

# Responses to fossil gas price volatility

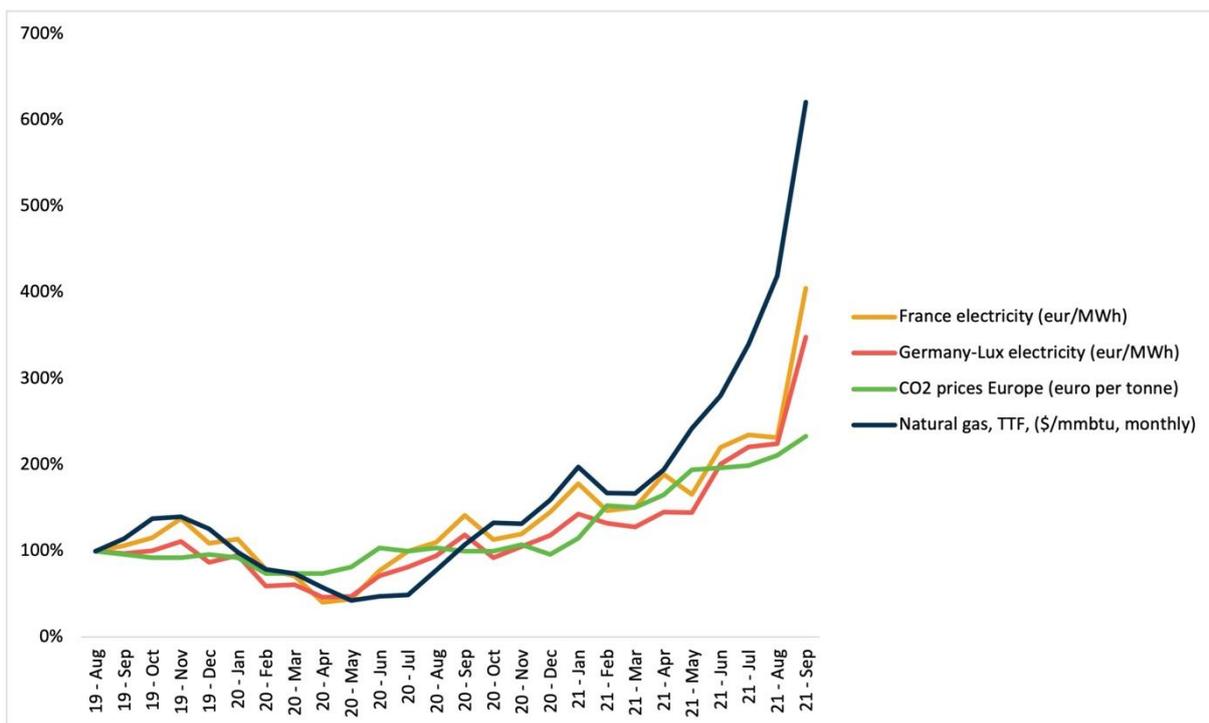
2 November 2021

## The situation

Energy and commodity prices respond to swings in the global economy. This is classic supply and demand market dynamics. The recent surge in energy prices in Europe, as shown in Figure 1, is economic theory in action: Supply is struggling to keep up with demand that is currently bouncing back to pre-COVID levels.

The surging international demand for liquified natural gas (LNG) is by far the most important driving factor of the recent rise in wholesale gas and electricity prices. (See Annex 1 for more detail.) The translation of these wholesale markets to retail prices for consumers differs across European countries. Important factors are the nation’s energy mix, the share of levies and taxes in retail prices and the extent to which prices are more or less directly linked to short-term markets.

