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ENERGY REGULATORS REGIONAL ASSOCIATION

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EU Accession Countries Working Group



## Quality of Electricity Supply - Comparative Survey

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## INTRODUCTION

The “*EU Accession Countries*” Working Group” of the Energy Regulators Regional Association (ERRA) was established with the aim of providing a common platform for those ERRA member organizations where EU accession is a high priority for national governments and EU membership is accessible in the near future. These ERRA members agreed that there are numerous topics related to energy regulation that necessitate common solutions and management by accession energy regulators.

We are proud to present you with the second Comparative Survey of the Working Group prepared on ***Quality of Electricity Supply***. The Survey consists of two parts: (1) *Benchmarking of Commercial Quality Standards and Actual Levels* (2) *Benchmarking of Continuity Actual Levels*. The basis of the Survey was a template prepared by the Working Group on Quality of Supply of the Council of European Energy Regulators (CEER) led by Mr. Roberto Malaman of Autorita per l’elettrica e il gas, Italy.

The general goals of the energy regulatory bodies (authorities, regulators) have several aspects and are therefore complex. The price-cap regulation system gives strong incentives for economic efficiency but at the same time the danger exists that this will be at the expense of quality of supply. The measurement and control of quality of supply is one of means to protect the consumers against possible abuses of market power. Quality regulation can ensure that cost cuts are not achieved at the expense of lower quality.

We would like to thank the following ERRA regulators for their contributions to the present Survey: Dr. Stefcho Nachev (State Energy Regulatory Commission of Bulgaria), Dr. Tibor Tersztyanszky and Dr. Gabor Szorenyi (Hungarian Energy Office), Mr. Raitis Rezaiss (Public Utilities Commission of Latvia), Ms. Jurga Barsauskiene (National Control Commission for Prices and Energy of Lithuania), Mr. Leszek Kukula (Energy Regulatory Authority of Poland), Mrs. Georgeta Stanciulescu (Romanian Electricity and Heat Regulatory Authority), Mr. Zeki Emrah Yilmaz (Energy Market Regulatory Authority of Turkey). We appreciate the technical assistance received from the Working Group on Quality of Supply of the Council of European Energy Regulators (CEER).



Vidmantas Jankauskas  
Chairman  
ERRA EU Accession Working Group  
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## **NOTES TO THE SURVEY:**

1. This survey is the first edition compiled by ERRA members in the Spring of 2004. The data is from 2001 unless otherwise indicated. ERRA plans future editions of this publication as members increase their utilization of quality of supply data as a regulatory tool.
2. Figures included in the Survey are not fully comparable because data collection rules and procedures in different countries are not homogeneous.
3. In case of figures in Table 1 for Latvia (indicators 7, 14, 15, 16): the provided data are average figures and respond to the company's internal standards.

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**All data presented in this Survey are for year 2001, unless indicated differently.**

**1 - Actual levels in commercial quality**

	Bulgaria	Croatia	Hungary ( in 2003)	Latvia	Lithuania	Romania	Turkey
<b>Indicators of Commercial Quality</b>							
Average waiting time in customer centres	15 min.	n/a	N/A	N/A	N/A	N/A	See below
Number of visits per 100 customers in customer centres	9,3	n/a	N/A	N/A	N/A	N/A	See below
Average waiting time in call centres	3,5 min	n/a	19 sec	10 sec (Riga only)	N/A	N/A	See below
Number of calls per 100 customers in call centres	2,5	n/a	130,3	N/A	N/A	N/A	See below
Number of complaints per 100 customers	0,27	n/a	15	N/A	N/A	1.97	See below
Average response time to customer's complaints	10.5 days	50% complaints in 7 days, 45% in 15 days, 5% in 30 days	N/A	N/A	N/A	15.9 days	See below
Average response time to customer's written queries	22.5 days	10 days	12,64 days	15 days	N/A	31.8 days	See below
Average annual meter readings per customer	12	Low voltage – 2 Medium – high up to 24	1,5	1.3	N/A	N/A	See below
Average annual self meter readings per customer	N/A		N/A	8.7	N/A	N/A	See below
Percentage of estimated bills	0,42%	75% for captive customers on 220V	N/A	0	N/A	N/A	See below

**1 - Actual levels in commercial quality (Continued)**

	Bulgaria	Croatia	Hungary ( in 2003)	Latvia	Lithuania	Romania	Turkey
<b>Indicators of Commercial Quality</b>							
Number of revised bills per 100 customers	N/A	N/a	N/A	0	N/A	0.93	See below
Average response time of repair service	5 days	The response time is not recorded, recorded is time to re-establishment of service which ranges from 1 - 8 hours for repairs on the LV	Unplanned interruptions: Within 3 hours: 73,3%, within 24 hours: 92.1%	Service not available	N/A	N/A	See below
Average response time for LV supply quotations	25 days	n/a	6.29 days	N/A	N/A	N/A	See below
Average time to connect a new LV customer to the network	28 days	The period in which all conditions, after written request is made, should be defined, is 60 days	5.78 days	4 months with project design, 2 months without project design	N/A	25.05 days	See below
Average time to provide meter and supply after supply contract	5 days	Contracted period is 60 days, actual period is usually shorter	5.78 days	2 working days	N/A	????	See below
Average time to restore supply to a customer after disconnection	1 day	Within 2 working days	1 day	2 working days	N/A	33.12 hours	See below

