SOGNO

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Report on fostering support for SOGNO codes and ancillary services

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Abstract

This deliverable reports on how the activities of the SOGNO project relate to the regulatory and standardization framework, both at the European level and from the perspective of the particularities of national regulations belonging to several states of the European Union. Specifically, it deals with how relevant organizations and institutions in this context understand and position themselves in relation to the SOGNO project results, as well as their willingness to further support their adoption and implementation.

Keyword list

SOGNO services, DSOs, Regulatory framework, Standards and regulations, Stakeholders consultations, TOTEX (CAPEX + OPEX), ICT chapter on existing NCs, European Energy Distribution NCs, Operating license.

Executive Summary

Cloud technology is helping companies in every industry to do more with less. The cloud can play a key role in pushing industries into successful digital integration. In the energy sector, legacy systems that rely on human involvement are now being replaced by automated systems that interact seamlessly with cloud platforms. The companies driving this shift report typical improvements such as higher efficiency and lower costs. Energy executives mostly aim to improve operational decision-making by using cloud-based software services as developed in SOGNO with reduced costs being a consequential benefit.

These represent practically the benefits and context of SOGNO power network management software services, proposed in this project. The basic motivation of SOGNO was to reduce the potentially negative impact that extreme weather phenomena have on the quality parameters of the electricity distribution service provided by DSOs. Better network operation is increasingly needed in this context, starting from the real-time monitoring, power control and quality evaluation, load & generation forecast, as well as faster fault location identification and service restauration.

Based on these projections for a better operation of the network, the SOGNO services were defined and tested. This process of outlining the functionality desired by these services has been accompanied by a permanent dialogue with stakeholders such as DSOs, policy makers, regulatory authorities and other relevant institutions. The purpose was to validate the usefulness of these proposals for the target segment, to support the adoption and implementation of the SOGNO services and to create synergies at European and regional level, from the political and regulatory perspective.

In this regard, the project partners involved in WPs 6 and 7 organized and participated in a series of workshops and sessions dedicated to consultations with all categories of the above-mentioned stakeholders. In a first stage of these consultations, DSOs in general and regulatory authorities were targeted in order to better understand current needs and trends. This input obtained in the first stage of the consultations had the role of contributing to the definition of the SOGNO services and the necessary functionalities from the perspective of the target segment.

At a later stage, as the services were defined in detail and put into tests, a series of proposals regarding the regulatory framework were outlined, which may be able to support adoption the implementation of the SOGNO services by DSOs. The consultations covered all categories of DSOs (large, small and medium-sized), regulators, and a permanent dialogue was maintained with representatives of the European Commission, as well as of sector and regulatory organizations operating at European level.

All these activities carried out synergistically with the participation of WPs 6 and 7 in the project, are part of a process that is still in progress, for the complete definition of the proposals on policy, regulations and standardization that will be the subject of the upcoming WP6 deliverables.

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1. Introduction

The introduction part of this deliverable presents its main objectives, the structure of the report and information flow, including its position and role within SOGNO project context, and the interdependency relation it has with other deliverables and work packages.

1.1 Objectives of the Report

Based on a complex activity of consultations with stakeholders on SOGNO services, this report aims to present how relevant organizations in this context relate to SOGNO results, both from the perspective of their usefulness and the potential interest of DSOs for their adoption, as well as from the perspective of how the regulatory and standardization authorities and other relevant organizations for SOGNO context can support their adoption.

1.2 Outline of the Report

Following the introductory parts, the chapter 2 of the deliverable provides a brief description of the regulatory and standardization framework associated with the SOGNO context, trends in technology advancement, as well as an overview of the relevant institutions and organizations that may have input or concrete support actions.

The initial input collection on how to better shape SOGNO services, depending on the needs of the target segment, as well as the promotion of the first proposals regarding the support that can be obtained by completing/ modifying the regulatory framework, were supported by a series of consultative workshops organized by the Romanian Energy Center project partner, with a wide international and regional participation, but also through a series of 1 to 1 meetings with organizations and authorities in the field of regulation.

From this category of actions undertaken by SOGNO partners and described in chapter 3 of the deliverable, the following are included:

- SOGNO regional workshop in Bucharest
- SOGNO European workshop in Brussels
- Workshop and consultations with ACER (Agency for the Cooperation of Energy Regulators)
- Workshop and consultations with ANRE (Romanian National Regulatory Authority)
- Consultations with E.DSO for Smart Grids and its members (large DSOs)
- Workshop and consultations with Council of European Energy Regulators
- Workshop and consultations with small and medium-size DSOs at FNN Kongress 2019, Nuremberg, Germany

The preliminary input collected on these occasions resulted from the interaction with EC representatives, regulators, sector regulatory organizations at EU level, DSOs and other energy related organizations on the SOGNO context.

This was the source of more clearly outlined proposals in the field of regulation, which were the subject of a more targeted second round of consultations, in which both large and small and medium-sized DSOs were specifically targeted, as well as the national regulatory authorities. This second stage of consultations, presented in the next subchapters of chapter 3, was facilitated by E.DSO for Smart Grids for consulting and obtaining input from large DSOs, by FNN Germany through CRE's participation in their national congress supporting the interaction with small and medium-sized DSOs, and by the Council of European Energy Regulators supporting us in the interaction with national regulatory authorities and EC energy regulation representatives.

Chapter 4 of the deliverable describes the position and recommendation of the European Commission on one of the most impactful regulatory proposals in the context of SOGNO - the TOTEX approach.

1.3 How to read this document

This report is part of WP7 which includes and counts all aspects that ensure the impact of the SOGNO project.

This work package together with WP6 ensures the reporting of the project results with the target segment, aims to exploit the results of the project on the energy market and how the legislation and standards applicable in the field of energy and the context of SOGNO can support this process.

From a functional perspective we could compare the activity carried out cross WPs in SOGNO as an activity carried out in a company through its departments. The WPs 1-3 represent "production departments" providing SOGNO research concepts and solutions, meaning "the product". Further, the WPs 4-5 represent the “departments” running the test preparation and concrete testing of the "product". These tests allow to highlight "product features" - the added value of SOGNO solutions, in order to be able to carry out a projection of the "product" on the "target market". "Market research, packaging and launch of the product on the market" are carried out in the "marketing, compliance and sales departments" represented by the WPs 6-7 that act synergistically in this context.

In this sense it is relevant to read the deliverables belonging to both WPs 2 and 3 to understand how SOGNO research concepts were defined, as well as the deliverables belonging to the WPs 4 and 5, which provides information on the viability of SOGNO solutions.

All this information is used in WPs 6-7 on the one hand for defining business models by referring to the target market, as well as to prepare the ground for the adoption and implementation of SOGNO services.

