

INTERNATIONAL MONETARY FUND

Targeted, Implementable, and Practical Energy Relief Measures for Households in Europe

Nicolas Arregui, Oya Celasun, Dora Iakova, Aiko Mineshima,
Victor Mylonas, Frederik Toscani, Yu Ching Wong, Li Zeng, and
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WP/22/262

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WORKING PAPER

IMF Working Paper
European Department

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Prepared by **Nicolas Arregui, Oya Celasun, Dora Iakova, Aiko Mineshima, Victor Mylonas, Frederik Toscani, Yu Ching Wong, Li Zeng, and Jing Zhou**

Authorized for distribution by Oya Celasun and Dora Iakova
December 2022

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ABSTRACT: The recommended way of helping households during the ongoing European energy crisis is to allow price signals to operate freely while providing targeted compensation to the vulnerable. In practice, however, institutional, political, and technical constraints have led many European governments to adopt broad, price-suppressing measures, which impede the adjustment in demand, have high fiscal costs, and widen cross-country gaps in prices. This paper focuses on easy-to-implement, second-best policies. Bonuses or rebates on energy bills (that are not linked to the current volume of consumption) or block tariffs are simple options which would improve on the current policy design in many countries. To avoid stoking inflation, fiscal policy should not add to aggregate demand, so relief for energy bills should be targeted and coupled with offsetting fiscal measures. One option is to reclaim the relief from the better-off through income taxation, which would also make support more progressive.

RECOMMENDED CITATION: Arregui, N., Celasun, O., Iakova, D., Mineshima, A., Mylonas, V., Toscani, F., Wong, Y., Zeng, L., & Zhou, J. (2022). Targeted, Implementable, and Practical Energy Relief Measures for Households in Europe. *IMF Working Papers*, 2022/262

JEL Classification Numbers:	H22, H23, Q41, Q48, Q58
Keywords:	energy prices, price pass-through, household incidence, distributional analysis, social safety nets
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Prepared by Nicolas Arregui, Oya Celasun, Dora Iakova, Aiko Mineshima, Victor Mylonas, Frederik Toscani, Yu Ching Wong, Li Zeng, and Jing Zhou¹

¹ The authors would like to thank Rohan Srinivas for excellent research assistance, Marizielle Evio for expert editorial assistance, and Paulo Medas, Andrea Pescatori, and Martin Stuermer for very useful discussions. The authors are also grateful to the desk economists in the IMF's European Department for help in compiling the dataset on energy-cost relief policies.

Contents

1. Overview	5
2. The European Energy Price Shock: A Brief Recap.....	6
3. How to Help Households Cope with Surging Energy Costs? Principles and Practical Recommendations	8
4. How Are Countries Responding to the Energy Crisis?.....	13
5. Conclusion.....	17
FIGURES	
1. Wholesale Energy Prices	7
2. Increases in Energy Prices and the Cost of Living.....	8
3. Increase in Cost of Living and Energy Relief Packages	144
4. Estimated vs. Announced Fiscal Cost and Fiscal Space	17
BOX	
I. Estimated Foregone Gas Savings	10
ANNEXES	
I. Consumer Energy Price Inflation Forecast	19
II. Overview of Measures Adopted by Countries	21
TABLES	
A2. Fiscal Costs and Household Support Measures in 2022 and 2023.....	22
REFERENCES.....	233

1. Overview

Europe's energy landscape has been permanently altered, causing a persistent increase in prices. At the heart of the crisis is the supply-demand imbalance caused by a sharp reduction in Russian natural gas flows to Europe. As of November 2022, Russian pipeline gas exports stood at about 15 percent of their average level in 2019, a drop corresponding to about one-third of European total natural gas consumption. So far, Europe has been able to largely replace the reduction in Russian natural gas with alternative sources, but at a high cost. European natural gas and electricity wholesale prices—which co-move because the wholesale market for electricity is based on a uniform-pricing auction system tied to the highest marginal cost¹—have been extremely volatile and in late summer peaked at over ten and seven times their early 2021 levels, respectively, before moderating in the fall.² Natural gas prices are expected to be significantly higher than historic averages into the medium term, albeit well below peaks seen in the summer of 2022.

This paper provides an update of the analysis in Ari et al (2022). In addition to updating the consumer price projections and incidence analysis, it updates the description of policy responses to the energy crisis in Europe and proposes concrete second-best policies, which are not far from the first-best, but easier to implement. The description of policies adopted to date (as of November 2022) and estimates of their costs are based on a survey of IMF desk economists for the respective countries. The survey database is published together with the paper.

Relief measures need to evolve from firefighting to a sustainable response. In the early stages of the energy crisis, in the immediate aftermath of Russia's invasion of Ukraine, the shock was generally expected to be relatively short-lived. Countries quickly introduced measures to ease the burden of higher energy costs on households and firms, many of which were untargeted and costly. EU governments have announced 2.4 percent of GDP³ on average for energy support packages in 2022 and 2023 (see Annex II for details), with about half of the cost coming from untargeted, price suppressing policies. These costs are significantly higher than what it would have cost governments to fully compensate the bottom 40 percent of households for the increase in the cost of living coming from the energy price shock. As the shock has proven to be persistent, policy design should be improved, taking into account available fiscal space; the need to reduce energy demand and contain inflationary pressures; and in some cases, constraints on administrative resources and the capacity of existing social benefit systems. The key challenge is to strike a balance among these trade-offs.

Concretely, European governments should adjust their policy response along two dimensions. First, they should incentivize energy conservation by allowing price signals to work more strongly than they have so far. Second, they should shift from providing broad-based to more targeted relief.

¹ In the pay-as-clear market, electricity producers bid into the market and set their price according to their production cost. The bidding goes from the cheapest to most the expensive energy source until demand is satisfied, and all market players obtain the price of the last supplier from which electricity was bought. In hours of high electricity demand, this is usually a fossil fuel plant (typically, a natural gas plant).

² Natural gas import prices are somewhat less volatile than the spot wholesale prices, given that long-term contracts often incorporate smoothing mechanisms or are indexed to prices other than the wholesale Dutch TTF benchmark. The price of electricity has been affected by the natural gas price shock, a surge in coal prices, and a significant temporary reduction in French nuclear production to as low as half of installed capacity. The spike of prices in August 2022 was driven in part by countries filling up their gas storage for the winter. By October, prices declined as gas storage was largely full and gas consumption was low due to warm weather.

³ For the full sample of 41 European countries included in the survey, listed in Annex II, the average fiscal cost is 2.3 percent of GDP. While pre-announced measures for 2023 are included for some countries, others have yet to announce support packages in their 2023 budgets, so the actual fiscal costs are likely to be higher.

The remainder of the paper is organized as follows. Section 2 provides an update on energy price developments in Europe. Section 3 presents a set of principles that should guide the design of household relief policies. Section 4 summarizes the actual measures taken by European governments to cushion the impact of the energy price surge on households so far. Section 5 concludes.

