



European Union Agency for the Cooperation
of Energy Regulators

HIGH ENERGY PRICES

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Executive Summary

The backdrop to this note

Energy commodity prices have reached unprecedented high levels across Europe. Gas prices in October 2021 are 400% more expensive than in April 2021. Power prices have increased by 200% (driven mainly by the increase in gas prices). Unsurprisingly, the current high energy prices are topping the EU political agenda. Governments are interested in identifying the key drivers and in determining if it is a temporary shock or a permanent shift. The answers to these issues will help inform their policy response. This note by the EU Agency for the Cooperation of Energy Regulators (ACER) provides a factual analysis of Europe's energy price developments.

Why are energy prices so high and how long will it last?

While various factors have contributed to the high energy prices in Europe, the main driver is the surge in the price of natural gas. This price surge has been mainly caused by a tight global LNG market. Forward markets expect a significant drop in wholesale prices for gas and electricity in spring 2022. A key variable in the very near term is the upcoming winter and its implications for gas demand.

Policy considerations – short term and longer term

The European Commission has prepared a 'toolbox' of measures that national governments can use to respond to price hikes without endangering the functioning of EU wholesale markets. This note by ACER touches on a few select policy considerations related to this response, namely:

- disproportionate effects of high prices on vulnerable consumers and the possibility for Member States to mitigate this in the short term without unduly distorting fundamental market signals;
- the functioning and rationale of the current EU electricity market design vis-à-vis the current high prices;
- certain issues related to gas supply going forward such as possible joint purchasing of strategic gas reserves as well as possible obligations for gas storage; and
- longer term transition trajectories and the link to holistic policy.

Today's energy price squeeze is a reminder of Europe's still high-dependency on imported fossil gas and the inherent volatility of global commodity markets. It is also a reminder that a well-designed energy transition pathway going forward will rely on holistic policy that targets demand just as much as supply, focusing on both the short-term and the long-term. As such, Europe's transition pathway will likely need to be a more 'managed transition' in the years ahead with both government and regulatory monitoring playing a significant role.

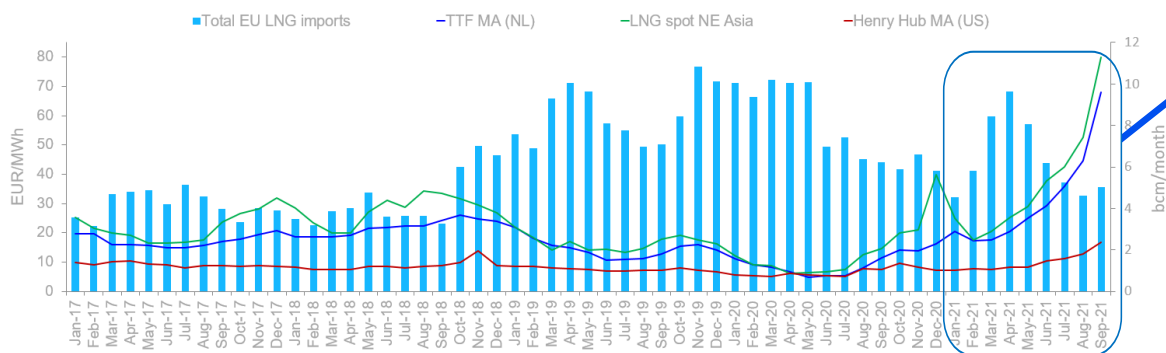
1. Introduction

This note, by the EU Agency for the Cooperation of Energy Regulators (ACER), provides data and insights on the recent high energy prices. It explains the drivers of why energy prices have hit unprecedented highs and the impact on price levels across Europe. It also provides an outlook of market expectations for the next six months and it takes a look at certain market behaviours. Finally, it provides a few brief policy considerations (both short and long term), namely some of the short-term relief measures that can protect energy poor and vulnerable customers without unduly distorting fundamental market signals; perspectives on the current EU energy market design; perspectives on gas storage obligations as well as centralised gas purchasing of strategic reserves; and the needs for a more ‘managed energy transition’ going forward.

2. Price levels and drivers

EU gas and electricity prices have increased rapidly and reached unprecedented levels. Gas prices in early October were 400% more expensive than in April 2021, driven significantly by global supply and demand dynamics. Electricity prices have increased by 200% over the same period, driven mainly by the gas prices.

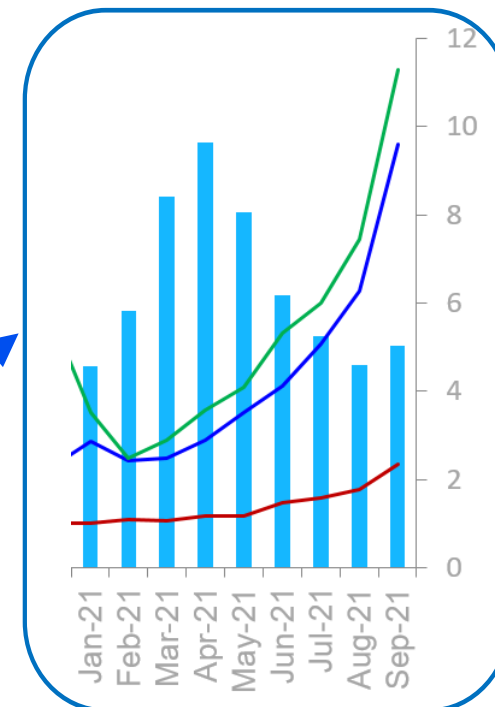
Figure 1: Comparison of international wholesale prices spreads vs EU plus UK LNG imports: 2017 to September 2021 – EUR/MWh and bcm/month



