



No 365 | JUNE 2022

SEE ENERGY BRIEF

Monthly Analysis

Can Europe's Electricity System Deliver More Competitive Prices?



Introduction

In an about-turn, the President of the European Commission, Ursula von der Leyen, acknowledged that the EU's electricity market “does not work anymore” and needs to be adapted to the “new realities of dominant renewables”. Responding to questions from the European Parliament on June 8, 2022, von der Leyen admitted that current measures to address surging energy prices had fallen short of addressing structural issues in the EU electricity market. [\(1\)](#)

“Indeed electricity prices – energy prices – are skyrocketing. And we are doing a lot on it,” von der Leyen said, citing the “toolbox” put forward by the Commission in autumn last year [\(2\)](#), which allows EU countries to tax the windfall profits made by energy firms and subsidise energy bills for the most vulnerable households and small businesses. “But we also acknowledge that this is a short-term relief that will not change the structure of the market,” she added, saying power markets were “designed in a way like it was necessary twenty years ago” when the share of renewables was low.

“Today, the market is completely different. It is the renewables that are the most cost-effective and the cheapest ones,” she explained. Gas prices have surged to record highs since the autumn on the back of tight supplies from Russia and the economic recovery from the COVID-19 crisis – a situation now compounded by the Ukraine war. This has pushed up the price of electricity, which is driven by “marginal” production capacity available from gas power plants that can be fired up at short notice to meet peak demand.

France and Spain have led calls to reform the current marginal pricing system, with Madrid asking for “structural solutions” at the European level to decouple gas and electricity markets. They were backed by the leaders of Italy, Portugal and Greece, who urged the EU executive to address the “contagion effect” of high gas prices on the electricity market. [\(3\)](#)

U-Turn in Brussels

Until now, the European Commission resisted those calls, pointing to an ongoing review of wholesale electricity markets by EU energy regulators. In a much-awaited report [\(4\)](#), the EU Agency for the Cooperation of Energy Regulators (ACER) concluded that markets were working as intended and that “the current electricity market design is not to blame for the current crisis”. But Ursula von der Leyen appeared to contradict those conclusions.

“This market system does not work anymore. We have to reform it. We have to adapt it to the new realities of dominant renewables,” the Commission President told Members of the European Parliament in Strasbourg. “This is the task that the Commission has taken over now. This is not trivial, this is a huge reform.

It will take time, it has to be well thought through. But we must step forward to adapt our electricity market to the modern conditions". In addition, "The Commission will launch an impact assessment process and engage widely with stakeholders and national regulatory authorities," said Tim McPhie, the EU Commission spokesperson for climate action and energy.

Germany's Position Shifting

Apart from Southern nations, other EU countries are not convinced about the need to reform electricity market rules. In October, a coalition of nine EU member states – including Denmark and Germany – urged the European Commission to refrain from far-reaching measures to contain rising power prices. But Germany's position has since started to shift. (5)

"The existing electricity market design with its free pricing should be maintained in principle," the German ministry for economy and climate recently said. "Nevertheless, it must be ensured at the same time that the electricity system is future-proof and fits in with the ambitious climate goals of the coming years and decades," it added.

The new German government, which entered office in December, launched a "climate-neutral electricity system" stakeholder platform to look into this. The platform, which gathers experts from the realm of science, business and civil society, is currently drawing up "concrete proposals for the market design," the ministry said.

At the heart of discussions is "how secured capacity can or should be stimulated to compensate for the fluctuating feed-in of renewables" and how to couple gas and electricity markets with new consumption sectors like transport, buildings and industry, the ministry said. Emerging technologies like heat pumps, solar PV storage, e-mobility and electrolyzers must all be able to react to market and grid signals to ensure system stability in the future, the ministry explained.