Figure 1. Average monthly energy and CO<sub>2</sub> prices August 2019 – September 2021



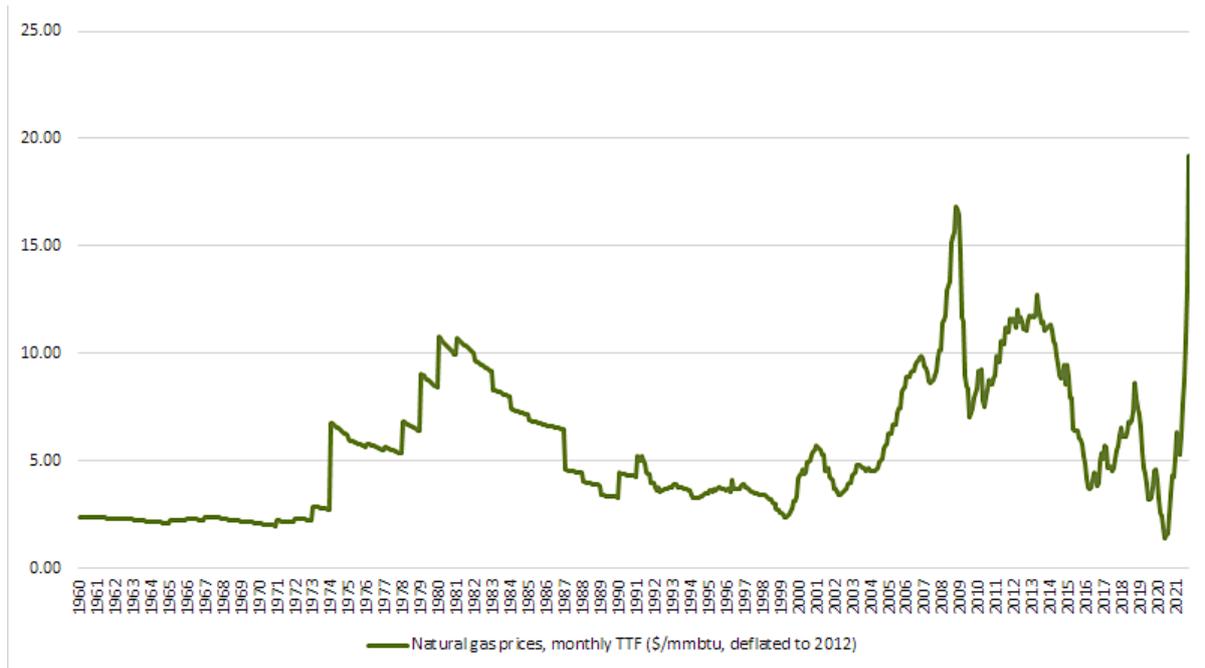
Source: RAP based on [World Bank](#), [EEX](#), [Sandbag](#)

Fossil gas, also called natural gas, is the dominant heating fuel in Europe, accounting for 45% of household energy for heating. Surging fossil gas prices — the underlying driver of high power prices — may mean even more dire times for households this winter, especially if it is a harsh winter.

Most experts expect prices to remain high through the winter, whilst analysts point to factors like potentially increasing LNG and pipeline supply that may relieve the pressure on gas

prices after the winter. High price volatility, however, has long been and will very likely remain a feature of fossil gas and other fossil fuel markets; Figure 2 illustrates the fluctuations of the last six decades. Given the multiple factors that will affect future natural gas prices — producer uncertainty about future demand, the costs of maintaining legacy transport and storage infrastructure, global shifts from coal to gas, CO<sub>2</sub> prices, more volatile energy demand patterns, and so on — the level of unpredictability is likely to only worsen.

**Figure 2. Natural gas price in Europe, 1960 to now**



Source: World Bank [Commodity Price Data](#) (The Pink Sheet)

## Rapid response measures

Governments across Europe are scrambling to find solutions to help families struggling to pay their energy bills this winter (see Annex 2 for summary of actions taken). The European Commission published a [toolbox with short-term recommendations](#). Its communication is largely aligned [with analysis](#) by the Agency for the Cooperation of Energy Regulators. As Member States, individually and in the European Council, implement and discuss the best way forward through the winter, we analyse short- and medium-term options.

Most measures require funding. Possible sources of revenue for governments include, in rough order of merit, with the best first:

- **Emissions Trading System (ETS) carbon revenues:** Higher ETS prices result in growing auction proceeds — potentially exceeding [€50 billion in 2022](#). Using these additional revenues to support consumers would be a prelude to the Social Climate Fund included in the Commission’s Fit for 55 legislative proposals.
- **Value-added tax (VAT) revenues:** VAT revenues on energy increase proportionally with surging gas and electricity prices, a windfall for government coffers. High energy costs, however, put pressure on household budgets, which can lead to lower expenditures

for other consumer goods, and thereby diminish any windfall of VAT revenues. Careful analysis of the likely net VAT revenues is needed.