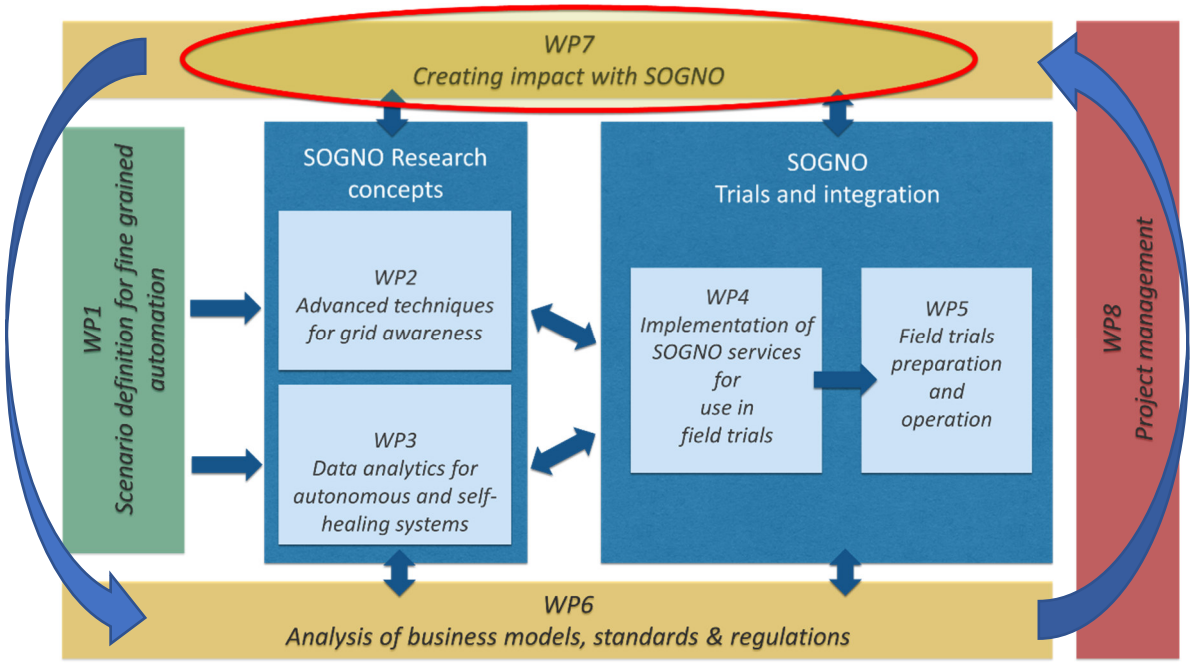


Figure 1.1. Overview of SOGNO activities.

2. Standards and regulatory framework current status and trends

2.1 European policy and regulatory context for DSOs

DSOs are responsible for all activities necessary to ensure the reliable operation of the electricity grid including strategic decisions regarding grid operation and physical network extension. As electricity distribution is not coordinated by the principles of competitive markets but functions as a natural monopoly, the activities of DSOs are subject to regulatory control. Across Europe, there are various regulatory frameworks in place to control the allowed income of DSOs such as "cost-plus" (e.g. Belgium), "incentive-based" (e.g. Czech Republic, Germany), "revenue, price or income cap" (Poland, Sweden) and combinations of these systems (e.g. Switzerland, UK) [1]. In most cases, the regulatory framework allows DSOs to only obtain “a maximum total allowed revenue (TAR) in return for […] (electricity distribution) services in one year, with the TAR in one year being equal to the TAR in the previous period corrected for (i) a requirement on improved efficiency performance, (ii) change in overall price level (inflation), and (iii) optional compensation schemes for adverse developments in demand. […] (The TAR) in the starting year is dependent on the total regulated asset base (RAB), the weighted average cost of capital and the operational expenditures. The RAB represents the value of the DSOs [sic] asset base” [2, p. 2910]. The purpose of regulatory control is to ensure that DSOs do not exploit their monopolistic market position and to incentivize them to take measures necessary to achieve overarching operational targets: maintain continuity of electricity supply, guarantee power quality and avoid curtailment of renewable sources [2].

Although the regulatory framework varies from country to country, it generally bridges the degree of operational target achievement with the income of DSOs. In two thirds of all European countries, DSOs are rewarded or penalized by regulators according to their operational performance in terms of continuity of supply [1]. Regulatory systems differ in that they are implemented as incentives and/or penalties at macro level (e.g. Denmark/France) or as incentives and/or penalties at micro level (e.g. Italy/Estonia). The continuity of supply among French DSOs, for example, is regulated at the macro level by an incentive regulation based on the annual SAIDI (System Average Interruption Duration Index) of a DSO. Micro-level penalties for DSOs in the form of compensation penalties to customers (which either must be requested by affected customers or are automatically invoiced by DSOs) for non-compliance with the required quality levels are also widespread. In general, DSOs compensate either based on aggregated values for total duration and number of interruptions or based on individual duration of planned (Romania and Slovenia only) and unplanned interruptions [1].

In order to benefit from current technological developments DSOs are required to build up new grid data processing capabilities. That is, DSOs need to handle new solutions to process all the data required for effective and efficient grid monitoring. However, neither working hours needed for internal development of those capabilities (Installation and operation of hardware and software for data measurement, data visualization, data analysis, data transfer, etc.) nor purchases from third-party vendors of machine-learning based software services for real time grid data processing (as envisioned in SOGNO) are directly governed by regulatory control. “In traditional incentive-based regulation DSOs are not allowed to include all new investments into the regulated asset base: i.e. no automatic pass-through of investment costs to end-consumers is allowed” [2, p. 2910]. Hence, the utilization of innovative software services is to some extent risky for DSOs, because service-induced improvements in operational performance are less certain to pay off financially than investments in the regulated asset base are.

2.2 Trends in technology advancement

The main driver of the technology advancement in the 21st century is digitization, taking place in all sectors and branches of the economy. In the energy sector, digitization not only allows for new technologies or interconnects existing ones but works as an enabler to accelerate the restructuring of the energy supply. Urged by the pressing ecological need and the following political decisions, it plays a crucial role in the transition from a centralized fossil- and nuclear-based power supply to a decentralized one, running on 100% renewable energies resources (RES).

One of the most comprehensive trends of the digitization is the Internet of Things (IoT), consisting of multiple interrelated devices with the ability to transfer data over a network without requiring human action. With the convergence of multiple technologies, e.g. machine learning and artificial intelligence, devices increasingly become smart, creating new technical applications. In the context of the energy sector, they range from devices for smart houses such as smart thermostats to high-end power measuring devices or grid actors in the energy system. With an increasing share of volatile RES fed into the distribution networks and a less predictable power consumption pattern (e.g. due to a bigger market share of electric vehicles), new measures to ensure grid stability are needed. Getting exact grid parameters becomes crucial and brings up new low-cost smart sensors. Equipped with a micro-controller, smart sensors allow smart features which enable the measurement of complex parameters like phase-angle or harmonics in combination with real-time data processing. to avoid load on gateways or on clouds. Further features of a smart sensor can be a low power demand as well as self-diagnostics and a self-supply with energy. According to the newest technology advancement, the data transfer itself is more and more realized with mobile communication technologies, allowing more flexible and remote applications. The new telecommunication standard 5G with features like network slicing, low latency, increased reliability in data transmission as well as the higher encryption for cyber security promises a high potential in the energy sector. Possible use cases of 5G are still in discussion like the simplified operation of virtual power plants, the control of inverters to provide reactive power or the control of micro grids to go islanding.

