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European Electricity Market Reform and Decoupling of Electricity and Natural Gas Prices

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Prepared by IENE's Research Team

IENE Briefing Notes

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Introduction

The dramatic rise in electricity prices across the EU over the past 18 months has highlighted the weaknesses of the existing system, which is heavily affected by the prices of a strategic fuel, natural gas, which, following Russia's invasion of Ukraine, moved at particularly high levels.

The existing operational model of the European and domestic wholesale electricity market, known as the "Target Model", has as its ultimate goal the creation of a single European electricity market, without restrictions on transactions, by strengthening competition and shaping better prices for consumers.

In addition, the policies implemented contributed to the large penetration of natural gas into electricity generation, "decommissioning" coal units and especially lignite-fired power plants. It should be noted that almost three decades ago when the electricity market was designed, the penetration of RES and natural gas was insignificant. Therefore, it is necessary to adapt to the new conditions, where there is now a substantial and increasing RES penetration in the electricity mix of most countries.

Also, the energy crisis has highlighted the need to decouple electricity prices from rising natural gas prices and to adopt a new market model that distinguishes energy resources that are used when they are available, and not on-demand as well as the on-demand energy resources, based on their respective contribution to the electricity mix. This could ensure, according to estimates, about 50% of lower electricity prices, given that on-demand energy resources (such as natural gas, nuclear and coal) have a 60% share in the electricity mix, a share that will continue to decline as the energy transition is accelerating.

As early as last September, the European Commission referred to the need of an in-depth reform in the European electricity market, which is expected to affect the way the Target Model operates. The purpose of this Strategy Report is to inform about the current situation, the proposals of the European Commission (EU electricity market reform) and the upcoming changes at the European and national level.

1. Need to Redesign the European Electricity Market Model

Since the summer of 2021, the unprecedented hike in natural gas prices in Europe has contributed to a dramatic increase of electricity prices. During the winter of 2021-2022, natural gas prices were on average five times higher than in the previous years. As a result,

wholesale electricity prices more than quadrupled during the same period without any clear sign of de-escalation in the near future. **(1)**

Electricity generation from natural gas in EU member states represents less than 20% of the total, while in some member states it exceeds 40%. However, natural gas is the main fuel that shapes the marginal price. Since gas-fired power plants need most of the time to balance the system and provide ancillary services, the most expensive electricity generation depends on natural gas.

Thus, in more than 2/3 of cases, the clearing price of the wholesale electricity market reflects the cost of natural gas, despite the very low prices of the other energy sources in the mix (e.g. RES). For example, for a natural gas price of €100/MWh and an carbon price of €80/tCO2, the wholesale price in the electricity market is around €220/MWh.

Figure 1: Evolution of the Natural Gas Price (€/MWh) in the Dutch TTF in the Last 2 Years

Source: ICE

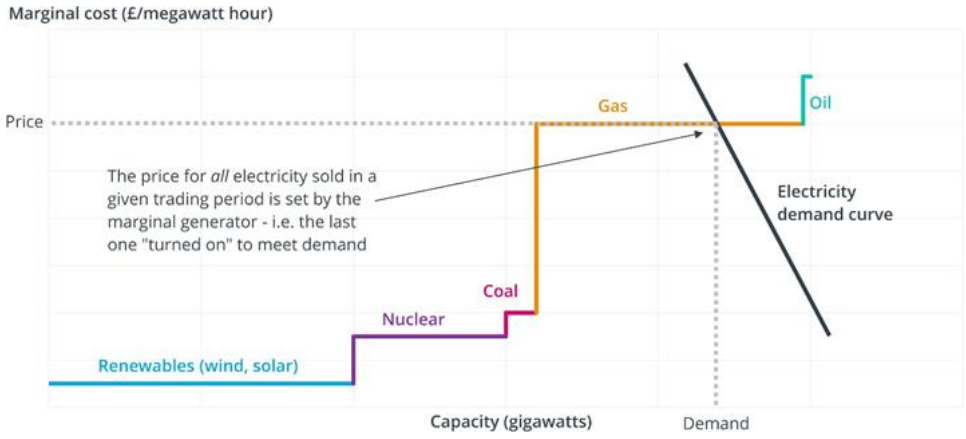
However, the actual total average cost of electricity is significantly lower. Nuclear, RES and hydro, which generate almost 2/3 of the total electricity production in the EU Member States (without CO2 emission charges), have a total weighted cost, including capital costs, of less than €100/MWh. Any income above this total cost constitutes extra profit, which would not have been paid in an efficiently operating market. In other words, the total average cost of electricity production is systematically about 50%-60% less than the marginal cost. However, it is the latter that drives market clearing prices and determines the retail prices that households and businesses pay. **(2)**

The energy resources of low or zero marginal cost already cover most of the electricity generation today, while their contribution to the electricity mix is expected to increase

significantly in the coming years. These resources cannot produce energy on demand, i.e. produce energy when they are available and cannot be able to respond to market signals.

