Ampacimon Response to Public Consultation on 2025 Bridge

Executive Summary

This document aims to respond to the consultation paper "European Energy Regulation: A Bridge to 2025" published by the Agency for the Cooperation of Energy Regulators ("ACER"), by providing Ampacimon's position on which should be the regulatory priorities and the actions to be taken by European regulators in the coming period.

The key messages of Ampacimon's position are the following:

- Innovative grid technologies that allow to increase the efficient use of existing power infrastructure, for instance by maximizing the use of the capacity of the current European networks, have not yet been sufficiently deployed across Europe due to the lack of appropriate regulatory framework.
- Innovative grid technologies, such as Dynamic Line Rating, have demonstrated that they can significantly increase efficiency and allow additional network capacity at minimal cost while avoiding sensitive permitting issues.
- However, existing European tariff regulation for Transmission System Operators ("TSOs") and Distribution System Operators ("DSOs") is mainly focused on the value of large assets built and quality of grid services and efficiency of grid operation are not acknowledged.
- In spite of the benefits offered by new grid technologies, the current TSO/DSO revenue regulation is significantly hampering the deployment of such technologies, resulting in missed opportunities to increase efficiency and to reduce the cost of electricity for end-customers benefit.
- Considering the European Union's effort to maximize grid efficiency and foster the development of renewable energies, ACER should promote the revision of the current regulatory frameworks, as well European as national, in order to facilitate the implementation of incentive based regulation for network operators, promoting the latest available technologies and allowing for maximized and efficient use of the existing European network infrastructure.

Introduction

On 29 April 2014, ACER published its consultation paper: "European Energy Regulation: A Bridge to 2025" (the "paper"). Ampacimon supports ACER's initiative of anticipating emerging challenges, which the energy sector will face from now until 2025, and of developing possible regulatory responses to these challenges.
Ampacimon (www.ampacimon.com) was created by the University of Liège (Belgium) in 2010 to market innovative solutions allowing an optimal use of the grid's transmission and distribution high voltage lines capacity.

Ampacimon thus welcomes the consultation paper as it further encourages a common thinking and regulatory approach among the European regulators and establishes a proposal on which the future regulatory framework should be based.

The paper identifies a number of areas that may benefit from greater regulatory attention. Without commenting on all the areas raised in ACER's paper, Ampacimon would like to focus its comments on the impact that new transmission and distribution grid technologies will have on the European electricity system and on how the current regulatory framework should be revised and adapted to make the best use of the benefits that these innovative technologies can bring to the power system and ultimately to the European consumer.

Transmission Grid Technologies and their Positive Impact for the Power Sector

Today, the European power sector is at a point where the pace of change and opportunity is rapidly accelerating. Europe's objective to move towards a decarbonized power sector by 2050 has led, in only a few years, to the fast deployment of renewable energy sources ("RES"), which has completely changed the game.

These recent developments have created new challenges for the power sector and in particular for distribution and transmission networks. European utilities are faced with the need to modernize their aging infrastructure, while finding ways to optimize the efficiency of their investment. TSOs and DSOs also face the challenging task of ensuring grid reliability, stability and security while at the same time supporting increased penetration of RES and maintaining system costs at a reasonable level that ensures the competitiveness of the European economy. Achieving higher levels of competitiveness and efficiency of the power sector that result in energy price reductions are currently a key priority and major concern for European policymakers and consumers.

These new challenges require the fast deployment of modern infrastructure and innovative solutions. Improving the utilization and efficiency of existing infrastructure assets is key to maximize an efficient network development and reduce operation costs. Existing and coming smart grid network solutions combined with IT and telecommunication systems can now enable real-time grid monitoring and control. This new level of control helps TSOs and DSOs becoming more reactive and more flexible when dealing with the growing complexity of grid systems, all of this at reduced costs and offer therefore significant benefits. Tariff and revenue regulations should foster the deployment of these solutions and technologies by incentivizing their smart and efficient implementation.

Benefits of Dynamic Line Rating

There are a number of already developed and mature innovative grid technologies that can immediately help the power system to adapt to the new challenges by increasing efficiency and reducing energy costs. In this document, Ampacimon has chosen to detail

the benefits that Dynamic Line Rating, as an example of one of these technologies, can bring to the European power system.

Ampacimon provides an innovative monitoring solution, (commonly known as Dynamic Line Rating DLR) that allows the ampacity (i.e. rating) of overhead lines to be measured in real time. In the absence of effective DLR solutions as the one offered by the Ampacimon technology, the maximum capacity of a transmission or distribution line is calculated on the basis of its static thermal rating, which considers the worse case scenario at any time, and therefore does not provide the real maximum available capacity of the line. DLR equipment takes into account the actual conductor status data, and not the theoretical one. By doing this, the DLR equipment allows to calculate the real maximum value of the capacity of the line at any given time, and can therefore enable the system operator to use this extra available capacity. Furthermore, through statistical algorithms and an integrated used of weather forecasting models, ampacity can forecast hours or even days ahead, therefore providing a much needed flexibility tool for TSOs on the day-ahead and intraday market. Conversely, it can also be used in the "near real time" time-band to increase cross-border pooling of ancillary and balancing services. It is an inexpensive solution that can considerably increase the capacity of existing transmission and distribution assets.

