

THE MERIT ORDER EFFECT OF PHOTOVOLTAIC ELECTRICITY GENERATION IN HUNGARY

Ágnes Csermely

The paper investigates the impact of the growing photovoltaic (PV) penetration on domestic wholesale electricity prices and, through this, on the profitability of traditional power technologies. While other renewable energy sources in the region have a significant negative price effect, domestic PV production has no detectable effect on day-ahead baseload prices. However, it changes the price pattern within the day; the decline in the morning hours is offset by price increases in the evening. Peak prices in the evening highlight the scarcity of domestic flexible electricity generation capacities. Regulatory interventions that reduce peak demand in the evening and encourage investment in flexible capacities are needed for PV production to mitigate wholesale prices in the Hungarian market.

INTERNATIONAL PRICE COMPARISON OF HUNGARIAN RENEWABLE TENDERS

Éva Szabina Somossy

As overall costs of renewable energy technologies have fallen considerably in the last decade, there is a need to rethink existing renewable energy operational support systems. According to new EU guidelines, renewable energy producers have to be integrated into the power market with premium support above market prices and competitive tendering procedures. On the one hand, the aim of this study is to give a deeper insight into the functioning and the outcomes of the Hungarian so-called *METÁR* tenders, which have been issued since 2019. On the other hand, the study makes a comparison with similar European tenders and shows the difference between average tender prices and the extent of competition. Moreover, the study aims to identify possible factors which could have an influence on tender prices and shows that beyond competition and economies of scale, other factors such as balancing costs, *LCOE (Levelized Cost of Energy)*, *WACC (Weighted Average Cost of Capital)* or political risks can also have an impact on tender prices.

FORECASTING THE COSTS OF THE HUNGARIAN ENERGY EFFICIENCY OBLIGATION SCHEME

Péter Vedres and Örs István Ringhoffer

The net climate neutrality target set by the European Union cannot be achieved without reducing energy consumption or increasing energy efficiency. In energy efficiency obligation schemes (EEOS) the obligated parties – energy traders, selling to end-users – are obliged to incentivize end-users to achieve energy savings. If the obligated parties fail to meet the energy savings required by their obligation, they have to pay a fine. In EEOS systems the external costs of using polluting energy are internalized; if energy consumption is not reduced, a higher price will have to be paid for energy. The policy obliges the trader, but the competing company follows the rational profit-maximizing behaviour and passes on the costs to end users. The study presents the theoretical background of EEOS systems, their internationally applied versions and the lessons learned. We shall then describe the elements of the Hungarian EEOS, introduced from January 1st 2021, in detail. We are analyzing the costs of the Hungarian EEOS system in four different scenarios, which could lead to an increase in domestic energy prices. Finally, we make policy recommendations to improve the effectiveness of the newly introduced policy instrument.

REGULATORY SANDBOXES IN THE ENERGY SECTOR: INNOVATION AND REGULATION

Zoltán Pék

This paper analyzes the purpose and rationale of regulatory sandboxes and reviews the literature on sandboxes operating in different sectors by collecting the advantages and disadvantages of a regulatory sandbox and assessing its limitations. Based on the best practices the paper defines the cornerstones of a regulatory sandbox and classifies the available “services”. After the general analysis, the paper evaluates the best practices of regulatory sandboxes operating in the energy sector, by presenting the British and German models in more detail, moreover reviewing other countries’ solutions that can offer valuable experience with regard to implementation in Hungary. The final part of the paper ponders the application of a regulatory sandbox in Hungary, and offers a high-level proposal for a “Hungarian model”.

SYSTEMATIC LITERATURE REVIEW ON THE ECONOMIC DIMENSION AND SUSTAINABILITY ASPECTS OF BIODIESEL PRODUCTION

Gábor Gyarmati and Tamás Mizik

Taking into consideration Earth's limited fossil energy resources, there is a growing demand for renewable resources such as biodiesel. This study analyzes the economic and sustainability issues of biodiesel production through a systematic literature

review. In this process, 56 relevant studies were analyzed out of 16 054 identified articles. All the studies agreed that there are several concerns about the first-generation technology, but advanced generations cannot yet be price competitive due to their high production costs. There are, however, promising alternatives such as wastewater-based microalgae; fat, oils, grease where the production cost is less than USD 799/gallon, and municipal solid waste-volatile fatty acids technology where the feedstock is available free of charge. Although the current high oil prices (USD 0.80/l) make biodiesel production economically viable, the proper use of by-products (mainly glycerine) is still essential, and only biorefineries can handle it properly. Sustainability is sometimes understood purely as cost-effectiveness, but the use of complex management is becoming more common. The minimum elements of sustainability are the environmental, social, and economic pillars.

POSSIBILITIES FOR ESTABLISHING AND OPERATING LEARNING ENERGY EFFICIENCY NETWORKS BASED ON AUSTRIAN AND GERMAN EXAMPLES

Boglárka Barsi, Orsolya Farkas, Mihály Lados and Eszter Szemerédi

In line with the objectives of the United Nations and the European Union, the National Energy Strategy 2030 aims to improve energy efficiency through the modernisation of the energy sector, switching to renewable energy sources, as well as through encouraging the modernisation of production processes in businesses. It is often stated in studies on businesses' energy efficiency that the main obstacle to improving efficiency is the lack of information among enterprises. To address this obstacle, energy efficiency clusters have been established throughout Europe and the United States over the last decade to share best practices and improve energy efficiency in participating companies through information exchange and cooperation. In our study, we compare international examples to illustrate the potential of energy efficiency clusters to improve energy efficiency and identify success factors that could help the establishment and effectiveness of a potential energy efficiency network in Hungary.