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Fossil Fuel Subsidies in EU Member States – Trends and Analytical Challenges

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Abstract

The EU agreed to phase out fossil fuel subsidies (FFS). Nevertheless, FFS strongly increased in 2022 to address the effects of the energy price spikes reached during the energy crisis. Phasing out FFS is therefore also a critical element analysed as part of the European Semester. This paper provides a detailed picture of recent trends and discusses the methodological challenges in analysing FFS.

The majority of FFS in the EU are usually tax-related measures, though in the responses to the energy crisis price-related transfers have been dominant. As the part of FFS in price-related support measures cannot always be identified, the crisis-related FFS in EU Member States are likely to be underestimated. Aggregating Member States projections of those FFS in their budgets indicates that the strong rise in directly targeted FFS amounts in 2022 and to a lesser extent in 2023, in particular to support households, is likely to be temporary. Going forward, still around half of EU Member States have only limited or no known plans to phase-out FFS.

There are different and partly complementary approaches to define and measure FFS. All approaches have specific challenges. Further reflection is needed on whether all public support which benefits fossil fuels should be treated the same way, or whether particular attention should be paid to FFS linked to a clear economic advantage provided to fossil fuels over other fuels and energy sources. Also, the definition and scope of FFS related to income support may require further scrutiny. The same holds for ways to improve comparability of tax-related FFS, and a possible combined analysis of FFS and implicit and explicit carbon pricing. Finally, further reflection is needed how to take account of the EU and international qualifying criteria for the phase out of fossil fuel subsidies.

JEL Classification: C8, H2, H5, Q3, Q4.

Keywords: fossil fuels, subsidies, taxation, energy policy, energy crisis.

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ABBREVIATIONS

EU	European Union
EUR	Euro
FF	Fossil fuels
FFS	Fossil fuel subsidies
GDP	Gross domestic product
IEA	International Energy Agency
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
RD&D	Research, development & demonstration
WTO	World Trade Organisation

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GRAPHS

1. INTERNATIONAL, EU AND ECONOMIC POLICY CONTEXT

Fossil fuel subsidies reflect long-established policies with various objectives. Main motivations for these subsidies are social concerns, the aim to support strategic industries or sectors, security of supply (e.g. of energy and food) or the aim to maintain regional or sectoral employment. In turn, there are very significant rationales to reduce their use, ranging from economic efficiency, budgetary costs, energy security to environmental and climate harm (e.g. Bárány and Grigonytė 2015). The political debate on phasing out harmful fossil fuel subsidies (FFS) has always been difficult, as they reflect trade-offs between different policy objectives. Fossil fuel subsidies are also often politically difficult to remove as they are provided in form of recurrent operational support, e.g. subsidies to households and firms or tax measures to reduce the price or cost of energy, rather than being provided as one-off investment support.

There are various international political commitments to phase-out inefficient fossil fuel subsidies, and different estimation methods. The first agreement was made by the G20 (2009) in the wake of the financial crisis and the strong oil price increase in the 2003-2008 period. It has been affirmed by the United Nations. The UN Sustainable Development Goals from 2015 aim to "rationalise inefficient fossil-fuel subsidies that encourage wasteful consumption (…) including by (…) phasing out those harmful subsidies" (United Nations 2015)[1]. This was reaffirmed by the 28th Conference of the Parties under the United Nations Framework Convention on Climate Change in 2023 which called on parties to contribute to "phasing out inefficient fossil fuel subsidies that do not address energy poverty or just transitions, as soon as possible" (United Nations 2023, pt. 28). The G7 countries had in 2022 committed to doing so by 2025 (G7 2022). However, these documents do not define what constitutes FFS. Section 2 of this paper provides an overview of different definitions and estimation methods elaborated by various international organisations, also explaining their caveats.

The European Union has agreed to phase out fossil fuel subsidies and has put reporting requirements and some specific phase-out provisions into EU law. The 2022 General Union Environment Action Programme to 2030 includes an agreement for "the Commission, Member States, regional and local authorities and stakeholders, as appropriate" to "[phase] out environmentally harmful subsidies, in particular fossil fuel subsidies, at Union, national, regional and local level, without delay"[2], inter alia, by "setting a deadline for the phasing out of fossil fuel subsidies consistent with the ambition of limiting global warming to 1.5 ºC" (European Parliament and Council 2022, Art 3(h)). This reinforces the EU's stance expressed in the 2021 European Climate Law which notes that "In light of the objective of achieving climate neutrality by 2050 and in view of the international commitments under the Paris Agreement, continued efforts are necessary to ensure the phasing out of energy subsidies which are incompatible with that objective, in particular for fossil fuels, without impacting efforts to reduce energy poverty" (European Parliament and Council 2021, recital 29). Moreover, a binding monitoring and reporting framework on energy subsidies, in particular fossil fuel subsidies has been already set in 2018 under the Regulation on the Energy Union and Climate Action Governance (European Parliament and Council 2018)[3]. Since 2020, the Commission must report annually on Member States' progress, and since 2023 Member States also have to report biennially on "national objectives to phase out energy subsidies, in particular for fossil fuels" as part of their national energy and climate progress reports[4]. Only a few Member States, however, have translated these ambitions into law or clear plans that specify when they intend to phase out fossil fuel subsidies. A legal requirement to phase out certain types of

[1] Goal 12, target 12.c, https://sdgs.un.org/goals/goal12#targets_and_indicators.

[2] This commitment was reiterated in the Council conclusions of 17 June 2024 on the 8th Environmental Action Programme mid-term review (Council of the European Union 2024a).

[3] Art 25d and 35n of Regulation (EU) 2018/1999 and Commission Implementing Regulation (EU) 2022/2299.

[4] The Commission is also preparing guidance to support Member States in identifying and reporting on non-energy environmentally harmful subsidies. Both is also needed for reporting of biodiversity harmful subsidies under the Kunming-Montreal Global Biodiversity Framework Target 18.

fossil fuel subsidies has been introduced in the revised Energy Performance of Buildings Directive (European Parliament and Council 2024), in particular subsidies for stand-alone boilers powered by fossil fuels will no longer be allowed as from 1 January 2025, with the exception of those selected before 2025 for investment[5]. The Energy Efficiency Directive recast contains similar provisions concerning direct fossil fuel combustion technologies and prohibits the support to new fossil-fuel based capacities (except gas until 2030) in efficient district heating and cooling systems (European Parliament and Council 2023a).

After some years of slightly declining fossil fuel subsidy amounts in the EU, energy subsidies, including for fossil fuels, have strongly increased since 2022 to address the effects of the unprecedented prices reached during the energy crisis. Section 3 of this paper analyses FFS, their composition and trends in the EU until the energy crisis based on an annual energy subsidy study for the Commission and the Commission's 2023 report on energy subsidies (European Commission 2023a). Section 4 dives deeper into FFS elements of EU Member States' recent temporary measures to address the energy crisis, drawing also on a Commission inventory of fiscal measures. Nearly all those new subsidies have taken the form of support to consumption (through price guarantees and tax measures) or operational expenditures[6]. While state aid through subsidies is in principle incompatible with EU internal market rules, the current State aid rules allow some types of subsidies under certain conditions (European Commission 2022a)[7]. Similarly, some EU funding instruments also provide specific and targeted provisions allowing limited and temporary support to fossil fuels under specific conditions.

