

Quality of Electricity Services Monitoring and Regulation

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**II Workshop on the QoS in the
Energy Community**
Vienna, 11-12 May 2010

Serbian Electricity Sector in 2009

- Number of customers: 3.4 mil.
- 1 TSO
- 5 DSO/Supply of captive customers
- 5 generation companies
- 41 Trading/Supply companies
- Consumption: 27.3 TWh/year
- 47% Market opening (potentially 330.000 eligible customers)

Electricity Service Quality in Serbia

System for Monitoring and Regulating

Quality of Electricity Services is



Service Quality – Legislation

Legal framework regulating service quality:

- Energy Law
- Decree on Conditions for Electricity delivery
- Grid Code
- Distribution Code (approved in December 2009)

Legislation – What?

Legal framework regulates some aspects of:

- Continuity of supply
- Voltage Quality
- Commercial Quality

BUT...

Still no clear provisions regarding:

- Quality indicators
- Performance standards
- Financial incentives

Legislation – Who?

Actors responsible for service quality:

- **Electric power inspector** – monitoring quality
- **TSO** – providing/monitoring service
- **DSO** – providing/monitoring service
- **Suppliers** – providing/monitoring service

Legislation – Role of the Regulator

Indirect role in monitoring/regulating service quality by:

- Approving Grid Code and Distribution Code
- Collecting and processing data on energy entities relating to the performance of energy activities
- Harmonizing activities of energy entities to provide a regular electricity supply and services to customers
- Deciding appeals against the TSO/DSO refusal of access or connection to the network
- Customer protection

BUT...

- **Direct monitoring competences** of the Regulator envisaged by the Energy Law amendments

Legislation – Role of the Regulator

Regulator has possibility to regulate service quality by introducing overall performance standards and financial incentives through the **methodologies** and **tariff systems** for:

- use of electricity transmission system
- use of electricity distribution system

BUT...

- No jurisdiction to introduce guaranteed individual standards

Service Quality Monitoring before 2009

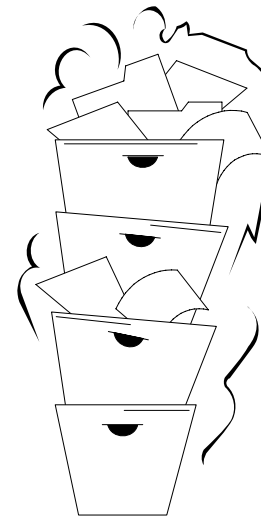
Electricity companies registered and analysed performance data...

BUT...

Available data are:

- incomplete
- inconsistent and
- non-comparable

⇒ **Non-applicable for service quality benchmarking**



Service Quality - prerequisites

Prerequisites for service quality monitoring and regulating:

- **I phase – Defining monitoring objectives and rules**
 - Competent teams for service quality monitoring within companies ✓
 - Unique rules for data registration ✓
 - Unique rules for calculation of service quality indicators ✓
 - **II phase – Data collection** ✓
 - Metering and acquisition systems
 - IT systems and databases
 - **III phase – Quality standards**
 - **IV phase – Financial incentives**
- as well as
- Amendments to the Energy Law clearly defining the responsibilities of individual institutions in service quality regulation

Service Quality

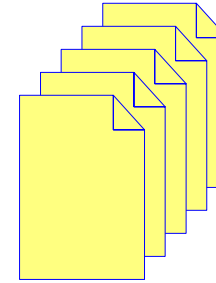
AERS –Information Code (I)

- As of January 1, 2009 AERS has introduced information rules for the registration of data and calculation of service quality indicators in the transmission, distribution and supply of electricity based on:
 - the existing legal framework
 - international practice in monitoring and regulation of service quality
 - existing companies' practices with regard to data collection
 - informal monitoring of the needs and requirements of users/customers
- aimed at:
 - harmonizing of rules for recording data and calculation of service quality indicators
 - continuous monitoring of service quality indicators,
- in order to allow for:
 - creation of complete and consistent database of quality indicators,
 - benchmarking and regulation of service quality.

Service Quality

AERS –Information Code (II)

- Information Code represents a set of Excel tables which define:
 - the type,
 - scope and
 - format of data, as well as
 - deadlines for submission to AERSthat electricity companies have to follow.



