

Towards Socially and Ecologically Sustainable Energy Markets

Options to reform energy pricing in the G20

Policy brief

8 January 2023

Michael Jakob

Nora Kögel

A decorative graphic on the left side of the page, consisting of several overlapping triangles in shades of grey and blue, pointing towards the right.

The G20 should **build on its existing work to reform fossil fuel subsidies** by:

Adopting a **common typology of fossil fuel subsidies** to capture the type of a fossil fuel subsidy and how it is employed. The G20 should set up a task force to develop this typology based on existing experiences.

Committing to **mandatory reporting of their fossil fuel subsidies and reform efforts** in a publicly accessible and transparent manner subject to periodic peer review. This process should be open for non-member countries that aim to reform their fossil fuel subsidies. Reporting could also include ex-ante and ex-post assessments of the macroeconomic implications of fossil fuel subsidy reforms on a voluntary basis.

Supporting efforts to reform fossil fuel subsidies with financial assistance and capacity building, especially for low- and lower-middle-income countries. This also includes supporting the design and implementation of compensation schemes for households at risk of energy poverty.

Facilitating the transition to sustainable alternatives by means of financial support, access to preferential loans and removal of institutional and legal barriers. The G20 should strengthen the existing working groups on climate and energy to act as a forum to exchange experiences on policies to accelerate the transition to clean alternatives, especially for people at risk of energy poverty.

Social and environmental dimensions of energy markets

Due to anthropogenic emissions of greenhouse gases, predominantly related to the combustion of fossil fuels, the global mean temperature has increased by 1.2°C above pre-industrial level (IPCC, 2021). This has resulted in an increasing prevalence of droughts, wildfires, floods, and tropical storms. The impacts of climate change are becoming more visible. For instance, the year 2022 witnessed some of the highest temperatures ever recorded in human history (Carbon Brief, 2022). Unabated climate change would have severe consequences for a broad range of issues such as human health, food supply, ecosystems, and international security.

To reach the goal to ‘avoid dangerous climate change’ stated in the United Nations Framework Convention on Climate Change (UNFCCC, 1992), drastic emissions cuts are necessary. However, G20 members have numerous policies in place that actively encourage the production and consumption of fossil fuels and hence endanger international climate targets.

Russia’s attack on Ukraine has caused a sharp increase in the prices for fossil fuels, in particular gas. Cushioning the social impacts of higher energy prices is an important concern for policy makers. This risks to slow down or even reverse progress that has been achieved to reform fossil fuel subsidies. Subsidizing fossil fuel use can indeed alleviate at least some of the economic impacts of energy price spikes. However, this will exacerbate the lock-in of fossil fuels and make climate targets more difficult to achieve in the future. Every dollar spent on fossil fuel subsidies is a dollar that is not available to support the ongoing transition of the energy system toward net-zero emissions or other societal goals, such as healthcare, education, or social security.

With declining costs of renewable energy, solar and wind power are now, according to the International Energy Agency, ‘the cheapest source of energy in human history’ (IEA, 2020). Hence, the transition away from fossil fuels required to achieve long-term climate targets, could provide a welcome opportunity to reduce households’ energy costs in the short run.

The G20 have in their communication of the Rome summit in 2021 reaffirmed their commitment to the targets of the Paris Agreement to keep global warming to ‘well below 2°C’ relative to pre-industrial temperatures and undertake efforts to limit the increase of the global mean temperature to 1.5°C (G20, 2021). As its member states currently account for roughly 70% of global emissions (see Figure 1), the G20 play a crucial role in global efforts to mitigate climate change.

Carbon pricing is a key policy instrument to provide incentives to reduce greenhouse gas emissions (Edenhofer et al., 2015) as it provides the flexibility to reduce emissions where abatement can be achieved at the lowest costs. Recent years have seen an increase of carbon pricing schemes, such as carbon taxes or emission trading, around the world. To date, 68 carbon pricing schemes covering 23% of global emissions are in place (World Bank, 2022). However, at an average of US\$ 7/tCO₂, these prices are substantially below the levels deemed necessary to reach the climate goals of the international community. According to the report by the High-Level Commission on Carbon Prices (2017), a price of US\$ 50–100/tCO₂ will be required by 2030 to reach the targets of the Paris Agreement.

Despite the climate benefits of carbon pricing, the production and consumption of fossil fuels on many occasions enjoys subsidies, such as tax breaks for extraction of fossil resources, or consumer prices that are set below the world market price. As these subsidies incentivize fossil fuel use, they work against the goal of reducing emissions and act like a negative carbon price. In 2009, the G20 have pledged to “phase out and rationalize over the medium term inefficient fossil fuel subsidies” (G20, 2009). This pledge has been reiterated in the G20 Rome Leaders’ Declaration in 2021 (G20, 2021). In the context of the G7, the communiqué of the Climate,

Energy and Environment ministers (G7, 2022) of May 2022 acknowledges that “fossil fuel subsidies are inconsistent with the goals of the Paris Agreement” and reaffirms the G7 Members’ commitment to phase out inefficient fossil fuel subsidies by 2025.

Furthermore, Article 2.1c of the Paris Agreement (UNFCCC, 2015), which all G20 have signed, calls for “[ma]king finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development”, and the Glasgow Climate Pact (UNFCCC, 2021) explicitly calls for the “phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition”.