Another technology advancement, closely connected to the IoT and smart devices are platforms, mainly serving to aggregate data and devices or to host services. Platforms enable automated networking, coordination and intelligent control of thousands of units for energy generation and consumption. Advantages are the easy scalability, customizability and security. Innovative applications of a platform can be online marketplaces for energy where consumers and distributed energy suppliers make peer-to-peer transactions to balance generation and consumption. Closely connected to platforms is the usage of cloud computing, which offers either an environment for applications (“Platform as a Service”), computing power (“Infrastructure as a Service”) or software solutions (“Software as Service”) on demand. Advantages are the easy scalability, the security and the reliability, since the data is usually saved redundantly on various sites of the network. In this context, a cloud could also provide the environment for an IoT platform, hosting services for a better integration of RES in the grid. A more decentral approach is cloud edge computing where the computation and the data storage are closer to the source of data than to the cloud data center. This way, the data collected by smart meters and sensors of nodes, generators and loads could be directly processed on-site. Without sending the data to the central cloud for computing, the edge gateway servers can reduce latency and improve the efficiency of demand and response. Advantages are the easy scalability of the edge cloud system and the high data security due to an on-site encryption.

Another technology advancement closely tied to IoT platforms is the ongoing development of artificial intelligence (AI), inextricably linked to the processing of big data that is being collected e.g. by smart sensors. With artificial intelligence solutions consisting of complex interacting algorithms, the grid can be operated more efficiently for example by predicting equipment failure. Another high-quality service in the energy sector being constantly researched on is the generation forecast with which volatile RES like PV and wind power can be integrated more efficiently into the power system.

It increases the accuracy of renewable energy generation prediction and is mainly based on advanced weather forecasting. Advanced weather forecasting models based on AI take into consideration site-specific parameters and real-time data gathered from advanced meteorological devices. By combining the processing power provided by modern ICT such as cloud-based computing, improved mathematical models and AI with the big data collected on past weather patterns and generation outputs as well as accuracy and locational resolution of variable RES, generation forecast is likely to be considerably improved.

This trend emphasizes that the technologies described above are rarely stand-alone solutions but unfold their highest impact by combining them. Fundamental for a fast and on-going technical advancement is the regulatory framework which needs to be continuously adjusted.

2.3 Overview of the relevant institutions and organizations for the SOGNO context

In order to promote and support the adoption and implementation of SOGNO solutions, we selected the relevant institutions and organizations to carry out consultations and to exchange information in this regard.

First, the DSOs, as potential beneficiaries and end users of the SOGNO solutions, represented the basic segment with which we maintained a permanent dialogue. This allowed us to better adapt the SOGNO solutions to their needs and to define the business models. Also, according to the defined business models, we considered the interaction with companies in the fields of energy and ICT, as potential integrators and suppliers of SOGNO solutions to DSOs.

We maintained as well a close collaboration with sectoral organizations at regional and European level, which have facilitated the exchange of information and interaction with the main category of stakeholders (DSOs), such as E.DSO for Smart Grids, VDE-FNN Germany, and others.

In the context of the support we can obtain to facilitate the adoption and implementation of these solutions, we have sought consultations and exchanges of information at political and standardization & regulatory level with representatives of the following institutions and organizations: European Commission – DG Energy, National regulatory authorities as well as a number of organizations at European level that have facilitated the interaction with the regulatory authorities, such as Council of European Energy Regulators - CEER, Agency for the Cooperation of Energy Regulators - ACER, etc.

3. Events and consultations with stakeholders – fostering support for SOGNO services and codes

In this chapter are mentioned the main events dedicated to SOGNO and carried out to raise awareness of the stakeholders on the utility and added value of the services proposed by our project, but especially for the exchange of ideas and feed-back collection through the interaction with the relevant organizations and institutions at European level.

These two-way consultations and exchanges of ideas were exploited from the perspective of adapting SOGNO solutions to the specific needs of the target segment as well as to the necessary measures on the regulatory side, responding to the requirements of this report on fostering support for the adoption and implementation of SOGNO services.

3.1 SOGNO regional workshop in Bucharest

In November 2017, CRE organized in Bucharest the regional event SUCCESS Open Day, which had a large regional and international participation of over 70 participants. During this event, a workshop dedicated to debating the SOGNO concepts was organized, through which we obtained input from the representatives of the main stakeholders.

The workshop was organized around a panel discussion, with participants having complementary expertise, from DSOs environment, academic and ICT, who debated on the following topics:

1. Cost of service vs. cost of investments
2. Properly tracking KPIs and minimizing penalties
3. New business model opportunities
4. Regulation on prioritization of the data traffic to ensure optimal operation of critical power distribution infrastructure

Based on the panelists' own experiences and perceptions, but also of other participants involved in the plenary discussions, the following information and points of view were highlighted:

- The representatives of the DSOs CEZ, ESB and Electrica appreciated to the same extent that improving the quality of the service provided to the customers is a major concern, and especially reducing interruptions alongside other important issues in the customer-DSO relationship will allow the provision of a better-quality service.
- DSOs have this preoccupation and even openness in assuming costs to allow SOGNO 5G cloud based services to be contracted, but they are also concerned about regulatory context: clear rules on costs recognition by the regulator are more than necessary; it has also been pointed out that managing the relationship with regulators in this regard is not a simple process, it involves going through a series of steps that will produce a change of mindset in regulations.
- The technical benefits of using 5G technology compared to existing technologies have also been discussed. In this context, it has been mentioned that this technology with superior performance to the existing technology is well suited to urban areas, but difficult to implement (involving significant costs) in non-urban areas where users are very widespread.

- A question mark was raised as to whether regulations should allow DSOs to provide only regulated services or not; the panellists thought the answer was "yes," the services need to be regulated, but this "yes", quite categorically, raises a second question mark, "when?
- Even though national regulatory authorities in different European countries have a very good understanding of the context and are well intentioned to support the issues discussed, regulations that can be adopted by themselves (classified as secondary legislation) are blocked by the lack of a favourable framework on the primary legislation; from this perspective, the unlocking of the situation can take place through an improvement in the primary legislative framework, allowing regulators to go further with necessary changes
- The network codes were also discussed, as well as the fact that in the new context of increasing the percentage of RES in the energy system, and of increasing the prosumer's role in this equation, the energy market is facing some deep changes; having this new context, ICT's role exponentially increases in the new market configuration and will require a dedicated ICT chapter within network codes
- Increasing self-sufficiency (e. g. due to the increasing number of prosumers) in micro grids or small energy communities leads to less consumers financing the rest of the grid and could result in higher electricity prices for non-prosumers in case that regulations will not change accordingly

3.2 SOGNO European workshop in Brussels

Following the regional workshop organized in Bucharest, CRE organized in November 2018 a new workshop dedicated to SOGNO in Brussels, in order to ensure a wider international participation including the representatives of the organizations operating at central EU level.

