

Redesigning EU electricity market for the benefit of consumers

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The need of reform in favour of the consumers.

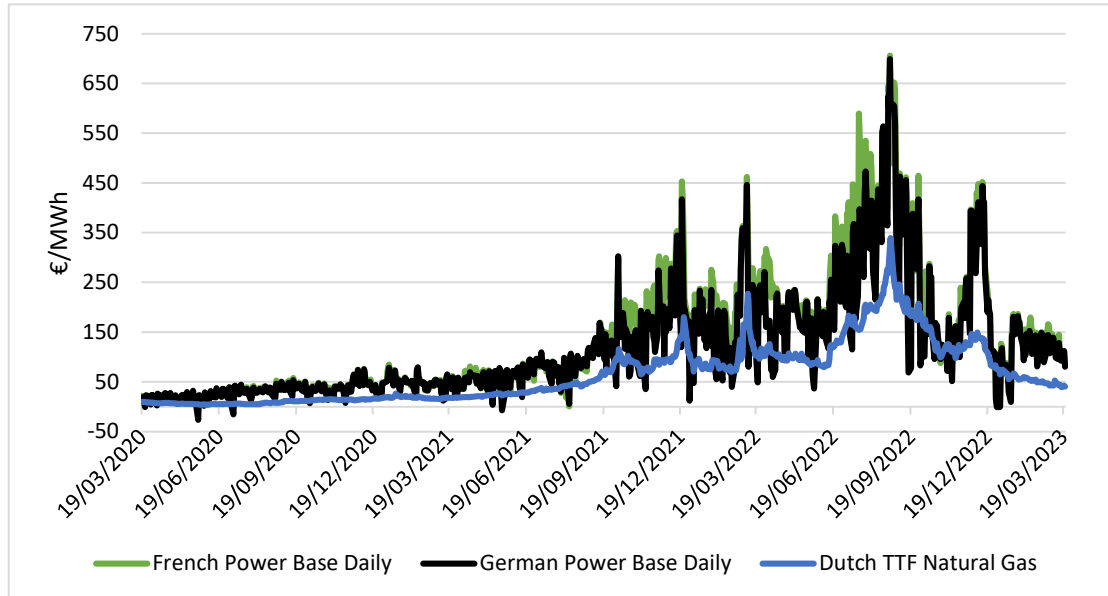
The authors of this paper are aware of the complexity of reforming an electricity market design which has been progressively developed during the last twenty years at EU level and beyond with a great success. The emergence of a war situation at the end of 2021 created an unprecedented increase of gas and electricity prices not sustainable for citizens and the economy. Short term and very costly measures, not particularly well targeted to those most in need of support, have been taken and a deeper structural reform started to be claimed by a number of Member States.

While the prices of gas and electricity are going sharply down these days, the European Commission has tabled, on 14 March 2023, a proposal to the Council and the Parliament in order to reach an agreement in the coming months. The fast changing market situation and the divergences of views between the Member States might well delay an EU decision after the European elections due in May 2024, while unity is needed to maintain the confidence in the system. Already, the announcement of a reform of the system had a negative impact on the investors willing to invest in new capacities, as they do not know the price regime which could be applied in the future. We do not intend to comment this proposal which includes a number of provisions meeting the concerns expressed here.

The main difficulty is to ensure that an improved market design must be fit not only for today but also for the longer term with more and more intermittent electricity in the mix.

In this non paper we try to offer ideas and solutions that require a certain level of ambition for the long term as EU, like the world, is looking for more decarbonised and affordable electricity. They have to mature in the coming months along the discussions which will take place everywhere around the proposal of the Commission.

Graph. 1 European electricity and gas prices



Source: Marketview

It is against this context, and in the framework of the Jacques Delors Institute and its mission, that we propose some possible solutions, sometimes very ambitious, to take into account the unacceptable energy crisis that the war has created. More significantly, our intention is to adopt largely the point of view of the consumers who are usually well forgotten in debates of such complexity, hijacked by the supply-side and the experts.

