existing ones;
  - d) the need to improve the performance indicators for the electricity distribution service.

#### 2.1 Planning Objectives

The Planning Objectives are to:

- Enable the planning, designing and construction of the Distribution System for an economic and safe operation.
- Facilitate the use (provide access) of the Distribution System by new Users requiring to be connected to the system and specify standards of supply.
- Provide sufficient information for Users of the Distribution System to assess opportunities for connection, and plan and develop their installation so as to be compatible with the Distribution System.
- Formalize System Planning data requirements.

## **2.2 Preparation of Development Plan for the Distribution System**

The preparation of the development plan for the Distribution System is based on the following data:

- a) demand forecasts provided on yearly basis from suppliers (including load type curves for specific days);
- b) forecasts of electricity production from existing generators (10 years max)
- c) safety level defined for the Distribution System in total and for each node according to legislation in force.
- d) the strategy of development of telecommunication infrastructure of the Distribution Company(s).

## **2.3 Planning Criteria**

The Distribution System Development Plan shall be prepared based on a perspective development study of the electric network for an average time-period of 5 to a maximum of 10 years. The Distribution System development plan takes in consideration:

- a) safe and steady operation, and application of standards for a qualitative service of Electricity distribution;
- b) use of Distribution System capacities within economic limits;
- c) selection of development alternatives of maximal economic efficiency,
- d) definition of economic operation of the Distribution Network under unreliable load conditions,
- e) observance of safety norms, as well as fire protection legislation.

The Distribution System development plan aims also to limit the negative environmental impact, mainly from:

1. chemical pollution;
2. aggressive environmental conditions (humidity, extended frost, ice, salts, powerful winds, turbulent air in vertical corridors, etc);
3. natural disasters (earthquakes, floods);
4. atmospheric discharges.

### **2.3.1 Criteria for the Dimensional Verification of the Distribution System**

The dimensional verification of the Distribution System shall be performed in conformity with effective technical norms taking in consideration:

- a) the economic criteria;
- b) the thermal stability criteria in long-term operation;
- c) the thermal stability and dynamic criteria in short circuit regime.

## **2.4 Planning and Development of Network**

### **2.4.1 Forecasts for Connection Point to Distribution Network**

Distribution Company(s) must give a 30 days written notice to each Users of the Distribution System of the annual date by which the User of the Distribution System

must provide the Distribution Company(s) the information required by the Distribution Company(s).

Details of planned future capacity must be provided by the Users of the Distribution System to the Distribution Company(s), if the latter has requested such information according to the procedure set out in the Distribution Code, as well as information regarding the active power capability and reactive power capability, proposed commencing date, operating times and special operating requirements. Any User of the Distribution System must provide accurate information, including details of any factors which may have impact on capacity forecasts or foreseen generation facilities.

If the DC reasonably assesses any forecast information to be unrealistic, the DC may modify that forecast information and must give an opinion to the Users of the Distribution System in writing of this action and the reason for the modification. The DC shall not be responsible for any adverse consequences of this action or consequences which might occur if the information indicated is not modified.

#### **2.4.2 Development of Distribution Network**

DC must analyze the operation of the Distribution Network over a specific planning period, taking into account the forecast capacities and loads, any future generation and transmission development and any other essential information.

DC shall co-operate with the Transmission System Operator to review the annual plan for the Development of Distribution Network. The annual planning review must incorporate the existing Connection Points and review of planning proposals for future Connection Points. Every year DC must provide the ERE with specified long-term (average 5 years to maximal 10 years) plan, consequently adjusted based on international experiences, development of technologies, changes in the national economy and its development. Every year DC must adjust its long-term development plan according to the Transmission System development plan prepared by OST.

If services of the Distribution System at a Connection Points are directly affected by an augmentation of load of a User, appropriate amendments to the relevant Connection Agreement must be negotiated in good faith between the parties in order to establish new terms in this connection point. When a DC agrees with a Distributed Generator directly connected to the Distribution System to use it periodically to ensure the network support functions then the costs of this network support service must be included in the calculation of distribution service prices determined in the Distribution Tariff Methodology. Being the case, the DC undertakes the following actions:

- registers the Distributed Generator directly connected to the Distribution System and specifies that the Generator may be periodically used to provide a network support function;

- includes the cost of this network support service to the Distribution Network in the calculation of distribution service tariffs determined in accordance with Tariff Methodology.

### 2.4.3 Distribution Network Planning

The Distribution Network Planning is carried out by the DC based on requirements of Users connected to the Distribution System as well as the Transmission System Planning performed by OST. DC and the Transmission System Operator shall cooperate to fulfill their obligations regarding the network planning. DC and the Transmission System Operator, based on mutually taken decision, jointly cover the costs incurred for studies required for planning actions.

### 2.5 Distribution System Designing Standards

Distribution System Designing Standards provide to potential Users of the Distribution Systems the information needed to install the appliances in their Connection Point with the Distribution System. The Distribution System designing standards are the following:

- The supply frequency has its nominal value (Nominal Frequency) of 50 Hz. Taking in consideration that the frequency is a main parameter for the safe operation of the Power System, the DC shall install in their system the Automatic Discharge Load due to Frequency Reduction (SHAF). The operation structure of SHAF is prepared by OST in cooperation with Distribution Company(s).
- The normal operating range: 49.8 to 50.2 Hz.
- During system disturbances: 48.0 to 52.0 Hz.

Voltage Levels in the Distribution System are: 220 V, 380 V, 6 kV, 10 kV, 20 kV, 35 kV, 110 kV (excluding 110 kV lines)

**Figure No. 2 – Operating Voltage Range**

Nominal voltage	Highest voltage	Lowest voltage
220 V	+ 10%	- 15%
380 V	+ 10%	- 15%
10 000 V	10 750 V	Variable according to operating conditions
20 000 V	24 000 V	Information on particular location upon request by interested user
35 000 V	39 000 V	31 000 V

110 000 V	99 000 V	123 000 V
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## **2.6 Requirements to Independent Generators Directly Connected to the Distribution System**

Distribution Code is applicable to all existing or prospective Independent Generators directly connected to the Distribution System, including Co-generators, Auto-producers and Generators using renewable sources of energy.

Generators with stand-by generators who are connected to the Distribution System must comply with requirements of Distribution Company(s) avoiding parallel operation with network. These requirements are prescribed in the Connection Agreement. Generators directly connected to the Distribution System shall initiate discussions at a early stage in design to allow the Distribution Company(s) to scrutinize the impact of the Generating Unit on the Distribution System.

The Distribution Company(s) may refuse permission for connection of the Generating Unit at a point on the Distribution System, or may require revision of the construction or technical parameters of the generation unit, or impose certain restrictions in order to ensure that security and quality of supply standards are maintained. In such instances, the DC shall provide sufficient explanatory information to justify the refusal or the required revisions. All Generators directly connected to the Distribution System shall provide the Distribution Company(s) all the data and information requested by DC according to deadlines defines by this Code.

### **2.6.1 Requirements to all Customers including Eligible Customers connected to the Distribution System**

Customers connected to the Distribution System shall provide to the Distribution Company(s) the following data, as well as all the data and information requested by DC according to deadlines defined by this Code.

1. Annual demand for active electricity
2. Annual demand for reactive electricity
3. Maximal demand for annual electricity
4. Maximal Load for each phase
5. Load Type, peak days
6. Nominal voltage of the point that supplies the load
7. Sensitivity of load from voltage and frequency.

### **2.6.2. Transferring of Planning Data**

Distribution Company(s) in coordination with the Transmission System Operator shall decide on the timing for planning periods and necessary data to be provided for planning purposes. Distribution System Users shall provide, upon Distribution Company(s)' request, the following information as well as any other information required by DC:

- Increase/decrease of load and demand during next planning period;
- Capability to participate in production or compensation of reactive energy;
- Absence or occurrence of disturbing loads;
- Energy to be traded and addresses of suppliers in case the Users of the Distribution System are Suppliers/Traders without distribution assets.

Generators connected to the Distribution System shall provide, upon Distribution Company(s)' request, information as follows as well as any other information required by DC:

- General information on their physical condition;
- Demand projections in case of cogeneration;
- Maximum/minimum capacity projections;
- Production projections;
- Reactive power capabilities;
- Other data required by the Distribution Company(s).

Users of the Distribution System shall provide planning data for specific future time periods updated annually as necessary including projected demand requirements and anticipated changes in maximum demand or generating capacity.