Since 2023, the Commission and the Council have strongly cautioned against keeping energy crisis subsidies longer than necessary as prices are getting back closer to pre-crisis levels. The country-specific recommendations 2023 and the euro area recommendation 2024 recommend Member States to wind down emergency energy support measures as soon as possible in 2023 and 2024 and use the related savings to reduce government deficits (Council of the European Union 2023a, 2023b, 2024b). This becomes more salient in 2024 with fiscal surveillance resuming under a revised economic governance framework. With the 2021 proposal to revise the Energy Taxation Directive, the Commission also aimed to structurally reduce and phase out fossil fuel subsidies in form of tax exemptions or reduced excise tax rates. Discussions are ongoing in the Council, where unanimity is required for the adoption of a revised Directive.

Against this background, following the abovementioned sections 2 to 4, on FFS definitions, pre-energy crisis patterns and recent trends during the energy crisis, section 5 of this paper discusses challenges linked to the current definition and calculation of fossil fuel subsidies in the EU which would benefit from further consideration and analysis. Section 6 concludes from a EU FFS phase-out perspective.

[5] E.g. related to Regulation (EU) 2021/241, Article 7(1), point (h)(i), third indent, Regulation (EU) 2021/1058 and to Article 73 of Regulation (EU) 2021/2115 of the European Parliament and of the Council.

[6] The few investment support examples are mostly linked to the support of Liquid Natural Gas terminals.

[7] The Guidelines on State aid for climate, environmental protection and energy authorise Member States to provide subsidies to fossil fuels when they contribute to a "shift away from coal, peat and oil shale activities", e.g. if they "support the closure of power plants that burn coal (including both hard coal and lignite), peat or oil shale and of mining operations for these fuels" (European Commission 2022, section 4.12).

2. DIFFERENT DEFINITIONS AND ESTIMATION METHODS OF FOSSIL FUEL SUBSIDIES AND THEIR CHALLENGES

The most widely used definition of subsidies in general stems from the World Trade Organisation. It is a generic and broad definition of subsidies that various actors have interpreted and operationalised differently for fossil fuel subsidies. A subsidy is defined by the World Trade Organisation (WTO) either as "a financial contribution by a government or any public body (…), i.e. where:

- a government practice involves a direct transfer of funds (e.g. grants, loans, and equity infusion), potential direct transfers of funds or liabilities (e.g. loan guarantees);
- government revenue that is otherwise due is foregone or not collected (e.g. fiscal incentives such as tax credits);
- a government provides goods or services other than general infrastructure, or purchases goods;
- a government makes payments to a funding mechanism, or entrusts or directs a private body to carry out one or more of the type of these functions which would normally be vested in the government"

or as "any form of income or price support [which operates directly or indirectly to increase exports of any product from, or to reduce imports of any product into, its territory], and a benefit is thereby conferred" (World Trade Organisation 2002, Art. 1). Various actors analysing fossil fuel subsidies have used, interpreted and operationalised this definition differently. A common feature is a broad notion of the term subsidy, usually including not only direct transfers but also foregone tax revenues and other income and price support measures.

As a result, there are different and partly complementary international approaches for defining and measuring fossil fuel subsidies (e.g. Bárány and Grigonytė 2015, OECD and IEA 2021)**. Thus, there are differences both in terms of methodology and scope.**

- The Organisation for Economic Co-operation and Development (OECD) has estimated FFS since 2010 based on a bottom-up inventory method identifying and quantifying individual policy measures that support fossil fuels, e.g. direct budgetary transfers and tax expenditures providing a benefit or preference for fossil-fuel production or consumption (OECD 2023). A challenge of country inventories is that the tax expenditure benchmarks are set on a country-by-country basis, and estimation methods applied by countries differ, hampering comparability (e.g. UNEP, OECD and IISD 2019). The OECD estimates also include the transfer of risks into the scope of fossil fuel support measures.
- The International Energy Agency (IEA) estimates FFS based on measuring the gap between the end-use prices paid by fuel consumers and international reference prices or the cost of importing and distributing the fuels (IEA 2023). Challenges here include to define the reference price, in particular for fuels for which there is no uniform reference price. The method also does not cover tax-related FFS. The International Monetary Fund (IMF) uses a similar methodology, however it includes further elements in the reference price (see below).
- The OECD and the IEA have been producing an annual joint estimate of support for fossil fuels since 2018, combining their two methods while eliminating double counting.
- The UN Environment Programme (UNEP), OECD and the International Institute for Sustainable Development (IISD) have jointly developed a method of measuring and tracking fossil fuel subsidies in the context of tracking Sustainable Development Goal indicator 12.c.1, "amount of fossil-fuel subsidies per unit of GDP (production and consumption)" (UNEP, OECD and IISD 2019). The method adopts the OECD Inventory approach for direct budgetary transfers and foregone tax expenditures (with the significant caveat of making the latter optional to report),

and the IEA price-gap approach for induced transfers/ price support. It does not include one of the four OECD subsidy categories, the transfer of risk[8].

- The IMF includes into the reference prices for determining FFS also the under-pricing of external costs, such as environment and climate damage (Black et al. 2023), unlike OECD and IEA. The additional challenge here is to provide a widely accepted quantification of such external costs. The IMF uses a constant carbon price as proxy.
- IMF, OECD and IEA also use different scopes with respect to electricity. OECD tries to estimate the part of electricity subsidies benefitting fossil fuels, while IEA and IMF estimate subsidies for fossil fuel inputs into electricity production based on the price-gap method.

The differences in scope and methodology can have a large impact on total estimated amounts and comparability between countries, making the use of trends of fossil fuel subsidies for analyses and comparisons more robust than absolute figures. The OECD inventory of support measures for fossil fuels estimates that direct transfers and tax expenditures associated with support measures for fossil fuels in 51 OECD, G20, and EU Eastern Partnership economies amounted to USD 428 billion in 2022 (OECD 2023). The IEA calculates that fossil fuels sold below reference prices amounted in 2022 to USD 1127 billion, covering 82 countries (IEA 2023). The IMF estimates global FFS as USD 7 trillion in 2022 (Black et al. 2023), of which 82% are undercharging for environmental costs and forgone consumption taxes[9]. A recent Dutch study highlighted the relevance of the inclusion or not of implicit subsidies as well as the reference value for external costs for the reported amount (Brink et al. 2023). One important implication is that estimates of trends of FFS measured in the same way are more robust than absolute subsidy figures. Interpreting changes over time is however difficult if the structure of FFS instruments or taxation levels change significantly over time.

