# ***Transition towards Electricity scarcity pricing in poland: lessons drawn from international experiences***

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#### **Overview**

Poland is one of the EU member states facing the risk of capacity shortages in the medium- and long-term perspective. In 2016, the Polish Ministry of Energy outlined its plan to introduce a Capacity Remuneration Mechanism (CRM) aimed at avoiding electricity shortages between 2020 and 2035 [1]–[3]. CRMs have been recognized by the European Commission (EC) as one of the possible measures to ensure the security of electricity supplies [4]. So far, the EC has authorized the implementation of CRMs in Belgium (strategic reserve), Germany (strategic reserve), France (demand response), Italy (market-wide capacity mechanism), Greece (demand response), UK (market-wide capacity mechanism), Ireland (market-wide capacity mechanisms) and Poland (market-wide capacity mechanism) [5].

In the case of Poland, the EC approved the introduction of a Capacity Market (CM) for a maximum period of 10 years starting from the date of the first auction, which underlines the idea that the Polish Capacity Market is only a temporary measure. Hence, according to the EC notification decision (State aid No. SA.46100), Poland has committed to undertake reforms and implement additional solutions in order to address the issue of the ‘missing money’ problem in its energy-only market. The main element of this reform is to establish a scarcity pricing mechanism in the intra-day market by the year 2021 [6]. If, however, this happens, then this will lead to the combination of a scarcity pricing mechanism and a capacity market and will pose new challenges to the design and operation of the Polish electricity market.

Experiences in other regions of the world have shown that the incorporation of scarcity pricing (short-term design) in a capacity market (long-term) design can provide higher energy market revenues, strong investment signals and promote demand response [7]. It is important to stress that a capacity market is an example of a quantity-based mechanism where all generators are compensated for their available capacity during specific delivery periods. On the other hand, scarcity pricing is a price-based approach that sets a high price cap up to the Value of Lost Load (VOLL). Several North American Regional Transmission Organizations (RTOs), such as PJM, ISO-NE, NYISO have incorporated scarcity pricing in their capacity market designs.

This article draws upon the international experiences in implementing scarcity pricing combined with capacity markets (e.g., United States, Canada, New Zealand) to provide a set of recommendations aimed to mitigate future regulatory uncertainties in Poland. The analysis will take into account the pricing reforms introduced in the local network codes of the balancing market and will highlight the structural elements of price formation in the Polish electricity market. After analyzing the causes of potential scarcity in Poland, this article will attempt to provide a comparison of the applicability of possible measures to the Polish electricity market such as Demand Side Response (DSR), lifting the price cap, among others.

#### **Methods**

This article describes the international experiences of regional transmission organizations on the incorporation of scarcity pricing in a capacity market. It reviews the existing literature on capacity markets and scarcity pricing for the last 10 years (e.g., scientific journals, regulatory commission, RTO reports, case reports, etc.). Also, the paper presents a framework to compare the critical differences between market designs that incorporate scarcity pricing and capacity markets, including their design elements and market rules. From the analysis of international experiences, we propose a set of recommendations aimed to mitigate future regulatory uncertainties in Poland.

#### **Results**

The results of the first auction of the Polish capacity market (early design and first auction in 2018) and the ongoing changes in the electricity market suggests that the country will require an additional long-term administrative solution for the resource adequacy. The preliminary results from the literature review of international experiences indicate that scarcity pricing combined with a capacity market could provide price signals for future capacity investments and, if the market prices are high enough, possibly induce policy changes to a price-based demand response. However, the introduction of a scarcity pricing in Poland arises several new challenges such as appropriate estimate of VOLL, double-payment, etc. To the best of our knowledge, this paper is the first attempt to provide a perspective on the issue of scarcity pricing in the Polish capacity market.

#### **Conclusions**

Poland is one of the EU member states facing the risk of capacity shortages in the medium- and long-term perspective. Moreover, with the possible incorporation of a scarcity pricing in its capacity market, the Polish government face several challenges including the possible increase of regulatory imperfections and insufficient incentives for capacity adequacy. Hence, it is of crucial importance for policymakers and researchers to apply the practical guides developed by countries where similar market schemes have been implemented.

#### **References**

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