In addition to periodic updates of planning information, Users of Distribution System shall give adequate notice of any significant change to their system or operating regime to enable the Distribution Company(s) to prepare its development plans and implement any necessary system modifications. In the event of unplanned changes in a User's System or operating regime a User of the Distribution System shall notify the Distribution Company(s) as soon as it is practically possible to take any necessary measures that can be implemented.

Users shall also provide details of reactive compensation plant directly or indirectly connected to the Distribution System, including its rating and operational control.

Users may be required to provide the Distribution Companies with detailed data relating to the interface between their installations and the Distribution System covering circuit parameters, switchgear and protection arrangements of Equipment directly connected to or affecting the Distribution System to enable the Distribution Company(s) to assess any implications associated with these points of connection.

### **2.6.3 Information to be exchanged**

Upon the request of a User of the Distribution System, the Distribution Company(s) shall provide information and data, as may be reasonably required by Distribution System Users. In case the Distribution Company(s) judges the information or data requested by the User of the Distribution System may harm the business of the Distribution Company(s) or of other Distribution System Users, the Distribution Company(s) shall refuse to provide such information or data.

The Distribution Company(s) shall provide information on request to Users of the Distribution System regarding the local network conditions to enable them to determine their protection requirements and to assess the need for back – up facilities.

When the Users installation is connected to the busbars of the Distribution System's substation, sufficient details may need to be exchanged with respect to User of the Distribution System/the Distribution Company's Ownership Boundary to enable an assessment of transient over-voltage effects will be made. The request for information may be initiated by either the Distribution Company(s) or the User of the Distribution System.

Information may be exchanged between the Distribution Company(s) and the User on short-circuit current levels at the feeding busbar or point of connection to the Distribution System as appropriate, in the form of:

- Three phase and single phase short circuit current.
- The X/R ratio under three phase fault conditions (X is the inductive reactance and R the active resistance).

Information shall be exchanged between the Distribution Company(s) and the User of the Distribution System on Demand Transfer Capability where the same demand can be supplied from alternate User points of supply. This shall include the proportion of Demand normally fed from each point of supply and the arrangements (manual or automatic) for transfer under planned/fault outage conditions.

#### **2.6.4. Planning Studies**

In order to facilitate new connections/modifications of existing connections to the Distribution System the Distribution Company(s) shall prepare upon request a study showing the implications of a connection/modification at a particular point on the Distribution System.

A reasonable charge may be levied by the Distribution Company(s) for the planning study purpose, based on the study's cost.

Users of the Distribution System or potential User of the Distribution System shall provide to the Distribution Company(s) information regarding the proposed facility including load details, interface arrangements, proposed connection point and withdrawal/injection of power for Distribution System necessities.

The studies shall normally be prepared within 45 days after the date of payments received or the agreement signed of the person making the request to pay the cost of the study. In the case of Generators and Eligible Customers seeking connection to the Distribution System, depending on the nature and complexity of the request, this period may extend up to 100 days.

Details of the procedures for application for connection to the Distribution System are described in the chapter "Connection to the Network" of this Distribution Code.

The Distribution Companies shall provide on request a statement of present and future Distribution System capacities, forecast power flows and loadings on parts of the Distribution System specified in the request and shall include fault levels at each Distribution node covered by the request. The Distribution Companies may levy a charge for the provision of this statement on account of the reasonable costs incurred by the Distribution Companies in preparing this statement. The statement shall be prepared within 45 calendar days. In the case of Generators connected to the Distribution System and Eligible Customers seeking connection this period may extend up to 60 days depending on the nature and complexity of the request.

## **CHAPTER III**

### **OPERATION**

**The Operation Chapter** specifies the terms to be applied by the Distribution Company(s) as operating the Distribution System.

#### **3 Demand Forecasting**

In order for the Distribution Company(s) to operate the Distribution System efficiently and to ensure maximum System security and System Stability, there is a need for Users of the Distribution System to provide for the Distribution Company(s), information about the load and generation output.

The Operation Chapter in the Distribution Code specifies the information to be provided to the Distribution Company(s) by Users of the Distribution System so that these requirements can be met.

- The information to be provided is required to enable the Distribution Company(s) to maintain the integrity of the Distribution System.
- Where demand data is required from the Users of the Distribution System, this means the amount of electricity in MWh demanded at the Connection Point. The Distribution Company(s) may in certain cases specify that the Demand data shall include the Demand in MVar.
- The means of providing the information to the DC and its confirmation includes any written form, or any other suitable means of electronic transfer which enables the recipient to retain information.

Requirements of the above provisions shall apply to all Main Users of the Distribution System.

#### **3.1 Information Flow and Coordination**

The Distribution Company(s) shall co-ordinate Demand forecast information for each connection point with the Transmission System to meet the requirements of the Transmission Grid Code.

Information for Generators connected to the Distribution System which are not subject to Central Dispatch, shall be provided directly to the DC. Centrally

Dispatched Generating Units shall comply with the requirements of the Transmission Grid Code. Information shall be provided directly to the Transmission System Operator.

### 3.2 Demand Forecast Data

Generating Units greater than 1 MW and not subject to central dispatch shall provide to the Distribution Company(s) information regarding output and planned shutdowns for specified future periods. This shall be provided on an annual basis when requested by the Distribution Company(s). The information required is given in the following table:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Maximum active power output MW (annual hour)						
Production MWh						
Planned outage periods:						
- start of outage						
- termination of outage						

Main Users of the Distribution System shall provide to the Distribution Company(s) information regarding demand and planned shutdowns for specified future periods. This shall be provided on an annual basis when requested by the Distribution Company(s). The information required is given in the following table:

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Maximum active power demand MW						
Power factor (cosφ)						
Annual energy demand MWh						
Planned outage periods:						
- start of outage						
- termination of outage						

### 3.3 Operational Planning

Distribution Code is concerned with the co-ordination of Planned Outages of User's Plant/Installation which affects the Operation of the Distribution Systems.

Distribution Code supplements the obligation of the Distribution Companies to provide certain information to the Transmission System Operator under the Transmission Grid Code and establishes procedures to enable the collection of such data from Users of the Distribution System.

The requirements of the information set out in the Transmission Grid Code to be provided by the Transmission System Operator will form the basis of Operational Planning.

**i. The objectives of Operational Planning are to:**

- Set out the rules of Electric Plant (connected to the distribution grid) outage, as required by the generator or the Distribution System.
- Specify the information to be provided by Users of the Distribution System to the Distribution Company(s) allowing it to comply with the Transmission Grid Code.
- Operational Planning applies to all Main Users of the Distribution System.

Information on Generation Plant connected to the Distribution System not subject to central dispatch (including Generators with CHP and Auto-producers) shall be provided directly to the Distribution Company(s);

Centrally Dispatched Generating Units shall comply with the requirements of the Transmission System Code. Information shall be provided directly to the Transmission System Operator.

**ii. Timescales and data:**

Detailed implementation of data gathering and timescales shall be determined by the Distribution Company(s) for each Users of the Distribution System.

The information may be required for different timescales as may be determined by the Transmission System Operator or the Distribution Company(s) planning needs.

**3.4 Information from Generators connected to the Distribution System:**

Information from Embedded Generating Plant greater than 1 MW and not subject to central dispatch shall include details of planned outages for maintenance or other purposes as well as the expected time of return to service. The Generator shall not synchronize without first obtaining operational permission from the Distribution Company(s) unless a prior agreement has been reached with the Distribution Company(s).

**3.4.1 Information to Users of the Distribution System**

The Distribution Company(s) shall inform all Customers or Generators who may be significantly affected by particular outages, of the likely dates and duration of the outages.

If there are any objection from Users they shall be considered by the Distribution Company(s), and alternative arrangements will be proposed if possible.

### **3.5 Load Control**

Distribution Code permits the Distribution Company(s), under certain circumstances, to apply reductions of Load in the event of insufficient generation in the Power System and transmission capacities from External Interconnections lines being unavailable to meet Demand or in the event of breakdown and/or operating problems (such as in respect of System Frequency, System Voltage levels or system thermal overloads) on any part of the Transmission or Distribution System.

The Load Control procedures ensure that hardship to Users of the Distribution System is minimized and that all parties affected are treated equitably. The Load Control term is used to describe any or all of these methods of achieving a Demand reduction.

Distribution Code deals with the following means of reducing Load:

- Automatic load disconnection due to low frequency;
- Manual load reduction of Distribution System User;
- Users of the Distribution System Load manual reduction instructed by the Transmission System Operator or the Distribution Company(s);
- Emergency manual Load disconnection;

Where Load Control is exercised by the Distribution Company(s) it shall be done in a manner that practically no User of the Distribution System (customer or supplier) shall be discriminate, and reasonable endeavors shall be used to ensure that the burden is shared fairly among customers.

