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Energy Crisis Relief as Implicit Insurance: Fossil Import Dependence and Policy Design*

Timothé Beaufils, Ulrich Eydam, Maik Heinemann, Matthias Kalkuhl, Nikolaj Moretti, Andreas Peichl, Philipp M. Richter, Joschka Wanner

- European economies rely heavily on fossil fuel imports and are exposed to global price shocks
- Relief measures face a trilemma: targeting, incentives, and feasibility rarely align
- Relief measures can function as taxpayer-financed implicit insurance against energy crises
- Based on recent crisis responses, relief implies EU-wide permanent subsidies of around EUR 18/tCO_2 (gas) and EUR 10/tCO_2 (oil)
- Such implicit subsidies weaken incentives to reduce fossil dependence and increase vulnerability to future crises

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Energy Crisis Relief as Implicit Insurance: Fossil Import Dependence and Policy Design*

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European economies rely heavily on fossil fuel imports, so foreign supply shocks impose substantial costs on firms and households. These costs are unevenly distributed and can be mitigated through relief measures, which, however, pose two fundamental challenges.

First, crisis relief faces a policy trilemma: policymakers seek to provide well-targeted support, preserve incentives to reduce fossil energy use, and ensure administrative feasibility, but standard instruments rarely achieve all three at once. Second, relief measures can create a dynamic incentive problem: if users of fossil energy come to expect government relief during future energy crises, such interventions act as implicit insurance against fossil price shocks. This weakens incentives to replace fossil fuel imports with domestically produced alternatives, especially electricity from renewable sources. As a result, relief measures can entrench fossil import dependence and increase vulnerability to future crises. This problem can be mitigated if the fiscal costs of relief measures are refinanced through a later increase in taxes and levies on fossil energy.

The German relief packages adopted in response to high natural gas prices during the 2022/23 energy crisis illustrate the order of magnitude involved. Depending on the definition applied, their fiscal cost amounted to between EUR 55 billion and EUR 187 billion. If, statistically, such a crisis occurs once every 20 years, this implicit government insurance is equivalent to a subsidy of EUR 15–40 per metric ton of CO_2 for natural gas. Similar patterns can be observed in other European countries and for other fossil fuel types, with a GDP-weighted EU-27 average implicit permanent subsidy of roughly EUR 18/tCO_2 for natural gas and EUR 10/tCO_2 for oil. More broadly, we argue that publicly provided insurance of this kind should be explicitly factored into the price of fossil fuels outside crisis periods, rather than being implicitly socialized during crises.

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Energy Price Shocks, Import Dependence, and Distributional Consequences

Price fluctuations on international energy markets serve an important economic function. In particular, price increases signal short-run scarcity and create strong incentives for consumers of oil and natural gas to save energy and for producers to expand supply. Historically, the largest price spikes have been associated with major disruptions in oil supply, often caused by regional conflicts (see **Figure 1**). Amid the current tensions surrounding the Strait of Hormuz, as during earlier historical crises, the shock is unfolding over a short time horizon. This limits the scope for rapid supply expansion and makes demand reductions in fuel-importing countries particularly important.