- **Windfall profit claw-back:** A more contentious option is to recover possible windfall profits from legacy zero-marginal-cost resources that benefit from current high power prices but are not exposed to ETS CO<sub>2</sub> prices. Distinguishing between windfall profits and legitimate capital cost recovery is problematic. Another drawback is that retroactive changes may heighten a sense of regulatory risk and increase the cost of capital.

The unbudgeted collection of VAT and ETS auction revenues creates the opportunity to support consumers without adversely affecting already tight budgets for existing priorities.

Many governments are already trying to control general consumer bill impacts in response to the price rises. Some are reducing the VAT charged on electricity, as Spain has done. Others, like Italy and Greece, are using ETS revenues to lower tariffs. By contrast, the German government is planning to shift levies on electricity to general taxation.

Lowering VAT rates and foregoing some of the revenue windfall will likely have a progressive impact and may offer advantages in simplicity and transparency. Generally speaking, however, untargeted measures will dilute the effectiveness of government action. The focus of government action is better targeted to those who are most adversely affected by the surge in commodity prices.

**Targeted measures** are more effective in helping vulnerable consumers, provided the targeting is effective and appropriate. There are various options available, in order of merit, with the best first:

- **Direct lump-sum payments to targeted consumers:** Lump-sum payments, such as the €150 ‘energy vouchers’ the French government introduced in 2018 and to which it now added a €100 voucher, help to cover increased costs and can specifically target consumers who truly need support. The French voucher can also be used to pay for (small) energy efficiency upgrades.
- **Rapid-response energy efficiency programmes:** Although logistically challenging, it is worth exploring a rollout of rapid-response efficiency programmes for specific groups, such as energy-poor or vulnerable consumers. Any energy savings would extend beyond the current crisis. Priorities would include building insulation, the installation of efficient appliances, and replacing inefficient resistance heaters with air-to-air heat pumps.
- **Exemptions from levies for low-income customers:** In many countries, levies make up a considerable part of the final electricity bill. Exempting low-income customers from those levies can dampen the impact of high electricity prices. This measure can be paid for through general taxation or can be made revenue neutral by adjusting the levies of the other consumers.

In the current environment, many consumers may consider lower-cost **retail offers** that may or may not offer net benefits over time. Governments and regulators can support consumers by providing clear information on the benefits and risks of available options and by protecting consumer rights.

On the market side, the regulator in Great Britain is now turning its attention to the question whether the retailers are sufficiently well capitalised. It is also important for regulators to

closely monitor the market and prevent and sanction any anti-competitive practice that may exacerbate the increases in prices, as reported by the Spanish consumer organisation OCU. The European Securities and Markets Authority (ESMA), for example, is looking into “the integrity of the European carbon market.”

## How to prevent this crisis from happening again?

The best and most durable solution to mitigate the social and economic impact of volatile fossil gas prices is tackling demand for fossil gas. There are multiple good solutions here, all of which must be deployed vigorously:

