



Quality of Electricity Supply

Croatian National Report

by

Croatian Energy Regulatory Agency (CERA)

Introductory remarks

Quality of electricity supply is recognised as one of the features that has to be included in the framework of the economic electricity tariff regulation. The goal of the QoS regulation is to provide the economic incentive for the network operators to reduce the costs, while keeping the satisfactory level of QoS.

Quality of electricity is defined and monitored with regard to:

- reliability (continuity) of power supply,
- voltage quality and
- quality of service for the network users at the point of electricity delivery/takeover (commercial quality).

There are basically four regulatory instruments that can be used in the QoS regulation:

- publication of the QoS data,
- minimum quality standards as a relatively simple method for protection of the customers with the lowest QoS,
- penalty/reward system as a more complex method for monitoring of the average system performance and
- premium quality standards for customers that require higher QoS.

Continuity of Supply

Within the continuity of supply all four regulatory instruments can be applied, but the experience indicates that starting with all of them in the same time could prove counterproductive. The beginning of the whole process is collection and publication of the annual CoS data for a few years. With the history of the data from 2006 to 2009 collected, CERA basically has basically fulfilled this phase.

The CoS indicators that are monitored are:

- For the distribution network:
 - SAIFI for long interruptions
 - SAIDI for long interruptions
- For the transmission network:
 - Energy not supplied

In 2009, HEP OPS (Transmission System Operator) met almost entirely the demands of Croatian customers for electricity, without significant disturbances in the supply system and within the set boundaries of standardized technical values of voltage and frequency. Table 1 shows interruptions in electricity supply and their duration as well as the estimated undelivered electricity in the HEP-OPS network in 2009.

Table 1: Interruptions in electricity supply by HEP-OPS and their duration in 2009

| Year | No. of supply interruptions | Duration of supply interruptions [min] | Estimated energy not supplied [MWh] |
|------|-----------------------------|--|-------------------------------------|
| 2009 | 144 | 7.676 | 1.840,4 |
| 2008 | 131 | 4.844 | 666,3 |

HEP ODS (Distribution System Operator) established in 2006 a system for monitoring power supply interruptions in all distribution areas by manually entering all interruptions lasting longer than 3 minutes into the DISPO program, down to the level of a sub-area office as the lowest organizational unit in HEP-ODS.

Reliability indices that are systematically monitored are System Average Interruption Frequency Index (SAIFI) and System Average Interruption Duration Index (SAIDI). The DISPO program allows the analysis of recorded interruptions and their statistical processing needed for the calculation of defined reliability indices. Planned interruptions are as a rule caused by removal of faulty or aged equipment, regular maintenance, construction of facilities and the network, elimination of malfunctions and other consequences due to force majeure, elimination of malfunctions and other consequences due to activity of third parties, maintenance of third party plants, construction of third party facilities and interruptions in the supply of the distribution network. Forceful interruptions are due to failures in the distribution network, failures caused by the third parties, force majeure and interruptions in the supply of the distribution network.

Reliability indices for 2009 are presented in the Figure 1, while Figure 2 represents the comparison of the supply reliability indices trend in HEP ODS from 2006 to 2009.