Distribution Company(s), following an instruction of the Transmission System Operator or otherwise to achieve a reduction in load that will either avoid or relieve operating problems on the Transmission System and/or the Distribution System, must operate in a manner that does not unduly discriminate any Supplier or Customer .

Implementation of Load Control by the Distribution Company(s) may affect all Users of Distribution System (Customers of Suppliers) connected to the Distribution System and where applicable, contractual arrangements between Suppliers and their Customers may need to reflect this.

#### **3.5.1 Methods of Load Control**

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

Automatic disconnection by under voltage relay may be used to indiscriminately disconnect load in order to maintain frequency within acceptable limits, so as to avoid widespread load shedding or black-outs.

Emergency manual load shedding may be carried out on the Distribution Systems for reasons of shortfall in supply or other reasons defined in this Code.

Transmission System Operator and Distribution Company(s) must agree in advance on load shedding schedules and establish sequence and amount of disconnected load.

Load shedding schedules approved by the Transmission System Operator must be in disposal of each operational unit of the Distribution Company(s) executing load shedding operations.

In case of a sustained period of shortfall then planned rotating load shedding may be used to share the available power among affected Users of the Distribution System (Customers). In such circumstances DC shall inform all Users through public informing means on the shedding territory and its duration.

### **3.5.2 Application of the Load Control**

When load control is exercised by the Distribution Company(s) in order to protect the Distribution System, or by OST's request to maintain the Power System, DC should immediately respond to such requirements and inform other Users of the Distribution System at the possible extent.

### **3.5.3 Operational Communications and Consultations**

Distribution Code sets the requirements for the exchange of information in relation to Operations and/or Events on the Distribution System or the Installation of any Users connected to the Distribution System causing Operational Effect on the Distribution System or the Installations of other Users of the Distribution System.

Requirements of the Distribution Code for the exchange of information in relation to Operations and/or Events on the Distribution System shall apply to all Main Users of the Distribution System.

The Distribution Company(s) and the Main Users of the Distribution System connected to the Distribution System shall nominate persons and/or contact addresses, and agree on communication channels for the necessary exchange of required information.

SCADA equipment may be required and installed at a Main User's site (with DC decision) for the transmission of information and data to and from the Distribution Company(s) or the Central Dispatch Centre. The requirement to provide this information shall be included in the Connection Agreement.

Information between the Distribution Company(s) and the Users of the Distribution System shall be exchanged upon a reasonable request of either party. The request may be in accordance with a prior agreement to exchange information for different

reasons. This does not preclude the voluntary exchange of information which may be deemed relevant to the operation of the Distribution System or User Installation.

In the case of an Operational Action in the Distribution System or upon receipt of notification on an Operation Action in the Transmission System, which in the opinion of the Distribution Company(s), will have an Operational Effect on the Installation of a User connected to the Distribution System, the Distribution Company(s) shall notify the User through public communication means.

### **3.6 Distribution Network Management through the Dispatching**

#### **3.6.1 General Provisions**

The Distribution System Management through dispatching is a specific activity in the electricity sector performed by specialized units (dispatching functions/levels) in hierarchic relations with the authorities participating in the Electricity market.

The Distribution System Management through dispatching provides safety, qualitative and economic conditions of operation through common operation of installations and equipment of the Distribution System requiring a unique management.

The Distribution System Management through dispatching is unique and hierarchically organized at central and local levels.

The main functions of Distribution System Management through dispatching are:

- a) use of the Distribution System operational plan;
- b) Distribution System operative management at local level, according to rules for the operative separation of managing authorities for installments.

Management through dispatching is based on specific rules of organization and operation applied by the Central Dispatch Centre, local dispatch and operative staff in User's installments and facilities.

Management levels of the Distribution System, through dispatching are:

1. Power System Central Dispatch Centre;
2. Distribution Company(s) Local Dispatch centers;
3. Operative staff in Distribution System Users' installments and facilities.

[**Note:** Orders issued by the Power System Central Dispatch Centre(National Dispatch Centre) are mandatory to all local dispatch centers and operative staff in Users' installment and facilities.]

Distribution Company(s) shall have its own local dispatch centers. Local dispatch centers shall be established to check and command the medium voltage networks. Operative commands for the medium voltage network shall be established by respective centers taking in consideration the installments volume and specifics, the technical level and safety rules.

The management level through dispatching includes:

- a. Operative command department with staff working in shifts to manage in due time the installment operation by coordinating the regimes and maneuvers.
- b. A supply, planning and operative scheduling department that observes and analyzes the operations and elaborates specific rules.

Transmission System Users have the obligation to supply their installment with experienced staff to manage the Distribution System through dispatching.

### **3.6.2 Activities of Dispatch levels within Distribution Company(s)**

The Distribution Company(s) performs its planning and operative management activities, as well as specific activities through its management level with respective local dispatch centers.

Distribution Company(s) has the obligation to perform its dispatching activities in the Distribution System in a non-discriminatory way for all electricity market participants.

#### **The Distribution Company(s) performs the following activities:**

- a. authorizes the staff on operative management in conformity with effective rules;
- b. collects, registers and archives statistical data on Distribution System operation according to effective rules;
- c. provides information exchange with Distribution System Users and other Electricity Market participants;
- d. cooperates with Distribution System Users for the development of studying and operative analyses;
- e. schedules, develops, rehabilitates and modernizes its own dispatching systems under acceptable economic and power efficiency terms, in conformity with Local Power Programs, consumption/development forecasts, technological progress and effective norms;
- f. coordinates, repairs and develops a DSM/SCADA system in Distribution System levels in order to allow the monitoring and management of the Distribution System through dispatching; and:
  - i. develops, modernizes and protects its own DSM/SCADA and telecommunication systems;
  - ii. requires the Distribution System Users to establish local SCADA systems in accordance with management requirements of Distribution System through dispatching.
- g. prevents prolonged disorders in the Distribution System and observes the quality service norms of Electricity Distribution;
- h. offers consulting on management issues through dispatching in other levels of management and third parties.

### **3.7 Operational Schedule**

The operational schedule consists in the following elements:

- a) list of normal scheme of operation;
- b) list of use and maintenance activities of Distribution System installments;
- c) list of protection and automatic systems of the Distribution System;
- d) list of voltage levels in the Distribution System;
- e) registers, processes and archives of the Distribution Company and required data for analyses and scheduling of the Distribution System;
- f) analyzes and certification of testing programs with equipment connected to the Distribution System or influencing its operation or the Power System operation;
- g) testing programs influencing the 110 kV network that should be approved by the National Dispatch Center.

#### **3.7.1 Scheduling of Normal Operation Schemes**

Every three months, the Distribution Company(s) shall submit for approval to the Central(National) Dispatch Centre the normal operation scheme for the Distribution System and the connection scheme of dispatching units. Distribution Company proposals shall be implemented only after the Central Dispatch Centre approval.

The Distribution System normal operation scheme is analyzed based on verifying calculation, referring to following parameters:

- power flow under safety criteria terms;
- voltage levels;
- short circuit flow levels;
- neuter regime mode;
- safety of operation for automatization and system protection.

#### **3.7.2 Operation and Maintenance Scheduling of Distribution System Installments**

The Distribution Company(s) shall prepare and submit for approval to the Central Dispatch Centre annual, seasonal and monthly schedules for power flows influencing the Power System operation.

#### **3.7.3 Operative Management of the Distribution System**

Operative Management of the Distribution System includes the following specific activities:

- to observe the Distribution System operation;
- to manage the Distribution System operation;
- to manage the units that are not under operative command of the Central Dispatch Centre;
- to manage the protection and automatization systems.

The Distribution Company(s) analyzes the Distribution System operation program and observes the performance and standards of distribution service through appropriate actions.

#### **3.7.4 Operative Scheduling of Distribution System Activity**

The operative scheduling of Distribution System activity has the following components:

- a) scheduling of operation schemes;
- b) scheduling of units connected to the Distribution System;
- c) scheduling of voltage level;
- d) scheduling of protection and automatic system.

The operative scheduling of the Distribution System is performed according to rules of this Code and respective norms in force. The specific activities of the Distribution Company(s) shall be coordinated with Distribution System Users activities taking in consideration the technical rules and signed contracts. Upon Central Dispatch Centre request, the DC has the right to immediately act against the malfunctioning of electric installments (plants) that risk the Power System safe operation and customer's supply.

DC may not modify the regime or adjust the conditions of automatic and protection systems established by the Dispatch Centre without its preliminary approval.