2. The European Energy Price Shock: A Brief Recap

The energy price increase has both a temporary and permanent component. Energy supply and demand will adjust over time, which should bring prices down in the medium term. Countries will adjust by, among other factors, building new LNG infrastructure, increasing energy supply domestically and abroad, improving efficiency, and substituting natural gas with alternative factors of production. Futures prices as of November 2022 suggest that about 75 percent of the natural gas price shock (defined as the increase in the average price between 2022 and 2019) will be unwound by 2026, while the other 25 percent will be permanent (Figure 1, Panel 1). Prices for the medium term have changed relatively little over the past months, settling around €50/MWh for 2026, which is two and half times the €20/MWh price expected before the war. These futures prices are much below the peak spot price of €300/MWh observed in the summer of 2022.⁴

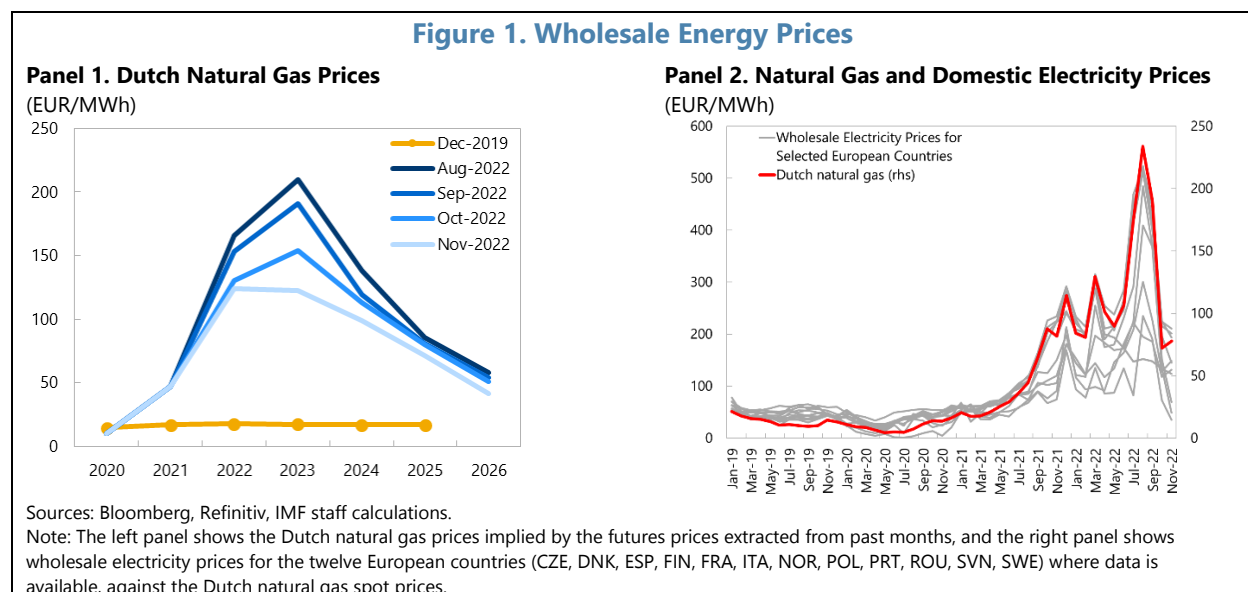
The shock to wholesale natural gas and electricity prices is being felt across Europe but with important differences across countries. Though Europe has largely integrated natural gas and electricity markets with significant cross-border trade, sizable differences in wholesale prices have emerged due to infrastructure bottlenecks, differences in the electricity generation mix, and diverging price intervention policies (Figure 1, Panel 2). Spanish and French natural gas prices have frequently been around 50 percent below the benchmark Dutch TTF price, given infrastructure constraints in bringing gas from West Europe to East Europe. Gaps for electricity can be wider still, given different generation matrices.

Consumer retail price movements are even more diverse. Prior to the crisis, retail natural gas and electricity prices in Europe were made up, in roughly equal proportion, of the wholesale energy prices as well as taxes, levies, and network charges.⁵ As wholesale energy prices surged, the energy component now accounts for a much larger share of total retail prices. However, the speed at (and degree to) which wholesale prices pass through to retail prices has differed significantly across Europe (Figure 2, Panel 1 and Figure A1, Panel 1).⁶ This diversity reflects variation in contract structure, competition, and existing government

⁴ Prices fell in October 2022 as natural gas storage targets were met and the temperatures stayed warmer than average. Prices could spike again since refilling storage ahead of the 2023–24 winter will be challenging in the absence of natural gas flows from Russia.

⁵ The weight of the non-energy component in retail prices differs across countries. This accounts for some of the diversity in the current policy response, with some countries lowering their previously high taxes and levies to reduce retail prices.

⁶ Another reason for the heterogeneity across countries is the difference in the scope of prices measured. For instance, the HICP is based on the price of new energy contracts in the Netherlands, while, in Spain, it is based on the regulated electricity market (which is directly linked to wholesale markets). In Estonia, data on electricity prices are collected centrally from the Nord Pool power exchange and may not fully reflect effective prices paid by households, on account of a significant share of fixed-price contracts.



mechanisms to limit passthrough.⁷ Government interventions are also contributing to divergence in retail prices across countries.

Consumer energy price inflation is expected to remain elevated in the near term. A considerable share of wholesale price increases has not been passed through to consumers yet. For instance, the average monthly passthrough⁸ for natural gas prices between January and August of 2022 was only about 20 percent (Figure A1, Panel 1); consumer energy prices are expected to add further pressure to households' cost of living in 2023, with buoyant inflation in natural gas and electricity consumer prices only partly offset by falling fuel oil prices.

Surging energy prices are eroding households' purchasing power in a regressive manner. Heightened energy prices are estimated to have raised the cost of living of the average European household by just under 6 percent in 2022 relative to early 2021, both by directly pushing up energy bills and by rippling across the prices of non-energy goods (Figure 2, Panel 2).⁹ The impact is projected to climb to over 7 percent in 2023 on the basis of November 2022 futures prices and our estimates of passthrough (see Annex I for details of the energy inflation projections).¹⁰ The loss in purchasing power is greater for lower-income households, who tend to spend a larger share of their budget on necessities, including energy.¹¹ The substantial jump in energy prices is also affecting some middle-income households, who are typically not covered by existing social safety programs.

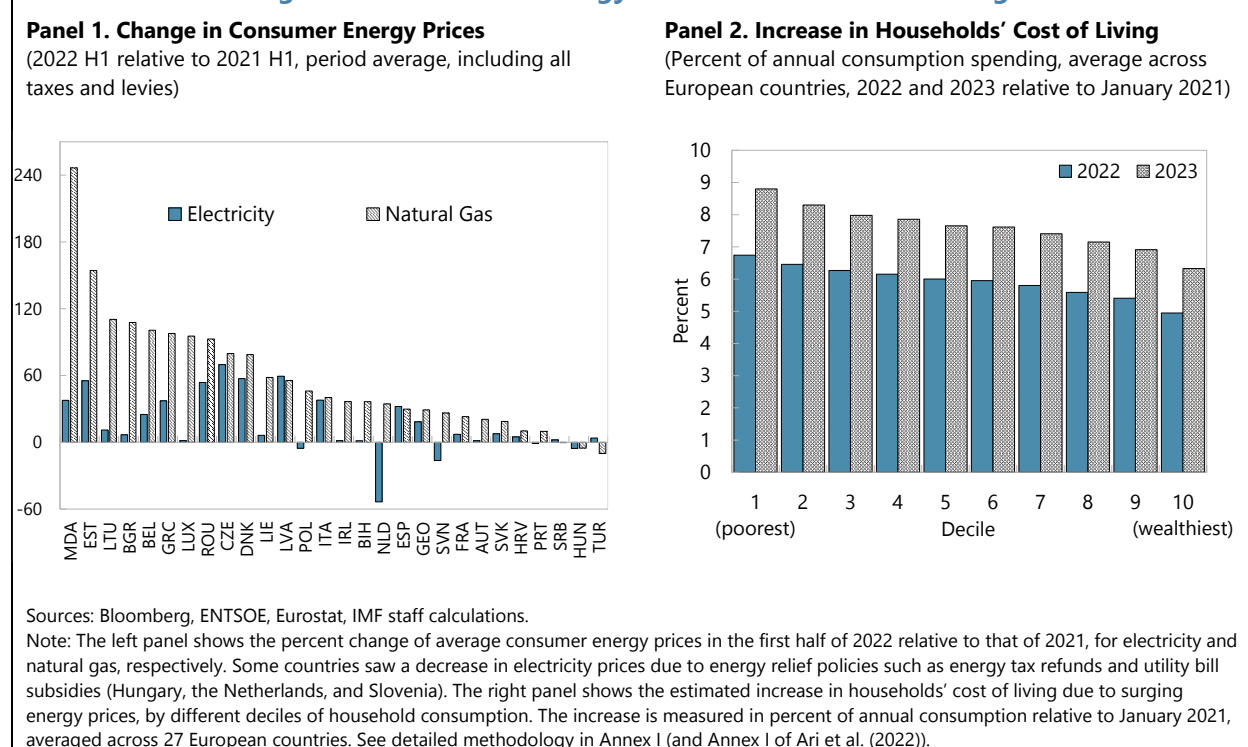
⁷ Passthrough to retail electricity prices is substantial and very quick in Spain, given the prevalence of dynamic contracts, which directly link retail to wholesale prices. On the other hand, there was no passthrough to either retail gas or electricity prices in Hungary until August 2022 (see footnote 23 for recent policy changes) and in Malta, given government-set tariffs (European Commission 2021, 2022).