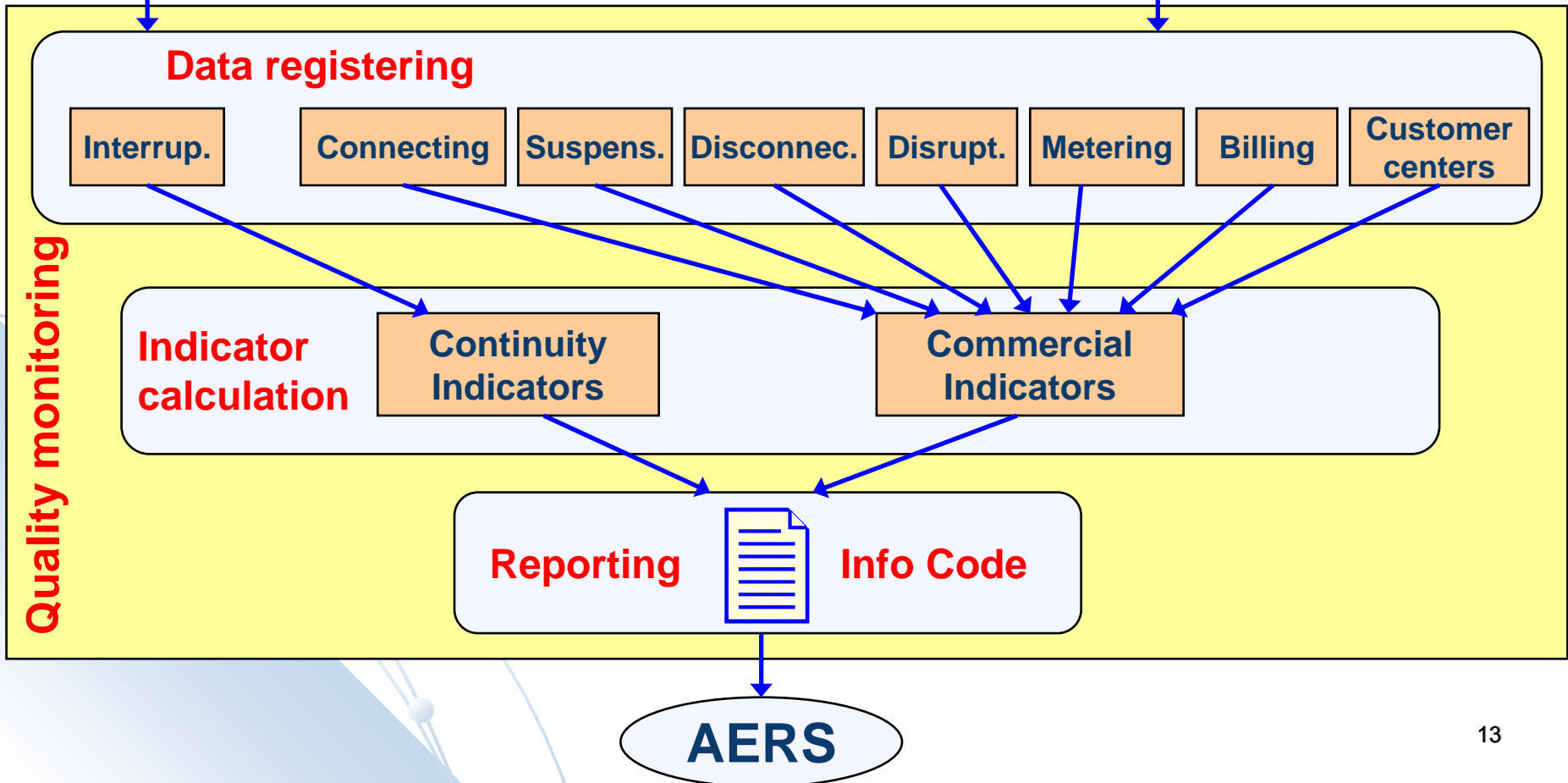
- Information Code is available on the AERS web-site

URL: www.aers.rs

Data registering and monitoring

Distribution system

Users-Customers



AERS –Information Code Continuity of Supply (I)



- **Information Code for monitoring continuity of supply includes rules for:**
 - **Registering long interruptions (longer than 3 min)**
 - **Calculating continuity of supply indicators**

- **Rules for registering interruption – which data and by what criteria**
 - **Start of interruption- date and time**
 - **End of interruption- date and time**
 - **Duration of interruption**
 - **Number of customers affected per each voltage level**
 - **Type of interruption – planned (24h notice in advance)/unplanned**
 - **Cause of interruption –**
own network/other energy entity/third party/force majeure/unknown/other
 - **Origin of interruption- Faulted component and voltage level**

AERS –Information Code Continuity of Supply (II)

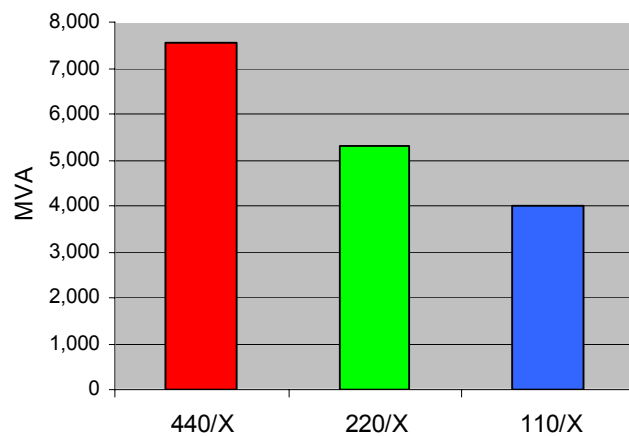


- **Rules for calculating continuity of supply indicators:**
 - Transmission network – ENS, AIT
 - Distribution network – SAIDI, SAIFI, CAIDI