We had the opportunity to discuss the issues regarding the adoption and implementation of SOGNO services, in a broad context of expertise. Among the approximately 60 participants were representatives belonging to the following categories of organizations: European Commission - DG Energy, DSOs, TSOs, sectoral organizations in the field of energy, private companies active in the field of energy, regulatory organizations at European level, academic and research environment, etc.

This event represented a moment of reconfirmation of the added value of the SOGNO services from the stakeholder's perspective, but also of the support proposals for the adoption and implementation of these services through the regulatory and standardization framework. At the same time, it has contributed to a better shaping and raising awareness of our proposals at the level of representative organizations at European level.

In this context, the following main aspects were highlighted in the discussions:

- In the context of the discussion for having a European level organization for DSOs, one of the most significant argument was about the need for supporting the necessary regulatory updates at the distribution level as presently having in the case for transmission

- At this stage the DSOs are getting incentives only for the investments in physical assets; increasing the level of RES is pushing to higher numbers of the pick values forcing the development of the network even if the periods when these pick values are registered are not significant, and the DSOs should be incentivized as well to work with “smart distribution”. It is expected to have some changes in the existing legislation, specifically referring to Art. 36A.
- The existing NCs already impacted the DSOs operation. A specific distribution code at European level would be foreseen due to the increasing role of the DSOs in the new higher distributed energy context.
- The newly issued “Winter package” is including a focus on services as well (OPEX related); this new version is practically removing the initial and exclusive focus on CAPEX and bring this new TOTEX approach
- Accelerating the process of restoring the network after an incident is accomplished by deploying algorithms in edge-cloud distributed architecture, as the algorithms are running locally at the base station.
- From a regulatory perspective it would be useful a software platform that can identify significant aspects for managing an activity that has interconnections and provisions answered in different network codes by integrating and uniquely presenting the relevant information

3.3 Workshop and consultations with ACER (Agency for the Cooperation of Energy Regulators)

CRE representatives attended the regular joined working meeting of Grid Connection and System Operation European Stakeholders Committees (ESCs), organized in Vienna on December 5th, 2018. The participation came as a result of the invitation received from Mr. Uros Gabrijel – Chairman of the above mentioned ESCs to present the results and findings of SOGNO project.

ACER and ENTSO-E have co-organised three European Stakeholder Committees, one per family of codes (Market codes, Operational codes and Connection codes). These Committees aim to complement, and not to replace, the legal obligations of stakeholder consultation and information included in the Network Codes during the implementation period.

The Grid Connection ESC is ensuring effective engagement of stakeholders in the implementation process of the Network Codes and Guidelines. The Grid Connection ESC will ensure that stakeholders are kept up to date on developments and provided with a platform to express their views and feedback on Network Code implementation.

The System Operation ESC (SO ESC) is set up with the aim to ensure effective engagement of stakeholders in the implementation process of the Network Codes and Guidelines. The SO ESC will ensure that stakeholders are kept up to date on developments and provided with a platform to express their views and feedback on Network Code implementation.

Participants in the meeting were representatives of the regulatory authorities from (in alphabetical order): Austria, Croatia, Czech Republic, Denmark, France, Ireland, Italy, Luxembourg, Netherland, Slovenia and Spain.

The last part of the meeting was dedicated to a session of discussions focused on the main aspects of SOGNO project from the regulatory perspective, in which we obtained a further collection of feedback from the regulators regarding what we are pursuing through the SOGNO project.

The attendance agreed that electricity distribution will be the first to be affected by the significant increase of RES volumes mainly because of the foreseen distributed generation associated. Also, it was agreed that the solutions proposed by SOGNO are valid and have potential to provide solutions to the electricity distribution systems of the future.

CRE representatives have answered to the questions regarding the software platforms and services developed in SOGNO project highlighting the advantages and positive impacts provided by these software products.

In the end of the meeting Mr. Uros Gabrijel – Chairman of both ESCs expressed the interest of ACER in general and Grid Connection and System Operation ESCs, to continue the collaboration with SOGNO project members and it was agreed that join meetings may be organized in the near future.

3.4 Workshop and consultations with ANRE (Romanian National Regulatory Authority)

From the beginning of SOGNO project CRE representatives have maintained a continuous exchange of information with ANRE, regarding the results and findings, and their potential for exploitation.

As part of this activity on July 24th, 2018 it was organized, in ANRE's Bucharest main offices, a workshop focused on electricity distribution digitization issues. Both ANRE and CRE were represented by numerous teams aiming to conduct a comprehensive and fruitful discussion.

Workshop started with a presentation of SOGNO project concepts, organization, partners, objectives and work plan. The presentations were focused on the aspects related to the services developed in the project, the software platforms where these services are implemented, the expected positive impacts and the procedures for testing the actual impacts in field trials. CRE representatives underlined the determination of all project members for developing services able to provide real positive impact for DSOs.

Considering that the SOGNO services (State Estimation, Power Control, Power Quality, Load and Generation Forecasting, and Fault Location, Isolation and Service Restauration – FLISR) are well known in the power sector ANRE representatives were interested to know what the innovation aspects are provided by the project. CRE representatives stated that among others the most innovative approaches are the Artificial Intelligence (AI) algorithms and the cloud-based software solutions with a special mention for edge cloud versions.

The following discussions focused on the potential impact on the regulatory framework of SOGNO solutions and findings.

CRE's representatives mentioned several aspects that must be considered in the regulatory framework, such us:

- Software platforms used by DSOs must be open-source type; this feature is very important because allows DSOs to avoid becoming so called "captive consumer" of the software providers. In SOGNO project there are four different (different developers) software platforms and the fifth services (also developed by different entities) have been successfully integrated in all of them. The success of this endeavor proves that open-source platforms grants a high level of interchangeability while keeping the required level of quality.
- Software utilization must be incentivised at least at the same level with the investment; currently in Romanian tariffs for electricity distribution are included incentives for investments. Based on the SOGNO project results and findings CRE's representatives argued that also the software utilization must be incentivized, at least at the same level with the investments if not more. The most important argument was the ratio between the software cost and the amount of financial positive impact.
- The positive impact of a software product must be very sound proved by the DSO before the regulatory authority grant it the recognition in the tariff or incentivise it; ANRE's representatives mentioned that in the last few years several software products were promoted by the DSOs but despite great expectations none of them proved to be efficient. All participants agreed that an official recognition of a software product must be very solidly justified by mid or long-term tests performed in real environments. It was also agreed that a special procedure for recognizing software products in electricity distribution tariffs would be useful and recommendable.