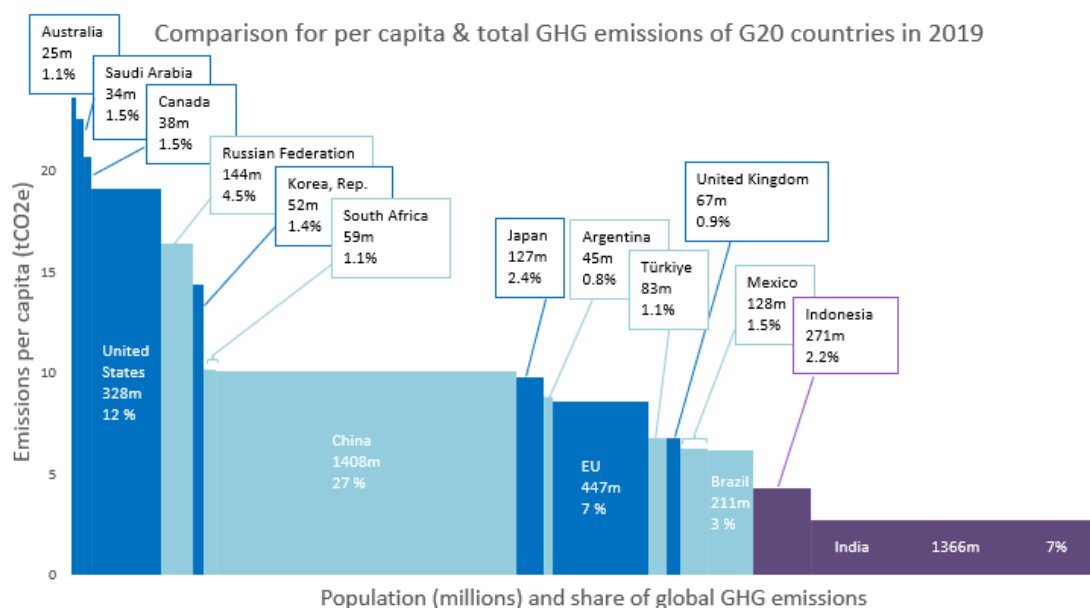


Figure 1: Population (x-axis), per-capita emissions (y-axis), and total emissions (area) for G20 Members. Colors denote income groups according to the World Bank classification (purple: lower-middle income; light blue: upper-middle income; dark blue: high income). Own depiction based on data from Minx et al. (2022)

This report outlines how fossil fuel subsidies could be reformed to simultaneously address social issues in the short term without jeopardizing progress towards long-run climate targets. It first provides a concise overview of fossil fuel subsidies in the G20. It then discusses alternative ways to shield consumers against the effects of higher energy prices. Finally, it provides recommendations how the G20 could work toward socially balanced energy pricing.

Energy pricing in the G20

In many instances, energy prices are not freely determined by market forces, but are subject to government intervention. Any advantage conferred by the public sector, such as direct financial support or advantageous treatment with regard to e.g. taxes, levies, royalties, or in-kind provision of e.g. public infrastructure is regarded as a subsidy.¹ Subsidies for fossil fuels can take on different forms. One distinction is between consumption subsidies (such as fixed prices or caps that lower the price of fossil fuels below the price on the world market)² vs. production subsidies (such as tax breaks or direct financial support for the exploration, extraction, or transport of fossil fuels) (IISD, 2022).

Both kinds of subsidies, which lower consumer prices of fossil fuels below the price that would prevail on an undistorted market, are so-called 'pre-tax' subsidies. A broader understanding of a subsidy also includes the ability to generate pollution without having to cover the associated social costs. These so-called 'post-tax' subsidies also considers advantages conferred to fossil fuels by favorable tax treatment (Coady et al., 2017). This includes lower taxes than those that are levied on other goods and services, but also the absence of taxes that reflect the true social costs of adverse consequences of fossil fuel combustion, such as air pollution and traffic accidents.³

In terms of *explicit (pre-tax) subsidies*, consumption subsidies (Figure 2, upper panel) are dominant, amounting to more than US\$ 235 bn for the G20 together. These subsidies are most frequently disbursed for the consumption of natural gas and electricity, and to some extent also for petroleum products.⁴ For Russia and Saudi Arabia, explicit consumer subsidies in 2020 amounted to about 4.5% and 7.6% of GDP (see Figure 2, upper panel). Most recent figures for 2021 that have been released after the numbers for this report have been compiled suggest a sharp increase of fossil fuel subsidies.⁵ On the global level, fossil subsidies in 2021 likely were about twice their level in 2020. It stands to reason that this also applies for fossil fuel subsidies in the G20.

Production subsidies, on the other hand, are an order of magnitude lower. In total, they were a little below US\$ 35 bn in 2020. For most countries, production subsidies were concentrated on petroleum products and to a lesser degree on natural gas. The European Union is an outlier in this regard, dispensing the largest share on subsidies for the production of fossil fuels on coal and fossil electricity (see Figure 2, lower panel).⁶

Subsidies for the production and consumption of fossil fuels can take on many different forms, such as prices set below world market prices, tax exemptions or public support via state-owned enterprises. Table 1 provides some selected examples to illustrate the variety of subsidies across G20 member countries.

¹ See the definition based on the WTO Agreement on Subsidies and Countervailing Measures: <https://www.oecd.org/fossil-fuels/methodology/>

² For this reason, consumption subsidies fluctuate with changing fossil fuel prices, especially the oil price.

³ What in economic jargon is called an 'uninternalized externality'.

⁴ Breaking down fossil fuel subsidies by types of fuels helps to understand who would be most affected by their reform.

⁵ See <https://www.oecd.org/newsroom/support-for-fossil-fuels-almost-doubled-in-2021-slowing-progress-toward-international-climate-goals-according-to-new-analysis-from-oecd-and-iea.htm>.

⁶ For the three EU Member States that are G20 members, namely France, Germany and Italy, total explicit fossil fuel subsidies amounted to US\$ 1.3 bn, US\$ 1.7 bn and US\$ 2.9 bn, respectively. For France and Italy, consumption subsidies predominated, for Germany production subsidies.