Aggregating and comparing estimates of fossil fuel subsidies related to tax expenditure across countries comes with caveats. As outlined above, the inventory method inter alia relies on country-specific benchmarks – e.g. the standard rate of an excise duty – to calculate the size of tax expenditures through tax differentiation or exemption. However, this means that countries with high standard tax rates on energy products mechanically have a larger imputed fossil fuel subsidy, even if they apply the same reduced rate as another country. For this reason, it can be more useful to speak of foregone revenue or fiscal cost of support of fossil fuels than of FFS. Moreover, it implies that the aggregation of tax expenditures and direct subsidies, and the comparison of tax-related FFS across countries, must be interpreted with care.

The EU scope and measurement of the fiscal cost of energy subsidies, including of fossil fuel subsidies, largely follows the OECD/WTO approach. Since 2014 the European Commission, Directorate-General for Energy, has commissioned recurrent studies on energy subsidies and other government interventions in the European Union. The studies provide estimates of energy subsidies with data available from 2008 onwards (called energy subsidy studies in what follows). In recent years the analysis has been conducted by a consortium of Enerdata and Trinomics, drawing on various data sources, including the OECD inventory of fossil fuel support, and with a review process involving Member States experts. The FFS calculation method starts from the WTO subsidy definition and, like the OECD, follows an inventory-based approach relying on Member State reporting (European Commission 2023a, European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023).

The inventory-based approach to report on fossil fuel subsidies has been codified under the Energy Union and Climate Action Governance Regulation (European Commission 2022b)**.** Fossil fuel subsidies are not further defined, but a **list of measures qualifying as subsidy** based on the WTO subsidy categories is provided:

[8] On this basis, a data set for 192 economies until 2022 has been published on the joint OECD/IISD Fossil Fuel Subsidy Tracker (https://fossilfuelsubsidytracker.org/). Country reporting began in 2022 but will likely take several years to ramp up and will be incorporated once available.

[9] For a single access point to international databases of OECD, IMF, World Bank Group and WTO see https://www.subsidydata.org/en/subsidydata/fossil-fuels.

- Direct transfers (Soft loans; Grants; Others) which also include support to Research, Development and Demonstration activities;
- Tax expenditures (Tax reduction; Tax exemption; Tax refund; Tax credits; Tax allowance; Others);
- Under-pricing of goods/services (Under-pricing of government-owned resources or land; Under-pricing of government-owned infrastructure; Under-pricing of other government-provided goods or services);
- Income or price supports (Capacity payments (electricity capacity mechanisms); Biofuels blending mandate; RES quotas with tradable certificates; Differentiated grid connection charges; Energy efficiency obligations; Interruptible load schemes; Contract for Difference (CfD); Feed-in premiums; Feed-in tariffs; Consumer price guarantees (cost support); Consumer price guarantees (price regulation); Producer price guarantees (price regulation); Others).

This subsidy scope follows largely OECD and WTO. What is not included compared to the WTO and OECD definitions are transfers of risk (similarly to the approach by UNEP, OECD and IISD) and foregone government revenues not related to tax expenditures (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023, Annex A.1., Table 7). Some Member States (e.g. Belgium and the Netherlands) have recently taken a broader approach also in this respect, which is one explanatory factor for significantly higher national fossil fuel subsidy estimates (Brink et al. 2023, Federal Public Service Finance of the Kingdom of Belgium 2024).

In addition, **for reporting purposes, a list of fuels, products and carriers is provided** as part of Commission Implementing Regulation (EU) 2022/2299, listing also the different fossil fuels such as Coal/Lignite, Natural Gas (Natural Gas, Mine gas, Shale gas), Oil (Crude oil & NGL, Oil & Gas, Petroleum products, Gasoil, Blended gasoil, Gasoline, Blended gasoline, LPG, Kerosene, Fossil-based marine fuels, Heavy fuel oil (HFO)), Peat as well as Fossil based Hydrogen (European Commission 2022b).

The energy subsidy studies estimate financial support to electricity generated by burning fossil fuels, when relevant and feasible. As electricity is treated as a separate fuel and product in the reporting (like in the OECD approach), FFS for electricity that ultimately benefit fossil fuels are estimated based on their share in the Member State's power mix**,** reflecting their treatment by OECD and IEA and UNEP, OECD and IISD. The fossil fuel share of multi-energy subsidies is estimated in a similar way, where possible. In some cases, those multi-energy subsidies benefiting fossil fuels are however not reflected in the fossil fuel category, but rather included into the "All energies" category (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023, section 3.3.3.1 and Annex A.1.7).

In the energy subsidy studies, transport coverage is restricted to fuel specific tax reductions/exemptions. Different treatment of diesel and gasoline in relation to a hypothetical universal norm based on energy or carbon content is not treated as subsidy. Some Member States include this differential treatment into their fossil fuel subsidy estimates (e.g. Austria, Belgium, Finland, the Netherlands and Sweden), leading to higher FFS estimates. Coverage is also limited to domestic and intra-EU transport, not covering the EU's share in international aviation and maritime, unlike some national estimates. The studies do also not cover reductions/exemptions of distance-based road charges[10], of potential urban road pricing schemes and of infrastructure charges, nor reduced VAT rates for transport companies (except if the reduction applies to the transport fuel purchases, usually diesel), zero VAT for aircraft flights or mileage allowances for employees. As in all other international analyses, government payments to other funding mechanisms are not covered in the studies, nor is public ownership in energy companies or public equity infusions in private firms[11].Finally, free allocations of emission allowances under the EU ETS are reported but currently not considered as fossil fuel subsidies.

[10] These charges are fuel neutral and relate to the externalities associated with road transport, not fossil fuel usage.

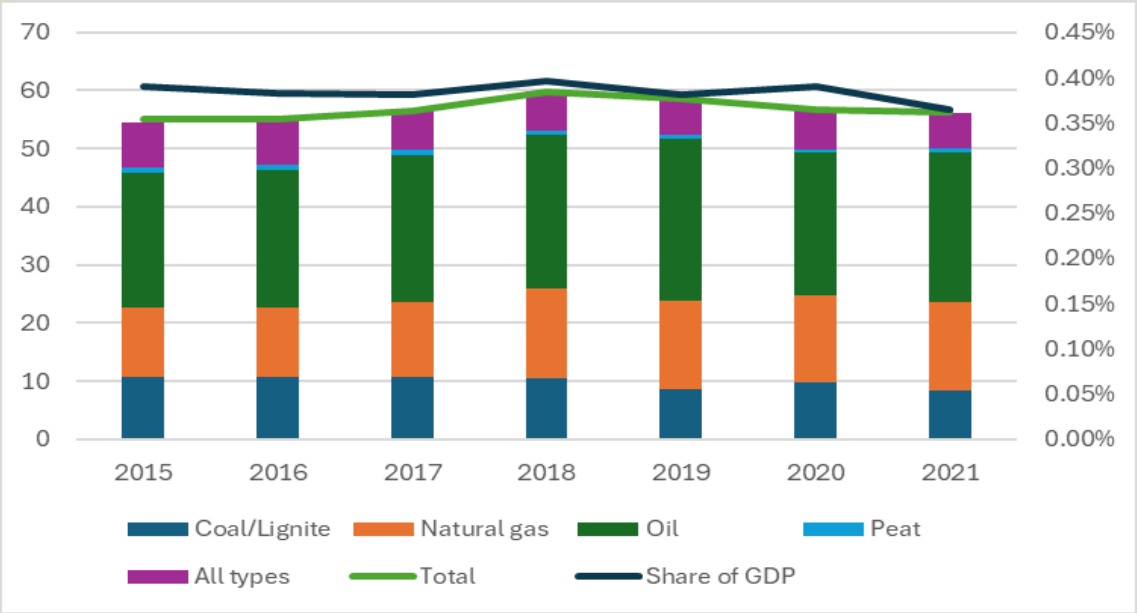
[11] See Annex 1 of European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023 for more details.