ACER's paper recognizes that timely delivery of the necessary transmission and distribution infrastructure is a key aspect to achieving a fully functioning integrated internal electricity market. Although significant efforts have be made at European level to solve the problem of infrastructure development delays, reality shows that permitting remains one of the main obstacles to the development of new lines and that the financing of new large grid infrastructure remains sometimes challenging. New technologies, such as Ampacimon's DLR solution, by being readily available and because of their easy installation process increase efficiency and facilitate additional network capacity at minimal cost, while at the same time avoiding sensitive permitting issues.

Ampacimon DLR monitoring systems have already been deployed ("pilots") at numerous European TSOs (including among others REE, National Grid, Terna and 50 Hz) and are now used operationally by RTE and Elia.
DLR Day-ahead forecasting coupled with flexibility tools (FACTS[1], PMUs[2], etc.) have been successfully tested by Elia, RTE and REE as part of the European Commission endorsed Twenties project.

Prevailing TSOs indicate return on investments of typically 12-18 months when this technology is deployed, through reduced curtailment costs and postponement of expensive CAPEX investments.

[1] Flexible alternating current transmission systems
[2] Phasor measurement units

As DLR capacity is maximum when overhead lines are cooled down by prevailing winds, Ampacimon DLR use lends itself very well to integrate more wind farm on the existing grid (because of the strong positive correlation between wind farm output and DLR capacity). Today, many TSO/DSOs are contemplating connecting more wind generation capacity simply by DLR-monitoring existing lines, instead of building/upgrading assets, translating into million Euros of efficiency gains in better calculated investment deployment, and much faster= connection of new wind generation.

The use of DLR (including day-ahead and intraday forecasting) on cross-border interconnectors has been studied through prototypes, showing that day-ahead capacities could typically be increased by 15-20 %[3]. This gain is much higher - typically 30-100% - as we get closer to real time). Such increase on cross-border flows would translate into million Euros per year of increased social welfare on each cross-border line. For instance, in Europe, congestion rents value for 2012 was 1187 million Euros (source ENTSOE technical report 2012).

A New Regulatory Framework

In spite of the considerable benefits at very reduced costs that they can offer, be it from a system efficiency, reduction of permitting issues and delays, or from a data transparency point of view, this type of innovative grid technology solution is still not broadly implemented by TSOs and DSOs essentially due to a lack of appropriate regulatory incentives. Most if not all of the European current TSO and DSO remuneration structures are based mainly on asset based remuneration and do not acknowledge by adequate incentives efficient grid management and operation therefore slowing down the fast deployment of innovative technologies. As the quality of services and grid operation efficiency are generally not remunerated, TSOs and DSOs have no incentive to invest in smart operating technologies. To the contrary, these investments are mostly considered as operational expenses ("OPEX") and have often to be balanced against other more or less needed OPEX costs.

For instance, the requirement to increase transmission capacity in a certain area can be met either by building a new line or, in some cases, by implementing existing mature transmission technologies, which can increase the capacity of an existing line at lower cost and with less environmental impacts. Under the current regulatory framework, the latter solution is however not incentivized since most of the time TSOs and DSOs' revenue are essentially based on a regulatory asset base ("RAB") regulatory system. Costly and large asset investments benefit from CAPEX remuneration, while technology investments are generally considered as OPEX and are a pass-through in network tariffs, meaning that the grid operator does not keep any of the revenue from the increased

[3] Twenties project final report, June 2013
(http://www.ewea.org/fileadmin/files/library/publications/reports/Twenties_report_short.pdf)

savings and has often to make a selection among various OPEX costs, included human resources which might be needed for the maintenance of the larger asset investments.

Of course new available grid technologies may have their specific characteristics and may not be suitable in all situations. Nevertheless, cost benefit analyses ("CBA") should be performed on a regular basis by TSOs and DSOs in order to determine those cases where the implementation of such technologies could significantly contribute to cost savings and permitting efforts. This type of analyses should apply to national transmission and distribution lines, but also to existing cross border interconnectors. For instance, the CBA methodology that is currently being developed by ENTSO-E, the European association of TSOs, as part of the selection process of the Projects of Common Interest ("PCIs") under the framework of the Energy Infrastructure Regulation[4], should clearly integrate the various positive benefits that innovative grid technologies provide to the European power system.

Transmission and distribution businesses operate as legal monopolies. Because of the highly regulated nature of power transmission and distribution activities, the implementation of new innovative solutions and technologies can only be achieved if an adequate regulatory framework which incentivizes efficiencies is put in place in the very short term.
In other areas of the power supply chain, such as generation or retail, the European Union promoted competition and this market situation accelerated the "natural" development of such innovative solutions. This is not the case for the network sectors. An efficient incentive based regulation will encourage TSOs and DSOs to use the latest available technologies in their business, resulting in efficiency gains and system reduction costs that will significantly reduce the energy bill for households and industries.