#### **3.7.5 Distribution System Operation Commands**

DC shall implement the operation programs according to the Distribution System operation schedule under normal working regimen.

DC shall observe the Distribution system operation through collection of necessary data referring to:

- a) typical parameters of operation regime:
  - frequency
  - voltage in Distribution System nodes
  - flow of active and reactive power through Distribution System elements
  - active and reactive power injected in each Distribution System connection point.
- b) Distribution System configuration;
- c) Exceeding of some defined limits of operation parameters;
- d) Distribution System occurred and anticipated events.

DC shall observe the Distribution System through its information and telecommunication system, typical for data collection, elaboration and transmission and necessary commands for the management of the Distribution System. The Central Dispatch Centre has the authority to issue orders for the Distribution Companies while the DC issues orders to Distribution System Users referring to Distribution System working regime of equipment and installments.

Orders of Central Dispatch Centre shall be promptly applied unless staff safety and equipment integrity are in danger. DC shall issue orders on coordination and maneuvering issues in conformity with effective rules. The operative staff shall execute maneuvers according to specific technical norms and safety rules.

DC has the obligation and authority to undertake all necessary measures to limit the enlargement of breakdowns and maintain normal operation terms in case of a turbulent operation condition due to orders issued by the Central Dispatch Centre.

Under breakdown circumstances, the DC has the right to limit the consumption by manual switch off in conformity with norms or orders of the Dispatch Centre in order to maintain Power System normal operation condition.

### **3.8 Event Reporting**

Distribution Code sets out the requirements for reporting in writing the Events. Information between the Distribution Company(s) and the Users of the Distribution System shall be exchanged on the reasonable request of both parties.

The objective of this paragraph is to facilitate the provision of more detailed information in writing and where agreed between the Distribution Company(s) and the Users of the Distribution System involved, joint investigation of those Significant Incidents reported verbally. Requirements apply to all Main Users of the Distribution System, DC and the Main Users of the Distribution System shall appoint representatives and establish communication channels to provide communication between them.

Communication shall, as far as possible, be direct between the Users of the Distribution System involved in event and the Distribution Company(s). However, this does not preclude communication with the Users nominated representative.

A Report in writing or in electronic form shall be submitted to the Distribution Company(s) or the Users of the Distribution System, as it will be the case. The Report shall contain the notification together with more details relating to the Significant Incident including information which has become known relating to the Significant Incident since the notification.

#### **3.8.1 Joint Investigation**

In case a significant Incident or breakdown has been declared and a report has been submitted, the Distribution Company(s) or Users of the Distribution System may request in writing that a joint investigation be carried out. An investigative panel shall be necessary for the incident or the breakdown to be investigated with the agreement of all parties involved.

A joint investigation shall take place where all parties affected by it agree on. The form and rules of, and procedures for, and any other matter relating to the joint

investigation shall be agreed in the joint investigation agreement. In the absence of such an agreement the joint investigation shall not take place, but an investigation shall be carried out by responsible organs authorized by the law.

Matters in written report of a significant incident should include:

- Date and time of Significant Incident;
- Location;
- Equipment involved;
- Brief description of Significant Incident;
- Details of any Control undertaken;
- Conclusions and recommendations if applicable.
- Duration of incident;
- Estimated date and time of return to normal service

For the Generator connected to the Distribution System matters in written report of a significant incident should include:

- Interrupted Generation;
- MVAR performance;
- Estimated date of the return to normal service.

### **3.8.2 System Tests**

Distribution Code sets out the responsibilities and procedures for arranging and carrying out System Tests. System Tests are those tests which involve either simulated or controlled application of unusual or extreme conditions on the Distribution System, but which do not include commissioning or re-commissioning tests or any other tests of a minor nature.

**The objectives of the Distribution Code requirements are:**

- To ensure that the procedures for arranging and carrying out System Tests do not threaten the safety of personnel or of the general public and cause minimum threat to the security of supplies, the integrity of Power Plants or Equipment and are not disadvantageous to the Distribution Company(s) and Users of the Distribution System;
- To set out procedures to be followed for establishing and reporting System Tests.

Requirements apply to all Main Users of the Distribution System:

If the System Test is proposed by the Distribution Company(s) or the User connected to the Distribution System and the test will or may have an effect on the Transmission System the provisions of the Transmission Grid Code shall apply.

When the Distribution Company(s) or a User of the Distribution System intend to undertake a System Test which may have significant effect on other Systems, normally six months notice shall be given by the person proposing the System Test to the Distribution Company(s) and to those User of the Distribution System who may be affected by such a System Test.

The proposal shall be in writing and shall contain details of the nature and purpose of the proposed System Test and shall indicate the extent and situation of the installations or Apparatus involved. If the information set out in the proposal notice is considered insufficient by the recipient they shall contact the person proposing Test with a written request for further information which shall be supplied as soon as practically possible.

If the Distribution Company wishes to undertake a System Test, the Distribution Company shall submit a proposal of that System Test to the respective User. The DC shall co-ordinate the Distribution System Test, using the information provided to it, and shall identify, which Users may be affected by the proposed System Test. Following receipt of the System Test proposal the Distribution Company(s) shall evaluate the impact of the System Test and discuss the proposals with Users of the Distribution System identified as being affected.

Within one month from receiving the System Test proposal, the DC shall submit a report to the applicant containing:

- a) proposals for carrying out the System Test;
- b) the manner it will be monitored;
- c) allocation of costs between the affected parties;
- d) the general principle that the person proposing Test will bear the costs;
- e) other matters that the Distribution Company(s) consider appropriate; report outlines the procedure to be followed and the proposed test schedule and advise of any costs.

The proposal report shall be submitted to all those who received a notice. If the proposal report agreed between the Distribution Company(s) and the person proposing Test is approved by all recipients, the System Test can proceed.

At least one month prior to the date of the proposed System Test, the Distribution Company(s) shall submit to all recipients of the proposal notice a program which shall be called a final test program stating the proposed timings, a list of those staff involved in carrying out the System Test and responsible for site safety and other matters as the Distribution Company(s) considers appropriate. The final test program shall bind all recipients to act in accordance with the provisions contained within the program in relation to the proposed System Test.

At the conclusion of the System Test, the person proposing Test shall be responsible for preparing a written report on the System Test for submission to the Distribution Company(s).

The final report shall include a description of the Power Plant and/or Apparatus tested together with the results, conclusions and recommendation. Results of test shall be reported to relevant parties, taking into account confidentiality issues. All system test procedures shall comply with all applicable legislation.

### **3.8.3 Monitoring of the Distribution System and Investigation of the Users Installations**

In order to properly exercise its responsibilities in respect of safe, secure and economic operation of the Distribution System and complying with its license conditions, the Distribution Company(s) shall organize and carry out monitoring and testing of Users electrical Plant or electrical Installation on the Distribution System.

The objective of this section is to specify the Distribution Company(s) requirements to test and/or monitor the Distribution System to ensure that Users are not operating outside technical parameters required by the Distribution Code. Requirements apply to all main Users of the Distribution System. The Distribution Company(s) shall, from time to time, determine the need to test or monitor the quality of supply at various points on the Distribution System. The requirement for specific testing and/or monitoring may be initiated by the receipt of specific complaints as to the quality of supply on the Distribution System. Where testing or monitoring is required at the Connection Point with a User of the Distribution System, the Distribution Company(s) shall inform the User involved and shall make available the results of such tests to the User together with related recommendations.

When a User is found to be operating outside the technical limits specified in the Distribution Code then the User shall correct the situation or disconnect the apparatus causing the problem from its electrical System connected to the Distribution System immediately or within such time as agreed with the Distribution Company(s).

Continued failure to correct the situation shall result in the User being disconnected in accordance with the Connection Agreement. The DC shall, from time to time, monitor the effects of the Users of the Distribution System on the Distribution System. The monitoring shall normally be related to the:

- amount of Active Power,
- Reactive Power or flickers,
- harmonics transferred across the Connection Point
- where the User is exporting or importing Active Power or Reactive Power in excess of those defined in the Connection Agreement or causing disturbances, the Distribution Company(s) shall notify the User and the User shall restrict the power transfer to within the specified parameters.
- the Distribution Company can check from time to time that Users connected to the Distribution System are in compliance with agreed protection requirements and protection settings.

### **3.9 Safety Coordination**

Distribution Code specifies the Safety Management System criteria to be applied by the Distribution Company(s) to meet legal requirements and Distribution License terms and conditions.

Similar criteria and standards of Safety Management Systems shall be provided by other Users of the Distribution System when carrying out work or tests at the operational interface with the Distribution Company(s). The safety coordination lay down the safety management criteria to be applied to ensure safety of persons working in the Distribution System and at or across operational and Ownership Boundaries. The safety coordination specifies the Safety Management criteria that apply to the Distribution Company(s) and the main Users of the Distribution System.