Source: ACER based on ICIS Heren and GIE

2.1 High prices in global LNG and European dependency on imports

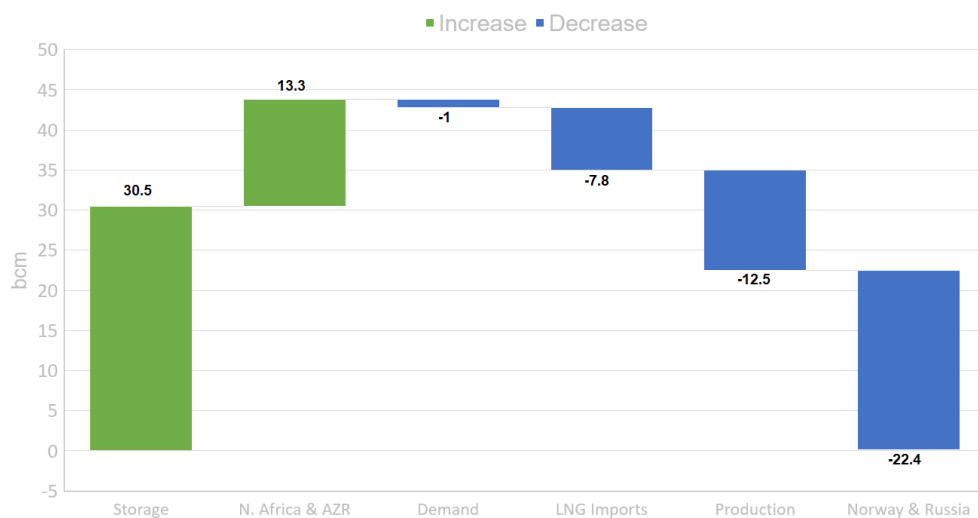
The main driver of the high energy prices in Europe is the global gas price surge, due to significant increase in demand (which in turn is driven by rapid economic recovery and certain weather patterns) combined with tight supply. North-East Asian and South American liquefied natural gas (LNG) demand has grown significantly, putting upward pressure on global prices and leaving less gas available for import into Europe, traditionally the global LNG ‘swing market’. LNG imports into the EU declined by -20% year-on-year (YoY) until September 2021. As LNG is the marginal price setter in many EU gas markets, this placed upward pressure on the prices offered by competing pipeline suppliers. Figure 1 below shows spiking prices in Asia in winter 2020 and a strong correlation between European and Asian LNG prices.



2.2 Secondary factors and historically low storage

While global gas prices are the main driver of energy price increases, a mix of secondary factors also contributed in Europe: coal and carbon price increases; high demand (triggered by the economic recovery) and weather patterns (cold winter, unusually hot summer); low renewable generation (e.g. lower wind generation and hydro impacted by drought); declining domestic gas production (-10% YoY) and some gas supply constraints due to maintenance and less investment in new production. While analysts expected the higher price to attract more pipeline supplies, aggregated gas pipeline imports remained steady. So far, the shortfall experienced (with Europe having had 10% less gas supplied) was picked up by gas storage, see Figure 2 below. This in turn has affected the current, relatively low level of gas storage stocks in Europe.

Figure 2: Comparison of the changes in gas supply to the EU, 2019 vs 2021: bcm in the January to August period and winter gas consumption

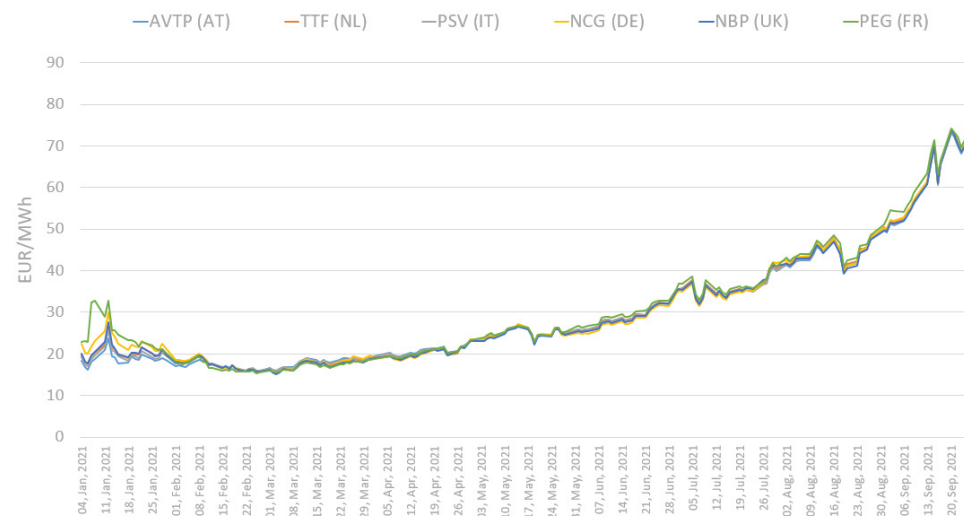


Source: Oxford Institute of Energy Studies based on ENTSOG, GIE and Kpler

2.3 Uniform impacts across European wholesale gas

As mentioned, markets in Europe have been significantly impacted by the global gas prices. Figure 3 below shows the gas front month contracts from January to September 2021 at selected gas hubs in Europe. The figure illustrates that price convergence between EU gas hubs has remained very strong, with spreads below 1 EUR/MWh in most cases. This shows the high level of gas market integration in Europe. Had European gas markets been less integrated, parts of the EU would have paid significantly higher prices for their gas.