Output form such energy sources is also based on public or private power purchase agreements, meaning Contracts for Differences (CfDs[1]) that reward electricity technology at their total weighted cost over a sufficient period in the future. In this way, these resources receive the lowest possible cost of capital, which is important since their financial structure is almost exclusively capital expenditure. Therefore, the additional profits they may have from wholesale markets, as happened in 2022, due to the uncertain and volatile formation of natural gas prices, will hardly facilitate additional investment in such technologies.

Figure 2: Illustration of the "Merit Order" of Power Producers in the European Wholesale Electricity Market



Source: UK Institute for Government

Therefore, remunerating all resources (including those with zero marginal costs) based on natural gas prices entails an unnecessary additional cost for consumers and an inefficient market. The current electricity market design fails to incorporate the developments in the renewable energy sector, because, contrary to the long-lasting cheaper gas-based power generation, from now on electricity generated from renewable energy sources (RES) will be much cheaper.

It is evident that a market designed to apply marginal cost pricing does not fit the purpose when the system is dominated by low carbon and zero marginal cost resources. This leads to

[1] A Contract for Difference (CfD) is a derivative product tied to an agreement between a buyer and seller to exchange the price difference of a stock, bond, commodity, or other asset between the dates that the contract is open and closed. If the price is higher at the close date, the buyer has profits. CfDs incentivize investment in renewable energy by providing investors of high-upfront-cost, long-life projects with immediate protection from volatile wholesale prices and protect consumers from paying increased costs when electricity prices are high.

a systematic market failure: marginal costs persistently stay above total average costs and there is no way to make them converge, which is exactly what a well-functioning market must do.

As the President of the European Commission, Ursula von der Leyen, stated on September 14, 2022, "the current electricity market design – based on merit order – is not doing justice to consumers anymore. They should reap the benefits of low-cost renewables" **(3).** Therefore, there is a need to reform the electricity market in Europe. The specific reform was included in the work program of the European Commission for 2023, while a summary of the redesigned European electricity market was presented to the energy ministers of the EU member countries by Energy Commissioner Ms. Kadri Simson on December 19, 2022.

In fact and as shown in Figure 3, the proposed reform of Europe's electricity market was recently submitted to public consultation, which ended on February 13, 2023, and now the European Commission is preparing the legislative proposal to be submitted on March 14, based on the following timetable.

Figure 3: Indicative Timeline of the European Electricity Market Reform

Source: Eurelectric

Eurelectric's Proposals

The liberalization of the electricity market brought benefits of around €34 billion per year for consumers, as the European Federation of the Electricity Industry (Eurelectric) points out in a statement **(4)**. At the same time, Eurelectric estimates that based on the new conditions taking shape in Europe, the fundamentals of market planning continue to generate the appropriate investment signals, although the demands for new investments combined with the shortage of natural gas lead to the need for further development.

In this context, Eurelectric's position is that the new electricity market needs three main pillars:

1. An enhanced customer contracting framework, enabling sufficient possibilities for long term hedging and contracts, to bring the benefit of RES and low-carbon generation more directly to consumers, while fostering customer engagement.
2. A market-compatible investment framework for renewables and low-carbon technologies (including firm and flexible resources such as demand-side response and storage), which are capital-intensive technologies, that still preserves competition.
3. A framework that maintains adequacy and security of supply and that meets evolving power system requirements, in particular because of decentralisation and increasing flexibility and firmness needs.

According to Eurelectric, a progressive market design should focus on the needs of consumers and support the huge investments needed for the energy transition. The new energy system must be cost-effective, reliable and able to manage price volatility.

An essential element of the proposal is the extension of long-term contracts and reinsurance tools to consumers, suppliers, traders and producers. For producers, it can provide pure long-term investment signals, while for consumers, a mix of long-term and short-term price signals can limit the effects of price spikes.

Long-term instruments can take different forms from country to country, which is why it is considered that there should be a high degree of harmonization so that wholesale markets protect the common market and allow competition. However, in retail markets a degree of flexibility is necessary given the different conditions in each country.

Based on the above, Eurelectric proposes the following:

- Introduction of a framework with liquidity for a variety of products with duration of up to 10-15 years.
- Removing barriers to long-term contracts.
- Defining common methodologies and responsibilities for extending the system design framework and supporting RES and flexibility.