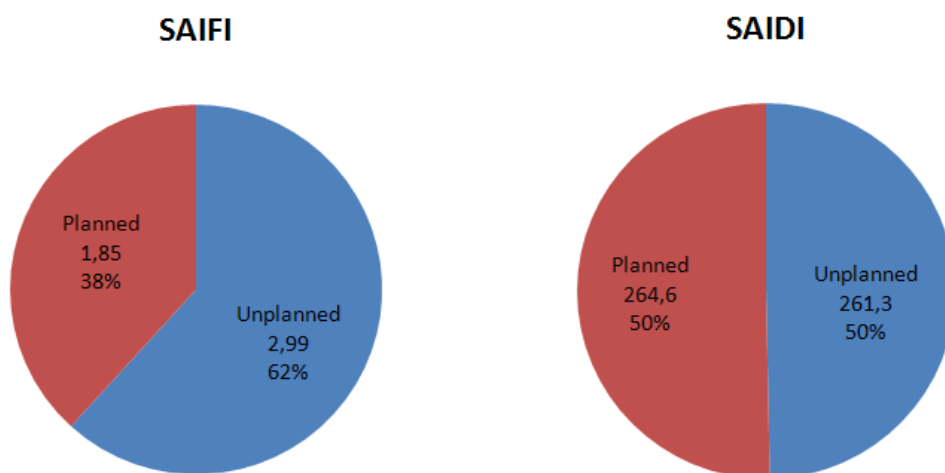


Figure 1: Indicators of continuity of supply in HEP ODS for 2009

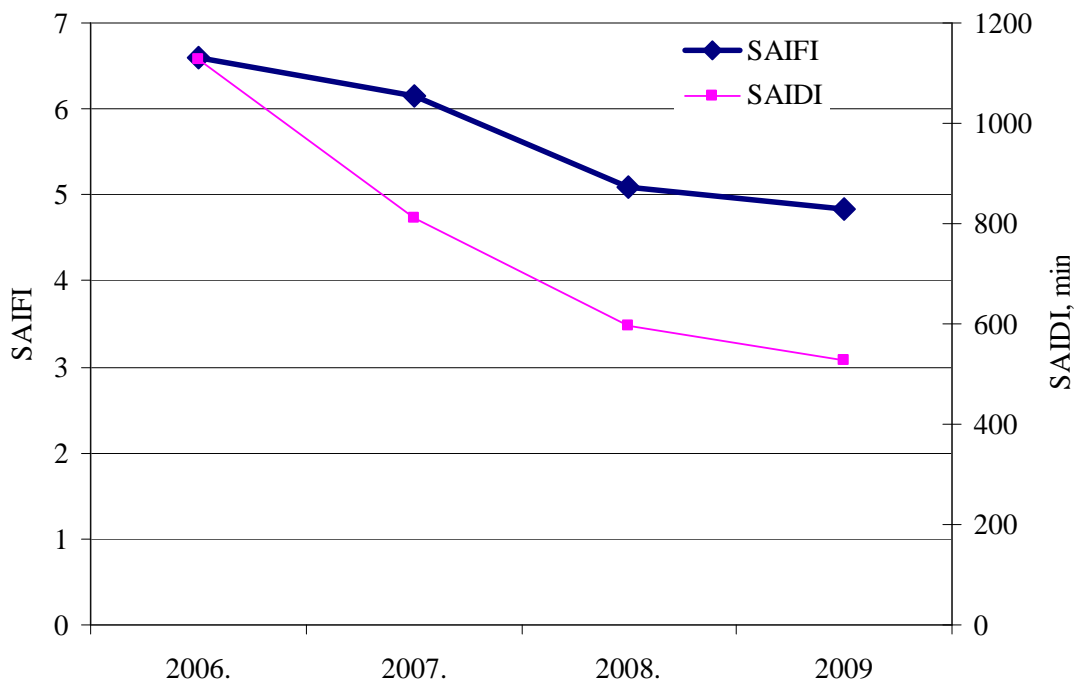


Figure 2: Trend of continuity of supply in HEP ODS from 2006 to 2009

Voltage Quality

Voltage quality regulation is still not commonly implemented in EU. A few countries have introduced overall and premium quality standards, but the regulation of the voltage quality is mostly not conducted. Regarding the application of the EN 50160 as MQS for voltage quality, European regulators share the opinion that it is not entirely suitable for protection of customers. Regulators usually monitor commercial quality indicators concerning voltage quality, such as response time of the DSO on the customer request for voltage quality control. Technical norms are in this process used as reference values and not for voltage quality regulation.

With the aim of establishing systematic monitoring of voltage quality, HEP ODS carried out voltage quality control at the level of distribution areas and systematically kept record of all complaints regarding the voltage quality in 2009.