Europe's Efforts to Shield Households From Soaring Energy Prices

Since October 2021, several European countries have announced packages for households struggling to meet soaring electricity and gas bills and generally to help shield consumers from rising energy costs (6). The following is a summary of the measures already taken by various countries:

Britain

Britain placed a price cap on the most widely used household energy contracts, but this rose by 54% in April and is expected to rise a further 40% in October, energy regulator Ofgem has warned. On May 26, 2022, the government announced a 15 billion pound package to help struggling households, partly funded by a 25% windfall tax on oil and gas producers' profits. All households are expected to see a 400 pound discount on energy bills, while the lowest income families will get an additional 650 pound payment as well. British finance minister Rishi Sunak said the latest announcements take the total cost of living support offered by the government to 37 billion pounds.

Bulgaria

Bulgaria earlier in May approved a \$1.1 billion package aimed at shielding companies and low-income consumers from the surge in energy and food prices caused by the Ukraine conflict. The government will also offer a discount of 0.25 leva per litre of petrol, diesel and liquefied petroleum gas and methane from July until the end of the year and scrap excise duties on natural gas, electricity and methane.

Denmark

Danish lawmakers have agreed a so-called "heat check", which means subsidies worth \$288 million will be paid to some 419,000 of the hardest-hit households.

France

France has committed to capping an increase on regulated electricity costs at 4%. To help do this, the government has ordered utility EDF, which is 80% state owned, to sell cheaper nuclear power to rivals. New measures announced since the Ukraine crisis, such as helping companies with the cost of higher gas and power bills, bring the total cost of the government package to \$27 billion, Finance Minister Le Maire said.

Germany

German workers and families will receive extra cash, cheaper petrol and cut-price public transport tickets to help them shoulder soaring power and heating costs. Workers who pay income tax will receive a one-off energy price allowance of €300 as a supplement to their salaries. In addition, families will receive a one-time bonus of €100 per child, which doubles for low-income families. This came on top of a roughly €13 billion package of measures including scrapping a surcharge levied on electricity bills to support green power announced in February.

Greece

Greece has spent more than €5.0 billion in power and gas bill subsidies since September 2021 and an additional aid of €722 million was recently announced for July, which includes a fuel rebate for low-income households. In June, the Greek government put into operation rebates on the additional charges made in customers' power bills – known as Power Pass. The rebates, which can range from €18 to €600, will be provided for bills issued between December 1, 2021 and May 31, 2022. The rebates amount to 60% of the additional charges levied on those bills, after deducting any subsidies already paid by the state and the power providers themselves.

Italy

Italy's Prime Minister Mario Draghi has budgeted almost €30 billion since January to help offset electricity, gas and petrol prices. Around €11 billion will come from a windfall tax on the increased profits of energy companies that have benefited from surging energy prices.

Netherlands

The Netherlands has cut energy taxes for its 8 million households.

Norway

Norway has been subsidising household electricity bills since December and currently covers 80% of the portion of power bills above a certain rate. In March, the minority government proposed to extend the scheme by one year to March 2023.

Poland

Poland has announced tax cuts on energy, petrol and basic food items, as well as cash handouts for households. It has also extended regulated gas prices for households and institutions like schools and hospitals until 2027.

Spain

Spain cut several taxes to reduce consumer bills, originally planning to maintain the lower rates until the end of last year, but has since decided to keep them lower until the end of June 2022. Spain announced €16 billion in direct aid and soft loans to help companies and households weather sky-high energy prices. Spain also legislated to claw back profits deemed to have been inflated by high gas prices, but later introduced exemptions which lessened the impact on many utilities' contracts. Spain and Portugal have also introduced

temporary caps on reference prices of natural gas and coal used by power plants, used to set electricity prices, to keep power prices down.

Sweden

Sweden will compensate households worst hit by the surge in electricity prices, with the government setting aside \$605 million for the measures.

Why Does Europe Need to Change its Electricity Market?

As a first step, several power analysts propose a market split. The dynamics of fossil-fuel-based generation are wholly different from those of renewables, where the price for renewables is usually fixed at auction and connected to a contract for difference (CfD). Fossil fuelled generation would sit, as now, in a market based on marginal pricing. Renewables would sit in a separate “market” where prices would be fixed using the price defined at the time of auction. A composite price for all renewables (each with its own fixed price) could easily be arrived at. The only variable being the amount of renewables generated. Price setting becomes less a regulatory issue and more a data communications and computing project.