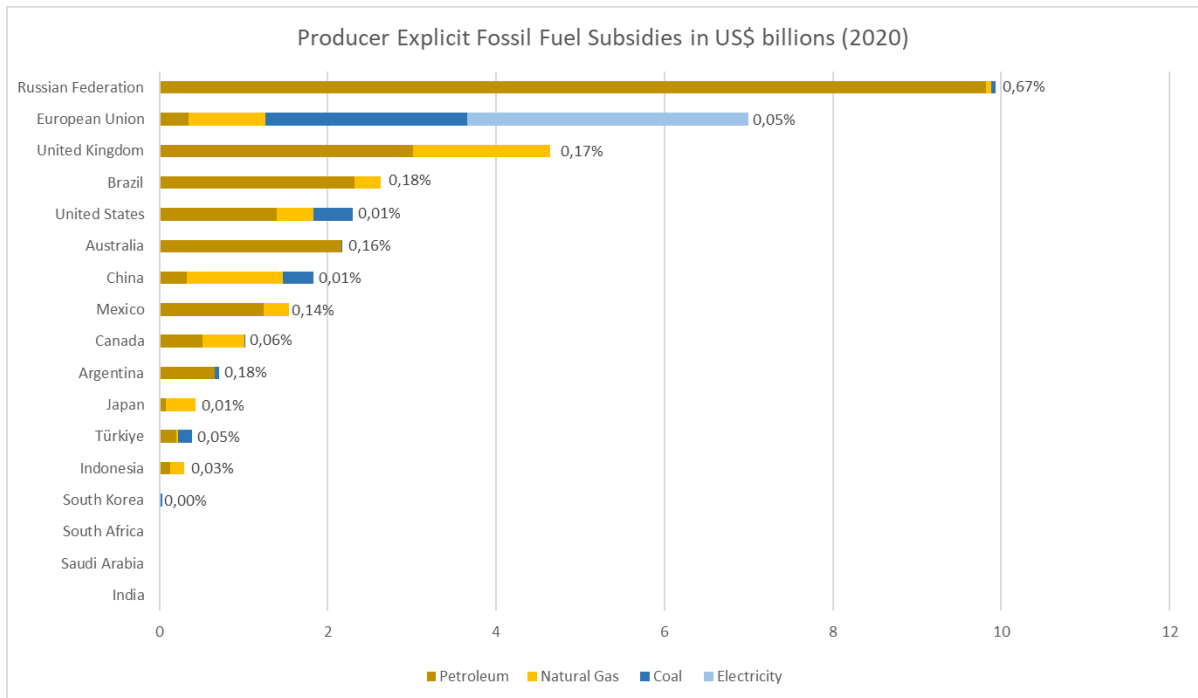
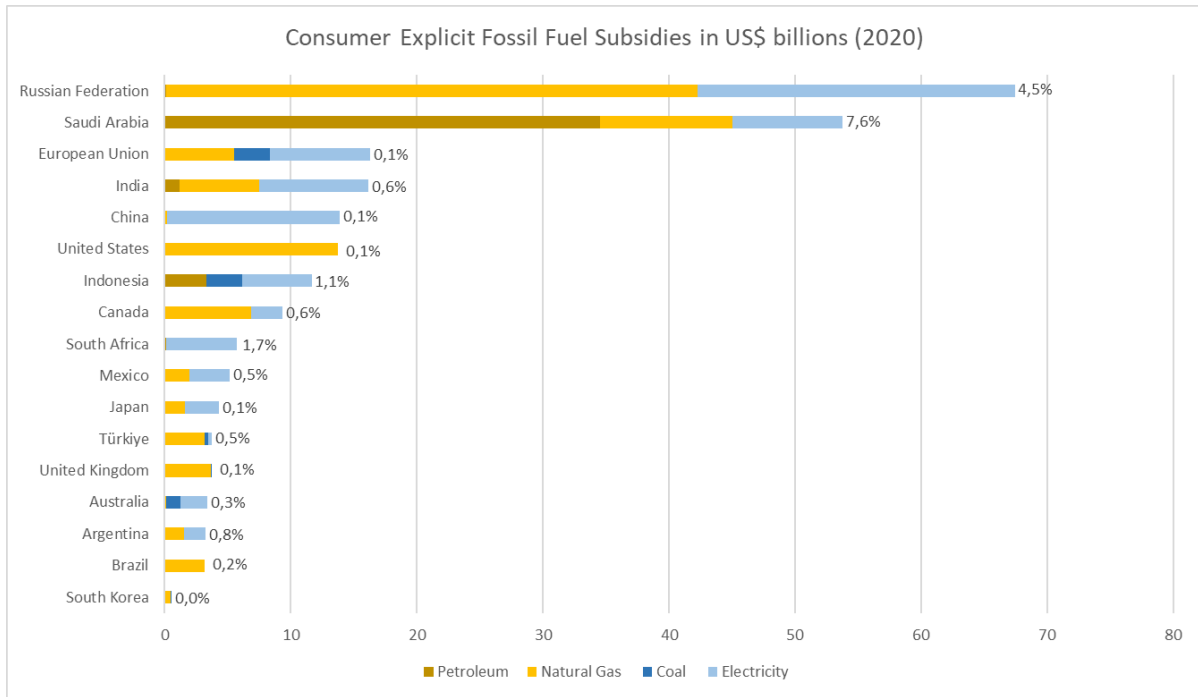


Figure 2: Explicit (pre-tax) fossil fuel subsidies by energy carrier for G20 members for the year 2020, divided by subsidies for consumers (upper panel) and producers (lower panel). Own depiction based on data from IMF (2021). Percentages indicate the share of fossil subsidies to GDP.

Country	Fossil Fuel Subsidies: Consumption	Fossil Fuel Subsidies: Production
<i>Argentina</i>	Tax exemption for liquid fuels used in the Southern region of the country, preferential taxation of Diesel	Financial assistance to Integración Energética Argentina S.A. Stimulus program for investments in non-conventional natural gas production
<i>Australia</i>	Fuel tax credit scheme: credits and grants to cover the excise tax paid on petrol and diesel to reduce its costs to heavy vehicles	Public support for exploration of natural gas fields
<i>Brazil</i>	Emergency support measures for civilian aviation	Special tax regime for goods used in the exploration and production of oil and natural gas, National Plan for Research and Development in the oil and gas Sector
<i>Canada</i>	Economic Recovery Rebate for customers of utility SaskPower	Oil and Gas Industry Recovery Assistance Fund, Emissions Reduction Fund, Subsidies for domestic pipelines and export infrastructure
<i>China</i>	Excise tax suspension for domestic aviation fuel, VAT reduction for natural gas and coal for home use, central government petroleum fuels price reform support program (transport & fisheries)	Resource tax abatements and refunds for oil and gas extraction, Government Grants to Sinopec and PetroChina and Other SOEs.
<i>France</i>	Excise tax refund for Diesel used in road freight transport	Excise tax refund for fuel used in agriculture
<i>Germany</i>	Energy tax exemption for fuels used in commercial aviation, reduced energy tax for Diesel fuel, electricity tax advantage for companies in the manufacturing sector in special cases (tax cap), and agricultural and forestry businesses	State aid for lignite power plants as reserve
<i>India</i>	Central-level oil and gas subsidies. Some significant subsidies also exist at the state level, such as fuel subsidies for fishers and farmers	Lower taxation of coal than for other minerals, capital outlay for exploration, strategic investment, and infrastructure development for petroleum products
<i>Indonesia</i>	Budgetary transfers for keeping fuel prices below market levels, e.g. government compensates state-owned electricity monopoly PLN for supplying electricity to consumers at a loss	Preferential royalty rates and corporate tax rates for small coal mining license holders, Tax exemptions for stimulating investments in new oil and gas developments

