

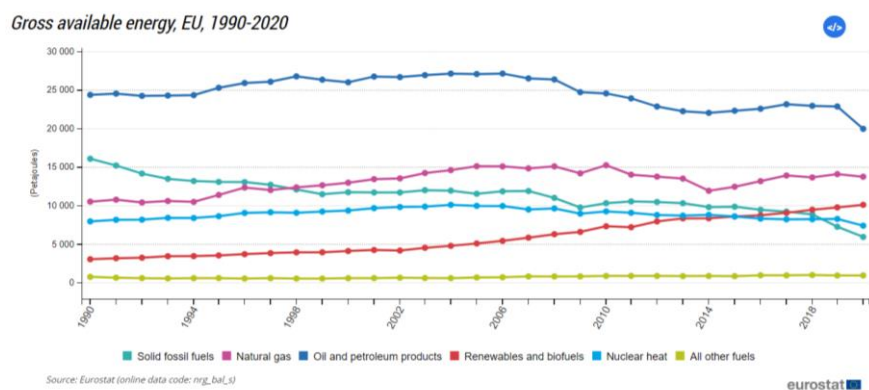
PRELIMINARY CONSIDERATIONS ON THE VOLATILITY OF EU ENERGY PRICES

I. Quick reminder:

EU energy mix: in 2020, petroleum products (including crude oil) was the first energy source at 35%, followed by natural gas (24%), renewable energy (17%), nuclear energy (13%) and solid fossil fuels (12%). These proportions vary considerably between Member States.¹

42% of EU energy is produced domestically, 58% is imported. Russia is the main supplier, providing until recently 27% of EU oil imports and 40% of EU gas needs.

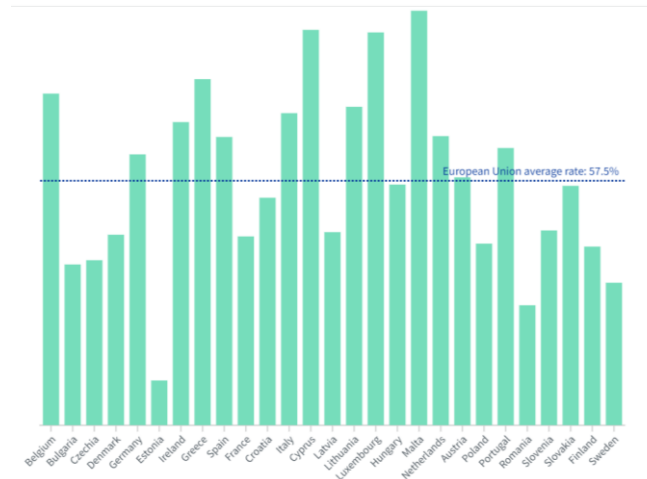
Within the 42% produced domestically, 40% comes from renewable sources, 33% from nuclear.



Source : [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics - an overview](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Energy_statistics_-_an_overview)

¹ <https://ec.europa.eu/eurostat/cache/infographs/energy/bloc-2a.html>

Energy imports per Member State



Source: <https://www.consilium.europa.eu/en/policies/energy-prices/>

Price formation mechanism in the EU natural gas market

There are 3 main price formation mechanisms for natural gas in Europe:²

- Long-term contracts linked to the price of oil or oil products;
- Gas-on-gas competition: this is a market-based price formation mechanism, where the price is the result of supply and demand dynamics in power exchanges;
- Regulated prices set by national energy regulators: 3 types of regulatory pricing rules are applied in by the Member States: prices caps, revenue caps and so called “Cost plus” regulation

Oil indexation has long been the dominant price formation mechanism in the EU. Since 2005, however, the European gas pricing has evolved from the classical oil-indexation formula to gas-to-gas competition, similar to the US market, and resulting in a decoupling of gas prices from oil prices.

As explained by think tank Bruegel, ‘*The advanced structure of the European gas market, ironically, makes the situation worse (...) Around 80% of the natural gas consumed in Europe in 2020 was priced based on gas-on-gas competition, with only the remaining 20% still being indexed to oil. For the sake of comparison, gas pricing in east Asia continues to be predominantly based on oil-indexation. This feature makes the European gas market more flexible, but exposes Europe to strong international market fluctuations.*’³

While natural gas only supplies around a fifth of Europe’s electricity, higher gas prices are putting disproportionate upward pressure on electricity prices, especially at times of low renewable energy production and high electricity demand.