3. FOSSIL FUEL SUBSIDIES AND TRENDS IN EU MEMBER STATES UNTIL THE ENERGY CRISIS

It is useful to start with an FFS trend analysis until 2021 as the amounts after 2021 are strongly but likely temporarily impacted by measures taken in response to the energy crisis and the Russian aggression against Ukraine. The analysis is based on the 2023 Commission Report on Energy Subsidies (European Commission 2023) and its underpinning energy subsidy study (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023).

Fossil fuel subsidies of EU Member States amounted in 2021 to 0.36% of EU GDP, with a rather stable GDP share over time[12]. FFS decreased between 2018 and 2021 to EUR 56 billion after having increased between 2015 and 2018, remaining roughly stable over the whole period 2015 to 2021. Already in 2008, FFS were at roughly similar levels (European Commission, Directorate-General for Energy, Lee, L., Rademaekers, K., Bovy, P. et al. 2021). Also, the share of FFS in EU GDP remained rather stable, having been slightly higher at 0.39% of GDP in 2015. Nearly half of the FFS amount went to oil. The subsidies to gas increased to EUR 15 billion, while amounts for coal and lignite have decreased to less than EUR 10 billion (see Graph 3.1.).

Graph 3.1. **Fossil fuel subsidies in EU Member States between 2015 and 2021, by fuel in EUR billion and as share of GDP**

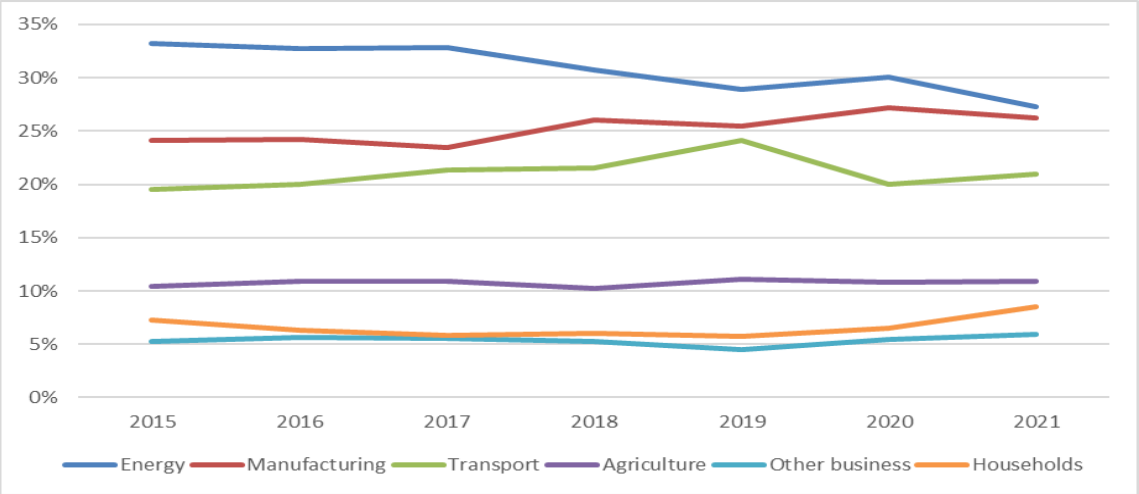


Sources: European Commission (2023a) based on European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023), AMECO database, Eurostat, own calculations.

The three largest receiving sectors in terms of total amounts were the energy sector (around 30%)**, manufacturing** (around 25%) **and transport** (around 20%), while less than 10% of FFS went directly to households (see Graph 3.2.). The share of FFS in the transport sector increased, being a key driver of the 2018 peak. The shares of FFS to support electricity production and industry restructuring, such as aid to close coal/lignite power plants and coal mines, decreased over time.

[12] Expressed in constant €2022, based on 2022 GDP in market prices and AMECO constant GDP time series. Data in the 2024 Commission Report on Energy Subsidies might differ slightly due to another base year and minor changes in the subsidy scope.

Graph 3.2. **Fossil fuel subsidies of EU Member States 2015-2021 by shares of receiving sectors**

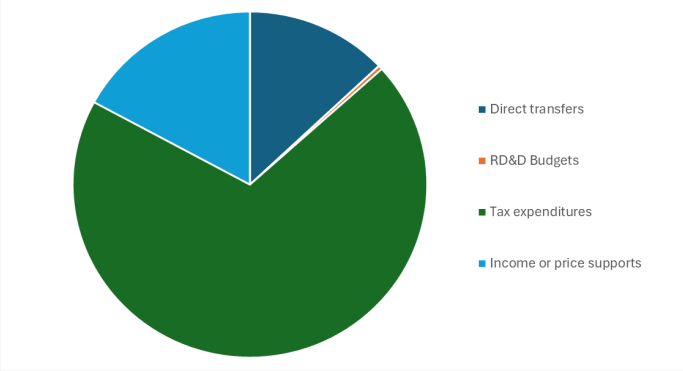


Sources: own calculations based on European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023).

Underneath this rather stable EU level trend are some interesting Member State differences. The shares of FFS in Member States' GDP in 2021 vary between 0.1 and 1.4%, a roughly similar range as in 2015, while shares in the five largest Member States are similar to the EU average (0.3 to 0.5% in 2021). Also changes of FFS shares in those EU Member States were limited between 2015 and 2021. However, some Member States have either decreased or increased the FFS share of GDP significantly[13].

Of the 470 fossil fuel subsidies accounted for in 2021, 70% of the amount was linked to tax expenditures. This reflects lower tax rates for certain energy products, such as for the use of gas in electricity generation, or for certain sectors, such as reduced tax rates for agricultural fuels, industry fuels or tax exemptions for air traffic fuels. Most of these concerned energy demand, with EUR 24 billion of tax differentials or exemptions benefiting oil and EUR 8 billion gas (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al., 2023, Figure 28). Of the oil subsidies, around EUR 10 billion were allocated based on the use of fuel markers, used by some Member States for marking lower taxed gas oil (which is equivalent to diesel). Overall, 17% were provided as income and price support, while 13% were direct transfers (see Graph 3.3.). Examples for the latter are subsidies for coal production and feed-in tariffs for combined heat and power.