Figure 3: Gas front month contracts from January to September 2021 – EUR/MWh

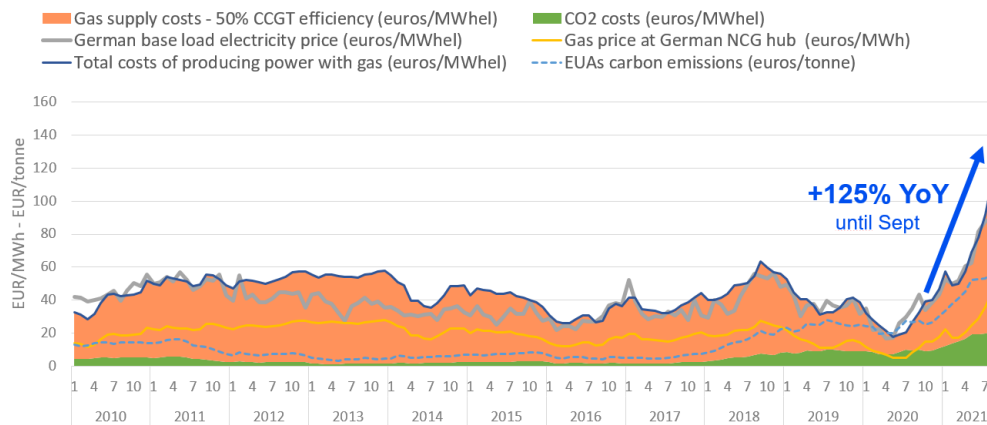


Source: ACER based on Reuters

2.4 Electricity wholesale prices also significantly affected, but less uniformly across Europe

As far as the impact on electricity prices are concerned, Figure 4 below shows the price evolution for electricity, gas and carbon since 2010 in Germany (the most liquid electricity market in Europe). Electricity baseload contract closely followed the cost increase in gas-fired electricity generation, which is a function of both natural gas and carbon prices. The latter has also experienced a strong price increase, though significantly lower than the price of gas (+90% since the end of 2020). This is due to the reduction¹ in the number of auctioned emission allowances as well as the increasing hedging activity of utilities and financial players.

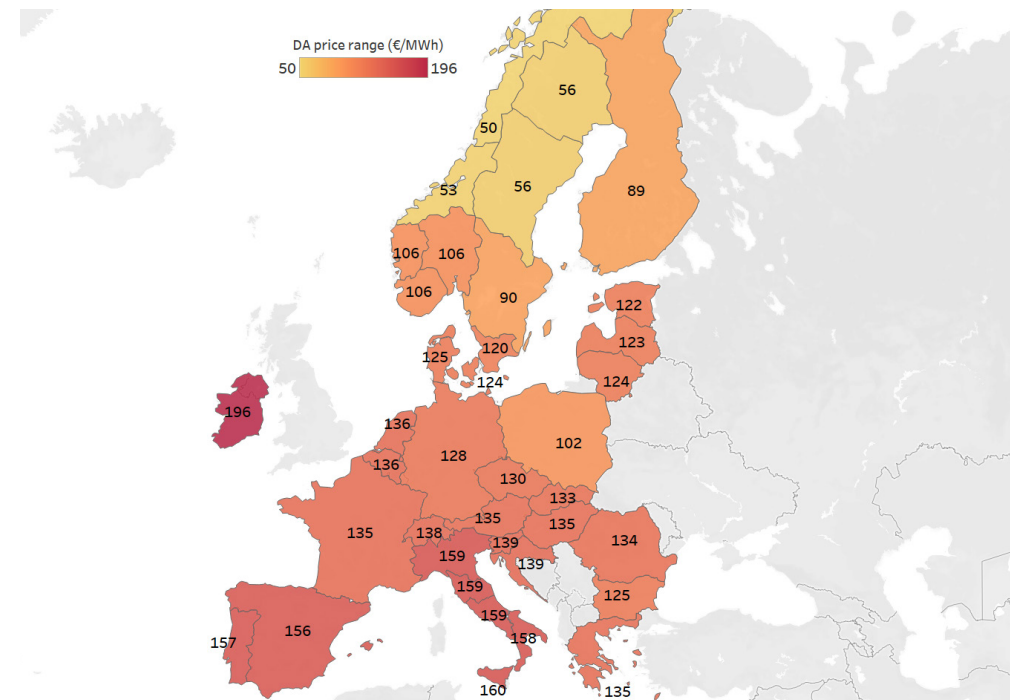
Figure 4: Price development for baseload electricity in Germany, gas, carbon and average short-run marginal costs of gas power plants (2010 – 2021)



Source: ACER based on ICIS Heren

Unlike European gas markets where the price rises were quite uniform, the wholesale electricity price rise differed significantly from one Member State to another (see Figure 5 below showing day-ahead market prices). In short, markets dependent on gas for a larger portion of their electricity generation (Southern European markets and the Single Electricity Market (SEM) for the island of Ireland) have experienced higher electricity prices. The level of interconnectivity also plays a role in this more uneven picture of electricity prices across Europe.

Figure 5: Average electricity prices for bidding zones in Europe: September 2021 (EUR/MWh)



Source: ACER based on ENTSO-E

¹ Sectors covered by the EU Emissions Trading System (EU ETS) must reduce their emissions by 43% compared to 2005 levels (see [Revision for phase 4 in the EU ETS](#)).

3. Near term outlook

This section discusses near term price expectations by examining some of the drivers that will determine electricity and gas price formation in the months to come. It also offers a look into certain market behaviours, underlining that no evidence of systematic manipulative behaviour has been detected (to date) as a cause of the high energy prices, but the surveillance is ongoing.

