

MEASURING FOSSIL FUEL SUBSIDIES IN THE CONTEXT OF THE SUSTAINABLE DEVELOPMENT GOALS



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Acronyms and Abbreviations

| | |
|-----------|--|
| APEC | Asia-Pacific Economic Cooperation |
| ASCM | Agreement on Subsidies and Countervailing Measures |
| ECOSOC | United Nations Economic and Social Council |
| EIA | Energy Information Administration (U.S. Government) |
| ESMAP | Energy Sector Management Programme |
| FFFSR | Friends of Fossil Fuel Subsidy Reform |
| G20 | Group of Twenty |
| G7 | Group of Seven |
| GDP | Gross Domestic Product |
| GSI | Global Subsidies Initiative |
| IADB | Inter-American Development Bank |
| IAGE-SDGs | Inter-Agency Expert Group on the Sustainable Development Goals |
| IDR | Indonesian Rupiah |
| IEA | International Energy Agency |
| IISD | International Institute for Sustainable Development |
| IPCC | International Panel on Climate Change |
| LPG | Liquefied Petroleum Gas |
| NDC | Nationally Determined Contribution |
| NGO | Non-Governmental Organisation |
| OCI | Oil Change International |
| ODI | Overseas Development Institute |
| OECD | Organisation for Economic Co-operation and Development |
| SDG | Sustainable Development Goal |
| SEEA | System of Environmental-Economic Accounts |
| SNA | Systems of National Accounts |
| UN | United Nations |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNSTATS | United Nations Statistical Commission |
| USD | United States dollar |
| VAT | Value added tax |
| WEO | World Energy Outlook |
| WHO | World Health Organisation |
| WTO | World Trade Organisation |

Foreword



Historically, governments around the world have used fossil fuel subsidies for a variety of reasons, including to promote energy independence, encourage industry and reduce poverty. But it is now clear that the planet simply cannot afford the impact of such subsidies. Air pollution claims the lives of 1 out of every 9 lives lost every year and is the single biggest health risk facing people across the world. Fossil fuel subsidies often fail to benefit targeted groups, and are a significant drain on national budgets. Global fossil fuel subsidies cost about USD 400 billion. Imagine if these public resources were directed to finance sustainable development, clean energy and climate action. Removing such subsidies can shift consumer and business behavior towards greater sustainability. Over the past few years, countries have made encouraging moves to remove subsidies.

Sustainable Development Goal 12 has set a target to rationalize inefficient fossil fuel subsidies that encourage wasteful consumption. It is important that subsidy reforms are accompanied by targeted social protection measures to mitigate impacts on vulnerable groups and compliment measures with encouraging greater awareness about the need to end such wasteful subsidies. Success in the agenda I have outlined above will depend significantly on the availability of transparent and high-quality data on fossil fuel subsidies. This should provide a clear understanding of their costs. I am proud that UN Environment is entrusted with this important task to monitor globally this indicator of the Sustainable Development Goals. This report provides a statistical methodology for measuring fossil fuel subsidies, aimed at guiding countries on collecting data that will help us evaluate our progress towards phasing out inefficient fossil fuel subsidies. At the same time, we hope that this guide will support governments in moving towards policies that encourage a far more sustainable future.

A handwritten signature in black ink, appearing to read 'Joyce Msuya', written over a thin horizontal line.

Joyce Msuya,

Acting Executive Director, UN Environment

Preface

Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals provides methodological guidance for measuring fossil fuel subsidies in the context of Sustainable Development Goal (SDG) indicator 12.c.1: "Amount of fossil fuel subsidies per unit of GDP (production and consumption)". This methodology is intended for use by National Statistical Systems in compiling national estimates of fossil fuel subsidies. It also includes an elaboration of how fossil fuel subsidies can be measured at the global level.

Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals was drafted as part of the role of UN Environment as the Custodian Agency for SDG indicator 12.c.1. As per the resolution adopted by the General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development (A/RES/71/313), all methodological guidance and reporting mechanisms for each SDG indicator is assigned to an international entity.

Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals was prepared in consultation with international experts on fossil fuel subsidies. A formal international Expert Group on Fossil Fuel Subsidies was established in this context. The Expert Group included a series of online consultations and a meeting in Italy on 29 September 2017 which was hosted by the Italian Government¹. The Expert Group subsequently peer reviewed and endorsed the methodology in early 2018. In addition, in June 2018 the UN Committee on Environmental Economic Accounts (UNCEEA) Technical Committee reviewed this methodology and plans to explore further the links between measuring fossil fuel subsidies and environmental-economic accounting².

¹ More information on the expert group is available from: <https://uneplive.unep.org/egm/fossil-fuels>.

² For more information on the UNCEEA see: <https://seea.un.org/content/un-committee-experts-environmental-economic-accounting-unceea>.

Executive Summary

The 2030 Agenda calls for a “robust, voluntary, effective, participatory, transparent and integrated follow-up and review framework” to monitor progress against the SDGs (United Nations, 2015). A global SDG indicator framework was adopted by the General Assembly on 6 July 2017 as per the Resolution adopted by the General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development (A/RES/71/313). One of the indicators included in the framework is SDG indicator 12.c.1 is “Amount of fossil fuel subsidies per unit of GDP (production and consumption)”. This indicator is under the custodianship of UN Environment.

In order to measure fossil fuel subsidies at the national, regional and global level, three sub-indicators are recommended for reporting on this indicator: 1) direct transfer of government funds; 2) induced transfers (price support); and as an optional sub-indicator 3) tax expenditure, other revenue foregone, and under-pricing of goods and services (as summarised in the table below). The definitions of the IEA Statistical Manual (IEA, 2005) and the Agreement on Subsidies and Countervailing Measures (ASCM) under the World Trade Organization (WTO, 1994) are used to define fossil fuel subsidies. Standardised descriptions from the United Nations Statistical Office's Central Product Classification should be used to classify individual energy products. It is proposed to drop the wording “as a proportion of total national expenditure on fossil fuels”.

It is recommended to follow a phased approach, moving gradually from global to national datasets, and to build up better datasets on the categories outlined in Table 1. This should build as much as possible on existing statistical systems. To facilitate the reporting by national governments and the harmonisation with and integration into existing statistical systems, it is recommended to develop practical guidance notes on how to measure and monitor specific types of subsidies in the existing statistical frameworks. The justification for the scope of reporting against the indicator is also included in the table below. Care should be given if a country chooses to aggregate across the three sub-indicators in order to avoid double counting and all three sub-indicators should be publicly available to ensure transparency.

Table 1: Assessment of subsidy categories for monitoring of SDG Indicator 12.c.1

| Subsidy category | Data availability | Complexity | Acceptance | Recommendation for SDGs | |
|--|-------------------|------------|------------|--------------------------------|-------------------|
| | | | | National | Global |
| Direct transfer of funds | ++ | ++ | ++ | National | Global |
| Induced transfers (price support) | + | + | ++ | Yes | Yes |
| Tax expenditure, other revenue foregone, and under-pricing of goods and services | + | 0 | + | Yes, but optional ³ | Yes, but optional |
| Transfer of risk | - | - | 0 | No | No |

++ (green) means “excellent” or “low degree of complexity”
 + (yellow) means “good” or “moderate degree of complexity”
 0 (orange) means “neutral”
 - (red) means “poor” or “difficult”

³ Countries are invited to report existing information and build up information on this category progressively. In 2025 it should be considered whether this indicator can be fully included.





The Green evolution



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Introduction

- A. Fossil fuel subsidies and the Sustainable Development Goals**
- B. International processes on fossil fuel subsidies**
- C. What are fossil fuel subsidies?**
- D. Overview of current estimates of the value of fossil fuel subsidies**

I. Introduction

The 2030 Agenda for Sustainable Development, an ambitious “plan of action for people, planet and prosperity”, aiming to “transform our world”, was adopted in September 2015 by heads of state. Rationalizing inefficient fossil fuel subsidies was included in Sustainable Development Goal (SDG) 12 “Ensure sustainable consumption and production patterns”, as an important building block to achieve this vision. The scale and impact of fossil fuel subsidies presents both challenges and opportunities for achieving the goals of the 2030 Agenda on Sustainable Development.

For one, the use of fossil fuels, and their promotion through subsidy schemes, adversely affects the ability of governments to attain key goals, such as reducing poverty, improving health, reaching gender equality, providing access to energy, and addressing climate change. At the same time, there is a need to ensure that poor households that are particularly vulnerable to price increases obtain or retain access to energy. Energy-dependent sectors of the economy can be affected, particularly by abrupt changes in prices. Any successful reform therefore requires careful analysis and adapted mitigation measures.

For another, reallocating fossil fuel subsidies to sectors that are relevant for development could give a boost to reaching the SDGs. While estimates of the global value of fossil fuel subsidies vary according to the definition and approach used, in 2015 it was estimated to be around USD 425 billion (Gerasimchuk et al., 2017). Fossil fuel subsidies are therefore included in SDG 12 through target 12.c, with an associated indicator 12.c.1. UN Environment is the custodian agency responsible for the monitoring and reporting of this indicator.

Awareness and understanding of existing subsidies based on credible data is necessary to increase transparency and inform decision-making. The availability of data on fossil fuel subsidies has much improved in the last decade, as country governments are collecting and making more

data publicly available, and international assessments of fossil fuel subsidies are being published at an increasing pace. Nevertheless, there is still no international agreement on the definition of a fossil fuel subsidy and how to generate reliable and comparable data on fossil fuel subsidies. Therefore, SDG Indicator 12.c.1 is currently still classified as a Tier III indicator, which means that an internationally established methodology needs to be developed or tested (IAEG-SDGs, 2017).

Reporting against a global indicator of fossil fuel subsidies would for the first time provide a comprehensive global picture that encompasses both consumer and producer subsidies. It would allow for tracking of national and global trends and serve as an important guide for policy-making. This document recommends that reporting be grounded in national data that should gradually be built up, complemented with international datasets where necessary.

To generate reliable and useful data on fossil fuel subsidies, the methodology for reporting against SDG Indicator 12.c.1 needs to be comprehensive and ambitious. At the same time it must take into account challenges such as differences in data availability and capacity for monitoring and reporting, in order for this indicator to be monitored in a meaningful and sustainable way.

Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals therefore sets out to describe current international and national practices of monitoring fossil fuel subsidies, and proposes a methodology for the global and national monitoring of fossil fuel subsidies. Chapter I introduces the relevance of fossil fuel subsidies for the SDGs. Chapter II explains the requirements for monitoring SDG Indicator 12.c.1, and sets out options for the SDG monitoring. Chapter III gives an overview of the current state of monitoring and describes best practice methods for measuring fossil fuel subsidies. Chapter IV proposes a methodology for reporting against SDG Indicator 12.c.1.

Box 1.1: SDG Target 12.c and Indicator 12.c.1

Target 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities.

Indicator 12.c.1 Amount of fossil fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels.

UN General Assembly Resolution A/RES/71/313

A. Fossil fuel subsidies and the Sustainable Development Goals

Reform of fossil fuel subsidies is crucial for the achievement of the SDGs. While fossil fuel subsidies are often advocated as a measure to fight poverty (SDG 1), studies show that a large share of subsidies does not reach the poorest households. According to Coady et al. (2005), the richest 20 per cent of households capture more than six times the benefit of fuel subsidies as compared to the poorest 20 per cent. This phenomenon is most pronounced for gasoline, but can even be observed for fuels like kerosene (Clarke, 2014). Untargeted fossil fuel subsidies are therefore an extremely costly approach to protecting the welfare of poor households which can be better supported by targeted social programmes.

Global health (SDG 3) suffers from local outdoor air pollution. The World Health Organization (WHO, 2016) estimates that 3 million premature deaths worldwide are attributable each year solely to outdoor air pollution. While the attribution of individual health impacts to the sources of pollution is complex, there is a clear link between air pollution from the combustion of fossil fuels and health. Coady et al. (2015) have calculated that eliminating fossil fuel subsidies and taxing fossil fuels could cut pre-mature air pollution deaths by more than half. In addition, household air pollution caused by the use of open fires and kerosene for cooking and lighting places a heavy burden on the health of women and children. The WHO estimates that 4.3 million deaths annually are caused by solid fuel use for cooking (WHO, 2016b). Fossil fuel subsidies currently support both polluting fuels like kerosene, as well as cleaner fuels like liquefied petroleum gas (LPG) and electricity.

The effect of fossil fuel subsidies on gender equality (SDG 5) is still under research and has been described as extremely context-specific (Kitson et al., 2016). Energy interventions can have significant gender benefits and improve women's livelihoods (Köhlin et al., 2011). Nevertheless, given that most subsidies benefit wealthier segments of society, fossil fuel subsidies seem to be a very inefficient tool for benefitting women, and poor women in particular (Kitson et al., 2016). A gender-sensitive approach to fossil fuel subsidies and alternative support measures for women is necessary.

In the energy sector (SDG7), subsidies to fossil fuels slow down the uptake of renewable energy technologies, as they improve the relative cost competitiveness of fossil-fuel generation (Bridle and Kitson, 2014). By lowering consumer prices, fossil fuel subsidies also encourage wasteful energy consumption and act as a barrier to investment in energy efficiency.

This also negatively affects the shift to sustainable consumption and production (SDG 12), which requires a more economical use of natural resources. Affordability of energy is crucial for energy access. Subsidies can have a positive effect on affordability and are sometimes used as a tool in the transition to cleaner fuels. But the greater uptake of subsidised fuels and electricity by wealthier households means that they are inefficient and uncertain tools for supporting poor households, especially for energy access in rural areas. Targeted social measures and alternative energy technologies such as solar home systems can often serve as viable alternatives. Ensuring energy access for the most vulnerable is a challenging and complicated task, and should be based on cost-benefit analyses. Any "one-size-fits-all" solutions should be avoided; solutions should fit the circumstances and priorities of individual countries.

Fossil fuel subsidies have a large impact on global greenhouse gas emissions and climate change (SDG 13). Research suggests that the removal of fossil fuel subsidies would lead to a global decrease in carbon emissions of 6.4 to 8.2 per cent in 2050 relative to the baseline (Burniaux and Chateau, 2011; Schwanitz et al., 2014). The International Energy Agency (IEA) has therefore identified the reform of fossil fuel subsidies as a key building block in their scenario to achieve the international goal of limiting global warming to below 2°C (IEA, 2015a).

Shifting financing for fossil fuel subsidies to other sectors could contribute to financing the SDGs (Merrill & Chung, 2014; UNEP, 2015). Ebeke and Ngouana (2015) point out that, given limited budgetary resources, energy subsidies may come at the cost of reduced spending elsewhere. Their research found that public spending on education and health was lower in countries with high fossil fuel subsidies. IMF research has found that removing fossil fuel subsidies and introducing taxes on fossil fuels that take externalities into account could provide average revenue streams to governments of about 2.6 per cent of global Gross Domestic Product (GDP) (Parry et al., 2014). The scale of global fossil fuel subsidies means that reforming them could cover a large portion the "SDG financing gap" (Schmidt-Traub, 2015).

Based on the estimate of USD 425 billion per year, fossil fuel subsidies are equivalent to half the annual spending gap for access to sustainable energy. Merrill et al. (2017) calculate that this could cover 11 times the spending gap for universal education, or 13 times the spending gap for reproductive, maternal, child and adolescent

health care. Several countries have demonstrated this potential in recent years and reallocated subsidies to more productive sectors. Two case studies in Annex 1 provide examples from Indonesia and Morocco on how reforming subsidies can serve to finance other policy

priorities. At the same time, redirecting the savings from fossil fuel reform to targeted assistance can also be key to resisting political pressure to keep domestic fuel prices low (Beaton et al., 2017; Husar & Kitt, 2016).

Table 2: Impact of fossil fuel subsidies on selected SDGs and financing for the SDGs








| | |
|---|---|
|  | <ul style="list-style-type: none"> ➤ Fossil fuel subsidies disproportionately benefit wealthier households. ➤ Subsidy reforms in combination with targeted social welfare programmes can address poverty. |
|  | <ul style="list-style-type: none"> ➤ Outdoor air pollution is estimated to cause 3 million premature deaths annually. ➤ Removing subsidies and taxing fossil fuels could reduce global air pollution. |
|  | <ul style="list-style-type: none"> ➤ Energy access is beneficial to women, in undertaking household chores and for productive uses, but often women do not benefit directly from fossil fuel subsidies. ➤ Social welfare programmes and targeted cash transfer can empower women. |
|  | <ul style="list-style-type: none"> ➤ Subsidies can hinder the uptake of new low-carbon technologies. ➤ Fossil fuel subsidies increase risk of creating stranded assets. |
|  | <ul style="list-style-type: none"> ➤ Decoupling economic growth from natural resource use is fundamental. ➤ Removing fossil fuel subsidies reduces the global demand for fossil fuels. |
|  | <ul style="list-style-type: none"> ➤ Fossil fuel subsidy reform could result in significant emissions reductions. ➤ Fossil fuel subsidies increase risk of creating stranded assets. |
|  | <ul style="list-style-type: none"> ➤ Fossil fuel subsidies are estimated to be 3.5 times more than the financing requirement for meeting the SDG targets related to basic social protection, universal health and education. |



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B. International processes on fossil fuel subsidies

Fossil fuel subsidy reform has gained considerable momentum over the last 10 years. National governments are reforming subsidies, and several international processes are stimulating coordinated action.

