

Energy Community comprises Albania, Bosnia and Herzegovina, Macedonia, Kosovo, Moldova, Montenegro, Serbia and Ukraine, while Armenia, Georgia, Turkey and Norway have the status of observer countries. The key objective of the organization is to expand the integrated EU electricity market to South East Europe, under a clearly regulated legal framework.

One of the most important bodies of this institution is the Regulatory Board (ECRB), which advises the Ministerial Council and the permanent high working group and has three main tasks: to coordinate during debates, harmonize international regulatory principles and promote know-how and experience exchange.

When it comes to the quality of electricity supply, this topic of the ECRB's agenda was set back in 2008, while the first report was submitted a year later. As a result of several workshops, Annex to the Sixth CEER Benchmarking Agreement was formulated, covering all three aspects of the problem: continuity, voltage and commercial quality. Essentially, the document analyses and provides a high level review of the current situation, proposes regulation development directions thus ensuring better future results.

Continuity of supply

At the beginning of the report it was noted that, in terms of continuity of supply, all member countries of the Energy Community are at an early stage of development of their service quality control, while the focus is placed on the supply control programs in distribution and transmission. This problem was categorized into five groups, representing the basis for the analysis:

Supply continuity monitoring

Continuity data analysis

Continuity of supply regulations and standards

Incentive mechanisms enhancing continuity of supply

Continuity of supply improvement regime effects

Unfortunately, due to the early stage of the implementation of regulations in the Member States, most of the data from these categories are difficult or impossible to collect. The report therefore focuses on the objective to define the implementation process through the terms such as: establishment of a legal framework, use of standards and guidelines of good practice, implementation of a system to monitor and maintain continuity of supply standards and incentive mechanisms. Such structural information should be collected to enable the institutions to more efficiently regulate the rules having long term positive effects on the regional market.

Supply monitoring can therefore be carried out on two levels – system level and level of specific consumers. In both cases, the establishment of a clear monitoring system is essential and the most fundamental requirement to establish a penalties or rewards system. In different Member States this includes monitoring of different indicators, supply

interruption causes and general circumstances. The report noted that the analysis applies to interruptions longer than three minutes and stated that finding their causes is one of the most important tasks on the road to defining elimination regulations. Information about this topic have been delivered by three countries: Ukraine, Macedonia and part of Bosnia and Herzegovina. Unplanned long interruptions are mainly monitored in all countries, but not on all voltage levels. However, there is a distinction and separate recording of planned and unplanned interruptions, as there is a belief that planned interruptions affect consumers less. In most countries, the government imposed a legal obligation to monitor interruptions without considering whether manufacturers can implement this, which proved to be an inefficient and bad solution. The EU's position is that in future concrete implementation of SCADA systems and other software dealing with this issue (DMS, GIS, etc.) should be insisted upon.

However, what such unclear data do show is that Albania only has a regulation that, when it comes to the length of the interruption, significantly differs from most others. In fact, most countries define interruptions below three minutes as short, while the ones over three minutes are classified as long, whereas in Albania short interruptions are the ones below 15, and long ones over 15 minutes. Furthermore, most countries "agree" with the provision that any interruption about which the consumer was notified is a planned interruption, and that, as such, it should be treated differently than the unplanned ones (which is mainly associated with external events, equipment operation outages and other types of interruptions).

However, when defining the planned outages, no country refers to the EN 50160 norms, or any other international references. When it comes to the consumer notification period, it varies from ten days to 24 hours depending on the Member State.

When talking about the monitoring of voltage levels, it is interesting that the incidents in connection with medium and high voltage are monitored in all countries. Also, all countries except Albania have reported that they monitor low voltage fluctuations. However, reliable and accurate monitoring of voltage fluctuations on low voltage networks requires state-of-the-art equipment, which is still not widely used in all countries of the European Union. It should also be noted that this type of oscillation can be monitored in two cases: when it is caused by changes in the low voltage network and when it results from fluctuations in the high voltage systems. The report notes that only Ukraine, with a low-voltage network monitoring implemented back in 2008, is at this moment on the way to establishing a satisfactory level of monitoring voltage changes in its supply network.

Furthermore, it was noted that there is no harmonized classification of the supply interruption causes, as EC Member States classify them differently.

Moreover, when considering the continuity of supply monitoring, it is important to take into account the interruptions caused by extreme weather conditions which, although not common, are long and affect the entire supply sector. Although almost all countries

acknowledge and mention this type of events, there is no clear, let alone agreed definition of what exactly describes them, as well as a proposal on how their impact can be measured. The big question is whether, given the different climatic and other conditions, this harmonization is at all possible, which greatly complicates the creation of a common interruptions table between countries. It was pointed out that only Kosovo excludes this type of events from its list of interruption causes. In Bosnia and Macedonia this type of data can be obtained only on special request.