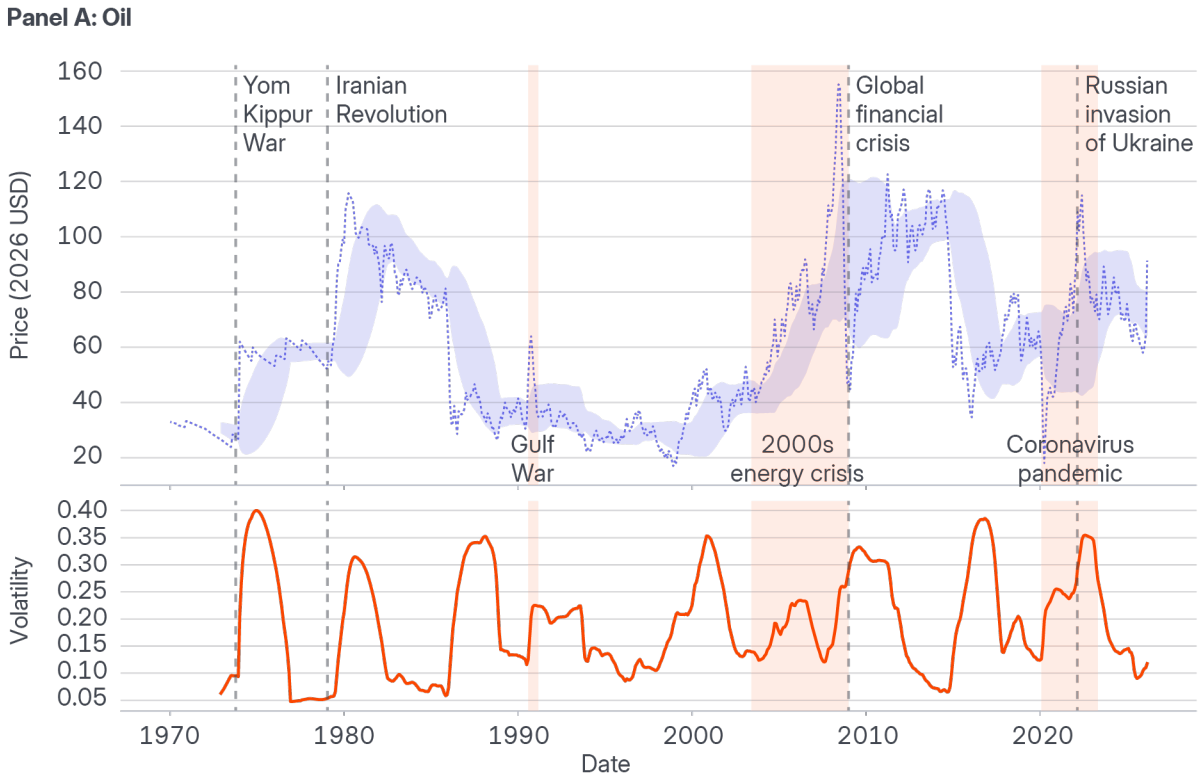
European economies are highly exposed to the volatility of global energy markets because of their substantial reliance on imported fossil fuels (see **Figure 2**). On average, the EU covers roughly 57 percent of its energy needs through imports, but the degree of dependence varies markedly across member states. It is particularly high in countries such as Belgium, Italy, Greece, and Ireland, remains close to 50 percent in France, and is substantially lower in Sweden, Romania, and Estonia. Germany, for example, imported fossil energy worth around EUR 80 billion in 2023. These imports cover 67 percent of the country's primary energy demand. If world market prices rise as a result of geopolitical conflicts or other supply shocks, this causes substantial losses in real purchasing power. A permanent 50 percent increase in fossil energy prices would raise Germany's annual import bill by around EUR 40 billion, or about one percent of GDP as a first-order effect.

