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Calls for an Electricity Market Reform in the EU: Don't Shoot the Messenger

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Calls for an Electricity Market Reform in the EU: Don't Shoot the Messenger

Tim Schittekatte and Carlos Batlle

1. Why to reform? Gap between short-run marginal prices and long-run marginal costs

Short-run marginal electricity prices have reached sustained and never expected high levels. There are reasons to think that this is not necessarily going to be an exceptional situation. In a theoretical market context with strictly zero entry barriers, the current crisis would be nothing else than a great opportunity. Strictly zero entry barriers imply full connection access, manageable investment risks and, related to this, the willingness to competitively engage in long-term contracts from both the supply and demand side. Under these conditions, from today to tomorrow, thousands of renewable megawatts would connect. Since there would be a severe risk for new entrants of what now has been called cannibalization, they would necessarily have to rely on some sort of long-term commitments with end users. The massively entering renewables would quickly bring overall price levels down by selling their currently below-market-price energy, considering not only their operating costs but also capital expenditures and a reasonable rate of return.

Instead, policy makers perceive a rather inert chasm between i) current short-run marginal prices, and ii) re-estimated long-run marginal costs (LRMC). The former, being the messenger, provide the much-needed signals that inform an efficient economic dispatch and medium-term planning. But due to the gas scarcity and the severe unavailability of certain technologies that were supposed to be fully reliable, short-run marginal prices have been reaching levels that are substantially higher than expected. The latter, LRMC, are lower than anticipated due to the steep learning curves of some renewable technologies. The high spot prices experienced in the last year and a half are hard to bear for a large segment of the political class. At the same time, these high prices have been leading to significant income for some existing generation plants: the so-called “windfall profits” for mainly non-fossil-fuel generation technologies as well as for gas-fired generators holding medium- to long-term gas supply contracts at pre-crisis conditions.¹ It is in this new reality that the open marginal market framework is severely questioned. Concretely, on the 23rd of January 2023, the European Commission (EC) launched a public consultation on the reform of the EU’s electricity market design (EC, 2023).

The ongoing energy crisis has indeed unveiled key structural illnesses of electricity markets, but—even though (unrightfully) heavily criticized—spot power market design is not one of them.² Rather, the immense shock can be the last straw to convince those who kept on arguing that long-term markets for electricity could ever “naturally” work. Certainly, the issue is not a lack of standardized products or organized markets. Power exchanges have offered this sort of contracts for years already, but liquidity has been negligible. The main reasons behind the power market incompleteness, not at all being a new topic of research³, that lead to the need for some sort of “market reform” are:

¹ For some reason, the latter unexpected large profits have been less under the radar of the political action.

² This does not mean that the current design of spot markets is perfect; it must be gradually improved. Examples are more locational prices, bidding formats, the removal of portfolio-based BRPs, and scarcity pricing (see, respectively, Eicke and Schittekatte (2022), Herrero et al. (2020), Neuhoff et al. (2016), and Papavasiliou (2020)).

³ See e.g., Willems and Morbee (2008), Rodilla and Batlle (2012), Joskow (2013), Cramton et al. (2013), Henriot and Glachant (2014), Simshauser et al. (2015), Newbery (2016), Batlle et al. (2021), and Simshauser (2021).

- i) lack of demand-side participation in long-term markets, partly due to transaction costs but mainly due the trust on governmental intervention in times of stress (confirmed soon after the crisis started).
- ii) vertical integration between generation and retail, combined with an asymmetric distribution of diversified generation portfolios.

2. What to reform? Two different problems that cannot be tackled with a single tool

These factors have led to two major problems that need to be finally tackled:

- a) the inability of (particularly new) investors in generation to efficiently manage long-term uncertainties and risks linked to technology learning curves, entry barriers for access, and rapidly changing policy agendas.
- b) lack of adequate hedging of end users against periods of sustained high prices.

