AMM and legal implications for the electricity market

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Abstract. This paper deals with legislation related to the introduction of AMM systems in European countries, particularly in the Czech Republic. It identifies relevant legislation and defines issues which will the legislator and the future operator of the system have to tackle. It analyzes both EU and Czech legislation.

Keywords: smart grid, electricity market, legal regulation, energy law, technology law.

1 Introduction

Electricity market is in European countries regulated by a complex systems of national laws, which are from above heavily influenced by the EU legislation and strategic documents and from the bottom by international technical standards. Most European countries are implementing or planning to implement widespread roll-out of technologies for smart metering of electricity consumption and for distribution of consumption data, in order to achieve greater efficiency in distribution and consumption of electricity[1]. This so-called roll-out is not only technical challenge, but also a legal one, because it is not certain which laws need to be changed and to what extent and which legal regulations need AMM (advanced metering management) systems operators take into account when implementing the roll-out.

In the Czech Republic, this implementation process is just beginning, which is why we need to discuss, how to tackle this legal challenge. This paper therefore analyzes the current legislative environment for the use of HDO (hromadné dálkové ovládání, block remote control) and AMM systems in the Czech Republic and the conditions for the operation and management of electricity distribution systems. The aim of this analysis is to identify the parts of current legislation that may regulate, limit or preclude the implementation of proposed solutions for the distribution networks and to propose possible legal solutions for identified obstacles from the perspective of the distribution network operator, customer and the legislator

The analysis focuses on legislation in the Czech Republic, in identifying solutions to any legislative restrictions but also assesses the possibility of using the legal tools

[1] Far greater efficiency may be achieved if the AMM system is accompanied by other technologies of so-called smart grid. Data gathered by the AMM may be used for controlling and operation of energy flows in the energy grid itself [1].

applied abroad (mainly in the EU). The aim is to identify relevant legal regulation, strategic documents and solutions from abroad, which may help to find relevant answer to research question – which technical, organizational and legal tools and solutions should the lawmaker, regulator and operators of distribution networks consider and use to meet the requirements and needs for the AMM systems?

2 European legislation

In order to analyze current legislative environment, we need to summarize basic legislative and strategic EU documents dealing with the use of AMM (advanced metering management) systems. Currently, this area is not regulated by directly applicable EU regulations, the process of introduction of smart metering technology and relevant technical requirements are however to be found in some EU directives and other legislative and strategic documents. Fundament is set by the Directive no. 2009/72/EC concerning common rules for the internal market in electricity, which does not directly regulate AMM area but its content suggests the EU's intention to require member states to introduce these technologies. In the directive, there is just one clear request in this direction – to conduct economic assessment of all the long-term costs and benefits of the implementation of intelligent metering systems to the market and the individual consumer or which form of intelligent metering is economically reasonable and cost-effective. Although EU emphasizes that the implementation of new systems should be particularly economically beneficial and the Czech economic assessment from 2012 concluded that implementation of AMM is not economically feasible (see below), it can be assumed from the recent development that the pressure to introduce intelligent metering systems will continue to evolve.

For the area of AMM is then crucial the Directive no. 2012/27/EU on energy efficiency that already includes specific requirements for the functionality of AMM systems. According to the directive, the AMM system should primarily provide customers and by them designated persons (eg. suppliers) with sufficiently detailed information about their consumption, which can then be used to achieve more efficient energy use and subsequent savings [2]. Roll out of these systems should then be in line with the economic assessment, and at the same time should be assured the security of the data to protect customer privacy.

Another binding regulation that could interfere in the issue is the Directive no. 2014/94/EU on the implementation of infrastructure for alternative fuels, which only suggests the possibility of the use of electric vehicles as a means of balancing the load in the electricity system.

Significantly more specific requirements include strategic materials that aren't currently directly or indirectly binding, but we can quite confidently expect that their principles will apply in future legislation - whether European or national. The key document would be the Recommendation no. 2012/148/EU on preparations for the roll-out of smart metering systems. It defines specific requirements for smart metering systems in terms of features, the list of which is clearly defined, in terms of protection of personal data, and in terms of economic benefits assessment. The system operator will be primarily obliged to process the data generated by the system so as to achieve

the objectives of the roll-out, but also to simultaneously protect customers' personal data[2]. For this purpose, the Recommendation defines the essential technical, organizational and legal measures that will the operator have to implement. It mainly refers to the data protection impact assessment (DPIA), in which the operator should assess the risks of the processing of personal data in the AMM system and identify methods and means which would help to cope with these risks.