Table 3: Fossil fuel subsidy reform in international processes

| | | |
|---|------------|---|
| G20 | Since 2009 | Member countries have committed to “rationalize and phase out inefficient subsidies that encourage wasteful consumption.” Peer-reviews are available for the USA, China, Germany, Mexico, Italy, and Indonesia. Canada and Argentina committed to undertake a peer-review in 2018. |
| APEC | Since 2009 | Member countries have committed to “rationalize and phase out inefficient subsidies that encourage wasteful consumption.” Peer-reviews are available for New Zealand, Peru, Philippines, Chinese Taipei, and were expected for Viet Nam in 2018. Brunei Darussalam has agreed to undertake a peer-review. |
| G7 | Since 2010 | Member countries have committed, by 2025, “to rationalize and phase out inefficient fossil fuel subsidies that encourage wasteful consumption”. |
| Friends of Fossil Fuel Subsidy Reform (FFFSR) | 2015 | A Communiqué on Fossil Fuel Subsidy Reform was presented to the 21st Conference of Parties of the UN Framework Convention on Climate Change (UNFCCC) in 2015, endorsed by 42 countries. |
| 2030 Agenda | 2015 | The 2030 Agenda for Sustainable Development included fossil fuel subsidy reform in SDG 12. |
| UN Framework Convention on Climate Change (UNFCCC) | 2015 | Paris Agreement, Art. 2, calls for “making finance flows consistent with a pathway towards low greenhouse gas emissions”. The Report of the Conference of the Parties “recognizes the important role of providing incentives for emission reduction activities, including tools such as domestic policies and carbon pricing”. Fossil fuel subsidy reform is included in 14 Nationally Determined Contributions. ⁶ |
| 3rd International Conference on Financing for Development | 2015 | Fossil fuel subsidy reform was included as an Action Area in the Addis Ababa Action Agenda. |
| WTO | 2017 | Initiated by the FFFSR, trade ministers from 12 members issued a Ministerial Statement calling for greater engagement by the WTO to rationalise and phase out inefficient fossil fuel subsidies that encourage wasteful consumption (WTO 2017b). |



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⁶ For a list of countries see Terton, Gass, Merrill, Wagner and Meyer, 2015.

C. What are fossil fuel subsidies?

A challenge for providing a global estimate of fossil fuel subsidies is the fact that they can occur in different forms. The Organisation for Economic Co-operation and Development (OECD) has so far identified more than 1,000 individual policies that support the production or consumption of fossil fuels in the 43 countries⁷ it covers in its inventory of fossil fuel support measures (OECD, 2018). Energy subsidies can be classified along different dimensions, for example between consumer and producer subsidies, as well as the nature of the instrument (i.e., how the transfer is provided) and its incidence (i.e., to which aspect of production or consumption it is targeted), as well as by type of fuel or energy carrier. The following section provides an introduction to fossil fuel subsidies. This will be further discussed in Chapter II.

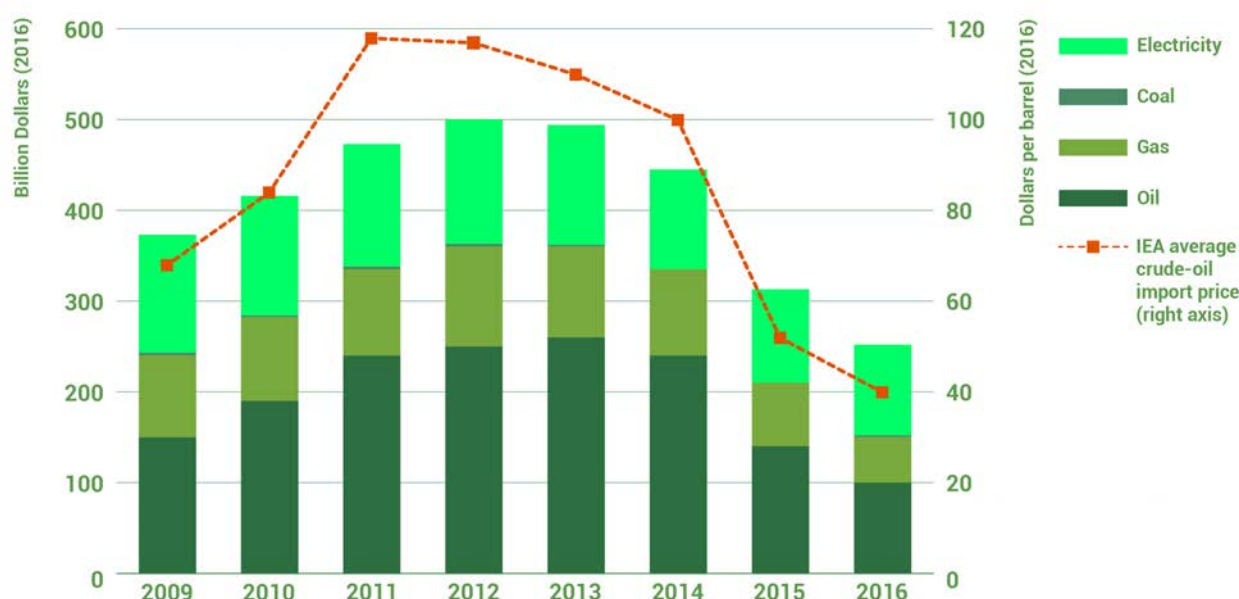
Consumer and producer subsidies

A common broad distinction is between subsidies to consumers and subsidies to producers. Consumer subsidies typically lower the price of fossil fuels for the private sector, the public sector or households below what they would be if all financial costs and the value of energy commodities were reflected in the price. They predominantly occur in developing countries for petroleum products for private customers for transport, lighting, cooking or heating, or for fuels used by electricity generators and strategically important domestic industries (GSI, 2010).

The IEA provides a global estimate of consumer subsidies in 41 countries which are considered to account for a large majority of global consumption subsidies, by calculating the difference between domestic energy prices and a reference price based on world market prices ("price-gap approach", see Chapter III). In 2016, this figure stood at USD 260 billion – a significant drop from close to USD 500 billion in 2014 (IEA, 2017; see also Figure 1). The largest share of these subsidies (41% of the total) went to electricity, just ahead of petroleum products (40%), with natural gas accounting for most of the remainder.

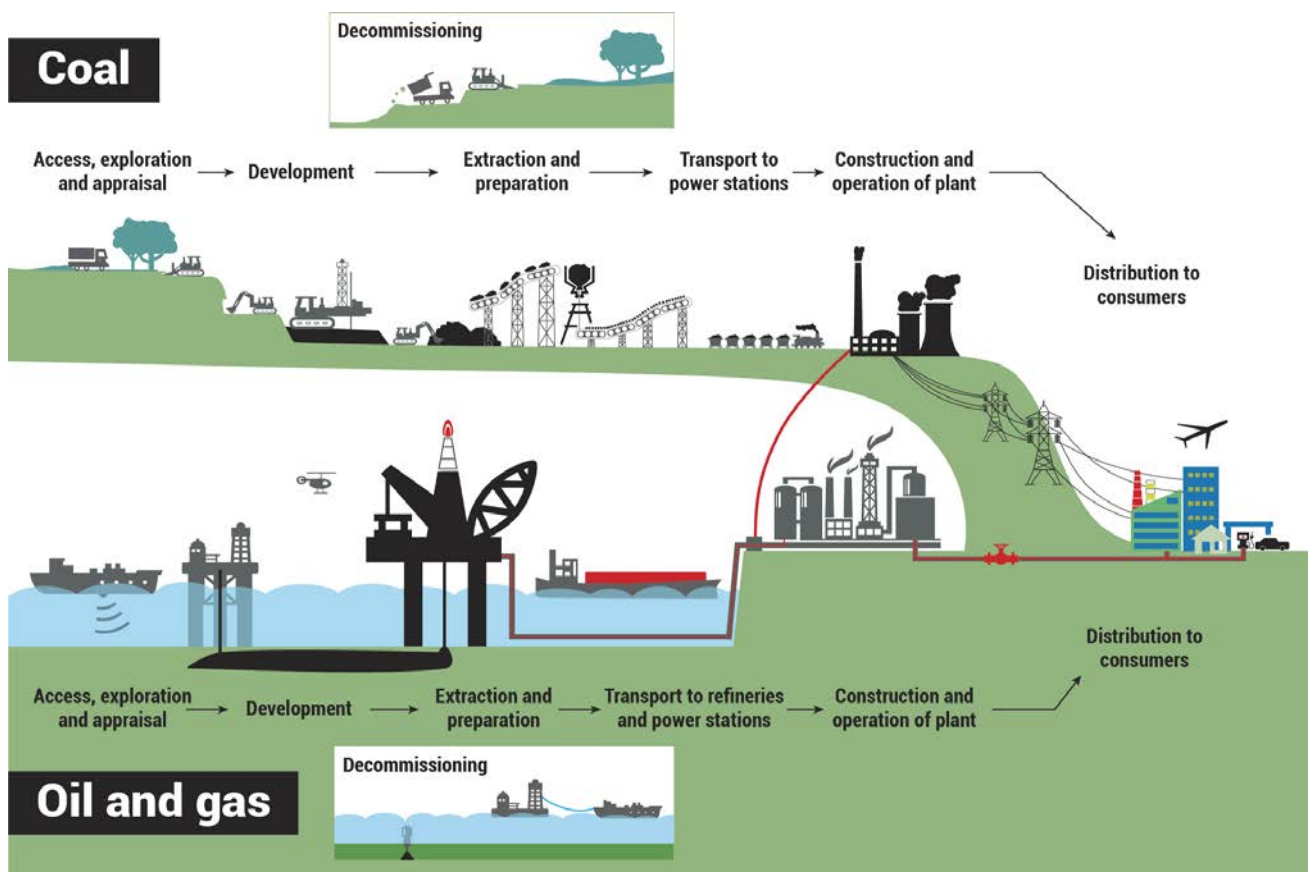
Producer subsidies, i.e. support for fossil fuel production, can occur along all stages of fossil fuel production (see Figure 2). They are concentrated in countries that are major producers of oil, gas, and coal. Producer subsidies are generally identified by an inventory approach (cf. Chapter III). The OECD compiles estimates of producer support in their inventory, which currently covers 43 countries (OECD, 2018). Non-governmental organisations (NGOs) have published reports identifying individual policies and programmes supporting fossil-fuel production in individual countries. There are currently no global estimates of producer subsidies. In 2015, Bast et al. published a report on subsidies to oil, gas and coal production in G20 countries based largely on the OECD Inventory.

Figure 1: Economic value of global fossil fuel consumption subsidies by energy source



⁷ The 35 OECD countries, plus one OECD accession country (Colombia), and Argentina, China, Brazil, India, Indonesia, Russia, and South Africa. The data sets are publicly available on <http://www.oecd.org/site/tadffss/data/>.

Figure 2: Stages of fossil fuel production



Source: Bast et al., 2015.

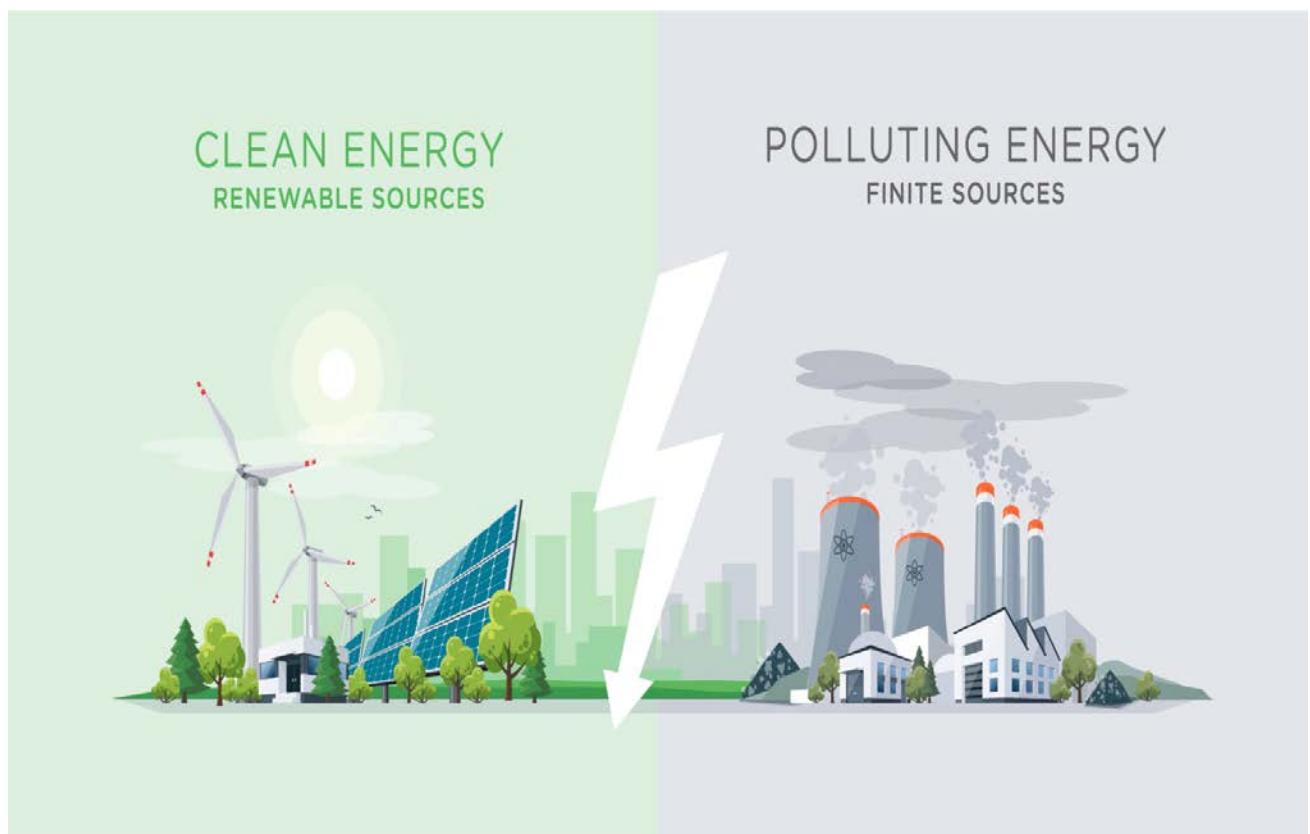
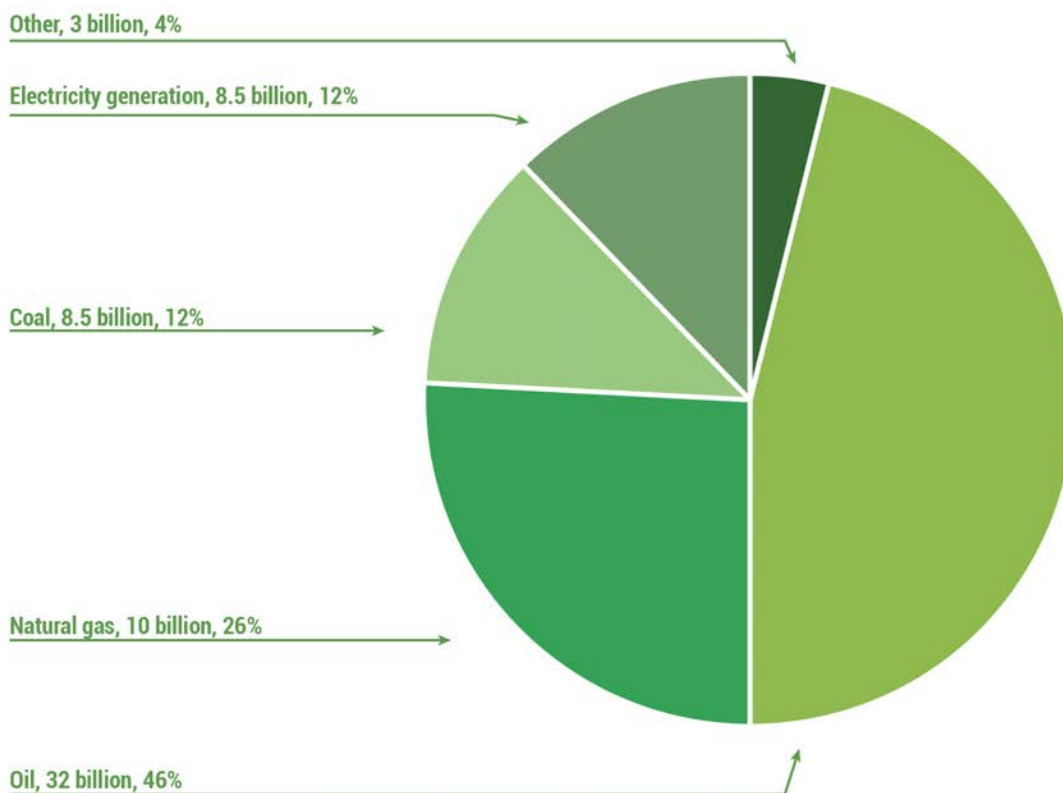


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The report found USD 70 billion of national subsidies delivered through direct spending and tax breaks. A breakdown of the total sum, provided in Gerasimchuk et al. (2017), shows that most of these subsidies could

be attributed to oil production (USD 32 billion), USD 18 billion to gas production and USD 8.5 billion to coal production. USD 8.5 billion in subsidies went to the generation of fossil fuel-based electricity (Figure 3).

Figure 3: Disaggregation of the USD 70 billion worth of G20 fossil fuel production subsidies by fuel, shares on annual average basis in 2013–2014.



Source: Gerasimchuk et al., 2017.

Types of subsidies and other support instruments

Fossil fuel subsidies are also often categorised based on the nature of the instrument that is used to provide them. Based on the Agreement on Subsidies and Countervailing Measures (ASCM) under the World Trade Organization (WTO), four types of subsidies can be identified, ranging from direct transfers of funds and induced transfers to government revenue foregone and transfer of risk. This distinction is further explained in Chapter II. A more fine-grained distinction would also take into account the incidence of the subsidy, i.e., to which aspect of production or consumption it is targeted (cf. OECD Typology in Annex 2). This is essential to understanding the economic and environmental effects of a subsidy.



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D. Overview of current estimates of the value of fossil fuel subsidies

There is currently no uniform, internationally agreed methodology for monitoring fossil fuel subsidies. As a result, there are several estimates put forward by international organisations based on their established methodologies.

The most recent estimates of the annual value of fossil fuel subsidies vary from USD 160 billion to USD 333 billion, or even USD 5.3 trillion, if the value of combustion-related externalities (what the IMF covers in “post-tax subsidies”) are included.

The difference in estimates stems from the number of countries included, the scope of subsidy measures included, the types of fuel included (with or without electricity), as well as the estimation methods (see Chapter III). Building on the different international assessments, fossil fuel subsidies were estimated to be at least USD 425 billion in 2015 (GSI, 2017). There is a strong correlation between estimates of fossil fuel subsidies to consumers and the global crude-oil

price, as can be seen for the IEA estimate in Figure 1. In times of high fuel prices, fuel-importing countries spend more to artificially keep energy prices low, while fuel-exporting countries have a higher opportunity cost from selling fuel domestically at low prices instead of exporting it. While fluctuations in global oil prices have the strongest influence on the total value of fossil fuel subsidies to consumers, reforms to fossil fuel subsidies have also had a strong effect.