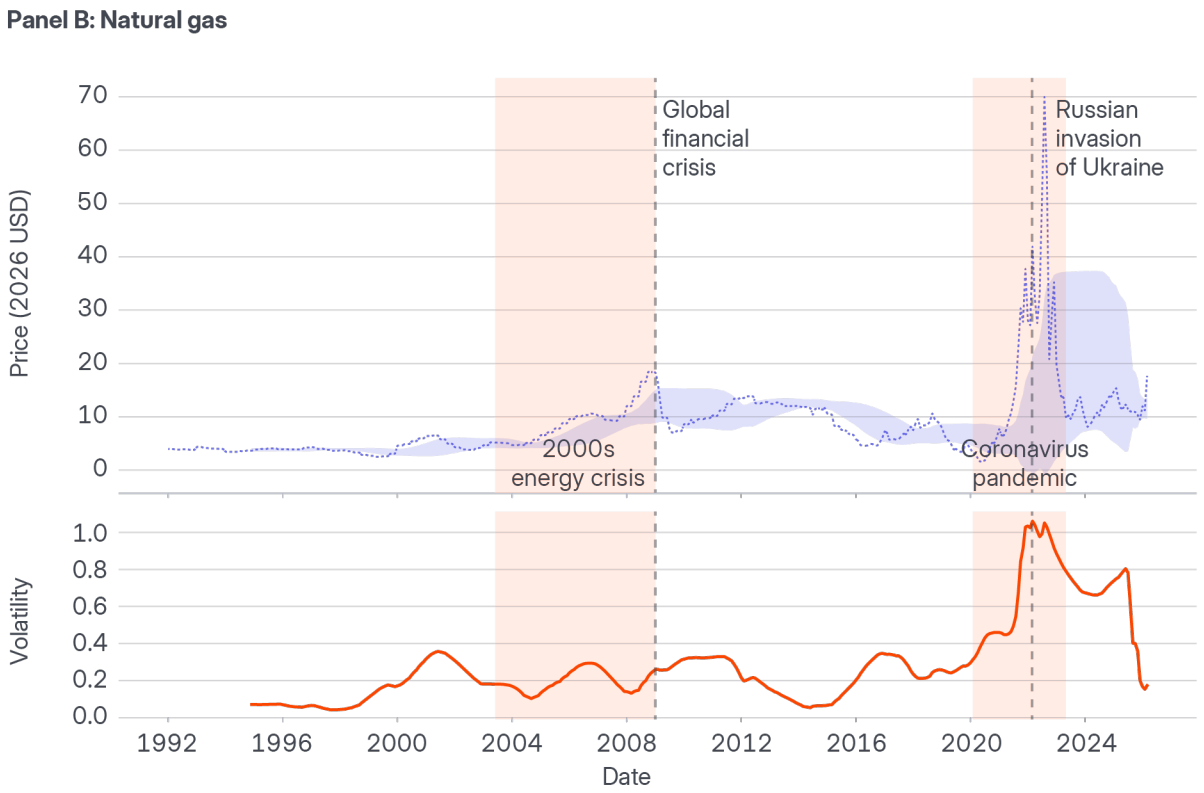
This exposure is highly heterogeneous not only across European countries, but also within them. Price fluctuations therefore have important distributional consequences and can generate considerable social and political tensions. Low-income households are disproportionately burdened relative to their income, and energy needs differ strongly across households and firms. Energy-intensive industries (and workers in those industries), frequent drivers (such as car commuters), and households living in poorly insulated buildings with fossil heating systems are particularly affected. In Germany, for example, the sharp rise in gas prices during the 2022/23 energy crisis led to additional costs of up to 10 percent of consumption expenditure for households with high gas consumption (Hänsel, Kellner, Franks, Gruner, Kalkuhl, Knopp and Edenhofer 2025). The recent rise in oil prices also implies substantial additional costs. An increase in gasoline prices of 50 cents per liter implies additional monthly costs of about EUR 39 for the average German driver, and as much as EUR 86 for a frequent driver.[1]

[1] Assuming an annual mileage of 12,500 km for an average driver and 27,500 km for a frequent driver, with average fuel consumption of 7.5 liters per 100 km, based on MiD (2023). The corresponding figures for diesel drivers are in a similar range.

Figure 1

International Prices of Oil and Natural Gas, Purchasing-Power-Adjusted USD in SDR Terms



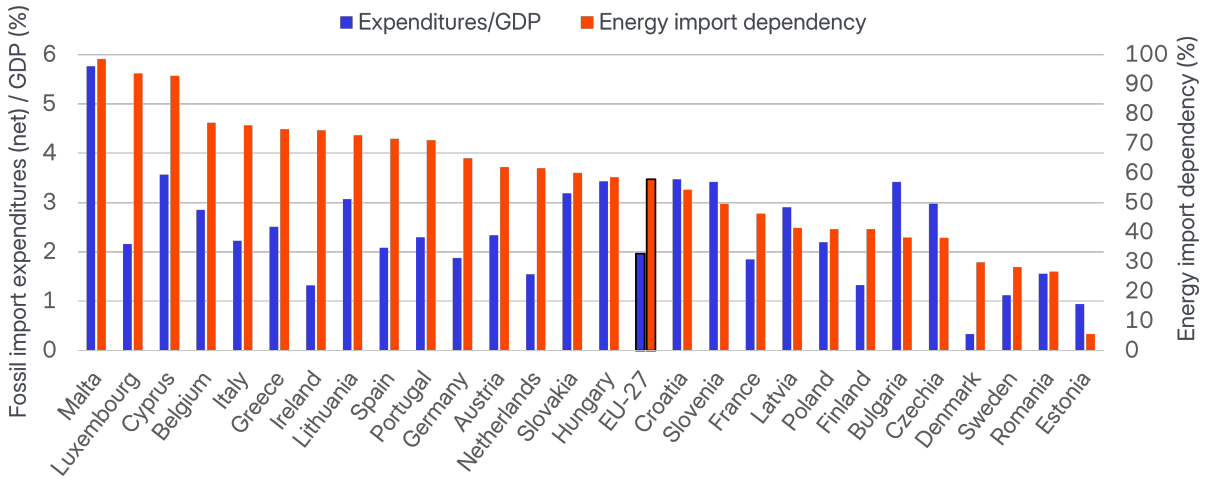


Note: The lower panels show volatility, measured as the standard deviation from the rolling price average.
Source: FRED (2026a, 2026b); World Bank (2025).