The last part of the workshop was dedicated to the final remarks and recommendations for future actions for both ANRE and SOGNO (CRE) representatives.

CRE's representatives expressed their interest and availability for supporting ANRE in all relevant aspects related to the regulatory framework future updates: support for identification of the most suitable decisions, support for proper documenting the decisions, support for drafting text, support for feed-back implementation etc.

3.5 Consultations with E.DSO for Smart Grids and its members (large DSOs)

E.DSO for Smart Grids is one of the most relevant organizations at European level which represents, as a sector organization in the field of energy, some of the largest and representative DSOs in Europe.

The consultations carried out with this partner of high importance for the specific aspects of SOGNO have been carried out on several occasions, both bilateral meetings and synergistic participation in different events organized by CRE. We have thus maintained a permanent dialogue with this organization, including by involving an E.DSO representative as a member on the SOGNO Advisory board.

Facilitating by E.DSO for Smart Grids the exchange of information with large-scale DSOs, including through the responses received in the context of a questionnaire-based research, highlighted the position of these categories of DSOs regarding SOGNO services and the necessary support in regulation.

Among the large DSOs who participated in our research and provided answers in this regard, we can mention the following: ENEA Operator Sp. Z.oo - Poland, NOE NETZ – Austria, Grupo Iberdrola – Spain, ENEL- Romania, E.ON-Romania. They provided answers regarding the following aspects, which can be summarized as follows:

1. Supporting "cost of service" in balance with CAPEX support (TOTEX approach) through the regulatory framework

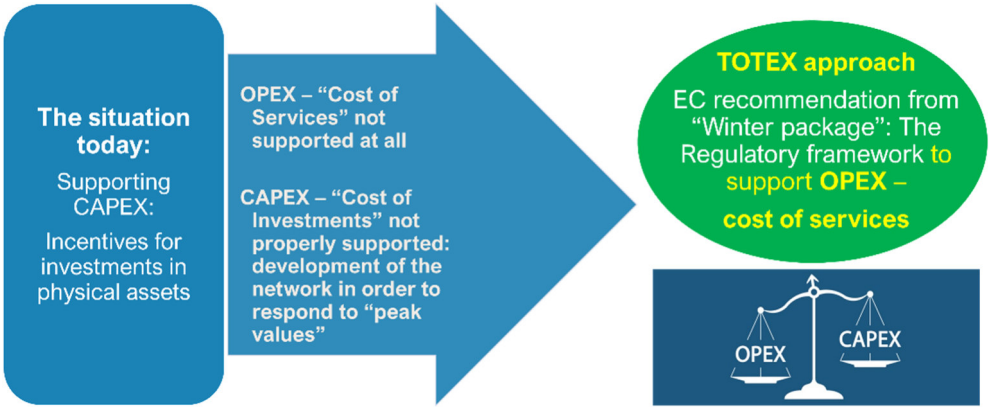


Figure 3.1. TOTEX context

Large DSOs perception over this aspect is that ICT based services promoting "TOTEX approach" might be a beneficial measure considering:

- The DSO will have the freedom to balance between CAPEX and OPEX
- The DSO is the most qualified entity to optimize the balance between CAPEX and OPEX
- Regulatory constraints might bias the right decision CAPEX vs OPEX
  Various stages of efficiency of the DSOs of a country can trigger wide spread of TOTEX

2. ICT requirements within existing energy distribution network codes

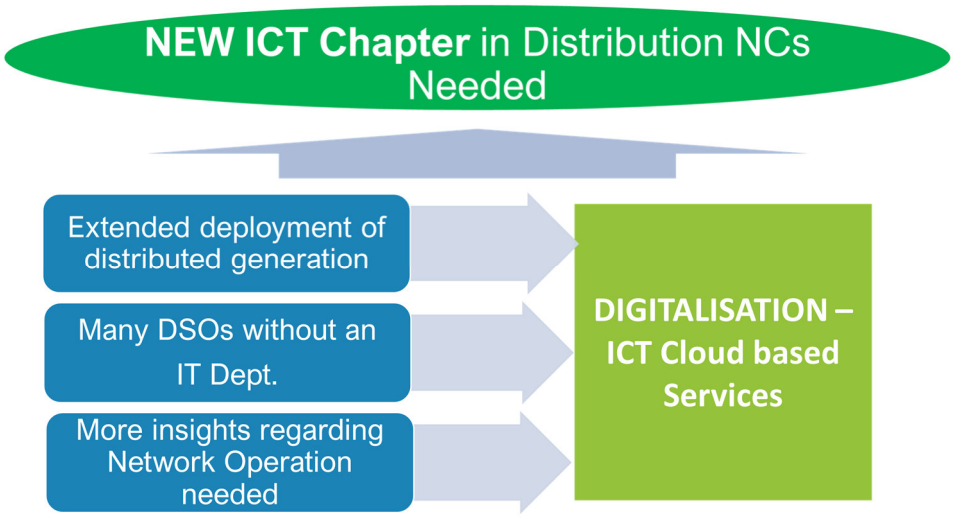


Figure 3.2. Justification of ICT Chapter in Energy Distribution NCs

The respondents considered that this is a beneficial measure to be considered through the regulatory framework, based on the following statements:

- Some DSOs are not that interested in digitization or they try to postpone the process
- Will ensure similar degrees of digitization for all DSOs
- Implementation of measures based on digitization will be possible if all DSOs have similar degrees of digitization
- National regulation should establish several targets to be met by DSOs, but the technical details of implementation should be left to the DSO and the regulator should not intervene for these details
- It must have in mind a cost- benefit analyses about the capacity of consumers to support a very technologized services through distribution tariffs; it would be relevant to have some financial incentives in this regard.

3. The harmonization of the legislative provisions at European level by an European Electricity Distribution Code

A common position was partially met by the respondents in support of this measure, mentioning the following:

- National regulatory provisions will be similar and the regulatory framework more predictable and more than that the Regulatory Authorities will be more coherent by following a certain calendar for implementing measures
- EU Regulations have already imposed on the DSO common obligations in the regulatory areas, but such an integrated measure at European level needs to be analysed from the perspective of the impact and utility it can have
- A common European framework that empowers DSOs as key players in the energy transition is positive; it is however relevant to say that most of the issues that affect DSOs are country specific and clearly a “one-size-fits-all” approach is not possible

4. Differentiated operating licence depending on the DSO size

This is a measure that large DSOs do not consider very relevant and do not particularly encourage, providing the following statements:

- Different operating license based on the size of the DSO is not appropriate for the group of large DSOs because it might generate discrimination and/ or claims of discrimination; most of the countries already have special license provisions for small distribution systems
- No, as this will unbalance the tariff cost base essentially and then the question is how to socialize the fixed costs among the customers situated in different grids/ tariff structures

3.6 Workshop and consultations with Council of European Energy Regulators

CEER represents the voice of Europe's energy regulators, therefore a key partner in our process of consultation with the European regulatory environment. The association has a long history of cooperation with its neighbours, the regulators from the Energy Community, ERRA, MEDREG, and the 6 countries of the Eastern Partnership, in support of Europe's external policy objectives.