Decomposition analysis by the IEA has shown that without the reforms in energy pricing implemented since 2009, the total global value of fossil fuel consumption subsidies would have been 24% higher than they actually were in 2014 (IEA 2015, p. 53; Figure 4). The recent low fuel price environment has provided the opportunity for many countries to initiate reforms. This has been observed in both oil-exporting and oil-importing countries, including the UAE, the Kingdom of Saudi Arabia, India and Indonesia.

Table 4: Comparison of OECD, IEA, IMF coverage and estimates

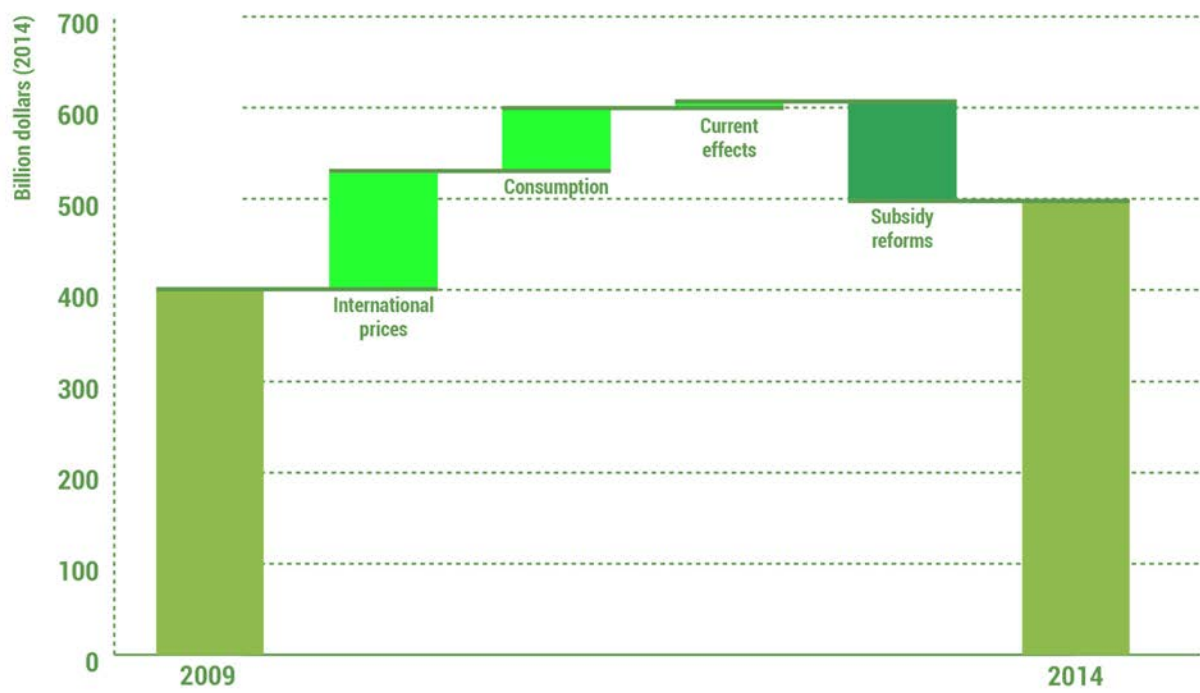
| Item | OECD | IEA | IMF |
|---------------------|---|---|---|
| Value (USD billion) | 160–200 (range between 2010 and 2016). | 260 (2016) | Pre-tax: 333 Post-tax: 5,300 |
| Countries included | 43 countries OECD member countries + Colombia, Argentina, Brazil, Russia, India, Indonesia, China and South Africa. | 40 countries reported, mainly emerging and developing countries, but many more analysed and found to provide no significant consumer price support. | 176 countries |
| Remarks | Subsidies to electricity are excluded, unless they are contingent on the use of fossil-fuels. | Coverage is only consumption subsidies revealed by a price gap, and includes electricity. | Pre-tax subsidies combine consumption subsidies plus the OECD's Producer Support estimates. |
| Method | Inventory of individual support measures | Estimated based on price-gaps | Consumer price estimated based on price-gaps, plus OECD-estimated producer subsidies. |

Source: updated and adapted from Gerasimchuk et al., 2017



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Figure 4: Contributing factors to the change in the value of fossil-fuel consumption subsidies



Source: IEA, 2015b, p. 97.



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Requirements for monitoring SDG Indicator 12.c.1

- A. The SDG Monitoring process
- B. Unpacking SDG Indicator 12.c.1

II. Requirements for monitoring SDG Indicator 12.c.1

A. The SDG Monitoring process

The 2030 Agenda calls for a “robust, voluntary, effective, participatory, transparent and integrated follow-up and review framework” to monitor progress against the SDGs (United Nations, 2015). The General Assembly tasked the UN Statistical Commission, in which statistical agencies from all UN Member States are represented, with developing a monitoring framework for the SDGs. The Inter-Agency and Expert Group on the SDG Indicators (IAEG-SDG), encompassing 30 countries that represent all regions, was set up to establish a global indicator framework. The IAEG-SDG agreed to a framework of 231 SDG indicators which was subsequently adopted by the UN Statistical Commission, the UN Economic and Social Council (ECOSOC) and finally the UN General Assembly.

The goal of SDG monitoring is to generate high-quality, timely, reliable and disaggregated data at a global scale. Country ownership of the data is a key principle of the 2030 Agenda, for implementation, progress monitoring and follow-up and review. Countries are encouraged to set up their own targets based on national circumstances. Reporting by countries is voluntary.

Monitoring for the SDGs should be primarily based on official national sources, with a coordinating role of national statistical offices (IAEG-SDGs, 2017). Based on the recommendations by the IAEG-SDGs, SDG monitoring should be based on national data (IAEG-SDGs, 2017). Each SDG indicator is assigned to a custodian agency to develop a methodology for monitoring and reporting of the indicator. The custodian agency is responsible for leading the development of an internationally established methodology and the design of a data-collection and reporting system for the indicators.

UN Environment is the custodian agency for 26 indicators, including 12.c.1.⁸ The custodian is responsible for retrieving data from the national designated focal point. If data are not available or not complete, the custodian agency can use either official data, or non-official data, based on mutual decision taken with the official national data provider. After a plausibility check, the data will be reported to the SDG indicators global database. To develop a methodology for 12.c.1, UN Environment has set up a technical expert group. This group has provided inputs into the development of the monitoring methodology, and was consulted on the proposed draft methodology before submission to the IAEG-SDG for approval.

⁸<http://uneplive.unep.org/projects>

B. Unpacking SDG Indicator 12.c.1

This section assesses each of the terms within Indicator 12.c.1, and presents possible options to establish a methodology for reporting and monitoring against the indicator. It also gives recommendations, based on best practice in international and national monitoring of fossil fuel subsidies, as well as feedback from expert consultations.

Box 2.1: SDG Indicator 12.c.1

SDG Indicator 12.c.1: “Amount of fossil fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels”.

UN General Assembly Resolution A/RES/71/313

1. Fossil fuels

Definitions of fossil fuels are either based on the properties of fossil fuels, i.e. the origin from organic material in the geological past, or a list of specific fuel types that constitute fossil fuels, or both. There is general agreement as to what constitutes a fossil fuel. Nuclear fuel, renewable energy and biofuels are not covered by the term. Table 5 provides an overview of commonly used definitions.



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Table 5: Definitions of the term “fossil fuel”

| Organisation and publication | Definition |
|--|--|
| IEA Energy Statistics Manual (IEA, 2005) | “Fossil fuels are taken from natural resources which were formed from biomass in the geological past. By extension, the term fossil is also applied to any secondary fuel manufactured from a fossil fuel.” Accompanied with detailed lists of fuels for every type of fossil fuel. |
| IPCC IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy (IPCC 2006) | List of fuels to be included as fossil fuels, based on the IEA Statistics Manual (p. 11ff.) |
| OECD Companion to the Inventory of Fossil Fuel Support Measures (OECD, 2015) | “The range of fuels covered by this Inventory comprises both primary fossil-fuel commodities (e.g. crude oil, natural gas, coal, and peat) and secondary refined or processed products (e.g. diesel fuel, gasoline, kerosene, and coal briquettes). Primary fuels include in particular those fossil fuels that are extracted from unconventional sources, such as oil extracted from bituminous sands, shale-based natural gas, or coal-bed methane. Measures supporting the production or use of biofuels are not, however, included in the present inventory. Nor are measures supporting electricity, except where it can be shown that the electricity is almost exclusively derived from fossil fuels, with limited possibilities for cross-border power exchanges. To help ensure consistency with other existing datasets, the database follows the classification of fuels described in the Energy Statistics Manual (IEA et al., 2004).” |
| UN Environment Glossary (UNSTATS, 2017) | “Coal, oil and natural gas. They are derived from the remains of ancient plant and animal life.” |
| US Energy Information Administration (EIA) (EIA, 2017) | “An energy source formed in the Earth’s crust from decayed organic material. The common fossil fuels are petroleum, coal, and natural gas.” |
| G20 peer-reviews of China and the United States (G20, 2016a and 2016b) | “Commodities and products that are to be considered ‘fossil fuels’ ... may include coal (including raw coal, solid fuels, coal gas, and coal-bed methane), petroleum (including crude oil, natural gas, liquids, and refined petroleum products), natural gas (including associated and non-associated gases), and the heat and electricity generated using the above fuels. This does not include fossil fuels used for non-energy purposes (e.g. their transformation into solvents such as white spirit).” ⁹ |

These definitions differ mainly in two aspects: the inclusion of all secondary commodities derived from fossil fuels, i.e. electricity and heat, and the inclusion of all uses of fossil fuels.



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Inclusion of secondary commodities derived from fossil fuels, in particular electricity & heat

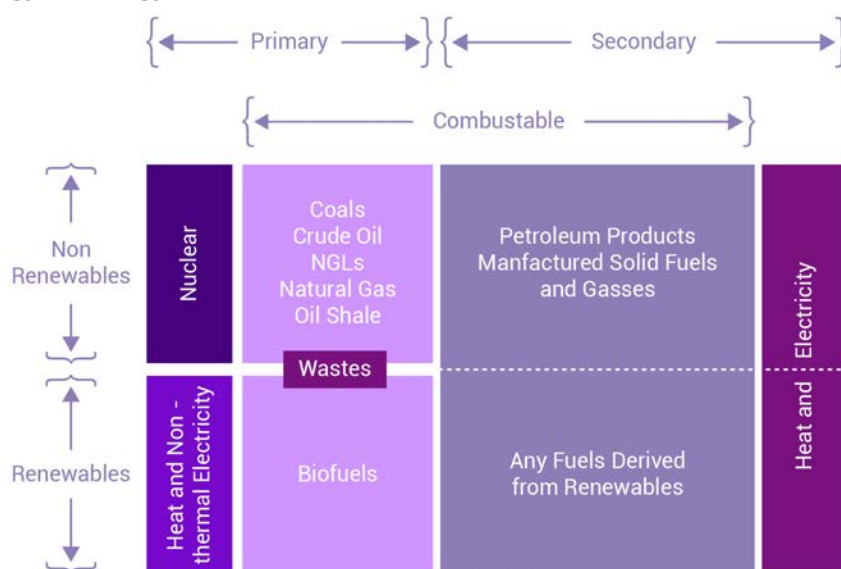
Figure 5 from the IEA Energy Statistics Manual shows the classification of energy into primary and secondary commodities. Electricity and heat are secondary commodities and can be classified as either renewable or non-renewable (i.e. fossil fuels and nuclear), depending on the source of electricity generation. The definitions by the IEA, the IPCC, the OECD, and most of the G20 peer-reviews include electricity and heat generated from fossil fuels in their definition of fossil fuels, whereas the definitions by UN Environment Glossary and EIA do not explicitly include it. The importance of whether to include subsidies to fossil-fuel-derived electricity is underlined by the large share of global fossil-fuel subsidies provided to electricity: 41% of the total in 2016 (IEA, 2017). Indicator 12.c.1 has to be understood in the context of sustainable development, and in particular SDG 12 (Sustainable Consumption and Production). Subsidies for electricity and heat generated from fossil fuels incentivise overconsumption of fossil fuels. It is therefore recommended that SDG Indicator 12.c.1 be comprehensive and include secondary commodities, based on the definition provided in the IEA Statistics Manual (IEA, 2005). For the classification of the individual products, it is proposed to use the descriptions set out in the United Nations Statistical Office's Central Product Classification, Version 2.1 (CPC Ver. 2.1), as provided in Annex 5.

Inclusion of all uses of fossil fuels

Fossil fuels are being used as feedstock for industrial products, for example hydrocarbons used in the production of plastics. These processes are not based on the combustion of fossil fuel inputs, and therefore have different environmental impacts. Nevertheless, subsidies incentivise the overconsumption of fossil fuels and increase the competitiveness of fossil fuel production. Many developing countries, some of which provide fossil fuels for industrial feedstocks at low prices, are in the process of diversifying their economies to reduce the share which is strongly dependent on fossil fuels.

This diversification would reduce the adverse impacts of fossil fuel price increases. Nevertheless, the portion of fossil fuel subsidies to non-energy uses of fossil fuels is not widely reported as a separate category.¹⁰ It is therefore recommended that non-energy uses of fossil fuels should be included in the scope of SDG Indicator 12.c.1, but its reporting be made optional. Countries would be asked to indicate in their reporting as to whether this has been included.

Figure 5: Terminology for energy commodities



Source: IEA Statistics Manual, 2005.

¹⁰ A country wishing to separate out subsidies going to non-energy products derived from fossil fuels (e.g., coal tar, naphtha, bitumen, white spirit, lubricants, paraffin waxes) would have to account for the amount of subsidies going to the fossil fuel used as feedstock, as well as subsidies for the production process of the non-energy product. The former category could include artificially low prices for crude-oil feedstock to refineries, or investment grants for refineries. The portion of subsidies going to non-energy uses of fossil fuels could then be apportioned. It is conceivable also that there may exist in some countries subsidies that are targeted at specific non-fuel products of fossil fuels, such as a production bounty (specific government per-unit payment) for bitumen, in which case the value of that subsidy would also be included in the total for non-fuel uses.

Box 2.1.1: Proposed SDG Indicator 12.c.1. Classifications

| Proposed option | Explanation |
|--|---|
| <ul style="list-style-type: none"> ➤ Use definition from IEA Statistics Manual. ➤ Use the terms set out in CPC Rev. 2.1 for the statistical classification of the individual products. | No other commonly accepted definition identified. |
| <ul style="list-style-type: none"> ➤ Include electricity and heat generated from fossil fuels. | <p>Included in definitions by the IEA, the IPCC, the OECD, and most of the G20 peer-reviews.</p> <p>Subsidies to electricity made up 41% of global fossil fuel consumption subsidies (as estimated by the IEA) in 2016.</p> |
| <ul style="list-style-type: none"> ➤ Include non-energy uses, but make monitoring optional. | <p>Subsidies for non-energy uses incentivise the over-consumption of fossil fuels and increase the competitiveness of fossil fuel production.</p> <p>Nevertheless, due to limited documentation, monitoring subsidies for non-energy uses should be optional.</p> |

2. Subsidies

Different definitions are used by organisations that assess fossil fuel or wider energy subsidies, notably the World Trade Organization (WTO), the OECD and the IEA. These definitions are based either on the form of policy intervention by governments (WTO, OECD), or the effect of some of these measures on cost and prices (IEA). The definition in the Agreement on Subsidies and Countervailing Measures (ASCM) under the World Trade Organization (WTO) is the most widely recognized definition of a subsidy and is the only definition that is legally binding for all WTO member countries. The ASCM currently has 164 WTO members as signatories.¹¹ Importantly, the ASCM is not specific to fossil fuel subsidies, but has been developed in the context of disciplines on subsidies that have trade-distorting effects and that are specific to certain recipients (i.e., are not given generally).

Article 1 of the ASCM ("Definition of a Subsidy") identifies broad forms of government support that it considers covered by the term "subsidy". However, an illustrative list of specific subsidies that constitute export subsidies points to many of the forms of support that would fall under the definition.¹² The ASCM subsidy definition is also widely used by organisations that work on fossil fuel subsidies. A simplified version of the ASCM was used by the United States and China in the G20 Peer-reviews of Fossil Fuel Subsidies published in 2016 (G20, 2016a, 2016b), Mexico and Germany in 2017 (G20, 2017a, 2017b), and Italy and Indonesia (G20, 2019a, 2019b). The OECD definition of "government support" used by the OECD (2011, 2013, 2015, and 2018)

to build its inventories follows the WTO definition. (See the overview of subsidy types in Annex 2). The Global Subsidies Initiative (GSI) and several other NGOs also use the ASCM definition (Gerasimchuk et al., 2017). The definition developed by the Organisation for Economic Co-operation and Development (OECD) serves as the basis for their inventory of support measures for fossil fuels in OECD countries and a selection of partner countries.¹³ The OECD describes what it finds as "support" measures rather than subsidies. In practice, there is generally a wide overlap between OECD "support" and WTO "subsidy", and the two would typically yield a similar set of measures if inventories were built from them.

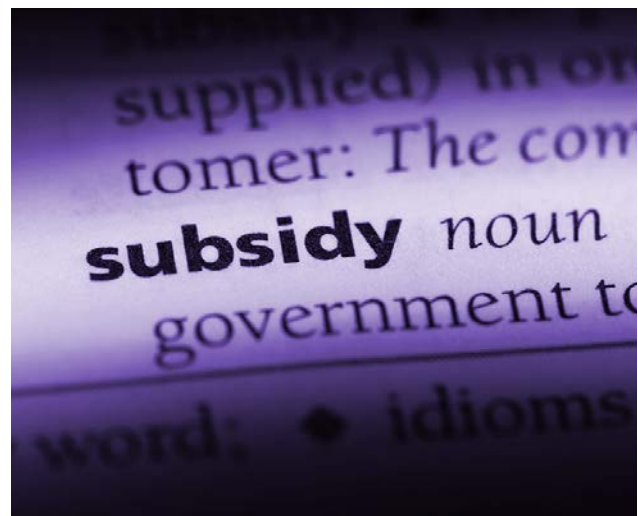


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¹¹ As of 27 October 2017; see: https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm

¹² https://www.wto.org/english/docs_e/legal_e/24-scm_03_e.htm#ann1

Box 2.1.2: WTO definition of subsidies in Agreement on Subsidies and Countervailing Measures (ASCM)

Article 1: Definition of a Subsidy:

1.1 For the purpose of this Agreement, a subsidy shall be deemed to exist if:

- (a) (1) there is a financial contribution by a government or any public body within the territory of a Member (referred to in this Agreement as "government"), i.e. where:
- (i) 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);
 - (ii) government revenue that is otherwise due is foregone or not collected (e.g. fiscal incentives such as tax credits)⁽¹⁾;
 - (iii) government provides goods or services other than general infrastructure, or purchases goods;
 - (iv) 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 functions illustrated in (i) to (iii) above which would normally be vested in the government and the practice, in no real sense, differs from practices normally followed by governments;
- or
- (a) (2) there is any form of income or price support in the sense of Article XVI of GATT 1994;
- and
- (b) a benefit is thereby conferred.