We understand indeed that consumers are not interested in spending time and effort in understanding the electricity system and their bills; they want a continuous supply of electricity as decarbonised as possible and as affordable as possible! However, they are ready to play a role if it is simple to understand and to manage, as is now made possible by digitalisation. In a market, there must be two equal parties: the supplier and the consumer. The reality in electricity is much too far from this balance, as the distress of many citizens and companies is acutely revealing.

The EU electricity market principles have been and are still dictated by the “utilities” which saw the emergence of consumers/prosumers as competitors rather than partners in a complex system. In such a game, policymakers took usually too much notice of the different actors representing the supply side, ignoring the vast majority of silent customers that failed to express their views in a way-too-complex market design. The price hikes have shown that, with the exception of the most vulnerable¹, the consumers are able to change their behaviour by consuming more cleverly or by investing in efficiency. The potential savings may be estimated at 20/30% of the demand and that is completely against the business model of the suppliers. Who is willing to speak for the consumers and represent them fairly?

It is our conviction that the right analysis of the present electricity crisis has to be undertaken under this assumption if we want to achieve some meaningful results and avoid adding complexity that will mainly benefit lobbyists and lawyers.

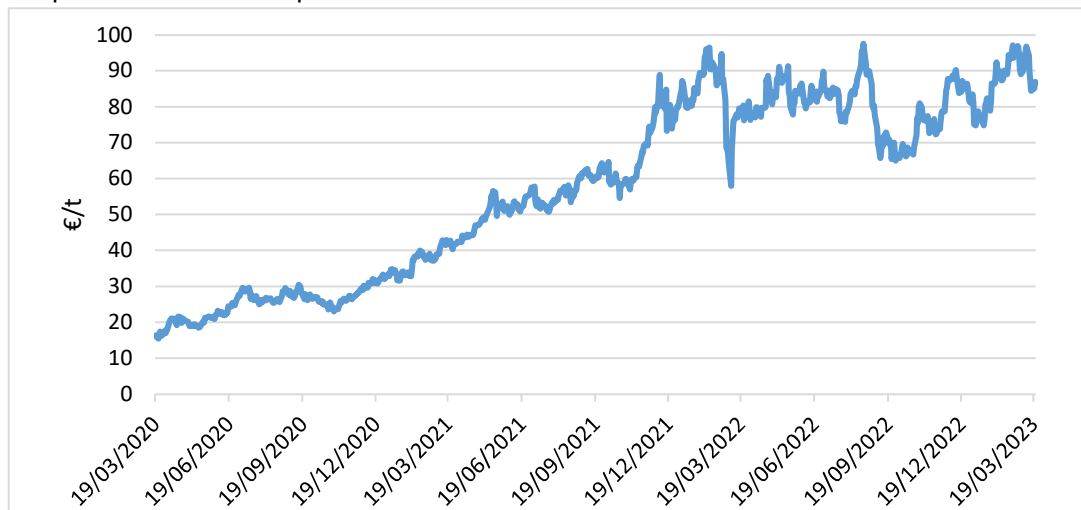
¹ A significant share of households and SMEs with no pricing power like bakeries

The European system did not fail because of the creation of a European market, favouring cross border exchanges to optimize the existing resources and the participation of a larger number of producers including those exploiting renewable sources.

In our view,

1. First, it failed due to a lack of innovation at several levels; electricity should now be viewed closer to water than telecoms. Thanks to continuous innovation in the last 20 years, telecoms have moved from an old landline national market to a truly EU data market with no roaming charges while electricity has seen no quantum leap and is even moving back to more Member States (MS) interventions²
2. Second, policymakers failed to tackle “Greenflation” embedded in the Green Deal. When proposing its Green Deal in 2019, a key thing the Von der Leyen Commission should have then addressed is the consequences of an electricity market design paving the way of higher electricity prices as they are set by the marginal³ thermal producer, with the price of CO₂ designed to go North⁴. The “weaponisation” of gas by Russia from 2021 made the system worse and led to unaffordable and disproportionate prices.
3. And finally, way too little supply competition on the production side materialise as “happy sobriety” was implemented in inappropriate dogmatic demand scenario without citizens being empowered. Smart meters have been rolled out very slowly across EU and do not always help the consumers to better manage their demand. In addition, the usual lack of transparent and monthly bills prevent them to do that simply.