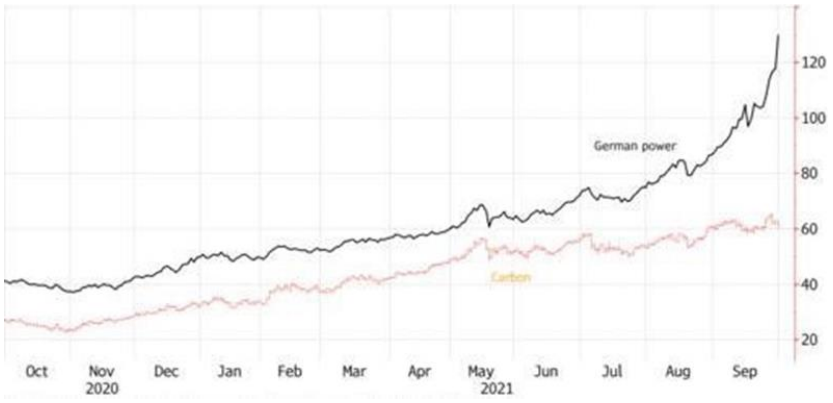
2. Adoption of the Revised Planning Principles of the Electricity Market

The fundamental economic principles governing the revision of market design principles, according to an EU proposal, are twofold:

1. Remuneration based on CfDs with prices reflecting total levelized cost is the suitable financial instrument for enabling nuclear, renewables and hydro investment and for bringing up to consumers the low-cost benefits.
2. Remuneration reflecting scarcity and marginal costs is suitable for resources deployed on-demand to balance the system, provide ancillary services and complement the eventual non-availability of renewables.

The resources that require CfD-based remuneration have the following features: (1) Operate when available, depending on technical and resource characteristics, and not on-demand, (2) Capital expenditure dominates their cost structure, (3) There are no changes in unit cost when increasing or decreasing their operation. Resources with such features are renewables, nuclear, high-efficiency co-generation, and mandatory hydro. In addition, the same category includes electricity storage bundled with intermittent renewables.

Figure 4: Electricity and Coal Prices Now Diverge in Certain Markets



Source: Bloomberg

The resources that can be included in a spot market in which marginal costs drive market-clearing prices are the fossil fuel plants, hydropower plants operating at peak load times, demand response and electricity storage (unbundled from RES). Such resources are dispatchable and operate on-demand. Also, they incur marginal cost variations when modifying their operation level. Therefore, cost-minimization requires defining a merit order based on increasing marginal costs. Also, the eventual scarcity of resources on-demand (for example in case of shortages) justifies market-clearing prices to be above marginal costs.

According to the Council of the European Union, the new design of the electricity market should be based on the following principles:

- The resources that operate when available and not on demand submit volume-based offers in the day-ahead market (DAM), not economic bids. The volume-based offers reflect the best possible forecasts of their operation on the next day. With this offer they assume responsibility for the realtime operation, are subject to deviation costs and can participate in the intra-day and balancing markets.
- For their volume-based offers in the DAM, these resources get remuneration depending on contracts for differences concluded with private third parties or the public sector, regardless of the DAM.
- In case these resources declare no coverage by bilateral or public contracts for differences, they may participate in a non-mandatory pool (green power pool) operated by a public body (or a private body adequately empowered) acting as a single buyer and seller to load-serving entities and consumers.
- The volume-based offers of these resources may correspond to bundled resources that may include storage and possibly an aggregation of RES plants.
- The system operator scrutinizes the volume-based offers from the perspective of forecasting accuracy and system operation possibilities and may accept or curtail the volumes declared. The eventual curtailment follows pro-rata rules.
- In the next step, the DAM considers that the accepted volumes of the above resources that operate when available and not on demand are must-take volumes. Thus, the market operator subtracts the accepted volumes from the load declarations. The remaining load (net load) corresponds to the demand that the on-demand resources must meet. Then, the resources submit combined economic and volume offers according to the same rules currently applied and the market is cleared with the same way it is cleared today.
- The load-serving entities and consumers pay at market-clearing prices for the energy purchased in the net-load DAM. They may also buy from the green power pool, if this operates. They also have payment obligations in the context of CfDs which are independently concluded.
- The above points describe a two-stage DAM: The first stage performs the acceptance and aggregation of the volume-based offers by the resources that operate when available and not on demand. The second stage performs market-clearing of the net load (after subtracting the accepted volumes from the load) using the bids of the on-demand resources.
- The intra-day and balancing markets remain unchanged.

- Although the participants submit bids at the bidding zones, the two-stage DAM performs directly at the level of the coupled markets. The market-clearing of the net load (i.e. second stage) takes into account the interconnection constraints. Thus, the algorithm may lead to different market-clearing prices of the second stage DAM in case of congestion.
- Evidently, the suppliers and consumers pay the weighted sum of the remuneration of resources that operate when available and not on demand and the market-clearing price of meeting the net load using on-demand resources. The former reflects the total levelized costs of the resources that operate when available and not on demand. The latter corresponds to marginal cost pricing and may reflect natural gas prices.
- Thus, if the first stage of the DAM corresponds, as today, roughly to two-thirds of electricity consumption and for example has an average cost of €80/MWh and the second stage of the DAM clears at €250/MWh reflecting gas generation costs, the consumer would pay (2/3 x 80) + (1/3 x 250) = €137/MWh, which is roughly 45% below the cost of electricity when applying the current market design.

