Utilization of Scenarios in European Electricity Policy: The Ten-Year Network Development Plan

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The full paper is available for download here.

The ambition shown by the European Union (EU) to transform its energy sector and to provide consumers with affordable, sustainable, and secure energy poses a number of challenges to the European electricity system. All three pillars of the EU's energy policy — Competition, Mitigation of climate change, and Security of energy supply — have significant impact upon the future development of European grid infrastructure. In particular, the anticipated (by 2030) 32 per cent share of renewables in final energy consumption and the reduction of greenhouse gas emissions by 80–95 per cent by 2050 will require extensive infrastructure investments at the European level.

Nevertheless, the future of the European electricity system is uncertain. The amount and location of generation, the way in which consumption will develop, the economic framework conditions, and advances in technology, inter alia, are all ambiguous factors with a potentially strong impact on infrastructure needs and investment decisions. In order to address these uncertainties, the European Network of Transmission System Operators for Electricity (ENTSO-E) was given the task of developing a set of scenarios within the two-yearly Ten-Year Network Development Plan (TYNDP). The TYNDP explores different plausible future paths and facilitates the assessment of the *hardware* of the European electricity system – namely transmission and interconnector projects – under various conditions. In this capacity, the TYNDP is viewed by the European Commission (EC) as the central planning tool for the advancement of European grid infrastructure. The TYNDP is an expertise-driven technical plan developed by experts from Transmission System Operators (TSOs). However, it also is part of the wider context of European energy and climate goals and is therefore subject to political influence.

As a result, the scenarios developed in the TYNDPs 2012-2018 are congruent with existing EU policy goals. In other words, the range of scenario assumptions is determined by political expectations about the future development of the European energy sector. This is particularly visible in the scenarios' assumptions on the future share of electricity from renewable sources, reduction of CO_2 emissions, and increased

interconnectivity in Europe. In addition, future electricity transmission and storage projects in the TYNDP are assessed for their contribution to EU policy goals.

The outlined policy congruence is closely connected to the way in which policymakers and stakeholders utilize the TYNDP. In this regard, the TYNDP's relevance for the Projects of Common Interest (PCI) selection process stands out, as it constitutes the first step in the process of identifying key pan-European electricity transmission and storage projects. As a consequence, the European Commission (EC) is particularly attentive and informally engaged in the TYNDP development process. Having in mind the subsequent PCI selection process which it champions, the EC sees the TYNDP as a first step in facilitating the achievement of EU energy policy goals through infrastructure investments. The second consequence of the described policy congruence is an exclusive focus on the *hardware* component of the future European electricity system within the TYNDP and PCI framework. This is because investments in electricity infrastructure are the common denominator for the advancement of each of the three EU policy goals.

As the *hardware* and *software* aspects – market design and regulations – of any given electricity system are closely interlinked and will have impact upon each other, an effective modelling of plausible future European electricity systems is not feasible by focusing solely on infrastructure projects. To elaborate, an evolution of European electricity market design – for instance, the integration of harmonized renewables support schemes or a European capacity mechanism – is not considered in the current TYNDP architecture. Nevertheless, these *software* reforms would have a significant impact on the infrastructure system requirements. As a consequence, the TYNDP fails to provide a holistic picture of the future European electricity system and gives only a limited indication of the related future challenges.

A similar issue exists in relation to the PCI process. The PCIs are key infrastructure projects that are being imposed on a European electricity market that is highly ineffective in providing the correct price signals and encouraging investment. Since the underlying market design is not capable of giving economic incentives for TSOs to invest in these projects, strong EU financial support is provided. Hence, the PCI selection is a politically motivated process championed by the Commission, which risks underestimating economic and technological aspects since the fundamental market failures are not addressed.

In order to address these issues, my working paper presents two measures. First, a fundamental reform of the European electricity market design is needed. An effective market architecture would need to factor in capacity mechanisms and renewables support schemes, in order to provide correct price signals and incentives for infrastructure investments. This would allow for a more effective allocation of key

infrastructure investments. In addition, the TYNDP process would benefit from a functioning electricity market template, as the *software* component of the future electricity system needs to be considered in its scenarios. This, in turn, could be achieved through a more active and earlier involvement of the Agency for the Cooperation of European Regulators (ACER), which would enable the inclusion of different plausible future market designs and European regulatory aspects. This leads to the second measure, namely the stronger regulation of the electricity system at EU level by transforming ACER into a European regulator. Empowered with appropriate competences, the agency would be capable of introducing, among other measures, European capacity mechanisms and harmonized renewables support schemes, thereby contributing to the functioning of the European electricity market. In addition, ACER could act as an arbiter, acting to guard key infrastructure investments, on the basis of system needs and facilitated by economic incentives. Ultimately, a stronger institutional position for ACER would go hand in hand with its improved engagement in the TYNDP process and facilitate the integration of the *software* component into the scenarios. In turn, this would improve the TYNDP's effectiveness as a strategic planning tool for Europe's future electricity system.