The Safety Management principles and procedures (Safety Management System) for ensuring the health and safety of all relevant personnel shall be specified by the Distribution Company(s) and respective related Users, according to the legislation in force.

There shall be joint agreement by the Distribution Company(s) and Users on which Safety Management System is to be used for sites or locations where an operational boundary exists, and proper documentation of the safety precautions to be taken shall be maintained. The DCT shall provide written authorization to personnel doing the work of control, operation, work or testing of sites or Apparatus connected to the Distribution System. There shall be joint agreement between the Distribution Company(s) and Users, which specifies responsibility for system or control equipment, which shall ensure that only one party is responsible for any item of site or apparatus at any one time.

The Distribution Company(s) and each User shall, at all times, have nominated a person or persons responsible for the coordination of safety in the respective systems. The Distribution Company(s) and each User shall maintain a suitable system of documentation which records all relevant operational events that have taken place on the Distribution System or other System connected to it and the coordination of relevant safety precautions for work. Electric schemes showing sufficient information for controlling personnel to carry out their duties shall be exchanged between the Distribution Company(s) and User.

The following procedure establishes the basic safety requirements of exchange between Users and DC. These procedures are necessary for the safety of all who may have to work at either side of the interface or on the interface. Written rules for safe working and communicating procedures shall be available and used by all persons who may have to work at or use the facilities at the interface.

Electrical equipment connected to either side of the interface and interface equipment shall be under the control of a named person at either side. Adequate means of isolation shall be provided at the interface to allow work to be carried out safely at either side of the interface. Where necessary to prevent danger adequate facilities for earthing shall be provided at either side of the interface to allow work to be carried out safely at the interface or at either side of the interface.

For equipments placed near to each other, which operation is being done in circumstances which may cause danger adequate working space, adequate access

means and, where necessary, adequate lighting shall be provided. All electrical equipment shall be properly identified when it is necessary to prevent danger.

Electrical installations and equipment shall comply with the effective legal requirements.

Operation and Maintenance of the Users' equipment shall only be carried out by authorized personnel. Before first commissioning of the plant, operating procedures shall be agreed with the Distribution Company. Information for operating and/or earthing the Users' electrical equipment shall be clearly displayed in the Users' Medium and Low Voltage switch room. The Safety Rules detail the safety procedures and technical safety requirements to be observed by all personnel working in the Distribution System.

### **3.10 Security of Supply and Performance Standards for the Electricity Distribution Service**

#### **3.10.1 Application Area**

The application of performance standards of Electricity Distribution Service establishes the indicators and performance levels for:

- a) Connection of Users to the Distribution System;
- b) Safety, reliability of supply as well as the quality of distributed electricity;
- c) Scheduled outages due to programmed maintenance and repair works;
- d) Unscheduled outages due to different breakdowns and defects;
- e) Solution of users complains on electricity quality;
- f) Solution of users complains.

These standards shall be applied for the relations between the DC and Users of the Distribution System, when:

- a) they have installations in alternative nominal voltage in the range of 0.4 kV  $\geq$  110 kV and frequency of 50 Hz.
- b) they do not cause supply disturbances to other Users of the Distribution System through their working regime.
- c) they remain within the maximal power established by technical approval for connection and observation of terms provided in the contract.

These standards shall not be applied in the following occasions:

- a) Force Majeure events
- b) Abnormal operation of the Distribution System as defined by the Distribution Company(s).
- c) Accidental events caused by third parties.

#### **3.10.2 Attributes and Competences**

In order to observe the performance standards, the DC should provide:

- a) Capacity to solve complaints and petitions of Users of the Distribution System according to this Code and the Legislation in force;

- b) Records of the applications for connection to the network and notices issued for the technical acceptance of connection;
- c) Records of the activity performance regarding the quality of Electricity distributed to Users of the Distribution system;
- d) Planning of programmed works for maintenance and repair;
- e) Continuity of distribution services performed by the Users.

### **3.10.3 Performance Indicator for Electricity Distribution Activity**

The Distribution Company(s) responsibility regarding the supply of Distribution System Users terminates at boundary points of installations between parties as specified by the distribution service contract. Place and numbers of boundary points shall be proposed by the Distribution Company(s) and shall be established by mutual agreements with the User of the Transmission System.

### **3.10.4 Electricity Supply Interruptions**

#### **3.10.4.1 Accidental interruptions**

The Distribution Company(s) shall restore, as soon as possible, the supply of the Distribution System customers affected by the accidental event that resulted in the supply interruption. The Distribution Company(s) shall file all complaints and inform the complainant on the file number. Any complaint should refer to the filed number.

The Distribution Company(s) should inform the complainant on the approximate period of interruption and the restoration of supply. The Distribution Company(s) should send emergency equipments to eliminate the breakdown within minimal time.

#### **3.10.5 Security of Supply**

The Distribution Company(s) shall use reasonable actions to preserve the security of supply from the system for its customers. This cannot be ensured, since faults, planned maintenance and new works outages and other circumstances outside Distribution Company's control can cause interruptions. On such occasions, the Distribution Company(s) shall use reasonable actions to restore the supply or connection as soon as practicable. Types of interruptions are:

- a) **Fault Outages:** The Distribution Company(s) shall make an effort to restore electricity supply to its customers according to the paragraphs of this Code. In specific circumstances the outage duration may be longer and, in such circumstances, the Distribution Company(s) shall act to keep the User of Distribution System informed of progress.
- b) **Planned Outages:** The Distribution Company(s) shall notify the necessary outages for planned maintenance and repairing. Distribution Company(s) shall make the notification through public information means, depending on the size of the affected area, at least 24 hours in advance, informing also the outage duration. For planned outages, not notified in advance, the Users of the Distribution System may complain, while the

Distribution Company(s) shall be due to repair related damages according to the distribution contract.

c) **Supply Curtailments:** In some circumstances, it may be necessary to request customers to reduce load or to use standby supplies where appropriate. In these situations the Distribution Company(s) shall make an effort to maintain access to the System and inform the Distribution System Users on supply curtailments 24 hours in advance in the affected areas

d) **Load Shedding:** In situations of generation shortages, load shedding may be required. In these circumstances the Distribution Company(s) shall notify customers if possible.

The Distribution Company(s) may disconnect Users under certain circumstances. These circumstances shall include:

- When the customer's installation or use of electricity is such as to impede with the acceptable operation of the Distribution or Transmission Systems or to cause disturbance to other Users of Distribution System.
- When the Distribution Company considers that the customer's installation is in a dangerous condition.
- When repairs, replaces or maintains the Distribution System and the switching off of the connection point is required.
- When a User of the Distribution System extends supply for use by another party.
- In any other circumstances in which disconnection is necessary or appropriate to enable the Distribution Company(s) to comply with the Distribution Code and/or to operate the Distribution System in accordance with effective rules, directives, norms, regulations or laws.

### 3.10.6 Indicators of Annual Performance

Indicators of annual performance of the Distribution System consist in:

- a) number of programmed outages according to voltage levels;
- b) total duration of scheduled outages according to voltage levels;
- c) number of Users affected by outages in time limits according to voltage levels and customer categories.
- d) number of incidents and breakdowns;
- e) duration of interruptions due to incidents and breakdowns according to voltage levels.

When a complaint is submitted regarding the voltage level, the Distribution Company(s) shall verify this parameter in boundaries with the User of the Distribution System and inform the User on the outcomes of analyses and actions undertaken to fix the problem. The standard time to answer the complaints is 15 calendar days.

Complaints shall have a registered number, and complainants shall be informed on this number. Later complaints shall be referred to this registered number.

### **3.10.7 Indicators of annual performance as to voltage level**

Indicators of annual performance of Distribution System as to voltage level consist in:

- a) number of complaints for voltage levels;
- b) number of complaints an answer was given;
- c) number of complaints no solution was given.

### **3.10.8 Annual Indicators related to Complaints of Distribution System Users:**

- a) number of written complaints;
- b) number of specified complaints that have been answered;
- c) number of specified complaints that have not been answered.

Distribution Company(s) is obligated to answer (by solving complaint or giving a written answer) to all written complaints from Users of the Distribution System. The maximal standard period to answer a complaint is 30 calendar days, unless otherwise defined by this Code.

Any complaint shall have a registered number that shall be communicated to the complainant. Later complaints shall be referred to the registered number.