When it comes to indicators showing the continuity of supply, they involve the measurement of network performance at the delivery points, including all interruptions and their duration. The most common indicators of long interruptions in the distribution network are the data provided by the so-called SAIDI (System Average Interruption Duration Index) and SAIFI (System Average Interruption Frequency Index), and in the transmission network ENS (Energy Not Supplied) and AIT (Average Interruption Time). The values used for short interruptions are determined by MAIFI - Momentary Average Interruption Frequency Index. Values can be calculated for a region, operator, particular city or even individual consumers. These data are necessary to establish the standard of supply, based on system characteristics, which allows for further measures and facilitates investment decisions, according to the report. In all EU countries indicators are measured in the whole area of the country's jurisdiction. All states make a distinction on the basis of voltages, as well as interruption cause information.

In addition to the above SAIDI and SAIFI methods, it is noted that Serbia uses CAIDI - Customer Average Interruption Duration Index, which is a combination of the first two ones. All these data are subject to complex analysis, enabling the verification of a series of values within a long time period. Although there are some differences among the EC Member States in the calculation methods, the results can be represented by the same diagrams. However, to make possible any concrete conclusions, it is necessary to take into account the specific characteristics, such as, for example, the previously mentioned extreme climatic events. Regardless of the difficulties, what can certainly be received are the data collected at the national level, monitoring of supply interruptions and fluctuations, inclusion into the calculation of extraordinary (emergency) events. In particular, when analysing the interruptions at different voltage levels for which data are available, it may be concluded that, on average, 85 percent of the SAIDIs and SAIFIs are caused by incidents in the medium voltage network. (It should be noted that in this case, EHV interruptions were not taken into account, which, according to previous experience, have a negligible impact). This analysis has also taken into account a number of network systems features, which differ significantly according to countries. They were used to finally present the overall view of the entire supply regulation framework, which is defined on two levels:

1. System standards regarding the continuity of supply which imply reward and penalty

systems.

2. Standards concerning the supply of individual consumers, with the related compensation scheme, however, it should be noted that they are still in the initial stage in all countries. There is no clear definition or regulation for the worst service. Similarly, due to the lack of data, it is impossible to determine the economic effects of the proposed regulatory measures.

The creation of a regulatory system for monitoring and ensuring the continuity of supply will definitely be one of the future priorities. Countries that have not yet adopted rules related to this field will have to do so soon, while others will be required to work on improving their implementation. All monitoring measures should be rounded by the functional stakeholder notification process. Transparency is one of the first steps towards regulation.

Although there are differences between countries in their respective supply interruption monitoring implementation levels (which is also in various stages), experts agree that all Member States have reached a level allowing it to be used to support the implementation of regulatory solutions. Common to all countries is that they mainly monitor long interruptions, there is different treatment of planned and unplanned interruptions, distinction is made between different voltage levels and that the causes are also monitored. It is obvious, however, that there are several major problems:

- Rules, processes and tools for automatic interruption recording are not in place in all countries (in some SCADA is used to a limited extent, while the manual measuring method is prevalent). Naturally, it is recommended that this needs to be changed as quickly as possible.
- Interruption definitions have not been aligned, whereas the data obtained from monitoring schemes lack understanding and efficiency (It should be noted though that there are some minor common principles, inter alia, the Fifth CEER Benchmarking Report on the quality of electricity supply in 2011). The basis of harmonization should be a rule stipulating that a short interruption is the one between one second and three minutes, while the long interruption is over three minutes. Consequently, a transient interruption is the one that is shorter or lasting exactly one second. There are also recommendations to introduce monitoring of short interruptions, which has thus far not been the case.
- Continuous statistics of either Member State does not contain information about interruptions on all voltage levels. Low voltages are still not sufficiently covered, which was the case in other EU countries, at an earlier stage. Lack of such data could significantly affect the complete image of the continuity of supply, and therefore it is recommended that monitoring be introduced at the level of low voltage.
- Categorization of interruptions varies significantly between the Member States, which is particularly evident in cases where the cause is defined as a "third party". Harmonisation in this field is essential.

- There is large difference when it comes to the level of detail applied during the calculation of interruption indicators. Monitoring at the level of an area, region or individual operators is not practiced. This would also need to be changed. System operators should be technically capable to provide this type of data, and to use them in their further operation once they have been processed. It is recommended, therefore, that every operating system has its own separate sets of data, in accordance with the population characteristics of the supplied area.
- The issue of insufficiently defined concept of “exceptional events”, preventing the analysis of the causes for this type of supply interruption inside a long time period. Although it is broadly used, it is difficult to determine the characteristics common to this concept in all EC Member States. The report suggests that events of this kind are classified into four different categories, and that everything occurring once a year or more frequently should be excluded from the group.
- In most countries, a set of indicators used does not provide a complete image about the continuity of supply, which means that it should be increased, to what all members will be encouraged.
- There is no obligation of regular publication of data collected from this area, whereas the reporting frequency is also not the same. It is recommended that the information be disclosed immediately when it is collected; this would encourage competition among the companies to provide the most reliable service. Also, data exchange on the international level is the basis of effective regulation.
- Underdeveloped data collection system and early phase of the supply interruption monitoring process is preventing the application of the reward and penalty system as well as other corrective methods, international institutions are encouraging their introduction and training, of course, once the right conditions have been created.