The two main objectives of the reform addressing these issues, i.e., facilitating the entry of new renewable energy sources (RES) at the lowest cost for end users and limiting the impact of high prices on end users' bills, are in practice less related than many might think. In the short to medium term, we cannot expect that new RES alone can solve the affordability concern. For at least a decade, the total volume of new RES electricity production is going to have a relatively limited impact on final bills. But moreover, as penetration increases, the hours of RES production are expected to increasingly decorrelate from high priced spot hours.⁴ There is no one solution that fits all. And as well known in the regulatory field, trying to address two problems of different nature with one instrument nearly unavoidably leads to inefficiencies.

Hence, we deem it important to face both objectives separately. On one side, focus on designing centralized auctions for long-term contracts for new RES entrants. On the other side, the development of mechanisms to provide end users in true need with hedges against future sustained high prices events. The natural counterparties of end users for such hedge are not new entrants, but existing generation companies owning large and diversified portfolios.

Investment risk management

This problem was being addressed in most jurisdictions already before the crisis started. On the one hand, capacity remuneration mechanisms (CRMs) were developed or are under development. The aim of the CRMs is guaranteeing the investment in sufficient resources capable of backing up the much-needed deployment of RES. There is still a lot of work to do to improve the design of these mechanisms. Examples of main open questions are levelling the playing field for different resource types to participate (RES, demand response, storage), the design of the reliability commitment, and the definition of the so-called firm capacity. Although this discussion is of utmost importance, particularly in the current context in which the whole regulatory compound is under review, we deem it out of the scope of this document.⁵

On the other hand, for new RES generation, centralized tenders for long-term contracts are widespread in Europe (AURES II, 2023), as well as worldwide (IRENA, 2015). Beyond keeping on gradually improving the design of these mechanisms and relevant contract formats, we do not see any need for a fundamental change or "reform" at this point in time. We agree with Neuhoff et al. (2022a;2022b) in that, even if RES costs decrease near or below grid parity, there are still very sound arguments to keep auctions for government-backed long-term contracts in place. What has gained momentum, now that

⁴For a quantitative example, see Box 2 in Schittekatte and Battle (2023).

⁵For a recent overview see the book by Hancher et al. (2022).



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these government-backed contracts are in the money, is the intention of some Member States to discriminate in favor of certain categories of end users (industrials or residential customers) by turning them, rather than the entire end user base, into the solely counterparties of the RES contracts. This is not a new practice in European regulation. For instance, large consumers in Germany were exempted from bearing the burden of RES subsidies. This idea is also further developed by academics as Grubb et al. (2022) proposing changes to the existing contract settlement methodology in the UK.

At this stage, we deem the emphasis should be on finding the most adequate contract format that balances investment support and short-term economic dispatch and medium- to long-term planning efficiency. This discussion was also already active before the crisis started.⁶ Currently this debate made it again to the spotlights; several interesting papers has been produced, see e.g., Fabra (2022) and Schlecht et al. (2022). We advocate for a contract format that resembles a standard contract-for-differences (CfD) but keeps dispatch incentives intact without significantly increasing investment risk. More precisely, we recommend a capacity-based support mechanism complemented with ex-post compensations or penalties resulting from the plant's performance compared to a reference plant. Such mechanism was implemented in Spain via the Royal Decree 413/2014 (Huntington et al., 2017).⁷

Lack of adequate hedging of end users against periods of sustained high prices

The lack of safeguards, revealed by the crisis, has led to a severe economy-wide affordability problem for the EU. And, obviously, high and unhedged prices have also led to generators' profits largely above expectations, both for policy makers and the market parties themselves. The regulatory objective in such context is the provision of long-term hedges for end users in need to guarantee affordability, while keeping short-term incentives for efficient consumption intact.