⁽¹⁾ In accordance with the provisions of Article XVI of GATT 1994 (Note to Article XVI) and the provisions of Annexes I through III of this Agreement, the exemption of an exported product from duties or taxes borne by the like product when destined for domestic consumption, or the remission of such duties or taxes in amounts not in excess of those which have accrued, shall not be deemed to be a subsidy.

Source: WTO, 1994; bold text added by the authors

Box 2.1.3: OECD concept of "support" to fossil fuels

The OECD definition of "support" for fossil fuel "includes both direct budgetary transfers and tax expenditures that in some way provide a benefit or preference for fossil-fuel production or consumption relative to alternatives. This broader definition therefore encompasses policies that can induce changes in the relative prices of fossil fuels. However, although the present inventory covers measures that provide support (either absolute or relative) to fossil fuels, it does not attempt to assess the impact on prices or quantities of the measures considered, nor does it pass any judgment as to whether a given measure is justified or not."

Source: OECD, 2015

The International Energy Agency (IEA) has since 1999 produced estimates of the size of fossil-fuel subsidies to consumers in developing and emerging countries. The IEA (2006) defines energy subsidies based on its effects on costs or prices. This definition is simpler, but narrower, and like the definitions used by the OECD and the IMF, has no legal power.



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Box 2.1.4: IEA definition of energy subsidies

“The IEA has defined energy subsidies as any government action that concerns primarily the energy sector that lowers the cost of energy production, raises the price received by energy producers or lowers the price paid by energy consumers.”

Source: (IEA, 2006). For more information on the IEA's work on subsidies, see: www.worldenergyoutlook.org/resources/energysubsidies/

The International Monetary Fund (IMF) uses the price paid by consumers for energy derived from fossil fuels as the criterion for the existence of fossil fuel subsidies. If the price is lower than the cost of supply, then subsidies are deemed to exist. Nevertheless, this definition of (pre-tax) consumer subsidies, which is solely based on price differentials, does not capture a number of subsidies that do not affect prices in the short term, nor exemptions from excise taxes in countries with high tax rates. The IMF also widens the scope by including “post-tax” consumer subsidies. It assumes that corrective taxes should be applied to fossil fuel prices for environmental damages caused, as well as additional consumption taxes. The exemption of these taxes is then regarded as a subsidy. Further, the IMF includes production subsidies drawn from the OECD Inventory.



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Box 2.1.5: IMF definition of consumer subsidies to fossil fuels

“Pre-tax consumer subsidies arise when the price paid by consumers (that is, firms and households) is below the cost of supplying energy. Post-tax consumer subsidies arise when the price paid by consumers is below the supply cost of energy plus an appropriate ‘Pigouvian’ (or ‘corrective’) tax that reflects the environmental damage associated with energy consumption and an additional consumption tax that should be applied to all consumption goods for raising revenues.”

Source: Coady et al., 2015.

The World Bank's Energy Sector Management Programme (ESMAP) defines fossil fuel subsidies as follows.

Box 2.1.6: World Bank (ESMAP) definition of fossil fuel subsidies

Fossil fuel subsidies are defined as a “deliberate policy action by the government that specifically targets fossil fuels, or electricity or heat generated from fossil fuels, and has one or more of the following effects:

- A. Reducing the net cost of energy purchased
- B. Reducing the cost of production or delivery of fuels, electricity or heat
- C. Increasing revenues retained by resource owners, or suppliers of fuel, electricity or heat”

Source: Kojima and Koplw, 2015.

In the System of National Accounts (European Commission et al., 2009), an internationally agreed standard set of recommendations on how to compile measures of economic activity in accordance with strict accounting conventions based on economic principles, defines subsidies as below. This definition has been agreed in an international process. Nevertheless, the definition only captures subsidies that involve payments, thereby leaving out any subsidies that are not causing a payment, such as under-recoveries, revenue foregone or transfers of risk. Several other forms of transfers are covered by other terms, however, including payable (or non-wasteable) tax credits, debt assumptions and cancellations, and contingent liabilities.



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Box 2.1.7: System of National Accounts

“Subsidies are current unrequited payments that government units, including non-resident government units, make to enterprises on the basis of the levels of their production activities or the quantities or values of the goods or services that they produce, sell or import.”

“A subsidy on a product is a subsidy payable per unit of a good or service. The subsidy may be a specific amount of money per unit of quantity of a good or service, or it may be calculated ad valorem as a specified percentage of the price per unit. A subsidy may also be calculated as the difference between a specified target price and the market price actually paid by a buyer.” “Other subsidies on production consist of subsidies except subsidies on products that resident enterprises may receive as a consequence of engaging in production.” Source: (European Commission et al., 2009)

All definitions proposed can be used as the basis to identify and measure fossil fuel subsidies and produce harmonised data. Nevertheless, the WTO definition is very comprehensive and allows the capture of these subsidies, both to producers and consumers. In addition, it is signed by 164 members and has legal force. Due to its comprehensive definition and wide acceptance, it is recommended that the definition of subsidies in the WTO ASCM be used for the monitoring of SDG Indicator 12.c.1. To identify individual measures, a typology of energy subsidies is often used. A typology of energy subsidies that draws on these various sources is shown in Table 6; a more detailed version can be found in Annex 3.



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Table 6: Typology of energy subsidies, based on WTO ASCM

| Type of subsidies | Examples |
|--|--|
| Direct transfer of government funds | <ul style="list-style-type: none"> ➤ Direct spending, budget and off-budget transfers ➤ Government ownership of energy-related enterprises if on terms and conditions more favourable for business than in case of private ownership |
| Induced transfers (price support) | <ul style="list-style-type: none"> ➤ Price support, including through market regulation |
| Tax expenditure, other revenue foregone, and under-pricing of goods and services | <ul style="list-style-type: none"> ➤ Tax breaks and other government revenue foregone ➤ Under-pricing of government-owned energy resources ➤ Under-pricing of non-energy, government-owned natural resources or land ➤ Under-pricing of government-owned infrastructure ➤ Under-pricing of other government-provided goods or services ➤ Below-market lending to energy-related enterprises, including loans to energy exporters, and debt restructuring and cancellations |
| Transfer of risk to government | <ul style="list-style-type: none"> ➤ Credit support through risk transfer mechanisms like loan guarantees ➤ Debt restructuring and cancellations ➤ Insurance and indemnification ➤ Assumption of risks related to occupational health and accidents ➤ Assumption of responsibility for remediating environmental damage |

Sources: Based on various sources, including OECD (2015), Gerasimchuk et al. (2017), Kojima (2017).

To support the interpretation of the WTO definition specifically for fossil fuel subsidies, it is recommended to use the classification in Annex 3, which provides full

details to Table 6. To allow for a statistically clear use of these categories, it is recommended that guidance notes on the different types of subsidies are developed.

Box 2.1.8: SDG Indicator 12.c.1. Classification by WTO ASCM

| Proposed option | Explanation |
|---|---|
| <ul style="list-style-type: none"> ➤ Use the definition of a subsidy from the WTO ASCM | <p>Well accepted definition with legal character and comprehensive treatment of both producer and consumer subsidies, also in countries with high tax rates.</p> <p>IEA and IMF definitions exclude production subsidies and do not provide transparency on measures. The notion of "post-tax subsidies", as used by the IMF, is not widely accepted.</p> |
| <ul style="list-style-type: none"> ➤ Use the classification in Annex 3 as guidance | <p>Provides guidance to countries to identify subsidies.</p> |



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3. Production and consumption

SDG Indicator 12.c.1 explicitly mentions subsidies to fossil fuel production and consumption. To report against this indicator, it is not necessary to report separately on these two subsets of subsidies, as long as the data reported covers both categories. Nevertheless, for increased transparency, it is proposed to monitor data on production and consumption separately. Consumer and producer subsidies are frequently treated separately. For example the IEA explicitly addresses consumer subsidies, and many analysts over the years (e.g., IEA, 1988; Koplow and Martin, 1998; Bast et al., 2015) have focussed exclusively on production subsidies.

The OECD is currently the only organisation making a statistically clear distinction between consumer and producer subsidies. The OECD, for its Inventory, classifies support measures to fossil fuels according to who benefits (OECD, 2015)¹⁴. Measures that benefit individual producers are classified as "Producer Support Estimate" (PSE); measures that benefit individual consumers as "Consumer Support Estimate" (CSE); and measures that benefit producers or consumers collectively, such as sector-wide research and development or the construction of infrastructure, as "General Services Support Estimate" (GSSE).

This classification scheme is used to classify the over 1,000 support measures in the OECD database.¹⁵ The System of National Accounts defines "a subsidy on a product [as ...] a subsidy payable per unit of a good or service" (European Commission et al., 2009, p. 148). "Other subsidies on production" are further defined as "subsidies except subsidies on products that resident enterprises may receive as a consequence of engaging in production" (ibid.). Applied to fossil fuels, these two categories could cover subsidies to fossil-fuel producers, and to fossil fuel consumed by other producers. Nevertheless, by referring only to payments made, these definitions leave out the largest part of what is generally found for production subsidies, i.e. tax breaks and other government revenue foregone.

Box 2.1.9: The classification by the OECD is therefore recommended as the most appropriate for SDG Indicator 12.c.1.

| Proposed option | Explanation |
|-----------------------|---|
| ➤ Use OECD definition | Tested classification used for inventories of fossil fuels with statistical rigour. |



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¹⁴The OECD defines consumption as "the stage at which fuels are combusted, whether it occurs in motor vehicles, stationary engines, heating equipment or power plants." Production is defined to encompass exploration and extraction, bulk transportation and storage, and refining and processing. Consumption encompasses the use of fossil fuels in heat and power generation, the use in industrial processes and activities outside of the energy sector, and all other final uses of fossil fuels, whether in the transport sector, the residential sector, or primary industries outside of the energy sector (OECD, 2015).

¹⁵In addition, the OECD also makes a distinction as to the stages of production or consumption at which the support occurs, also called the "formal or initial incidence" of a subsidy. The matrix in Annex 2 shows for every category of subsidies and for the different stages of production and consumption, which support measures could occur.

4. National expenditure on fossil fuels

The term “national expenditure on fossil fuels” is not a commonly used term in the literature on fossil fuel subsidies. This figure could be constructed by adding the following data:

- for all fossil fuels, prices paid by the different consumer categories, including taxes, multiplied by volume for each consumer category
- subsidies to consumers, or to consumers and producer

Relevance: If the indicator were to be constructed like this, it would measure the amount of subsidies in relation to the monetary value that is spent on fossil fuels. National expenditure on fossil fuels is relatively low in countries with either low consumption of fossil fuels, or low prices for these fuels. The aggregated indicator would therefore not allow for an unambiguous international comparison.

The calculation of national expenditure on fossil fuels would furthermore involve calculation of a completely new dataset. If possible, it is recommended to propose the removal of this part of the indicator to the IAEG.

Box 2.1.10: Recommendation to propose the change of the wording of SDG Indicator 12.c.1

| Proposed option | Explanation |
|---|--|
| ➤ Propose to change the wording of the indicator as follows: “Amount of fossil fuel subsidies per unit of GDP (production and consumption) | This is not a standard term that is statistically collected and would require considerable efforts to calculate. |



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1,950
50,859
585,090

1,072,211

200,100

1,452,600

25,305

20,620

1,698,625

2,770,836

180,650

1,355,900

30,500

20,350

1,587,400

2,289,415

195,025
1,452,000

20,658

18,067

1,686,310

2,688



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Estimating subsidies to fossil fuels

- A. Approaches
- B. Current monitoring practices
- C. Measuring individual subsidy components

III. Estimating subsidies to fossil fuels

Fossil fuel subsidies occur in different forms. Ultimately, all subsidies incentivise the consumption of fossil fuels and should therefore be monitored. Nevertheless, there are large differences between different categories of fossil fuel subsidies in terms of data availability, complexity of calculation, and acceptance as subsidies by national governments. For example, most countries monitor direct budgetary transfers, for which data are generally well documented, while other categories are more difficult to quantify and track.

These differences have important implications for the practicality and comparability of data monitoring and reporting for the SDGs. Based on an overview of current monitoring practices, the following chapter explains how the different categories of subsidies are measured and what data are already available, as well as challenges and capacity-building needs. It also analyses each category according to the criteria of data availability, complexity of calculation and acceptance.

A. Approaches

In the literature, a distinction is frequently made between the two main approaches to estimating different elements of total fossil fuel subsidies: calculating price gaps to detect subsidies to consumers, and identifying and quantifying individual support measures in an inventory that are not revealed through the examination of price differentials. These two approaches are not mutually exclusive, but rather complement each other by looking at the same phenomenon from two different angles. The way that price-gap calculations have been carried out and reported to date just show the results of those calculations, without analysing what policies give rise to observed price differentials. It is a method that is commonly and widely used for estimating a major element of subsidies to production and consumption.¹⁶

It is generally not used by countries for their national monitoring, but rather as an internal tool for analytical purposes. A complete accounting in an inventory, by contrast, would identify the measures that affect these prices, plus additional measures without effect on prices. A useful table that compares for individual subsidy categories whether they would be captured by an OECD-type inventory or the price gap can be found in Kojima and Koplou (2015: 7ff.). Due to the complementarity of the price-gap approach and the inventory approach, it is important to avoid double-counting, as described in the box below.

As both approaches are important to analyse different aspects of fossil fuel subsidies, it is proposed to apply both approaches for national and global monitoring, while taking steps to avoid double-counting.



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¹⁶ In particular, it has been used for more than three decades to estimate support to agricultural producers, and has been applied to estimate support to fuel and electricity consumers by the World Resources Institute (Kosmo, 1987), the World Bank (Larson and Shaw, 1992), the IEA (1999 and later years), and the IMF (2013 and later years).

Box 3.1: Avoiding double-counting between direct transfers and price support to producers or consumers

Direct transfers and price support are closely related. All direct transfers of government funds to producers have the potential to reduce production costs, and therefore prices, in the medium- or long-term. Some budgetary transfers are necessary simply to compensate suppliers for the effects of regulated producer or consumer prices. An example would be a payment to a fuel or electricity supplier to compensate it for losses incurred in selling a fuel or electricity domestically at a reduced price. Government expenditures can also be used to prop up producer prices. When both producer or consumer price support and government expenditure exist to facilitate such support, counting both transfers in the total subsidy estimates for a country would be double-counting.

In these cases, steps must be taken to avoid summing both the price support and government expenditure that facilitates that support. The analyst should determine which transfer best represents the value of the price support and note the other transfer, but not include it in the total. For the purpose of SDG Indicator 12.c.1, this should be taken into account when aggregating the values to arrive at a global estimate for fossil fuel subsidies. This is specified in Chapter IV.

One source for such information, for countries that produce detailed and timely National Accounts, are government payments registered as “Other subsidies on products” (Paragraph 7.105 in SNA 2008). This includes “subsidies payable to resident enterprises in respect of their outputs that are used or consumed within the economic territory”. It also contains losses incurred by government trading organizations whose function is to buy and sell the products of resident enterprises, such as losses incurred as a matter of deliberate government economic or social policy by selling at lower prices than those at which they purchased the goods.

In this case, the difference between the purchase and the selling prices should be treated as the associated subsidy. It finally contains “subsidies to public corporations and quasi-corporations that are intended to compensate for persistent losses (that is, negative operating surpluses) incurred on their productive activities as a result of charging prices that are lower than their average costs of production as a matter of deliberate government economic and social policy.” However, caution should be exercised when extracting data under this category from an SNA to ensure that subsidies not relevant to the fossil-fuel industry, such as those resulting from a country’s central bank accepting a lower rate of interest than the market rate, are not picked up as well.

| Proposed option | Explanation |
|---|--|
| <p>➤ Use a combination of both approaches for national and global monitoring, while taking measures to avoid double-counting.</p> | <p>Both approaches are necessary to provide a complete picture of fossil fuel subsidies.</p> <p>It is not recommended to use only the price-gap calculation, as this would not detect specific subsidies not directly bearing on prices.</p> |

B. Current monitoring practices

Data on fossil fuel subsidies are being collected nationally, by governments and other institutions, and internationally, through peer-reviews and by intergovernmental organisations (Table 7).

1. National monitoring

Many governments are monitoring and reporting on their fossil fuel subsidies. Three case studies of Egypt, India and Zambia were carried out by the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD) for this report in 2017 (see box below). The countries were selected to collect a breadth of views on the topic. The participating countries differed in the following aspects: fossil fuel importers and exporters, populations and geographic extents of the countries, energy access situation, levels of income, and GDP per capita. The country visits found that these countries already monitor data on fossil fuel subsidies, but that the definitions of fossil fuel subsidies used differ from country to country, with large differences in the scope of subsidies being reported. The detailed findings are reported in Box 3.1.1



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Box 3.1.1: Findings from the case studies in India, Zambia and Egypt carried out by the GSI in 2017

All three countries are regularly monitoring subsidies. The amount of data collected and documents made publicly available varied greatly between countries. The case studies found that practices for making data public varied widely, from extensive public documentation of energy prices and other relevant data, to keeping information internal. Monitoring of fossil fuel subsidies generally involves several institutions from the energy sector, planning sector and statistical agencies. The countries follow their own definitions of fossil fuel subsidies, and in all cases they are narrower than those used internationally. All three countries were found to only report budgetary transfers (direct transfers) as energy subsidies. These mostly cover shortfalls between the cost of supply and revenues of state-owned enterprises, often caused by price support (induced transfers) or for specific measures such as conditional cash transfers or regional transfer mechanisms. Desk reviews and interviews with energy experts identified other fossil fuel subsidies that are not reported as energy subsidies by the governments.