## 2 - Standards in commercial quality

Service	GS/ OS	Hungary (in 2001)		Hungary (since 2004)		Croatia		Romania	
		Yes	Standard	Yes	Standard	Yes	Standard	Yes	Standard
Responding to failure of supplier's fuse	GS	√	Between 4 hours (capital) and 24 hours (rural area)	√	Between 4 hours (capital) and 24 hours (rural area)			√	1 h in the big cities 3 h in the others cities 24 h in rural area
	OS					√	1 hour		
Restoring/ reconnecting supply	GS	√	Within 24 hours	√	Within 21 hours in simple case, Within 18 hours in any cases				
	OS					√			
Connection (supply and meter)	GS	√	Within 8 days	√	Within 8 days	√	Up to 60 days	√	30 days
	OS								
Estimating Charges	GS	√	Within 24 hours	√	Within 8 days in cases not requiring network intervention, ,Within 30 days requiring network intervention	√	Up to 30 days		
	OS			√	90% in 7 days for				
Notice of supply interruption	GS			√	shorter than 4 hours:4 days, longer than 4 hours: 8 days			√	24 hours
	OS	√	8 days in advance			√	1 day ahead		

(continued)

## 2 - Standards in commercial quality (continued 1)

Service	GS/ OS	Hungary (in 2001)		Hungary (since 2004)		Croatia		Romania	
		Yes	Standard	Yes	Standard	Yes	Standard	Yes	Standard
Voltage complaints	GS	No		√	contact the customer within 10 workdays, metering within another 5 days			√	15 days
	OS	No							
Meter problems	GS	√	Agreement with customer	√	Agreement on appearing with customer			√	10 days
	OS								
Queries on charges and payments	GS	No		√	within 15 days				
	OS	No				√			
Appointments scheduling	GS	√	Agreement with customer	√	Agreement with customer. The length of time cannot be longer than 4 hours.				
	OS								
Payments notice under standards	GS	No		No					
	OS	No		No					
Prepayment meter fault	GS	No		No					
	OS	No		No					
Correction of voltage faults	GS	No		√	_within 12 months				
	OS	No		No					

(continued)

## 2 - Standards in commercial quality (continued 2)

Service	GS/ OS	Hungary (in 2001)		Hungary (since 2004)		Croatia		Romania	
		Yes	Standard	Yes	Standard	Yes	Standard	Yes	Standard
Visits to customers who required a meter move	GS	√	Agreement with customer	√	Agreement with customer				
	OS					√			
Meters changed when required	GS	√	Agreement with customer	√	Agreement with customer				
	OS								
Number of meter readings	GS	No		No		Dependin g on customer class			
within a year	OS	No		No					
Response to customers letters	GS	√	Within 15 days	√	Within 15 days				
	OS			√	90% in 12 days	√	10 days		
Response to customers claims	GS	No		√	Within 15 days				
	OS	No		√	90% in 12 days	√	25 days average	√	30 days
Response to customer	GS	No		√	Within 15 days				
	OS	No				√		√	30 days
Execution of simple works	GS	No		No					
	OS	No		No		√	2 working days	√	30 days

(continued)

## 2 - Standards in commercial quality (continued 3)

		Hungary (in 2001)		Hungary (since 2004)		Romania		Croatia	
Desactivation on customer's request	GS	No		No					
	OS	No		No					
Reconnection following lack of payment	GS	No		1 day				√	2 working days
	OS	No		No		√	24 hours	√	Within 30 days
Estimating charges for complex works	GS								
	OS	√	Within 30 days	√	Within 30 days				
Execution of complex works	GS	No		No					
	OS	No		No					
Accuracy of bills made on estimations	GS	No		No					
	OS	No		No		√	10 days		
Attendance in customers centres	GS	No		No					
	OS	No		No					
Attendance in telephone service	GS	No		No					
	OS	No		No					

GS - Guaranteed Standards; OS - Overall Standards

## NOTES:

### Turkey:

The Turkish Electricity Market reform process commenced with the Electricity Market Law issued in 2001. As part of this process, EMRA has issued the majority of the secondary legislation complementing the Electricity Market Law. At present, the electricity sector is under transition from a system based on a vertically integrated state-owned utility toward the competitive market structure envisaged. As the transition phase is ongoing, only a few standards have been issued in relation to quality of supply. Therefore, we are unable to provide you with definitive answers for all questions at this time, but we have nevertheless provided the relevant information where such standards were available. Please note that EMRA is working together with the transmission and distribution companies for the drafting of a comprehensive regulation on supply reliability and quality.