Graph 3.3. **Fossil fuel subsidy instruments used by Member States in 2021**

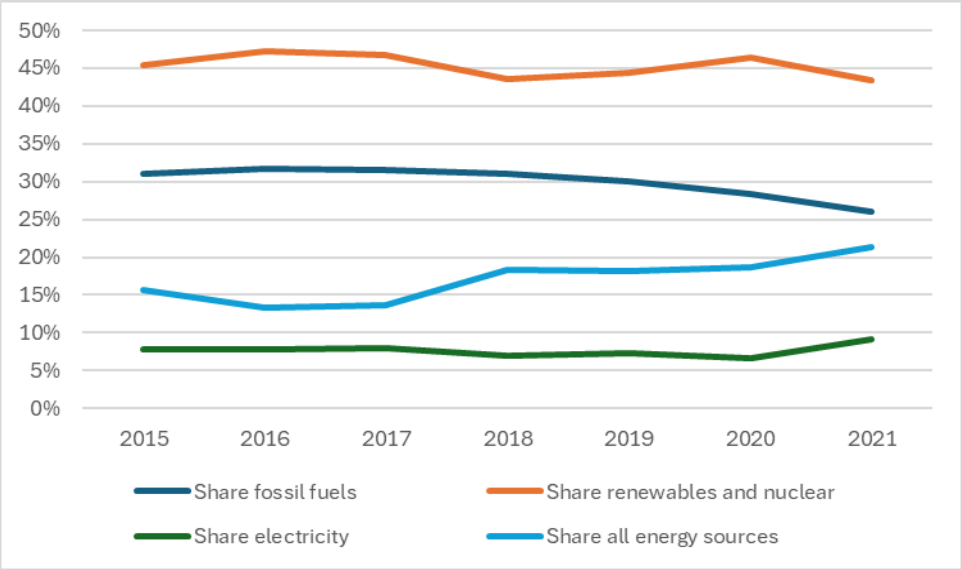


Source: based on data collected for European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023).

[13] The analysis is based on data presented in European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023), Figure 8.

The share of fossil fuel subsidies in total EU Member States energy subsidies decreased between 2015 and 2021. In parallel to this decrease from 31% to 26%, the combined share of subsidies for electricity or for subsidies benefiting all or several fuels increased from 24% to 31%, mainly driven by an increase in the latter subcategory[14]. The share of subsidies for renewable energy and nuclear energy remained stable over the same period (see Graph 3.4.).

Graph 3.4. **Share of fossil fuel and other subsidies in total Member States' energy subsidies over time**



Sources: own calculations based on European Commission (2023a) and European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023).

Note: The share of "all energy sources" means the share of subsidies benefiting all or several fuels in all energy subsidies.

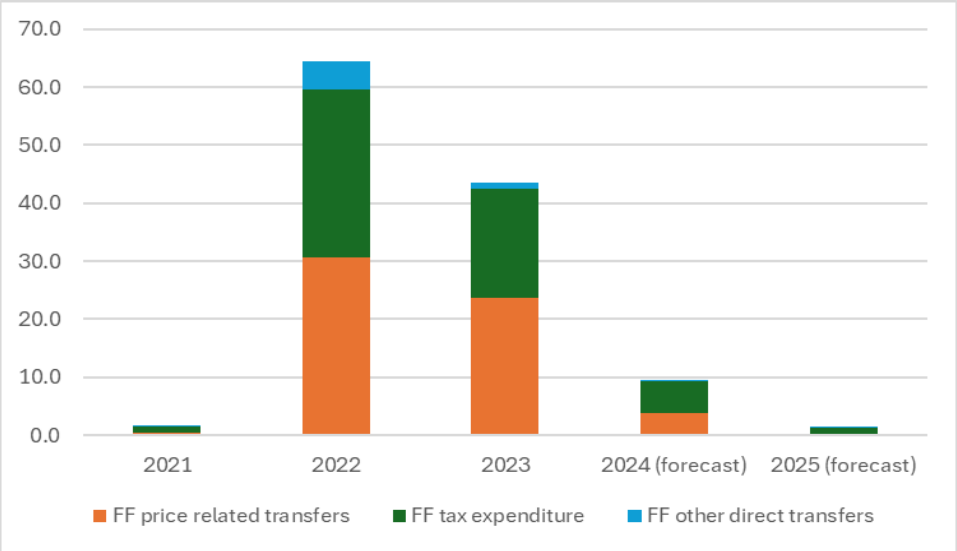
[14] Some of those subsidies for electricity or benefiting all or several fuels also benefit fossil fuels.

4. FOSSIL FUEL SUBSIDY ELEMENTS OF EU MEMBER STATES' RECENT TEMPORARY ENERGY MEASURES TO ADDRESS THE ENERGY CRISIS

The high energy prices, largely driven by Russia's military aggression against Ukraine, have led to a substantial increase in fossil fuel subsidies. The 2023 Commission subsidy report estimated an increase from EUR 56 billion in 2021 to EUR 123 billion in 2022 (European Commission 2023a), that is from 0.36% to 0.84% of GDP. In 2022, 98% of the FFS, EUR 120 billion, could be characterised as environmentally harmful (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al., 2023)[15]. Estimates for 2023 for the 2024 edition of the energy subsidy study, based on Member State data covering most of 2023, indicate that FFS decreased compared to 2022, but remain significantly higher than 2021.

These recent trends are confirmed by an analysis of Member States fiscal measures introduced to address the energy crisis. The European Commission, DG ECFIN maintains an inventory of EU Member States' budgetary policy measures to mitigate the impact of high energy prices on households and firms and their budgetary estimates for 2021 to 2025. The version of April 2024 (Bethuyne et al. 2024) is used to have a closer look at latest trends for this subset of fossil fuel subsidies, trying to replicate to the extent possible the methodology of the energy subsidy study. However, a quantification of budgeted fossil fuel subsidies is only possible for subsidy measures which directly target only fossil fuels, thereby excluding measures which also include other subsidies or which support fossil fuels indirectly. The share of these direct fossil fuel subsidies of all energy crisis support measures in the fiscal inventory is around one quarter (29% in 2022, 24% in 2023, 25% in 2024). The amount of direct fossil fuel subsidies, taken in response to the energy crisis, increased strongly from around EUR 1.5 billion in 2021 to EUR 64.5 billion in 2022, before an estimated decrease to EUR 43.5 billion in 2023.

Graph 4.1. **Targeted fossil fuel subsidies to respond to the energy crisis 2021 – 2025** (in EUR bn)



Source: own calculations based on Bethuyne et al. (2024).

[15] Of the non-environmentally harmful FFS, the vast majority relate to compensation to companies and workers for curtailment or closure of coal mines and coal-fired power plants, or funding for rehabilitation of the areas where such closures have taken place.

The rise in direct fossil fuel subsidies in 2022 and 2023 is expected to be temporary. The 2023 energy subsidy study found that for 47% of total FFS amounts in 2022 there has been a planned end date before 2025 (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023). Similarly, the analysis of the Member States' budgetary policy measures to mitigate the impact of high energy prices on households and firms indicates that subsidies targeting only fossil fuels are projected to drop strongly from around EUR 43.5 billion in 2023 to EUR 9.5 billion in 2024 and EUR 1.5 billion in 2025 (see Graph 4.1.). Hence, for what concerns the recent energy crisis support measures that are part of fossil fuel subsidies, Member States' budgets envisage an almost complete phase-out.