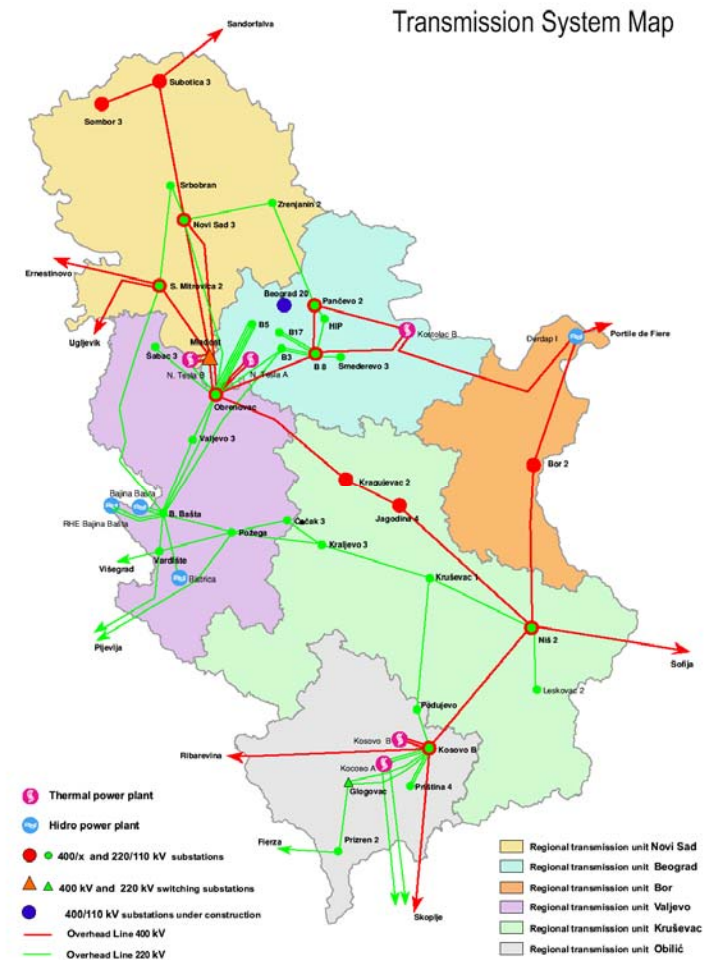
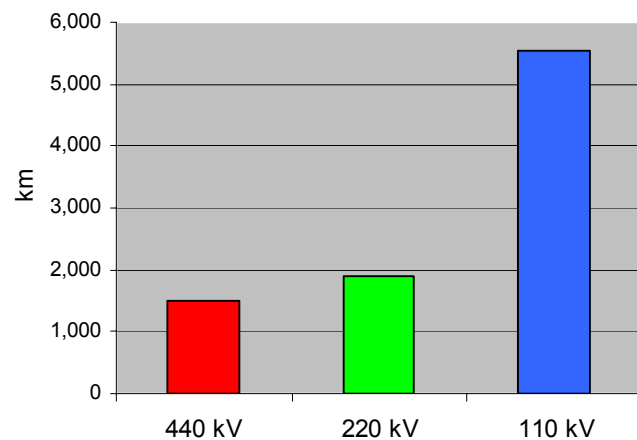
- **Continuity of supply indicators envisaged to be calculated per:**
 - Duration of interruption –
 - Long interruptions (longer than 3 min) – I phase
 - Short interruptions (shorter than 3 min, longer than 1 s) – II phase
 - Transient interruption (shorter than 1 s) – not envisaged
 - Type of interruption – planned/unplanned
 - Voltage level – HV/MV/LV
 - Cause of interruption (if any exceptional events)

Transmission Network in 2009

- Installed capacity - 16,860 MVA



- Length of overhead lines – 8,931 km

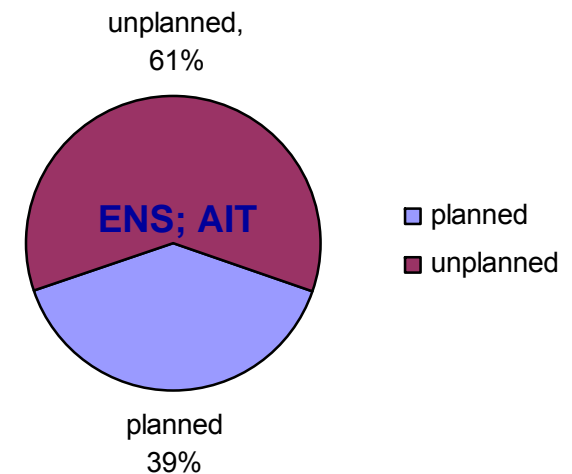


Transmission Network Continuity of Supply in 2009



- Delivered electricity - 40 TWh
- Continuity of supply indicators*:

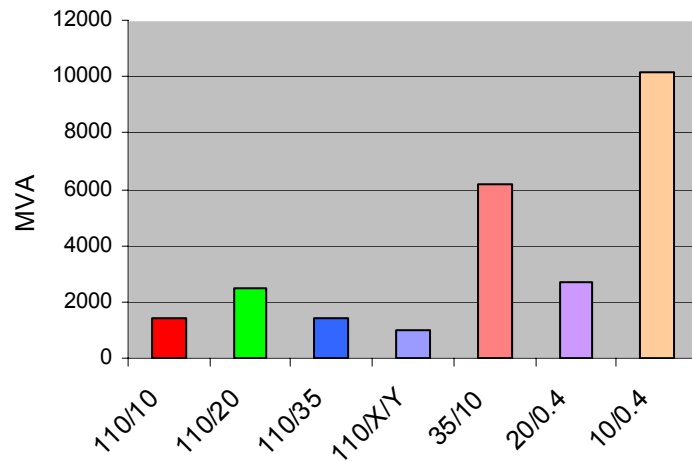
Interruptions	ENS [MWh/year]	ENS [%]	AIT [min/year]
planned	971.67	0.00242%	12.74
unplanned	1,524.79	0.00381%	20.00
total	2,496.46	0.00623%	32.74



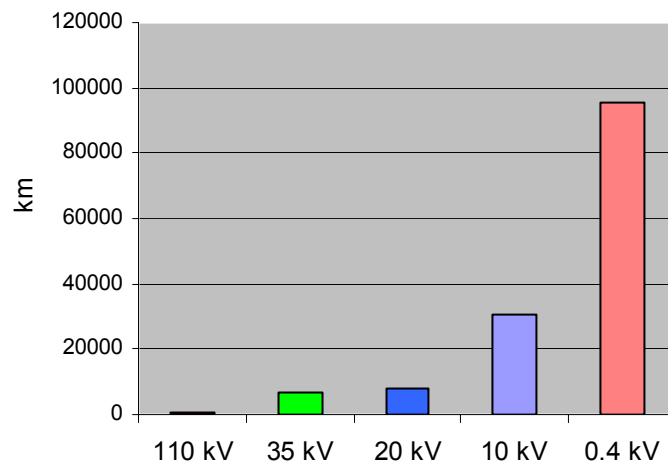
*Exceptional events are included in the calculated annual ENS and AIT indicators

Distribution Network in 2009

- Installed capacity - 25,413 MVA



- Length of lines – 141,482 km



- No. of customers – 3.4 mil.
- Territory – 77,696 km²

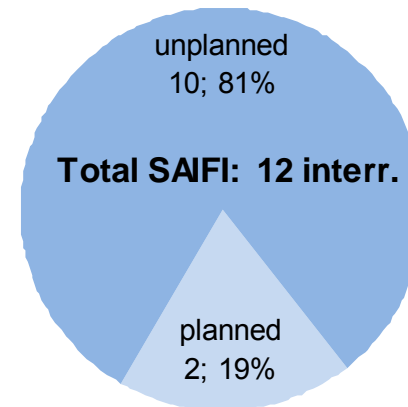
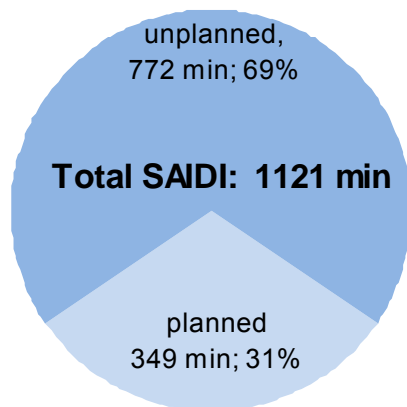
DISCOs Map



Distribution Network Continuity of Supply in 2009



- Delivered electricity – 27.3 TWh
- Average annual continuity of supply indicators including 110, 35, 20 and 10 kV distribution network*:



CAIDI	total	planned	unplanned
[min/interr.]	96	159	81

* Average annual SAIDI, SAIFI and CAIDI are calculated from the interruptions data collected from 4 out of 5 distribution companies with exceptional events included

Distribution Network Interruption Registration



- **Interruption registration**

DSO's on a different level of development of:

- Metering and acquisition systems
- IT systems and databases



Collected data on interruptions are not fully:

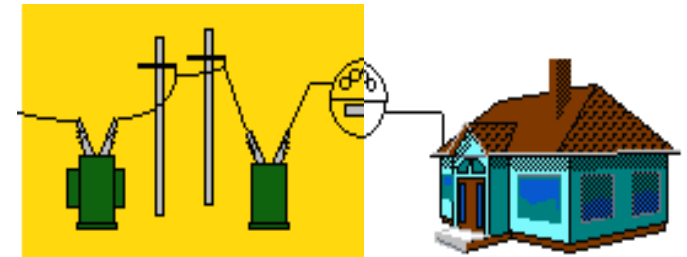
- complete for calculating continuity indicators per each voltage level (specially at 10 kV)
- comparable for benchmarking analyses of DSOs

AERS –Information Code Commercial Quality

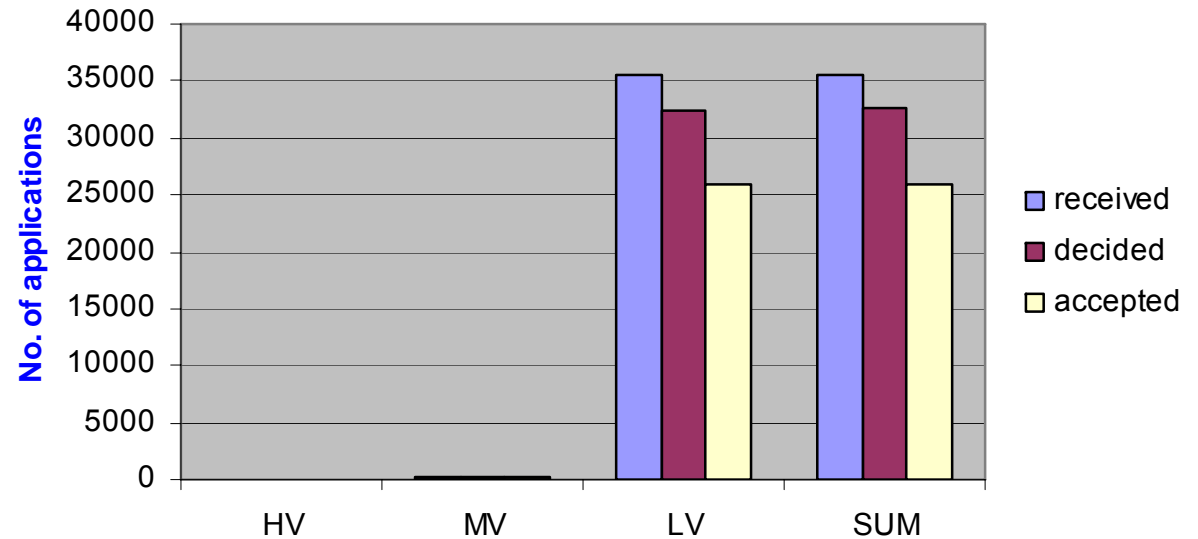


- **Information Code for monitoring commercial quality is based on collecting data on:**
 - **Number of requests from users/customers**
 - **Number of companies' responses to requests of the users/customers within the prescribed period**
 - **Average response time of companies to user's requests**
- **in providing:**
 - **One-time services –**
 - **Connection of the users' facilities to the transmission/distribution network**
 - **Regular services –**
 - **Meter reading**
 - **Billing and collection**
 - **Occasional services –**
 - **Suspension of electricity supply**
 - **Disconnection from the network**
 - **Meter inspection**
 - **Resolving voltage problems**
 - **Response to users questions, requests and complaints**

Connections in 2009



➤ Connection applications



Connection applications		HV	MV	LV	SUM
received		1	155	35,460	35,615
%	decided per received	100%	87%	92%	92%
	accepted per received	100%	77%	73%	73%