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Figure 2[2]

Fossil Import Expenditures/GDP and Energy Import Dependency (2015-25)



Notes: Net fossil import expenditures as a share of GDP and energy import dependency in selected EU member states and the EU-27 average. Average over 2015–25. Blue bars show average net annual fossil import expenditures over GDP (left axis); red bars show energy import dependency in % (right axis). Highlighted bars indicate the EU-27 average.

Source: Eurostat (2026a, 2026b).

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Options for Relief

The exogenous nature of supply-driven energy crises justifies policy interventions to cushion their distributional effects on the most exposed firms and households. These relief measures should strike a compromise between three dimensions: first, they should be economically efficient to limit the stress on public finance and minimize market distortions; second, they should preserve the incentives for fuel users to reduce their consumption such as to limit the market imbalance; third, they should be implementable quickly and with minimum administrative costs.

Practically, the policy toolbox in times of crisis mostly relies on three types of instruments.

Reductions in Taxes and Levies on Fossil Energy

Reducing taxes and levies on fossil fuels affected by price increases effectively compensates households and firms with the highest fossil fuel use, but at the same time weakens incentives to save fossil energy. In turn, weaker incentives to save energy lead to overconsumption and thus to efficiency losses (Blanz, Eydam, Heinemann and Kalkuhl 2022). Ultimately, the reduction in energy prices must be financed through higher taxes and therefore does not constitute an economy-wide welfare gain.

In addition, such relief measures may be less effective than they appear from a national perspective, because part of the relief can accrue not to domestic consumers but to foreign producers through higher world market prices. By dampening the decline in demand, tax cuts on fossil fuels push up international market prices for oil and gas, so that the relief is only partially passed through to domestic consumers

[2] Based on Eurostat (2026a, 2026b). Net values of fossil energy imports in euros are based on ds-059331 and retrieved from: https://ec.europa.eu/eurostat/databrowser/view/ds-059331__custom_21079653/default/table. Specifically, we use the sum over SITC-32, SITC-33, and SITC-34 and subtract exports.

while the remaining share flows to foreign fuel producers. In effect, taxpayers end up financing additional revenues for oil and natural gas exporters,[3] and this impact becomes more important the more countries respond to rising world market prices by cutting taxes.

The simultaneous adoption of such price interventions can also trigger a costly subsidy race. If many countries shield consumers from higher prices, demand adjusts less, global scarcity persists, and market prices rise further. This increases the fiscal cost of relief for all governments and shifts a disproportionate share of the burden onto countries that are less able to finance such support. Similar effects already followed from the 2022 gas crisis, during which large-scale interventions on liquefied natural gas (LNG) markets led to major disruptions in Asia and South America (Emiliozzi, Ferriani and Gazzani 2025).

The simultaneous adoption of price interventions in multiple countries thus triggers additional challenges that can seriously affect the efficiency of relief measures. For that reason, we argue that EU countries and other major oil consumers should coordinate their policy responses to avoid price-driving effects on global markets, which are particularly likely for tax and levy reductions.

General Relief Measures

In general, untargeted relief measures can provide short-term buffers for firms and households, but their lack of efficiency makes them prohibitively expensive over longer horizons.

Debt-financed relief measures such as progressive tax cuts or increases in transfer payments mainly help low-income households, for whom energy expenditures tend to account for an above-average share of total spending and who often have fewer financial resources to substitute away from energy-intensive appliances, heating systems, or mobility needs. At the same time, households within the same income group can differ substantially in fossil energy expenditures and thus in how strongly they are affected by price increases.

Similarly, macroeconomic stabilization instruments such as temporary tax cuts, state-guaranteed loans or monetary policy adjustments can help businesses cope with energy crises. Again, these measures are imperfectly aligned with actual energy burdens and might thus generate inefficient redistributional effects.