Figure 3 shows statistics of objections regarding the voltage quality in the HEP ODS distribution network in 2009. Out of a total of 2.310.811 metering points in the HEP ODS distribution network, a total of 354 complaints were received regarding the voltage quality, which makes a 0,02% compared to the total number of metering points. Justified objections amounted to 176 or 0.01% compared to the total number of metering points.

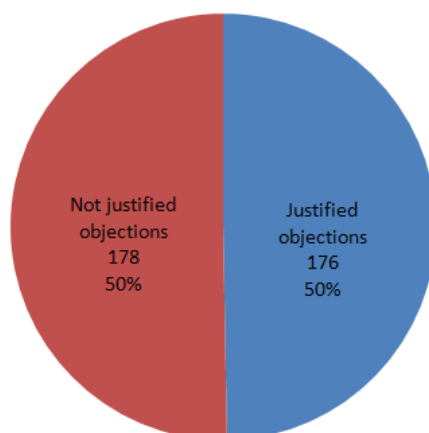


Figure 3: Objections regarding the voltage quality in HEP ODS distribution network in 2009

Commercial Quality

Commercial quality regulation deals with mutual relations between customers and energy companies. In practice, commercial quality regulation comprises three out of four basic regulatory instruments: monitoring and publication of relevant indicators, minimum quality standards and only rarely penalty/reward schemes. Premium quality standards have not yet been used in Europe. CERA, as one of the regulators just starting the implementation of QoS regulation, should focus on setting up MQS for most commonly used services.

The quality of service is estimated based on the level of complaints from network users regarding the performance of services and the timeliness of services performed related to connections, network usage and regulated electricity supply.

Besides the energy activity of electricity distribution, HEP ODS also carries out the activity of supplying tariff customers with electricity as a public service under regulated conditions. HEP ODS separates services in the distribution and electricity supply in the following categories:

- 1) Service quality within the activities of electricity distribution;
- 2) Measurement services quality within the activities of electricity distribution;
- 3) Service quality within the activities of electricity supply;
- 4) Other attributable services and
- 5) Business conduct quality control.

In the tables below the following statistics concerning commercial quality are given:

- issued prior connection approvals and connection approvals, and the average number of issuing days in HEP ODS in 2009;
- HEP ODS' contracting of electricity supply in 2009;
- charges and issuing of invoices in HEP ODS in 2009;
- collecting debts via regular HEP ODS procedure in 2009;
- replies to questions, requests and complaints received from HEP ODS customers in 2009;
- non-standard services of calculation and issuing of invoices by HEP ODS in 2009;
- collecting debts via non-standard procedure (sending dunning letters) by HEP ODS in 2009.

Table 2: Issued preliminary connection approvals and connection approvals and the average number of issuing days in HEP ODS in 2009

| Type of approvals | Number of approvals | Average number of issuing days |
|--|---------------------|--------------------------------|
| Preliminary network connection approval | 26.260 | 25 |
| Network connection approval – new customers | 43.072 | - |
| Network connection approval – construction site connection | 1.474 | - |
| Network connection approval – temporary connection | 386 | - |

Table 3: HEP ODS contracting of electricity supply in 2009

| Consumption category | No. of concluded contracts | No. of objections to the contracting process | |
|--|----------------------------|--|-------------------|
| | | Received | Accepted |
| Households | 115.176 | 188 | 30 |
| Businesses | 45.086 | 605 | 57 |
| Total | 160.262 | 793 | 87 |
| Share of objections in the no. of concluded contracts | | 0,49% | 0,05%(11%) |

Table 4: Charging and issuing invoices in HEP ODS in 2009

| Consumption category | No. of concluded contracts | Complaints to charging | |
|--|----------------------------|------------------------|--------------------|
| | | Received | Accepted |
| Households | 29.767.199 | 115.060 | 92.799 |
| Businesses | 1.967.739 | 14.304 | 10.650 |
| Total | 31.734.938 | 129.364 | 103.449 |
| Share of objections in the no. of concluded contracts | | 0,41% | 0,33% (80%) |