3.1 Possible market manipulation attempts covered by the REMIT framework?

An important issue when addressing unusual and/or unexpected market developments is whether there are signs of market manipulation, potentially contributing to such developments. Currently, based on the information and data available to ACER, there is no obvious indication nor evidence of systematic manipulative behaviour or insider trading under REMIT² causing the high energy prices. Furthermore, given the global fundamental drivers of current high prices in Europe as outlined above, it is unlikely that any specific and repetitive market trading behaviour would have a significant impact on such high prices. ACER's market surveillance efforts alongside those of national regulators under REMIT are ongoing³.

3.2 Market behaviour by Russia?

As mentioned above, pipeline imports to the EU have remained steady. Gazprom is the biggest supplier of gas to the European market, having approximately 35% market share. Hence, there have been discussions on why the current high European prices have not triggered an increase in deliveries from Gazprom.

² REMIT is a dedicated EU-wide framework, since 2011, securing the integrity of wholesale gas and power markets under Regulation (EU) No. 1227/2011: Regulation on Wholesale Energy Market Integrity and Transparency.

³ Emission allowances (EUAs) within the EU Emissions trading system (ETS) recently faced significant price increases (in particular in the first five months of 2021). Increasing EUA prices are designed to add to the production costs of fossil fuel power plants in the EU. Hence, this contributes to higher electricity prices whenever renewable and nuclear production alone are not able to meet electricity demand. Currently, emission allowances are classified as financial products supervised by financial regulators, and out of the scope of the REMIT monitoring scheme.

On one hand, according to publicly available information, Gazprom has delivered its contractual gas commitments. It is expected that Gazprom deliveries will have increased by 5% YoY by the end of the year. On the other hand, there is significant transport capacity currently not booked which would allow for increased Gazprom supplies to Europe, thus adding to questions as to why this has not happened.

Some factors point to certain restraints facing Russian supply of gas. There is higher domestic consumption in Russia (+12% YoY, including doubled storage injections to refill depleted storage stocks) and additional exports to other markets such as Turkey (+10 bcm), China (+3 bcm) but also via LNG (+3%, all until August). Summer maintenance works at the Nord Stream and Yamal pipelines (also deferred maintenance and outages occurred on North Sea platforms) as well as variable spare production capacity is likely to have affected the total available Russian flows. Another issue concerns the market strategy of Gazprom in a situation, as said, where current prices are attractive for suppliers, perhaps targeting more price than volume or market share. Finally, Gazprom's reluctance to acquire short-term transmission capacity to increase or even maintain its flows across Ukraine and Poland has led to discussions on potential linkages to the possible entry into operation of the Nord Stream 2 pipeline.

3.3 Market expectations – how long will it last?

While ACER is not in a position to forecast market prices, information on future price expectations is available from market participant trading. Forward curves for gas and electricity wholesale contracts delivered in the mid-term future (see Figures 6 and 7 on the next page) indicate that short-term prices are expected to fall back significantly after the coming winter. A trend towards further 'normalisation' is anticipated for the next two years. In short, the market expectation is that the current energy price surge is temporary in nature.

Figure 6: Electricity forward curve

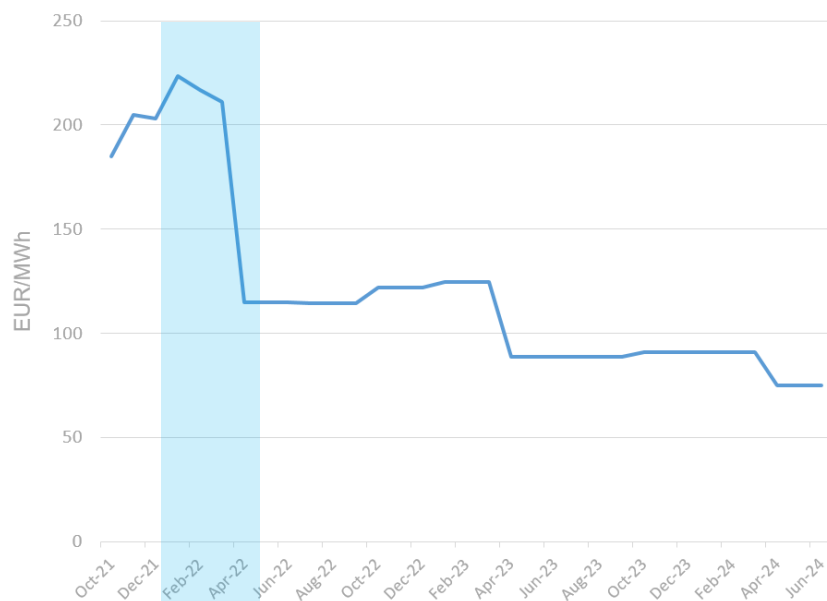
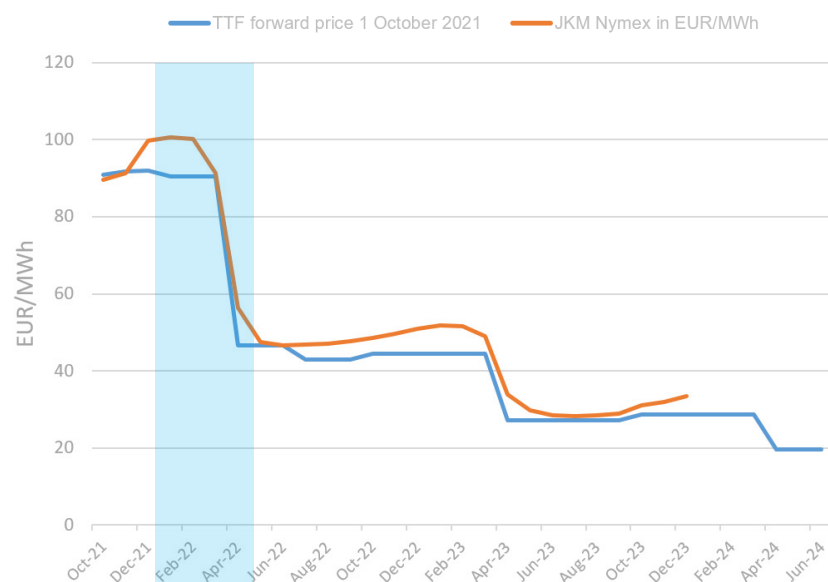