Price formation mechanism in the EU electricity market

Up until 3 decades ago, the electricity sector in the European Union was organized as a regulated monopoly, with national vertically integrated companies providing generation, transmission, distribution and supply of electricity.

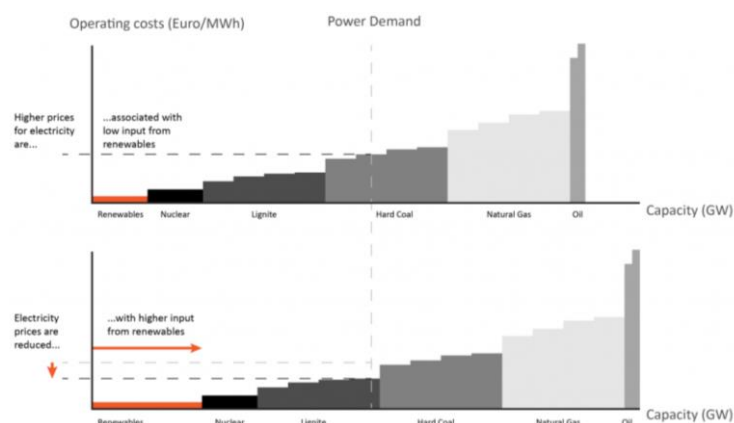
² [https://www.europarl.europa.eu/RegData/etudes/etudes/etudes/join/2014/518747/IPOL-ITRE_ET\(2014\)518747_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/etudes/join/2014/518747/IPOL-ITRE_ET(2014)518747_EN.pdf)

³ <https://www.bruegel.org/2021/09/is-europes-gas-and-electricity-price-surge-a-one-off/>

Through 3 legislative packages (1996, 2003, 2009), the EU opened and deregulated⁴ the electricity market. Today, transmission and distribution remain regulated natural monopolies, but generation and supply compete in liberalised market environments.

Generators sell electricity to large industrial clients in the wholesale electricity market, whereas suppliers sell electricity to retail final consumers. The market trades intraday, day ahead and longer dated forward/futures contracts.

The wholesale market price formation mechanism is based on the merit order curve, where supplier bids are ordered according to ascending marginal cost. The wholesale market in the EU is a system of marginal pricing, also known as pay-as-clear market, where all electricity generators get the same price for the power that they are selling at a given moment.⁵



II. Factors explaining the recent rise of energy prices

Wholesale gas prices in Europe reached record levels in the last quarter of 2021, as spot contracts rose from 85 €/MWh to the unprecedented 183 €/MWh on 21 December (subsequently exceeded in 2022), finishing the year at 60 €/MWh. This rise was triggered by a tightness in global gas markets (low gas storage levels in Q4 2021, decline in Spanish imports from Algeria due to the expiration of the GME pipeline contract) and growing geopolitical tensions with EU's main supplier Russia.⁶

Other factors included a long cold winter in early 2021 resulting in an increased use of heating, followed by a long, hot summer and a greater use of cooling devices, increased demand for liquefied natural gas and a consequent spike in its price, and a greater consumption of gas in Asia due to the economic recovery.⁷

Electricity prices also rose to unprecedented highs during Q4 2021, the European Power Benchmark averaging 194 €/MWh in Q4 2021 – 400% higher than Q4 2020 and 85% more than Q3 2021. This was linked primarily to the rise in gas prices and a post-Covid economic recovery leading to a sharp

⁴ https://set.kuleuven.be/ei/images/EI_factsheet8_eng.pdf/

⁵ https://energy.ec.europa.eu/topics/markets-and-consumers/eu-energy-prices_en
<https://fsr.eui.eu/acers-assessment-of-the-eu-wholesale-electricity-market-design/>
https://www.elia.be/-/media/project/elia/elia-site/public-consultations/2020/20201218_studyreport_pacforfirrcapacity_final_17dec2020_en.pdf

⁶ https://energy.ec.europa.eu/data-and-analysis/market-analysis_en

⁷ <https://www.consilium.europa.eu/en/policies/energy-prices/>

rise in demand. Price volatility also reached new heights due to uncertain output of renewables and tight supply-demand balance.⁸