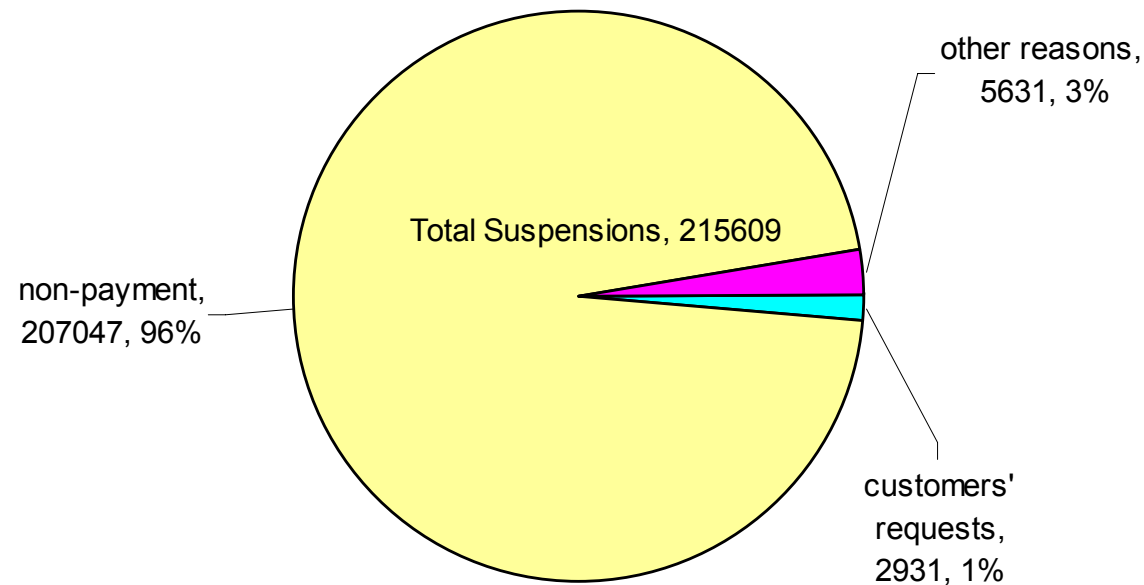
➤ Connections:

Connections	HV	MV	LV	SUM
Number of connections	1	106	17,434	17,540
Connected per accepted	100%	89%	68%	68%

Suspensions of delivery in 2009

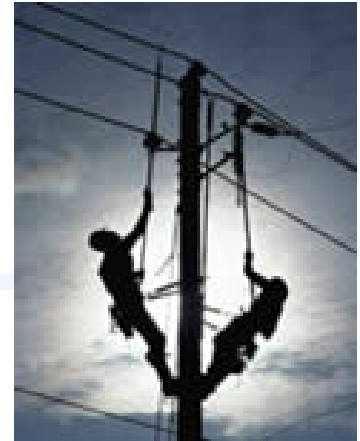


Structure of suspensions:



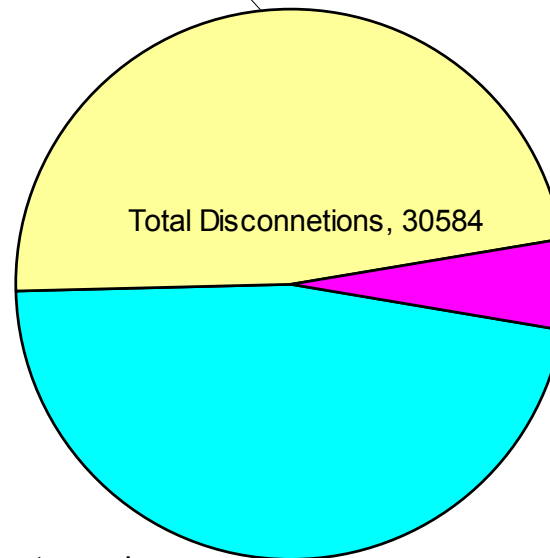
⇒ **6.2% suspensions compared to 3.4 mil. of customers**

Disconnections in 2009



Structure of disconnections:

following one year
suspension,
14742, 48%



other reasons,
1597, 5%

customers'
requests,
14245, 47%

⇒ **0.9% of disconnections compared to 3.4 mil. of customers**

Billing and Collection in 2009



Billing		Total
No. of invoices	regular	39,865,424
	for unauthorized consumption	14,344
	corrected	447,473
	other	15,038
	Total	40,342,279
%	corrected	1.11%
	for unauthorized consumption	0.04%