3. The Greek Electricity Market Model

A new model for Greece's electricity market, intended to contain soaring prices brought about by the energy crisis, 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. A ministerial decision set upper limits per technology used.

In particular and according to the "Intermediate Mechanism", as it is known, the price for hydropower plants was set at €112/MWh, for RES at €85/MWh, for natural gas-fired power plants at €253.98/MWh and for lignite plants at €206.71/MWh. These limits remained valid for the first one-month period, starting on July 1, 2022. Funds arising from the discrepancy between the upper limits of those prices and the average price of the day-ahead market were transferred to the Energy Transition Fund (ETF) in order to cover subsidy support to consumers. **(5)**

Calculations for a finalized electricity price per KWh, following the deduction of subsidies, are based on state-controlled power utility's (PPC) new price list. The government, guided by the utility's revised price list, thus sets a single price for all suppliers. The level at which PPC will set the bar remains to be seen. It is assumed that the company's market dominance will set a standard for the entire market.

In retrospect, many analysts believe that Greece's model, activated last July, is more effective than the model applied by the Iberian Peninsula countries and therefore more suitable for EU wide use. The Greek mechanism sets compensation ceilings per power generation technology, while the electricity exchange market is left intact to operate normally on the basis of the System Marginal Price.

A summary of the main characteristics of the Greek model is shown in Table 1. The revenues recovered are used to subsidize the electricity bills of households and businesses, through the ETF, which is managed by the Renewable Energy Sources Operator & Guarantees of Origin (DAPEEP).

Table 1: Main Characteristics of the Greek Model

Reintroduction of cost-plus price regulation for all electricity generators. Regulated prices differ per technology and revenues used to provide financial support to energy consumers	
Policy objective	To re-regulate all electricity generators and pay them on a cost-plus basis instead of on the basis of the market price for electricity
Impact on consumer prices	The measure would not reduce the day-ahead wholesale market price. The regulation would intervene ex-post. Generated revenues can be used to provide direct relief to energy consumers most suffering from the high prices (e.g., through vouchers to households, and financial support to businesses).
Impact on gas consumption	No increase is expected in gas consumption.
Impact on integrity of the Single Market and impact on security of electricity security	The measure would have a strong impact on the functioning of the internal market as it would remove any price-based competition between generators. As all generators would be regulated based on their costs, also inefficient cost structures would be paid for.
Suitability for swift implementation	Very challenging. To revert to the cost-plus regulation national regulators needs very detailed information about the different plants. This information is in many cases not available and cannot be obtained in short delay.
Budgetary cost	No direct budgetary costs.
Risk of subsidised electricity exports outside the EU	The measure is unlikely to trigger increased exports to third countries.
Impact on decarbonisation	The measure is likely to significantly impact investor certainty, which may mean support may be needed for all future electricity generation. This regulatory risk will be reflected in higher costs of capital and lower renewables deployment in future. The risk is particularly high when all revenues above the costs are clawed-back as it is the case here. The measure is likely to disincentivize the conclusion of long-term PPAs and national hedging strategies.
Conclusion	**This option should not be recommended given that it would entirely remove price-based competition between different generation technologies, remunerate generators for inefficient operations and disincentivize investments in new more cost-effective technologies.**

Source: Euractiv

The New Energy Subsidy Mechanism

Also, since last October, the Greek government has implemented a new energy subsidy mechanism. The new scheme of subsidies is graduated, with higher support for low consumptions and an additional discount for those who achieve energy savings of at least 15% compared to the corresponding period last year and applies to the first residence, holiday homes, student residences and businesses.

The new model is based on the principle that the lower the consumption, the higher the subsidy. In fact, there are three staggered subsidies. The first scale concerns the first 300 kWh and enjoys the largest subsidy, while the second one includes a range of intermediate consumption and the third the remaining kilowatt hours of higher consumption.

Three staggered subsidies corresponding to the aforementioned three categories of consumption are announced every month. The highest subsidy is given to the lowest tier (first), the second is slightly lower to the second tier and an even smaller subsidy is given to the third tier of consumption with the most kilowatt hours.