New RES entrants via centralized auctions for government-backed CfDs can slowly soften the medium- to long-term volatility of certain category of end users' prices. But this solution can only be very partial. Unfortunately, in the absence of abundant storage, not just short-term but also seasonal storage, the market price that consumers pay will increasingly diverge from the price that new renewables perceive in the market. This is due to the mismatching of the end users' consumption and the RES production profiles. This is especially an acute problem for solar. In this context, owning a large and, maybe even more important, fully diversified generation portfolio provides incumbents with an unbeatable competitive advantage in both the generation and retail market. Why would these generators be willing to offer long-term hedges to competing retailers, instead of allowing their own retail branch to benefit from this natural hedge?

We propose two mechanisms to address this issue: a market maker obligation (MMO) on incumbent vertically integrated firms, and the purchase (via centralized auctions, if sufficient competition can be guaranteed) of affordability options (AOs, Batlle et al., 2022a;2022b). The former was put in place in Great Britain some time ago, but unfortunately, some implementation flaws and the pressure of the incumbent companies led the initiative to a quick end (Ofgem, 2019). The latter, AOs, are a non-distortive instrument that is adapted to the desired objective: to limit future unaffordable expenses and excessive revenues.

In what follows we briefly discuss how the key two matters should be addressed by regulation. A more in-depth discussion can be found in Schittekatte and Batlle (2023).

⁶See e.g., Cochran et al. (2012), Purkus et al. (2015), Huntington et al. (2017), Barquín et al. (2017) and Newbery (2017).

⁷This mechanism was later abandoned in Spain due to difficult-to-explain reasons. The only criticism heard at the time was that it was very complex as 1200 reference plants had to be defined. But it was done, without leading to meaningful complications. Other argued that, unfortunately, the Government at the time preferred an energy-based mechanism, since these mechanisms, although more inefficient, allow calculating and evidencing in a more straightforward way the actual savings linked to every RES MWh produced coming from the governmental auctions (€/MWh than can be compared with average marginal prices, something that cannot be done in the case of capacity-based auctions). Several authors have later discussed and supported that 2014 Spanish mechanism or at least very similar approaches, such as Newbery (2023) and Schlecht et al. (2022).



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3. How to reform? Different regulatory solutions engaging different stakeholders

The two objectives engage different groups of stakeholders, i.e., newly connecting generating units and existing generators, and require different regulatory solutions. We discuss these two separately, but before doing so, we start by highlighting a key factor common to both mechanisms: the end users on behalf of whom the regulator purchases long-term contracts.

3.1 Beneficiaries of the market intervention

Policy makers must decide on which categories of end users' behalf they are going to procure long-term contracts. Once determined, these end users will not only benefit from the settlement of the contracts, but they also have to bear the burden, in case the contracts end up being out of the money in the future.

i) In principle, for the case of the contracts to facilitate penetration of RES, all end users could be the counterparties. All end users benefit from the entry of this new generation, as competition increases. But it could also be equally assumed that large-sized consumers can perfectly manage themselves to bilaterally enter into this sort of hedges at wish using corporate PPAs. For the case of the purchase of financial instruments to deal with potential affordability issues, only those consumers who the regulator considers in true need and are not expected to enter into contracts by themselves should be covered by the contracts. In principle these are the vulnerable consumers, but to avoid future political discomfort, it could be extended to small and middle-size consumers.

ii) The auctions, in both cases (for new RES and existing generators), should be open on a voluntary basis for any type of end user that is not directly considered by the regulator.

iii) It is instrumental to design a transparent methodology to allocate the future settlement of the contracts into the system charge of the represented end users. Further, it is important to guarantee that no future arbitrage would be possible for those end users on behalf of whom these contracts were signed. For example, if an end user decides to sign a contract with a retailer in the market, the link to the settlement of the long-term contracts committed on her behalf should remain via a component in the system charge.

3.2 Newly connecting generators

As stated, the objective should be to speed up RES penetration at the lowest system cost. This implies removing unnecessary administrative and technical barriers for connection, optimizing the risk management, and maximizing competition.