It expects the operator of AMM system to cooperate with the national Office for Personal Data Protection to create a situation where personal data will be utilized so as to allow the beneficial functioning of the AMM. At the same time however these data must be processed as little as possible, in as little ways as possible and for as shortest time as possible, the data should also be processed and transmitted only via secure communication channels and should anonymized as soon as possible. The Recommendation also deals with the economic assessment of the benefits of the AMM, which should be elaborated using the template, which was distributed by the EU Commission. From a features standpoint recommendations contain requirements that:

- the system should provide updated information on the consumption to customers and their designated operators often enough and in comprehensible form
- the system should make the data about the consumption accessible remotely and often enough for the purpose of network management, installed meters should also allow two-way communication,
- the system should allow the use of advanced tariffs in order to reduce consumption[3],
- the system should be able to remotely turn on, off or limit the supply points,
- the communication with the meter will be secure,
- the system should be able to provide import/export and reactive metering.

In terms of protection of personal data is the most important the Directive no. 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data (data protection directive, DPD), which regulates the obligations of member states for the protection of personal data. Most of the obligations that the data controllers (which are also operators of AMM systems) meet are mentioned in the following chapter which deals with the Czech legislation. In terms of European legislation is the most important the fact, that the operators will be probably expected to conduct the DPIA (data protection impact assessment).

Further requirements on assessing the impact AMM systems for the protection of personal data includes the Recommendation no. 2014/724/EU which provides the template for assessing the impact of smart grids and smart metering systems for data protection. This Recommendation specifies how and in what cases should the DPIA be

[2] Since smart meters have unintended consequences for customer privacy. Energy use information stored at the meter and distributed thereafter acts as an information-rich side channel, exposing customer habits and behaviors [3].

[3] Advanced tariffs should be used for creating methods for achieving so-called price-responsive demand. Most extreme approach may be real-time pricing of electricity (RTP). RTP describes a system that charges different retail electricity prices for different hours of the day and for different days [4].

conducted. The template itself contains a fairly extensive description of the whole process and the various aspects to be taken into account in the evaluation.

Another important aspect is the fact, that the DPD will soon be replaced by the new EU legislation on personal data protection in the form General data protection regulation (GDPR). This regulation would quite fundamentally change the functioning of the data protection in member states, primarily because it will also replace national legislation and introduce new obligations. Since the adoption of this Regulation is expected in the next few years, the data controllers should certainly take these new obligations into account.

In conclusion, from the existing EU legislation we can identify the following recommendations for the roll-out of AMM systems:

1. During the roll-out of AMM systems should be continually assessed the economic merits following the Commission template. This assessment should be conducted not only at the level of each member state or the system operator, but even at the level of individual new technologies or features.
2. Given the generality of functionality requirements, universal technical solutions should be chosen to maximize modularity and to enable possible introduction of additional functionalities in the future, chosen solutions should however be at the same time economically viable. Mandatory requirements in the EU legislation are currently rather general, specifics of the AMM systems will therefore primarily depend on the specific implementation of the new legislation at the national level.
3. Functions of the AMM systems should be beneficial for both the distribution network operator and especially for customers. The economic evaluation should consider savings of the customer, since the customers will be the main source of the funding for the roll-out.
4. The system operator should conduct DPIA for assessing the impact of the roll-out on privacy of customers not only because it is expected in EU strategic documents, but also because in the forthcoming GDPR the DPIA will be probably mandatory.
5. The AMM system operator should also take into the new GDPR which introduces new requirements and will replace the current legislation at the national level.
6. The present EU standards in the field of cyber security are non-binding. In the legislative process, however, is already new NIS (network and information security) directive, which lays down the obligation of member states to ensure a minimum level of information security of important information systems[4]. Czech legislation on cyber security is in line with the requirements of the directive.

[4] Even though the cyber security point of view is by the European legislation and strategic documents mostly overseen, it is definitely an important issue. Studies have shown, that cyberattack against the AMM system may cause great damages, since for example in some cases it is possible to remotely disconnect customers from the grid just by sending a disconnect command [5].

3 Czech legislation

As we can see from the previous chapter, the EU legislation is very general, let's focus more on the national level and summarize the basic principles of the current Czech legislation that affects or could affect the eventual deployment of AMM system and its interaction with HDO.

Current legal regulation of the measurement and control in the electricity distribution networks is to some extent relatively general and technologically neutral. Therefore, the roll-out of AMM system in Czech distribution system basically shouldn't face any fundamental legislative obstacles. The absence of specific legislation which would regulate the functioning of the AMM system, define its properties, or specify the procedure for the roll-out, requirements for data handling processes or funding method does not allow for immediate easy roll-out of AMM system with sufficient legal certainty. In terms of future legislation, it is therefore necessary to focus more closely on general issues and gaps in the existing Czech legislation and its adjustment before the roll-out of the AMM system, particularly in the following areas:

- willingness of customers and property owners to tolerate the installation of smart meters and other technologies,
- upgrade of the technologies installed in private properties so that it is possible to install the smart meters
- transfer of consumption data (to what extent, time and to whom)
- data protection, privacy
- trading and distribution tariffs
- funding of the roll-out of AMM systems (by all stakeholders)
- legislative enshrinement of the business model
- flexibility of invoicing

These requirements are to some extent reflected in Update of the Czech national energy strategy (ASEK) and especially in the Czech national action plan for the smart grid (NAP SG). In these documents it is clearly stated, that there will be a new legislation which would change current rules for electricity market in order to allow the roll-out of AMM systems. The foreseen content of this legislation is however described only in very general terms.