These include regulated prices for specific types of fuels, such as regulated electricity prices, and their financial implications (induced transfers), foregone tax revenues, for example VAT exemptions for certain fuels, tax breaks for companies involved in exploration of resources, or the use of government assets at concessional rates (under-pricing of other goods and services) and investment incentives such as government loans and loan guarantees at concessional rates (risk transfers). Information on risk transfers was most difficult to obtain.

The fuel types for which data are being collected by countries include coal, petroleum products and gas, as well as electricity. The countries interviewed use the term “energy subsidies” rather than “fossil fuel subsidies”, and therefore include subsidies to electricity. It could therefore not be established whether the interviewed country authorities would consider electricity generated from fossil fuels to be classified as a fossil fuel, as there is currently no distinction between energy subsidies and fossil fuel subsidies. Subnational subsidies could be identified in only one country. No distinction is being made between consumer and producer subsidies, even though some types of subsidies could be attributed to one or the other. Countries were found to be focused mostly on consumer subsidies. The cost of externalities was not considered by any of the countries. The countries are not calculating consumer price support using the price-gap approach for official purposes, even though some are doing so for analytical internal uses. There seems to be sufficient capacity to fulfil the current national monitoring practices, but more extensive monitoring for the SDGs might require additional capacities. Several international assessments of fossil fuel subsidies are available for these countries, among them from the OECD, IEA, GSI, Asian Development Bank, and IMF.

Desk research further showed that some governments are already reporting extensively on fossil fuel subsidies, covering categories such as tax expenditures, other government revenue foregone and under-pricing of other goods and services and risk transfers, as well as direct budgetary transfers. The Government of Germany publishes a report on subsidies on a two-year basis (latest report 2017). The Subsidies Report considers financial assistance (earmarked grants, debt service assistance and loans) and tax concessions according to the legal definition of subsidies in Germany. The Environmentally Harmful Subsidies in Germany report, which is not published by the Government, but rather the Federal Environment Agency (2016), applies an extended approach by covering direct budgetary transfers and tax concessions, as well as subsidies without direct budgetary impact such as guarantees, concessions, and state provision or procurement of goods, services and rights at non-market prices (risk transfers and under-pricing of other goods and services).¹⁷

The Italian Catalogue of Environmentally Friendly Subsidies and Environmentally Harmful Subsidies (Italian Ministry of the Environment, 2016) covers fossil fuel subsidies comprising direct budgetary transfers and tax expenditures. Ireland is committed to producing a report identifying all fossil fuel subsidies as part of its National Mitigation Plan, which identifies Ireland's pathway to decarbonization (Ireland, Department of Communications, Climate Action and Environment, 2017). Additionally, in countries where prices of fossil fuels or electricity are being regulated by the government, there is generally very good documentation of prices which are necessary to calculate induced transfers. Nevertheless, most governments do not publish information on the value of consumer price support calculated by the price-gap method. Countries are also collecting and monitoring data using statistical systems. Key sources of information for statistical data are the following. The System of National Accounts¹⁸ (SNA) sets out definitions and classifications for industries¹⁹ (e.g. as electricity and gas supply, refining) and products²⁰ (e.g. refined and crude petroleum products, electricity) (European Commission et al., 2009) with relevance to fossil fuel subsidies.

This includes transactions in products and (re-) distributive and financial transactions, including subsidies, other current transfers, capital transfers, taxes, (payable and non-payable) tax credits and final consumption expenditure. It also contains information on debt assumptions and cancellations which are a key element regarding the subsidy categories for under-pricing of government services and transfer of risk. The SNA sets an internationally agreed framework for accounting rules, and serves as a key backbone for generating national statistical data. As such, it might be an important tool for generating comparable country data on fossil fuel subsidies. In addition, "satellite systems" have been created to bring the data of the SNA into the context of specific data needs, for example on the environment, health or others.

The System of Economic-Environmental Accounts (SEEA)²¹ is a statistical system that brings together economic and environmental information into a common framework to measure the condition of the environment, the contribution of the environment to the economy and the impact of the economy on the environment. In some regions, for example for countries of the European Union²², data reporting against these systems is very advanced and partially legally binding.

Therefore these systems contain relevant information with regard to the monitoring of fossil fuel subsidies that could be used for the reporting. While some subsidies (especially direct transfers) are already being reported by countries, national reporting of the full spectrum of subsidies is in its early stages, and there is large heterogeneity with respect to the categories that are being reported. Table 8 illustrates (based on a selection of countries) which types of subsidies are being reported, and a full overview for UN Member Countries can be found in Annex 7. While governments are not reporting on all types of subsidy categories, the data for monitoring these subsidies are often publicly available from government institutions.

¹⁷ The definition of a tax concession varies between these two reports: According to the Subsidies Report, tax concessions are special fiscal exceptions to existing statutory regulations which result in reduced revenue for the public sector, in line with the definition used by the OECD in calculating revenue foregone in its Inventory of Support Measures for Fossil Fuels. The Federal Environment Agency report considers these tax concessions as well as – according to their broader definition of subsidies – tax exemptions, or unduly low tax rates, which are not in line with the purpose and justification of the tax, e.g. the exemption of commercial air transport from energy tax and energy tax concessions for diesel fuel.

¹⁸ <https://unstats.un.org/unsd/nationalaccount/sna.asp>

¹⁹ <https://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27&Lg=1>

²⁰ <https://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=31&Lg=1>

²¹ <https://seea.un.org/content/about-seea>

²² <http://ec.europa.eu/eurostat/web/environment/overview>

Box 3.1.2: Lessons learned from current national monitoring practices

- In countries with high monitoring capacity and an open-data approach, national data monitoring systems and national data that are publicly available can provide a basis for SDG monitoring.
- While fossil fuel subsidies reported by national governments present a very valuable dataset with high relevance for the national context, the case studies show there is often under-reporting of subsidies.
- The minimum set of subsidies reported seems to be direct transfers that appear in government budgets. Some countries are also monitoring tax expenditures, government revenue foregone and under-pricing of other goods and services, as well as risk transfers.
- Regulated fuel prices (induced transfers) are generally very well documented, but countries do not publish information on the resulting subsidies.
- Countries do not seem to distinguish between producer and consumer subsidies, and are generally more focused on consumer subsidies. While some subsidies identified by countries can be classified as one or the other, this is not generally done in the country reporting.
- Subsidies to electricity are monitored as energy subsidies, but most countries do not differentiate as to whether electricity is generated from fossil fuels.
- The international comparability of existing national datasets is limited due to differences in scope and definition.
- Statistical systems such as the System of National Accounts and the relevant satellite systems contain relevant data with respect to fossil fuel subsidies.
- Countries with good monitoring capacity might already be able to monitor data for SDG Indicator 12.c.1, while other countries require more support.
- For all countries, specific guidance on the monitoring of the different types of subsidies, in particular the category on tax expenditure, other government revenue foregone and under-pricing of goods and services, including risk, and their integration with existing statistical systems might be useful.

2. Peer-reviews under G20 and APEC

Several peer-review reports of fossil fuel subsidies have been produced in the context of international commitments under the G20 and Asia-Pacific Economic Cooperation (APEC). In 2013, G20 Finance Ministers agreed to develop a framework for voluntary peer-reviews focussed on “inefficient fossil fuel subsidies that encourage wasteful consumption”. So far, G20 peer-reviews have been published for the People’s Republic of China and the United States (2016), Germany and Mexico (2017) and Indonesia and Italy (2019).²³ In the context of APEC, Peru, New Zealand, the Philippines, and Chinese Taipei have undergone a peer-review on their subsidies, while Vietnam and Brunei Darussalam are ongoing.

These peer-reviews, especially for the non-OECD members of APEC, have yielded new information on government support measures for those countries that had not previously been included in the monitoring programmes of inter-governmental organisations. For example, the review of China revealed the existence of a number of tax preferences, particularly relating to land taxes, benefitting domestic oil and gas producers. However, none of four G20 countries that have finished their peer reviews as of early 2018 discussed some of the more difficult-to-measure subsidies, such as those related to residual government liability in the event of energy-related accidents such as large petroleum spills, or loan guarantees related to investments in fossil-fuel infrastructure.

²³ <http://www.oecd.org/site/tadffss/publication/>

3. Periodic international monitoring

The IEA, IMF and OECD are regularly collecting data on production or consumption subsidies to build up international databases (Table 7).

The IEA surveys most countries of the world, and publishes estimates of consumer price support for coal, electricity, natural gas, and oil (petroleum products). The IEA uses a price-gap approach to calculate consumer subsidies²⁴. Data are only reported for countries for which significant subsidies are identified. In its latest release, for 2016, the IEA (2017) reports its findings on 41 countries.

The IMF has reported consumer price support (a component of its “pre-tax subsidies” estimates) calculated by the price-gap method, for coal, electricity, natural gas, and three petroleum fuels (gasoline, diesel, and kerosene). The dataset is compiled from data collected from government sources, IMF staff, and monitoring of news reports. In its latest database, consumer price support is reported for each year from 2004 through 2016 for most of the 153 economies it covers. The organization is currently preparing an update of these estimates (through 2017), for release in 2018.²⁵

The OECD has developed a systematic database of fossil fuel subsidies, built up from estimates of individual measures. It includes information on direct transfers of funds and tax revenue foregone for production and consumption of fossil fuels. These estimates are published in its online Inventory of Support Measures for Fossil Fuels, which in the 2017 update covers 43 countries. Data are mainly collected from government budget and tax-expenditure reports, in most cases available publicly. The estimates are, in turn, sent to country officials from OECD countries and partner economies for checking validation. The numbers are revised according to feedback from the appropriate country authorities and only then can they be made public.

In addition, Article 25 of the WTO’s ASCM obliges members to notify the WTO Committee on Subsidies

and Countervailing Measures each year “any subsidy as defined in paragraph 1 of Article 1, which is specific within the meaning of Article 2, granted or maintained within their territories”. Enforcement of this provision is weak, hence compliance is partial.

For the year 2015, some 83 WTO members (out of 164) had failed to submit a notification; another 17 had submitted a “nil” notification. Even among those that had submitted a notification, coverage was incomplete (WTO, 2017). This low level of notifications is not surprising, as notifications are limited to trade-distorting and specific measures. All environment-related notifications are available on the WTO’s environmental database²⁶, which reports only 45 notifications by countries between 2009-15; however, of those that mention subsidies, all pertain to the funding of fossil-fuel alternatives.



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²⁴ The IEA measures subsidies based on the amount by which the price of a given fuel falls short of its reference price, which corresponds to the international market price, adjusted for the costs of transportation and distribution and value-added tax (VAT), or where appropriate the full cost of supply. The estimates cover subsidies to fossil fuels consumed by end-users and subsidies to fossil-fuel inputs to power generation. For countries that import a given product, the estimates represent net expenditures resulting from the domestic sale of imported energy (purchased at world prices in hard currency), at lower, regulated prices. For countries that export a given product, the estimates represent the opportunity cost of pricing domestic energy below-market levels. However, it is important to note that a number of countries are of the opinion that the reference price should be based on the cost of production rather than on import- or export-parity pricing (IEA, OPEC, OECD, World Bank, 2010).

²⁵ www.imf.org/external/np/fad/subsidies/data/subsidiestemplate.xlsx

²⁶ https://www.wto.org/english/tratop_e/envir_e/envdb_e.htm

Table 7: Current state of international monitoring by subsidy category

| Subsidy category | Production | | Consumption | |
|--|---|---|---|---|
| | Production-related capital | Production or input related | Consumption-related capital | Consumption (volume or price) related |
| Direct transfers of funds | OECD (43) ²⁷ | OECD (43) | Partial coverage by OECD (43) | OECD (43) |
| Tax revenue foregone | OECD (43) | OECD (43) | Not yet measured | OECD (43) |
| Under-pricing of goods and services, other government revenue foregone | Partial coverage by OECD (43) | Partial coverage by OECD (43) | Not yet measured | Partial coverage by OECD (43) |
| Induced transfers | n.a. | Not yet measured | n.a. | Estimated for world by IEA (41) and IMF (153) |
| Transfer of risk to the government | Many measures identified for G20 countries but not yet quantified | Some measures identified for G20 countries but not yet quantified | Many measures identified for G20 countries but not yet quantified | n.a. |

Box 3.1.3: Lessons learned from international monitoring

- Several international organisations have produced comprehensive data sets according to standardised methodologies.
- These datasets measure different categories of fossil fuel subsidies, with the inventory of the OECD including support measures to production.
- The datasets provide a distinction between consumer and producer subsidies.



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²⁷ Number of countries for which the data are collected is indicated in brackets.

4. Regional and national studies by other organisations (non-periodic)

Several inter-governmental organisations, NGOs and multilateral development banks (MDBs) have undertaken studies of individual countries' fossil fuel subsidies. The United Nations Development Programme (UNDP), through its regional offices, has published several reports, including of Lebanon (Lebanon and UNDP, 2016), the Western Balkans (Kovacevic, 2011), and Vietnam (UNDP, 2014). The GSI has undertaken extensive studies of fossil fuel subsidies in several countries.²⁸ The ADB has also recently commissioned studies of the fossil fuel subsidies of three countries – India, Indonesia (ADB, 2015a), and Thailand (ADB, 2015b). The Inter-American Development Bank (IADB), in cooperation with the World Bank, has estimated fossil fuel consumption subsidies of all of its Latin American and Caribbean members, covering the period 2008-2014. In addition, Oil Change International (OCI), and the Overseas Development Institute (ODI), have assessed and compiled information on production subsidies based on existing databases, including credit-related support to producers provided by export-credit agencies and multilateral lending institutions, as well as investments by state-owned energy enterprises in fossil fuel-related infrastructure (Bast et al., 2015).

The World Bank has calculated the “quasi-fiscal deficits” of electricity sectors in a number of countries. This metric captures the deviations from reference costs based on efficient costs, due to under-pricing, under-collection of bills, over-staffing, and transmission and distribution losses. A recent World Bank study of 39 sub-Saharan African countries (Trimble et al., 2016), for example, used two scenarios to calculate the quasi-fiscal deficit of each country: existing utility performance and benchmark utility performance. Under the first scenario, the study found that only two countries (the Seychelles and Uganda) had a financially viable electricity sector in 2015. Electric utilities in only 19 countries were covering their operating expenditures, while some countries were losing USD 0.25 or more per kilowatt-hour sold. On average, quasi-fiscal deficits related to insufficient revenues from electricity sales were equivalent to 1.5 per cent of GDP, and exceeded 5 per cent of GDP in several countries. The IMF often includes assessments of subsidies in its Article IV Consultations.²⁹ On occasion, these subsidy assessments have included an analysis of energy subsidies.

²⁸ <http://www.iisd.org/gsi/energy-subsidies>

²⁹ <http://www.imf.org/external/np/sec/aiv/index.aspx>

5. Summary

The foregoing overview of current monitoring practices of fossil fuel subsidies shows that a large body of data and research already exists on the topic. The existing information covers all subsidy categories (Table 8) for a selection of examples, as well as Annex 7 for all UN Member States. Nevertheless, the research also reveals a great variety in terms of data availability. While for some countries extensive datasets exist that are being collected based on internationally agreed methodologies, other countries collect a more limited set of data that mostly includes direct transfers, based on their own internal methodology.



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Table 8: Subsidy categories reported by selective national governments and international processes

| Subsidy category | Case study countries | Germany | Italy | G20 peer reviews | APEC peer-reviews | OECD | IMF and IEA |
|--|----------------------|---------|-------|------------------|-------------------|------|-------------|
| Direct transfer of funds | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | * |
| Tax expenditure and under pricing of government provided goods or services | * | ✓ | ✓ | ✓ | ✓ | ✓ | * |
| Induced transfers (price support) | ✓ | * | * | ✓ | ✓ | * | ✓ |
| Transfer of risk to government | * | * | * | * | * | ✓ | * |

C. Measuring individual subsidy components

This section provides a broad description of the main types of subsidies provided to fossil fuel producers and consumers, guidance on how to measure them and an assessment of whether this could be measured for the SDGs. The measurement of fossil fuel subsidies invariably requires some degree of judgement by the analyst. Some types of subsidies are simple to measure, while others involve complex calculations, detailed data, and sometimes simplifying assumptions. The guidance provided for the monitoring of SDG Indicator 12.c.1 aims at reducing the degree of judgment as far as possible, while allowing to build on existing subsidy estimates as much as possible.³⁰ The authors are aware that the uptake of these techniques by national governments, as well as the harmonisation with and integration into existing statistical systems might require additional guidance, for example through guidance notes on specific types of subsidies. This would ideally be taken forward by national governments as part of ongoing discussions, for example on systems of national accounts (SNAs) and the System of Environmental-Economic Accounts (SEEA).

1. Direct transfers of government funds

Direct transfers of government funds are mainly payments made by governments, or bodies acting on behalf of governments, to individual recipients. This includes direct spending, e.g. for specific support programmes, and government ownership (fully or through equity shares) of energy-related enterprises (for examples see Table 9).³¹ In the System of National Accounts (SNA) 2008 (European Commission et al., 2009), capital transfers are one form of direct payments. They are defined as unrequited transfers where either the party making the transfer realizes the funds involved by disposing of an asset (other than cash or inventories), by relinquishing a financial claim (other than accounts receivable) or the party receiving the transfer is obliged to acquire an asset (other than cash or inventories) or both conditions are met. Capital transfers are often large and irregular but neither of these are necessary conditions for a transfer to be considered a capital rather than a current transfer. In the SNA, capital transfers are sub-divided into three components: capital taxes, investment grants, and other capital transfers. Capital taxes are not usually relevant in this context, but the latter two categories can be. Investment grants, as defined for the SNA, consist of capital transfers made by governments to other institutional units to finance all or part of the costs of their acquiring fixed assets.

³⁰ For details on how to measure particular types of subsidies, readers are directed to Steenblik et al (2010) and Kojima (2017). For more thorough discussions of the various considerations and cautions with regard to the identification and measurement of subsidies, readers are directed to OECD (2010), Kojima and Koplów (2015) and Kojima (2017).

³¹ Refundable tax credits, i.e., payments that are made to taxpayers that can exceed the amount of tax due, are a special case that will not be dealt with in detail here.