Figure 7: Gas forward curve



Source of figures 6 and 7: ACER calculation based on ICIS Heren and Refinitiv data

3.4 Winter is a key variable for gas demand

As current gas supply is unusually tight, attention naturally turns to a key variable for near-term demand in the form of the upcoming winter season in Europe. Here, weather-driven consumption (where households account for 40% of gas and 30% of overall electricity use) as well as levels of economic activity will be key for price developments as the events of 2021 show. A colder than average 2021/2022 winter season could push gas demand further up, whilst at the same time limiting some renewable electricity generation, thereby resulting in potentially higher prices than anticipated today. Demand from industry will be shaped by a number of factors, one of which is the profitability of continued production in light of higher energy (and other commodity) input prices. So far, however, the post-COVID-19 economic growth seems rather robust.

On the supply side, over the last year underground gas storage withdrawals have played a crucial role to rebalance EU supply portfolios (as mentioned above). However, combined with reduced LNG injections in spring, operators depleted storage levels to volumes lower than observed in previous years. In October 2021, EU underground stocks are on average at 76% of capacity (behind this average figure stand, however, significant differences in storage access regimes around the EU⁴.)

A tight supply scenario in the coming winter, recalling here that spot LNG deliveries into the EU will be influenced by global demand and supply dynamics, coupled with present day low gas storage stocks would imply upward pressure on prices. Put briefly, if LNG and pipeline imports do not increase compared to current levels, stocks may be tight to face a similar winter to 2020/21, and short to face the ‘worst scenario’ in terms of winter temperatures.

⁴ To name a few examples: Storage is around 55% in Austria or the Netherlands, with a negotiated access regime, compared to around 90% in Italy, France or Poland which have set regulated access conditions.

4. Select policy considerations

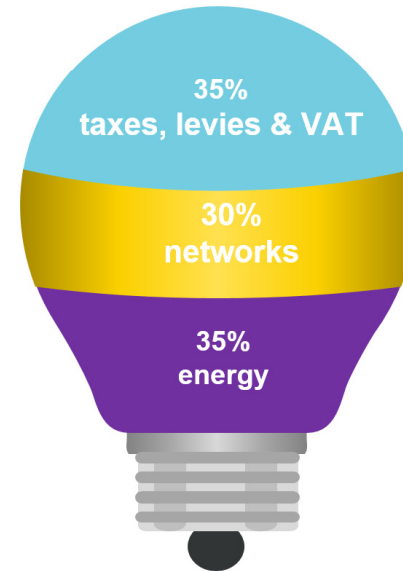
The current undersupply in global gas markets and resulting global gas price surge is significantly affecting European gas and electricity consumers. Higher than usual market prices are not per se a sign of malfunctioning markets, in particular when they follow underlying market fundamentals. Rather, the markets function so as to draw attention to these underlying fundamentals, raising questions as to whether policy action should be taken to address them (one example being the currently significant reliance on gas imports into the EU).

That said, persistently high energy prices naturally raise a number of concerns for governments, e.g. affordability for end-consumers and especially vulnerable consumers, as well as competitiveness of industry, inflationary pressures and wider macroeconomic implications for the economic recovery. Here, we highlight a few important policy considerations, both short-term and longer-term.

4.1 Short-term relief to protect the vulnerable and the European Commission’s Toolbox

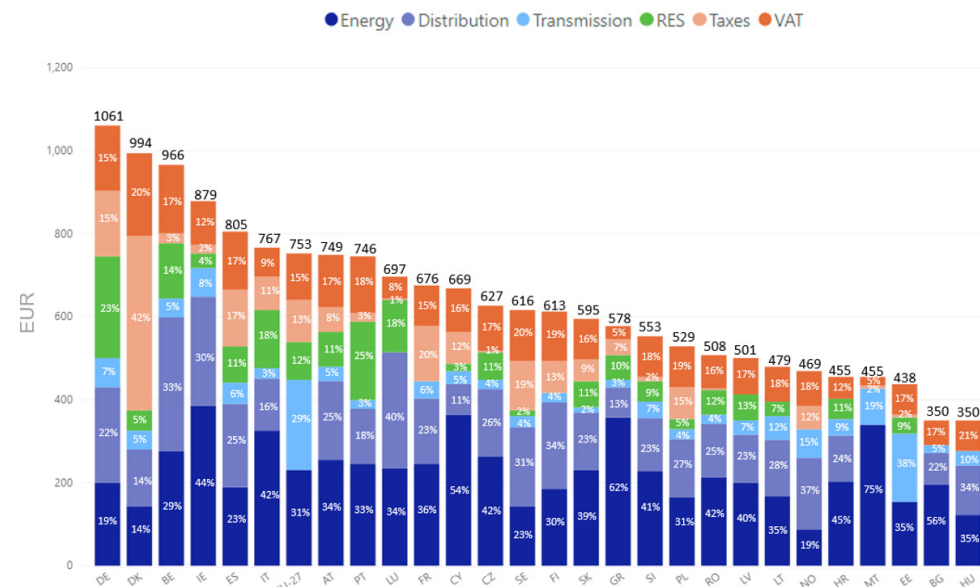
Energy price increases will disproportionately affect vulnerable consumers and those on lower incomes, thus raising issues of equity. The timing and impact on consumers depends on their contract for energy services (e.g. whether these are flexible, dynamic or fixed price contracts). Eventually, however, suppliers are likely to pass on cost increases to consumers (be it immediately or later on).