The CEER activity is structured in working groups (WGs), which is supported by work streams (WSs) in charge of specific issues. Currently are active the following WGs [3]:

- **Customers and Retail Markets – CRM WG**; The main objectives of this WG are to monitor consumer protection and competitive retail markets with an emphasis on enabling consumers to engage more effectively in energy markets and energy regulation issues. This WG has five WSs: Monitoring Consumer Empowerment Work Stream (MCE WS), Innovation and Retail Markets Work Stream (IRM WS), Customer Empowerment Work Stream (CEM WS), Monitoring Retail Markets Work Stream (MRM WS) and Retail Market Roadmap Work Stream (RMR WS).
- **Electricity – E WG**; E WG reported in 2019 on the implemented regulatory regimes for energy networks in European countries as part of the CEER annual report on Regulatory Frameworks Report of European Energy Networks. As it covers both the electricity and gas sector, the report is drafted in cooperation with the CEER G WG. Additionally, it will examine the impact of the increasing shares of renewable energy sources on the investment signals. This WG has three WSs: Sustainable Development (SD), Future Policy (FP) and Incentives Regulation and Efficiency Benchmarking (IRB).
- **Gas – G WG**; This WG has four WSs: Regulatory Gas Strategy (RGS), Liquefied Natural Gas (LNG), New Gas Legislation (NGL) and Gas Settlement (GS).
- **Distribution Systems – DS WG**; DS WG examine the changing role of distribution networks in anticipation of current retail and wholesale market developments and has two WSs: Energy Quality of Supply (EQS) and Cybersecurity (CS).
- **Market Integrity and Transparency – MIT WG**; MIT WG addresses the issues of transparency and supervision of energy trading including the interrelationship of wholesale energy market legislation and relevant financial market legislation and has only one WS: The Wholesale Energy Market (WEM) Work Stream.

On November 22nd, 2019, in CEER main offices from Brussels, DS WG organized a workshop dedicated to consultations in the triangle of the European Commission, National Regulatory Authorities and H2020 projects under implementation and selected in terms of consistency of concerns and proposals regarding the regulatory framework. Following the sustained activity of promoting the regulatory measures, the SOGNO project was one of the 4 projects selected in this context alongside with INTERFACE, COORDINET, and INTERFLEX. Each project was briefly presented and then DS WG members asked questions and made comments, mainly focused on regulatory issues.

Concerning SOGNO project the following aspects proved to be of great interest for the participants:

- The implementation of the services requires to install supplementary sensors, or it may be performed using the existing devices?
- What is the efficiency of the services utilization and how it will be (at the end of the project) measured and quantified?
- What is the assessed impact on the existing regulatory framework?
- What is the necessary exchange of data between relevant parties? (type, routing, frequency)?
- What sort of prerequisites in terms of control and information systems need to be in place? Especially relating to observability and coordination, how are these planned to be implemented?

- What is the real benefit through the approach in SOGNO project for the whole energy system (which could not be reached in similar form with another approach)?

CRE's representatives have answered accurately and in detail to all questions raised by the participants and their contribution was highly appreciated by the chairman of DS WG.

Discussions with representatives of national regulatory authorities and those of the European Commission confirmed the concern of both categories of stakeholders regarding most of SOGNO's proposals in the field of regulation:

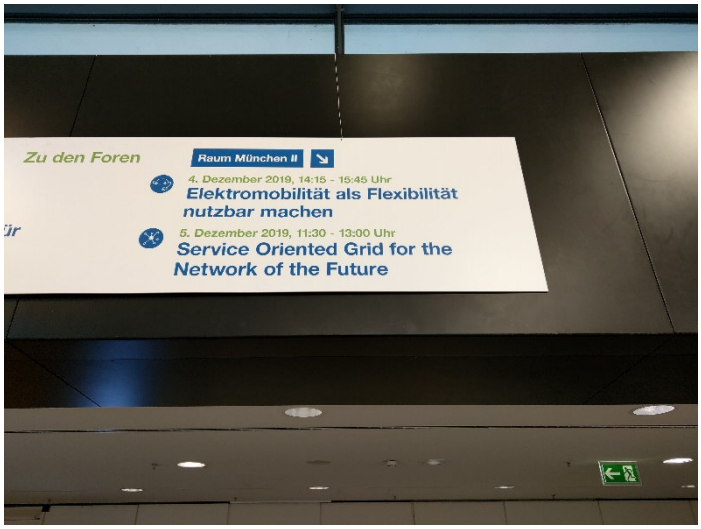
- TOTEX approach and support for "cost of service"
- the need for a dedicated ICT chapter within the NCs
- the need for uniformity of the legislative provisions at European level in the context of DSOs, for which the European Commission has already started the procedure of developing 3 NCs: on data management, demand response and data security

In the end of the meeting CRE's representatives and DS WG chairman agreed to continue the collaboration related to the SOGNO project by attending other workshops organized by CEER and/or regular meeting of DS WG or other WGs.

3.7 Workshop and consultations with small and medium-size DSOs at FNN Kongress 2019, Nuremberg, Germany

In order to have the perspectives of all the parties involved in the process of consultations on SOGNO solutions, stakeholders and all relevant organizations, besides the large DSOs and regulatory authorities already addressed and presented in the previous subchapters, we also considered the consultations with the small and medium-size DSOs.

The partnership with VDE/ FNN, the technical regulator for power grids, one of the most relevant organizations in Germany for the activity of small and medium-sized DSOs, facilitated the interaction with this category of stakeholders through the national FNN congress that took place at the beginning of December 2019, in Nuremberg, Germany.



During this congress we had the opportunity to run a workshop dedicated to SOGNO, to present our proposals to the specified audience and to obtain the opinions of the participants regarding the SOGNO solutions and the proposals to support the regulatory framework.

Following the presentation of the concepts, solutions and proposals in the field of regulation for SOGNO, the plenary discussions confirmed to a large extend the positions expressed by the large DSOs, presented in the previous chapters.

Moreover, during the workshop we conducted an online research among the participants, who were able to offer their answers and their position towards the SOGNO solutions and proposals. 38 of the participants in the plenary offered answers to our questions through the mobile phone, as follows:

Question 1: Do you consider that the support of "cost of service" (OPEX) in balance with the support of CAPEX can be a real support for the activity of DSOs?