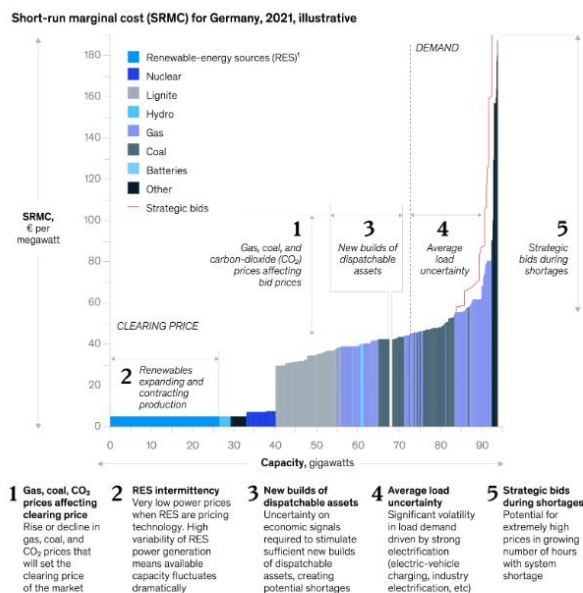
While some blamed the rise in no small part on carbon prices, the International Energy Agency (IEA) found this factor to be marginal, stating in January that *'we estimate that the effect on European electricity prices of the sharp spike in natural gas prices is nearly eight times bigger than the effect of the increase in carbon prices.'*⁹

The military aggression by Russia to Ukraine, which started on 24 February 2022, has further disrupted energy markets by adding pressure on prices, in particular of gas and oil.

Looking at the future, several long-term fundamental trends in the European power system are expected to lead to a much more volatile power-pricing environment, according to a recent study by McKinsey¹⁰: the increased deployment of renewable energy sources combined with a phaseout of coal and decommissioning of nuclear plants and a steady increase in electricity demand (linked to the electrification of transport and a ramp-up in the production of green hydrogen through electrolysis) will mean a future energy system dominated by intermittent production, with uncertainty about total capacity rollout.

According to McKinsey, Europe is entering a period of extreme volatility, with daily and hourly prices hitting new highs. In Germany, upward of 3,000 hours a year may be priced at more than €100 or at less than €10 by 2030, compared with just several hundred hours today, according to McKinsey's EU Power Model. The merit order cost curve shown in the chart below illustrates the price-setting mechanism in the power market and the 5 different elements affecting future prices and price volatility.

The merit-order cost curve exemplifies the pricing mechanism in the European power market.



*Renewables placed at €5/MWh-hour for illustrative purposes.
Source: McKinsey Power Solutions, EU power model, June 2021

Source : <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/five-trends-reshaping-european-power-markets>

⁸ <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/five-trends-reshaping-european-power-markets>

⁹ <https://www.cleanenergywire.org/factsheets/energy-crunch-what-causes-rise-energy-prices>

¹⁰ <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/five-trends-reshaping-european-power-markets>

The last factor, strategic bids during shortages, appears to play a significant role: anticipated supply shortages could lead market players to bid their capacity at prices higher than the marginal cost, theoretically up to the maximum allowed price during a growing number of hours.

In other words, according to McKinsey the expected intermittent production linked to the growing deployment of renewables may mean that price volatility in a liberalized electricity market could increase in the future.

If this is to be the case, then policy changes and/or market players' behavioural changes may be warranted. These may range from using more hedging and fixed price power purchase agreements, to changing bidding design rules in order to curb predatory speculative behaviour, or to revisiting the liberalization of the EU electricity market.

III. The EU Political response so far

In October 2021, the European Commission issued a communication called '*Tackling rising energy prices A toolbox for action and support.*' The toolbox put forward some short-term measures to support consumers and industry, as well as structural medium measures. These included considering revisiting the security of supply regulation and functioning of gas storage to adapt them to the growing intake of renewables, asking European energy regulators (ACER) to assess the wholesale electricity market design in comparison to alternative market models, asking ESMA to assess the carbon market, and supporting '*consumer empowerment by providing consumers with information and options on how they can participate in the energy market, for example with faster and easier switching of suppliers.*'¹¹

European Commission president Ursula Von Der Leyen stated that '*we must end speculation on the energy markets, that is why we are increasing our monitoring of the gas and energy markets.*'¹²

While these measures go in the right direction, it is worth noting that asking to compare to design of the EU electricity market to 'alternative market models' indicates an unwillingness of the Commission to even consider non market models.