Table 9: Examples for direct transfers of funds (complete table in Annex 3)

| | | |
|--------------------------------------|--|---|
| Direct transfers of government funds | Direct spending, budget and off-budget transfers | Agency appropriations: Targeted spending on the sector through government budgets of different levels and budgets of individual government agencies. Government procurement of energy at above-market rates. |
| | Government ownership of energy-related enterprises if on terms and conditions more favourable for business than in case of private ownership | Government ownership of strategic and other energy assets that provides returns on investment at rates below-market. |

These are conditional transfers, requiring the recipients to use the grants for purposes of gross fixed capital formation. Such grants are often tied to specific investment projects, such as a large coal mine. SNA guidelines note that an investment grant in cash that is paid out in multi-year instalments should continue to be classified as capital transfers, even though they may be recorded in a succession of different accounting periods. Other capital transfers, which included the cancellation of debt by mutual agreement between the creditor and the debtor, is discussed below under the category of “risk transfers”.

Measurement

Direct transfers normally are reported by governments in their budgets and generally do not need to be estimated by analysts, but only reported.³² This includes targeted spending on specific programmes, like support programmes for cooking fuels, or financial transfers to state-owned enterprises. In many cases, national governments provide this information at the level of individual sectors or industries. However, in cases where direct transfers are made to a range of industries, additional analysis may be required to allocate the amount of payments that are specific or quasi-specific to fossil fuel-related industries.

In general, payments are attributed in full to the fiscal year in which they are made.³³ The following describes best practice for special cases.



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³² There could be cases of under- or overcompensation, for example for utilities running a deficit due to regulated prices in addition to compensation through direct transfers. This should be checked in the analysis.

³³ This is also the way that capital transfers are reported in a country's SNA. Direct transfers are mostly tied to economic activities that take place in the year in which the transfer has taken place, or shortly thereafter. For example, a government may create a subsidy to help poor households pay for the cost of purchasing heating fuel; the expenses incurred by the households may take place late in the government's fiscal year but the payments made early in the next. Ideally, the value of the payment should be attributed to the year in which the corresponding activity took place. However, in most cases parsing the payments in that way is highly resource-intensive, or not possible at all, so the most pragmatic choice is to report the expenditure in the year for which it is reported.

A similar argument can be made for capital-related grants and similar instruments. Grants that are tied to capital investments in the energy sector raise issues of how best to measure the value of the support over time. The simplest is to allocate the full value of the grant in the year in which it is awarded to the recipient firm or firms. For long-lived assets, a more economically relevant accounting would spread the value of the grant over the life of the asset. However, that requires tracking a potentially large number of individual grants over multiple years, a task that for some countries would prove daunting. In such cases, reporting the annual disbursement of investment-contingent grants may be the most practical course.

Government procurement

Government procurement refers to the purchase of a good or a service by a government, or an entity acting on behalf of a government, for its own purposes (cf. Clements, Schwartz, & Hugounenq, 1995). Governments typically purchase fuel and electricity for their military, for government vehicle fleets, and to power or heat their buildings. To the extent that such purchases are made at above the market price (e.g., to favour domestic suppliers), a benefit is thereby conferred to the producers or distributors of those fuels or electricity.³⁴

Thus, if the requisite information is available, the estimation of the subsidy value of a government-procurement transaction is relatively straightforward: it is the differential between the unit price actually paid for the energy and its unit value in the market, multiplied by the affected volume. However, if the unit value in the market is a subsidised price to begin with – i.e., below the international reference price – the government paying a price closer to the international reference price does not constitute a subsidy to production. Indeed, if the government pays more than the regulated domestic price, but no higher than the international reference price, that transaction may need to be subtracted from the estimate of consumer price support. In practice, obtaining information on the unit price and other conditions of a government purchase may not be easy. Some countries, such as the United States Federal Government, provide detailed information on government procurement³⁵, but this is not commonplace in most countries of the world. Given that, and the number of procurement transactions that take place, it would be unreasonable to include subsidies related to public procurement as a standard component in the Indicator, unless such procurement accounts for a majority of the volume of a fuel sold in a country.

Government ownership of state-owned energy enterprises

The financial relationship between governments and their state-owned energy enterprises is often very close, and it is not always easy to clearly identify where subsidies exist, or the full scope of those subsidies. As a minimum, direct budgetary transfers should be included in the monitoring. Nevertheless, additional subsidies, for example preferential access to state-owned resources, including financial institutions, should be identified and reported as thoroughly as possible.

Government equity infusions into private firms

Governments at times assist large firms by providing them with an infusion of equity. Often, the risk of a lower return or a default is such that the expected return is below what private investors would expect, and the terms for the recipient are better than what it could receive in private equity markets.³⁶ Estimating the grant-equivalent value of an equity infusion is a complex task, potentially requiring a considerable amount of data and calculation. Because of this, it is not recommended to include the subsidy component of equity injections in the national and global monitoring of the SDG indicator at this time. However, it would be useful for countries to report as many details as they can about these transactions in their annual monitoring.

Data availability

Direct transfers are generally reported in government budgets, and well documented in sectoral and Finance Ministries, broken down by programme if not by fuel. Those that meet the SNA definition of “subsidies” – i.e., subsidies on products, and other subsidies on production – can also be found in a country’s System of National Accounts. Budget documents are publicly available for more than 100 countries (for a detailed overview of data availability see Annex 7).

³⁴ Article 14 of the WTO Agreement on Subsidies and Countervailing Measures states that:

“[T]he provision of goods or services ... by a government shall not be considered as conferring a benefit unless the provision is made for less than adequate remuneration [...]. The adequacy of remuneration shall be determined in relation to prevailing market conditions for the good or service in question in the country of provision [...] (including price, quality, availability, marketability, transportation and other conditions of purchase or sale).”

³⁵ Federal Procurement Data System, available from: <https://www.fpds.gov/fpdsng/cms/index.php/en/>

³⁶ Bruce (1990) provides a useful perspective on equity infusions: Unlike loans, the [recipient] firm has no commitment to make any repayment. Thus, an equity infusion to a firm that makes no dividend payments and is not expected to do so in the foreseeable future is, for all intents and purposes, a cash grant. Where the firm’s shares are publicly traded, one could estimate the market value of the shares given to the government agency in exchange for the infusion. The difference can then be treated as equivalent to a cash grant.

Bruce (1990) then goes on to suggest that where market values do not exist, an estimate must be made of the capitalised value of the firm’s future dividend payments per share in order to determine the subsidy component. The WTO’s Informal Group of Experts (WTO, 1998) made a similar distinction based on whether the recipient firm’s shares are publicly traded. No consensus was reached by the Group on a specific estimation method in this regard, however. Various WTO members have nonetheless set out guidelines on how to deal with equity infusions of various types. (See Steenblik et al (2010))

The degree to which information on individual programmes is itemized in those reports is highly variable, however. Support to corporations involved in energy production or transformation may sometimes be found in their annual reports, for example. In some cases, researchers may be able to obtain unpublished data from state-owned energy enterprises directly.

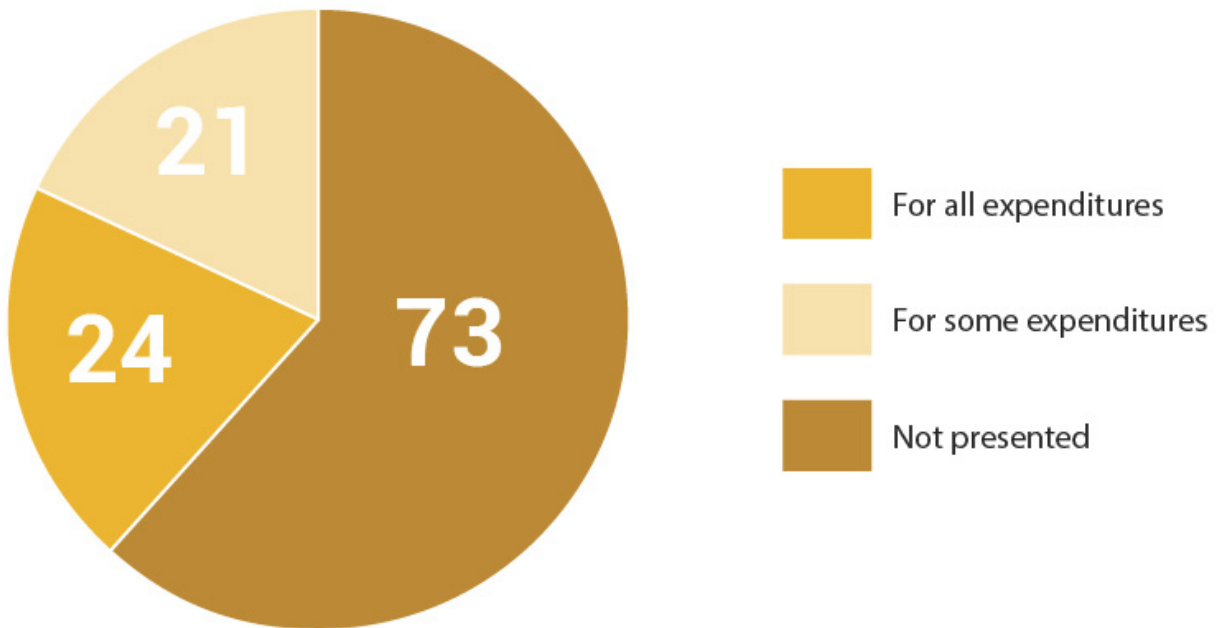
Challenges and capacity-building needs

Governments normally provide excellent documentation of direct transfers. A challenge might be data collection by the statistical agencies from the sectoral ministries and state-owned enterprises, including at the sub-national level, which depends on their capacity. Capacity-building would most usefully be targeted at improving national procedures for obtaining expenditure data, such as from their state-owned energy enterprises or from surveys. For external actors like international organisations or NGOs, the major constraint to producing estimates of direct transfers of government funds is that not all countries provide estimates of their proposed or actual budget expenditures. According to the International Budget Partnership's Open Budget Survey, for 94 out of 118 countries surveyed, the budget documentation does not present all expenditures for individual programmes in the budget year (Figure 6).



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Figure 6: Countries reporting detailed expenditure for individual programmes



Data sources: International Budget Partnership, augmented by OECD information on Australia, Austria, Belgium, Canada, Denmark, Estonia, Finland, Greece, Iceland, Ireland, Israel, Japan, Latvia Luxembourg, Netherlands, and Switzerland.

Analysis and recommendation

Information on direct transfers of funds is generally the best documented of all types of subsidies and relatively easily obtainable. Direct transfers are clearly identified in all definitions of the concept of subsidy. They are also included in the domestic subsidy definitions identified in the case studies. For the monitoring of SDG indicator 12.c.1, it is therefore recommended that direct transfers of government funds be reported by governments, with the exception of equity infusions into fossil-fuel or electricity producing firms, and government procurement, except where such public procurement accounts for a majority of the volume of a fuel or electricity sold in a country. However, it would be helpful for countries to report the gross value of equity infusions, though that value should not form part of total subsidies.



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| Data availability | Complexity | Acceptance |
|---|--|---|
| ++ | ++ | ++ |
| Direct budgetary transfers are well documented by governments, and often in publicly available documents. | Do not need to be estimated by analysts, only reported. Some analysis may be required to allocate the amount to fossil fuel-related industries. | Included in all international definitions, accepted by governments in case study countries. |
| ++ (green) means "excellent" or "low degree of complexity" + (yellow) means "good" or "moderate degree of complexity" o (orange) means "neutral" - (red) means "poor" or "difficult" | | |

2. Induced transfers (price support)

Induced transfers arise as a consequence of government interventions that affect prices received by producers and paid by domestic consumers. The main instruments of intervention are direct price regulation, pricing formulas, border controls or taxes, and domestic purchase or supply mandates, and variants thereof. Price intervention in the energy sector nowadays is predominantly in favour of consumers. Nonetheless, because there are still some places where domestic producers are supported, or otherwise insulated from foreign competition, both types are explained below.



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Table 10: Examples for induced transfers (complete table in Annex 3)

| | | |
|-----------------------------------|--|---|
| Induced transfers (price support) | Price support, including through market regulation | <p>Consumption mandates and mandated feed-in tariffs: fixed consumption shares for use of a specific energy type.</p> <p>Border protection or restrictions: controls (tariff and non-tariff measures) on imports or exports leading to unfair advantages.</p> <p>Regulated prices set at below-market rates: for consumers (including where there is no financial contribution by government).</p> <p>Regulated prices set at above-market rates: for producers</p> <p>Cross-subsidies in the electricity sector.</p> |
|-----------------------------------|--|---|

Consumer price support

The most prevalent induced transfers are regulations that oblige producers to sell their fuel at lower than the opportunity-cost price of that fuel (consumer price support). Among the most common mechanisms are direct price controls, automatic pricing formulas and supply mandates, sometimes used in combination. Direct price controls and automatic pricing formulas set the price at a level below-market prices. Domestic supply mandates are common in countries where governments keep domestic natural gas prices below the price at which the supplier exports its gas (Kojima, 2017), for example through conditions on export licenses or policies that designate coal from certain areas for domestic use only.

Tariff differentiation among customer classes is commonplace in the electricity³⁷ and natural gas markets, and can give rise to cross-subsidies. In many emerging economies, for example, small households and agricultural users pay much lower electricity or natural gas prices than larger households and commercial or industrial customers, whilst the cost of supply decreases with consumption volume. Such cross subsidies can exist whether or not natural gas or electricity consumers are in aggregate subsidised.

Producer price support

Governments may also support domestic energy industries, or certain segments of those industries, such as refining. Import duties increase the price of products imported, which allows domestic producers to raise their prices by up to the amount of the tariff.³⁸



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³⁷ Attribution to different types of fuels has to be done carefully. For example, subsidies to electricity have to be attributed according to the share of fossil fuels used in generating that electricity.

³⁸ Import bans can have a similar, albeit stronger, effect. Formal import bans on products that are legal to sell in a country are prohibited by the WTO, but de facto bans can be applied if the main importer, or importers, are state-controlled. An obligation on a downstream user of a fuel, such as an oil refinery or coal-fired power station, to use only domestically sourced raw material also usually raises the price received by domestic producers.

Measurement

Induced transfer are measured by calculating the price-gap between the producer or consumer price and a reference price, and multiplying that differential by the affected volume produced or consumed. The calculation of the price gap is described below.

Box 3.1.4: Price-gap measurements

Estimates of subsidies to consumers observable through price-gaps (i.e., consumer price support) have been calculated by several international organizations (IADB, IEA, and IMF), covering different geographic regions and time-periods. The three organisations that produce these estimates use roughly the same approach, which can be summed up by the following equation, adapted from Kojima (2017):

Consumer price support = (adjusted net-of-tax reference unit price – local net-of-tax unit price) x units subsidised

In general, IEA and IMF analysts base their reference prices on import (or export) parity prices using the price of a product at the nearest international hub, adjusted for quality differences if necessary, plus (or minus) the cost of freight and insurance to the net importer (or back to the net exporter), plus the cost of internal distribution and marketing and any value-added tax (VAT). For tradable commodities (mainly coal, crude oil, and petroleum products), the reference prices are based on the spot price at the nearest international hub – e.g., the United States, Northwest Europe, or Singapore. The table provided in Annex 4 lists the approach as documented by the IMF. Although the basic formula is simple, the accuracy of the results depends on careful selection of an appropriate data series, and a number of potential adjustments.

As Kojima (2017) explains, how prices are administered can lead to over- or under-estimations of actual consumer price support. For example, if there is a flourishing black market for the subsidised fuel, or some of it is sold illegally outside the country, the actual volume purchased at the subsidised price may be less than officially reported. As price-gap calculations compare adjusted reference and domestic prices at a specific point in time, the fluctuations in international prices, as well as exchange rates influence the calculation. Ideally, a calculation would be done for several points in time of the year. Other administrative characteristics increase the amount of computation required to produce an accurate estimate of total consumer price support:

- If prices are controlled at many points in a country (e.g., separately for each petroleum refinery), there are likely to be multiple local unit prices, and corresponding volumes.
- Even where uniform pricing is applied to a product no matter where it is sold in a country, the reference unit prices are likely to differ. Remote or inland areas will be more costly to supply than concentrated urban areas near ports.
- If a government sets a price ceiling for a product, rather than control its actual sales price, differences in actual prices sold may differ if, for example, the market is served by a mix of state-owned and private fuel distributors.
- If prices for the same type of fuel are differentiated by end-use ("multi-tier pricing"), accurate estimation of the associated consumer price support requires knowing the associated volumes sold at each price.
- Multiple calculations also have to be carried out if there are several grades of the subsidised fuel, such as gasoline (usually differentiated by octane number), or many tariff classes with fixed and variable cost components (e.g. electricity).

Estimating price support is generally easier for petroleum products than for natural gas, coal or electricity, as a larger share of petroleum products are traded internationally. Many more considerations need to be taken into account when estimating price gaps for these sources; see Kojima (2017).

Kojima (2017: 15) concludes by acknowledging that, in light of the data limitations, "it is likely that many simplifying assumptions will have to be made". These uncertainties, in turn, imply that caution should be exercised when generating price-gap estimates, and that because small price gaps could simply reflect calculation uncertainties, the conclusion should not necessarily be drawn in such cases that consumer price support exists.

Data availability

In cases where fuel prices are regulated, governments generally have very good documentation of the regulated fuel prices and domestic price build-up as monitored by regulatory agencies. Furthermore, data on the prices of fuels and electricity sold domestically are generally available for most countries, even if only for certain regions. The IEA and IMF are using these data already to estimate consumer price support for most of the countries of the world.



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| | |
|---|--|
| <p>IEA quarterly database on fuel prices and taxes³⁹</p> | <p>The Energy Prices and Taxes data service contains a major international compilation of energy prices for OECD countries. The database includes annual and quarterly end user industry and consumer prices as well as annual, quarterly and monthly crude oil spot prices, oil product spot prices and import costs by crude stream. The end user prices cover the main oil products, gas, coal and electricity.</p> |
| <p>IMF fuel price dataset⁴⁰</p> | <p>Retail prices for petroleum, coal and natural gas. Not country-specific, but benchmark prices which are representative of the global market, determined by the largest exporter of a given commodity. Compiled from data collected from government sources, IMF staff, and monitoring of news reports.</p> |
| <p>International Fuel Prices report published by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)⁴¹</p> | <p>Retail prices of gasoline, diesel, and LPG, based on surveys conducted on a specific day throughout the world. The report is published roughly every two years, the latest being 2018.</p> |



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³⁹ <http://www.iea.org/statistics/relateddatabases/energypricesandtaxes/>

⁴⁰ <http://www.imf.org/external/np/res/commod/index.aspx>

⁴¹ <https://www.transformative-mobility.org/assets/site/GIZ-IFP-International-Fuel-Prices-Report-2019.pdf>

Challenges and capacity-building needs

The main challenges to data collection for this indicator are obtaining data that accurately represents the situation in countries with complex pricing systems for fuels and electricity. Challenges also arise from the price fluctuation of internationally traded energy commodities and disaggregation of data, for example for consumer classes. Additionally, there is a need to analyse the beneficiaries of fossil fuel subsidies by income quintile and by other socio-economic variables, including gender, disability, ethnicity, etc. However, this is particularly challenging due to both a lack of data sources on how individual households benefit from fossil fuel subsidies and even less information on differentiated benefits within households which constrains the possibility of conducting gender-analysis of fossil fuel subsidies.