Under the current structure, the supply and distribution of electricity is carried out by the distribution companies in every region, which hold the relevant licenses for both activities. Privatization of the distribution companies is expected to start in 2004.

**Restoring/ reconnecting supply** a) within two working days for residential areas,  
b) within three working days outside residential areas

**Connection (supply and meter)** a) within three working days for residential areas,  
b) within five working days outside residential areas  
Upon the signing of the connection agreement:

**Notice of supply interruption** The distribution licensees shall notify their customers of planned interruptions at least 48 hours in advance, by means of printed, audio and visual media.

**Queries on charges and payments** Retailers should finalize the process of reviewing customers' objections regarding charges within 10 working days of its filing.

**Response to customers letters** Customer notifications regarding failures or illegal usage of electricity may be made in person, by telephone or over the internet. All other applications shall be submitted in writing to the customer service center of the relevant licensees. Such applications shall be reviewed and finalized by the relevant licensee within 15 working days.

**Response to customer** Customer notifications regarding failures or illegal usage of electricity may be made in person, by telephone or over the internet. All other applications shall be submitted in writing to the customer service center of the relevant licensees. Such applications shall be reviewed and finalized by the relevant licensee within 15 working days.

**Deactivation on customer's request** While requesting that the service be discontinued, the customer should state the date they would like the discontinuation takes place.

**Reconnection following lack of payment** a) within two working days for residential areas,  
b) within three working days outside residential areas

Provided that the customer pays the relevant amount and associated interest within 1 month of disconnection or if the customer guarantees to make the payments within the time frame determined by the retail licensee.

**Penalty payments:** No individual penalties have been specified for each standard. There is, however, one reference to breach of obligations arising from the legislation in force, in Article 11 of the Electricity Market Law, which reads: “In cases where it is determined that legal entity is in breach of the provisions of this law, and regulations and notifications issued by the Board, a fine of TL 782 billion [€450,000] shall be imposed and the legal entity shall be warned to remedy the breach within thirty days.”

#### **LITHUANIA:**

Only several aspects of quality are provided in the legal acts, which are in force currently (in the Rules for Electric Power Supply and Consumption). The additional requirements regarding quality may be added in the contracts concluded with consumers. There is no compensation provided for consumers when the company doesn't meet the quality requirements.

#### **Restoring/ reconnecting supply:**

Three categories of consumers are separated out due to the period of time to restore the supply after the interruption. Ordinary to the 1<sup>st</sup> category belong large industrial undertakings, and to the 3<sup>rd</sup> – domestic consumers connected to the low voltage.

Restoration time equals to: 1st category – *up to 3 s.*, 2nd category – *up to 2,5 hours*, and the 3rd category – *up to 24 hours*.

#### **Connection (supply and meter):**

Period of time of simple connection of new domestic and non-domestic consumers shall be *15 working days* after the signing of the connection agreement. Simple connection it means without special agreement regarding the complicated connection works.

#### **Notice of supply interruption:**

Period of time between the notification and the planned interruption shall be at least *15 calendar days*.

#### **Meter problems:**

Period of time during which the supplier visited the consumer after his request due to problems in metering shall be *no longer than 10 calendar days*.

Period of time to eliminate the detected fault of the meter shall be *no longer than 10 calendar days* for domestic consumers and *2 working days* for non-domestic consumers.

**Number of meter readings within a year:**

Once per year.

**Response to customers letters and claims:**

Period of time of the investigation and sending the answer to the consumer shall be maximum *30 calendar days*.

**Reconnection following lack of payment:**

No longer than *5 working days* for domestic consumers and *2 working days* for non-domestic consumers.

**BULGARIA:**

At the moment in Bulgaria Guaranteed and Overall Standards of commercial quality don't exist. We are unable to provide you with concrete answers for all questions at this time, but we have nevertheless provided the relevant information where such standards were available. We have commercial quality requirements as following:

Indicator	Criteria
1. Connection to the network of new consumers and starting the power supply	Up to 7 days after a request of the consumer, payment and implementation of the conditions of connection.
2. Argumentation of the refusal for starting the power supply to new consumers	Up to 7 days of the date of the consumer's written request
3. Responses (written) to requests, letters and requests of consumers	Up to 30 calendar days
4. Preliminary notification to consumers for a planned interruption of power supply	Up to 30 calendar days
5. Organizing resumption of the power supply after a signal of consumers for interruption of supply	For cities – up to 2 hours For rural areas – up to 4 hours

Indicator	Criteria
6. Resumption of the supply after malfunctions in the network of the supplier	In the minimum technical timeframe in accordance with the “good governance practice”. When possible, notifying the consumers about a duration longer than 8 hours
7. Providing a telephone line for connection with consumers about interruptions or a lower quality of the power. Registering the messages with a recording device	Telephone number (Different from the one of the dispatch service) For towns – 24 hours a day, every day of the week For rural areas – 8 hours
8. Check of the bad quality of the power after a signal of the consumers. Taking measures or announcing the opinion of the supplier	7 calendar days
9. Check on the commercial metering device after a request of the consumer	5 days
10. Repair or change of the commercial metering device of the consumer : - device with better characteristics - Improper function (does not measure, mistakes outside the accuracy class)	Up to 30 calendar days and notification  Up to 7 calendar days
11. Check of the bill for the used power on a written notification of the consumer	Up to 5 calendar days
12. Correcting the incorrect measurement (bill) of the used power	Up to 7 days after the check  Up to 30 day, reimbursement of the sum
13. Regime of visits of supplier personnel to the property of consumers for installing, repairing, checking, maintaining and servicing the facilities of the supplier	From 8:00 to 20:00, after a preliminary notification and identification