- **Collection rate**

- 93.9% in 2009

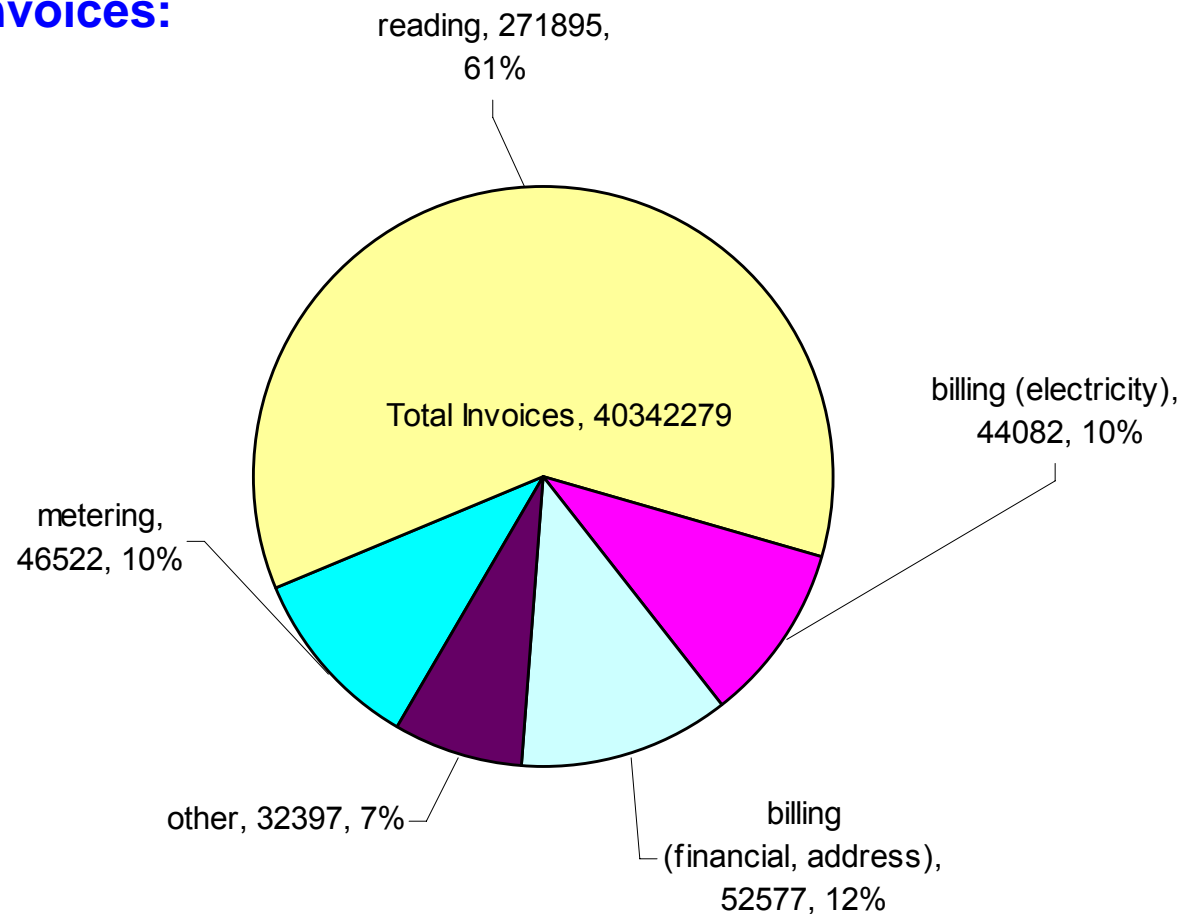
- 97.41% in 2008

⇒ 3.61% 

Billing corrections and complaints in 2009



- **Complaints to invoices: 79,906 - 0.2% out of the total number of issued invoices**
- **Corrections of invoices:**