The current price difference between renewables and fossil fuels is stark and weighs heavily on electricity prices across Europe. “A quick solution to this would be to keep the current marginal pricing system for fossil fuels and create a separate market for renewables where prices would be defined at the time of auction. Wholesale price oscillations can be by two orders of magnitude in 8 hours, a clear indication of a malfunctioning market”, writes Mike Parr, Director of PWR, a UK-based company providing market research and technical support in the field of renewables and energy efficiency. (7)

If such a split is adopted, the final wholesale price would be set by a mix of marginal and composite prices and respective volumes. The legislative effort to do this would be trivial, and would reduce wholesale electricity prices by 50% or more, based on specific estimates made by power analysts. Implementation of such a system could be in months, if the political will was there. The need for fast action on electricity market reform is driven by member state’s renewable ambitions. Taking the example of Germany, the installed base of renewables is now circa 120 GW. Commendably, the plan is to expand this to 360 GW by 2030, 8 years hence. Very low or negative wholesale electricity prices due to renewables are now a regular feature of the German market, as well as others. A target for 360 GW of renewables within 8 years will have an even greater impact on wholesale markets. Spain and other countries have similar renewable ambitions in similar time frames.

Under current CfDs, renewable owners are compensated, even if electricity prices are extremely low, which means that under current markets structures, consumers will pay twice for the same electron; once for the energy, a second time to cover CfD costs. Furthermore, changing CfDs will not solve the problem, as they are a key element in providing the future revenue certainty that renewable developers need to build the renewables that the EU needs.

Splitting the electricity market into two parts eliminates this negative result (pay twice for the same electricity), dilutes the impact of high-cost fossil-based electricity and delivers the benefits of low cost zero-carbon electricity to citizens. It does not need a 4th Energy Package to do this, it needs, as already mentioned, data communications and computers. Furthermore, splitting the market, has little to no impact on cross-border trading, given that a final wholesale price is still arrived at, thus providing the price signal needed for cross border trading.

Looking at the bigger picture, large amounts of renewables in any member state will need large-scale storage. Demand response and batteries have a role to play in smoothing the output of renewables in times frames of less than 24h hours. However, the only system that will scale to the Terawatt hours of storage needed before 2030 is a re-purposed gas system/gas storage system. Furthermore, if we are going to decarbonise the total electrical power system, this means that we will need to use green-hydrogen in generation and we will need large amounts of storage, both for the power sector and industry (which has its own hydrogen trajectory). How will this be managed is an open issue, but one that needs to be resolved within 8 years or less.

The changes that the European energy system will undergo in the next 10 years requires a flexible regulatory response. A series of short steps are needed, rather than the quantum leaps that characterised the various energy packages. Time is against the old approaches and learning by doing, albeit “small doings” might be the best way forward.

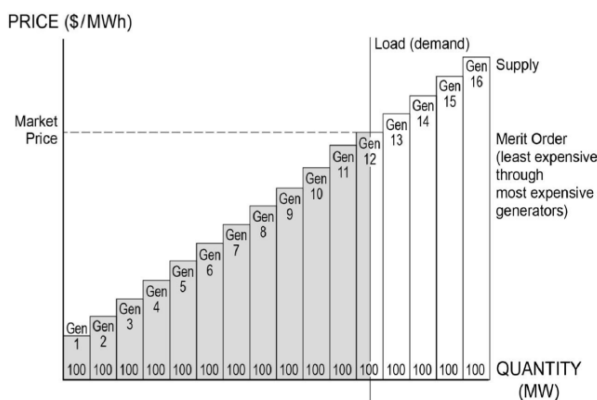
On June 13, the UK government announced that it would propose legislation later in 2022 to reform its electricity market by splitting the market into two parts, one with gas generation and the other with renewables (8). This is being done to reduce electricity prices. This begs the question if, as seems likely, this is an act of political desperation by an embattled Tory government, why can't the EU act in a similar time frame?