Table 5: Collection of debts through a regular procedure by HEP ODS in 2009

| Consumption category | No. of paid invoices without dunning letter | No. of objections to the regular collection procedure | |
|---|---|---|--------------------|
| | | Received | Accepted |
| Households | 24.128.992 | 13.998 | 1.872 |
| Businesses | 1.324.787 | 1.038 | 625 |
| Total | 25.453.779 | 15.036 | 2.497 |
| Share of complaints in the no. of invoices paid without dunning letter | | 0,06% | 0,01% (17%) |

Table 6: Replies to questions, requests and complaints from HEP ODS customers in 2009

| Consumption category | Number of questions, requests and complaints from customers | No. of replies within legally provided deadline |
|--|---|---|
| Households | 711.146 | 699.017 |
| Businesses | 52.450 | 51.560 |
| Total | 763.596 | 750.577 |
| Share in the total no. of questions, requests and complaints from customers | | 98,30% |

Table 7: Non-standard services of calculation and issuing invoices in HEP ODS in 2009

| Consumption category | No. of non-standard services of calculation and issuing of invoices | | | | No. of complaints on non-standard services of calculation and issuing of invoices | |
|----------------------|---|---------------|--|----------------|---|--------------------|
| | Special calculation | Self-reading | Copies of payment slips and certified invoices | Total | Received | Accepted |
| Households | 454.142 | 214.366 | 12.318 | 680.826 | 1.960 | 1.582 |
| Businesses | 6.432 | 3.272 | | 9.704 | 257 | 124 |
| Total | 460.574 | 217.638 | 12.318 | 690.530 | 2.217 | 1.706 |
| Share | 66,70% | 31,52% | 1,78% | 100,00% | 0,32% | 0,25% (77%) |

Table 8: Collection of debts through a non-standard procedure (sending dunning letters) by HEP ODS in 2009

| Consumption category | No. of sent dunning letters | No. of complaints on dunning letters | |
|---|-----------------------------|--------------------------------------|--------------------|
| | | Received | Accepted |
| Households | 1.693.669 | 7.076 | 2.354 |
| Businesses | 421.944 | 1.106 | 382 |
| Total | 2.115.613 | 8.182 | 2.736 |
| Share in the no. of sent dunning letters | | 0,39% | 0,13% (33%) |

The Customer Complaint Committee of HEP ODS held 56 meetings and the results of their work are presented in Table 9. Out of 236 complaints in total, processed by the Customer Complaint Committee, 71 were accepted and 165 rejected.

Table 9 Analysis of operations of the Customer Complaint Commission of HEP ODS in 2009

| Meetings held | Total complaints | Total accepted | Total rejected |
|---------------|------------------|----------------|----------------|
| 56 | 236 | 71 (30%) | 165 (70%) |

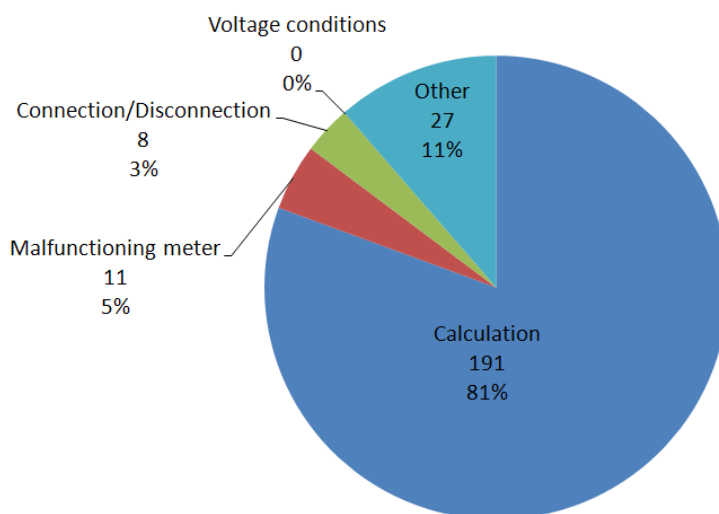


Figure 4: Share of certain types of customer complaints resolved by the Customer Complaint Commission