The typical bill sheds some light on where government policy interventions could be e.g. reducing **taxes and levies**. The cost breakdown of the household bill is roughly one-third energy, one-third network charges, and one-third taxes and levies (although with significant variations between Member States as Figure 8 shows). Hence, the approaches in different Member States will likely vary.



With taxes and levies making up a considerable part of the typical household electricity bill in the EU, governments may want to consider reductions or targeted exemptions of taxes and levies. From a regulatory perspective, such measures would have maximum impact if they target particularly vulnerable consumer groups.

Figure 8: Average EU electricity bill breakdown 2020 (% , EUR/MWh)



Source: Eurostat Band DC – 2,500-5,000kWh consumption per annum

Another option is to enact **social policy measures** outside of the energy domain like e.g. dedicated financial transfers. Such measures can be targeted to those groups deemed most in need and avoid the risk of inadvertently tampering with desired price signals over the medium-term. In addition, dedicated consumer protection measures (e.g. **disconnection safeguards**) could be considered.

Energy efficiency and specific consumer action can also assist in reducing energy bills. Quite a number of consumers in Europe are still with their traditional supplier 'inherited' from the period before the liberalisation of retail energy markets. This may expose such consumers to a 'loyalty penalty', resulting in them paying more for their energy. As outlined in European Commission Quarterly Report (Q4) on European Electricity Markets 2020⁵, **consumers can save by switching supplier**. Comparison tool websites also help consumers find an alternative supplier at a lower price.

A frequently debated measure is the use of **price regulation or targeted price restrictions**. Importantly, price regulation, in particular at the electricity wholesale market level, is not allowed under EU legislation. While price interventions (e.g. caps on prices, bids or revenues) may appease some concerns in the short-term, they risk jeopardising broader objectives such as further innovation in market offerings, competition and trust in wholesale markets. This in turn risks leading to lower participation from potentially competitive suppliers as well as demands for higher-risk premiums. And these in turn may further aggravate those high prices which were the political impetus behind those same interventions in the first instance.

The European Commission has prepared a ['toolbox' of measures](#) that national governments can use to protect the vulnerable without endangering the well-functioning EU wholesale markets. In ACER's view, protective measures that aim to provide short-term relief should seek to refrain from interfering with the operation of energy markets where these markets are designed to make the best use of existing

resources and appropriately signal supply scarcity. Such markets incentivise other providers to come in and meet demand, potentially via different and more competitive offerings. A fundamental dilemma during situations of unusually high prices is that whilst the political focus naturally is on protecting the most vulnerable, the role and value of price signals should not disappear. On the contrary, such signals contribute to drive desired behaviour (e.g. towards new investment and/or increased efficiency efforts). In the absence of such signals, it is likely that choices will be driven towards less-desired behaviour.

4.2 Medium to long-term measures

Wholesale market design is often questioned when prices rise above certain levels. ACER is of the view that an efficient and long-term sustainable energy market design is a key pillar for realising Europe's vision of a competitive and climate neutral economy.

4.2.1 Electricity 'pay as clear' markets

A key feature of the EU electricity wholesale market is that prices and exchanges of electricity across market areas (so-called bidding zones⁶) are determined through a process known as market coupling. This keeps electricity costs down for consumers across the EU and allows Member States to rely on neighbours at times of scarcity, supporting security of electricity supply.

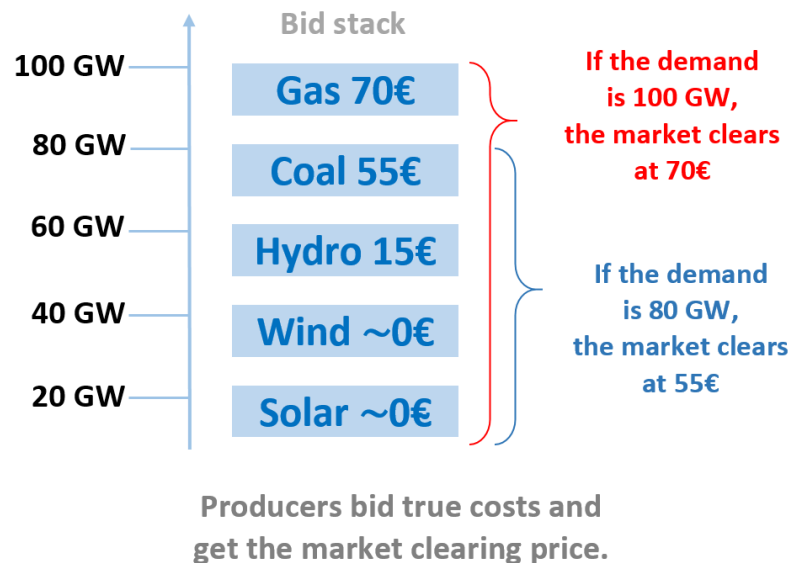
The EU electricity market is based on a marginal pricing method (also known as a 'pay-as-clear' market). All electricity producers (including renewables, demand-side response and technologies such as storage) in the same bidding zone are incentivised to bid their true costs (so they are dispatched the maximum amount of time) and are all paid the same price for their electricity, provided their bid comes under the final clearing price.