<i>Italy</i>	Tax credits and exemptions for Diesel, VAT reduction on electricity for domestic use, tax relief for trucking companies	Fossil fuels R&D funding
<i>Japan</i>	Subsidy for distributors of gasoline, kerosene, gasoil and fuel oil	Provides finance for international fossil fuel projects
<i>Mexico</i>	Direct transfer to Comisión Federal de Electricidad (CFE) by the federal government to cover part of the electricity tariff, tax benefit for gasoline	Tax credit for Pemex shared utility tax, absorption by federal budget of Pemex pension liabilities
<i>Russian Federation</i>	Regulated tariffs for electricity and natural gas	Reduced extraction tax for oil, federal budget spending on exploration and prospecting for hydrocarbons and coal
<i>Saudi Arabia</i>	Subsidized fuel prices halved against the backdrop of international oil price plunge	Subsidizing expansion of gas storage, electricity subsidies as a relief measure for commercial, industrial and agricultural sectors
<i>South Africa</i>	VAT exemption for sales of gasoline, diesel, and illuminating paraffin	Carbon Tax exemptions for coal producers, government bailouts for carbon-intensive industries, e.g. state-owned utility Eskom
<i>South Korea</i>	Fuel tax exemptions for agriculture and fisheries	Price support for coal mining, support for coal briquette production, coal RD&D funding
<i>Türkiye</i>	Rebate for Diesel in agriculture, fuel tax exemption for domestic commercial aviation	Aid to the hard coal industry, establishment of oil-gas companies with a Presidential Decree
<i>UK</i>	Reduced Rate of VAT for domestic fuel and power	Provides tax allowances and relief for fossil fuel extraction
<i>US</i>	Financial assistance for heating costs for low-income households	Depreciation of capital expenses for fossil fuel extraction

Table 1: Examples of explicit consumption and production subsidies for fossil fuels in G20 Members. Note that the list is illustrative and far from comprehensive. Source: (Aggarwal et al. 2022; Bridle et al. 2022; Gardiner and Jakob 2022; Gerasimchuk and Braithwaite 2019; IISD International Institute for Sustainable Development 2022, 20; Market Forces 2022; Nuaimy-Barker 2015; OECD 2022)

Implicit (post-tax) subsidies (Figure 3) were more than an order of magnitude above explicit subsidies. That is, the total social costs of fossil fuel use of more than US\$ 4.500 bn are more than ten times the pure financial costs indicated by explicit subsidies. This is most apparent for coal, for which explicit subsidies are relatively limited. Accounting for the associated social costs, in particular health costs resulting from air pollution, puts the social costs of coal combustion at almost US\$ 2.200 bn. For China alone, implicit subsidies for coal use amount to almost US\$ 1.400 bn. Likewise, air pollution and traffic accidents related to the use of petroleum products result in substantial social costs of more than US\$ 2.000 bn. By contrast, implicit subsidies for natural gas and electricity constitute only a small share of the total implicit subsidies in the G20.