Wherever still possible, giving away the right to connect to the transmission network on a first-come-first-served basis does not seem recommendable anymore. This is nothing new, e.g., when considering auctions for offshore wind plants. But it can be generalized, at least at transmission-level. The ability to auction the right to connect, in the current context, does not only allow leveraging the benefits of competition for access to the system, but also makes a more efficient coordination of the generation and transmission capacity expansion possible, which is a major challenge nowadays.

Wherever access to the transmission network has not already and massively been granted in the past, access to the network can be linked to a long-term contract for (part of) the produced energy. In this regulatory context, or even in case the political decision (if desired and legally possible) would be to enforce new entrants to participate in these auctions, the key question is what the contract design should be.



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Fabra (2022) claims that there is little value of exposing RES to the spot price at the margin and highlights the trade-off with increases in financing costs by doing so. She sees no problem with “as-produced” hourly settled CfDs, which give zero incentives for RES to plan and operate the plant in an efficient and “system friendly” way. But instead, she emphasizes the need to organize different technology-specific auctions for different sites in case the resource endowments are sufficiently different between the sites.

Newbery (2023), Schlecht et al. (2022) and Neuhoff et al. (2022b) all argue for improved incentives of RES plants under CfDs. The general and recurring idea is to decouple the actual production of a RES power plant from the financial flows from the CfD, while limiting the increased risk for the RES investor. This can be achieved without a minimally significant increase of risk premia, either by directly setting a fixed amount in the contract, or better, by linking the amount involved in the contract to a reference power plant (sometimes also called a “yardstick”). National implementations in this regard go back to earlier implementations of the capacity-based auction mechanism in Spain, described in Huntington et al. (2017) or Newbery (2023). The original Spanish mechanism, developed in the Royal Decree 413/2014⁸, could be further improved as discussed by Barquín et al. (2017) if deemed necessary to maximize the system value of the RES capacity purchased. Neuhoff et al. (2022b) refer to the German reference yield model but as far as we understand the reference yield model does not impact operational incentives. What it does is introducing a correction factor of the remuneration of different windfarms across the country that lead to a higher valuation of the electricity produced by wind turbines at lower wind sites.⁹

Importantly, the reference plant approach implies that the reference price is resource specific and, at least in the case of intermittent RES, typically lower than the arithmetic average wholesale price. Having a resource specific reference price is key to let independent renewable project promoters compete with incumbents owning diversified (thermal and hydro) portfolios. The characteristics of the reference plant corresponding to bidders in the auction are known in advance, so they can easily estimate how their relative performance will be. Such type of settlement, while being optimal from a dispatch perspective, implies that it is unavoidable to have technology-specific auctions for new entrants and thus a larger role of the regulator/government in generation expansion planning.¹⁰

The second-best alternative would be a CfD with some sort of sliding premium, indexed to the technology price that is averaged over a longer settlement period. Such contracts are implemented in the UK, i.e., CfDs with a seasonally determined “Baseload reference price”, and other jurisdictions (in line with the contracts supported by Fabra, 2022). In these contracts, the actual production of the power plant and financial flows from the CfD are not decoupled and, hence, distortions are introduced. This type of contract design might potentially lead to less investment risk (compared to the reference power plant approach), but we consider the benefits of keeping efficient incentives intact would largely compensate for it.

3.3 Existing generators

Beyond the consideration of financial hardship of consumers, this scenario of high electricity prices unveils a higher-order threat: the potential loss of trust (and patience) of the political class and the mass media in the whole market compound. A policy shock of this nature, potentially leading to future loss of efficiency in the decarbonization process, can no longer be seen as a risk. It is a fact. Therefore, we argue that proactively protecting certain subsets of consumers against affordability risks could be justified. This does not necessarily imply subsidizing these end users, what we mean is the possibility to act on their behalf.

⁸ Translated into English in www.global-regulation.com, available here: <https://cutt.ly/t9Belgr>

⁹ As pointed out by our colleague Pablo Rodilla, the need for this correction factor is because it is not an auction but an administratively determined price mechanism.