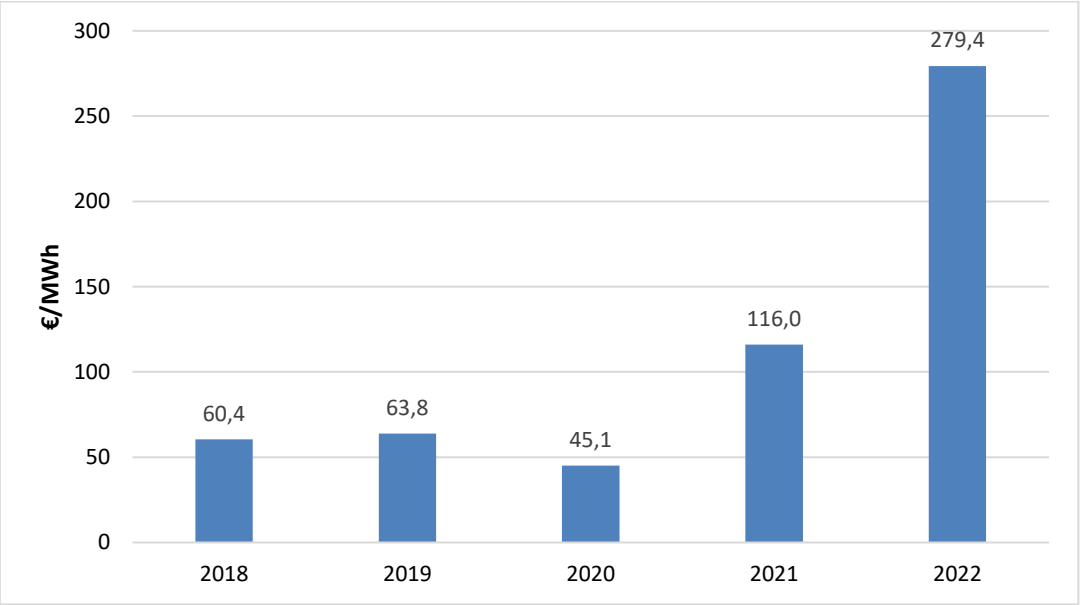
Those consumers who belong to the third tier, i.e. of the highest electricity consumption, and who consume 15% fewer kilowatt-hours compared to last year, will have an additional subsidy. The subsidy is such that it reaches the height of the second scale. Accordingly, consumers who belong to the second scale of consumption and save energy by 15% receive support so that they, in turn, reach the amount of the subsidy of the first scale. Those who acquire a residence for the first time or move to a new one are subsidized based on the amount of consumption they will make the first time.

As far as natural gas is concerned, i.e. in 700,000 households, the subsidies are horizontal regardless of consumption. The rate of absorption of the increase is either 70% or 50%, while the subsidy is a combination of state aid and a discount from DEPA.

4. Critique on Greece's "Enhanced" Electricity Model

The high uncertainty the electricity suppliers face in their attempt to forecast the wholesale prices which will charge each month (until the 20th of the previous month when they have to announce their charges) is highlighted every month. Also, the new pricing system in the retail electricity market has disrupted consumer confidence. Consumers end up being trapped in this mechanism, and as a result even the exercise of their basic right, i.e. the choice to change energy provider, is undermined.

Figure 5: Average Market Clearance Price (€/MWh) in Greece, 2018-2022



Sources: HEnEx, IENE

Initially, households and small businesses paid substantially more for the electricity they consumed and this cannot be attributed to the energy crisis alone. Most importantly, however, they lacked the ability to choose a competitively priced provider. Now, with supply prices changing every month, there is no stability, no guarantee that the attractive tariffs that a supplier may have offered will be maintained. Their lifetime is only for one month. Unknown what will happen next. Thus, consumers do not attempt to move from one provider to another, even though they may not be happy with the current one because it has higher prices and poor service.

Also, the mechanism deprives supply companies of degrees of freedom. They are unable to implement commercial policies to attract customers, the mechanism hinders their growth and hurts their credibility. The consumer is bombarded by prices that generally move at the same levels, he/she is unable to evaluate them as they are accompanied by discounts, which in order to be given require his/her consistency, and in the end his/her only guide is what the supplier will give him/her next month as well. **(6)**

In other words, the new electricity pricing mechanism nullifies the rules of the free market, constrains consumers, deprives the market of the possibility of improvement through healthy competition, and contributes to the maintenance of a peculiar situation, that is, the

shares of all companies remain almost unchanged, while the dominant player keeps the lion's share.

Why is electricity more expensive in Greece?