Voltage quality

The report at the beginning of the chapter that deals with the voltage quality and distribution regulation monitoring notes that data collection, as the first measure during the introduction of the procedure, had started in all EU Member States. However, it is only in the initial stage. The information available can be analysed from several aspects:

- Regulations and legislation relating to the voltage quality
- Voltage quality monitoring system (VQMS)
- Collection, aggregation and publication of data obtained through VQMS
- Voltage quality indicators
- Concrete data for voltage classes, other VQ parameters
- Studies examining the damage caused as a result of the poor voltage quality

All countries have recognized the need for an internationally accepted rules governing this area introduced into their legal systems. However, clear directives have not yet been

defined, let alone implemented. Most members of the EC implemented the EN 50160 as a voluntary standard, so it can be considered as a document which should be the basis for determining the voltage quality in these countries.

It mainly relates to low and medium voltage levels up to 35kV. Only Macedonia has in its legislation procedures and responsibilities relating to the implementation of the voltage quality monitoring system. Bosnia and Herzegovina has also adopted some general principles. Ukraine has an established penalties system which should be applied if the voltage quality is not satisfactory.

In order to prevent the potential impacts of the consumers' installations on the transmission network voltage quality, the majority of EU Member States legally defined emission limits for individual consumers. However, here too there are different approaches, whereby a common limit cannot be determined.

For now, the monitoring system determining voltage quality is installed only in Bosnia and Herzegovina and is used only for statistical and research purposes.

By analysing the situation, the report, therefore, reaches several specific conclusions about the voltage quality:

- EN50160 standard has been implemented in most countries. In those where it is not, it should be as soon as possible.
- Details of the process and obligations related to the voltage quality control should be introduced into the legislation, as it (for now) has only been done by Macedonia.
- Monitoring systems, except in B&H have not been implemented.
- Individual voltage quality checks at the consumer's request are possible in most countries. The availability of this information should be legally provided, along with information about the costs incurred by the voltage quality oscillations. Statistics in this area will generally improve the quality of services.
- Likewise, it is necessary to develop accurate ways of determining emission limits, in order to prevent system incidents. A penalties system should be developed as well as other measures to penalize consumers violating this rule.

Commercial quality

Commercial quality standards are divided into two basic groups: guaranteed (those that must be provided in every case) and general (referring to a concrete case, all consumers in a certain area, taking into account the entire population of an area).

Commercial quality standards can be viewed through four indicators:

1. Connection quality,
2. Consumer care,
3. Technical services,
4. Metering and billing.

Connection quality is best determined by four factors: time it takes from the consumer's

request to the moment when transmission is in place; time required to assess the costs of basic operations; time required to connect new customers and time needed for disconnection upon consumer's request.

When it comes to consumer care, there are many aspects which have not been defined. This is explained by the lack of market competitiveness and liberalisation delays in other EU Member States. There is no sufficient number of consumer communication centres and their permanent supervision. This results in companies that in most cases are not consumer-oriented, treating their reactions exclusively as statistical data. They also do not have staff responsible solely for this aspect of their business operations. Therefore, the data is incomplete and difficult to classify.

Technical services are the most diverse group in the field of commercial quality, while the issue of metering and billing is the only one having defined indicators of commercial quality standards applying to other companies in addition to the DSO.

The report finds that the consumer rights in the EU Member States are far below the standards existing in the European Union. Four basic conclusions were defined requiring future application of a set of measures:

- There is a massive use of standards relating to one hundred percent of consumers, but they do not imply rights that could be exercised by individual consumers or penalties for the company. In the future, consumers' obligations should be defined as precisely as possible.
- Commercial quality standards have not been clearly imposed on suppliers and operators, which is logical given the early stage of market development. These standards should be established given the different positions of the DSO, suppliers and other stakeholders.
- In general, standards relating to commercial quality have not been tightly defined, which makes their implementation impossible.
- DSO and other companies from the sector do not address their customer relations to the extent necessary and solely focus on their own activities. Managerial teams dealing exclusively with this aspect of the business operations need to exist, tasked with raising customer communication to a higher level, which is the basic requirement for achieving free market competitiveness, transmits Serbia-energy.eu