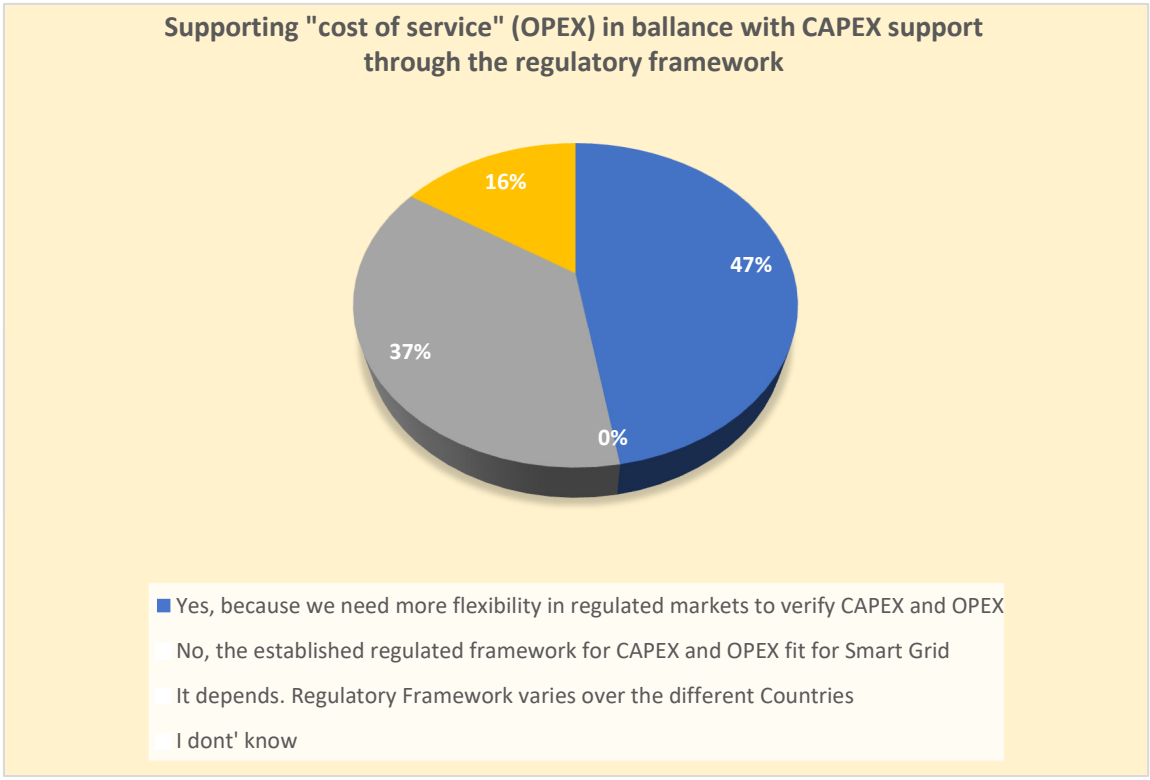


Figure 3.3. Research results – FNN Congress – supporting CAPEX and OPEX

Question 2: Do you consider it relevant and implicitly support the idea of introducing ICT requirements within the national energy distribution network codes?

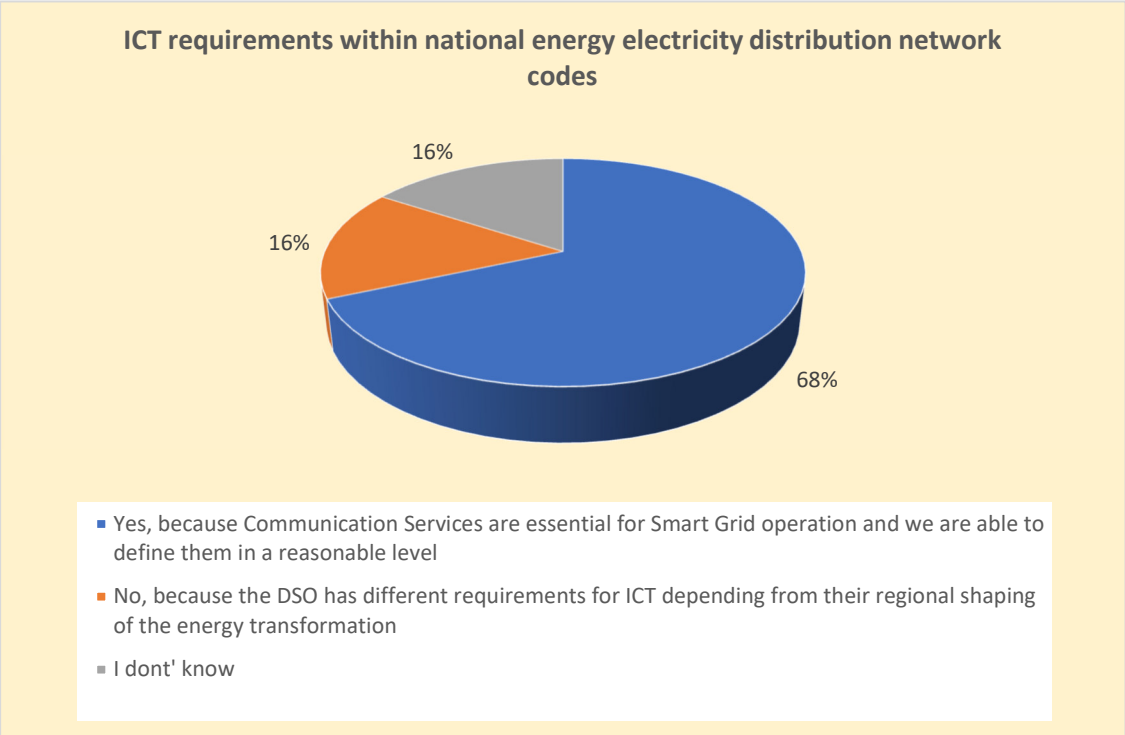


Figure 3.4. Research results – FNN Congress – ICT requirements within NCs

Question 3: Do you consider useful and do you support the process of harmonizing legislative provisions by energy distribution network codes at the EU level?