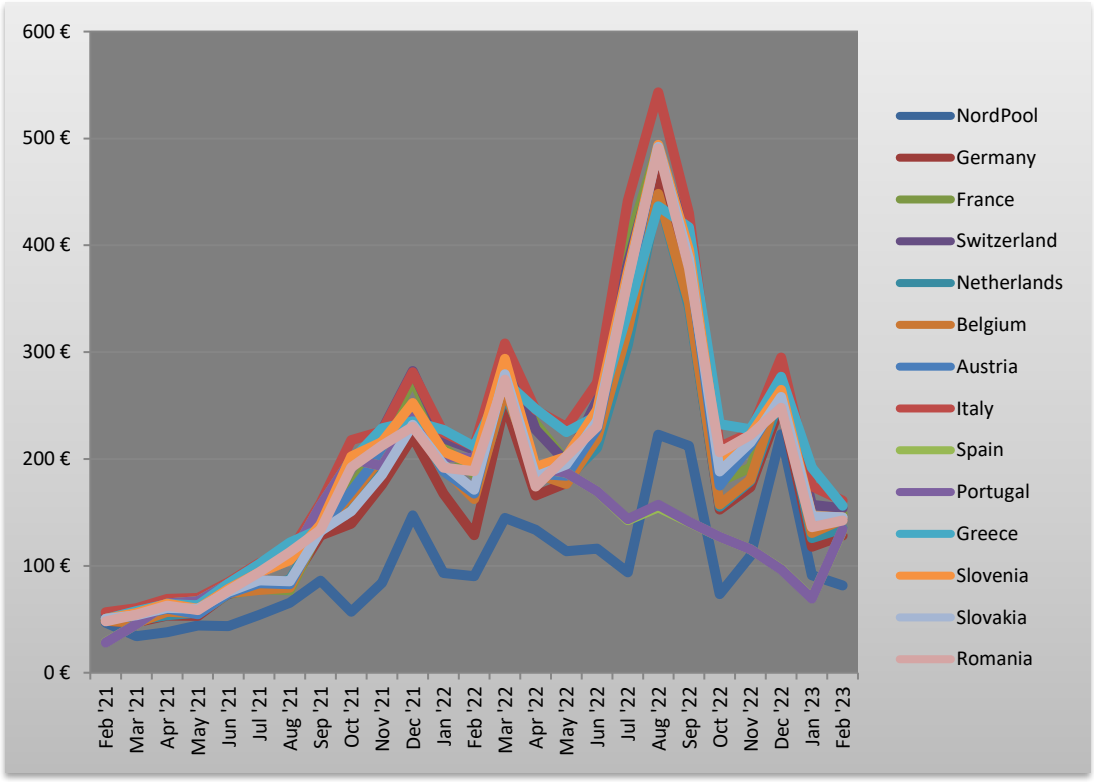
Another criticism leveled at the government is that the more expensive electricity that consumers now pay is a consequence of the distorted model imposed by the new intermediary mechanism and not solely the result of the energy crisis. Of course, to a large extent, this is also the result of the uncertainty entailed by the prevailing conditions of international markets, but, mainly, it is due to the fact that suppliers are forced to forecast their costs for a month ahead. This presupposes the incorporation of a high risk factor.

When things are bound to change from one moment to the next, companies are forced to factor into their prices a high risk premium so as not to derail. The greater the liquidity of markets and international prices, the higher the margin risk, with consumers ultimately bearing it. This has been reflected in the September 2022 and October 2022 electricity prices and the high tariffs applied to households and businesses.

The adjustment clause was cheaper

From August 1, 2022, the new pricing system in the electricity market came into force, which changed the context of how consumers pay. The until then "adjustment clause" was removed and its cost was incorporated into the base price now offered by electricity suppliers. The first conclusions from the implementation of this new model are that it led to the desired final political result, i.e. lower prices for the average consumer, but with additional costs for the state as well as significant risk for suppliers. **(7)**

Figure 6: Wholesale Electricity Prices (€/MWh) in the Day-Ahead Markets in Europe, February 2021-February 2023



Source: Websites of European Energy Exchanges

While prices in the wholesale markets, for rather opportunistic reasons, follow a continuous path of de-escalation since the new pricing formula was decided and implemented, the monthly prices announced by the providers are systematically above the total cost (including profit margin and operating expenses). This is because providers, who initially expressed reservations that the new model would lead to increases, are now incorporating the most extreme scenarios for price developments in the wholesale market in order to avoid the high risk involved in forecasting amid intense volatility of the market.

For consumers, the very large increases brought about by the removal of the "adjustment clause" were not immediately visible, since the new pricing model was combined with generous subsidies to keep tariffs at tolerable levels. The burden was borne by the Energy Transition Fund and to a lesser extent the state budget, which had to pay increased subsidies of more than €1 billion for the two months of September-October alone to finally cover the providers' risk, which would not have existed with the adjustment clause. The Ministry of the Environment and Energy is attempting to rectify the situation through

legislation for the taxation of the excess income in the supply market, indirectly making accountable the suppliers who were obliged by legislation to invoice on a monthly basis.

Table 2: Wholesale Electricity Market Prices in Greece

	September 2022	October 2022
Weighted average (€/MWh)	447.1	261.2
Forecast (€/MWh)	788	595
Low Voltage Tariff	516.7	301.9
Low Voltage	49%	46%
Total (MWh)	4,267,000	4,037,000
Low Voltage (MWh)	2,090,830	1,857,020

Source: Ministry of the Environment and Energy

Based on data provided by the Hellenic Energy Exchange, the Independent Power Transmission Operator (IPTO) and the Hellenic Electricity Distribution Network Operator (HEDNO) on the evolution of prices in the wholesale market, the additional charges for shaping the wholesale electricity cost and consumption in the two months of September-October 2022, the total cost of electricity for low voltage was increased by €1.11 billion, more than it would have been if it had been priced with the adjustment clause.