Targeted Transfers

Targeted transfers are similar to general tax-and-transfer measures but seek to align the size and scope of the transfer more closely with the burden imposed by higher energy prices. This can allow households and firms that are particularly affected by price increases to receive more support while preserving incentives to save energy by maintaining the price signal. To do so, however, the transfer must be granted independently of current behavior – that is, it should not depend on contemporaneous energy use, though it may be based on past consumption or household or building characteristics, which can no longer be influenced.

In practice, such instruments are often administratively difficult to implement and only imperfectly targeted. During the 2022/23 energy crisis, Germany implemented the Gaspreisbremse ("gas price brake"), which based relief on previous-year consumption and thus combined targeting with incentives to save

[3] This may also create geopolitical costs, since part of the additional producer rents accrues to fossil-fuel exporters whose revenues strengthen military spending; for a discussion of revenues funding Russia's invasion of Ukraine, see Beaufils, Conyngham, de Vries, Jakob, Kalkuhl, Richter, Spiro, Stern and Wanner (2025).

energy (Hänsel et al. 2025). More generally, comparable approaches are harder to implement where past consumption cannot easily be observed, as is often the case for transport fuels.

Quantifying Implicit Fossil Subsidies from Energy Crisis Relief

Beyond the efficiency and distributional concerns associated with specific policy instruments, relief measures share a common weakness: they overlook long-term incentive effects. If users of fossil energy come to expect that the government – that is, taxpayers – will step in during crises and compensate them for high prices, this undermines long-term investment in energy-saving technologies and in substitutes that primarily rely on domestically produced electricity, such as heat pumps and electric vehicles. Put differently, if households and firms can rely on government intervention during crises, the costs of such price risks are shifted onto society at large rather than borne by the fossil-fuel users themselves. This weakens private incentives to invest in technologies that do not rely on fossil fuels and that are less vulnerable to international crises and supply bottlenecks, while more broadly reducing incentives for diversification, storage, and domestic production (Jakob, Kalkuhl, Marschinski, Mehling and Wanner 2025).

The German relief measures adopted during the 2022/23 energy crisis illustrate the order of magnitude of these distorted incentives. Realized relief measures targeted at oil and gas consumers amounted to EUR 71 billion over 2022–24, of which around EUR 55 billion went to consumers of natural gas. In addition, broader measures – such as a one-off energy price allowance, higher social benefits, and reductions in income taxes – brought the total volume of realized support related to oil and gas price increases to EUR 187 billion. Expressed relative to natural gas supply in 2021 in terms of CO_2, gas-related compensation therefore amounted to roughly EUR 300–800 per metric ton of CO_2, depending on whether one uses the narrow definition of clearly gas-related measures (EUR 55 billion) or a broader definition that also includes general relief measures, allocating only the gas-related share of more general relief measures (EUR 144 billion).[4] If the probability of another comparable crisis is 5 percent per year – or equivalently one such crisis every 20 years – then the expectation of future relief acts like a permanent subsidy of EUR 15–40 per metric ton of CO_2 for natural gas.[5]

Similar mechanisms apply to other European countries and fossil fuel types as well, even if the scale and design of relief packages differ across member states. **Figure 3** extends the analysis beyond the German case to other European countries and to both natural gas and oil. For this cross-country comparison, we use harmonized data on planned and realized relief volumes from Bruegel (2021), combined with Eurostat import data to allocate support across natural gas and oil. We again express relief measures in terms of CO_2 and assume a 5 percent crisis probability when calculating the implied permanent subsidies.[6] For Germany, the resulting value differs somewhat from the calculation above based on detailed national relief-package data but remains in a similar range at around EUR 22/tCO_2 for natural gas. While the more

[4] For details on the German relief measures and alternative definitions, see Kalkuhl, Beaufils, Eydam, Heinemann, Moretti, Peichl and Richter (2026). We apply a CO_2 emission factor for natural gas of 0.201 kg CO_2/kWh (BAFA 2025).