Graph 2. EU allowances prices



Source: Marketview

We also have to recognise the different geographic scales:

² Nationalisation of Uniper in Germany, EDF in France, the coal part of PGE in Poland, etc.

³ In energy commodities allowing the marginal producer to set the price makes sense if the commodity is standard. Unfortunately, in electricity electrons should be viewed differently as soon as we take their carbon footprint.

⁴ CO₂ prices increased from less than 10€ in 2018 to more than 100€ per ton in February 2023.

- As Member States keep sovereignty on their energy mix there will never be a “perfect” EU-wide electricity market, hence the need to design the least “inefficient” market,
- If consumers are not happy with the price outcome, they may vote out their national leaders.

National regulators have to ensure the protection of consumers, while the EU wide regulator has to regulate and monitor the European market (see ‘One true EU electricity regulator and an empowered EU TSO are needed’).

Electricity is not Telecoms

During the last 20 years a one size-fit-all liberalisation process was applied to water, gas, electricity and telecoms. The old meaning of “utilities” with electricity and water alone fits best the present situation. Consumers require something that is climate friendly (drinkable water and decarbonised electricity). and affordable with little interest in what’s happening “upstream” behind their taps and switches. Both bills should look similar with quantities used and the price of the commodity. Both require an extensive infrastructure that hasn’t seen major innovation in the last 20 years. The major difference is that electricity needs constant balancing between supply and demand with, for now, very limited storage solutions (and still mostly done with water!). This is why we treat differently the balancing and the non-balancing supply of electricity in this brief. On top, in electricity, like water, the more local the supply, the better/cheaper. With more and more decentralised electricity production, the grid will need to be massively expanded⁵ and grid losses will increase. On the transmission network, the percentage of network losses is lower than on the distribution network: around 1.7% of the electricity transferred over the transmission network is lost, and a further 5-8% is lost over the distribution networks⁶

Like for water, households and small companies do not have the time to shop around and understand the complexity and prices of their contract although there are more and more service providers doing that for SME’s. They could rely on a strong regulation and a regional provider/distributor controlled by elected officials. Prices are rather explicit, security of supply is guaranteed and reserves are controlled permanently. They should essentially be informed about their own monthly consumption patterns and the price per unit they are charged (€/MWh).

There is an obvious need to accelerate the process to decarbonise electricity and it could be useful to examine whether the renewables target should not be replaced by a single CO₂ content target, at least for electricity supply. While the Member States remain sovereign to decide their energy mix⁷, and in order to stimulate a fast EU decarbonised electricity system a malus could be implemented for the 3 worst countries in terms of CO₂t/MWh on top of the CO₂ prices paid. The worst 3 states in terms of CO₂ emissions would face a fine. This could look at first unacceptable for many MS but in a climate emergency this could be viewed as the only way to foster fast changes and to avoid procrastination from MS hiding behind the