The recent EU-wide developments of significantly increasing fossil fuel subsidies related to the energy crisis are broadly similar in many Member States, while forecasted trends diverge. Many Member States, including some large ones, have increased their FFS significantly. The number of Member States with FFS shares above 1% of their GDP has increased from 2 to 12 between 2021 and 2022[16]. However, there are also a few Member States in which the amount of fossil fuel subsidies decreased between 2021 and 2022. It is notable that seven Member States had lower FFS in 2022 than in 2015 (European Environment Agency 2023). However, this could at least partly reflect the trend to provide subsidies for fossil fuels as part of broader energy subsidy packages. Future trends concerning the phase-out of FFS diverge at Member State level. Around half of the Member States, including three of the four largest ones, plan a significant reduction of FFS amounts by 2025, mirroring the forecasted EU-wide reduction of crisis-related FFS. Other Member States do not plan any FFS phase-out measures or only measures with limited amounts by that date. Overall, for more than half of the 2022 amount of fossil fuel subsidies in 19 Member States there has been in 2023 no known fixed end date yet (European Commission 2024).

Recent trends in OECD and partner countries have been similar to EU Member States. Combined OECD and IEA estimates indicate that the fiscal cost of government support for fossil fuels almost doubled in 2022 compared to 2021 from USD 770 to 1481 billion. Governments across the OECD and partner countries introduced substantial initiatives to mitigate high energy costs for households and firms (OECD 2023). 2023 amounts are below 2022 but above 2021 (OECD 2024a).

In the direct fossil fuel subsidies provided by EU Member States in response to the energy crisis, support to households has increased and price-related transfers have dominated as compared to tax measures and other direct transfers. The FFS increase is due to increased support to households, the transport sector and, to a lesser extent, the energy sector to cope with rising prices and to protect consumers. Correspondingly, an analysis of Member States' budgetary policy energy crisis measures directly targeting fossil fuels indicates that energy price-related transfers, which in economic terms are particularly inefficient, constitute around 50% of the amount of new directly targeted FFS measures in 2022 and 2023 (Graph 4.1.). As the share of tax measures in the amount of those FFS is only around 45% for 2022 and 2023, the share of overall FFS provided through tax measures has declined compared to 2021. The 2023 energy subsidy study quantified the total amount of FFS through tax measures at EUR 51 billion in 2022 (European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. 2023). Of this sum, 79% went to oil, 20% to gas, and the remaining 1% to coal. However, the increased role of price-related transfers compared to tax measures is planned to be temporary. For those budgetary energy crisis FFS which continue beyond 2023, around 60% of the projected volume in 2024 and around 85% in 2025 are tax-related measures, while price support measures drop to around 40% in 2024 and around 10% in 2025 (Graph 4.1.). Other direct transfers only play a minor role in the crisis related direct FFS.

EU Member States' fossil fuel subsidies are likely to be underestimated, in particular for 2022 and 2023. First, neither the 2023 energy subsidy study nor the inventory of budgetary policy measures quantify the fossil fuel subsidy part of the many energy crisis measures that have tackled at the same time electricity or heat prices and fossil fuel prices. Energy subsidies covering all or several energy sources increased between 2021 and 2022 from 21% to 28% (European Commission 2023a). In

[16] Analysis based on European Commission (2024), COM(2024) 163, Graph 1, using subsidy data from European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023).

the energy crisis budgetary policy measure dataset, mixed measures covering both electricity and gas have a volume of around EUR 33.5 billion in 2022 and EUR 43.5 billion in 2023. In particular, support for industry often falls into this category and is then not classified as FFS but as subsidies for "other energies". However, most of these measures are planned to be phased out by 2025. Second, both types of analyses confirm that the general limit of inventory-based subsidy estimates, i.e. limited comparability across countries if reporting is not done in a consistent way, applies also to these EU Member States' FFS estimates.

5. CHALLENGES AND ISSUES FOR FURTHER CONSIDERATION AND ANALYSIS

There are several challenges linked to the current definition and calculation of fossil fuel subsidies in the EU, which deserve further consideration or analysis:

Scope of the fossil fuel subsidy definition: equal coverage of all support benefitting fossil fuels or more focus on support providing preferences or economic advantages to such fuels? In line with the OECD approach, the current definition used by the energy subsidy studies for calculating FFS includes all funding that provides benefits to fossil fuels. From a microeconomic theory perspective, which highlights incentive effects, it could be useful to also put a focus on FFS which provide clear economic advantage compared to other fuels[17]. This is not necessarily the case for certain subsidies provided for electricity, district heating or combined heat and power production. For example, subsidising electricity is in principle fuel neutral and does not provide specific economic incentives to produce electricity from fossil fuels compared to other fuel inputs or electricity sources. However, fossil fuels still largely benefit from such subsidies and the share of electricity subsidies benefiting fossil fuels is therefore often categorised as fossil fuel subsidy. It is also not always straightforward to calculate these shares. One option could be to introduce a distinction between direct and indirect FFS, which, when combined, would remain aligned with international definitions. This would create an analytical basis for a distinction of "direct" FFS in economic terms, which provide a preference or economic advantage to fossil fuels. With the rapidly increasing share of renewable electricity and heat, the relevance of the fossil fuel element of subsidies for electricity and heat production will decrease, too.

Which income support should be considered as equivalent to a fossil fuel subsidy? As the energy subsidy studies build on the WTO subsidy definition, the EU subsidy monitoring methodology includes income support as a form of FFS. However, the WTO focuses on income support "which operates directly or indirectly to increase exports of any product from, or to reduce imports of any product into, its territory". Translated from trade purposes to FFS purposes, it refers specifically to income support which operates directly or indirectly to increase the production or use of fossil fuels. This is clearcut if such a subsidy is equivalent to a price or cost subsidy, e.g. if all coal, gas or oil users, and only those, receive a transfer, even if provided lump-sum. However, it is debatable if income support is a FFS if only the motivation of a subsidy is linked to fossil fuel costs, but the eligibility for the subsidy payment is not based on fossil fuel use and made lump-sum. Examples are certain subsidies for long distance commuters or compensations of income effects of carbon pricing. Such income support does not provide any economic advantage for fossil fuels compared to other fuels (see first challenge), and can also be used for any purpose, hence even the benefit for fossil fuels is questionable. Similar arguments hold for income support provided to users of fossil fuels due to other reasons (e.g. economic bailouts, etc.) and not linked to fossil fuel use or costs.

How could the comparability of tax-related fossil fuel subsidies across countries be improved? As tax measures are the most important type of FFS in the EU and their comparison faces particular methodological challenges, it is important to have a transparent and coherent reporting of tax levels and underlying tax exemptions. Elements of the proposed revision of the EU Energy Taxation Directive (European Commission 2021) could be instrumental in this respect. Still, the challenge remains that FFS focus on tax differentiation and exemptions, and that comparisons across countries do not cover differences in fossil fuel tax levels. A similar challenge holds for the coverage of carbon pricing.