Some European countries are now gradually moving into this direction and have started with the implementation of incentive based regulation. For example, the German regulation and the new RIIO in the UK acknowledge the importance of innovative technologies and efficiency. However, in general, the vast majority of European countries is still lagging behind in this respect.

The European 2020 energy efficiency target is clearly behind schedule. Although existing European legislation already promotes the introduction of measures to incentivize efficient development and operation of European networks, reality shows that the majority of European Union ("EU") Member States have not yet moved in that direction. Article 15 of the Energy Efficiency Directive[5] stated that Member States shall ensure that network operators are incentivized to improve efficiency in infrastructure design and operation. This European Directive must be translated into concrete

[4] Regulation (EU) No 347/2013 of 17 April 2013 on guidelines for trans-European energy infrastructure.

[5] Directive 2012/27/EU of 25 October 2012

implementing measures at national level and therefore provides an interesting and useful legal basis for national regulatory authorities to start working on the implementation of network incentive based regulations that allow to increase the level of efficiency in network planning and operation.

A single innovative grid technology might not solve all the problems associated with the transmission and distribution challenges across Europe, but a combination of these technologies, used where appropriate in the different specific situations, could certainly help to alleviate existing problems and should start to play a more prominent role in the future of transmission and distribution businesses.

Regulatory Priorities

In line with the foregoing, Ampacimon considers that a proper regulatory framework making maximum use of existing innovative grid technologies, which can help increase system capacity at a reduced cost for consumers and reduce permitting hurdles, is missing at European level.

Acer should foster the implementation by the national regulators all over Europe of regulatory actions that provide real incentives for TSOs and DSOs to make cost efficient investments using the latest available technologies. A priority for the coming years should be the establishment of an incentive based regulation across Europe that encourages efficient operation and efficient investments by TSOs and DSOs. This should also be considered for cross-border energy infrastructure.

Concrete Regulatory Proposals

In order to design the correct regulatory framework, regulators will have to come up with innovative approaches that allow the required regulatory improvements to materialize.

ACER should foster the fast implementation of regulatory measures allowing for the fair recovery by TSOs and DSOs of investments in grid technology solutions. These new regulatory measures should provide incentives for network operators to achieve cost reduction gains or reduced investments budgets by implementing other available solutions and technologies, rather than only by building new lines.

For instance, a given network system located in a country that needs to increase its grid capacity by 20%. Today the TSO operating this network would have the choice between building a new line costing around 100 M€ but being fully remunerated on the asset base of the line, or alternatively implement DLR devices in select locations of the existing network, costing only 2-5 M€, but without any remuneration on this OPEX cost. Considering capacity gains are at least similar and quality of supply is maintained if not enhanced, the TSO should be incentivized to opt for the less costly solution. In order to make such a choice, the TSO must be adequately rewarded financially for making such an investment, which can save enormous amounts of money for end-users. If the TSO

would invest in the new line, the current regulatory framework allows it to recover a certain amount of the investment (for instance, if we consider a minimum regulated rate of return of 4%, the TSO would recover at least 4 M€). To the contrary, if the TSO instead would decide today to invest in a DLR solution, the amount of the investment would contribute to increase its OPEX and therefore under the current regulation its revenue would be penalized. Regulation should be changed in order to avoid such costly choice for the consumer who eventually shall have to assume the cost of the investment.

New tariff regulation should base part of the remuneration of TSOs/DSOs on the establishment that, as a consequence of the implementation of innovative grid technologies, the network operator was able to effectively reduce grid costs, by making the appropriate grid investments and/or accelerate availability of increase network capacity, by a certain percentage to be determined compared to the traditional current solutions. Of course, the operator will demonstrate that the efficient investments, including in technology, do not reduce the quality of supply. If the determined level of cost reduction is achieved, part of the resulting savings should be kept by the TSO/DSO as a reward for its operational efficiency.

Another way of incentivizing TSOs/DSOs for investing in technology solutions, would be to place the burden of successful efficient investment in the new technology on the DLR service provider. For instance, instead of the TSO/DSO supporting the investment cost of installing DLR devices, the service provider (e.g. Ampacimon) would make the investment, manage the information provided by the device, and provide the TSO, as other interested parties assuming legislation allows it, of the increased transmission capacity available. If at the end of the day, the result of such solution is increased grid capacity compared to the historical data on capacity and costs, the savings or welfare gains would be calculated and part of those gains would be shared between the TSO and the service provider, at no additional cost for the consumer. Additionally part of the welfare gain could go to the consumer too through tariff reductions. This would result in a win-win situation for consumers, grid operators and grid technical service providers, and would open the door to a market-based transmission capacity industry.

Under current regulation, TSOs/DSOs have no incentives whatsoever should they implement innovative solutions. Instead, they are compensated only for investments in large assets. Therefore, their choice of investments is often and understandably done in favor of the most expensive approach. By acknowledging the value of new technologies such as DLR, new regulation should incentivize the grid operators in making the most efficient investment for the grid security, the faster deployment of RES and for the ultimate benefit of the consumer. ACER could play a significant role in achieving this objective.

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