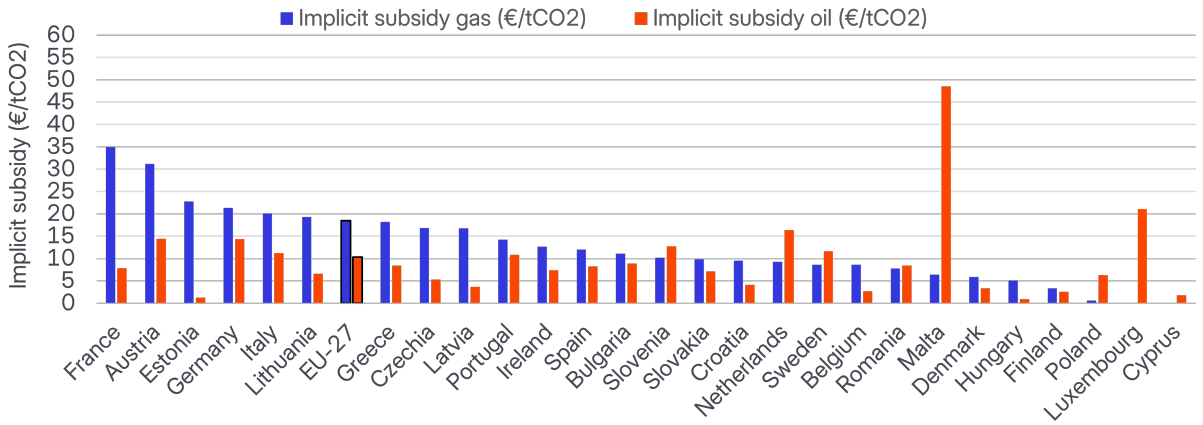
[5] This estimate should be interpreted as a rough and conservative order of magnitude, since a complete quantification of all relief measures is not available. In particular, it does not include the costs of nationalizing the energy company UNIPER or the costs of building and operating LNG terminals, which were partly borne by the state.

[6] For comparability, we use the same crisis probability for natural gas and oil. This is a simplifying assumption; in practice, oil prices have historically shown higher volatility and more frequent crisis episodes than natural gas prices (see **Figure 1**).

detailed German data is preferable for the national benchmark, the more aggregate Bruegel-based approach underlying **Figure 3** provides the consistency needed to estimate implicit subsidies across multiple European economies.

Figure 3

Implicit Subsidies for Gas and Oil



Notes: Implicit permanent subsidies for natural gas and oil in European countries. Blue bars show the implicit permanent subsidy for natural gas (€/tCO_2); red bars show the corresponding implicit permanent subsidy for oil (€/tCO_2). Total relief volumes are allocated across gas and oil using the change in country-specific import values between 2021 and 2022 for gas (SITC-34) and petroleum products (SITC-33), based on Eurostat (2026c). Subsidies are expressed in CO_2-price-equivalent terms assuming a 5% probability of a crisis on the scale of 2022/23 and a CO_2 emission factor for natural gas of 0.201 kg CO_2/kWh. The EU-27 value is calculated as a GDP-weighted average using nominal GDP in 2022.

Source: Bruegel (2021); Eurostat (2026c, 2026d); BAFA (2025); authors' calculations.

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Germany is far from unique: several other countries also exhibit sizable implicit permanent subsidies, and in some cases even higher ones. For natural gas, the range is broad, peaking at approximately EUR 35 per metric ton of CO_2 in France and falling close to zero in Poland. For oil, the implied permanent subsidies are generally lower but still economically meaningful, reaching around EUR 17/tCO_2 in the Netherlands and exceeding EUR 10/tCO_2 in Austria, Germany, and Sweden. At the aggregate European level, the GDP-weighted EU-27 average implicit permanent subsidy amounts to roughly EUR 18/tCO_2 for natural gas and EUR 10/tCO_2 for oil.

These implicit subsidies increase structural dependence on fossil fuel imports because the risk of energy crises is not correctly internalized by fossil-fuel consumers. At the same time, they weaken incentives for decarbonization and entrench dependence on fossil fuel imports. This, in turn, increases vulnerability to future crises.

The current European policy debate highlights the relevance of this mechanism. In response to the recent oil-price shock following the Iranian conflict, governments across Europe have again considered or adopted a broad range of support measures, including tax reductions on fuels (e.g., Germany, Italy, Poland, Spain), temporary fuel price caps (e.g., Croatia, Hungary, Poland), and broader support for households and exposed sectors (e.g., France, Spain).[7] To assess the size of the price distortion of currently debated or already implemented price-reducing policies, consider the following example: If high oil prices persist and relief is provided for one year, a reduction in gasoline and diesel prices of 20 cents per liter would correspond to a subsidy of roughly EUR 70/tCO_2. If the probability of future oil crises with comparable compensation is assessed at 10 percent – that is, statistically one crisis every 10 years – then such relief acts

[7] For current policy measures, see Moscovici and Nguyen (2026) for an EU-focused overview as well as OECD (2026) and IEA (2026).

as a permanent subsidy of EUR 7/tCO_2 and thus slows the transition to electric mobility. If tax reductions are smaller or shorter-lived, the implicit permanent subsidy falls accordingly. Conversely, additional relief measures targeted at fossil-fuel users – such as support for aviation, commuters, or energy-intensive industries – would further increase the implied permanent subsidy.

