



Quality of Electricity Supply

Albanian National Report

by

Energy Regulatory Entity (ERE)

National Legal Framework

Distribution Code

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 (Transmission System Operator) 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)

Table 1: 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



Security of Supply and Performance Standards for the Electricity Distribution Service

1. Application Area

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

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

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

- they have installations in alternative nominal voltage in the range of 0.4 kV \geq 110 kV and frequency of 50 Hz.
- they do not cause supply disturbances to other Users of the Distribution System through their working regime.
- 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:

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

2. Attributes and Competences

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

- Capacity to solve complaints and petitions of Users of the Distribution System according to this Code and the Legislation in force;
- Records of the applications for connection to the network and notices issued for the technical acceptance of connection;
- Records of the activity performance regarding the quality of Electricity distributed to Users of the Distribution system;
- Planning of programmed works for maintenance and repair;
- Continuity of distribution services performed by the Users.

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.

4. Electricity Supply 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 equips to eliminate the breakdown within minimal time.

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.

6. Indicators of Annual Performance

Indicators of annual performance of the Distribution System consist in:

- number of programmed outages according to voltage levels;
- total duration of scheduled outages according to voltage levels;
- number of Users affected by outages in time limits according to voltage levels and customer categories.
- number of incidents and breakdowns;



- 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.

7. Indicators of annual performance as to voltage level

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

- number of complaints for voltage levels;
- number of complaints an answer was given;
- number of complaints no solution was given.

8. Annual Indicators related to Complaints of Distribution System Users

Annual Indicators related to Complaints of Distribution System Users are:

- number of written complaints;
- number of specified complaints that have been answered;
- 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.

9. Monitoring and Registering of Performance Indicators

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

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

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

Table 2: Performance indicators

No.	Performance indicator definition	Monthly archived data
1	<ul style="list-style-type: none"> ▪ Number of Users applying for new connection or modification of existing ones. 	LV (Low Voltage) MV (Medium Voltage) HV (High Voltage)
2	<ul style="list-style-type: none"> ▪ Number of applications for electricity distribution service contracts according to voltage levels and Users categories. ▪ Number of terminated contracts. 	LV MV HV



No.	Performance indicator definition	Monthly archived data
3	<ul style="list-style-type: none"> ▪ Number of incidents and breakdowns. ▪ Duration of interruption due to incidents and breakdowns. 	LV MV HV
4	<ul style="list-style-type: none"> ▪ Number of scheduled outages. ▪ Total duration of scheduled outages (hours) ▪ Number of Users affected by scheduled interruptions. ▪ Number of interruptions in the 	LV MV HV

Metering Code

General requirements

1. Meter Reading

The meter shall be read and registered on the monthly basis in order to prepare the electricity balance (sale-purchase, transactions, and exchanges). Parties may agree to read the meter in different periods of time as agreed. Occasionally, or based on the agreements of the Parties, meters can be read in distance (on-line).

2. Lack of functioning of the Metering System

If metering data are invalid due to breakdowns of communication equipment or data central system, data received by local equipment installed at the meter should be used (for example local register, etc). In cases when data are invalid due to breakdowns and lack of functioning of meters installed in the object, voltage, current and cabling transformers, or protection equipment or in cases when the meters installed in the object are working beyond of allowed error limits, then the receiving of metering data shall be established by the agreement of the Parties in accordance with ERE rules.

3. Protection from Tampering and Damages

DSO and Suppliers should verify the electricity consumption registered in every metering point in order to define the real consumption for final customers. In case illegal interferences or use of electricity are evidenced, DSO, Suppliers and the authorized organs shall apply the Legislation in force in the territory of the Republic of Albania. When meters or meter parts have been damaged, are out of function or are working beyond allowed error limits, then measures should be taken to fix, repair or replace them or their damaged parts by enabling their restoration according to requirements for allowed error limits. Customers should carefully use and maintain the meters. In case they evidence meter damages, they should inform by a written letter the owner of the metering equipment in order to repair or replace the meter according to agreements.

4. Requirements for Users and Final Customers

Users or Final Customers should allow OST, DSO, Wholesale Public Supplier, Retail Public Supplier, Qualified Supplier, Electric Police, employees, inspectors, agents or any other person authorized by the Legislation in force, to enter premises or objects owned by them for electricity consumption, in order to check and implement rules and obligations according to Metering Code and the Legislation in force.

According to this paragraph, the right to intervene includes the right of authorized persons to check, verify and perform necessary works in the territory of the User or Customer for each



meter or metering equipment in order to implement Metering Code and the Legislation in force.

Technical requirements for final customers

1. Construction and Maintenance of the Metering System

The metering system should be constructed, installed, maintained and operated according to the engineering practices of the electricity industry and international standards to provide at a reasonable extent, the continuity of service, the uniformity of service quality and the safety of people and property.