Also noteworthy in our opinion is the proposal to facilitate switching suppliers for retail customers. While not bad in itself, we fear that in the absence of more structural measures curbing price volatility, far from 'empowering consumers,' such a measure may only lead to more temporary promotional offers to lure clients.

In November 2021, ACER and ESMA issued their preliminary reports about the functioning of energy and carbon markets. ESMA found no change in the breakdown of open positions between different categories since 2018 and concluded that it "*is broadly in line with the expected functioning of the market,*"¹³ i.e., no need to change anything (note that ESMA didn't say that the market functioned well but only 'as expected'). Another study found however on the contrary that

¹¹ <https://op.europa.eu/en/publication-detail/-/publication/a6651e1b-3089-11ec-bd8e-01aa75ed71a1/language-en/format-PDF>

¹² <https://euobserver.com/green-economy/153295>

¹³ <https://www.esma.europa.eu/press-news/esma-news/esma-publishes-its-preliminary-report-eu-carbon-market>

speculation was excessive in the EU ETS, leading to excessive price volatility and an intermittent price signal.¹⁴

ACER found that the current design of the wholesale market ‘ensures efficient and secure electricity supply under relatively ‘normal’ market conditions” and therefore it is worth keeping. At the same time, ACER recognised that “the current circumstances impacting the EU’s energy system are far from ‘normal’.’ ACER also concluded that the current design ‘is not to blame for the current crisis. On the contrary, the market rules in place have to some extent helped mitigate the current crisis, thus avoiding electricity curtailment or even blackouts in certain quarters.’¹⁵

ACER however recognized that some longer-term improvements were needed and formulated 13 recommendations. More interventionist options such as capping electricity prices were not included in its recommendations, since ‘as a rule of thumb, ACER considers that the more interventionist the approach, the higher the potential to distort the market.’¹⁶

13 measures for the consideration of policymakers, future-proofing the EU wholesale electricity market design

ACER
European Union Agency for the Cooperation of Energy Regulators

1. Speed up electricity market integration, implementing what is already agreed
2. Improve access to renewable Power Purchase Agreements (PPAs)
3. Improve the efficiency of renewable investment support schemes
4. Stimulate 'market making' to increase liquidity in long-term markets
5. Better integrate forward markets
6. Review (and potentially reduce, if warranted) collateral requirements
7. Preserve the wholesale price signal and remove barriers to demand resources providing flexibility
8. Shield those consumers that need protection the most from price volatility
9. Tackle avoidable supplier bankruptcies, getting the balance right
10. Tackle non-market barriers, ensuring generation and infrastructure is built at pace
11. Consider prudently the need for market interventions in situations of extreme duress; if pursued, consider tackling 'the root causes'
12. Consider public intervention to establish hedging instruments against future price shocks
13. Consider a 'temporary relief valve' for the future when wholesale prices rise unusually rapidly to high levels

Want to learn more?
Check out the full report on ACER's Final Assessment of the EU Wholesale Electricity Market Design.

www.acer.europa.eu | linkedin.com/company/eu-acer | twitter.com/eu_acer

Source: ACER's Final Assessment of the EU Wholesale Electricity Market Design, April 2022. Page

Source :

https://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Documents/Infographic%20on%20the%2013%20measures%20in%20ACER%202020Assessment.pdf

In March 2022, the Commission proposed its **REPowerEU plan**, outlining measures to drastically reduce Russian gas imports from its 2021 level before the end of this year – and reach complete independence from Russian fossil fuels well before the end of the decade. The assessment is that it will be possible to fully compensate the end to Russian gas imports by a **combination of demand reductions as envisaged by the Commission’s fit for 55 package, a ramp up of domestic**

¹⁴ https://greenfinanceobservatory.org/wp-content/uploads/2022/02/2021CarbonMarketsOdyssey_ETSpolicyreview-final.pdf

¹⁵ <https://fsr.eu.eu/acers-assessment-of-the-eu-wholesale-electricity-market-design/>
https://www.elia.be/-/media/project/elia/elia-site/public-consultations/2020/20201218_studyreport_pacforfirrcapacity_final_17dec2020_en.pdf

¹⁶ <https://www.acer.europa.eu/sites/default/files/documents/Publications/ACER%26%23039%3Bs%20Final%20Assessment%20of%20the%20EU%20Wholesale%20Electricity%20Market%20Design.pdf>

production of biogas and fossil-free hydrogen in particular, and rather limited additions of gas infrastructure beyond what is already included in the current 5th PCI list.