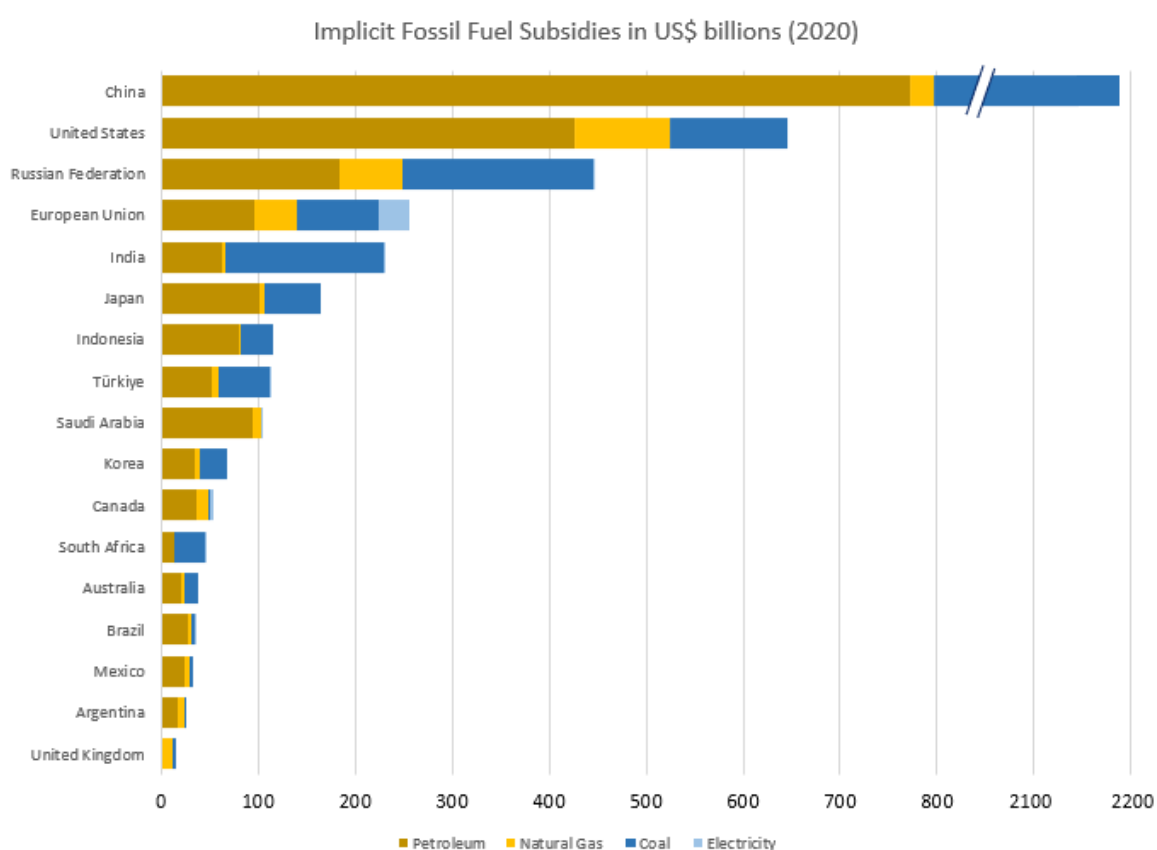


Figure 3: Implicit (post-tax) fossil fuel subsidies by energy carrier for G20 members for the year 2020. Percentages indicate the share of fossil subsidies to GDP. Own depiction based on data from IMF (2021). Please note broken x-axis for China.

Cushioning the social impacts of higher energy prices

Sharp increases of fossil fuel prices raise concerns of increasing energy poverty. Energy poverty is commonly understood as a lack of affordable and reliable access to basic energy services, such as heating or mobility. Households that are subject or are vulnerable to energy poverty are defined by a combination of low income, a large share of disposable income spent on energy, and limited possibilities to switch to non-fossil alternatives. Rising energy prices can thus make energy poverty worse, as vulnerable households may become unable to afford basic energy services or need to cut back on other essential expenditures (Berry, 2018).

Policy makers can apply different approaches to lower the risk of energy poverty. First, they can impose measures to directly lower the price of energy. Second, they can provide compensation through targeted income support in the form of financial or in-kind transfers. Third, they can adopt policies that support households at risk of energy poverty to adapt to higher fossil fuel prices more effectively, for instance by providing financial support to insulate buildings or install heat pumps.

Subsidizing fossil fuels

Policies to decrease the price of fossil fuels can help alleviate the impacts of energy price hikes on vulnerable segments of society and hence alleviate energy poverty, at least in the short run. In response to the recent energy price hikes, several G20 Members have taken steps to curtail fossil fuel prices by either imposing direct price controls or lowering taxes or other levies.

It is a robust finding from the academic literature that higher energy prices reduce energy consumption (Labandeira et al., 2017). In the short run, energy savings mostly result from behavioral changes, such as driving less or adjusting room temperatures downwards. In the medium and long term, additional energy savings may result from investments with a long lead time, such more energy-efficient appliances or improving housing insulation. As subsidies for fossil fuels dampen the incentive to reduce their consumption (Hahn & Metcalfe, 2021) they have adverse effects on the climate.

Subsidies for fossil fuels do not constitute well-targeted social policies (OECD & IEA, 2021). As energy (and fossil fuel) use rises with income, the largest share of fossil fuel subsidies accrues to high-income consumers. For instance, transferring one dollar to the lowest 20% of the income distribution by means of energy subsidies may cost up to 20 dollars of public funds (Vogt-Schilb et al., 2019), as low-income households consume substantially less energy than high-income ones.⁷ This constitutes a massive drain on public budgets and reduces the funding available for other societal objectives, such as reducing poverty and mitigating climate change. Furthermore, capping prices means that there will be a disconnect between supply and demand. This results in rationing, i.e. not everyone will be able to receive energy at the (artificially) low price, which may also entail substantial adverse implications for equity. Nevertheless, a sudden removal of existing subsidies for fossil fuels would increase rates of energy poverty. For this reason, subsidy reforms require a clear and credible long-term strategy, complemented by policies to ease the transition away from fossil fuels.

Block-pricing tariffs offer a possibility to directly lower the costs of fossil fuels that only moderately distorts incentives to conserve energy. These tariff schemes offer a certain basic amount of energy at a low price while charging a higher price for every unit of energy consumption exceeding the basic amount. Block-pricing tariffs also provide benefits for high incomes, but unlike price controls, these benefits are not proportional to energy use. They hence achieve more equitable distributional outcomes and exert less pressure on the public budget. In reality, determining the basic amount is challenging, as people's energy needs to achieve a certain outcome depend on the specific context, e.g. the type of building they inhabit. A pragmatic approach that has been taken by numerous governments hence consists in making a certain amount of the previous year's energy consumption (for instance 80%) available at a subsidized price. In this way, households receive income support while still facing incentives to conserve energy. However, this scheme is not well-targeted, as it confers benefits to all income groups, with on average larger benefits for higher incomes, which tend to consume more energy.

⁷ That is, the 20% of society with the lowest incomes only account for about 5% of total energy consumption.

Making eligibility for such schemes contingent on income could circumvent this problem but might not be feasible in the short term due to informational and institutional constraints.

Assistance in terms of access to affordable fossil energy sources might also be required to enable firms to deal with energy price spikes. The quantity of fossil energy that firms may acquire at subsidized rate could – similar to the approach for households discussed above – employ the consumption of previous years as a benchmark. Allowing firms to sell the fossil fuels they have received at subsidized rates at the higher market prices allows to maintain the incentive to reduce fuel use. Yet, firms that occupy critical positions in the supply chain might be subject to limitations or outright bans to prevent supply shortages to prevent cascading effects on downstream industries – at least unless it can be convincingly demonstrated that either their production can be substituted by imports, or that demand would raise market prices to levels that make production worthwhile even with high energy prices.

Financial or in-kind transfers

A straightforward and effective approach to compensate vulnerable households for higher energy prices consists in direct financial transfers. Such approaches could build on existing schemes to provide transfer payments to low-income households, such as Bolsa Família, which had been in place in Brazil until the end of 2021 before being replaced with the provisional Auxílio Brasil program. Unlike fossil fuel subsidies, financial transfers do not reduce incentives for energy savings. That is, recipients can choose whether they prefer to use the transfer to keep up their energy consumption patterns or adapt their energy consumption and have some part of the transfer available as disposable income.