### **3.10.9. Monitoring and Registering of Performance Indicators**

For recording of complaints made by Users of the Distribution System, every Distribution Company shall organize:

- a) a centre for customer relations in each territorial unit registering the complaints;
- b) a telephone service;
- c) a specialized sector for analyzing the complaints.

Distribution Company(s) shall guarantee to monitor other performance indicators through specialized sectors.

**Table of Performance Indicators**

No.	Performance indicators	Monthly archived data							
		1	2	3	...	...	...	...	1 2
1	<p>Number of Users applying for new connection or modification of existing ones.</p> <p>LV (Low Voltage) MV (Medium Voltage) HV (High Voltage)</p>								
2	<p>Number of applications for electricity distribution service contracts according to voltage levels and Users categories.</p> <p>Number of terminated contracts.</p> <p>LV MV HV</p>								
3	<p>Number of incidents and breakdowns.</p> <p>Duration of interruption due to incidents and breakdowns.</p> <p>LV MV HV</p>								
4	<p>Number of scheduled outages.</p> <p>Total duration of scheduled outages (hours)</p> <p>Number of Users affected by scheduled interruptions.</p> <p>Number of interruptions in the</p> <p>LV MV HV</p>								

	Distribution System due to the lack of Electricity supply from the Transmission System.  Duration of interruptions in the Distribution System due to lack of Electricity supply from the Transmission System.									
5	Number of complaints for the voltage level.  Number of complaints that cannot be solved.	LV MV HV  LV MV HV								

## CHAPTER IV

### CONNECTION

The Connection Chapter specifies the terms, criteria and deadlines to be fulfilled by the Users of the Distribution System in order to connect to or modify their existing connections to the Distribution System.

#### **4. Scope**

The scope of this paragraph is to fulfill the following objectives:

1. All existing Users of the Distribution System or perspective Users should be treated equally.
2. New Connections should not cause any negative effect on the existing Users and New Connections should not be influenced by negative effects of the existing Users.
3. Assist the Distribution System Users to meet their obligations and provide high quality operation and maintenance of their installments.
4. Clearly specify in a standard format the obligations and responsibilities of all Distribution System Users for every place where a new Connection is made or an existing one modified.

## **4.1 Procedure of Application for Connection**

Any Distribution System User requiring a new connection or modification of existing connections and/or using the Distribution system should follow the procedures established by this Chapter.

DC shall follow the procedures and deadlines specified in this Code in the process of application, modification, acceptance or refusal of a request.

### **4.1.2 Application for Connection**

Any Distribution System User that requires to use the Distribution System may submit an Application for Connection to the DC, in the format required by the DC.

The request should include at least the following information:

- a) name, address, phone/fax/e-mail of the applicant;
- b) scope of the applicant related to the connection (generation unit, distribution installments, load installments, etc)
- c) written commitment of the applicant to comply with the Distribution Code
- d) documentation attached to the application according to following paragraph specifications.

## **4.2 Specific information required for getting connected to the low voltage Distribution Network**

For connections at Low Voltage, the DC requires the following information:

- Object name (consumption site);
- Location of the object, address. Location map should be attached if requested by the DC;
- Activity type (production, trade, services, etc.)
- Type of required connection (one or three phases);
- Installed capacity in kW;
- Electric design of Users installments prepared by a licensed electric engineer;
- Statement of conformity of User's internal installations;
- Maximum kW or kVA requirements;
- Annual demand for Electricity in kWh;
- Type and electrical loading of equipment to be connected (such as number and size of motors, illumination, etc);
- Average power factor of customer work ( $\cos\phi$ );
- The date when connection is requested.

If a preliminary assessment of this data indicates that more detailed information is practically required, then it shall be provided to the Distribution Company(s) upon request by the respective User/Customer.

### **4.2.1 Specific information required for connection at High and Medium Voltages**

For connection at High and Medium Voltages the following information will be required:

- Object name (consumption site);
- Location of the object, address. Location map should be attached if requested by the DC;
- Activity type (production, services, working methods, shift number, working days in a week, etc.);
- Installed power in MW;
- Load curve
- Average power factor of customer work ( $\cos\phi$ );
- Electric design of Users installments prepared by a licensed electric engineer;
- Statement of conformity of User's internal installations;
- If the User is already connected and requires a modification of the existing connection, it should submit: Actual manner of supply of the object (scheme, characteristics, supply lines and the metering method of consumed electricity). A copy of the Connection Agreement and the scheme of location of supply installments to the existing receiving and metering point should also be provided;
- An annual and a 5-years Maximum and Minimum Reactive Power demand;
- An annual and a 5-years Maximum and Minimum Reactive Electricity demand;
- Type of load and control arrangements (e.g. type of motor start);
- Maximum load on each phase;
- Maximal current harmonics that may be imposed on the Distribution System;
- Details of cyclic variations or fluctuating loads (as below);
- Disturbing Loads;
- Comprehensive schedule of installed new equipment including details of disturbing loads. These are loads which have the potential to introduce harmonics, flickers or unbalances to the Distribution System;
- Fluctuating Loads;
- Technical data on equipment that generate/observe reactive power, if there is any;
- Responsibilities for equipment control and maintenance;
- Date when connection is requested for.

Main Users that apply for Connection should also guarantee:

- Responsibilities for equipment control and maintenance;
- Responsibilities for equipment operation;
- Responsibilities for staff and technical safety.

In some cases, more detailed information may be required to permit a full assessment of the effect of the User of the Distribution System load on the Distribution System. Such information may include a proposed commissioning program. This information shall be specifically requested by the Distribution Company(s) if necessary, and shall be provided by the User within a reasonable time.

User of the Distribution System shall inform the Distribution Companies in advance if it is proposed to make any significant change to the connection, electric lines or electric equipment, install or operate any generating equipment or do anything else that could affect the Distribution System or require changes to connection. Users

shall provide to the Distribution Company(s) any information reasonably required by the Distribution Company(s) about the nature and use of electrical equipment on the Users premises.

After receiving all the data and information prescribed above, the Distribution Company(s) shall develop the respective study on new connections or modification of existing connections in medium and high voltage levels. In order to define the place for new Connection, the Distribution Company(s) shall be based on the following factors:

- i) Security level of Supply;
- ii) Static and dynamic stability of Distribution System Elements;
- iii) Short circuit current level;
- iv) Effect of technical losses in case of Old and New Connections to the Distribution Network;
- v) Assessment of Connection manner to the existing scheme of the Distribution Network;
- vi) Assessment of Connection cost for DC according to the Connection version proposed by the Applicant;
- vii) Compliance with Connection technical terms;
- viii) Compliance with respective paragraphs of the Distribution Code.

If the analysis indicates that the Connection shall function better in a different voltage level from that proposed by the applicant, then the connection shall be made in the respective voltage level as indicated by the study.

### **4.3 Connection to the Distribution Network**

The Distribution System Users requiring to connect to the Distribution Network or to modify the existing connection should fulfill the minimal technical criteria of planning and operation in order to maintain a stable and safe operation of the Distribution System. This is also necessary to protect the Plants and installments of the Distribution System and of the Distribution System Users directly connected to the Distribution System.

#### **4.3.1 Terms of Connection to the Distribution System**

Terms of Connection to the Distribution System establish minimal principles and standards to perform the Connection, way of connection and technical and performance standards.

The terms of connection should be similar to all Users of the Distribution System for the equivalent categories. The terms of Connection to the Distribution System specify the information to be provided by Users of the Distribution System in order to undertake appropriate actions from the Distribution Company(s) for new connections or modification of the existing connections.

Prospective User of Distribution System shall provide to the Distribution Company(s) in satisfactory time all the information and data prescribed in this Code. In conjunction with the terms of connection, there are Connection Agreements, which are bilateral agreements between the Distribution Company(s) and any User of the Distribution System, and which contain the specific details on each User's connection

to and use of the Distribution System. The Connection Agreement requires the User of the Distribution System and the Distribution Company(s) to comply with the terms of the Distribution Code.

The terms of connection define the minimum standards for the method of connection to the Distribution System and the technical, design and operational standards to which Users connecting to the Distribution System shall comply. The terms of connection specify the technical arrangements required at the Ownership Boundary between the Distribution System and the Installation of the User of the Distribution System and is applicable at all voltage levels covered by the Distribution Code. The terms of connection outline the types of signals and indications that will be required to be made available to the Distribution Company(s) by each User of the Distribution System. The terms of connection apply to all connected Users of the Distribution System that require the modification of the existing connection, and Users planning a connection to the Distribution System.

#### **4.4 Connection Agreements**

During the application for connection the Distribution Company(s) based on the respective study and in consultation with the applicant, shall specify the voltage level to which a User of the Distribution System will be connected in accordance with normal practice for the type of load to be supplied and network characteristics.