Current legislation also enables distribution network operators to implement parallel operation of the HDO and the AMM systems, HDO can perform a wider or narrower variety of tasks, depending on the architecture of the AMM system. Complete replacement of the HDO with AMM system with advanced features is in terms of current legislation not possible.

Another legal challenge that is related to introduction of AMM systems is the protection of privacy of customers during collection and processing data produced by AMM systems. Even Czech Office for personal data protection stated in its opinion no. 1/2014[5] clearly stated that the AMM system will undoubtedly deal with personal data and its operator will therefore be as a data controller subject to the obligations arising

[5] See online at: https://www.uoou.cz/VismoOnline_ActionScripts/File.ashx?id_org=200144&id_dokumenty=11445.

from the Czech data protection legislation. This is why AMM systems operators will have to identify which personal data will be by the system collected and processed and for what purposes. This basis will help them to identify appropriate organizational, legal and technical measures, which will ensure compliance with obligations arising from data protection laws and at the same time allow them to use the data to achieve identified purposes.

It is also to be expected that extent, to which will be the personal data processed, and methods used will be largely determined by the new legislation in energy sector which will be in connection with the roll-out of AMM systems adopted. The extent to which the distribution network operators will be responsible for the operation of the AMM system can in fact expand or narrow the range of their rights and obligations related to the processing of personal data. Considering the recommendations of the EC and European legislation, it can be recommended to the AMM operators to conduct DPIA following a EC template, which is a good starting point for evaluation of purposes for the processing of personal data.

For the operation of AMM systems are also relevant provisions of the Act on cybersecurity, its implementing regulations, as well as the crisis act. According to the current diction, the Act on cybersecurity would cover the operator of the AMM system only if the system was classified as critical information infrastructure. It is impossible to predict, whether the AMM system will be classified this way, but it definitely may happen since such a system may be critical for functioning of smart grid systems and subsequently for operation of the whole distribution network [6][6]. Therefore, it can be recommended, to design the entire system so that it can meet the requirements of the Act on cybersecurity and its implementing regulations without any further modifications or with only minor ones. This approach may be also helpful in case the operator will have to prove that processed personal data are protected well enough, because the requirements for the technical protection of personal data in the current data protection legislation are too general.

Since it is also possible to use wireless communication to transmit data within the AMM system, it is also necessary to analyze the Act on Electronic Communications, which regulates the use of individual frequency bands. If a wireless network will be chosen as the main communication channel for the data of the AMM system, it can by recommended to analyze possible risks arising from the nature of the regulation of use of needed radio frequencies in the country.

4 European countries

According to my findings it is clear that legislative intervention affecting AMM systems / SG in individual EU countries differed quite significantly. For example, Italy and Greece basically started the roll-out of AMM without any legislative definition of its functions, implementation procedure or the nature of the system. On the other hand

[6] As suggested by Knapp E. et. al. in: ERIC D. KNAPP, RAJ SAMANI, Eric D. Knapp, Raj Samani a technical editor.JOEL LANGILL. Applied Cyber Security and the Smart Grid Implementing Security Controls into the Modern Power Infrastructure. Online-Ausg. Burlington: Elsevier Science, 2013. ISBN 9780124046382.

in, say, Germany, the legislative bodies opted for the opposite approach, and regulated the procedure of the roll-out as well as requirement for the system quite heavily. From the perspective of the Czech Republic it certainly seems advisable to opt for adoption of more detailed legislation before the roll-out takes place. Not only in order to ensure greater legal certainty, but above all because of better technical and operational coordination of the roll-out of AMM systems in the distribution networks of individual operators. At the same time however, the legislation should be technologically neutral and general enough, so the technical implementation of the system will be viable and the operators can choose economically and functionally effective technical solution.

4 Conclusion

From the abovementioned analysis it is clear, that there are more ways how to solve issues related to the roll-out of AMM systems in the Czech Republic. My research will therefore in the future focus more on proposed legislation at European and national level and mainly on comparative study of solutions chosen in other European countries. This comparative study will be based on the data collected from legislation of foreign countries and mainly from national studies and analyses focused on the issue. This data will then be compared and evaluated in terms of effectivity and applicability of specific solutions in the Czech legislative environment. Proposed solutions may serve as significant contribution to the expert discussion on how to implement roll-out of AMM systems in Czech distribution networks.

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