Indicator	Criteria
14. Resumption of the power supply after interruption because of a failure to pay for the used electricity	<p>For towns – by the end of the next working day after the payment</p> <p>For rural regions – by the end of the 5<sup>th</sup> working day after the payment</p>

### 3 - Homogeneity warnings

*Please indicate criteria to calculate times for commercial quality services*

Hungary: Time is calculated: Arrival date of consumers' request and date of execution of work

Romania: There is no such criteria

Lithuania: There is no uniform criteria

### 4 - Impact of liberalisation on commercial quality regulation

#### **General comments:**

Poland: Currently due to implementation of the liberalisation process the legal regulations are under elaboration and the national document identical with EN 50160 standard is not obligatory. Therefore some changes of the legal regulation are expected in the near future, especially in respect of consumer servicing quality standards and conditions for connecting entities to electrical power networks. Impact of these changes on commercial quality is not known yet. There are not enough data (some of them are not available yet) to fill the templates about the commercial quality. Only the effective legal regulations regarding the quality of supply could be presented, but necessity to update this information should be taken in account.

Please answer shortly to the following questions.

#### 4.1 Have the regulator changed the commercial quality regulation to adapt it to the liberalisation process (especially in respect of supply liberalisation and/or separation between distribution and supply)?

Bulgaria: some changes were introduced with codes, licences and agreements which contain some commercial quality elements. The guarantees for the quality of services are contained also in the general conditions of the sale contracts for electrical energy between the transmission utility and consumers connected to the transmission network; between the distribution utility and consumers connected to the distribution network.

Croatia: The regulator is in charge for monitoring application of tariff system, which led to greater number of meter readings within a year, i.e. better abeyance of the tariff code.

Hungary: The liberalisation came into force in Hungary in January 1<sup>st</sup>, 2003. The [regulator changed the commercial quality regulation in 2004](#).

Latvia: Currently the new system of commercial quality regulation is under elaboration.

Lithuania: In 2001 liberalisation did not exist .

Poland: There is not a distinction between distribution and supply in respect commercial quality standards.

Romania: Yes, distribution and supply have been unbundled for eligible consumers.

Turkey: Regulations issued by EMRA regarding quality of supply are all based on the liberalization process and its main pillars, including a competitive electricity market and the separation of supply and network businesses.

#### 4.2 Which commercial quality standards have been put on distributors and which ones on suppliers?

Bulgaria: At the moment in Bulgaria there is not a legal distinction between supplier and distributor. Distributors are responsible for all quality issues. In the future, Suppliers: standards related to billing, customer queries on charges and payments. Distributors: all the rest commercial quality standards.

Croatia: n/a

Hungary: The distribution and public supply businesses are not legally separated. The commercial quality standards are not separated either.

Latvia: There are no different standards for distributors and suppliers due to customers have contracts only with distribution companies which are responsible for all the quality issues.

Lithuania: In 2001 liberalisation did not exist .

Poland: There are no different standards for distributors and suppliers.

Romania: Except billing put on suppliers all the others quality standards have been put both on distributors and suppliers.

Turkey: Distributors:

Restoring/ reconnecting supply

Connection (supply and meter)

Reconnection following lack of payment

Suppliers:

Queries on charges and payments

Both:

Response to customers letters

Response to customer

#### **4.3 How is metering regulation defined in respect of commercial quality aspects (reading, billing, meter installation, meter verification)**

Bulgaria: Metering provisions are set out in Metering Codes.

Croatia: Reading and billing is defined by tariff system, and meter installation and verification by state office for metrology.

Hungary: Metering regulation relates to the distributor since January 1<sup>st</sup>, 2003

Latvia: The major electricity supplying and distribution company in Latvia State's Stocks Company "Latvenergo" has implemented the customers' service system which includes reading, billing, meter installation and verification and meets all the legal requirements in Latvia. There are not enough data yet for evaluating its impact to commercial quality.

Lithuania: Metering provisions are set out in the Rules for Electric Power Supply and Consumption.

Poland: There are a number of standards related to reading, billing and metering services. Some metering regulations are defined in the tariffs.

Romania: There are overall standards related with reading, billing and meter verification.

Turkey: The Communiqué regarding meters outlines the minimum specifications for the meters that will be used in the electricity market. Retail licensees shall provide services such as metering and billing, in addition to the sale of electric energy and/or capacity to consumers. Distribution

licensees shall make sure that meters are checked periodically for the necessary adjustments, calibration and maintenance. The charges for the periodic checks shall be determined based on the amounts determined by the Ministry of Industry and trade and these costs shall be borne by the owners of the meters.