- **Apply energy efficiency as a leading measure throughout.** Energy efficiency programmes have demonstrated that large decreases in energy demand can be achieved, thereby lowering dependence on fossil fuels and reducing the risks associated with their price volatility. The importance of the European ‘renovation wave’ cannot be understated. Research by Cambridge Econometrics shows meeting the goal of 35 million renovated buildings by 2030 reduces gas consumption by about 43,000 GWh annually. Buildings can be further weaned off gas through the rapid deployment of heat pumps, supported by a package of policy measures including subsidy programmes, regulation and energy price reform.
- **Build on a massive rollout of solar and wind with a goal to reach zero emissions in the European power system by 2035, as advocated by the International Energy Agency.** A zero-emission power system will be less vulnerable to international fossil fuel price shocks. Wind and solar are increasingly the cheapest power generation resource, especially with increased gas, oil and coal prices. To reduce the need for fossil generation, especially fossil gas generation, variable renewable generation must be combined with energy efficiency, demand-side flexibility and better use of transmission networks as well as storage. Integrated regional markets can buffer fluctuating renewable resources across larger regions. To eliminate any risk of lock-in to fossil gas as a feedstock, **all hydrogen-related development efforts should focus on green hydrogen devoted strictly to hard-to-reach applications** such as backup thermal power generation, air and shipping transport fuels and hydrocarbon-based industries.
- **Ensure equity in the energy transition.** With millions of people living in energy poverty, governments must ensure the costs and benefits of the transition are shared fairly among consumers. They should address energy poverty by designing fair network tariffs. Carbon revenues can be earmarked for investments in renewables and efficiency, as well as bill support for vulnerable customers — an approach polling suggests would remove the impetus behind yellow-vest-type movements. Enabling access to energy services can unlock bill savings for low-income families.

## Ineffective solutions

### Mind the cap

It may be tempting to shield consumers from fuel-driven price hikes by imposing a cap on electricity or gas prices. An aggressive price cap, however, will likely exacerbate supply shortages and can see retailers struggling to pay their sourcing costs. This may lead to the undue exit of retailers and bring long-term damage to retail competition. Some of this scenario is playing out in the UK, which has a price cap in place. Price intervention is also a

generic measure rather than the preferred approach, which is targeted to those that need it most. It can be costly if it drives inefficient consumption decisions, makes cost-effective efficiency investments appear more costly, and impedes investment needed for long-run security of supply.

## The market: Don't fix what is not broken

Surging electricity prices have also stimulated calls to “fix Europe's broken electricity market.” Attempts to blame market design, however, miss the mark. The problem is the cost of fossil fuel, upon which the system remains critically reliant.

The European electricity market design is based on sound principles. Indeed, until recently, the market produced results that led to calls from investors for *increases* in wholesale market revenues, either directly through higher energy prices or indirectly through capacity remuneration mechanisms. The current price surges should be seen in this context, as another part of the cycle, albeit an extreme upswing.

The wholesale power market in Europe uses pay-as-cleared marginal pricing to set the price for electricity. All market participants get the same price for the electricity they produce. Markets tend naturally to organise themselves into a uniform clearing price reflecting costs at the margin. Marginal pricing incentivises the party with the cheapest additional capacity to balance demand and supply for electricity. A clearing price that is linked to marginal cost thus drives minimisation of total long-run cost and maximises societal welfare.

An alternative to marginal pricing is using “**pay-as-bid**,” where market participants are paid their asking price, resulting in a market price at a weighted average of market offers.

It is well settled in the academic literature that energy markets work best when they are uniform price markets based on marginal costs (pay-as-cleared). Only in some specialised reserves markets is it thought that pay-as-bid may be more efficient. In all other cases, pay-as-bid not only fails to produce lower prices but in fact can be expected to lead to less efficient and thus higher price outcomes. This is because market participants simply bid up their price as close as possible to what they think the market will bear.

Still another alternative may be to introduce average pricing in combination with **price caps**. Also in this case, parties may adjust their bids upwards, thus failing to dampen prices. Parties may also fear that they will not be able recover all their energy costs, leading to calls for costly capacity mechanisms. Or, failing all that, security of supply might deteriorate.

Moving to a **cost-of-service model**, another alternative, requires re-regulation or re-nationalisation of the generation and retail sectors. Under this option, wholesale prices

### Electricity markets

- It will always be important to have sufficient **competition** in the market. This is the best tool for putting sustained downward pressure on prices — visible prices — and parties acting in their own rational self-interest.
- A lack of **hedging** via long-term (forward) contracts may result in energy costs that fluctuate above and below the long-run average more than is socially optimal. Tampering with the price formation would cause inefficiency and raise long-term costs. A better way to dampen price fluctuations is with long-term hedging.

over the past two decades would almost certainly have been higher than they were.<sup>1</sup> Levelised wholesale costs of electricity would be no less — and very possibly more than what they would be under the current market design — and those costs would still have to be recovered either through electricity prices or through other indirect means. Moreover, a cost-of-service price for renewables would reflect their all-in costs, not their marginal dispatch cost.