The Commission however unfortunately proposed to finance this plan via the sale of additional carbon credits currently held in the EU ETS Market Stability Reserve, thereby both weakening its climate ambitions and disrupting the carbon market.

On 23 March 2022, the Commission also presented a legislative proposal introducing a **minimum 80% gas storage level obligation for next winter rising to 90% for the following years** to ensure security of energy supply. It also adopted a communication on **options for temporary market intervention in the short term to limit price increases**¹⁷ and expressed its **readiness to create a task force for common gas purchases**.¹⁸



Source: https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1936

The options for temporary market intervention ranged reduced VAT rates and other financial compensation measures for vulnerable end users to aggregate purchases and caps on electricity or gas prices.

The Commission warned however that setting up a regulatory cap on maximum electricity prices would have significant drawbacks, as it might disincentivize private investments in renewable energy, by reducing the price differential between renewable-based and fossil-based electricity. In addition, as the root cause of high electricity prices is high gas prices, it might make more sense to intervene on gas prices rather than electricity prices.

Setting up a regulatory cap or trading bands for gas trading in the EU is an interesting option, but one that would require a careful choosing of the cap level and strong demand management, in order to avoid facing gas supply shortages and increased demand for gas linked to its lower price.

As a first step, we find 2 options particularly interesting and with limited drawbacks amongst those presented by the Commission:

- setting up a joint EU negotiating strategy on gas volume and price with international suppliers to secure long term production and imports;
- setting up a clawback mechanism to limit excess profits: As the Commission explains, *‘Member States could turn their support schemes for new generation into systems of two-way contracts for*

¹⁷ https://eur-lex.europa.eu/resource.html?uri=cellar:22b6b0f8-aac5-11ec-83e1-01aa75ed71a1.0001.02/DOC_1&format=PDF
https://eur-lex.europa.eu/resource.html?uri=cellar:22b6b0f8-aac5-11ec-83e1-01aa75ed71a1.0001.02/DOC_2&format=PDF

¹⁸ https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1936

*difference. By asking the power generators to repay their investment support when prices are high, this mechanism would prevent a situation where new generation built at the moment will in the future benefit from subsidies also in situations when market prices are very high and volatile. Where players in the natural gas markets earn excessive returns due to the current crisis situation, e.g., because they are able to sell volumes contracted long term at significantly higher prices on the spot market, the returns could be covered by similar tax interventions.'*¹⁹

If well designed, such an option would not interfere with price formation and would not affect EU-wide trading. This would require addressing questions of access to generators/suppliers' data, competition and risks of legal challenges but seems a promising avenue.

It is interesting to note that annex 2 of the Repower EU communication²⁰ set out similarly that MS may consider temporary tax measures on windfall profits. According to the International Energy Agency such fiscal measures on high rents could make available up to EUR 200 billion in 2022 to partially offset higher energy bills.

In May 2022, the Council and the EP reached a provisional deal on **new rules on gas storage**: Member States will fill their storage capacities before winter and share these with other member states in a spirit of solidarity. That same month, EU leaders agreed on **banning almost 90% of all Russian oil imports by the end of the year**.

IV. Excess speculation in EU gas trading?

The Dutch TTF Gas contract is the most liquid contract and the leading pricing benchmark for North-West Europe. Analysing the churn ratio of a contract - defined as total traded volume over consumption in the hub area²¹ - is a good indicator of speculation in a market. It is generally considered that a churn ratio of 10, i.e., the number of times a contract is bought before being settled is a sign of a healthy and liquid market.

The net churn ratio of the TTF contract has increased from 13.9 in 2011 to 114.5 in 2020, meaning that there is 114 times more trading than related gas consumption. This major increase suggests that speculation in gas in Europe has increased very significantly over the past decade. This factor may have had a non-neglectable amplifying impact on the current rise and volatility of gas prices, and may thus require additional regulatory action.

While the TTF contract is subject to position limits under the MiFID II directive, this measure merely limits individual positions in order to prevent market abuse, but does curb speculation.