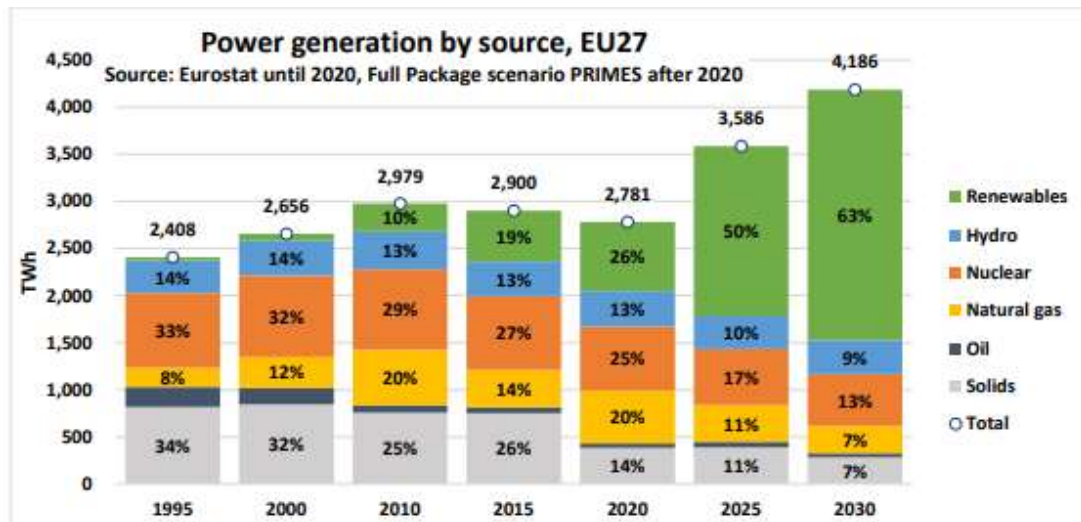
⁵ Enel estimates new connections request to its grids to have been multiplied by 5 between 2020 and 2022 (Capital markets day, 22 November 2022).

⁶ [Summary \(parliament.uk\)](#)

⁷ Article 194 of the Treaty on the Functioning of the European Union

Treaty. Each State will have to provide, each month, the wholesale average cost and the average carbon footprint to the Commission under a normalised format⁸.

Graph 3. EU-27 power generation by source



Source: Greek proposal, ENER 366

The flexibility of demand is a resource which has been recently discovered by the TSO's and it should be further encouraged to avoid very costly peak times and risks of black outs. Consumers should be clearly empowered and incentivised to participate in such exercise. Monthly electricity prices should educate consumers on when the supply-demand balance is tight and therefore when to concentrate to find solutions.

In the ongoing energy transition, electricity demand is bound to increase as electricity will be used as the main vector to remove fossil fuels from many sectors, mainly industry and transport. In addition, the appropriate interactions will have to be organised between users to optimize the use of electricity. Users, individually or collectively will become more often producers of electricity for self-consumption or for sharing it. These trends should be effectively encouraged and facilitated by the authorities, TSO's and DSO's. This decentralisation is a major feature of the transition and of the decarbonisation. As the present crisis showed, there is an asymmetry in prices: too little supply and market prices are skyrocketing while too little demand reduces market prices to 0 but keep consumers on the hook for all contracts for differences (CfD⁹) signed for priority access renewable. Renewable curtailments, nuclear modulation and congestion management are ultimately borne by consumers. The real difficulty is fine tuning this "spare capacity". Before national monopolies overinvested to please their political masters while now private companies under-invested to return higher dividends to their shareholders. Having a more regional supply-demand-

⁸ See the excellent public application "Electricity maps" that discloses production figures of all European States, with the intensity of carbon of the electricity mix at any moment of the day, as well as the exports and imports and the prices.

⁹ The operators incentivized by this support mechanism feed their electricity into the grid. If the price achieved on the power exchange is below the amount that was specified in the auction, the operator receives the difference from the fixed subsidy amount. If the price is above this reference price, the operator has to pay the difference to the contracting party. As this electricity is not providing the balance, we will use the term "fixed price" to better reflect the new reality.

pricing balance could help foster greener local supply and empower local citizens in being more coherent between what supply they want and what they wish to consume.

One true EU electricity regulator and an empowered EU TSO are needed.