¹⁰ At this stage, this should be considered a minor issue, since the National energy and climate plans in the EU already determined the RES volumes per technology that are expected to be installed in the years to come.



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One possibility is to prolong the “temporary” revenue cap for a very long period. We do not recommend this as it creates uncertainty and because it is extremely complicated to introduce such mechanism without distorting the dispatch. Another very tempting option for governments is to quickly enter into some sort of long-term contracting with specific generators (e.g., nuclear plants) or incumbents at negotiated or administratively determined price levels. A bill decrease would be achieved in the short run, but end users would pay the higher bill in the middle to long term when prices normalize again. In the energy sector, there is a long record of these legacy contracts that later turned into a significant burden for end users. For obvious reasons this might not be perceived as an issue when the generator is at least partially publicly owned. For example, signing a long-term contract with EDF at whatever price is not such an issue for French citizens as, in the end, consumers in France might end up paying a high price but French taxpayers benefit in a similar proportion. However, when this is not the case, any contract not resulting from a truly competitive process has proven to be a bad practice. A too costly contract is not the only potentially regretful burden for the future. For example, contracting all the current output of the nuclear fleet (24/7) can imply that in a few years’ time these units have to be considered “must run” even if being uneconomical. This could imply that lots of solar production would have to be spilled. Another example is imposed contracts for reservoir hydro-generators. These generators are flexible in operation, but their future reservoir levels, and thus the total amount of electricity they can produce over a certain timespan, are uncertain. Due to these characteristics, imposed contracts for hydro-generators are extremely complicated to design without introducing costly and potentially even security of supply endangering distortions.

The best alternative would be to engage the end users in need in some financial long-term hedge. When the crisis calms down, we propose the organization of centralized regulatory-driven auctions for AOs, which can be complementary to an MMO.¹⁰ Taking into account that diversified electricity generation portfolios are often highly concentrated, it is important to maximize competitive pressure in these auctions. To do so, besides considering a reserve (maximum) price, we recommend minimizing the volume of AOs to those in true need. The decision about the volume of AOs shall be based on which end users are deemed to (or want to) be protected from sustained high prices and the total volume of production already under existing CfDs. Such assessment is not very different than e.g., resource adequacy forecasts that regulators perform. Protected end users might be only “standard” vulnerable consumers, i.e., consumers facing energy poverty in normal price scenarios, or a larger share of residential and/or even commercial consumers that would suffer significantly from periods of sustained high prices. End users that are not by default covered by affordability options (e.g., industrial consumers) shall have the right to opt-in and participate in the auction, with the same rights and future obligations.

Why AOs and not CfDs for existing generation? The argument that CfDs lower revenue uncertainty and thus financing costs is irrelevant in the case of existing generators as the investment has already been made. The purpose of this instrument is to protect against high bills, not to fix bills to predefined levels. Hence, options are better suited than obligations. Rather than leading to more stable bills under CfDs, AOs only protect against very high bills and bolster as much as possible the beneficial impact of short-term price signals, particularly under “normal” circumstances. From another perspective, AOs can be seen as nothing else than merely an elegant way of implementing a revenue cap. However, this sort of revenue cap does not distort and does not necessarily have to come for free or at an administratively set remuneration. Rather, ideally the option premium is determined in an auction. Generators selling AOs can contract or market their production as they want but need to consider their AO contract when doing so.

In case revenues from AOs, revenues from spot, or revenues from available contracts in forward markets (in organized exchanges or over-the-counter) do not suffice to keep particular generators online that are deemed vital for system security, a CRM should be in place. Such CRM shall build in specific performance guarantees to incentivize production to be available when it is of the highest value for the system, on top of the already-in-place incentive to produce at high spot prices that occur those hours. Such additional incentive is not inherent in ordinary CfD contracts.

¹⁰ Furthermore, we do not delve much into it in here, but we deem that if a MMO is not considered to be a feasible option, the role of retailers will unavoidably need to be revisited.



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