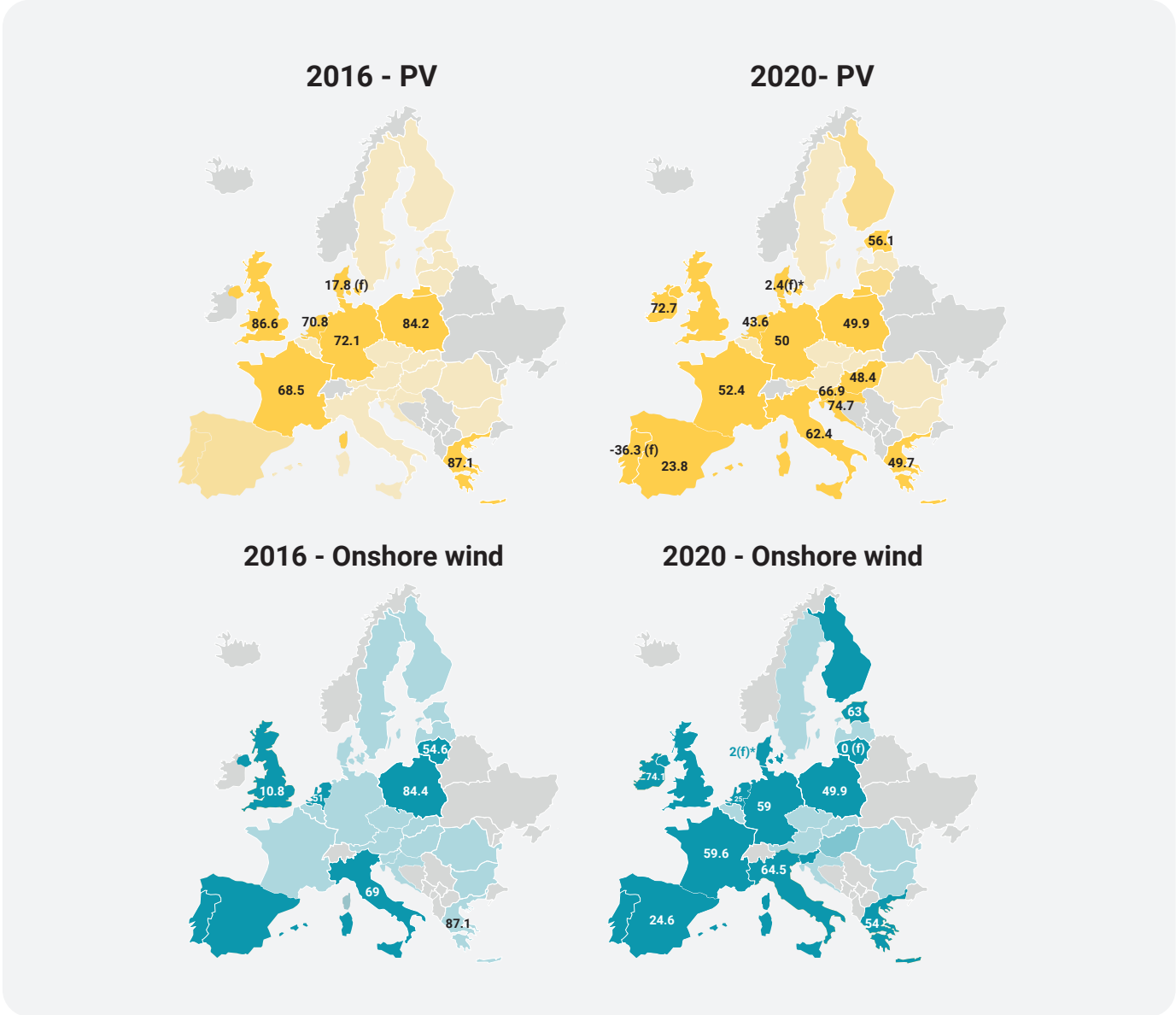
Auctions in a zero-subsidy environment

Executive Summary

Authors:
Mária Bartek-Lesi, Alfa Diallo, László Szabó,
András Mezősi (REKK)
Jasper Geipel, Gustav Resch (TU Wien)

As electricity generation from renewable energy sources (RES) becomes more and more competitive, auction prices may fall below wholesale prices in some countries in Europe, especially in those with more favourable resource potentials (mostly PV and wind). Figure 1 depicts the minimum average prices formed in auctions held in the EU in 2016 and 2020.

Figure 1: Occurrence and the lowest annual average auction price for PV and onshore wind capacities in the EU, 2016 and 2020 (2019 €/MWh)



*Source: AURES II auction database. Remarks: (f) fixed premium auctions, * auction prices corresponding to the previous year. Light yellow and blue colours indicate countries where multi-technology auctions were organised for the corresponding technology, but no capacity has been awarded.*

The case studies prepared under the AURES II project [1] already provide some examples for this trend, raising interesting questions as to how the auction schemes will evolve in the future. Will renewable capacities be installed on a pure market basis? Can we expect the role of private/corporate power purchase agreements (PPA) to increase serving as a risk mitigation tool for investors and users? Will national governments reconsider their remuneration schemes to take account of the costs of grid integration? This summary highlights possible future directions drawing on the case studies of three recent auctions: Portugal, Denmark and Spain.