⁵ https://ec.europa.eu/energy/sites/default/files/quarterly_report_on_european_electricity_markets_q4_2020.pdf

⁶ The geographical boundaries of EU bidding zones are typically the borders of the Member State, with a few exceptions.

Figure 9 illustrates the pay-as-clear model.

Figure 9: Marginal pricing: Pay-as-clear

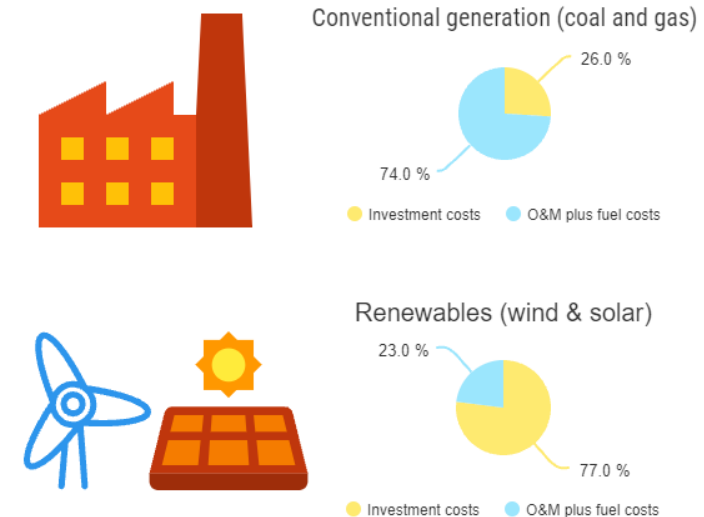


Source: ACER

The divergent breakdown of the costs incurred by generation technologies is one of the factors to be kept in mind when considering the appropriateness of the current market design vis-à-vis current high prices, and in particular the perception of ‘unfair profits’ possibly being made.

First, a common feature of most low-carbon technologies, including renewable generation, is that they have relatively low marginal cost but significant upfront capital investment cost (often referred to as ‘high CAPEX, low OPEX’ technologies). Figure 10 gives an indication of the difference, here comparing one type of gas thermal generation with solar PV generation.

Figure 10: Illustrative breakdown of costs for conventional and renewable generation technologies



Source: ACER based on the IEA

As a result, ‘high CAPEX, low OPEX’ technologies will need to recuperate their higher capital costs via (first) being accepted in the merit order (which would normally happen in the absence of very low demand given their low marginal cost); and (second) the clearing price being significantly above such marginal costs for a significant number of hours during the year. In the absence of that, such investments will likely not be financially viable without significant subsidy support – and if so, it is likely such investments will no longer be made.

Second, as in other major jurisdictions around the world, the EU’s 2050 trajectory will likely entail a significant increase in overall electricity generation as this is a cost-efficient means to decarbonise multiple sectors of the economy. Substantial shares of this increase in generation is likely to be renewable technologies, of which a substantial share will be intermittent renewables like e.g. wind and solar generation.

Recent IEA analysis shows that the flexibility needs of the electricity system as a result will increase at a higher rate than the overall increase in generation, see Figure 11.

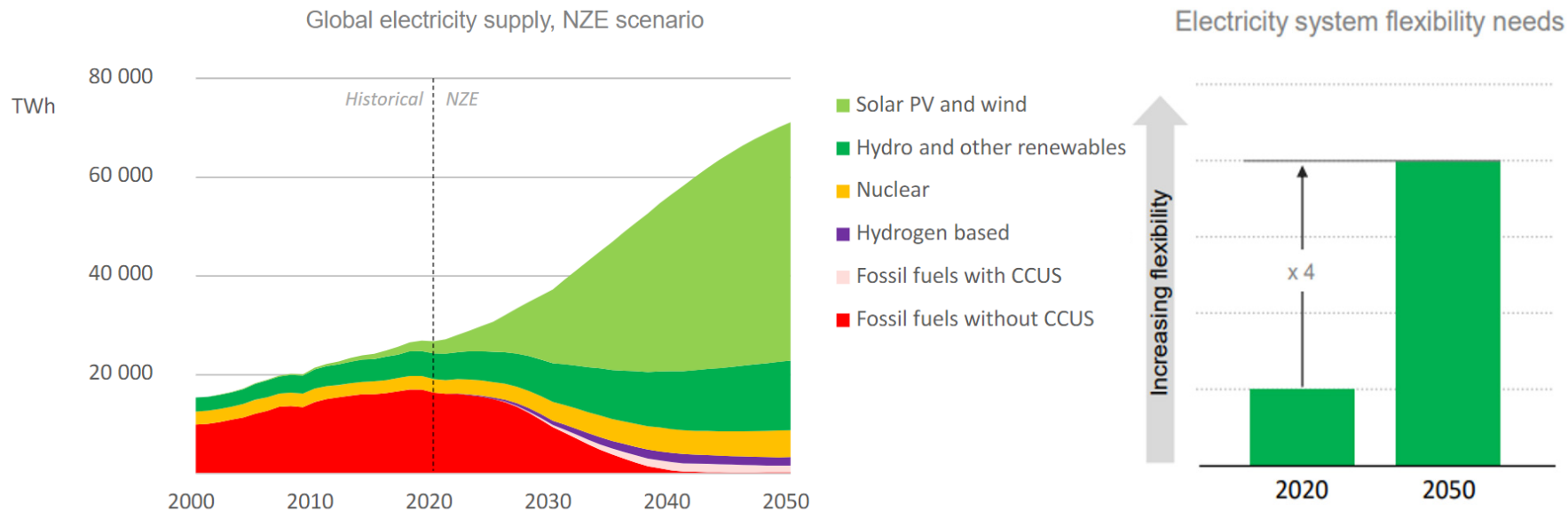
In turn, this means that the future electricity system is likely to remain inherently volatile, with prices varying significantly as a function of generation availability. As a result, there is a need to incentivise those providers and technologies that can ‘smooth’ this volatility (be it batteries, larger-scale storage, aggregated demand-response providers like electric vehicle fleets, energy communities etc.).