Last September, PPC's tariff, which is also a reference point for the determination of subsidies each month, was €788/MWh based on a forecast, while the total wholesale cost was finally €516.7/MWh, generating a surplus of €567,153,606. Accordingly, in October 2022, the megawatt hour price was at €595 based on the forecast, while it would be at €301.9 with the adjustment clause. In September 2022, electricity subsidies reached €1.9 billion and in October €1.1 billion.

5. The Industry View

However, several players of the domestic electricity market have expressed their objections to the aforementioned, arguing that the Target Model, as applied in Greece, worked well and sent the right signals with regard to the scarcity of the raw material. In particular, they state that if another model were to operate hypothetically, there would still be high prices, while in times of energy crisis, extraordinary measures can be taken, such as the taxation of the inframarginal, stressing, however, that the existing model is not insufficient.

At the same time, many argue that if RES had been agreed to be paid with CfD, then there is no difference from the current feed-in premium model, as everyone will be paid at the price

set by the most expensive unit and then return to DAPEEP (in ETF) the difference between the price they received in the RAE tender and the clearing price in the next day's market.

As industry sources point out, only if a cost-oriented CfD has been agreed bilaterally or alternatively a cost-oriented bilateral PPA contract for, let's say, 10 or 15 years, with the quantity simply being announced to IPTO for execution (i.e. outside the daily market for the quantity agreed upon by the two involved), the participants' degrees of freedom will increase and the difference will be visible.

In both cases (or at least in one, that of CfD), there must be an announcement of the agreed price so that the algorithm that calculates the next day's market clearing price can take it into account. After all, this price must be announced by REMIT[2]. For all this, however, legislative regulation is required and this change should also be checked in the context of solving the EUPHEMIA[3] common price coupling algorithm, because the markets are now coupled.

Of course, it is understood that the RES producer will bilaterally "lock in" a fixed amount, either base load or profile, agreed with his/her offtakers and the remaining amounts (either up or down) he/she will have to inject/seek to the day market of the day-ahead market, as well as intraday and balancing. This means on the one hand that it should not be mandatory for everyone to participate in the day-ahead market and on the other hand that RES producers should be encouraged and trained not to be "cash sellers" anymore, but also to take the risk of making forecasts of their production and actively participate within the various market sectors to correct their supply, in case their forecasts were not verified (either to find the additional quantity to give to their customer, or to sell any additional quantity they produce). The same will apply to buyers, whether they are industries, communities, suppliers, etc.

Of course, in order for all interested parties on both sides to have confidence in the bilateral contracts, which will normally be long-term, the market should be properly regulated and

[2] In December 2011, the EU issued Regulation (EU) No. 1227/2011 on integrity and transparency in the wholesale energy market (REMIT). The REMIT Regulation applies to the trading of wholesale energy products and sets the framework for detecting and preventing abusive practices affecting wholesale energy markets.

[3] A common price coupling algorithm, called EUPHEMIA (acronym of Pan-European Hybrid Electricity Market Integration Algorithm), is used to calculate energy allocation, net positions and electricity prices across Europe, maximising the overall welfare and increasing transparency of price computation and power flows resulting in net positions.

there should exist control and safeguards by the Authorities, in cases of e.g. bankruptcy, failure to deliver or pay, change of property, etc.

Also, several market players in the domestic industry stress that the prolonged energy crisis is particularly affecting the country's energy-intensive industries, to the extent that not only threaten their competitiveness but also their sustainability, due to the ongoing dead-end energy policy. "It doesn't make sense that the subsidies given to energy-intensive industries are the same as those given to all consumers of Medium and High Voltage, regardless of whether they are a supermarket or a steel mill", they point out.

And this despite the fact that the existing European state aid framework (Temporary Crisis Framework) enables each EU member state to quickly and easily get an approval from the European Commission for a separate aid, in addition to the one given horizontally to all, for a specific sector, such as eligible energy-intensive industries. An option that was chosen by Greece's government which it offered an additional subsidy of €85 million for 2022 to bakers and farmers. "It is obvious that a corresponding amount of subsidy, earmarked for industries, would be enough to mitigate the negative effects of the increase in electricity prices. Something that the authorities deny, citing the financial inability to find €85 million per year to support the industry", according to Mr. Antonis Kontoleon, Chairman of the Hellenic Union of Industrial Consumers of Energy (UNICEN). **(8)**

Furthermore, industry players point out that subsidies are announced on a monthly basis without setting a maximum target price for burdening industries, based on which the amount of subsidy is adjusted. Thus, energy-intensive industries do not even have the ability to predict electricity prices, even on a short-term basis and hence are unable to formulate a proper sales strategy for their products. Simply put, the industry is moving into uncharted territory.

At the same time, after the abolition of the "adjustment clause", suppliers were allowed to set their Low Voltage tariffs at excessively high prices based on their will, without the slightest control. And this despite the fact that the prices at which the suppliers finally procure the energy from the market are 60% lower than their forecasts. The result is that in the last five months (September 2022-January 2023) excessively high profits for suppliers are created, exceeding €2.5 billion, much higher than what they would have obtained as producers when the "adjustment clause" was applied.