A perfect compensation scheme would provide financial transfers to exactly those households that are at risk of energy poverty. As in reality there are substantial challenges to correctly identify and target these households, there is a risk to exclude some people from the transfers who would be entitled to receive them. Less stringent criteria for eligibility to receive transfers would reduce the risk of leaving certain energy poor households behind but would at the same time increase the costs for the public budget.⁸ Policy makers hence need to navigate the trade-off between limiting the pressures on the public budget and providing effective protection against energy poverty. How this trade-off can best be addressed will likely depend on country-specific circumstances regarding availability of reliable information on energy consumption for different social groups and institutional capacities to disburse transfers.

Alternative approaches to reduce the financial burden of higher energy prices consist in reducing taxes that are not directly related to fossil fuel consumption (such as income taxes or value-added taxes) and providing in-kind transfers (such as provision of public infrastructure). For instance, in Switzerland carbon revenues are used to reduce the costs of health insurance and in some Canadian provinces they are recycled back in the form of tax refunds (Klenert et al., 2018). Since households with similar incomes and energy use patterns may have very different tax burdens, tax reductions are less well-targeted than direct financial transfers. A further concern is that (with the exception of taxes on consumption, such as value-added taxes) low-income households pay relatively little taxes, so that tax cuts would mostly benefit richer households. In-kind transfers are also less well targeted than direct financial transfers. However, in-kind transfers can be used as part of a broad agenda for the provision of public infrastructure.

⁸ Handing out an identical sum to each citizens constitutes the extreme case of 'leaving no one behind' but entails high costs. Yet, such an approach would not be well-targeted and use a large share of available funds for recipients that are not at risk of energy poverty. Making the transfer subject to income taxation constitutes a first step to make it more progressive.

Public revenues from the reform of fossil fuel subsidies would mobilize substantial domestic financial resources to advance the UN Sustainable Development Goal Agenda by e.g., investing in healthcare and education or expanding access to clean water and sanitation (Franks et al., 2018).

Supporting adjustment

Measures that make it easier for people to adjust to higher energy prices have promising potential to limit the adverse impact of price hikes while at the same time accelerating the clean energy transition. Common policies in this regard include financial support schemes, such as tax breaks for zero-emission vehicles or rebates for innovative heating systems. Other options include direct provision of public infrastructure that enable individuals to transition away from fossil fuels, such as public transportation or bike lanes. These policies are often open for all citizens and not targeted at specific population groups. For instance, several EU Member States have introduced schemes that allow for low-cost access to public transportation to alleviate the burden of the recent energy price hike (Sgaravatti et al., 2022).

Nevertheless, there is the possibility to introduce specific requirements to condition eligibility for such schemes on household income or energy use and to offer more favorable conditions for households at risk of energy poverty. These measures need to consider the most important barriers for the adoption of clean alternatives, such as informational constraints and lack of access to financial markets. Informational campaigns and preferential loan schemes allow households at risk of energy poverty to install heat pumps or refurbish homes are examples for such an approach. Some of the relevant constraints, such as shortage of skilled labor or legal barriers for a low-carbon transition, might not be addressed in the short term but will likely require a continuous reform effort.

In any case, adjustment support schemes should, even if they are open to all, be designed in ways that do not favor richer households. Tax breaks are especially problematic in this regard. As high-income households tend to pay higher taxes as share of their income (with the exception of some consumption taxes, such as value-added-tax), they benefit more from tax breaks than low-income households. Schemes that provide an identical financial contribution for clean alternatives to everyone regardless of income, or which offer preferential treatment for earners of low incomes, achieve more equitable outcomes than tax breaks.

Recommendations for the G20

Rising prices of natural gas, oil and coal can best be countered by accelerating the phase-out of fossil fuels instead of providing subsidies to their production and consumption. In this way, short- and mid-term considerations of social policy can be aligned with long-term climate considerations. The G20 can facilitate the necessary reform of fossil fuel subsidies by adopting a common typology of fossil fuel subsidies and establishing a reporting and monitoring scheme. Furthermore, G20 member states can provide support for fossil fuel subsidy reforms and exchange experiences with policies to ease the adoption of sustainable alternatives.

A common typology of fossil fuel subsidies

To arrive at a clear picture of fossil fuel subsidies in the G20, a common typology to classify different types of fossil fuel subsidies is required.⁹ This typology should capture whether a specific subsidy can be regarded as a production or a consumption subsidy as well as how it is deployed, e.g. via direct financial support, tax breaks, or price controls. In addition, methodologies and assumptions used to assess the financial volume of fossil fuel subsidies should be made available by all G20 members. Including post-tax subsidies would complement the picture, but is more challenging, as it would require a separate typology and an agreed method to assign a monetary value to the social costs of fossil fuel use (e.g. health costs related to air pollution and traffic accidents). A transparent account of fossil fuel subsidies can underpin increased efforts to communicate the rationales and expected effects of fossil fuel subsidy reforms and thus increased political support.

The G20 should set up a task force to develop a common approach to classify and measure fossil fuel subsidies. This task force could build on existing experiences of the IEA and the OECD who compile regular update reports to the G20 on progress in phasing out fossil-fuel subsidies. A G20 task force could benefit from easier access to data from G20 members and have a stronger mandate to propose typologies and reporting standards for fossil fuel subsidies.

Reporting guidelines and mandatory peer review

G20 Members should commit to periodically reporting their fossil fuel subsidies in a publicly accessible and transparent manner. This should include a detailed description of the kind of subsidy, its intended effect, its beneficiaries and the associated financial volume. A common database should be established to make fossil fuel subsidies comparable across G20 countries. This effort could be supported by the IEA and the OECD, who already have existing databases on fossil fuel subsidies.

Furthermore, G20 Members should provide periodical progress reports detailing which steps have been undertaken to reduce fossil fuel subsidies and which further action is intended in the future. These reports can be subjected to a peer review mechanism to confirm their accuracy and promote the exchange of experiences regarding policy design. The already existing peer review mechanism – which is voluntary – could be strengthened in scope and be scheduled for all G20 Members in regular intervals.

Reporting and peer review of fossil fuel subsidies and reform efforts should be mandatory for G20 Members but should also open for other countries aiming to reform their energy pricing regimes. This information could be a first step towards ‘Green Budgets’ that include detailed information on the positive and negative environmental implications of public finance.