Another element to explore could therefore be the use of complementary indicators combining fossil fuel support and carbon pricing, e.g. via using external costs as benchmark for calculating FFS (like the IMF) or by calculating net effective carbon rates (building on OECD)[18]. The idea

[17] Also the early OECD (2005) definition of environmentally harmful subsidies focused on the conferred advantage on consumers and producers.

[18] For the OECD methodology see Garsous et al. (2023), for the latest status and data see OECD (2024). Also ongoing UN work on phasing out FFS makes a link between carbon pricing and fossil fuel subsidies.

is to have a better understanding of how much the use of fossil fuels is encouraged in a country, in particular over cleaner solutions. Net effective carbon rates complement FFS calculations by calculating and aggregating the explicit and implicit carbon price, e.g. of energy taxation, across the economy without the need to rely on any benchmarks, as well as deducting selected FFS from that carbon price. The OECD produces such an indicator and has very recently broadened coverage to all EU Member States (OECD 2024b). It has very recently started to include net effective carbon rates as additional indicator in its annual inventory report on fossil fuel support measures (OECD 2024a). Also, some researchers have started to express FFS in terms of a negative carbon price (e.g. Plötz et al. 2024). The Dutch Bureau for Economic Policy Analysis and the Dutch Environmental Assessment Agency have proposed an approach to assess FFS which combines elements of the IMF approach of using an external cost/ carbon price benchmark as reference and of the net effective carbon rate approach (Brink et al. 2023). If climate protection is seen as key benchmark for assessing FFS, as the case in the EU, this could be a useful complement of FFS monitoring and accounting.

How to take account of and to operationalise the international and EU qualifying criteria for the phase out of fossil fuel subsidies? The most frequent qualifying criterion used in international commitments is a focus on "inefficient" FFS (e.g. G20 2009, United Nations 2015, G7 2022), which is however not well defined and combined with varying explanations. It could be interpreted in terms of energy efficiency and/or triggering lower CO2 equivalent emissions in the long-term, leading to eliminating first measures which encourage (wasteful) fossil fuel energy consumption, as highlighted under the related UN Sustainable Development Goal. It could also be interpreted in terms of economic efficiency, leading to eliminating first direct price support measures and providing remaining FFS by means of lump-sum income support to not provide distortive economic incentives[19]. EU legislation refers to two qualifying criteria. The 8th Environmental Action Programme refers to the phase out of environmentally harmful subsidies, in particular fossil fuel subsidies (European Parliament and Council 2022). This qualifying criterion of environmental harmfulness, which is also referred to by United Nations (2015), is addressed in the current Commission reporting on energy and FF subsidies (e.g. European Commission 2023a, section 1.6). The European Climate Law introduces the qualification that the FFS phase out should be without impact on efforts to reduce energy poverty (European Parliament and Council 2021). A similar but broader qualifying criterion is present in the conclusions of the 28th Conference of the Parties under the United Nations Framework Convention on Climate Change, which focus on the phase-out of all FFS that do not address energy poverty or just transitions (United Nations 2023).

[19] On the economic advantages of income-based compared to price-based energy measures see also Varga et al. (2022).

6. CONCLUSION

Despite the political objective to phase them out, fossil fuel subsidies remain an economically relevant policy element. The definitions and estimation methodologies vary**.** Even if defined restrictively on some aspects, EU Member States' FFS have temporarily increased significantly to 0.84% of GDP in 2022, an increase which has by far not been compensated by decreases in 2023. That said, more significant decreases, at least of the energy crisis related FFS, are expected for 2024, but for more than half of the fossil fuel subsidies there has been in 2023 no known fixed end date yet. Tax measures were and are expected to remain the most used FFS instrument in EU Member States, although the comparability of quantitative estimates across countries is limited.

The political support and economic pressure to phase out fossil fuel subsidies is increasing. International and EU commitments and the Commission[20] have called on Member States to eliminate subsidies for fossil fuels. The Regulation on the Governance of the Energy Union and Climate Action and the 8th Environment Action programme (European Parliament and Council 2018, 2022) call on EU Member States to set phase-out dates for fossil fuel subsidies and have introduced a regular reporting and monitoring. Both the 2023 country-specific recommendations and the 2024 Euro Area recommendation request Member States to wind down emergency energy support measures as soon as possible in 2023 and 2024 (Council of the European Union 2023, 2024). This would imply a return to at least the FFS situation before the energy crisis. The Council of the European Union (2024) also noted that the phasing out of fossil fuel subsidies which do not address energy poverty or facilitate a just transition could contribute to increasing the fiscal space for euro area Member States.

Nevertheless, in aggregate, national policies are only moving slowly into this direction, and with many exceptions. Many Member States plan to reduce energy-crisis related FFS significantly in 2024, from in aggregate around EUR 43.5 billion in 2023 to EUR 9.5 billion in 2024. EU-wide, for 47% of total FFS amounts in 2022 there has been in 2023 a planned end date before 2025. Still, in 19 Member States planned FFS for 2030 (as known in 2023) have been not lower than before the energy crisis (European Commission 2024). The final updated National Energy and Climate Plans as well as the Medium Term Fiscal Structural Plans under the revised economic governance framework are recent opportunities for Member States to further clarify their strategies and measures to phase out FFS.

In view of the political sensitivity of some of the remaining fossil fuel subsidies, further qualifying criteria for the next steps in the phasing-out process could be helpful. There are also good economic arguments that any remaining FFS in the EU should be targeted, e.g. means-tested and focused on vulnerable households (see e.g. Varga et al. 2022). Ideally, the purpose of the FFS would rather be achieved through ancillary measures to protect vulnerable households (European Commission 2023c). However, while a socially motivated qualification of FFS is reflected in recent EU documents, it may leave out of focus a considerable amount of FFS[21], in particular in lower-income Member States, if not further qualified from an economic efficiency perspective. There is also an EU-debate if and to which extent ancillary measures are needed to safeguard security of supply and competitiveness (European Commission 2023c), in particular to meet immediate security of supply needs for gas following Russia's military aggression against Ukraine (European Parliament and Council 2023b).

Close cooperation with national authorities, improved monitoring and a broad political consensus on the way forward would be key to ensuring progress on phasing out FFS. This could include e.g. more comprehensive and consistent monitoring by Member States, more differentiated accounting of FFS measures in line with current policy purposes with more guidance by the Commission, as well as the sequencing of phase-out measures. Ongoing work in OECD, UN, WTO and other international fora should be taken into account. Various actions have started or are envisaged by Commission services to improve FFS data and indicators and to work on a framework to further scale down and phase out the use of fossil fuel subsidies, possibly including through the European Semester.

[20] Recently European Commission (2023b) and European Commission (2024); the latter communication also pointing to tax exemptions or reduced rates, in line with the Commission's proposal to review the Energy Taxation Directive (European Commission 2021).

[21] The amount concerned depends also how the FFS scope related to income support measures is defined.

REFERENCES

Bárány, A. and Grigonytė, D. (2015). Measuring Fossil Fuel Subsidies, ECFIN Economic Brief, Issue 40, March 2015.