The DSO and Suppliers should implement the requirements and technical standards established by the following acts as well as by international standards:

- Metering Code,
- Grid Code,
- Distribution Code and
- Requirements of IEC Standards for Electricity metering and transforming instruments.

The Electricity Market Participants should adopt an inspection program for the metering system in order to define the needs for replacement and repair. The frequency of various inspections should be based on the experience and best accepted practices.

Every DSO and/or Supplier should prepare (register) a map showing its operation areas. The map should be checked yearly except when such a control is unnecessary. In such case, the DSO and/or Supplier should inform ERE that the registered map is invalid. In addition to terms defined by the license, the map should indicate:

- 110/MV kV substations
- Lines under 110 kV up to 35 kV managed by the DSO
- State borders
- Territorial boundaries

All used data and maps that indicate the positions of the distribution lines, their number and orientation, circuits and distribution transformers, should be kept in a file. These data and respective modifications should be created and updated within 6 months from the factual construction.

2. Meter Location

Meters outside the object

Meters installed outside the object should be placed outside the building in order to be legible for authorized persons and customers. DSO shall be responsible for meter testing and maintenance. Meters should not be installed in places where persons authorized to read them or service people may damage the environment, or in places they may face difficulties to read or perform other metering services. Meters should not be installed in places they may be easily damaged, or create difficulties to the Customer and the DSO. If for objective reasons, the meter cannot be installed outside the object, then the meter shall be installed where DSO believe is reasonable in order to comply with the norms of this Code.

Meters installed to the Object (main meters)

The main meters are not allowed to be installed in buildings with more than one unit. Separate meters for electricity control are required to be installed in such buildings for each unit. Despite the requirements of paragraph IV.2.3, the main meters may be installed and no specific meters are required in the following occasions:

- In household buildings where units are on loan for less than 30 days.



- In household buildings where one family is separated and has created a new unit.
- In household buildings without special electric equipment in the unit for heating/cooling of space, space between flats, etc.
- In student dormitories or schools, colleges and universities
- In commercial centres where a company or firm occupies 70% or more of the available space.
- In commercial centres not definitely divided in units, but with established spaces for each loaner

The main meters should not be installed in trailers, and separate electricity meters are required for each trailer with the exception of trailers on loan for less than 30 days, for which no specific meters are required. Other exceptions may be allowed by ERE's approval in specific situations where main meters may be inappropriate to be installed.

Replacing of meters

The DSO with its own initiative and expenses may replace a meter when necessary. Upon Customer's request, the DSO shall replace a meter and the customer shall pay the cost of such service, as estimated by DSO.

3. Meter Laboratory Testing Equipment

Metering Laboratory

Any DSO or any Supplying Company that maintains or decides to maintain a metering laboratory, shall be authorized, inspected, and/or certified according to the Legislation in force. The DSO and Suppliers that does not own metering laboratory may be authorized by DPMK to perform approved laboratory tests according to the Legislation in force.

Metering Equipment

Every DSO and Supplier that performs electricity metering services should provide and have available electricity portable testing instruments or watt-hour meters within limits described in this Code, as well as models to test the watt-hour service, electricity demand meters, commuting instruments, voltage meters and other electrical instruments in use, according to the Legislation in force.

Tests of Portable Standard Meters

In order to test the accuracy of portable watt-hour meters, usually called "standard portable watt-hour meters" and other portable instruments used for testing meters, every DSO and or Supplier authorized by GDMC should provide and have available for reference or check the electric instrument standards, watt-hour meters, watt meters or other equipment of the metering system according to the Legislation in force. Control meters shall be used to control and test the electricity metering equipment.

4. Meters Accuracy Requirements

Before the installation and after periodical or other tests, the watt-hour meters should be adjusted in order to accurately fulfil the following requirements:

- Any Watt-hour meter with constant incorrect registration, or registering without load should be replaced or repaired to remain in service.
- Any Watt-hour meter with a registration error more than +2% or -4% in low load, or $\pm 2\%$ in full load, should be replaced or not allowed to serve without adjustments. Meters exceeding those limits should always be adjusted.
- Meters should be adjusted with a range of error within allowed norms. Meters should not be adjusted for allowed error tolerances.



5. *Location and Methods of Meter Testing*

All watt-hour meter tests should be done with approved testing equipment and in places authorized and/or certified according to the Legislation in force.

6. *Meters Primary Tests for Installation*

Before the installation, the new watt-hour meters shall be tested and adjusted for accurate registration within the limits specified by this Code. Watt-hour meters used in low voltage circuits shall be tested and adjusted before the installation for an accurate registering within $\pm 2\%$, in 50% and 100% of the nominal current. Current and voltage transformers shall be tested to define their coefficient and accuracy. The laboratory authorized by GDCM shall perform all the tests.