These factors combined would seem to imply that any future market design needs to be able to (a) remunerate technologies above their marginal costs, sometimes quite significantly so, and (b) incentivise the alleviation or smoothing of volatility in the market. The ‘pay-as-clear’ model allows for both of these elements.

The aforementioned considerations do not necessary imply that the current market design for all intent and purposes is ‘future-proof’. By way of perspective, up until recently most discussions about an evolving electricity market design revolved around the question of whether a market dominated by low-marginal cost generation would be able to ‘make enough money’ for those present in the market. This seems to contrast with some of current discussions, seemingly more focused on whether generators are ‘making too much money’.

From ACER’s perspective, certain fundamental questions around future electricity market design persist and are pertinent. However, these questions revolve more around the former question (making enough money) than the latter (making too much money).

Figure 11: Outlook for global electricity generation and associated flexibility needs towards a 2050 net zero trajectory



Source: Net Zero by 2050: a Pathway for the Electricity Sector, IEA May 2021

4.2.2 Expand gas storage obligations and/or centralise purchasing of strategic gas reserves?

With global gas supply and demand dynamics being the key driver of the current high prices, political attention has, not surprisingly, turned to possible measures relevant for gas supply security going forward. Discussions have focused on options like expanding obligations for gas storage in Member States or centralised gas purchasing of strategic reserves.

Regarding gas storage obligations, as outlined earlier, Member States have so far adopted different approaches. While storage obligations tend to result in higher stock levels, they can also reduce the efficiency of supply and restrict hub-trading activity, which could lead to higher final prices. Therefore, proposals to expand gas storage obligations across the EU, notwithstanding certain supply security benefits, deserve appropriate analysis.

As regards ideas for centralised purchasing of strategic reserves, it is not immediately clear that pooling of such purchasing power would have much impact on the price of gas supplies. For starters, current circumstances constitute a 'seller's market'. As such, any collective buying proposition from European companies would need to be attractive vis-à-vis, say, major demand markets in Asia that are currently driving prices upwards. Similarly, the dominant gas pipeline suppliers to Europe do not seem to be reacting heavily to the current high-price environment by significantly enhancing their supply. Hence, it is an open question whether pooling purchasing power would have a material effect.

Centralised gas purchasing strategies have resonated in the past, as a proposal to limit the bargaining power of gas producers. For example, various Central and Eastern European Member States expressed in 2015 interest to jointly negotiate contracts with Russia, in the context of price and transit disputes. Consortiums have also been formed to back new production and transportation investments (e.g. various Member

States and companies expressed interest to develop the eventually non-concluded Nabucco pipeline, to bring gas from the Caspian region into the EU). These collective voluntary actions did not materialise in view of the practical difficulties faced, but also because the analysis identified that - even if they could partly assist a more efficient negotiation - the initiatives could restrict competition, reduce transparency or withdraw liquidity from hubs. Alternative measures such as the further harmonisation of market rules, grid reinforcement and promotion of hub competition were deemed more effective.

4.2.3 A comprehensive energy transition will need to be a well-managed one, targeting both demand and supply

Energy markets play a central role in driving broader decarbonisation objectives as these markets provide the primary price signals to drive desired behaviour such as e.g. greater efficiency efforts or decisions on new investment. Such markets are important to ensure that choices made in the coming years are efficient, lowering overall system transition cost; a factor which in turn is likely to prove key for overall affordability longer-term.

The current high price situation, resulting in particular from global supply and demand dynamics, has shown that faced with a sudden and unexpected supply glut, demand to a significant extent has failed to respond (a phenomenon economists often refer to as 'inelastic' demand). This rather simple fact shows that a well-designed energy transition pathway going forward will need to rely on holistic policy that targets demand just as much as supply and focuses on both the short-term and the long-term.

This type of focus suggest that energy transition pathways are likely to become more of a 'managed energy transition' going forward. If so, consistent government and regulatory monitoring will play an increasingly important role.

EU Agency for the Cooperation of Energy Regulators (ACER)

ACER, the EU Agency for the Cooperation of Energy Regulators, contributes to Europe's broader energy objectives, including the transitioning of the energy system at lower cost, by:

- Developing competitive, integrated energy markets across the EU via common rules and approaches, thereby enabling reliable and secure energy supply at lower cost;
- Contributing to efficient trans-European energy infrastructure and networks, enabling energy to move across borders, thus enabling energy choices at lower cost and furthering the integration e.g. of renewables;
- Monitoring the well-functioning and transparency of energy markets, deterring market manipulation and abusive behaviour.

ACER was established in March 2011 and is headquartered in Ljubljana, Slovenia, with a small liaison office in Brussels. Over time, the Agency has received additional tasks and responsibilities relevant for the further integration of the European internal energy market and for monitoring how energy markets are working.

Each energy National Regulatory Authority (NRA) in the EU Member States participates in ACER and is a voting member of the Agency's Board of Regulators. Regulatory oversight is shared between the Agency and NRAs, whilst enforcement is done at national level.

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