Moreover, David Robinson, Senior Research Fellow at the Oxford Institute of Energy Studies, says that there are three main views on how to reform markets to ensure efficient investment incentives when there is deep penetration of renewables. (9)

1. One is incremental reform of the energy-only market, for instance providing better price signals and ensuring prices can spike to help recover investment costs. However, this will not resolve the under-investment risk because investors will be concerned about prices tending to be low and about governments capping prices whenever prices rise.
2. A second approach is to let governments decide what to build and use central auctions to decide who builds it. It has the advantage of guaranteeing that plant will be built and that government guarantees will help lower the cost of project finance. However, there is a significant potential cost if governments make mistakes; which, he says, history suggests is very likely. There is difficulty of passing the costs of these mistakes to consumers. That was possible in the past because consumers had no alternative but now they have choices about whether to buy from the central system or to self-supply.
3. The third approach is Liberalization 2.0 which relies on competitive markets under new economic and technological conditions. The liberalization approach is central to existing EU legislation.

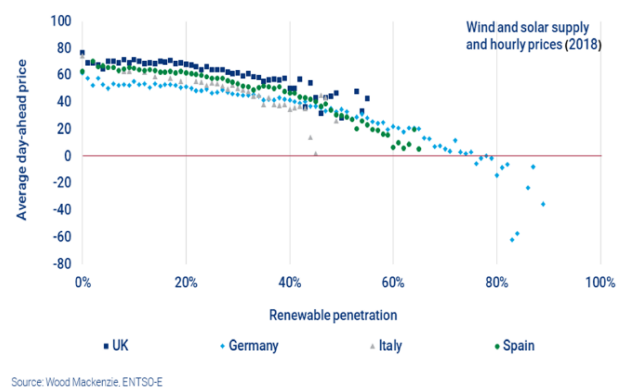
Figure: The fundamental problem: energy-only markets are not sustainable

Energy only market price = marginal bid to meet demand



Source: Hunt 2002, p 134

Price cannibalisation increases with renewables penetration



Sources: Hunt (2002), Wood Mackenzie, ENTSOe

Furthermore, David Robinson argues that Liberalization 2.0 is the right model because of the growing potential for decentralized and decarbonized energy solutions (e.g. renewables and storage) that enable consumers to decide to what extent they wish to rely on and pay for energy from the central system. Electricity market reform is a process and need not be disruptive. It is important to define where the system is heading and to ensure that market reforms lead in the right direction. Robinson stresses that Liberalization 2.0 defines the right direction. There are many variations of this approach and they should be the focus of serious analysis and debate. Meanwhile, it is important not to introduce short-term reforms that aim to

address the crisis of high spot prices but that undermine the structural challenge of prices that will be too low to support the energy transition.

The Case of Greece

A new model for the country's electricity market came into effect on July 1, 2022 with the introduction, as a first step, of price caps in the wholesale market, setting remuneration upper limits for electricity producers of all categories. Upper limits of €112/MWh for hydropower facilities, €85/MWh for renewables, €253.98/MWh for natural gas-fueled power stations and €206.71/MWh for lignite-fired power stations have been set. These limits will remain valid for the first one-month period, starting on July 1, 2022. Any discrepancy between these upper limits and the average price of the day-ahead market will be paid into the Energy Transition Fund for subsidy support.

The government hopes its plan will subdue electricity prices to levels of between 20% and 30% higher than last summer. Calculations for a finalized electricity price per KWh, following the deduction of subsidies, will be based on state-controlled power utility PPC's new price list. The government, guided by the utility's new price list, will set a single price for all suppliers. The level at which PPC will set the bar remains to be seen. The company's market dominance will set a standard for the entire market.

Though not yet confirmed, it is believed that PPC will announce, by the end of July, a nominal price of between €460/MWh and €490/MWh, meaning 46-49 cents per KWh for retail customers. PPC and all other players are abandoning a 30% discount offered to customers. PPC's subsidies for hydropower and lignite units will now end up with the State, which is assuming the discount-policy role.