The examples of relief measures for natural gas and oil discussed here show that these negative incentives can be substantial: they persist long after the crisis itself has ended and the relief measures have expired, as long as households and firms continue to expect future government insurance.

Policy Implications: Designing Relief Without Locking in Fossil Dependence

Energy crises generate large losses for European firms and households. These losses are unevenly distributed and, given their exogenous and often unpredictable nature, justify policy intervention to cushion their effects. At the same time, the severity of such crises is itself a consequence of Europe's dependence on fossil fuel imports: if European energy demand were met to a greater extent through domestically generated electricity, price transmission would be weaker.[8] In addition, higher energy prices would be economically less damaging because excess revenues would accrue more to domestic energy producers rather than to fossil-fuel exporters abroad. Relief measures should therefore be designed in ways that preserve incentives to decarbonize and to reduce the dependence on fossil fuel imports.

Poorly designed relief can instead become self-undermining: by weakening incentives to reduce fossil dependence today, it increases vulnerability to future crises tomorrow. More broadly, government relief during energy crises functions as implicit insurance against fossil price risks and thereby entrenches import dependence unless it is flanked by later increases in taxes or levies on fossil fuels or by additional measures to promote decarbonization. The analysis above shows that these effects can be quantitatively substantial. The broader lesson for Europe is that relief measures should cushion acute hardship without locking in the very vulnerabilities that make future crises more likely and more costly. This lesson is particularly relevant in the current policy debate, as European governments once again consider measures to cushion renewed oil-price pressures following the blockade of the Strait of Hormuz amid the Iranian conflict.

These effects should be taken into account when designing relief measures and weighed against their intended benefits. In general, policy interventions should preserve incentives for short-term demand reduction and long-term energy diversification, while effectively cushioning acute burdens for the most exposed users. This calls for carefully targeted support measures, which are often context-specific and difficult to implement. It also highlights the importance of coordination within the EU: rather than engaging in parallel fossil-fuel tax cuts or price caps that bid up world prices, member states should coordinate on common principles for crisis relief, prioritizing targeted support over broad price interventions.

Practically, because fully targeted transfers are often hard to achieve, we highlight three policy options that represent good compromises between efficiency, incentive preservation, and feasibility (see Blanz, Eydam, Heinemann, Kalkuhl and Moretti 2026). Taken together, these measures can help cushion acute hardship without weakening the long-run incentives needed to reduce fossil import dependence and future crisis vulnerability.

[8] Simon and Anadon (2025) refer to an "insurance value of renewables," reflecting reduced transmission of natural gas price shocks to electricity prices as the share of renewables increases.

Lower Electricity Taxes

Reducing electricity taxes is, unlike relief for fossil fuels, also desirable in the long run because it combines relief with decarbonization. It lowers the relative price of electricity compared with fossil fuels and thereby strengthens incentives for electrification – for example, switching from gas and oil heating to heat pumps, or from internal combustion cars to electric vehicles. At the same time, it can provide relief to broad segments of the population.

Transfers Targeted at Low-Income Households

Support for low-income households through transfers – for example, along the lines of the German 2022 energy price allowance – or other measures that smooth out consumption and partially offset the real income shock can cushion severe burdens and liquidity constraints, especially among lower-income households, without directly interfering with energy price formation. Like lower electricity taxes, such income-based support is less likely to create problematic dynamic distortions: the risk of future energy crises remains more strongly with households that continue to rely on fossil technologies, thereby preserving incentives to switch to fossil-free alternatives.

Post-Crisis Refinancing Through Higher Fossil Energy Taxes

Relief measures targeted at users of fossil fuels should be linked to later refinancing through higher taxes or levies on fossil fuels. This strengthens the "polluter pays" principle and ensures that dependence on imports is priced in by users. It also avoids the problematic long-run distortions created by government "insurance" against energy crises.

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