#### **4.4 Is there any regulation for switching supplier? Is there some standard about switching?**

Bulgaria: No. There is not. There is not any standard about switching supplier because we haven't got competition in distribution utility yet (the new energy law was adopted in December 2003, according to which supplying is separated from distribution).

Croatia: Implicit. Market rules define that contract between eligible consumer and supplier should be concluded for a minimum period of one month.

Hungary: Government regulation contains standards for switching supplier.

Latvia: According to existing legislation in Latvia only eligible customers (consumption 20 GWh and more per year) are allowed to choose supplier. There are no special standards for switching supplier, but some conditions are stated in the Grid Code.

Lithuania: Starting from 2004 eligible customers (consumption 3 GWh and more per year) are allowed to choose supplier.

Poland: There is no specific standard for switching yet.

Romania: The eligible consumer has the obligation to notify its intention, 30 days before. There is no standard about switching.

Turkey: According to the Communiqué Regarding Retail Sale Contracts, if a consumer wishes to switch suppliers, the retail licensee shall ask the consumer to document that the consumer in question has fulfilled its obligations in relation to their previous suppliers. The previous supplier shall provide the necessary document within two working days upon receipt of that request.

#### **4.5 Is the supplier the only customer interface or can the eligible customer have direct relations with the distribution network operator (for instance for connections)?**

Bulgaria: The eligible customers have direct relations with the transmission and distribution network operator.

Croatia: This depends on the voltage level at which eligible customer is connected. Eligible consumer can have relationship with distribution company or system operator.

Hungary: The eligible consumer may have direct relations with the distributor.

Latvia: Eligible customers can have direct relations with Distribution Operator or Transmission Operator depending on connection point with a grid.

Lithuania: Starting from 2002 , eligible customers can have direct relations with the distribution network operator.

Poland: Customers have direct relations with the supplier.

Romania: The eligible consumer can choose to have direct relations with the distribution network operator or indirect relations interfaced by supplier.

Turkey: The eligible customer can have direct relations with the distribution network operator.

#### **4.6 Is the billing unique for eligible customers or do they receive separate bills for distribution and supply?**

Bulgaria: The eligible customers will receive a single bill and costs will be not separated out.

Croatia: Unique

Hungary: The eligible consumer may choose the billing.

Latvia: The billing for eligible customers is not regulated and will depend on each particular contract.

Lithuania: Starting from 2002, eligible customers can receive separate bills. It depends on each particular contract.

Poland: There is only one bill but the costs of supply and distribution are specified in the bill.

Romania: The bill is unique but attached to the bill, the eligible consumers receive o tote witch details the contribution of distribution and the contribution of supply.

Turkey: Customers receive a single bill from their suppliers, covering generation, transmission, distribution and supply costs. The regulations in force envisage itemized billing, however, in the relevant licensees have not been able to provide such detail until the transition phase is completed and the necessary infrastructure and software are in place.

## SECOND PART

# **BENCHMARKING OF CONTINUITY ACTUAL LEVELS**

Table 1- COUNTRY: **BULGARIA, CROATIA, ROMANIA, HUNGARY, LITHUANIA**  
**UNPLANNED INTERRUPTIONS**

*Time-series 1999-2001 (aggregate nation-wide data)*

Continuity Indicator	Romania			Hungary				Lithuania		
	1999	2000	2001	1999	2000	2001	2002	1999	2000	2001
Minutes lost per customer per year	N/A	N/A	4.9	411	241,8	231,6	198,6	N/A	46,8	62
Number of interruptions per customer per year	4.6	4.6	4.9	3.09	2.29	2,13	2,04	N/A	N/A	0,52

Continuity Indicator	Bulgaria			Croatia
	1999	2000	2001	2002
Minutes lost per customer per year	N/A	N/A	145,25	n/a
Number of interruptions per customer per year	N/A	N/A	4,63	n/a

*Only for year 2001, responsibility analysis of nation-wide data (if available)*

Continuity Indicator	Romania			Hungary 2001/2002			Lithuania		
	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.
Minutes lost per customer per year	N/A	N/A	N/A	N/A	N/A	250,7/198,6	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	N/A	N/A	N/A	N/A	2,13/2,04	N/A	N/A	N/A

Table 1- COUNTRY: **BULGARIA, CROATIA, ROMANIA, HUNGARY, LITHUANIA**  
**UNPLANNED INTERRUPTIONS (continued)**

*Only for year 2001, responsibility analysis of nation-wide data (if available) (continued)*

	Bulgaria			Croatia for 2002		
Continuity Indicator	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.
Minutes lost per customer per year	N/A	N/A	N/A	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	N/A	N/A	N/A	N/A	N/A