Attempts to introduce an alternative to the current pay-as-clear design would likely fail — the market would change behaviours and thus get around it — and would result in more opaque and inefficient pricing. And more drastic attempts to force this change would require massive intervention, which would jeopardise the significant efficiency gains delivered by the current system.

While the European electricity market can definitely be improved, tinkering with its underlying design as Spain, France and a small handful of other Members States are proposing would leave the root causes of the current situation untouched. It could even exacerbate them and have wide-ranging and potentially adverse consequences: By making price formation opaque and distorting investment signals, it could increase, instead of decrease, costs to consumers. Triggering an extended period of change and uncertainty by starting a fundamental market redesign would chill new investment and merely aggravate supply shortages. This concern is shared by Germany, Denmark and others.

### Liberalisation gains in GB

The effect of liberalising the GB electricity market in the 1990s was analysed in an empirical social cost-benefit analysis of the privatisation and restructuring of the Central Electricity Generating Board (CEGB). The CEGB generated and transmitted all public electricity in England and Wales until 1990. The main benefits of the liberalisation came from generator efficiency gains, switching from nuclear and lower emissions. The central estimate is a permanent cost reduction of 5%. This is likely suggestive of the effect of undoing these reforms.

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<sup>1</sup> Higher prices would have been due to retailers paying prices that included fixed and investment costs for generation, including a significant surplus of generation, that many generators have insisted they were unable to earn in the competitive market.

## Annex 1: Factors contributing to increasing prices

The European Commission estimates about 80% of the electricity wholesale market price increase is due to the increased natural gas price (natural gas power generators usually set the market price for electricity). Only 20% of the price increase is attributable to increased ETS carbon prices.

### Key factors contributing to the gas price surge

Factor	Results / Notes
Global economy is recovering from the COVID-crisis in 2020, leading to <b>gas demand</b> surge for industry and transport.	<ul style="list-style-type: none"> <li>Asian demand for liquified natural gas (LNG) pushing up international market prices, reinforced by policy spurring the shift from coal to gas.</li> <li>European gas demand highest in five years.</li> </ul>
Cold spring in 2021 leads to more <b>heating fuel</b> consumption than usual.	<ul style="list-style-type: none"> <li>European natural gas storage inventories 20% below normal (linked to absence of a forward price premium for winter).</li> </ul>
<b>Pipeline and LNG supply is constrained.</b>	<ul style="list-style-type: none"> <li>Reduced Gazprom supplies potentially stemming from tightness or from withholding, to influence Nord Stream 2 certification procedure.</li> <li>Norwegian output low due to maintenance on North Sea platforms.</li> <li>Equinor committed to increased supply from October 1 onwards.</li> <li>Supply from the U.S. unable to ramp up exports sufficiently, due to hurricane season in the Gulf of Mexico.</li> </ul>
Surging CO <sub>2</sub> <b>emission trading</b> prices. Reform of Emissions Trading System (ETS) and anticipated tightening of the cap in the Fit for 55 legislative package driving up prices.	<ul style="list-style-type: none"> <li>ETS prices have doubled to €65/tonne CO<sub>2</sub> between January and the end of September 2021.</li> </ul>
<b>National</b> circumstances.	<ul style="list-style-type: none"> <li>Spain: low hydro output, investigated for price manipulation.</li> <li>UK: nuclear unavailability, temporary low wind, interconnector failure between UK and France.</li> <li>Germany, Denmark, UK: low Norwegian hydro reservoirs problematic for connected countries.</li> </ul>