¹⁹ https://eur-lex.europa.eu/resource.html?uri=cellar:22b6b0f8-aac5-11ec-83e1-01aa75ed71a1.0001.02/DOC_2&format=PDF

²⁰ https://eur-lex.europa.eu/resource.html?uri=cellar:71767319-9f0a-11ec-83e1-01aa75ed71a1.0001.02/DOC_3&format=PDF

²¹ Net churn ratio = total traded volume / consumption ; gross churn ratio = total traded volume / (consumption + exports)

Table 4: Churn rates: 2008–2018

2018	TRADED GAS HUBS CHURN RATES*				
HUB	2008	2011	2016	2017	2018
TTF	3.3	13.9	57.1	54.3	70.9
NBP	14.4	19.8	22.1	23.9	16.9
VTP	CEGH 2.4	CEGH 2.2	5.7	5.3	6.9
NCG	0.4	1.8	4.0	3.4	3.8
GPL		0.8	2.5	2.6	2.8
ZEE+ZTP	5.1	4.1	4.1	2.9	3.1
TRF	FRANCE 0.4	FRANCE 1.0	PEG N 1.7 TRS 0.6	PEG N 1.7 TRS 0.6	1.7
PSV	0.2	0.2	1.2	1.2	1.4
VOB	n/a	n/a	1.1	1.1	0.9
PVB	n/a	n/a	0.1	0.2	0.3

*Calculated on a Net Market Churn basis; not the same methodology in all years.

Source : <https://a9w7k6q9.stackpathcdn.com/wpcms/wp-content/uploads/2019/07/European-traded-gas-hubs-a-decade-of-change-Insight-55.pdf>

2020	TRADED GAS HUBS CHURN RATES					
	Net Churn* basis			Gross Churn** basis		
HUB	2018	2019	2020	2018	2019	2020
TTF	70.9	97.1	114.5	31.6	44.0	60.0
NBP	17.0	14.3	12.6	15.5	13.0	11.2
VTP	6.9	9.0	10.8	1.2	1.7	2.0
NCG	3.8	4.3	4.0	2.0	2.5	2.1
GPL	2.8	2.9	3.0	1.5	1.7	1.6
PSV	1.4	1.8	1.9	1.4	1.8	1.9
TRF	1.7	2.0	2.0	1.5	1.6	1.6
ZEE***	2.4	2.0	1.2	1.0	0.9	0.5
ZTP***	0.8	1.0	1.2	0.3	0.4	0.5
VOB	0.9	1.0	1.0	0.2	0.3	0.2
PVB	0.3	0.3	0.4	0.3	0.3	0.4

Source : <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2021/07/European-Traded-Gas-Hubs-NG-170.pdf>

V. Next steps and recommendations

As the rise in electricity prices has been linked for the main part to the rise in gas prices, we support the idea of addressing price levels on volatility on gas directly rather than on electricity.

We note that oil and gas prices are expected to remain high in the future²², the price of crude being expected to hit \$150 this year according to Trafigura CEO.

In addition, several structural long-term trends, including the further deployment of renewables, the phaseout of coal, decommissioning of some nuclear plants and increased demand for electricity are expected to result in a more volatile power-pricing environment in the future.

We support the measures proposed by the European Commission aimed at reducing dependence from Russian oil and gas, curbing EU gas demand, stabilizing long term supply through joint gas purchases, and increasing gas storage capacity and batteries.

We also support the introduction of clawback mechanisms aimed at capping excess profits. If such measures do not prove sufficient, then stronger regulation options might be warranted.

We strongly regret, however, the proposal to finance some of the measures through the sale of additional carbon credits from the EU ETS Market Stability Reserve, as we believe that energy security should not come at the cost of weaker climate action.

We also note that more could be done to curb energy demand in the EU, which would yield additional environmental co-benefits. The rollout of 5G and the allowance of Proof-of-Work mining in the EU are examples of not indispensable or wasteful energy consumption.

Finally, we note that, while Mrs. Von Der Leyen stated the need to end speculation in EU energy markets last October, no measures have been proposed so far to assess and address if needed speculation in commodity derivatives. In light of the very significant increase in the TTF churn ratio over the past decade, there may be a need to investigate further this point.

²² <https://www.euractiv.com/section/energy/interview/academic-we-are-probably-entering-a-long-period-of-high-gas-prices/>
<https://www.ft.com/content/a6e7fdb3-be01-4473-9eee-2e496a3dda82>