In Portugal [2], a dynamic, location-specific PV auction was held in July 2019, with two parallel bidding schemes offering bidders the choice between competing 1) for a two-sided sliding premium/Contract-for-Difference (CfD)[1] below a ceiling price that is lower than the current market price, or 2) offering a certain level of payment per MWh produced to the electricity system operator. In this auction, producers basically competed for a limited opportunity to connect to the grid, with the ceiling price (around 45 EUR/MWh) set below expected future wholesale electricity prices. The competition led to the average winning prices of 20 and 21 EUR/MWh in the two bidding schemes. In addition to the vast solar resources, the low bids can be explained by the economies of scale associated with the large minimum size set for participants, the large number of projects in the pipeline in the absence of available support since the mid-2010s, and the shortage of available grid connection points.

The most recent offshore wind auction organized in Denmark [3] at the end of 2021 is another example where auctioneers mainly competed for the opportunity to complete their projects. The tender for the 1 GW Thor offshore wind farm in November 2021 was a single-unit auction, with several participants bidding at the minimum price of DKK 0.0001/kWh (around EUR 0.013/MWh) [6]. Since the remuneration scheme was a CfD, this would mean that participants would be willing to pay almost all of their electricity market revenues for the right to implement their project. It should be added, however, that the Danish tender set a cap of DKK 2.8 billion (around EUR 380 million) on the repayment obligation, which means that once the full (negative premium) payment is reached, the winner can benefit from market prices.

The 2021 Spanish auction resulted in average prices between 24-26 €/MWh for the auctioned CfDs, well below electricity market prices [4]. Auctions held in other EU countries in the same period resulted in prices between 45 to 68 €/MWh for wind and PV technologies. At these prices the Spanish auction was the second lowest cost auction in Europe after Portugal. After the auction was completed, the annual savings for consumers were initially estimated at 173 million Euros at the expected wholesale prices, but these savings are even higher due to the recent surge in spot market prices.

At the same time, Spanish PPAs were settled at 38-40 €/MWh, reflecting the higher risks inherent in these contracts. It remains a valid question which one would bring more benefits to the consumers.

If these systems face the same conditions (connection, access, balancing and timing), the ultimate difference is that the auctions would transfer the savings to the state or to the grid operator. The savings could then be used to improve the grid or to reduce the support burden of previous RES support schemes. In case of PPAs the risk of market price changes and volatility is shared between the contracting parties, while in case of auctions, the risk is socialised to different degrees depending on the type of remuneration scheme (fixed or floating, one-sided or two-sided premium).

The importance of PPAs in the future will largely depend on the regulation of the country concerned. In some Member States they are subject to regulatory restrictions or additional financial burden, e.g., in Portugal, a prior grid capacity access right is required before applying for a production licence to build a power plant. However, the applicant automatically loses this right if an auction is launched for that area and the production licence has not yet been granted. This may also reflect the government's aim to shift the main purpose of auctions from providing operational support to the allocation of scarce network connection capacity.

In this framework, auctions can again result in a significant part of the welfare of producers being passed on to consumers, either in the form of a reduction in the contribution to renewable support or a reduction in grid costs. The trend towards auctions that combine RES generation capacity with storage also points in this direction, and thus reduces balancing costs.

From an economic point of view, the deployment of renewables through both PPAs and zero-subsidy auctions will only take place if the expected market returns to investors exceed their investment and operating costs. As the above examples and recent developments in the electricity spot markets show, this is certainly the case for some European countries at present. Given the demand-side catch-up effects of the Covid epidemic, the gradual phasing out of fossil and nuclear capacity, and the significant ramp-up of direct electrification in the transport sector, extrapolation of the current market situation would undoubtedly support the view that market-based expansion of renewables is the norm.

Yet, it is still uncertain whether this trend will continue and whether zero-subsidy auctions and/or PPAs will make a significant contribution to the increase in renewable energy needed to meet the European RES targets. One critical factor opposing this trend is the negative impact of massive scale variable RES deployment leading to a reduction in market values and thus a reduction in incentives for market-based expansion. This effect could be mitigated by parallel large scale storage developments, but at a higher cost. Thus, the future condition of markets and networks, while inherently uncertain, is central to the issue of whether financial support can be phased out in the forthcoming years. Qualitative scenario developments [5] as well as accompanying modelling activities [6] carried out within AURES II have shown that a high degree of system flexibility and decentralisation can act as enabler, and even be a prerequisite for a zero subsidy RES expansion.

1 The two-sided sliding premium or Contract for Difference (CfD) is a special case of sliding feed-in premiums, in which the winning price is a remuneration ceiling. In periods when the reference electricity price exceeds the bid price, renewable installations are required to pay back the difference to the regulator.

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