## Annex 2. Country-level actions

### Non-exhaustive overview of national responses to energy price surge

Country	Details	Assessment
Belgium	<p>Extension in time of social tariff for vulnerable families, additional €80 bill credit for beneficiaries of social tariff. Fund to assist energy poor through social services.</p> <p>Preparations to shift levies out of electricity bill.</p>	<ul style="list-style-type: none"> <li>• Targets most vulnerable customers with assistance.</li> </ul>
Czechia	<p>Prime minister proposes cap on emissions trading system (ETS) prices.</p>	<ul style="list-style-type: none"> <li>• Cap on ETS prices would not help significantly, since 80% of increase stems from gas price surge.</li> </ul>
France	<p>Energy vouchers worth about €150 per year since 2018. Additional €100 voucher this winter. Can also be used for energy renovation work.</p> <p>Caps gas price until April 2022.</p> <p>Lowers taxes on electricity.</p>	<ul style="list-style-type: none"> <li>• Vouchers to targeted households are a sensible approach.</li> <li>• Price cap on gas risks is a costly measure that is unnecessarily broad.</li> </ul>
Germany	<p>Shift of levies to general state budget and direct support.</p>	<ul style="list-style-type: none"> <li>• Shifting levies to general taxation makes them progressive and supports beneficial electrification. Germany has one of the most unbalanced tax burdens on electricity versus gas.</li> </ul>
Greece	<p>There appear to be some direct and indirect taxes decreases.</p> <p>Use of ETS revenue for energy price intervention.</p>	<ul style="list-style-type: none"> <li>• Measures do not appear to be targeted at vulnerable consumers, which is costly.</li> </ul>
Hungary	<p>All households enjoy regulated retail price. The problem is how the two main retailers will finance the growing revenue gap.</p> <p>The prime minister has been criticising the EU ETS as the cause of a surge in energy bills.</p>	<ul style="list-style-type: none"> <li>• Risk of cross-subsidisation across industry and households as the market permits, or trying to cut a deal to use cheap nuclear for households.</li> <li>• Surge in gas price, not ETS prices, is single most important driver of energy price rise, so proposed carbon price intervention would not help.</li> </ul>

Country	Details	Assessment
Ireland	<u>Price cap</u> pushed by single biggest political party in parliament (Sinn Fein).	<ul style="list-style-type: none"> <li>• Broad-based measure (wastes effort), risks unintended consequences as observed in Great Britain.</li> </ul>
Italy	Use ETS revenue to finance price intervention. Freeze value-added tax levels on utility bill payments.	<ul style="list-style-type: none"> <li>• Targeted measures are accompanied by expensive non-targeted measures (costing in total €3 billion).</li> </ul>
Netherlands	Considering re-opening the Groningen gas field.	<ul style="list-style-type: none"> <li>• Not well targeted to the challenge of reducing gas demand.</li> <li>• Runs counter to advice from International Energy Agency against new fossil fuel investments.</li> </ul>
Poland	Push out households from the regulated tariff to the competitive segment. <u>Calls for cap on price of carbon allowances.</u>	<ul style="list-style-type: none"> <li>• Cap on ETS prices would not help significantly, since 80% of increase stems from gas price surge.</li> <li>• Well-functioning ETS is key to reduce reliance fossil fuels, with their volatile prices.</li> </ul>
Romania	New law on vulnerable consumers proposed. Also disbursing subsidies before winter to those with consumption, or incomes, below average.	<ul style="list-style-type: none"> <li>• Proposals appear to be targeted.</li> </ul>
Spain	Royal decree in parliament with national measures. VAT reduction (from 5.1% to 0.5%), windfall profit tax on nuclear/hydro/wind, capacity auction by incumbents to competitive suppliers, use of ETS auction revenues to lower electricity bills. Calls for ETS reform, changes in price formation in market design.	<ul style="list-style-type: none"> <li>• ETS auction revenues may be helpful in short run to finance targeted support; but in medium term should target energy efficiency as enduring solution.</li> <li>• Market design is not the problem, gas is the problem.</li> <li>• Windfall profit tax may have unintended consequences.</li> </ul>
UK	Potential for multiple retailer bankruptcies, linked to regulated tariff and retailers not hedging. Solutions aired: make supplier of last resort work, reform price cap, short-run nationalisation, abolish price cap, help to fuel poor, green levy shift away from retailers. Longer-term political proposal to zero-emission power system by 2035 and to shift levies from electricity to fossil fuels.	<ul style="list-style-type: none"> <li>• Good ideas: abolish price cap, and address fuel poverty with energy efficiency, shift levies to fossil fuels.</li> </ul>



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