An additional potential area of reporting, most likely on a voluntary basis, includes the macro-economic implications of fossil fuel subsidies. This could on the one hand include ex-ante assessments of how fossil fuel subsidy reforms would affect economic output, employment and public budgets. On the other hand, it could entail ex-post assessments of the effects of fossil fuel subsidy reforms that have been implemented. These analyses would be conducted by G20 Members based on jointly agreed methodologies and the results be made available to all interested parties.

⁹ See, for instance, the classification scheme used by the OECD: <https://www.oecd.org/fossil-fuels/data/>

Support for energy pricing reforms

The G20 should support efforts to reform fossil fuel subsidies with financial assistance and capacity building, especially for low- and lower-middle-income countries. This support should not be restricted to G20 Members but be available to all countries that make good faith efforts to reduce their fossil fuel subsidies. Reporting the state of fossil fuel subsidies, proposing intended reforms and participating in the peer review mechanism for fossil fuel subsidies – possibly extended along the lines specified above – could be a first step to access support. In order to receive support, countries should be required to demonstrate their ability to identify households at risk of energy poverty and effectively protect them against the impacts of higher fossil fuel prices.

Designing schemes to compensate households at risk of energy poverty for higher fossil fuel prices requires up-to-date information on energy use patterns, spending and income. The World Bank's Living Standard Measurement Survey provides useful information in this regard. Hence, countries aiming to reform their fossil fuel subsidies should be entitled to support by the international community to gather the required data.

Financial support to expand social systems to enable them to deal with higher energy prices should be reported alongside accounts of climate finance. This support could be provided by bi- and multilateral development assistance. For the design of social assistance mechanisms, countries should have the possibility to request support from the World Bank and the IMF.

Deliberations to reform fossil fuel subsidies should be included within the G20 Sustainable Finance Working Group. One of the key objectives of the Sustainable Finance Roadmap, adopted in 2021 under the auspices of this working group, is “market development and approaches to align investments to sustainability goals”. In this way, fossil fuel subsidy reform would be included in a broader reform effort to redirect financial flows in a sustainable direction. Alignment of public policies with the requirements of financial markets could also spur green investments from the private sector, which could be an important source of finance especially for lower-middle income countries facing tight budget constraints.

Facilitate the transition to sustainable alternatives

The social impacts of higher prices of fossil fuels are less severe if people can easily switch to non-fossil alternatives, such as electric mobility, public transport, or heat pumps for residential heating. Designing policies that promote the uptake of such clean alternatives and address barriers to their deployment need to consider the specific country-context. This is particularly relevant for lower-middle and upper-middle income G20 members, for which credit constraints might pose substantial obstacles for people to pay for the initial investment required for sustainable energy services. In this case, measures to support direct costs need to be complemented with scheme to ensure preferential access to loans.

One possibility to fund such programs consists in redirecting fossil fuel subsidies accordingly. To date, financial support by G20 members for fossil and sustainable energy sources are of comparable magnitudes.¹⁰ Phasing out fossil fuel subsidies thus provides the opportunity to double support for sustainable energy sources without the need to raise additional public finance. An additional funding source consists in taxing profits accruing to energy producers that can produce at low costs and which hence benefit from windfall gains. However, determining where windfalls accrue is challenging, as energy market transactions often depend on long-

¹⁰ See <https://www.energypolicytracker.org/region/g20/>

term arrangements that might have different exposure to current price fluctuations. Excess profit taxes hence need to be introduced carefully and open the possibility for companies to demonstrate that their actual profits are below the benchmark used for taxation.

Emphasizing the potentials of sustainable technologies to create innovation and employment can increase the support for redirecting fossil fuel subsidies to other economic sectors. Around the world, 'green industrial policies' are increasingly being used to guide long-term economic development, most prominently as part of the Inflation Reduction Act recently introduced in the US. If the development of such sustainable industries is seen as a desirable objective, fossil fuel subsidies are a direct impediment to achieving this objective – which makes their removal the more attractive for policy makers.

Measures to facilitate the transition away from fossil fuels need to take into account the temporal dimension. That is, whereas removal of fossil fuel subsidies has immediate income effects, the benefits of sustainable alternatives may only materialize in the long-run. Furthermore, removing institutional and legal barriers for the uptake of sustainable energy takes time. For this reason, complementary income support might be needed in a transitional period.

The G20 should further strengthen the existing working groups on climate and energy to act as a forum to exchange experiences on policies to accelerate the transition to clean alternatives, especially for people at risk of energy poverty, and expand access to sustainable energy and energy services. This should include detailed information on policy design and outcomes as well as lessons learnt.