AERS –Information Code Voltage Quality

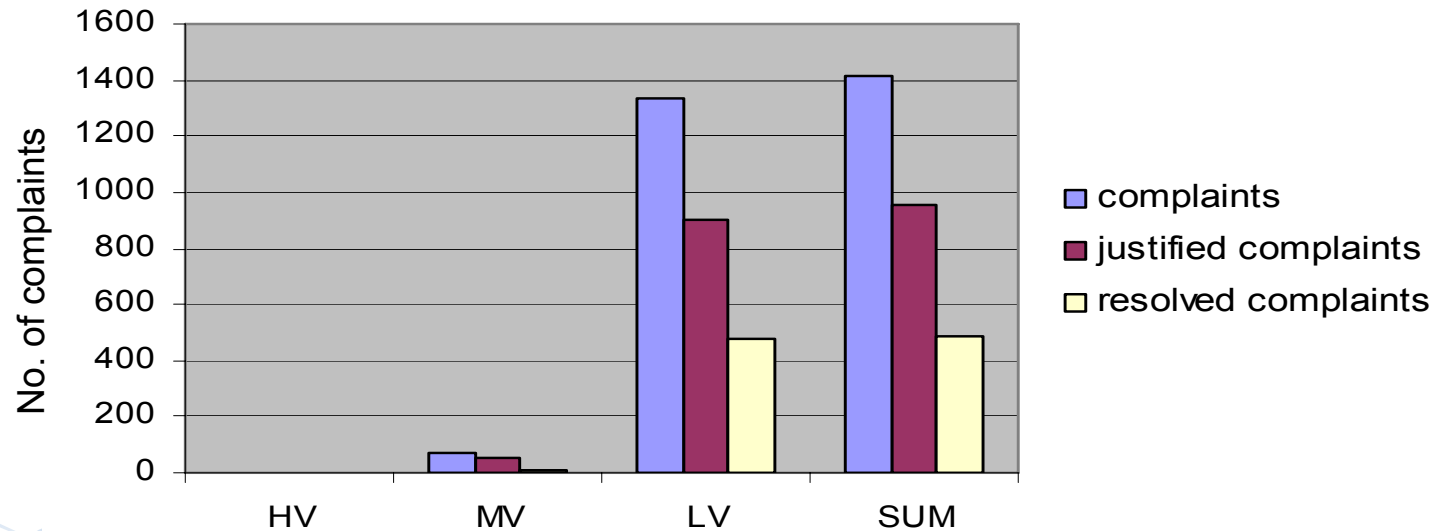


- No EN 50160 introduced, but some requirements regarding voltage characteristics prescribed in the network codes, but still no provisions regarding metering procedures and financial consequences in case of noncompliance
- Main obstacle to monitoring technical indicators of the voltage quality is the lack of appropriate metering systems that would register and monitor voltage characteristics in the network



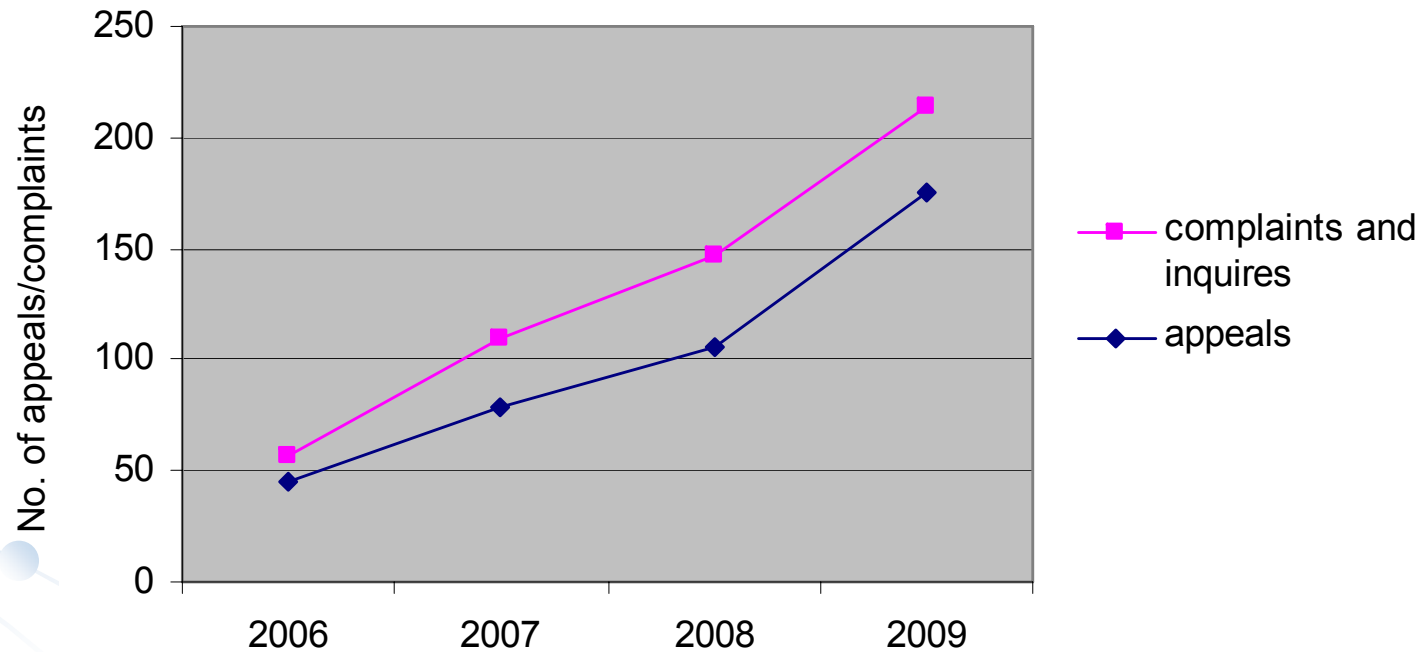
- I phase – Information rules for voltage quality monitoring are based only on collecting commercial data on:
 - number of customers' voltage complaints
 - response time to customers' voltage complaints
 - number of justified customers' voltage complaints and
 - number of resolved voltage problems

Voltage Quality Complaints in 2009



- **68% of complaints were justified**
- **51% of justified complaints were resolved**
- **0.04% of voltage complaints per total number of metering points**
- **48 electric power inspector's decision to resolve voltage problems**

Customers' complaints to AERS in 2009



- **95% of all customers' appeals were decided by AERS in favour of the customer**

AERS – QoS Future Strategy

Gradual implementation of a system for monitoring and regulation of service quality through active participation and cooperation of all relevant institutions both within countries and internationally in order to:

- harmonize information rules, as it is possible, among companies' within countries and among different countries, and allow for
- benchmarking and regulating of service quality in line with growing customers needs and requirements.



Thank you for your attention!

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