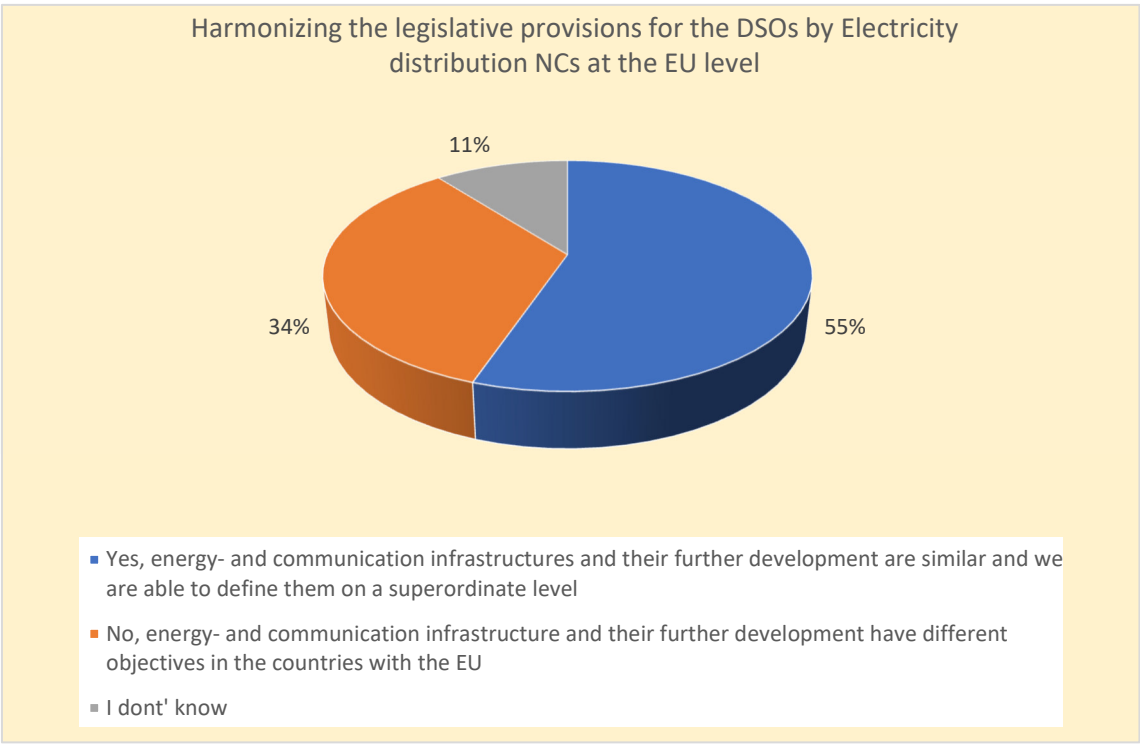


Figure 3.5. Research results – harmonizing legislative provision at the EU level

Question 4: Do you consider a differentiated operating license depending on the size of the DSO would be appropriate for balancing the competitive advantage?

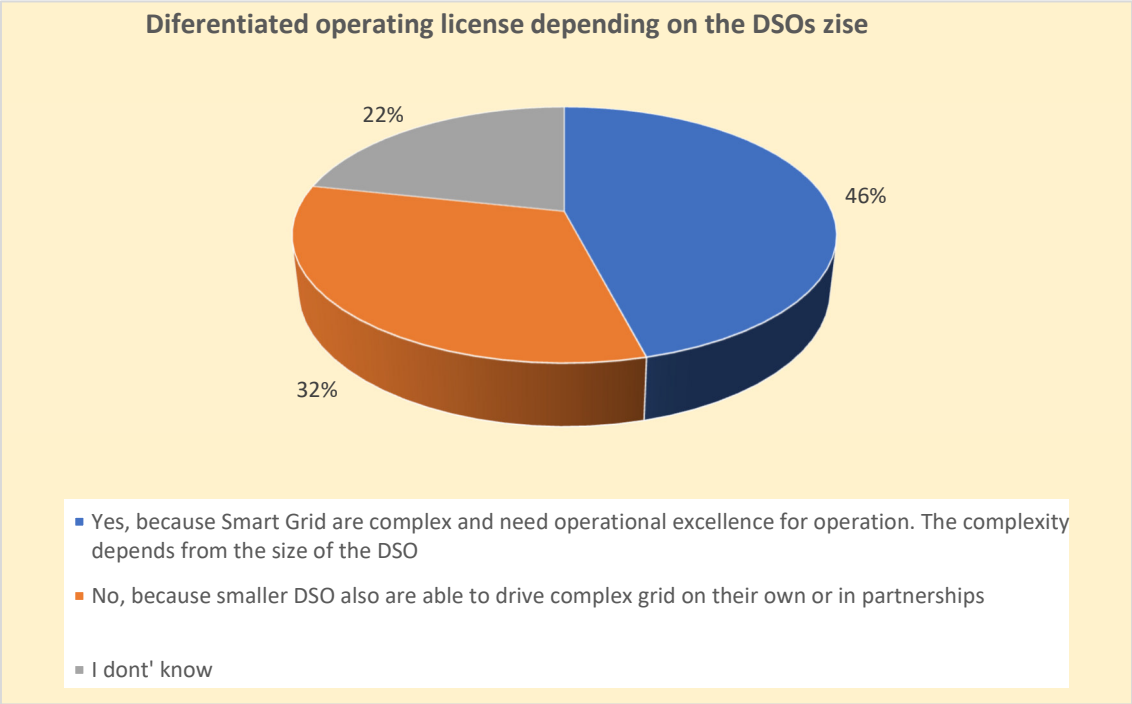


Figure 3.6. Research results – Differentiated operating license on the DSOs size

4. European Commission recommendation for supporting “cost of service” – TOTEX approach

The updated “Winter package” reveals the European Commission's commitment to the “TOTEX perspective” about supporting both CAPEX and OPEX, and therefore pursues the promotion of measures to encourage contracting services, not only the realization of investments. Henceforth, in order to adopt measures to stimulate the contracting of services from the legislative perspective, each national regulatory authority must play its own role and the awareness of these issues both at DSOs level and at the level of the regulatory authorities is very important. For the DSOs to be motivated to support this process and furthermore to seek and obtain the support of regulatory authorities, business models must be promoted by demonstrating that the integration of certain services will determine either cost savings or revenue generation.

5. List of Figures

6. Bibliography

[1] Ernst and Young, “Mapping power and utilities regulation in Europe,” 2016.

[2] J. De Joode, J. C. Jansen, A. J. Van der Welle and M. J. J. Scheepers, “Increasing penetration of renewable and distributed electricity generation and the need for different network regulation,” Energy Policy, vol. 37, no. 8, pp. 2907-2915, 2009.

[3] CEER website

7. List of Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
ANRE	Romanian National Regulatory Authority
CAPEX	Capital Expenditures
CEER	Council of European Energy Regulators
CRE	Centrul Roman al Energiei (Romanian Energy Center)
CEM WS	Customer Empowerment Work Stream
CRM WG	Customers and Retail Markets WG
E and G WG	Electricity and Gas WG
DSO	Distribution System Operator
ERRA	Energy Regulators Regional Association
FLISR	Fault Location Identification and Service Restoration
ICT	Information and Communications Technology
IRM WS	Innovation and Retail Markets Work Stream
LV	Low Voltage
MCE WS	Monitoring Consumer Empowerment Work Stream
MEDREG	Mediterranean Energy Regulators
MRM WS	Monitoring Retail Markets Work Stream
MV	Medium Voltage
NC	Network Code
OPEX	Operational Expenditures
PC	Power Control
PQE	Power Quality Evaluation
RMR WS	Retail Market Roadmap Work Stream
SE	State Estimation
SOGNO	Service Oriented Grid for the Network of the Future
TOTEX	Both CAPEX & OPEX
FNN/VDE	Technical regulator for power grids in Germany
WP	Work Package
WG	Working group