A price-cap mechanism for electricity producer payments is set to be launched shortly and is expected to generate approximately €580 million for the Energy Transition Fund in July, a sum to be utilized for subsidizing consumer electricity bills. Of this sum, €150 million will be derived from natural gas and lignite-fired power plants as well as power utility PPC's hydropower facilities, while the other €380 million will stem from the RES sector.

Most of July's funds to be provided by the RES sector will not be newly generated money as RES units had already refunded money to the RES special account and its surpluses were then injected into the Energy Transition Fund. Under the new system, these amounts will be directly injected into the Energy Transition Fund.

Discussion

Electricity and gas prices unexpected surges first observed in the second half of 2021 and carried on in 2022 many decision-makers and public opinion in general to question the functioning of present-day electricity and gas markets in Europe. The fact that in 2020, in the EU, mainly as a consequence of Covid-19, electricity and gas prices had reached their lowest values ever, compounded the perception that excessive price volatility and excessive prices must be a symptom of EU energy markets dysfunction.

By the turn of the year, many observers expected that the 2021 price surge would vanish soon, similarly to the last energy price crisis, back in 2008, relieving energy consumers and policymakers alike. Unfortunately, the Russian invasion of Ukraine, in February 2022, put an end to such expectations. Daily natural gas prices (TTF) that had reached €50/MWh on August 31, 2021, were trading above €100/MWh on October 5, touched €180/MWh on December 21 and, following a period of relative stability in the ensuing weeks, around €80/MWh, reached €227/MWh on March 7, 2022 and above €170/MWh in July. Futures for the current year trade above €100/MWh, for 2023 above €80/MWh and for 2024 above €60/MWh. Many factors contribute to the current energy price crisis: some causes are transient and exogenous to EU energy markets, while other factors are intrinsic.

Currently, there is a debate whether the European electricity markets should change or not. On the one side, energy regulators and incumbents see no need for change and on the other side, the European Commission and a number of governments announced structural market reforms. For instance, Germany will develop a new electricity market design as part of the expansion of renewables, while Italy wishes to revise, in structural terms, how the price of electricity is formed, which is a systemic problem and must be resolved with structural solutions, decoupling the price of gas from the price of electricity.

A recent report [\(10\)](#), written with the support and contribution of several energy experts, proposes a reform of EU electricity markets based on two principles: (a) ensuring the existence of a revamped, open to innovation, cross-border electricity market based on common rules and (b) fostering the emergence of local markets where energy system integration takes place through suitable local platforms. The report offers a conceptual framework for the design of innovative multi-sector and multi-level energy architectures and brings new light on several related issues, from fairness to financing and infrastructure planning. The aim is to better understand how electricity market reform can accelerate decarbonization and strategic energy autonomy.

In the new European electricity market architecture, a supplier will be able to purchase electricity generated from renewables at a lower cost and for instance electricity produced from gas at a higher cost. Therefore, the supplier will presumably be able to determine a final price lower than the current cost.

Most energy analysts point out that the current electricity market design is unsustainable in the face of deep penetration of intermittent renewables. Design assumes that spot wholesale electricity prices will incentivize investment decisions in generation. That may be feasible in a fossil-based system when spot prices reflect high marginal costs. But renewables have near-zero short run marginal costs. As the share of renewables rises, their low marginal cost will depress spot prices to levels that make investment unattractive. Failure to attract investment in the power sector will undermine the energy transition.

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IENE SEE ENERGY BRIEF MONTHLY ANALYSIS - Issue No. 365 – ISSN:179-9163

Contributed by IENE’s Research Team

Monthly Analysis is published by the INSTITUTE OF ENERGY FOR SOUTH-EAST EUROPE (IENE)

3, Alex. Soutsou st. 106 71 Athens, Greece, T: +30-210 3628457, 3640278, F: +30 210 3646144, marketing@iene.gr, www.iene.eu

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