*Only for year 2001, voltage level analysis of nation-wide data (if available)*

	Romania			Hungary 2001/2002		
Continuity Indicator	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks
Minutes lost per customer per year	N/A	N/A	N/A	N/A	174,4/139	76,2/60,
Number of interruptions per customer per year	6.9	6.9	N/A	N/A	1,70/1, 632	0.42/0,43

	Lithuania			Bulgaria		
Continuity Indicator	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks
Minutes lost per customer per year	N/A	102	22	N/A	145,25	N/A
Number of interruptions per customer per year	N/A	0,85	0,18	N/A	4,63	N/A

Table 1 - COUNTRY: HUNGARY  
**UNPLANNED INTERRUPTIONS (continued)**

COMMENTS:

**Hungary** introduced quality incentive regime by setting 9 minimum quality requirements in the year 2003 after several years experiences. Among them **Minutes lost per customer per year** and **Number of interruptions per customer per year** of Unplanned Interruptions are linked with tariff. If the distributor does not fulfil these requirements, the distribution fee for the consumers has to decrease. If they are much better than minimum quality requirements, the profit could be increased. The company may face with penalties if other minimum quality requirements are not met. The first application of quality incentive regime will be in the year 2004.

*Only for year 2002, regional analysis (if available)*

Regions	Minutes lost per cust.	Number of interrupt. per cust.	Distributed energy at MV & LV (TWh)	Length of MV circuits (km)	Number of LV users (millions)	Area (kmq)
DÉDÁSZ (Déli-dunántúli Áramszolgáltató Rt.)	267,6/181,2	2,44/2,07	3,018	11 640	709	18 414
DÉMÁSZ (Délmagyarországi Áramszolgáltató Rt.)	332,4/2,95,8	2,66/2,72	3,244	9 401	740	18 235
ELMŰ (Budapesti Elektromos Művek Rt.)	237,6/139,8	1,58/1,53	5,813	11 451	917	18 223
ÉDÁSZ (Északdunántúli Áramszolgáltató Rt.)	176,4/1,83	1,74/1,83	8,148	10 344	1 359	4 050
ÉMÁSZ (Északmagyarországi Áramszolgáltató Rt.)	264,62,28,6/	2,63/2,59	3,264	8 802	712	15 501
TITÁSZ (Tiszántúli Áramszolgáltató Rt.)	252,6/2,15	2,46/2,36	3,531	11 876	748	18 608
<b>Whole country</b>	250,7/198,6	2,13/2,04	6,549	63 514	5 184	93 031

Table 1 - COUNTRY: ROMANIA  
**UNPLANNED INTERRUPTIONS (continued)**

*Only for year 2001, regional analysis (if available)*

Regions*	Minutes lost per cust.	Number of interrupt. per cust.	Distributed energy at MV & LV (TWh)	Length of MV circuits (km)	Number of LV users (millions)	Area (kmq)
Moldova						
Dobrogea						
Banat						
Oltenia						
North Transilvania						
South Transilvania						
North Muntenia						
South Muntenia						

\*In 2001 The Romanian electricity distribution and supply company S.C. Electrica S.A. has been splitted in the above mentioned eight subsidiaries.

Beginning with 2002, separate data are available.

<b>Whole country</b>	n.a.	5.4	26.6	119658	8.45	
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Table 1 - COUNTRY:           **LATVIA**            
**UNPLANNED INTERRUPTIONS (continued)**

*Only for year 2001, regional analysis (if available)*

<b>Regions</b>	<b>Minutes lost per cust.</b>	<b>Number of interrupt, per cust.</b>	<b>Distributed energy at MV&amp;LV (TWh)</b>	<b>Length of MV circuits (km)</b>	<b>Number of LV users (millions)</b>	<b>Area (km<sup>2</sup>)</b>
Branch RET				4871		10654
Branch CET				2973		5070
Branch DET				5322		11448
Branch ZET				5365		10206
Branch AET				6121		12071
Branch ZAET				5972		15470
Branch RT				2060		184
<b>Whole country</b>				<b>32684</b>		<b>65103</b>

Table 1 - COUNTRY: LITHUANIA  
**UNPLANNED INTERRUPTIONS (continued)**

*Only for year 2001, regional analysis (if available)*

<b>Regions</b>	<b>Minutes lost per cust.</b>	<b>Number of interrupt. per cust.</b>	<b>Distributed energy at MV &amp; LV (TWh)</b>	<b>Length of MV circuits (km)</b>	<b>Number of LV users (millions)</b>	<b>Area (kmq)</b>
Vilniaus ET	60,6	0,48	1,8467	6459		
Kauno ET	29,4	0,40	1,4024	7627		
Klaipėdos ET	63	0,49	1,2112	9033		
Šiaulių ET	88,2	0,52	0,7516	8668		
Panevėžio ET	99	0,67	0,6851	7112		
Alytaus ET	17,4	0,38	0,6498	5810		
Utenos ET	98,4	0,88	0,3703	7165		
<b>Whole country</b>	62	0,52	6,9171	51874	1343415	65303