⁸ Passthrough is defined here as the ratio between one-year consumer price inflation and one-year wholesale price inflation.

⁹ The cost-of-living impacts reported here are conceptually similar to total "contributions" of energy price increases to consumer price indices (comprising both direct and indirect impacts), but also allow the demand for energy and other products to respond to price changes. This assessment is based on the IMF-World Bank Climate Policy Assessment Tool (CPAT) (see Annex I of Ari et al. (2022)).

¹⁰ The actual impact could be lower if governments implement further price-suppressing measures.

¹¹ Other reasons that could contribute to low-income households' high energy expenses include low-efficiency house heating systems, poor house insulation, or long commutes to work.

Figure 2. Increases in Energy Prices and the Cost of Living

The energy crisis has magnified the underlying macroeconomic policy challenges. Public debt in Europe increased sharply during the COVID-19 pandemic, reducing fiscal space for many countries. With Central Banks raising policy rates to fight the surge in inflation, financing conditions have tightened sharply in recent months, raising borrowing costs for households and governments, and reducing fiscal space further. European policymakers are facing tough policy choices in dealing with weak growth and high inflation.

3. How to Help Households Cope with Surging Energy Costs? Principles and Practical Recommendations

The speed and scale of the surge in energy prices in Europe has raised concerns of a potential jump in energy poverty. While in many countries the purchasing power of poor households would be largely protected by CPI-indexation of social benefits, low- to lower-middle income households, whose incomes are above levels that would qualify them for benefits, would be vulnerable to falling into poverty in the absence of government support.

The first-best policy response to the ongoing surge in households' energy bills is to let price signals operate while providing targeted income support to the vulnerable. Allowing prices to reflect market conditions is critical to incentivize the necessary adjustment in demand at a time of reduced supplies. The coverage of vulnerable households to be provided with financial assistance could differ across countries depending on differences in income levels and the share of spending on energy, as well as the speed and scale of the rise in retail energy prices in each country. Ideally, governments would target support based on households' incomes and vulnerability to energy price shocks (which can vary because of housing type, family size, or geographical location).

It is important for households to contribute to the reduction in energy consumption in Europe. EU countries have in the summer of 2022 agreed on voluntary national consumption reduction targets of 15 percent for natural gas and 5 percent for electricity through the first quarter of 2023 compared to their average consumption in the same period during the five preceding years to limit the risk of energy shortages and rationing. Without a reduction in the energy use of households, which together with Small and Medium-sized Enterprises (SMEs) directly consume around 25 percent of natural gas in Europe,¹² firms would have to bear the brunt of the demand adjustment, potentially leading to an excessive destruction of jobs and capital. Price signals are critical to lowering the energy use of households, whose access to natural gas and electricity is guaranteed by law in many European countries (i.e., the bar for rationing is very high). Analysis in Box 1 shows that European households could have saved about 50 percent more gas in the first three quarters of 2022 than they actually did (corresponding to about 2 percent of total European gas consumption in the pre-pandemic years) if passthrough from wholesale to retail natural gas prices had been more complete.

Given high inflation and reduced fiscal buffers, relief for households should not lead to an overall loosening in fiscal policy. Rapid increases in the prices of energy and other goods and services over the past year have reduced real incomes, which should temper private consumption spending and help stabilize inflation pressures going forward. Compensating households for the loss in real incomes with overly generous policy support would bolster aggregate demand and make it more likely that the price jumps seen to date trigger second-round increases in wages and prices.¹³ More persistent inflation pressures, in turn, would require further tightening in monetary policy, potentially harming financial stability. Keeping the relief well targeted would help contain the boost to aggregate demand. Moreover, countries need to start lowering fiscal deficits and rebuilding fiscal buffers in the aftermath of the pandemic. Moving from broad-based to well-targeted temporary support would help keep the overall fiscal costs in check.

In practice, however, technical challenges and political considerations often prevent a swift deployment of targeted and non-price-distorting measures. In some cases, countries have been able to quickly expand safety nets and deliver targeted income transfers, for example, by extending social registries and inviting people to apply for benefits through a dedicated online platform. In other cases, however, it has proven difficult and time-consuming to extend safety nets or launch new means-tested programs.

- **Information/data gaps and administrative costs.** Lack of joint data on household income and/or energy consumption, especially of households that are not under social safety net programs, makes it difficult for governments to identify the vulnerable segment of the population that should be supported.

¹² Electricity generation accounts for another 35 percent of total natural gas consumption.

¹³ One might also argue that well-designed and communicated one-off support could help moderate wage demands and prevent the overshooting in energy prices from being translated into wage increases. For countries where negotiated wages account for a relatively modest share of wage contracts, this effect is likely to be weak.

Data gaps could reflect confidentiality or privacy issues (for instance, confidentiality laws have prevented data sharing among different levels of government within Germany's federal system), or technical constraints (e.g., countries with an individual tax filing system such as Austria do not have information on income at the household level, which is more relevant for energy relief needs). In some cases, governments also lack information on households' bank accounts, making it difficult to deliver transfers to those outside the existing social benefit programs. A lack of administrative resources has also constrained the authorities' ability to design and swiftly launch new programs in some countries.

Box 1: Estimated Foregone Gas Savings

An important policy question is how much larger households' energy savings would have been and would be going forward in the absence of price suppressing measures. The key to such an assessment is the counterfactual retail price that would have prevailed without these measures. Obtaining such a counterfactual is complicated by several factors, notably (i) the pre-existing institutional and legal differences across Europe which influence passthrough from wholesale to retail prices even in the absence of new measures; and (ii) the size of the current shock. The large magnitude of the current shock - which is outside the historical range - implies that historical passthrough rates may not be a good guide for what would have happened without new measures.

To obtain a sense of magnitudes of "foregone gas savings", we look at two exercises which can be thought of as an upper and lower bound.