References

- Aggarwal, P., Goel, S., Laan, T., Mehta, T., Pant, A., Raizada, S., Viswanathan, B., Viswamohan, A., Beaton, C., & Ganesan. (2022). *Mapping India's Energy Policy 2022*. International Institute for Sustainable Development (IISD). <https://www.iisd.org/publications/mapping-india-energy-policy-2022>
- Berry, O. (2018). *Measuring energy poverty: Uncovering the multiple dimensions of energy poverty*. (CIRED Working Paper).
- Bridle, R., Muzondo, C., Schmidt, M., Laan, T., Viswamohan, A., & Geddes, A. (2022). *South Africa's Energy Fiscal Policies*. International Institute for Sustainable Development (IISD). <https://www.iisd.org/publications/south-africa-energy-subsidies>
- Carbon Brief. (2022). *State of the climate: 2022 on track for a summer of extreme heat*. <https://www.carbon-brief.org/state-of-the-climate-2022-on-track-for-a-summer-of-extreme-heat/>
- Carbon Pricing Leadership Coalition. (2017). *Report of the High-Level Commission on Carbon Prices*. <https://www.carbonpricingleadership.org/report-of-the-highlevel-commission-on-carbon-prices/>
- Coady, D., Parry, I., Sears, L., & Shang, B. (2017). How Large Are Global Fossil Fuel Subsidies? *World Development*, 91, 11–27. <https://doi.org/10.1016/j.worlddev.2016.10.004>
- Edenhofer, O., Jakob, M., Creutzig, F., Flachsland, C., Fuss, S., Kowarsch, M., Lessmann, K., Mattauch, L., Siegmeier, J., & Steckel, J. C. (2015). Closing the Emission Price Gap. *Global Environmental Change*.
- Franks, M., Lessmann, K., Jakob, M., Steckel, J. C., & Edenhofer, O. (2018). Mobilizing domestic resources for the Agenda 2030 via carbon pricing. *Nature Sustainability*, 1(7), Article 7. <https://doi.org/10.1038/s41893-018-0083-3>
- G7. (2022). *G7 Climate, Energy and Environment Ministers' Communiqué*. <https://www.bundesregierung.de/resource/blob/974430/2044350/84e380088170c69e6b6ad45dbd133ef8/2022-05-27-1-climate-ministers-communique-data.pdf?download=1>
- G20. (2009). *Pittsburgh G20 Leaders' summit communiqué*. <https://www.oecd.org/g20/summits/pittsburgh/G20-Pittsburgh-Leaders-Declaration.pdf>
- G20. (2021). *G20 Rome Leaders' Declaration*. <https://www.consilium.europa.eu/en/press/press-releases/2021/10/31/g20-rome-leaders-declaration/>
- Gardiner, J., & Jakob, D. M. (2022). *G7 Climate Crossroads: State of Play* [Report]. World Wide Fund for Nature, Germany. <https://www.ecologic.eu/18645>
- Gerasimchuk, I., & Braithwaite, D. (2019). *Beyond Fossil Fuels: Indonesia's fiscal transition*. International Institute for Sustainable Development (IISD). <https://www.iisd.org/publications/report/beyond-fossil-fuels-indonesias-fiscal-transition>
- Hahn, R. W., & Metcalfe, R. D. (2021). Efficiency and Equity Impacts of Energy Subsidies. *American Economic Review*, 111(5), 1658–1688. <https://doi.org/10.1257/aer.20180441>
- IEA. (2020). *World Energy Outlook 2020*.
- IISD. (2022). *Background Note on Fossil Fuel Subsidy Reform*. <https://www.iisd.org/system/files/2022-08/background-note-fossil-fuel-subsidy-reform.pdf>
- IISD International Institute for Sustainable Development. (2022). *Energy Policy Tracker: G20 countries*. Energy Policy Tracker. <https://www.energypolicytracker.org/region/g20/>
- IMF. (2021). *Fossil Fuel Subsidies by Country and Fuel Database*. <https://www.imf.org/en/Topics/climate-change/energy-subsidies>
- IPCC. (2021). *Climate Change 2021: The Physical Science Basis*. <https://www.ipcc.ch/report/ar6/wg1/>
- Klenert, D., Mattauch, L., Combet, E., Edenhofer, O., Hepburn, C., Rafaty, R., & Stern, N. (2018). Making carbon pricing work for citizens. *Nature Climate Change*, 8(8), Article 8. <https://doi.org/10.1038/s41558-018-0201-2>
- Labandeira, X., Labeaga, J. M., & López-Otero, X. (2017). A meta-analysis on the price elasticity of energy demand. *Energy Policy*, 102, 549–568. <https://doi.org/10.1016/j.enpol.2017.01.002>
- Market Forces. (2022). *Fossil fuel subsidies: Public money propping up fossil fuels*. Market Forces. <https://www.marketforces.org.au/campaigns/ffs/>
- Minx, J. C., Lamb, W. F., Andrew, R. M., Canadell, J. G., Crippa, M., Döbbling, N., Forster, P., Guizzardi, D., Olivier, J., Pongratz, J., Reisinger, A., Rigby, M., Peters, G., Saunio, M., Smith, S. J., Solazzo, E., & Tian, H. (2022). *A comprehensive and synthetic dataset for global, regional and national greenhouse gas emissions by sector 1970-2018 with an extension to 2019* [Data set]. Zenodo. <https://doi.org/10.5281/ZENODO.5844489>
- Nuaimy-Barker, R. (2015). *G20 subsidies to oil, gas and coal production: Brazil*. International Institute for Sustainable Development (IISD). <https://www.iisd.org/publications/report/g20-subsidies-oil-gas-and-coal-production-brazil>
- OECD. (2022). *OECD Inventory of Support Measures for Fossil Fuels: Country Notes*. OECD Publishing. <https://doi.org/10.1787/5a3efe65-en>
- OECD, & IEA. (2021). *Update on recent progress in reform of inefficient fossil-fuel subsidies that encourage wasteful consumption 2021*. <https://www.oecd.org/g20/topics/climate-sustainability-and-energy/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2021.pdf>

- Sgaravatti, G., Tagliapietra, S., & Zachmann, G. (2022). *https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices*. <https://www.bruegel.org/dataset/national-policies-shield-consumers-rising-energy-prices>
- UNFCCC. (1992). *United Nations Framework Convention on Climate Change*.
- UNFCCC. (2015). *Paris Agreement*. <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>
- UNFCCC. (2021). *Decision 1/CMA.3*. https://unfccc.int/sites/default/files/resource/cma2021_10_add1_adv.pdf
- Vogt-Schilb, A., Walsh, B., Feng, K., Di Capua, L., Liu, Y., Zuluaga, D., Robles, M., & Hubaceck, K. (2019). Cash transfers for pro-poor carbon taxes in Latin America and the Caribbean. *Nature Sustainability*, 2(10), 941–948. <https://doi.org/10.1038/s41893-019-0385-0>
- World Bank. (2022). *Carbon Pricing Dashboard*. <https://carbonpricingdashboard.worldbank.org/>

IMPRINT

Contact

Michael Jakob
 Senior Fellow
 Ecologic Institute
 Pfalzburger Straße 43/44
 10717 Berlin
 E-Mail: michael.jakob@ecologic.eu

Date

07.12.2022

Suggested citation

Michael Jakob and Nora Sophie Kögel (2022):
 Towards Socially and Ecologically Sustainable
 Energy Markets. Options to reform energy sub-
 sidies in the G20. Ecologic Institute, Berlin

This policy brief is part of the project “G7
 Klimapolitik Austausch und Input für die und von
 der Zivilgesellschaft – Folgephase”,

Funding

Federal Ministry for Economic Affairs and Cli-
 mate Action

Supported by:



Federal Ministry
 for Economic Affairs
 and Climate Action

on the basis of a decision
 by the German Bundestag