7. *Periodical Tests of Watt-Hour meters*

All types of meters and metering equipment in customer's property should be tested according to the last review of IEC standards for electricity meters and previous paragraphs of this Code. After the enactment of this act, all meters or metering equipment in service for which no test statements exist within the specified time period should be tested as soon as possible.

8. *Tests upon Customers Request*

Upon its request, any electricity customer could perform in the DSO laboratory or in any private licensed laboratory, an accuracy test of meter registering. The customer shall pay the cost for the test performed if the test results are within the accuracy range defined by this Code otherwise the cost will be covered by DSO if the test has been made in another laboratory. In all cases tests performed by private licensed laboratory, should be paid. The customer should be given a official report by the Laboratory. A summary report on the test results should be prepared based on Customer's request. A copy of this report and a summary shall be kept in a file in the office of the DSO for a two-year period.

9. *Metering Inaccuracies*

Adjustments of electricity metering inaccuracies shall be limited for the last 12 month period and shall be performed as follows:

Any time the DSO, the Suppliers or other subjects authorized by the legislation in force, evidence that a meter exceeds the accuracy range defined by this Metering Code (minus or plus), then the following procedures shall be applied:

- If the Customer has paid more due to metering error exceeding the allowed limits, then the DSO is obligated to reimburse the value to the customer for the last 12 months. The reimbursement shall be done by correcting the Customer's next monthly bill until the complete paid off, or as a payment of the total amount within 45 days from evidencing the inaccurate metering (billing). For the latter method the DSO and the Customer should agree for an instalment or total payment.
- If the Customer has paid less due to metering error exceeding the allowed limits, then the Customer is obligated to pay the remained value for the last 12 months. The payment shall be done by correcting the Customer's next monthly bill until the complete paid off, or as a payment of the total amount within 45 days from evidencing the inaccurate metering (billing). For the latter method the DSO and the Customer should agree for an instalment or total payment.

Continuity of Supply

For analysing the trends of the power supply to customers we refer to the period of 2002-2008. In the Table 3 the synthetic technical-economical figures of the power supply standards for 2002-2008 period are presented. In this analysis the trends of the power supply, the trends of the average prices of import, tendencies of load shedding and also the tendencies of the hydro energy reserve usage are taken under consideration.

Table 3: Power supply trends 2002-2008

Name	Year						
	2002	2003	2004	2005	2006	2007	2008
Generation (GWh)	3,204	4,974	5,467	5,409	5,516	2,933	3,770
Import (GWh)	2,072	937	567	365	633	2,828	2,417
Average Price for import (Euro/MWh)	30.18	30.15	35.57	40.04	47.81	69	79
Import price (000Euro)	62,534	28,261	20,172	14,628	30,246	195,132	190,943
Supply (GWh)	5,430	5,900	5,945	5,933	6,121	5,750	6,300
Annual water amount(billion,m3)	4.44	5.8	7.81	6.74	6.52	4.11	4.12
Specific consumption (m3/kWh)	1.38	1.17	1.43	1.25	1.18	1.4	1.04
Load sheddings (GWh)	960	662	556	664	412	891	200
Load sheddings (hours/days)	4.3	2.9	2.3	2.7	1.6	3.4	0.3

A very important parameter of the quality of power supply for the customers is the continuity of supply, expressed in the amount of outages and their duration. In the developed western countries interruptions of supply that last for more than one second, but less than 3 minutes usually are considered as short interruptions, while those lasting for more than 3 minutes are considered as long interruptions.

In Italy, based on these data, the general number of interruptions in low voltage in 2007 has been around 7 per customer per year, while their annual duration has not passed 58 minutes per each customer. Regretfully, we have to admit that in our system the annual number of interruptions is counted to hundreds, while their duration for each consumer reaches various hours per day. In 2008 for the first time in our experience of power supply, there has been no programmed load shedding. This marks a turning point in the quality of the power supply.

In order to avoid any misinterpretation, when we talk about a reliable power supply to customers, we exclude interruptions or blackouts due to breakdowns and problems in the power supply system, interruptions due to maintenance and repair works and the blackouts due to force majeure.

On the other hand, we have to admit that given the actual condition of our network in all voltage levels, such as the low level of automatic switching, a limited transformation capacity, relatively long period of time for restoration of the normal power system after a breakdown, as well as the restricted possibilities during maintenance as repair works, the duration of interruptions or blackouts is expected to be longer than in developed countries. Actually, we are in a process of a continuous improvement of this parameter, but the changes are not expected to be seen in a short time, because of considerable investments needed.