- We compare observed retail prices with prices under a hypothetical full and fast passthrough of TTF prices to retail prices across Europe. This is likely to be an overestimate of the impact of new measures since pre-existing institutional features (such as long fixed contracts) and some smoothing of retail prices by energy providers would have led to a less than full passthrough anyway.
- We compare observed retail prices with prices implied by historical country-specific passthrough estimates. This is likely to be an underestimate of the impact of new measures since the large size of the shock likely implies that some of the smoothing in retail energy prices observed historically would currently not be feasible without severe implications for the solvency of energy providers.

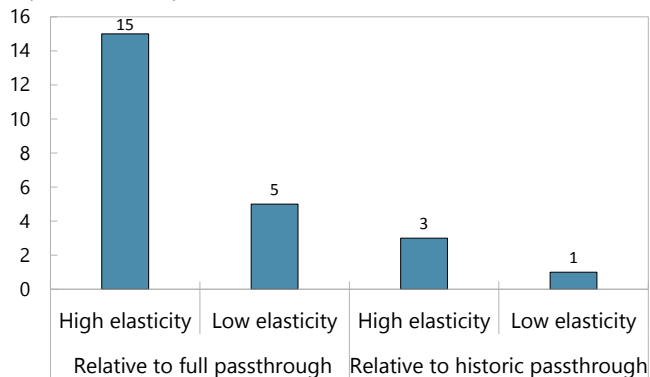
For each of the price scenarios we use a range of elasticities to recover the impact on gas demand.¹⁴

¹⁴ We use a range of -0.1 to -0.3. See <https://www.econstor.eu/handle/10419/265522> for recent evidence that the elasticity in Germany could have been towards the upper end of this range during the current shock.

The estimates suggest that there is room to increase savings by households by moving closer to high levels of passthrough. We find that gas

savings could have been higher by 5–15 percent of consumption under the hypothetical full pass through to end users, and 1–3 percent under historically observed rates of pass through. Based on the mid-point of the above range (8 percent), a rough estimate suggests that household gas savings might be 50 percent higher than they have been so far.¹⁵ And with households accounting for around 25 percent of EU gas demand, this would imply an aggregate drop in European natural gas demand of 2 percent of pre-war consumption, thus making a meaningful contribution to meeting the EU’s 15 percent consumption reduction target.

Europe: Foregone Natural Gas Savings
(2022 Q1 - Q3)



Source: Authors' calculations.

- **Political pressures.** It is politically easier to pass broad-based measures than agree on targeting, especially given rising social tensions amidst the surge in the cost of living.

Where targeted income transfers are difficult to implement quickly, bonuses on energy bills or block pricing are second-best policy options. Support under these policies is not linked to household income, but can be linked to exposure to energy costs:

- **Rebates or bonuses that do not distort the marginal price.** These can be distributed through utility companies (either on the energy bill or separately). The amount could be either a uniform lump sum for all households, or designed as a household-specific bonus based on the pre-shock level of energy consumption.¹⁶ For instance, in the recently announced natural gas-price brake in Germany, the government will pay a bonus equal to any (positive) difference between the actual price and a guaranteed maximum price times a fraction of the household’s past consumption volume, without distorting the marginal price for any actual level of consumption (see Section 4 for more details). Such a bonus can also be based on the energy consumption volume of a representative low- or middle-income income family. Alternatively, the bonus could be a fixed nominal amount for each household.¹⁷ Since they do not take into account households’ “typical” consumption levels, these two options can lead to a large variation in the effective amount of relief relative to energy bills across households. To keep fiscal costs in check and avoid making large transfers to the well-off, governments can make the rebates or bonuses taxable, or cap them in nominal terms per household, where possible.
- **Block pricing, which distorts the marginal price to a limited degree.** Under this system, consumption beyond a given volume is charged the market price, whereas consumption below that

¹⁵ Based on Bruegel estimates of a household consumption reduction of up to 15 percent year-to-date in 2022.

¹⁶ In principle they could also be dependent on family size, but utility companies normally do not have information on family characteristics.

¹⁷ Lump-sum transfers can also be provided through the tax system, for instance in the form of tax credits. This takes time to do, and it may not be feasible to tailor the lump sums by income or family size. Moreover, the time lag between policy adoption and delivery may mean that the amount of support may not be aligned well with needs.

volume (the first “block”) is charged a subsidized rate. Under block pricing, households would have an incentive to keep their consumption volume within the subsidized block of consumption but would have a diminished incentive to save natural gas within that first block (the marginal price would be distorted). The subsidized block can be common across households or can vary based on a fraction of each household’s past energy consumption. As in the case of bonuses or rebates given to all households, it would be advisable to claw back the support from high-income households through taxation.

The preferred measures and their calibration could differ across countries. A high degree of heterogeneity in the volume of energy use across vulnerable households (or an inability to distinguish the bills of single or multi-family residences) would favor linking the support to past consumption. At the same time, limited capacity to administer and quickly deliver new forms of support may require simpler solutions like uniform rebates or basic block pricing where the subsidized level of consumption is the same across households. Limited fiscal space would call for keeping the parameters less generous.

Retail price caps are simple to implement but reduce the adjustment in demand and can be fiscally costly. Price caps benefit all households (in proportion to their consumption). They also take the pressure off near-term inflation and therefore could reduce second-round effects. However, caps or freezes can also prolong the period of high inflation, as prices could rise again once the measures are lifted (this would happen, for instance, if the caps push prices below cost recovery levels). Moreover, capping or freezing energy prices indiscriminately for all households could entail large costs for governments, which will have to pay for the difference between the wholesale price and the retail price times the volume of household consumption. Finally, keeping prices low would impede the adjustment in demand, which could harm energy security.

Coordination at the European level is critical. Generous support for households in one country often leads to demands for equally generous support in others. Moreover, caps or subsidies for retail prices benefit not only households but also SMEs. This could distort competition in the single market.

Energy-saving campaigns and targets are a useful complement to price signals. The EU and many Member States have adopted such targets and are using information campaigns to help achieve them. There are many examples of campaigns having been used successfully in the past. For instance, after the March 2011 earthquake and subsequent shutdown of nuclear power plants, Japan set consumption targets for enterprises and ran public campaigns for energy savings. The 15 percent reduction in electricity consumption following these efforts proved to be persistent (Kimura and Nishio, 2016). In the early 2000s, Brazil designed an effective quota system with price signals and achieved more than 20 percent reduction in consumption in one year (Maurer and others, 2005).¹⁸ Thanks to energy-saving campaigns, electricity consumption fell by 10 percent in Chile in 2008, when the country lost natural gas supplies from Argentina (Velasco and Tokman, 2022).

¹⁸ Beyond incentives to reduce demand, well-designed rationing could also, in principle, lead to reductions in prices (e.g., reducing energy consumption during peak hours), but would require careful planning and may come with incentive and information problems (Amaglobeli et al., 2022).

4. How Are Countries Responding to the Energy Crisis?

EU Member States' policy responses to surging household energy bills have been framed to some degree by EU-level policy. The European Commission (EC) published a “toolbox” on energy support measures for households in early 2022. The toolbox gave wide latitude to Member States to support households but suggested that measures should be temporary and targeted. In particular, the toolbox specified that Member States can provide emergency income support, authorize deferrals of bill payments for households, and temporarily exempt or apply a reduced tax rate for vulnerable households. The September and October 2022 EU emergency energy packages,¹⁹ among other measures, proposed raising windfall revenues from the energy sector through an inframarginal price cap and a fossil fuel windfall profit tax. The revenues are to be used to support and protect final energy customers. The packages also included goals for energy consumption reductions. In October 2022, the Eurogroup committed itself to focusing support increasingly on cost-efficient measures which are exceptional, temporary, and targeted to the vulnerable, in line with the principles set out in section 3 of this paper.²⁰ The EC has also initiated several measures to enhance energy supply and support firms (which are not the focus of this paper).