Capacity building in many countries could be valuable particularly in helping some countries improve their statistical techniques for obtaining information on prices and volumes associated with consumption subsidies. In addition, the calculation of the reference price requires information about what the correct levels of costs for price build-up and taxation should be. This dataset is currently still incomplete. More detailed guidance on the calculation of the price gap, including the calculation of reference prices, would be a very useful. This should be based on information from the inter-governmental

Analysis and recommendation

Calculating price differentials provides an important cross-check about existing subsidies, and gives a good idea of the total scale of subsidies for many developing and emerging countries. The authors therefore recommend that induced transfers should be included into the monitoring of SDG Indicator 12.c.1. The options are for individual countries to rely on the IMF's or the IEA's estimates, or to calculate these themselves to the best of their ability. In addition, it would be very useful to provide details on how prices are formed in their countries, and what level of detail exists on their domestic markets that would permit estimating (weighted) average prices by fuel, and whether corresponding consumption figures at those prices exist.



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| Data availability | Complexity | Acceptance |
|---|---|--|
| + | + | ++ |
| Good, as data on energy prices is available for most countries. Data to calculate the reference price could be improved. | Moderate and can vary, depending on the size of the market and fuels. | Price support is widely recognized as a component of total government support in estimates of total support under the WTO Agreement on Agriculture, the OECD's work on support for different sectors, the IEA's and IMF's work on fossil fuel subsidies, and in the economic literature more generally. However, low-cost producer countries argue that the reference price for making comparisons, even for tradable commodities such as petroleum products, should be production cost, not export-price parity. |
| ++ (green) means "excellent" or "low degree of complexity" + (yellow) means "good" or "moderate degree of complexity" o (orange) means "neutral" - (red) means "poor" or "difficult" | | |

3. Tax expenditures, other government revenue foregone and under-pricing of goods and services, including risk

This category can be broadly separated into tax expenditures (the monetary value of tax breaks) and government revenue foregone (targeted reductions for specific industries of import and other duties), and the under-pricing of goods and services, including risk (access to government services and goods for free or at a reduced price). Table 11 provides examples for subsidies that can be found in this category.

Table 11: Examples for tax expenditures and under-pricing of other good and services (complete table in Annex 3)

| | | |
|---|---|---|
| Tax expenditures, other government revenue foregone and under-pricing of goods and services, including risk | Tax breaks and other government revenue foregone | Income-tax expenditures: Tax expenditures are foregone tax revenues, due to special exemptions, deductions, rate reductions, rebates, credits or deferrals that reduce the amount of tax that would otherwise be payable. Exemptions from excise taxes and other special taxes, or other duties: Exemption of excise taxes on fuels; special targeted taxes on energy industry (e.g., based on environmental concerns or “windfall” profits); exemption of import duties on equipment for a specific industry. |
| | Under-pricing of government-owned energy resources | Benefits related to differences in procedures for energy resource leasing: For example, some countries auction access to larger sites, but designate a sole source for smaller sites. Royalty relief or reductions in other taxes due on extraction: reduced, delayed or eliminated royalties. |
| | Under-pricing of non-energy, government-owned natural resources or land | Access to government-owned natural resources such as water or land at no charge or for below-market rate. |
| | Under-pricing of government-owned infrastructure | Use of government-provided infrastructure at no charge or below-market rate. |
| | Under-pricing of other government-provided goods or services | Government-provided goods or services at below-market rates. Government loans: below-market lending to energy-related enterprises, including loans to energy exporters, and debt restructuring and cancellations. |

Tax expenditures and other government revenue foregone

Tax expenditures take a variety of forms, including tax-rate reductions, allowances, credits, and deferrals. Unlike direct spending, tax expenditures are almost always deliberated outside of the budgetary framework. Once in place, tax expenditures do not require approval by the legislature and might therefore be less subject to oversight (Kojima and Koplow, 2015). There can be other forms of government revenue foregone, such as import-duty exemptions for specific industries. Their measurement and data availability follows the same principles as for tax expenditures.



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Measurement

Measuring the value of special features introduced into the tax code to favour certain industries or activities of those industries (such as investment in productive capital) can be a complex endeavour. Some countries do this exercise already, and report the annual value of those tax features in their periodic tax-expenditure reports. Where that is not the case, the analyst must construct a model and estimate the difference in the revenues that would be owed to the government under the baseline conditions and with the special tax feature.⁴² The quantification of tax expenditures requires information about the benchmark tax system. Tax expenditure is the difference in revenue due to deviations from the tax norm (Kojima and Koplou, 2015). The following sets out (a) what should be considered to be a tax expenditure, and (b) how it should be measured.

Identifying a benchmark

There are several approaches⁴³ used by governments when determining a benchmark tax regime.

- Setting the benchmark on the structural features of the tax system: This approach treats any "special features", such as higher taxes aimed at raising revenues or internalising externalities, as deviations. Such an approach requires identifying which features should be treated as "special".
- A reference-law approach considers as tax concessions only those explicitly stated in law. In this case, a lower tax rate on one product than on another within a broader category would not necessarily be considered a tax exemption. For example, some countries regard the standard rate of VAT as a baseline for measuring tax exemptions, while others (adhering to the principle described in the first bullet) regard the differential rates as intrinsic elements of the VAT.
- Another, less common, approach limits the scope of tax concessions to those that involve public

expenditure, such as refundable income-tax credits.

- For the purposes of SDG Indicator 12.c.1, the first two approaches are the most common and therefore most internationally comparable, and are therefore recommended.

Estimating tax expenditures

Based on the benchmark tax regime, the tax expenditure can be quantified. There are several approaches used by countries:

- The revenue foregone method calculates the tax expenditure as the rate of the tax concession multiplied by the base or uptake. It is the most straightforward and common method of measurement.
- The revenue gain method estimates the expected increase in government revenue if the tax concession were eliminated, allowing for substitution effects. Removal of the tax concession would be expected to reduce the consumption of the (now more expensive) good, resulting in an increase in tax revenue that is smaller than the revenue foregone.
- The expenditure equivalent method estimates the amount of funding that would be required to achieve the same outcome using a direct budgetary transfer. This method tends to result in larger estimations than the above two methods as direct government transfers are generally taxed, while transfers made through tax concessions often are not.

The revenue foregone method appears to be the most common approach used by countries⁴⁴ and is the simplest to apply practically. All three approaches yield acceptable estimates for the purposes of SDG Indicator 12.c.1, if a country applies the method consistently. The development of guidance notes on the methods for estimating tax expenditures would be very helpful in

⁴² There are also various preferential tax practices, such as those that allow a tax payment to be deferred while maintaining its ultimate nominal liability. The most common form is an accelerated depreciation allowance for capital investments. There are two main approaches to estimating the tax expenditure in these cases, which are quite distinct and not directly comparable. The nominal cash flow approach estimates the extent to which the taxes in a given year would have been higher or lower in the absence of the accelerated allowance. The present-value approach measures the discounted value of the time series of annual cash-flow tax expenditures, generally from the time at which the asset was purchased.

⁴³ In theory, another approach could be to use an "optimal" tax regime as a benchmark, although this is often carried out in the context of an analytic exercise rather than for government estimations. It is relevant in the case of fossil fuels where the goal of taxation increasingly is not only to raise revenues but also to internalise the environmental externalities and reduce harmful emissions to socially optimal levels. However, in practice the determination of an optimal tax level is fraught with difficulties as it would vary significantly across time, users, locations and fuels.

⁴⁴ Based on a review of tax-expenditure documents drawn on for the purposes of the OECD Inventory, carried out by Augustin Redonda of the Council on Economic Policies in November 2017.

this regard, and could serve to build further regional and international agreement, also with a view to developing regional benchmarks for taxation levels.

These guidance notes could also explore synergies with existing data collection efforts on taxes, e.g. under the System of Environment-Economic Accounts (SEEA).

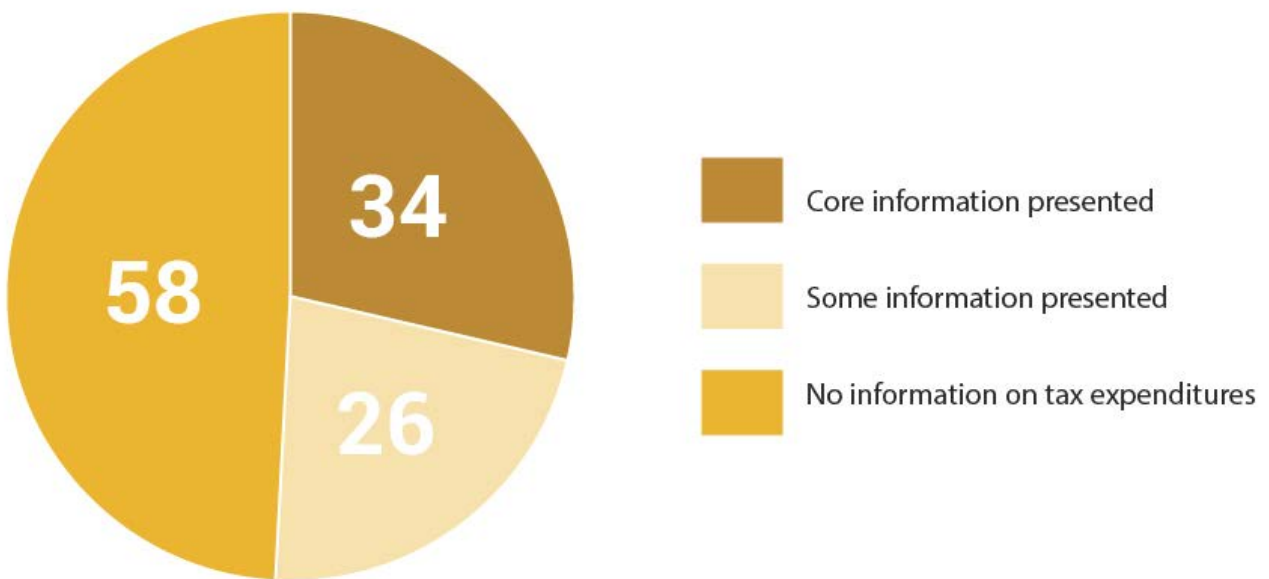
Data availability

As outlined above, some countries are producing detailed tax expenditure reports, but this is not general practice. In only 34 out of the 118 countries listed in Annex 7 do the governments publish core information on tax expenditures (Figure 7). The lack of established accounting and reporting practices of tax expenditures, or lack of transparency can limit assessments and international comparability of tax expenditures for fossil fuel subsidies, particularly in developing countries. In addition, information on tax expenditures at the subnational level is often hard to come by.



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Figure 7: Countries reporting information on tax expenditures



Data sources: International Budget Partnership, augmented by OECD information on Australia, Austria, Belgium, Canada, Denmark, Estonia, Finland, Greece, Iceland, Ireland, Israel, Japan, Latvia Luxembourg, Netherlands, and Switzerland.

Challenges and capacity-building needs

As benchmarks are currently set on a country-by-country basis, and as estimation methods applied by countries differ, the international comparability of existing tax expenditure estimates is limited in the absence of a uniform international framework. Differences in the amount of subsidies reported can be due to a range of factors such as a higher tax benchmark, a stricter definition of the benchmark system, or a more complete set of tax-expenditure accounts. The OECD Inventory of Support Measures for Fossil Fuels reports tax expenditures estimated by each country itself, providing the caveat that the higher tax expenditures reported do not necessarily mean that the country provides a higher level of support (OECD, 2013).

There seems to be an opportunity for further improving datasets, as well as some interest from countries in improving their accounting of tax expenditures, based on the case studies as well as exchanges between the authors and country governments. This seems to be an area in which capacity-building might be very useful. Guidance and international discussion on best practices, building on existing processes such as discussions in the context of the System of Environmental-Economic Accounting (SEEA), could support a gradual consolidation.

Under-pricing of goods and services

Fossil-fuel production involves combining capital goods with financing, labour, intermediate inputs, land, energy, and sometimes water. Subsidies associated with these different production inputs are sometimes reported by governments, but not always. If not, the analyst must estimate these subsidies themselves. Examples of subsidies to labour are less common for hydrocarbon production than for coal mining. In the latter case, they may take the simple form of wage subsidies, or through government subsidization of the social charges of miners. The surface area occupied by a well, mine, or fuel-processing facility may also be provided rent-free or below-market rate by a government. This value – essentially the rental value of the land – is distinct from the value of the sub-surface resource. Where the land involved is publicly owned, and the land is provided for free or at a price lower than what the government may be able to charge for alternative uses, the relevant metric is the foregone rental value.⁴⁵ In the case of privately owned land, the more common form of government support is a waiver from, or a reduction in, the property taxes due on that property. The value of the subsidy in that case is the tax revenue foregone.

Governments, or state-owned banks, also offer credit to companies involved in the exploration and extraction

of fossil fuels, on terms that are more favourable than could be obtained from private lenders, resulting in the under-pricing of a service.

Measurement

The subsidy value of under-priced resources is relatively non-complex to measure – multiplying the difference between the unit price of the resource and the market price by the number of units involved – if one can find the requisite data. For loans provided at below-market rates, the amount of the financing provided is calculated as the amount committed on the date that the loan was approved by the institution. If it can be determined that only a portion of the project or loan went to energy, then only that percentage is included as the reported amount. The subsidy-equivalent cost of a preferential loan is the difference between what would have been paid by the debtor under market pricing and what is actually paid to the lending institution. It is difficult to estimate as it requires determination of the loan terms that would apply if the lending institution would not have stepped in.

The (OECD, 2018) has proposed a method to quantify the support element of government credit assistance based on the work of Lucas (2014). This method uses information about a firm's creditworthiness, extracted from its credit-ratings, to calculate the value of the direct loan or the loan guarantee that would result from private lending. This, or a similar, method is recommended for the monitoring of SDG Indicator 12.c.1. The authors of this report are aware that not all countries will be able to report this data now, and that this depends on the resources available in individual countries. More guidance and capacity-building might be needed to further build up this aspect of fossil fuel subsidies.

Data availability

Exploration of under-pricing of other goods and services has not advanced very far in the literature, so it is difficult to generalise about the availability of data. A possible limiting issue is that many government-controlled resources that are provided for free or under-priced are very local, so obtaining a counterfactual market price for comparison may be difficult. Data on financing, and the conditions of financing, can be opaque, and disaggregated data are often not made public.

The primary directory on public finance for fossil fuels in the form of loans, and loan guarantees is Oil Change International's Shift the Subsidies Database.

⁴⁵ The exception would be where access to the land is included in the value of a bid where the project is allocated via a bidding process.

The database tracks public financial flows to fossil fuels from international, regional, and bilateral public financial institutions around the world. It now includes over 7,000 energy-related financial transactions from 2008 up to 2015. These include financing from international financial institutions, such as the World Bank Group, and regional development banks, as well as from US bilateral financing agencies. Data for bilateral financing agencies of other G20 countries have also been available since 2013. However, these data represent the gross values of loans and guarantees, not their subsidy-equivalent values. International and bilateral financing is not included in national estimates of fossil fuels to date. International financing nevertheless constitutes an important element of risk transfers, and the authors recommend that resulting fossil fuel subsidies should be attributed to the recipient. To quantify the subsidy-equivalent value of loans and loan guarantees, one needs information specific to each transaction: the face value of the loan or guarantee, its duration, the rate of interest paid, and any fees. While most governments may have this information somewhere, not all are willing to share it with other parts of the government, much

Analysis and recommendation

Some countries are already assessing tax expenditure in dedicated national reports. The self-reports prepared by G20 countries for the purposes of their peer-reviews of inefficient fossil fuel subsidies, for example, list tax expenditures and under-pricing of other goods and services (G20, 2016a, 2016b, 2017a, 2017b), noting that those subsidies listed may not be all those which

a comprehensive assessment would identify. Given the data intensity of information needed to assess tax treatment of fossil-fuel production and some categories of under-pricing of other goods and services, the authors recommend that this category be included in national and international monitoring as a separate sub-indicator, but should be optional for national reporting for countries that do not yet have this information or the resources available for this task.

Over time, as countries develop the capacity to report on their tax expenditures generally, it would be helpful if they undertake work to identify and report on their tax expenditures relating to fossil fuels. Countries should be supported in this process through further guidance and capacity-building so that they build up information on this category progressively. Countries are also encouraged to report information on any other policies that result in foregone revenue for the government. While tax expenditure estimates do not provide a full basis for international comparison, they can provide insights into the treatment of different products within a national tax system and the resulting incentives for the economic actors in that system, and the changes within the tax system over time. This makes information on tax expenditure a very relevant dataset.

| Data availability | Complexity | Acceptance |
|---|--|--|
| + | o | + |
| Government estimates of tax expenditures relevant to the production of fossil fuels are reported by most developed countries, but not by many others. | Tax expenditures: relatively complex to measure. | Tax expenditures: Included in national monitoring in some countries and G20 peer-reviews, but not widespread. |
| Data that would permit the valuation of exemptions, reductions and rebates of consumption-side taxes – VAT and excise taxes in particular – should be obtainable with a moderate amount of effort. | Under-pricing of goods and services: relatively non-complex to measure. | Can be controversial, because differences in national tax systems make interpretation necessary. |
| Data on financing can be opaque but is increasingly being collected. | Methods for estimating the subsidy element of loans have been developed, but not systematically applied. | Under-pricing of goods and services: included in most definitions, and accepted, though in practice not widely measured. |
| ++ (green) means "excellent" or "low degree of complexity" + (yellow) means "good" or "moderate degree of complexity" o (orange) means "neutral" - (red) means "poor" or "difficult" | | |

4. Transfer of risk to government

Private enterprise in the fossil-fuel industry involves managing various risks – technological, financial, price-related and policy-related, and geological. Many governments of fossil-fuel producing countries have developed ways to shift a portion of those risks to the government, and ultimately taxpayers. This is usually through direct involvement in industry, for example through a state-owned enterprise, or by offering credit, loan guarantees or other risk-sharing mechanisms to independent companies on terms that are more favourable than could be obtained from private lenders.