Bethuyne, G., Balcerowicz, W. and Erdei, M (2024). Budgetary policy measures to mitigate the impact of high energy prices on households and firms: methodology and budgetary impact. Commission services internal working document, DG ECFIN, 15 September 2022, updated (cut-off date of 30 April 2024).

Black, S., Liu, A.A., Parry, I.W.H. and Vernon, N. (2023). IMF Fossil Fuel Subsidies Data: 2023 Update. Washington.

Brink, C., Trinks, A., Vollebergh, H. and Zwaneveld, P. (2023). Abolishing Fossil Fuel Subsidies- A Brain Teaser Rather than a No Brainer. CPB Netherlands Bureau for Economic Policy Analysis and PBL Netherlands Environmental Assessment Agency.

Council of the European Union (2023a). European Semester 2023: Council Recommendations on the 2023 National Reform Programmes and delivering Council opinions on the updated Stability or Convergence Programmes. 9903/1/23, 30.6.2023.

Council of the European Union (2023b). COUNCIL EXPLANATORY NOTE Accompanying document to Council Recommendations to Member States under the European Semester 2023. 9902/1/23 REV 1., 12.6.2023.

Council of the European Union (2024a): The 8th Environmental Action Programme Mid-term Review - The way forward to a green and just transition for a sustainable Europe - Council conclusions.

Council of the European Union (2024b). Council Recommendation of 12 April 2024 on the economic policy of the euro area, ST/6316/2024/INIT. Official Journal C, C/2024/2807, 23.4.2024.European Commission (2021). Proposal for a Council Directive restructuring the Union framework for the taxation of energy products and electricity (recast). Brussels: COM(2021) 563 final.

European Commission (2022a). Guidelines on State aid for climate, environmental protection and energy 2022, C/2022/481. Official Journal C 80, 18.2.2022: 1–89.

European Commission (2022b). Commission Implementing Regulation (EU) 2022/2299 of 15 November 2022 laying down rules for the application of Regulation (EU) 2018/1999 of the European Parliament and of the Council as regards the structure, format, technical details and process for the integrated national energy and climate progress reports, C/2022/8251. Official Journal L 306, 25.11.2022: 1–98.

European Commission (2023a). Commission 2023 Report on Energy Subsidies in the EU. Brussels: COM(2023) 651 final.

European Commission (2023b). Annual Sustainable Growth Survey 2024. Brussels: COM(2023)901 final.

European Commission (2023c). EU wide assessment of the draft updated National Energy and Climate Plans. An important step towards the more ambitious 2030 energy and climate objectives under the European Green Deal and RePowerEU. Brussels: COM(2023)796 final.

European Commission (2024). The Clean Transition Dialogues – stocktaking. A strong European industry for a sustainable Europe. Brussels: COM(2024) 163 final.

European Commission, Directorate-General for Energy, Bon-Mardion, J., Casteleyn, M., Queenan, J. et al. (2023). Study on energy subsidies and other government interventions in the European Union – Final report – 2023 edition. Luxembourg: Publications Office of the European Union.

European Commission, Directorate-General for Energy, Lee, L., Rademaekers, K., Bovy, P. et al. (2021). Study on energy subsidies and other government interventions in the European Union – Final report. Luxembourg: Publications Office of the European Union.

European Environment Agency (2023). European Union 8th Environment Action Programme. Monitoring report on progress towards the 8th EAP objectives, 2023 edition. Copenhagen: EEA Report 11/2023.

European Parliament and Council (2018). Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council. Official Journal L 328, 21.12.2018: 1–77.

European Parliament and Council (2021). Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'). Official Journal L 243, 9.7.2021: 1–17.

European Parliament and Council (2022). Decision (EU) 2022/591 of the European Parliament and of the Council of 6 April 2022 on a General Union Environment Action Programme to 2030. Official Journal L 114, 12.4.2022: 22–36.

European Parliament and Council (2023a). Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955 (recast). Official Journal L 231, 20.9.2023: 1–111.

European Parliament and Council (2023b). Regulation (EU) 2023/435 of the European Parliament and of the Council of 27 February 2023 amending Regulation (EU) 2021/241 as regards REPowerEU chapters in recovery and resilience plans and amending Regulations (EU) No 1303/2013, (EU) 2021/1060 and (EU) 2021/1755, and Directive 2003/87/EC. Official Journal L 63, 28.2.2023, p. 1–27.

European Parliament and Council (2024). Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast). Official Journal L, 2024/1275, 8.5.2024.

Federal Public Service Finance of the Kingdom of Belgium (2024). Federal Inventory of Fossil Fuel Subsidies. Brussels.

G20 (2009). G20 Leaders Statement: The Pittsburgh Summit, Pittsburgh: G20, September 24-25, 2009.

G7 (2022). G7 Leaders' Communiqué. Elmau: G7, June 28, 2022.

Garsous G., Mateo, M., Teusch J., Theodoropoulos, K., Tricaud, A. and Van Dender, K. (2023). Net effective carbon rates. Paris: OECD Taxation Working Papers, No. 61.

IEA (2023). Fossil Fuels Consumption Subsidies 2022. Paris.

OECD (2005). Environmentally harmful subsidies: challenges for reform. Paris: OECD Publishing.

OECD (2023). OECD Inventory of Support Measures for Fossil Fuels 2023. Paris: OECD Publishing.

OECD (2024a). OECD Inventory of Support Measures for Fossil Fuels 2024: Policy Trends up to 2023, Paris: OECD Publishing.

OECD (2024b). Pricing Greenhouse Gas Emissions 2024. Gearing up to bring emissions down. Paris: OECD Publishing.

OECD and IEA (2021). Update on recent progress in reform of inefficient fossil-fuel subsidies that encourage wasteful consumption 2021, Contribution by the Organisation for Economic Co-operation and Development (OECD) and the International Energy Agency (IEA) to G20 Environment, Climate and Energy Ministers, in consultation with the Organisation of Petroleum Exporting Countries (OPEC), Climate and Energy Joint Ministerial Meeting, Naples, 23 July 2021. Paris.

Plötz, P., Koch, N., Bach, S., Haan, P., Kistinger, D. and Illenseer, N. (2024). Climate-damaging subsidies correspond to negative CO2 prices. Potsdam: Kopernikus project Ariadne.

UNEP, OECD and IISD (2019). Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals. Nairobi, Kenya: UN Environment.

United Nations (2015). Transforming our World: The 2030 Agenda for Sustainable Development. New York: United Nations.

United Nations (2023). Conference of the Parties serving as the meeting of the Parties to the Paris Agreement. Decision 1/CMA5 Outcome of the first global stocktake. United Arab Emirates.

Varga, J., Kasdorp, R., Johannesson Lindén, Å., Döhring, B., Cima, A., and Bethuyne, G. (2022). Targeted income support is the most social and climate-friendly measure for mitigating the impact of high energy prices. VoxEU, 6 June 2022.

World Trade Organisation (2002): Agreement on Subsidies and Countervailing Measures. Geneva.

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