EU countries have announced or adopted a wide range of measures, often far from the first-best response, at a high (and growing) fiscal cost. Governments of EU countries so far have spent or announced on average about 2.4 percent of GDP on relief for households and SMEs (this includes all measures for 2022 and some pre-announced measures for 2023). The measures can be categorized along two key dimensions: whether they distort the relative prices of energy and whether they target relief to the vulnerable. Nearly all countries have adopted at least one measure that distorts prices, such as caps on retail energy prices, or reduced rates of VAT or other energy-specific taxes, or reduced fees, charges, and carbon taxes. Block tariffs are also classified as untargeted and price distorting, although they are progressive (in the sense that they subsidize users that consume less more than those that consume more). Most of the price-distorting measures are untargeted: they apply to all users, irrespective of their income levels. In addition, many countries have adopted measures that do not distort price signals but are not targeted, benefiting both low- and high-income households. These include, among others, energy vouchers or bonuses, lump-sum income tax credits, or transportation support to all households (Annex II). At the aggregate, while untargeted measures account for just over half of all relief measures adopted or announced to date, they accounted for about 70 percent of the total fiscal outlays (Figure 3, Panels 1 and 2; and Table A2). Price-distorting and untargeted measures account for about 45 percent of the fiscal costs. Several European countries have yet to announce energy support packages for 2023, which will further increase fiscal costs.

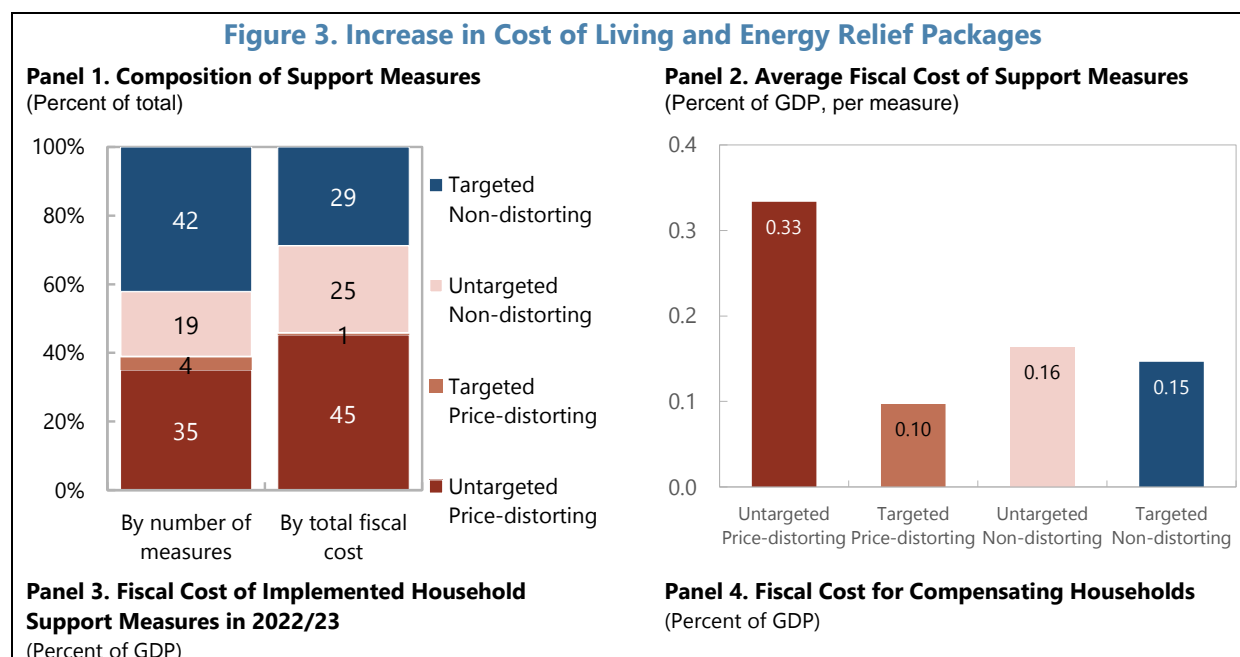
Fiscal costs could be substantially reduced through better targeting. An update of the incidence analysis in Ari et. al. (2022) suggests that fully compensating the bottom 40 percent of households for the surge in the cost of living since early 2021 would cost over 0.7 and 0.9 percent of GDP, for 2022 and 2023, respectively

¹⁹ See [Council agrees on emergency measures to reduce energy prices - Consilium \(europa.eu\)](https://www.consilium.europa.eu/en/press/press-releases/2022/09/03/eurogroup-statement-on-the-fiscal-policy-response-to-high-energy-prices-and-inflationary-pressures/) for the September announcement and [Additional proposals to fight high energy prices \(europa.eu\)](https://www.consilium.europa.eu/en/press/press-releases/2022/10/03/eurogroup-statement-on-the-fiscal-policy-response-to-high-energy-prices-and-inflationary-pressures/) for the October proposal.

²⁰ For the September announcement, see: <https://www.consilium.europa.eu/en/press/press-releases/2022/10/03/eurogroup-statement-on-the-fiscal-policy-response-to-high-energy-prices-and-inflationary-pressures/>. For the October proposal, see: [Additional proposals to fight high energy prices \(europa.eu\)](https://www.consilium.europa.eu/en/press/press-releases/2022/10/03/eurogroup-statement-on-the-fiscal-policy-response-to-high-energy-prices-and-inflationary-pressures/).

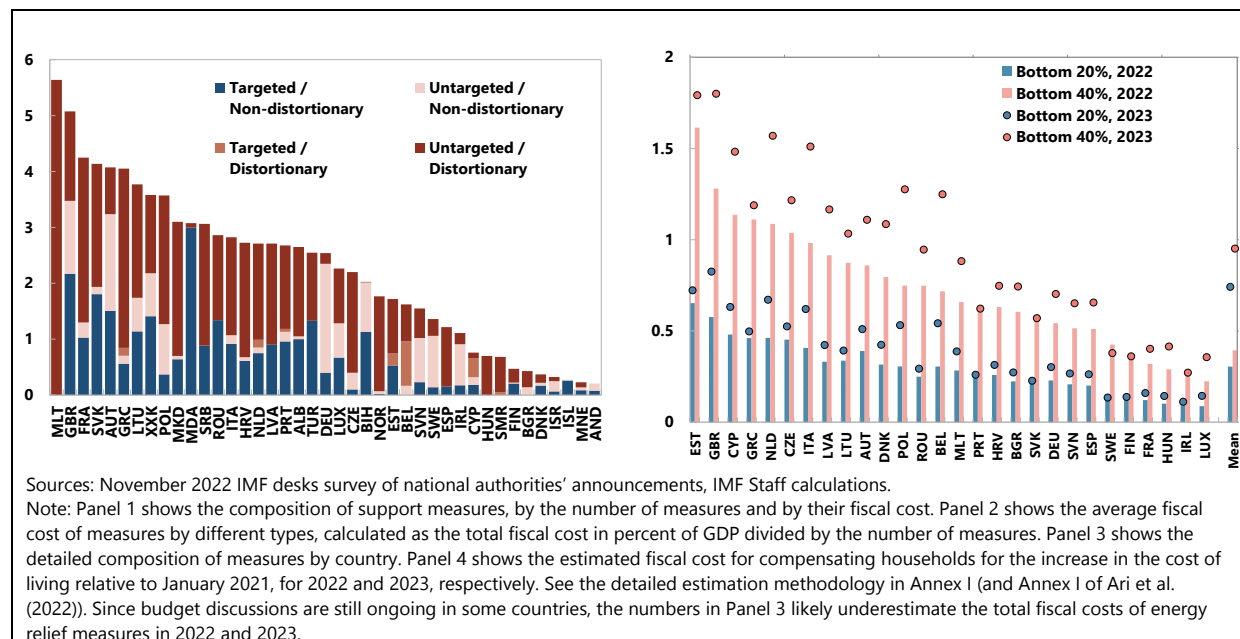
(Figure 3, Panel 4).²¹ These costs are lower than the 2.4 percent of GDP cost of the measures announced so far by EU governments. Focusing the support on lower-income households would be a more efficient way of using taxpayer funds to limit energy poverty (Figure 4).