Unfortunately, after a long period of positive growth rates, industrial production in Greece has been moving in recent months at lower levels than the average of the European Union. Consequently, there is a risk of losing the positive momentum that the industry has managed to acquire in recent years, with a significant increase in the added value of the manufacturing industry, from 9% to the level of 11%.

A fact that highlights the potential of the Greek industry as the most important factor in the development of the country's economy, as long as it receives the same support the rest of the European governments provide to their industries. At the present time, an additional reason for concern for the competitiveness of Greek industry is the fact that in recent months the member states have presented more effective support measures for their industry to compensate for the high energy costs, utilizing, among others, the European Temporary State Aid Framework.

Now facing a very real risk of deindustrialization, all industrial associations in the country have issued a warning signal through a joint letter to the prime minister, in which they request a radical change of the industrial policy followed in the energy sector. **(9)**

Among the main measures that the government is called upon to take immediately is a regulation that will allow industries to enter into bilateral contracts with producers, the well-known PPAs[4], which is a central axis of European policy, as such contracts are regarded a key tool for reducing electricity costs for industry. A regulation, however, which should not be limited to the exemption from the imposition of the cap on producers' profits only for bilateral contracts with physical delivery, but also to exclude financial (virtual) bilateral contracts, as long as they are fully defined both the production unit as well as the buyer.

Excluding only PPAs with physical delivery is a significant obstacle for small industries to enter into agreements with RES producers, because physical delivery always requires the ability of a consumer to absorb the amount of energy produced at the time it is produced.

Taking into account all the above, it is obvious that there is a serious risk that the big players will monopolize the green PPAs as well, extending their monopoly to the RES market as well.

[4] A Power Purchase Agreement (PPA) is generally the primary contract between the public and private sector parties which underpin a power sector PPP. It is typically between a public sector purchaser "offtaker" (often a state-owned electricity utility, in jurisdictions where the power sector is largely state operated) and a privately-owned power producer. It usually provides the primary revenue stream which underwrites the PPP project. Therefore, the structure and risk allocation regime under the PPA is central to the private sector participant's ability to raise finance for the project, recover its capital costs and earn a return on equity.

Therefore, based on the above, if immediate measures are not taken to ensure competitive energy costs for the country's industries, many of them, looking at 2023 with uncertainty, are considering the possibility of further reducing production or even suspending their operation or even moving to another country.

Conclusion

As electricity prices in Europe continue to move at high levels, the European Commission is considering that the current electricity market design is not fit for purpose. Many European governments are weighing market interventions such as price caps and decoupling wholesale power and gas prices.

Europe's current design is a sequence of markets, some continent-wide, where electricity providers such as power plants meet retail suppliers, large industrial customers and others. Some deals are made months or even years before electricity is delivered, as suppliers and customers need clarity over revenues and costs. The reference price for electricity and for the settlement of many long-term agreements is set on the spot market, where the physical delivery of electricity is traded for the next day. Suppliers bid according to how much it would cost to provide an extra unit of power, known as its marginal cost.

The EU plans a "deep and comprehensive" reform of the existing electricity market in order to cope with an underlying energy crisis, which became worse following Russia's war in Ukraine. The measures include a cap on electricity producers' profits that could have raised €140 billion and "cushion" consumers from high prices if applied today.

At present, the spot market efficiently allocates capacity and provides signals on energy scarcity, offering an incentive for investment in renewables and gas. But to guard against sustained shortfalls in capacity, and thus another price crunch, Europe's energy markets must adapt.

It is worth mentioning that since last July three major interventions in the domestic electricity market have been recorded in Greece, which are summarized as follows:

- In the wholesale market, a price cap per electricity generation technology has been introduced since July 2022.
- In the retail market, electricity suppliers are obliged from August 2022 to offer fixed monthly tariffs to customers and publish them on the 20th of the previous month.

Throughout the duration of this measure, customers can switch suppliers without any early exit penalty.

- From November 1, 2022, an additional levy of €10/MWh has been imposed on the quantities of natural gas used for electricity production.
- The combination of the above measures and interventions by the state has led to a normalization of the operating conditions of the market, as can also be seen from the lower prices that have been established at the consumer level.

It is worth mentioning that the proposed reform of the European electricity market was until recently in public consultation by the European Commission, in which IENE actively participated **(10)**. In view of the legislative proposal that will be presented by the European Commission on March 14, this specific reform should include elements and interventions, such as the decoupling of natural gas and electricity prices, the strengthening of investments in RES and storage and facilitating the conclusion of long-term contracts such as PPAs and CfDs. Such a market model is considered necessary for the stability of consumer prices and the mitigation of the effects of sharp and large increases in natural gas prices. Also, European industry needs a fully functioning market with sufficient liquidity, removing administrative barriers and incentivising long-term contracts in order to secure low-cost energy and become competitive.

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