The voltage level will be the minimum allowed voltage in standard use on the Distribution System. Based on the information provided by Users to the Distribution Company(s) for connection to the Distribution System, the Distribution Company(s) shall prepare a statement containing the following elements that are necessary for and relevant to the proposed connection:

- Nominal voltage at which connection will be made;
- Method of connection, extension and/or reinforcement details;
- The normal impedance to source at the point of connection;
- Method of earthing;
- Maximum withdrawal capacity of electricity;

#### **Individual customer restrictions relating to:**

- Harmonic Distortion
- Voltage Flicker
- Unbalance
- Expected lead time of providing connection (following formal acceptance of terms for Supply);
- Cost of connection.

#### **4.5 Ownership Boundaries**

The point or points at which energy is withdrawn or injected between the Distribution System and User's installation shall be decided between the Distribution Company and the User as to the request. Ownership boundaries shall be established in Connection Agreement or Supply Agreement in order:

- to facilitate maintenance actions of Distribution Company(s)
- to minimize inconveniences of User of the Distribution System from Distribution Company(s) and Suppliers daily duties;
- to facilitate readings of commercial meters and data convey;
- to enable disconnection and reconnection of network equipment.

For low voltage supplies the Distribution Company(s)'s responsibility extends up to the Customer's Connection. For High Voltage supplies the ownership boundaries shall be in each case subject to specific agreement between the parties. Changes in the Boundary arrangements proposed by either party shall be agreed in advance.

All equipment at the Ownership Boundary shall meet the design principles contained in the Planning Chapter. Connections of Users to the Distribution System shall include means of disconnection of the User's installation by the Distribution System.

#### **4.6 Technical Requirements for Connection.**

A connection to the Distribution System may be by means of an overhead line, an underground cable or a combination of both. The network configuration at the Connection Point may take a number of forms appropriate to the nature of the load and network arrangements.

All equipment in an installation connected to the Distribution System shall be designed, manufactured, tested and installed in accordance with all applicable legal obligations and shall conform to the relevant CENELEC (European Committee for Electro Technical Standardization) or Albanian Standards up to date at the time of the connection of the installation to the Distribution System. The Distribution Company(s) may notify Users that supplemental specifications and/or standards shall be met.

All equipment in an installation connected to the Distribution System shall be suitable for use at the operating frequency of the Distribution System and at the voltage and short-circuit rating of the Distribution System, as in Design Chapter of Distribution Code, at the Connection Point. The Distribution Company(s) may require manufacturers' certification that the equipment has been designed and installed in an acceptable manner. The Distribution Company(s) may also seek evidence that the equipment has been tested for conformance with the international standards.

Before entering into a connection agreement it will be necessary for the Distribution Company(s) to be convincingly satisfied that the User's System at the boundary with the Distribution System shall comply with the appropriate requirements of the Distribution Code.

##### **4.6.1 Protection Requirements.**

User of Distribution System shall make certain that faults in the User's Plant and Apparatus do not cause disturbances to the Distribution System or to other Users.

Without limiting this obligation, a User shall prior to connection of the User's Installation to the Distribution System, install the protection equipment

Faults on the Distribution System can cause damage to User's Plant and Apparatus. These faults could result in a loss of a phase, over voltage, or under voltage. The User shall take account of the established practices of the particular network to which a connection is to be made, and ensure that protection installed is compatible with that used by the Distribution Company(s). The adequacy of the protection installed by the User of the Distribution System is User's responsibility.

User's Protection arrangements at the Ownership Boundary, including types of Equipment and Protection settings, shall be compatible with existing system conditions and the Distribution System protection practice as specified by the Distribution Company(s) at the time of application.

Users should be aware that disconnection of one or two phases only of a three phase system may be effected by Distribution Protection arrangements for certain types of faults. The minimum protection required for a User Installation connected to the Distribution System will vary according to type, size, and method of connection and earthing of the User System.

New connection may require the following protection amenities:

- Three phase over-current;
- Earth fault protection;
- Other necessary according to circumstances.

Where interface circuit breakers are used they shall be fitted with relays of a type of acceptable to the Distribution Company(s). These relays shall have three phase over-current elements and one earth fault element and shall have time-current characteristics. Maximum permissible relay settings at the ownership boundary will be provided by the Distribution Company(s), and these settings may be reviewed at any time in the future by the Distribution Company(s).

In order to ensure satisfactory operation of the Distribution System, Protection systems, operating times and sensitivity at the Ownership boundary shall be agreed between the Distribution Company(s) and the User of the Distribution System during the application for connection process, and may be reviewed from time to time by the Distribution Company(s);

In order to avoid effects caused from a Circuit Breaker or other nonfunctioning equipment, a back-up protection shall be provided upon the DC request. Protection relays shall be commissioned on site by the User of the Distribution System who shall guarantee that the settings are below the maximum permitted levels. The Distribution Company(s) can observe these tests and it shall be the responsibility of the User of the Distribution System to ensure that sufficient notice is given to the Distribution Company(s). Users shall ensure that the protection settings remain below the maximum permitted levels.

#### **4.6.2 Earthing.**

Earthing of the part of the User's Installation that is connected to the Distribution System shall comply with the requirements of the Distribution Code and legislation in force. Earthing installation of Distribution System shall be designed to comply with rules and legal acts in force.

Users of the Distribution System shall take safety measures to limit the occurrence and effects of circulating currents in respect of neutral points connected with earth where there is more than one source of energy.

#### **4.6.4 Short-Circuit Levels**

The short circuit rating of User's Equipment at the connection point shall not be less than the design Fault Level of the Distribution System. The User's of Distribution System incoming supply shall be controlled by a main circuit breaker which shall comply with a recognized international standard acceptable for the Distribution Company(s).

#### **4.6.5 Insulation Levels**

The design of equipment connected to the Distribution System shall be such as to enable it to survive the AC and impulse tests

#### **4.6.6 Capacitive and Inductive Effects**

The User of the Distribution System shall provide the Distribution Company with information of any capacitor banks and reactors connected at High Voltage and/or Medium Voltage, which could affect the Distribution System.

#### **4.6.7 Voltage Disturbances**

Users of the Distribution System should not generate voltage disturbances at a level that would affect other Users connected to the Distribution System. Users should select equipment that is capable of functioning satisfactorily in the presence of disturbances at the levels permitted by international standards.

#### **4.6.8 Metering and Telemetry**

The User may be required to provide such voltage, current, frequency, Active Power and Reactive Power indications of the measuring that are essential for the Distribution Company(s) to ensure adequate System monitoring. Details will be specified in the Connection Agreement.

If agreed by the parties that the Distribution Company(s) shall control the switchgear on the User's System, the Distribution Company(s) shall install the necessary telecontrol station. Responsibility of the User of the Distribution System is

to provide the necessary control interface for the switchgear of the User, which are subject of control.

Personnel carrying out the designing or installation work for the customer interface with the Distribution Company(s) should comply with principles of the Distribution Code.

#### **4.6.9 Specific Rules for Distributed Generators**

The integrity of the Distribution System and the security and quality of supply to existing Users of Distribution System shall not fall below standard as a result of generators operating synchronized with the Distribution System. Conditions for operation shall guarantee the safety of:

- General public;
- Personnel;
- Equipment of the Distribution System and Users of the Distribution System.

Generation Units connecting to the Distribution System and operating in parallel with, or which are capable of being operated in parallel with the Distribution System shall comply with requirements for Connection of Distributed Generators. This Code sets out the conditions to which Distributed Generating Units operating in parallel to the Distribution System shall comply. The Distributed Generator is responsible for protection of its personnel and equipment and the efficient operation of his Generating Unit.

Distribution Company(s) shall be informed where a Generator Unit is to be installed. The Distribution Company(s) shall have the right to inspect generating installations to ensure that the requirements are met. In some cases the Distribution Company(s) may require a demonstration or testing of operation of the generator. Such demonstrations and tests shall be performed according to the agreement with the Generator.