Countries' institutional frameworks and exposure to high energy prices have shaped their policy responses. The impact of higher energy prices on household budgets is determined by two factors discussed in Section 2: First, the speed and extent of passthrough of wholesale to retail prices; and second, the composition of households' energy consumption (that is, whether energy consumption is intensive in the products whose prices have increased the most). Differences in the passthrough reflect varying retail energy market structures (including in contractual terms), the degree of competition, and government mechanisms to limit passthrough. On compositional effects, countries with a large number of households that spend large shares of their budget on natural gas and electricity tend to have been more affected by the crisis than countries where households spend more on oil products or biomass (e.g., firewood). Passthrough and energy consumption shares have also had an important influence on the design of policy responses. For example, Spain, where the passthrough from wholesale to retail electricity prices is large and immediate, has chosen to intervene in the wholesale electricity market through the Iberian cap. Countries with a history of highly regulated retail tariffs such as Hungary and Malta have continued to allow for very limited or no passthrough.²²



²¹ The definition of vulnerable households could differ across countries. We use two benchmarks—bottom 20 and 40 percent of the distribution—to provide estimates of the potential fiscal costs for targeting the vulnerable, in a comparable way at the country level. In practice, it would be desirable to taper off the amount of support as income increases instead of having an abrupt drop-off at a certain income level.

²² In Hungary, gas and electricity price caps for households have been in place since 2014. From August 1, 2022, the former lower energy price caps for households apply only to consumption up to the national average, above which another higher price cap—adjusted on a quarterly basis—was introduced in both the electricity and gas markets. The higher caps are still more favorable than the actual market prices but follow energy market dynamics to some extent.



While no country has relied solely on well-targeted measures that preserve price signals, in most countries the relief effort did include income transfers. In some cases, this took the form of a top-up of benefits to people on existing safety nets or to pensioners. In other cases, governments designed ways of providing lump-sum relief to households outside existing safety nets, without introducing significant distortions to end-user energy prices. Examples of the latter include the following (see Annex II and online policy dataset for more details):

- **Progressive lump-sum transfers for low-income households (Cyprus).** Households with children and annual income up to €49,000 that do not receive the minimum guaranteed income or social benefits received a one-off grant per child under 18 years old of €60-150 depending on household income. Recipients of the minimum guaranteed income or other social benefits received a one-off grant of €100 for the beneficiary, €50 for the spouse and €25 for every child. The government directly deposited the amount into beneficiaries' bank accounts by end-June 2022.
- **A lump-sum transfer for lower-income households that are neither covered by a minimum vital income benefit nor receiving pension (Spain).** Eligible beneficiaries were those i) registered with Spain's social security system who are either an employee, self-employed, or registered as unemployed; ii) with gross household income below €14,000 in 2021; iii) who are not recipients of the Minimum Vital Income or a state pension; and iv) with total household assets below €43,196 (as of January 1, 2022). These beneficiaries could apply for a €200 one-off benefit via Spain's tax agency website in 2022.
- **Uniform lump-sum transfers that are income-taxable (Germany).** All employees, including mini-jobbers,²³ received a one-off energy price lump sum of €300 as a salary supplement in September

²³ Germany's "mini-job" is a marginal job under which one cannot earn more than €520 per month or €6,240 per year, or a job that only includes short-term employment for a few weeks or months.

2022.²⁴ For the self-employed, advance tax payment for September was reduced accordingly. This lump-sum benefit is subject to income tax, making the net benefit progressive.

- **Lump-sum rebates on energy bills with claw-back from high-income earners through a tax levy (Belgium).** A basic package provides rebates to be deducted directly from monthly energy bills (up to €135 for natural gas and €61 for electricity) for the winter months of November 2022 to March 2023, for variable energy contracts and fixed contracts that were renewed after October 1, 2021. Existing beneficiaries of social energy tariffs are not eligible, and singles (couples) with an annual taxable income of more than €62,000 (€125,000) will pay part of the rebates back through a special levy on their income tax.
- **Expansion in the coverage of existing social assistance programs (Belgium, Germany, Luxembourg).** As part of its pandemic measures, Belgium extended the coverage of social energy tariffs, which previously applied to households receiving social benefits (i.e., living wage, income guarantee for the elderly, allowances for serious disability), to include pensioners, single parents in financial difficulty, those with gross income not more than €20,000 per year, etc. The expansion will cover about one million households (about one in five households). Luxembourg announced a one-off increase of the cost-of-living allowance and introduced an energy allowance (ranging from €200 to €400 depending on household composition). The income thresholds for the energy allowance are set 25 percent above those for the cost-of-living allowance. The application period was through end-October 2022 and benefits are paid out as soon as applications are approved. Starting in 2023, Germany will also expand the housing benefit to cover around 2 million households, up from around 0.6 million in 2022, and increase the benefit to €370 per month (up from €180 per month in 2022).

There have also been examples of second-best measures that provide bonuses on energy bills linked to past consumption or introduce block tariffs:

- **Energy “price brakes” (Germany).** In November, the German cabinet passed a “price brake” for natural gas and electricity (the German Parliament is expected to approve it in December). Under the “brake” system, the government will cover any (positive) difference between the actual price and a guaranteed maximum price for a fraction of a user’s past consumption volume. For natural gas, the guaranteed price is to be set at 12 eurocents per kilowatt-hour (KWh) on 80 percent of the previous year’s consumption volume. Similarly, for electricity, the price is set at 40 eurocents per KWh on 80 percent of the previous year’s consumption volume. During February 2023–April 2024, each beneficiary will receive a monthly cash transfer based on any positive difference between the beneficiary’s actual unit cost of energy and the “price brake”, regardless of the beneficiary’s actual energy use that month. The bonuses will not affect the price charged to the user for an extra unit of energy; the ongoing rise in consumer gas prices are expected to incentivize energy conservation.
- **Block tariffs (Estonia, Austria, Poland, the Netherlands).** During January–March 2022, Estonia capped the household electricity price at 12 eurocents per KWh for up to 650 KWh per month for electricity and at 6.5 eurocents per KWh for up to 2.75 MWh per month for natural gas. During October 2022–March 2023, Estonia will compensate households for 80 percent of the price of natural gas above €80 per MWh for natural gas consumption of up to 2600 KWh in consumption per month. In September 2022, Austria announced an electricity price cap at 10 eurocents per KWh for the period December 2022–June 2024, applied to 80 percent of the electricity consumed by the household. Poland also announced in September 2022 a cap on the 2023 electricity prices for household consumption of up to 2000 KWh, for which about

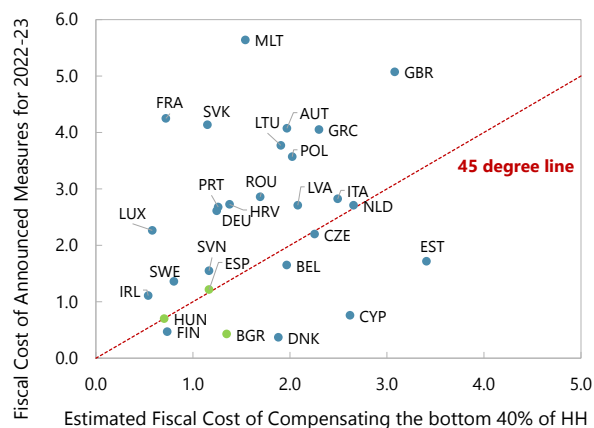
²⁴ If the employer submits wage tax returns only annually, they may not be liable for payment to employees. In this case, employees can receive the allowance by filing out an income tax return for the year 2022.

two-thirds of households are eligible. The Netherlands has announced a cap on the price of consumption for each household or SME (“small consumers”) up to a certain consumption volume, set at the median consumption volume of these consumers.