The creation of national regulators at the beginning of this millennium was the cornerstone to avoid political interferences and ill-conceived decisions, but in practice having national regulators leaves each Member State interfering with its national regulator. The worst example is the French CRE where the President can move straight from his position to a Ministerial position while being replaced by a former minister¹⁰. It is therefore not in the interest of consumers to pay for 27+ regulators lacking the necessary independence. To avoid further fragmentation of 27 markets and set an EU level playing field, there should only be one powerful EU electricity regulator (as in the banking sector after the financial crisis). Making the Agency for the Cooperation of energy regulators (ACER) a true European regulator would lead to a single European regulation applied in the same way in all Member States. The same is valid for the transmission system operators in charge of balancing the system. Their competences are limited to regional or national territories when interconnections have created an almost true European market as shown by all exchanges taking place every minute between Member States and beyond. The limitation made by the national regulators on their TSO is a major obstacle to the creation of a true European market and to the optimisation of the system. The benefits of such market for the consumers have been evaluated at Billions € per year¹¹.

In the aviation sector, air traffic control is managed by a single entity (Eurocontrol) that shows that organising the Europe wide exchange of electricity could be done efficiently by a single entity.

In gas, it is well known that Gazprom had the best view of the European gas transmission infrastructure functioning in real time thanks to its European control board in Saint Petersburg, while there are 44 gas TSO's inside the EU¹², now used to cooperate for 15 years and surely able to become a more effective European organisation too.

The 27+ national energy regulators should particularly focus on gas as this is a much more difficult task with many new gases on the horizon. Their competences in the field of electricity should be redefined after establishing the tasks of the European electricity regulator. In any case, the effective protection of consumers should always be ensured by the national regulators.

Moving to fixed prices and to a level playing field.

To avoid hidden subsidies and to set a level playing field no other mechanism than fixed prices for those projects approved by the grid operator should be allowed. Capacity Remuneration Mechanisms (CRM) in their present form should be abolished as benefiting only suppliers at the expense of consumers. CRM have been introduced to ensure that an adequate level of firm and reliable capacity is made available and this mostly to cope with

¹⁰ Happening in 2022

¹¹ [Market Monitoring report 2020 \(europa.eu\)](https://www.entsoe.eu/Market%20Monitoring%20Report/Market%20Monitoring%20Report%202020)

¹² [Members | ENTSOG](https://www.entsoe.eu/Members)

some nuclear power plants closures. It makes little sense to replace an operating nuclear plant by thermal generation at the expenses of both climate and consumers. The hydrogen and batteries industries are already getting massive EU and national subsidies and this seems to offer more promising and innovative solutions in order to balance the energy system.

For decentralised power, PPA¹³ could only be signed with an industrial plant located in the same region/bidding zone. Investment in concentrated decarbonised plants (mainly new nuclear and offshore wind) needs to be treated differently than decentralised power production as the amount of power produced will de facto make the concerned region an electricity exporter. In this case alone PPA and fixed price could be signed with region/bidding zones bordering the new construction site.

Subject to competition rules, maximum duration of all contracts (PPA and fixed price) should not exceed 15 years to boost construction of new plants. After 15 years, those plants would still be able to provide PPA and fixed price contracts hopefully with lower duration. In case of uprates, new 15-year max contracts could again be allowed. On top, all producers with a fixed price have the ability to reduce their fixed price each year to improve their priority ranking access to the grid for the benefit of consumers (see Fierce decarbonised production competition).

The EU regulator will set the methodology to move from wholesale pricing to retail pricing as well as the ancillary costs (grid, distribution) to be paid by the customers. Downstream electricity price from a region would be calculated prorata of regional intermittent renewable (wind, solar) and baseload decarbonised (run-of-river hydro, nuclear) at fixed prices and coal, gas, steps, batteries at market price¹⁴ for providing the supply-demand balance.

Moving to more local electricity production will entail having different costs and therefore prices all over Europe. Member State or regions will not be allowed to grant cross subsidies or downstream subsidies to electricity prices. The EU electricity regulator will have all powers to check this.

Regional wholesale price set by local supply-demand balance to foster renewable sources.