#### **4.7 Provision of the Information**

Distribution Company(s) before entering into an agreement to connect any Distributed Generators Plant to the system may require the following information:

Generating Units

##### ***a) Generators' Parameters***

1. Nominal Voltage ( $U_n$  in kV)
2. Nominal Absolute Power ( $S_n$  in MVA)
3. Nominal Active Power ( $P_n$  in MW)
4. Phase Nominal Current ( $I_n$  in A)
5. Nominal Power Factor ( $\cos\phi$ )
6. Nominal Frequency ( $F_n$  in Hz)
7. Nominal Speed ( $N_n$  in rot/min)
8. Inertia Constant  $H$  (MW Sec/MVA)

9. Volant Moment ( $GD^2$  in  $Tm^2$ )
10. Short Circuit Coefficient ( $K_c$ )
11. Direct-Axis Synchronous Reactance ( $X_d$  in p.u)
12. Direct-Axis Transient Reactance ( $X'_d$  in p.u )
13. Direct-Axis Sub-Transient Reactance ( $X''_d$  in p.u )
14. Quadrature-Axis Synchronous Reactance ( $X_q$  in p.u)
15. Quadrature-Axis Transient Reactance ( $X'_q$  in p.u)
16. Quadrature-Axis Sub-transient Reactive ( $X''_q$  in p.u)
17. Stator Resistance per phase in 75 °C ( $R_a$  in  $\Omega$ )
18. Direct-Axis Transient Open Circuit time Constant ( $T'_{do}$  in sec )
19. Direct-Axis Sub-Transient Open Circuit Time Constant ( $T''_{do}$  in sec)
20. Quadrature -Axis Transient Open Circuit Time constant ( $T'_{qo}$  in sec)
21. Quadrature -Axis Sub-Transient Open Circuit Time Constant ( $T''_{qo}$  in sec)
22. Time factor of stator's winding for short circuit ( $T_s$  per sec).
23. Open-Circuit Saturation Curve
24. Generator Capability Curve.

**b) Parameters of Exciting System and Automatic Voltage Regulator (RAT)**

1. Type of Exciter
  2. Nominal Current of Exciter ( $I_n$  in A)
  3. Nominal Voltage of Exciter ( $U$  in V)
  4. Exciter maximal Current along Transient Time ( $I_{max}$  in A)
  5. Exciter maximal Voltage ( $V_{max}$  in V)
  6. Excitation System Transient Response
  7. Excitation System Open-Loop Response characteristic
  8. Excitation System closed loop Response characteristic
  9. Dynamic characteristics of over exciting and limits
  10. Dynamic characteristics of under exciting and limits
  11. Detailed structured scheme of the whole exciting system that shows details of transmitting functions and parameters of its elements.
- $K_a$  – Voltage Regulator Constant  
 $T_a$  – Voltage Regulator Time Constant  
 $V_{rmax}$  – Normal Max voltage in exit  
 $V_{amax}, V_{amin}$  – Maximal and Minimal Voltage of Internal Regulator

**c) Parameters of Regulation and Parameters of Governor**

1. Type of **Governor**,
2. kg coefficient to define the working range of the Governor (in MW/Hz) as defined by IEEE norms.
3. Speed and its time constant ( $T_{sr}$ )
4. Time constant of servomotor and Guiding Apparatus ( $T_{sm}$ )
5. Opening valve of the speed regulator with limit number ( $C_{V.OPEN}$ )
6. Closing valve of the speed regulator with limit number ( $C_{V.CLOSE}$ )
7. Limit of speed regulator valve ( $C_{VMax}$  and  $C_{VMin}$ )
8. Based on the steam turbine system in CR-IEEE the following parameters should be provided when appropriate:
  - i.  $T_{RH}, T_{RH1}$  – Time Constant of Over-Warming up (first stage)
  - ii.  $T_{RH2}$  – Time Constant of Over-Warming up (second stage)

9. Structural Scheme of the Regulator System and Speed Regulator indicate the transmitting functions of specific elements.

**Transformer Parameters in Generating Units:**

- a) Nominal Power MVA
- b) Nominal Voltage kV
- c) Vector group
- d) On Load Losses  $P_{cu}$  in kW
- e) Short circuit voltage  $U_k$  in %
- f) No load Losses  $P_0$  in kW
- g) No load current  $I_0$  in %
- h) Positive sequence reactance (at maximum, minimum, normal Tap ) (% on MVA )
- i) Positive sequence resistance (at maximum, minimum, normal tap) (% on MVA)
- j) Zero sequence reactance (% on MVA)
- k) Tap changer level ( $\pm\%$ ) and steps
- l) Type of Tap changer (Off load/On load)

**4.8 Interface Arrangements**

These agreements define details for connecting with earth of Distributed Generators Plant directly connected to the Distribution System and other specifications that might be requested according to generation unit connections to the Distribution System. The details of information required will vary depending on the type and size of the Generating Unit or the point at which connection is to be made to the Distribution System. This information shall be provided by the Generator upon the reasonable request of the Distribution Company(s).

The DC will use the information provided to model the Generator Unit to determine a technically acceptable method of connection. If the DC reasonably concludes that the nature of the proposed connection or changes to an existing connection requires more detailed analysis then further specified information may be required.

In normal circumstances the information specified above will enable the Distribution Company(s) to assess the connection requirements. Occasionally additional information may be required. In such circumstances, the information shall be made available by the Distributed Generators upon the reasonable request of the Distribution Company(s).

**Information provided by the Distribution Company**

Distribution Company(s) shall prepare a statement for the Distributed Generators applying for connection to the Distribution System. In case of power export, the following additional information shall be provided:

- Interface protection settings
- Equipment, cabling, switchgear, metering requirements

- Substation site and building requirements (dimensions, access, planning permission, earthing, lighting and heating)

#### **4.9 Distributed Generators Plant Performance Requirements:**

For Distributed Generators not subject to central dispatching the electrical parameters to be achieved at the Generating Unit terminals shall be specified by the Distribution Companies with the offer for connection. Protection associated with Distributed Generator's Plant shall be required to co-ordinate with the Distribution System protection system regarding:

- clearance times for fault currents
- co-ordination with auto re-closer requirements
- protection settings of the controlling circuit breaker

Protection settings shall not be changed without agreement from the Distribution Companies. The emission limit for voltage fluctuations and flicker caused by switching or continuous operation of wind / other type turbine installations is  $P_{st} = 0.35$  and  $Plt = 0.35$  where:

- $P_{st}$ : Short Term Flicker Severity - an index of visual severity evaluated over a 10 minute period.
- $Plt$ : Long Term Flicker Severity - an index of visual severity evaluated over a 2 hour period.

For generators the Voltage Level Total Harmonic Voltage Distortion is (%):

- 0,4 kV = 2.5
- 10 kV = 2.0
- 20 kV = 2.0
- 35 kV = 1.5

A schedule of individual harmonic distortion limits shall be provided by the Distribution Companies where appropriate.

#### **4.10 Islanding**

It is conceivable that a part of the Distribution System, to which Distributed Generator are connected can, during emergency conditions, become detached from the rest of the System. Distribution Company(s) may decide, dependent on local network conditions, if it is desirable for the Distributed Generator to continue to generate onto the islanded section of the Distribution System.

If facilities do not exist for the subsequent re-synchronization with the rest of the Distribution System then the Distributed Generator shall under Distribution Company(s) instruction ensure that the Generating Plant is disconnected for re-synchronization.

Under emergency conditions there is an expectation that some generation will continue to operate outside the statutory frequency limits. However, for Distributed Generators connected to the Distribution System it is likely that this could mean

connection within an automatic low frequency load disconnection zone. Distributed Generator should ensure that all Protection on Generating Plant should have settings to co-ordinate with those on the low frequency load disconnection equipment which will be detailed by the Distribution Company(s) on request.

#### **4.10.1 Black Start Capability**

Distributed Generator shall notify the DC if its Generating Plant has a restart capability without connection to an external power supply, unless the Distributed Generator has previously notified the Transmission System Operator accordingly under the Transmission Grid Code.

#### **4.10.2 Generating Plant Commissioning Tests**

Where the Generating Plant requires connection to the Distribution System in advance of the commissioning date, for the purposes of testing, the Generator shall comply with the requirements of the Connection Agreement.

The Distributed Generator shall provide the Distribution Company(s) with a commissioning program, approved consequently by the Distribution Company(s), to allow Commissioning Tests to be co-coordinated.

#### **4.10.3 Standby Generators**

Parallel operation with the Distribution System is generally not permitted for standby generators. Specific agreement of the Distribution Company(s) is required for parallel operation.

Customers with standby generation shall ensure that any part of the installation supplied by the generating plant has first been disconnected from the Distribution System and remains disconnected while the generating plant is connected to the installation. Methods of change-over and inter-locking shall meet Supplementary Requirements for Low Voltage Synchronous Generator Installations.

## **CHAPTER V**

### **FINAL PROVISIONS**

5.1 Electricity Distribution Functioning Code is object of review with the decision of ERE's Board of Commissioners.

5.2 This Code enters in force 15 days after the publication in the Official Journal.