Figure 4. Estimated vs. Announced Fiscal Cost of Energy Relief and Fiscal Space

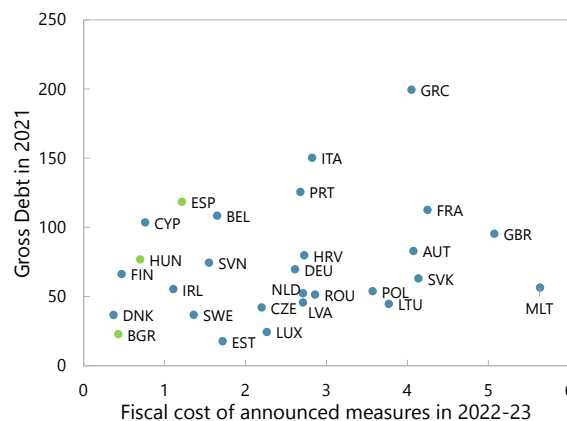
Panel 1. Estimated Fiscal Cost for Targeted Support versus Fiscal Cost of Announced Measures, 2022-23

(Percent of GDP)



Panel 2. Fiscal Cost of Announced Measures versus Gross Public Debt

(Percent of GDP)



Sources: World Economic Outlook (October 2022) and IMF survey of national authorities' announcements.

Note: The left panel shows the fiscal cost of officially announced energy support measures against the estimated fiscal cost for compensating the bottom 40 percent of households for the increase in their cost of living (in both 2022 and 2023). The right panel shows the fiscal cost of officially announced energy support measures against gross government debt in 2021. Fiscal support measures specifically targeting firms and industries are excluded. Countries that have announced measures for only 2022 are shown in green dots.

5. Conclusion

Surging energy prices are eroding the purchasing power of households. Heightened energy prices are projected to raise the cost of living of the average European household by around 6 percent this year relative to early 2021, both by directly pushing up households' energy bills and by driving up the production costs and prices of non-energy goods and services. The impact is projected to increase further in 2023. Lower-income households tend to have the greatest relative loss in purchasing power since they spend a larger share of their budget on energy. Moreover, low-income households have the least means to cope with large increases in the cost-of-living. Given the size of the shock, some lower middle-income families not covered by existing social safety programs may also need assistance to prevent energy poverty.

The first-best policy response to surging energy costs is to let price signals operate and provide targeted relief to vulnerable—households, but this has been challenging to implement in practice. In practice, institutional, political, and technical constraints have made it challenging to deliver targeted support to low- and lower–middle-income households that are currently outside existing safety nets. This has led many European governments to react to the crisis with broad price-suppressing measures that are fiscally costly and do not provide strong incentives to reduce energy consumption.

Implementable, second-best policy choices should now urgently replace more distortive measures.

Rebates on energy bills (that are not linked to the current volume of consumption and do not distort price signals and energy-saving incentives) or block tariffs (that preserve price signals fully for consumption levels

above a certain threshold) are relatively simple, concrete options that would improve on the current policy design in many countries. To limit fiscal costs and enhance progressivity, policymakers could make the relief subject to income taxation or introduce one-off solidarity taxes on higher-income households. To support monetary policy in curbing inflation, the increased spending on energy support measures should be offset with fiscal tightening in other areas.

Countries should urgently develop comprehensive information systems on household incomes and energy use to be better prepared for energy cost shocks in the future. Such systems can allow governments to deliver energy-cost relief (if needed again in the future) to a broader group than only those on social safety nets, which can be also helpful during the green transition.

Annex I. Consumer Energy Inflation Forecasts

To calculate the incidence of higher energy prices on household budgets, we first need forecasts of consumer energy price inflation. The latter forecasts involve two inputs: i) the inflation of wholesale prices of energy products; and ii) the passthrough from wholesale energy inflation to consumer energy inflation.

Forecasts of wholesale energy price inflation are based on the futures prices of energy goods—prices of Brent oil for liquid fuels, Dutch TTF market futures for natural gas, country-specific futures prices of electricity, and the average of the Newcastle and Rotterdam markets' futures prices of coal. For countries that do not have electricity contracts traded in the futures market, the average of electricity futures in France, Germany, Italy, and Spain is used.

Passthrough is estimated based on the outturns of wholesale and retail prices in 2022. Passthrough coefficients—defined here as the ratio between the one-year HICP inflation and wholesale price inflation for each energy good—have generally trended upwards (Figure A1, Panel 1). One exception has been the passthrough of wholesale natural gas price inflation into consumer natural gas price inflation, which declined during the summer. This is due to the substantial, transient upswing in wholesale natural gas prices following the disruptions to flows through Nord Stream 1, which consumer prices have not yet fully captured. Amidst the surge in wholesale prices and a general uptrend in observed passthrough, it is challenging to pin down a passthrough coefficient for forecasting purposes. Reflecting the potentially high passthrough during the energy crisis, passthrough coefficients for the forecasts are set at a high level. Specifically, for those countries that have already seen high passthrough (top 20th percentile of coefficients across countries), the forecast assumes that said maximum passthrough will hold for the projection horizon. For the rest, it is assumed that passthrough will surpass the observed maximum passthrough in these countries, reaching the coefficients seen in high-passthrough countries. The rationale is that passthrough is likely delayed in these countries given a prevalence of fixed-term utility contracts, but as contracts are renewed over time, passthrough will increase. Overall, the high passthrough assumed for the forecasts implies that the projected consumer energy price increases for the incidence analysis are close to those that would prevail under minimal government intervention in prices.

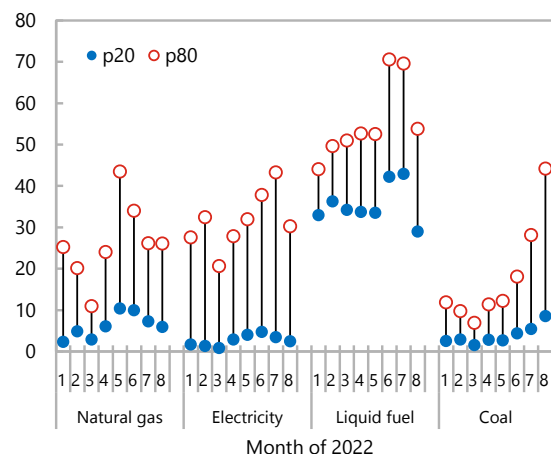
Consumer energy prices are projected to increase in 2022 and climb further in 2023, especially for natural gas and electricity (Figure A1, Panel 2 shows the projected increases relative to early 2021 levels). The median projected increase in consumer natural gas prices in 2023 with respect to January 2021 levels is 140 percent. The projected median increase in consumer electricity prices is 55 percent. There is large heterogeneity in projected increases across countries. The natural gas price in 2023 would range between a quarter higher and quintuple that of January 2021, varying across different countries in Europe.²⁵ With wholesale oil and coal futures prices edging down in 2023 and their relatively high contemporaneous passthrough coefficients, consumer liquid fuel inflation prices are projected to moderate next year (but remain about 30–40 percent higher than their early-2019 levels).