We acknowledge the fact that even if today the electricity markets are at Member State level this needs to change to a more local structure to better reflect local decentralised electricity mix. Each region could set up its own organisation with the aim to implement local green projects for the benefit of its citizens. These regions could be the present bidding zones and new ones to create according to the needs.

A single buyer could even be established in each region to better empower the people. Each single buyer will have to provide to the regional organisation each month, the wholesale average cost of buying their respective MWh and the average carbon footprint. This will set the price of electricity for all segments of society (from households to industry with no cross-subsidies). The single buyer should never be in deficit (no subsidies allowed downstream). Intensive electricity users would have the choice either to go via their regional organisation

¹³ PPAs are power purchase agreements concluded between a large industrial consumer and a producer of decarbonised electricity to help finance its investments. It may be valid up to 15 years, at a predefined, stable rate.

¹⁴ See Fierce decarbonised production competition below.

(at a monthly price set by the monthly regional wholesale price and ancillary services set by the EU regulator) or signed PPA directly with producers¹⁵.

Once a region decides to establish its own electricity organisation all local decentralised producers are in priority providing electricity to the region. This will create nodal pricing zones reflecting the real interest of local citizens and should foster new decarbonized production at regional level as the locals would first benefit from their choices. On the contrary big cities with limited space could have to pay a higher electricity price as the pro-rata of decarbonized electricity at fixed prices will be lower. Consumers there will have less pro-rata fix-price decarbonized electricity and the bidding zone will need more market price electricity. This drawback is mitigated by the fact that, on average, citizens in big cities have a higher purchasing power. It also makes more sense for less well-off regions to benefit first from their local decarbonized production.

All citizens and industries in each region should be incentivised by this mechanism to push for more low-fixed-prices decarbonised production units.

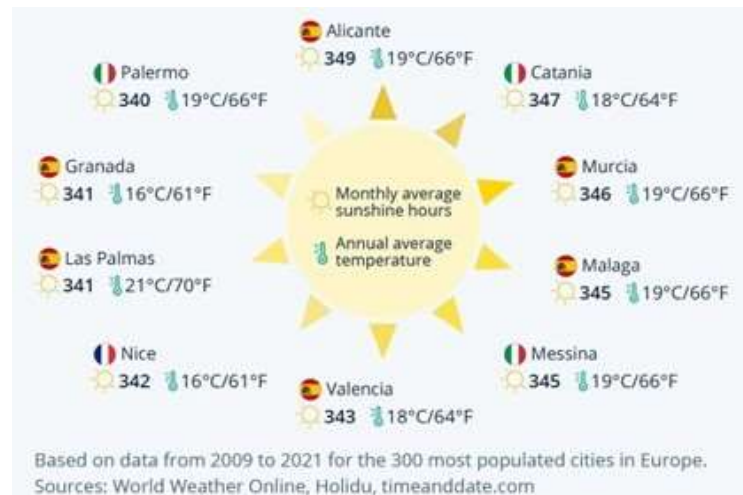
This will be the end of the French and German “péréquation tarifaire”. If this was a great idea just after WWII with a centralized system, we have to accept that, except maybe for nuclear power plants, decarbonized electricity is mostly decentralized. Also, life is more expensive in big cities (with higher salaries) and it makes today no logic in asking local communities to have the negative aspects (visual) of new decarbonized production projects to provide big cities with cheap electricity. To overcome this, big cities could sign (PPA for industries and fixed price for the rest) contracts to foster new concentrated decarbonized project in bordering regions. It will also force national policymakers to address the issue of how to deal with decarbonized electricity in their own major cities. For example, in France, « les Architectes des Bâtiments de France »¹⁶ have the right to dismiss any local solar-panel on residential properties around any historical building or center. This translates de facto in very little solar electricity in French big cities even in the sunny South. It is perhaps time, in front of the climate crisis, to remove wisely this prescription that is penalizing the local population. Greece is a good example with citizens in Athens having installed on their roof the required decentralised solar equipment to reduce their electricity bills.