Table 1 - COUNTRY: BULGARIA  
**UNPLANNED INTERRUPTIONS (continued)**

*Only for year 2001, regional analysis (if available)*

Regions	Minutes lost per cust.	Number of interrupt. per cust.	Distributed energy at MV & LV (TWh)	Length of MV circuits (km)	Number of LV users (millions)	Area (kmq)
EDC G. Oriahoviza	59	2,84	1,5	8 585	0,538962	15 017
EDC Pleven	286	2,6	6,93	10 515	0,580549	19 255
EDC Sofia District	N A	N A	N A	8 757	0,533670	19 093
EDC Sofia Capital	150	4,09	2,529	3 875	0,585992	1 311
EDC Varna	86	9,0	4,8	7 678	0,590600	14360
EDC Plovdiv	N A	N A	N A	12 568	0,858432	20 000
EDC St. Zagora	N A	N A	N A	11 048	0,682131	21 000
EDC Zl. Piasaci	N A	N A	N A	25	0,000460	2,17
<b>Whole country</b>	145,25	4,63	N A	63 051	4,370796	110038,17

Comments:

Bulgaria lack information about unplanned interruptions in the years 1999-2000. The distribution companies divorced from National Electricity Company on June 2000 year.

Table 2 - COUNTRY: BULGARIA, CROATIA, ROMANIA, HUNGARY, LITHUANIA  
**PLANNED INTERRUPTIONS**

*Time-series 1999-2001 (aggregate data)*

Continuity Indicator	ROMANIA			HUNGARY				LITHUANIA		
	1999	2000	2001	1999	2000	2001 139,8	2002	1999	2000	2001
Minutes lost per customer per year	10,81	9,03	7,49	77,4	96,6	139,8	135,6	N/A	78	67
Number of interruptions per customer per year	1,69	1,39	1,63	0,29	0,34	0,5	0,5	N/A	N/A	0,22

Continuity Indicator	BULGARIA			CROATIA		
	1999	2000	2001	1999	2000	2001
Minutes lost per customer per year	N/A	N/A	91,63	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	N/A	2,4	N/A	N/A	N/A

*Only for year 2001, responsibility analysis of nation-wide data (if available)*

Continuity Indicator	ROMANIA			HUNGARY 2001/2002*			LITHUANIA		
	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties	utility responsi
Minutes lost per customer per year	N/A	N/A	N/A	N/A	N/A	139,8/135,6	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	N/A	N/A	N/A	N/A	0,5/0,5	N/A	N/A	N/A

\* For MV network only

Continuity Indicator	BULGARIA			CROATIA		
	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.	Acts of God	3 <sup>rd</sup> parties damages	utility responsib.
Minutes lost per customer per year	N/A	N/A	N/A	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	N/A	N/A	N/A	N/A	N/A

Table 2 - COUNTRY: BULGARIA, CROATIA, ROMANIA, HUNGARY, LITHUANIA  
**PLANNED INTERRUPTIONS (continued)**

*Only for year 2001, voltage level analysis of nation-wide data (if available)*

	ROMANIA			HUNGARY 2001/2002*		
Continuity Indicator	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks
Minutes lost per customer per year	0,882	1,912	4,695	N/A	139,8/135,6	N/A
Number of interruptions per customer per year	0,105	0,374	1,149	N/A	0,5/0,5	N/A

\* For MV network only

LITHUANIA			
Continuity Indicator	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks
Minutes lost per customer per year	N/A	80,4	53,4
Number of interruptions per customer per year	N/A	0,25	0,20

	BULGARIA			CROATIA DATA FOR 2002		
Continuity Indicator	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks	Generation, transmission & HV networks	Distribution MV networks	Distribution LV networks
Minutes lost per customer per year	N/A	91,63	N/A	N/A	N/A	N/A
Number of interruptions per customer per year	N/A	2,4	N/A	2,2	5,9	0,02

## HOMOGENEITY WARNINGS- Country:       HUNGARY

*Please check the following assumptions; should they not be fulfilled, please indicate exact conditions of measuring*

#	Condition	Yes	No	in case of No, please specify
1)	<b>Unplanned interruptions:</b> duration > 3', no notice in advance	√		
2)	<b>Planned interruptions:</b> duration > 3', notice in advance at least 1 day	√		
3)	<b>Recording practices:</b> all interruptions at all voltage levels are included		√	Except EHV
4)	<b>Nation-wide data:</b> the whole country is included	√		
5)	<b>Indicators:</b> minutes lost are weighted on number of LV customers; the same for number of interruptions per customer	√		
6)	<b>Acts of god:</b> <i>please specify</i>	Over design criteria, authority declaration		
7)	<b>3<sup>rd</sup> parties damages:</b> : <i>please specify</i>	Police records		
8)	<b>Density levels:</b> <i>please specify</i>	Urban	n.a.	
		Semi-urban	n.a.	
		Rural	n.a.	
9)	<b>Other:</b> <i>please specify</i>	-		

## HOMOGENEITY WARNINGS- Country: Romania

*Please check the following assumptions; should they not be fulfilled, please indicate exact conditions of measuring*