²⁵ The fact that the scope of prices is not necessarily the same across countries also contributes to this heterogeneity. For instance, the HCPI is based on the price of new energy contracts in the Netherlands, which would induce upward bias when energy prices are on an increasing trend. In Estonia, data on electricity prices are collected centrally from the Nord Pool power exchange and may not fully reflect effective prices paid by households, on account of a significant share of fixed-price contracts.

Figure A1. Consumer Energy Prices

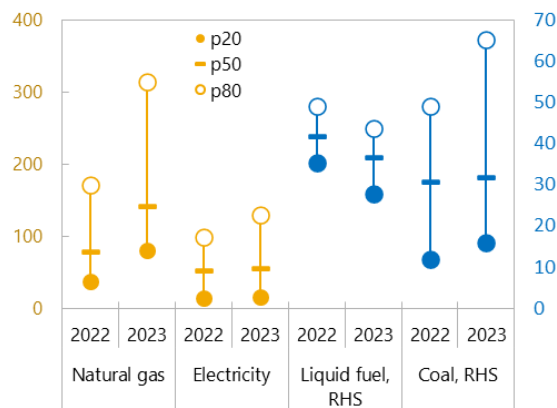
Panel 1. Energy Price Passthrough

(Percent, ratio between HICP inflation and wholesale inflation, year-on-year)



Panel 2. Projected Consumer Energy Price Inflation

(Percent, annual average relative to January 2021)



Sources: Bloomberg, ENTSOE, Eurostat, IMF staff calculations.

Note: The left panel shows the passthrough from wholesale to retail energy prices by energy product. The passthrough is calculated as the ratio between year-on-year consumer price inflation and year-on-year wholesale price inflation. The right panel shows the estimated inflation of consumer energy prices by energy product, for 2022 and 2023, respectively. The sample includes AUT, BEL, BGR, CYP, CZE, DEU, DNK, ESP, EST, FIN, FRA, DEU, GBR, GRC, HRV, HUN, IRL, ITA, LVA, LTU, LUX, NLD, POL, PRT, ROU, SVK, SVN, and SWE.

Annex II. Overview of Measures Adopted by Countries

Fiscal measures adopted by countries to cushion the impact of high energy prices on households and SMEs can be broadly divided into two categories: price-suppressing policies and income support to households. Either type of support can be targeted to lower-income households or other more vulnerable groups, or it can be untargeted (delivered to all users).

- **Price-suppressing policies.** These include broad-based cuts to excise duties or VAT rates on energy products (Belgium, Bulgaria, Finland, Germany, Greece, Italy, Lithuania, Netherlands, Romania); caps on the retail prices of energy products (France, Hungary, Portugal, Romania, Slovenia, Spain, U.K. for natural gas, and Austria, Estonia, Germany, Poland, Slovakia for electricity), and energy bill discounts, such as fee reductions. Some countries distort prices only for some households, offering discounted tariffs (so-called social tariffs) for lower-income households (Belgium, Greece, Italy, U.K.). Some countries implement block tariffs for electricity (Austria, Croatia, Estonia, the Netherlands, Poland), offering a discounted tariff for a limited or basic consumption volume.
- **Income support to households.** Measures can be categorized as untargeted versus targeted to vulnerable households. These include cash transfers (Austria, Cyprus, Czech Rep, France, Germany, Spain, U.K.), energy bill vouchers²⁶ (Belgium, Croatia, Estonia, the Netherlands, Romania, Sweden), and other forms of subsidies such as energy efficiency grants/subsidies (Lithuania, Luxembourg, Sweden) exclusively for vulnerable households or, more broadly, covering all households. Some good examples of targeted measures include expanding the coverage of existing social assistance programs (Belgium, Luxembourg), and progressive or income-taxable, lump-sum transfers (Cyprus, Germany). In general, fiscal costs of household support measures, including those associated with price-suppressing policies, range from less than 1 to close to 6 percent of GDP in European countries.

²⁶ These vouchers are similar to fixed-amount gift cards provided for energy bills. Some countries have provided vouchers on a broader basis, while others have only offered them to vulnerable groups.

**Table A2. Fiscal Costs of Household Support Measures in 2022 and 2023
(percent of GDP)**

Country	Targeted / Non-distortionary	Untargeted / Non-distortionary	Targeted / Distortionary	Untargeted / Distortionary	Total
Malta				5.64	5.64
United Kingdom	2.17	1.30		1.60	5.07
France	1.03	0.27		2.95	4.25
Slovakia	1.81	0.13		2.20	4.14
Austria	1.51	1.73		0.84	4.07
Greece	0.56	0.14	0.14	3.21	4.05
Lithuania	1.14	0.60		2.03	3.77
Kosovo	1.41	0.77		1.40	3.58
Poland	0.37	0.90		2.30	3.57
North Macedonia	0.64	0.06		2.40	3.10
Moldova	3.00			0.08	3.08
Serbia	0.89			2.18	3.06
Romania	1.34			1.52	2.86
Italy	0.92	0.15	0.00	1.75	2.82
Croatia	0.61	0.07		2.05	2.73
Netherlands	0.75	0.10	0.14	1.72	2.71
Latvia	0.90			1.81	2.71
Portugal	0.96	0.17	0.05	1.49	2.68
Albania	1.00	0.05		1.60	2.65
Turkey	1.33			1.22	2.55
Germany	0.40	1.95		0.19	2.54
Luxembourg	0.67	0.61		0.98	2.26
Czech Republic	0.10	0.30		1.80	2.20
Bosnia and Herzegovina	1.13	0.88	0.02	0.00	2.03
Norway	0.02	0.05		1.70	1.77
Estonia	0.53		0.21	0.97	1.72
Belgium		0.17	0.80	0.66	1.62
Slovenia	0.23	0.79		0.53	1.55
Sweden	0.14	0.92		0.30	1.36
Spain	0.15		0.00	1.06	1.22
Ireland	0.18	0.73		0.20	1.11
Cyprus	0.18	0.14	0.34	0.10	0.76
Hungary				0.70	0.70
San Marino			0.05	0.63	0.68
Finland	0.21	0.02		0.25	0.47
Bulgaria		0.14		0.29	0.43
Denmark	0.17	0.05		0.15	0.37
Israel	0.07	0.18		0.07	0.32
Iceland	0.26	0.02			0.28
Montenegro	0.09	0.05		0.09	0.23
Andorra	0.08	0.13			0.21
Average	0.66	0.33	0.04	1.24	2.27

Source: Based on surveys of country desk economists at the IMF's European Department.

Notes: (i) The estimated fiscal costs pertain to fiscal support measures for households; measures specifically targeting firms and industries are excluded. (ii) The estimates cover measures for 2022 for some countries (rows for these countries are shaded gray) and measures for 2022 and announced measures for 2023 for the other countries. Fiscal costs for 2023 could change as budget discussions in some countries are ongoing. (iii) The calculation of the average fiscal costs across the sample of countries treats countries not adopting a certain category of measures as having a total fiscal cost of zero for such measures.

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Targeted, Implementable, and Practical Energy Relief Measures for Households in Europe
Working Paper No. **WP/2022/262**