¹⁵ Risk sharing will be between those 2 private entities with no State backing.

¹⁶ [ANABF | Les ABE](#)

Graph 4. European'sunniest cities

Top 10 European cities with the most hours of sunshine per month (and their average temperatures)



Source: Statistica

If a region decides to over-invest and another one decides to under-invest, it would be fair to ask the under-investing region to pay a higher electricity price on both the wholesale and the downstream levels.

Undistorted short term price signals, market integration and liquidity are essential to ensure an efficient dispatch of generation and flexibility resources. Day-ahead, intraday and balancing price signals in all bidding zones should thus continue to be a key feature of the future market design. Short-term and ancillary services markets will also need to progressively evolve to remove any remaining barriers to market entry for new flexibility providers and allow efficient and coordinated access to distributed energy and flexibility resources including storage and demand response.

Fierce decarbonised production competition.

Decarbonised electricity should continue to have priority access to the grid but the rules should evolve to benefit customers, while not discouraging renewable producers and prosumers. Each new intermittent renewable (wind, solar) and baseload decarbonised (run-of-river hydro, nuclear) plants could either decide to provide electricity on demand at market price (in the bidding zone) or, more likely, apply to priority access with fixed prices for a 15-year period max to foster investment. Once all prices are disclosed, the grid operator will set priority access to the lowest cost first. Once investment has been sunk, operating decarbonised projects could always revise down their fixed prices each year to benefit both customers and their ranking in the priority access. This will always guarantee competition on the decarbonised part of the equation.

Guarantees of Origin associated with the decarbonised generation are allocated first to the producers. Once a fixed price or a PPA is signed, the Guarantees of Origin are transferred to respectively the grid operator or the local private buyer. Guarantees of Origin are bundled to the electricity produced to avoid any opaque secondary market.

To balance the market, each TSO will call on-demand other national plants (dam, gas, coal and battery) or call on imports at market price (including CO₂ prices if non-green). If a country/region is too long in decarbonised electricity it would export its most expensive fixed price plant. If a country/region is short of electricity it will need to import from its neighbours what is left (at either fixed price of more likely higher market price with higher CO₂ content).

If a decarbonised plant is able to produce and the grid unable to transport for technical reasons it will continue to get paid. But if demand is too low and less costly fixed price are able to fully meet demand, the decarbonised producer will not be able to inject on the grid and will not be paid. This mechanism will allow too expensive decarbonised plants to either be removed from the mix and the downstream pro-rata price or to kick start fierce competition.

This mechanism is not only technologically neutral but also most importantly “innovation-fostering” as it will push engineers to implement low-cost solutions. As we recognised that electricity market design partly failed due to too little innovation in the last 20 years, it is very appropriate to implement “innovation-fostering” mechanisms.

With a fierce decarbonised production competition, it would also look against all market rules to subsidise the supply-demand balance by implementing CRM for the only benefit of producers. If the market starts to become imbalanced, both producers and consumers could be incentivised by higher prices to respectively grow the supply or reduce the demand. The present CRM that was implemented to replace operating nuclear plants and is used at a time of war in Ukraine cannot be viewed as a sustainable market mechanism and should be discarded.

Removing inefficient/ghost suppliers.

To kick start the liberalisation process, largely opposed by traditional monopolistic producers, Member States allowed suppliers with no production to address consumer’s needs. The assumption was that as production takes time to be built, a few years down the road all suppliers will then produce the required electricity. This not only failed as many suppliers did not bother to even consider becoming producers but it also gave traders exorbitant power. Suppliers will only be allowed to sell the electricity they produce themselves, either to the grid with fixed price or at market prices or to industries with PPA.

Each state/region will benefit from its respective energy mix reflected in a nodal cost of wholesale electricity. The competition between Member States/regions should be to get the lowest average wholesale decarbonised electricity price for the benefit of its consumers. Competition rules will not allow for a region to provide unfair below-cost electricity prices to its citizens and industries.