#	Condition	Yes	No	in case of No, please specify
1)	<b>Unplanned interruptions:</b> duration > 3', no notice in advance	√		
2)	<b>Planned interruptions:</b> duration > 3', notice in advance at least 1 day	√		
3)	<b>Recording practices:</b> all interruptions at all voltage levels are included	√		
4)	<b>Nation-wide data:</b> the whole country is included	√		
5)	<b>Indicators:</b> minutes lost are weighted on number of LV customers; the same for number of interruptions per customer		√	There no exist information regarding minutes lost for unplanned interruption
6)	<b>Acts of god:</b> <i>please specify*</i>	Natural disasters, severe weather conditions		
7)	<b>3<sup>rd</sup> parties damages:</b> <i>please specify*</i>	Interruptions caused by users		
8)	<b>Density levels:</b> <i>please specify*</i>	Urban: more than 25,000 inhabitants		
		Semi-urban: more then 4,000 and less than 25,000 inhabitants		
		Rural: less than 4,000 inhabitants		
9)	<b>Other:</b> <i>please specify</i>			

- These are only the definitions applicable in Romania, but there no exist separated registration for these cases. The provisions of Romanian power quality standard are not applicable in case of: force major, severe weather conditions and damages by third parties.

## HOMOGENEITY WARNINGS- Country:   LITHUANIA

*Please check the following assumptions; should they not be fulfilled, please indicate exact conditions of measuring*

#	Condition	Yes	No	in case of No, please specify
1)	<b>Unplanned interruptions:</b> duration > 3', no notice in advance	√		
2)	<b>Planned interruptions:</b> duration > 3', notice in advance at least 1 day	√		
3)	<b>Recording practices:</b> all interruptions at all voltage levels are included	√		
4)	<b>Nation-wide data:</b> the whole country is included		√	Except 5 very small local distribution companies
5)	<b>Indicators:</b> minutes lost are weighted on number of LV customers; the same for number of interruptions per customer	√		
6)	<b>Acts of god:</b> <i>please specify</i>	Natural disasters, severe weather conditions		
7)	<b>3<sup>rd</sup> parties damages:</b> : <i>please specify</i>	Interruptions caused by users		
8)	<b>Density levels:</b> <i>please specify</i>	Urban	N/A	
		Semi-urban	N/A	
		Rural	N/A	
9)	<b>Other:</b> <i>please specify</i>	-		

## HOMOGENEITY WARNINGS- Country: **\_BULGARIA**

*Please check the following assumptions; should they not be fulfilled, please indicate exact conditions of measuring*

#	Condition	Yes	No	in case of No, please specify
1)	<b>Unplanned interruptions:</b> duration > 3', no notice in advance	√		
2)	<b>Planned interruptions:</b> duration > 3', notice in advance at least 1 day	√		
3)	<b>Recording practices:</b> all interruptions at all voltage levels are included		√	Except EHV and HV
4)	<b>Nation-wide data:</b> the whole country is included	√		
5)	<b>Indicators:</b> minutes lost are weighted on number of LV customers; the same for number of interruptions per customer	√		
6)	<b>Acts of god:</b> <i>please specify</i>	Natural disasters, severe weather conditions (over design criteria)		
7)	<b>3<sup>rd</sup> parties damages:</b> : <i>please specify</i>	Interruptions caused by users, incorrect attitude of the consumers		
8)	<b>Density levels:</b> <i>please specify</i>	Urban	N/A	
		Semi-urban – No	N/A	
		Rural	N/A	
9)	<b>Other:</b> <i>please specify</i>			

We lack information about planned and unplanned interruptions in the years 1999-2000 (we have been monitoring the service and power quality since 2002 year).

## HOMOGENEITY WARNINGS- Country:   CROATIA

*Please check the following assumptions; should they not be fulfilled, please indicate exact conditions of measuring*

#	Condition	Yes	No	in case of No, please specify
1)	<b>Unplanned interruptions:</b> duration > 3', no notice in advance	YES		
2)	<b>Planned interruptions:</b> duration > 3', notice in advance at least 1 day	YES		
3)	<b>Recording practices:</b> all interruptions at all voltage levels are included	YES		* There is no uniform practice for recording, so the data cannot be compared
4)	<b>Nation-wide data:</b> the whole country is included	YES		
5)	<b>Indicators:</b> minutes lost are weighted on number of LV customers; the same for number of interruptions per customer		NO	Only the number of interruptions longer than 3minutes is available. There is individual data for each interruption, but this is not included into a database.
6)	<b>Acts of god:</b> <i>please specify</i>	Natural disasters (Flood, earthquake, fire), atmospheric phenomena (e.g. thunder and lightning, frost, extremely strong wind) and third party damage		
7)	<b>3<sup>rd</sup> parties damages:</b> <i>please specify</i>			
8)	<b>Density levels:</b> <i>please specify</i>	Urban		
		Semi-urban		
		Rural		
9)	<b>Other:</b> <i>please specify</i>			