During 2008 the power load shedding have been imposed due to justifiable reasons which were explained above, but also we need to admit that there have been some abusive load shedding in various areas by DSO with the goal of improving the level of losses in these areas, which is not acceptable.

In the graph on the Figure 1 the annual amounts of power supplied to the tariff customers and the load shedding expressed in hours/days for 2002-2008 period are presented. The graph shows that the highest load shedding has happened in the years where the domestic power generation has been minimal (years 2002 and 2007).

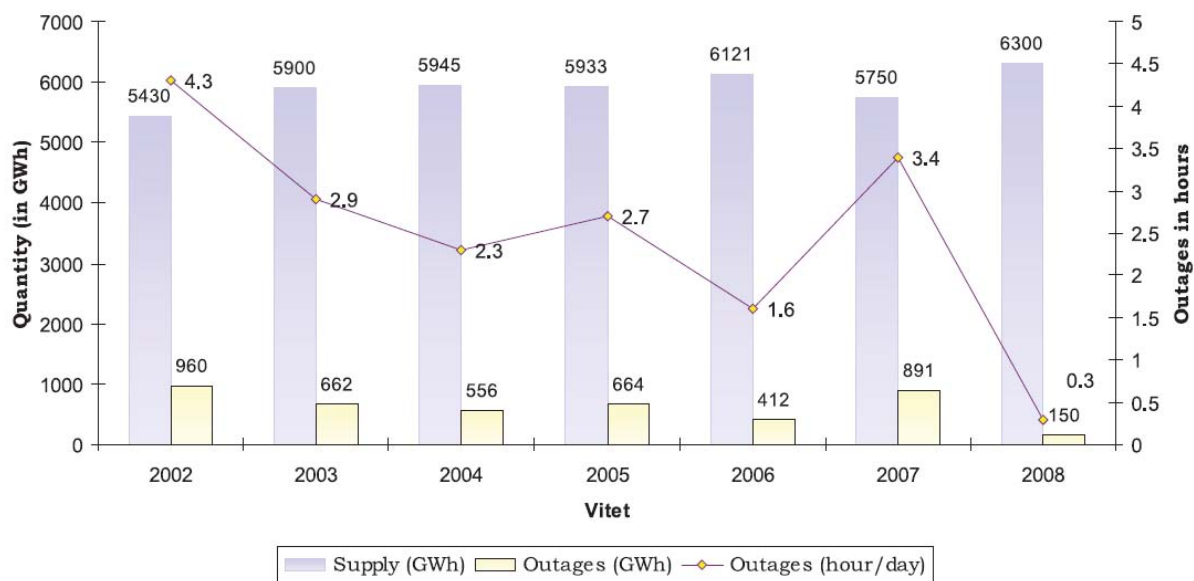


Figure 1. Electricity supply versus load shedding

One of the goals stated in KESH management practice for the period until 2007 was no interruptions of power supply for tariff customers, but their supply was programmed with planned load shedding. ERE judges that in the period 2003-2005 all favourable conditions existed to have a better power supply or to have, visibly, less load shedding for the tariff customers. The 2008 was the first year in which there were no electricity load shedding schemes planned for consumers. The electricity load shedding for this year did not exceed more than 25 minutes per day per customer, and it was mainly applied for household customers. For other categories (industrial customers) the load shedding can be characterised as irrelevant.

During 2007 and 2008 the importance of the power supply for the tariff customers has been reconsidered. Only in these two years about 5,278 GWh was imported, which is 15.4% more than the import of the entire period of 2002-2007, while the expenditures for electricity import reached 388.7 million Euro or 2.5 more time than the expenditures of the entire period of 2002-2007.

From this analysis, the ERE comes to the important conclusion that the principle of reliable power supply of tariff customers taking into consideration the heavy economic and social impact of causes 1 kWh lost load in the country's life, coordinated with the principle of visible increase of efficiency in the management practice of the public utilities must represent the fundamental leading criteria of their work.

Based on these principles, ERE will organise its entire decision making activities for evaluation of electricity tariffs in the future, but also in monitoring and evaluating the public utilities. As to load shedding, DSO does not have any clear evidences of the number of load shedding in the network supply countrywide, while the time of load shedding is calculated indirectly through the differences of planned electricity for consumers supply and the actual supply.



It is important that the practice of planned reliable power supply of the customers, realised during 2008, become a compulsory standard, since the electricity nowadays represents a significant part of the way of existence of human society.

The performance of KESH, DSO and TSO during 2008 was rightfully appraised by ERE as a good management model, despite being an unfavourable year as mentioned above, with a record power supply, without load shedding and with very efficient use of hydroenergy reserves. On the other side the objectives for reducing losses and increasing of collections are still unmet.