Table 12: Examples for transfer of risk to government (complete table in Annex 3)

| | | |
|---|---|--|
| Transfer of risk to government | Credit support | Loan guarantees: at below-market rates. |
| | Debt restructuring and cancellations | Debt restructuring: the government orders the easing of the debt burden on one or more firms. |
| | | Debt cancellation: the government forgives the outstanding balance of a loan it has made, with no compensation from the beneficiary. |
| | Insurance and indemnification | Government insurance and indemnification: market or below-market risk-management or risk-shifting services. |
| | | Statutory caps on commercial liability: can confer substantial subsidies if set well below plausible damage scenarios. |
| Assumption of risks related to occupational health and accidents | Assumption of occupational health and accident liabilities. | |
| Assumption of responsibility for remediating environmental damage | Responsibility for closure and post-closure risks: facility decommissioning and clean-up; long-term monitoring; remediation of contaminated sites; litigation. | |
| | Waste management and environmental damages: avoidance of fees payable to deal with waste, avoidance of liability and remediation to make the environment whole. | |

Measurement

The calculation of the subsidy element in credit-related instruments to transfer risk follows the same logic as for under-priced loans, using the method proposed by the (OECD, 2018; Lucas, 2014). Risks related to occupational health and accidents, as well as remediating environmental damage is difficult to quantify, as this requires information on the amount of damage covered and the likelihood of these events happening. The System of National Accounts (SNA) 2008 includes a specific category of transaction called Other capital transfers (¶ 10.210), which for

those countries that compile an SNA may provide the requisite information. This category consists of all capital transfers other than capital taxes and investment grants. One notable category is the cancellation of debt by mutual agreement between a creditor and a debtor. Such a cancellation is treated as a capital transfer from the creditor to the debtor and is set equal to the value of the outstanding debt at the time of debt cancellation. Another is large payments in compensation for extensive damages or serious injuries not covered by private insurance policies.

As noted in SNA 2008, they include payments of compensation for damages caused by major explosions and oil spillages. Such payments, minus contributions from the responsible industry (e.g., producers of oil and natural gas), if made to those harmed by a fossil fuel-related activity, can be treated as a subsidy to that industry.

Data availability

Data on financing, and the conditions of financing, is not always publicly available, as described in the previous section. Risk-related data is also often not publicly available and requires access to a uniform methodology of putting a financial value to this risk. However, as mentioned above, a country's detailed SNA may provide a source of information on certain capital transfers, such as debt cancellations.

Challenges and capacity-building needs

Apart from the aforementioned data challenges, a detailed understanding of the energy sector, risk quantification and corporate financing may be required, to evaluate the level of support provided through concessional financing, insurance and assumption of risks. It is difficult to generalise about individual countries' needs, so a first step before proposing a capacity-building programme would be to undertake a survey of the nature and scope of the finance-related support in the country, to determine its complexity and the resources needed to update the estimates.

Analysis and recommendation

Given the data intensity of information needed to assess government measures that involve a shifting of risk, the authors recommended that this category not be included into the monitoring of SDG Indicator 12.c.1 in the initial stages.



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| Data availability | Complexity | Acceptance |
|---|--------------------------------|---|
| - | - | o |
| Only the face values of individual transactions are generally made public, if they are public at all. Other data needed to produce estimates are likely to be hard to obtain. | Relatively complex to measure. | Generally accepted in theory, but rarely quantified in practice. In concrete cases of subsidy estimations, divergent stakeholder views are often observed. |
| ++ (green) means "excellent" or "low degree of complexity" + (yellow) means "good" or "moderate degree of complexity" o (orange) means "neutral" - (red) means "poor" or "difficult" | | |

5. Summary

The analysis of the individual subsidy categories showed that there are large differences in terms of data availability, complexity of calculation, and acceptance by governments and researchers. Ultimately all fossil fuel subsidies should be monitored and reported. Nevertheless, to ensure comparability and replicability, and especially taking into account the monitoring capacity of the 193 countries that will report against the SDGs, it is proposed to only include the following categories, as outlined in Table 13. For the national monitoring, direct transfers and induced transfers should be reported by all countries. Tax expenditure, other revenue foregone, and under-pricing of goods and services should be reported as an optional sub-indicator by countries for which information on this category is available; the data should be built up gradually by all countries, potentially with capacity building support.

Transfer of risk was deemed too complex and context-specific for the purposes of SDG monitoring. For the global monitoring, the same subsidy categories should be reported by building on and gradually expanding two available and well-established datasets. For fossil fuel consumption subsidies, data monitored by the IMF, in partnership with IEA, should be used. For fossil fuel production subsidies, data measured by OECD on direct transfers of funds and tax expenditure should be included.



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Table 13: Assessment of subsidy categories for monitoring of SDG Indicator 12.c.1.

| Subsidy category | Data availability | Complexity | Acceptance | Recommendation for SDG monitoring | |
|--|-------------------|------------|------------|-----------------------------------|-------------------|
| | | | | National | Global |
| Direct transfer of funds | ++ | ++ | ++ | Yes | Yes |
| Induced transfers (price support) | + | + | ++ | Yes | Yes |
| Tax expenditure, other revenue foregone, and under-pricing of goods and services | + | o | + | Yes, but optional | Yes, but optional |
| Transfer of risk | - | - | o | No | No |

++ (green) means "excellent" or "low degree of complexity"
 + (yellow) means "good" or "moderate degree of complexity"
 o (orange) means "neutral"
 - (red) means "poor" or "difficult"

| Proposed option | Explanation |
|---|---|
| <p>Direct transfers and induced transfers should be reported by all countries.</p> <p>Tax expenditure, other revenue foregone, and under-pricing of goods and services should be reported as an optional sub-indicator in cases where information is available and resources are available.</p> <p>Transfer of risk should not be included.</p> | <p>This recommendation was developed based on analysis taking into account the criteria of data availability, complexity, and acceptance.</p> |
| <p>Coverage should include the same categories as national reporting direct transfers, induced transfers, tax expenditure).</p> <p>To be reported by building on and gradually expanding datasets on consumer subsidies (IMF, in partnership with IEA), and producer subsidies (OECD).</p> | <p>See above.</p> |



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→ Team

Target

Concept

Sustainable

Friendly

Contemporary

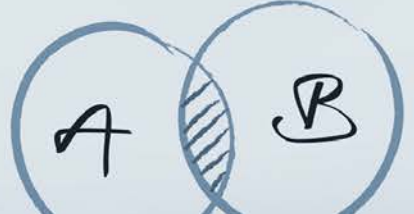


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IV



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Proposed methodology for SDG Monitoring

- A. Definitions and scop
- B. National monitoring
- C. Comparability

IV. Proposed methodology for SDG Monitoring

As set out in the previous chapters, different data sets capture different aspects of global fossil fuel subsidies. While national monitoring has high relevance informing national policy-making, comparability between countries is limited. It is therefore proposed to collect national data, and supplement it with two international datasets, on the one hand the dataset on

fossil fuel consumer subsidies collected by the IEA, and on the other hand data on fossil fuel producer and some consumer subsidies compiled by the OECD. The following chapter sums up the definition and scope of fossil fuel subsidies, and gives guidance as to how the datasets should be compiled.

A. Definitions and scope

The scope of fossil fuel subsidies pertains to the types of fossil fuels, the uses of fossil fuels, and to the types of support measures to be included. While the target itself refers to “inefficient fossil fuel subsidies”, for the

indicator, no distinction is made between “efficient” and “inefficient” subsidies. The following should be included in the monitoring of SDG Indicator 12.c.1:

Table 14: Definition of fossil fuel subsidies

| | |
|-----------------------------|---|
| Definition of “Fossil fuel” | <p>“Fossil fuels are taken from natural resources which were formed from biomass in the geological past. By extension, the term fossil is also applied to any secondary fuel manufactured from a fossil fuel.” (IEA, 2005)</p> <p>Therefore both primary fossil-fuel commodities (e.g. crude oil, natural gas, coal, lignite and peat) and secondary refined or processed products (e.g. diesel fuel, gasoline, kerosene, and coal briquettes, but also electricity generated from fossil fuel sources) should be included.</p> <p>A list of fuels to be included can be found in Annex 5.</p> <p>All uses of fossil fuels should be included, i.e.</p> <ul style="list-style-type: none"> ➤ Electric and motive power, including aviation ➤ Heat ➤ Non-energy uses of fossil fuels, e.g. in petro-chemical industries <p>While non-energy uses of fossil fuels should be included in the definition, monitoring should be optional.</p> |
| Definition of subsidies | <p>Definition of a subsidy under the WTO’s Agreement on Subsidies and Countervailing Measures (ASCM).</p> <p>To guide the identification and classification of subsidies, the overview of subsidy types that can be found under the ASCM definition should be used (Annex 3).</p> |

B. National monitoring

The SDG monitoring of fossil fuel subsidies by governments is proposed to be undertaken by identifying and reporting individual measures that can be classified as fossil fuel subsidies following an inventory approach. This provides valuable information for national level discussions, and is best adapted to national monitoring practices. As data availability on fossil fuel subsidies differs greatly between countries, countries should start with their existing data, and progressively build up their monitoring efforts, potentially with capacity building support from the custodian agency or others. Based on the analysis in Chapter III, it is proposed that countries

report on the subsidy categories listed below as sub-indicators.

- Direct transfers;
- Induced transfers (reporting on regulated prices and calculation of the total amount);
- Tax expenditure, other government revenue foregone and under-pricing of goods and services, including risk (optional).

The last category should be included as an optional sub-indicator. Countries are invited to report existing information and build up information on this category progressively. In 2025 it should be considered whether this indicator can be fully included.

Risk transfers are more complex to quantify and therefore need not form part of the national SDG monitoring at this point, but could be included once there is an internationally established methodology. Care should be given if a country chooses to aggregate across the three sub-indicators in order to avoid double counting and all three sub-indicators should be publicly available to ensure transparency.

To provide a realistic and relevant global picture of existing fossil fuel subsidies, all subsidies should be reported and quantified, as far as possible. As described in Chapter III, for some types of subsidies it is more difficult to calculate the financial value. Where subsidies cannot be quantified, they should be reported without attributing a financial value as they represent valuable data for national decision-making (Gerasimchuk et al., 2017; Kojima and Koplou, 2015).

To contextualise the data, a text box should provide a short qualitative explanation on the data reported, the scope of measures included and the method used to calculate the subsidies. As noted in Section III.A., care needs to be taken when aggregating estimates

C. Comparability

Comparability is a key issue with regards to the monitoring of SDG indicator 12.c.1. As outlined above, the scope in terms of fuels and subsidy types, as well as the method for measurement, have an impact on results. Global assessments undertaken by international organisations have the advantage of following a uniform methodology that is applied for a number of countries. These datasets therefore have a good comparability between countries and over time. National datasets on fossil fuel subsidies are much more diverse.

This is due to the fact that to date there is no internationally proposed or agreed methodology for national monitoring of fossil fuel subsidies. Secondly, countries differ greatly in how much effort has been undertaken to measure fossil fuel subsidies.

Due consideration should therefore be given to the disparity in terms of data availability across countries and challenges associated with that. Building capacity over time will be important to improve data comparability. The methodology proposed for SDG Indicator 12.c.1 contributes to improving this situation, by proposing a definition and scope, as well as through guidance on how to measure subsidies. It is clear that full reporting

of induced transfers with data on direct transfers and some measures in under-pricing of goods and services. Because of the risk of double counting, the dataset should therefore provide disaggregated information on individual subsidy measures that will be reported as sub-indicators by category of subsidies.

Draft guidance on how to identify, quantify and report subsidies can be found in Annex 6. It is recommended that countries build as much as possible on existing estimates of fossil fuel subsidies, from national or international sources. A list of potential sources is listed in Annex 6. Furthermore, countries can collect data from relevant government agencies. Countries could also conduct an independent analysis of existing subsidies, potentially with international support.

In addition to the disaggregated information on subsidies, countries are invited to report:

- data to calculate the price gap;
- qualitative data on the scope of data reported;
- additional reports and reviews deemed useful to understanding the country's fossil-fuel and electric-power sectors;
- information on past and ongoing fossil fuel subsidy reform(s).

will not happen immediately, and that datasets will have to be built up gradually. More finely-grained guidance notes on how to measure individual types of subsidies could support these efforts. In addition, and possibly as part of these guidance note, it should be further explored how these data collection efforts could be connected to existing statistical systems, for example under the Systems of Environmental-Economic Accounts (SEEA).

This would contribute to rooting the monitoring effort in national systems, and increase transparency on the existing subsidies and the monitoring on the country level. Figure 8 illustrates how a phased approach could be used to move from international data to a comprehensive dataset that makes use of both national and international data and is harmonised with existing statistical systems.

It is recommended as part of the national monitoring that countries report on the scope of data reported to increase comparability. When comparing results between countries and over time, it is important to take into account that countries differ greatly in terms of their natural resource endowments and policy context.

Figure 8: Illustration of a step-wise approach to building up global and national monitoring on SDG Indicator 12.c.

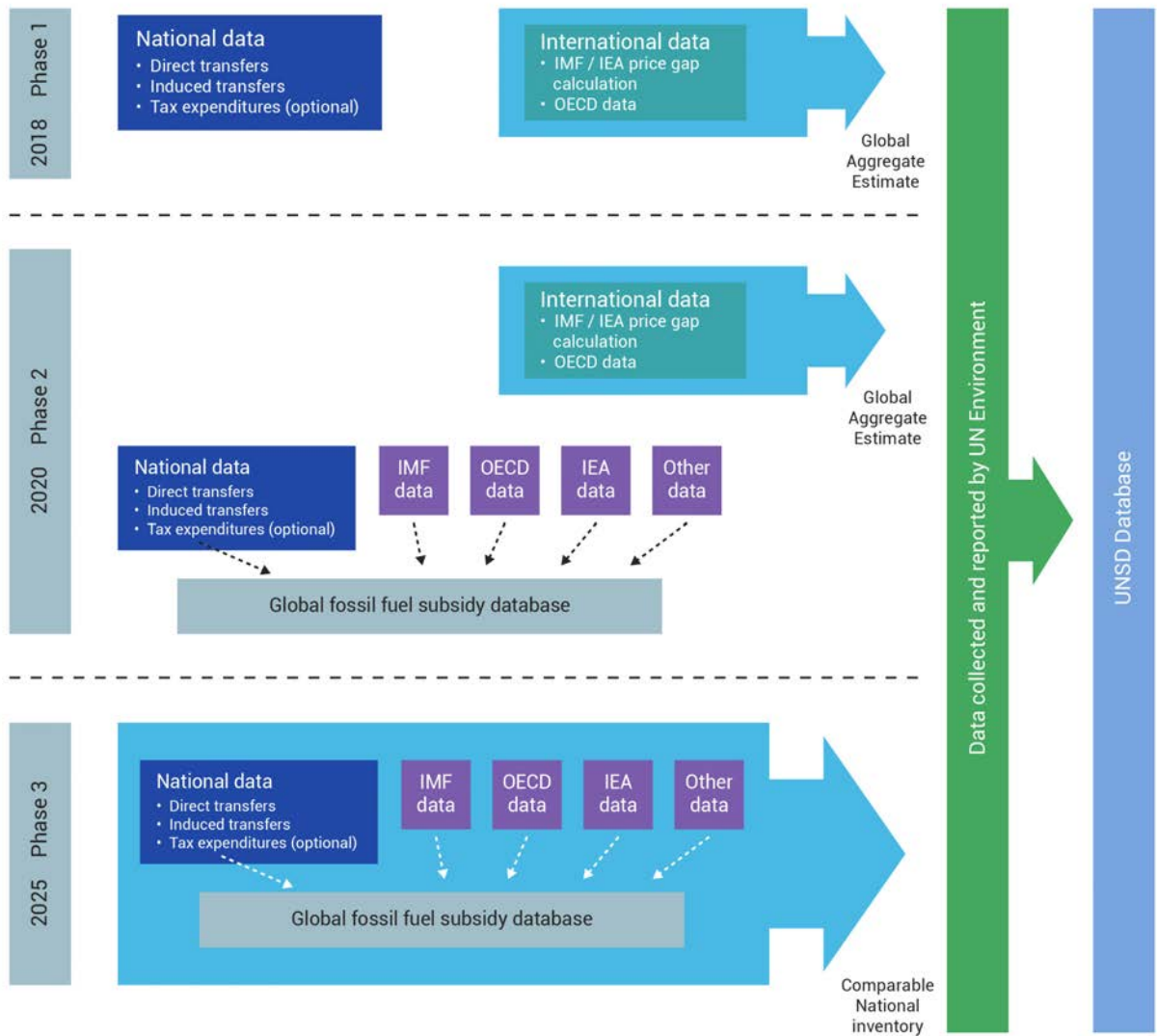


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Conclusion

V. Conclusion

Reforming fossil fuel subsidies is a key element in the global strategy for sustainable development. Reliable and internationally comparable information on existing fossil fuel subsidies is necessary to inform policy-making, both on the national as well as at the international level. Data availability on fossil fuel subsidies has gradually improved over the last decade, and methods for monitoring these subsidies have been tested and refined. Nevertheless, there is still no internationally agreed method for monitoring fossil fuel subsidies, and several monitoring efforts exist in parallel. This paper has described current monitoring efforts and practices, pointing out challenges and areas that are still under development.

Based on this analysis, the authors have proposed a way forward that embraces the advantages and drawbacks of different datasets to combine them for the monitoring of SDG Indicator 12.c.1. The proposed mix of indicators is intended to provide a balanced picture. Nationally reported data would collectively provide a dataset that is grounded in national realities and allows for policy analysis at the national level.

Nevertheless, due to differences in reporting practices and reporting ambitions that can also be expected, at least during the early years of SDG monitoring, even with a standardised methodology, the international comparability of this dataset is likely to be limited. A combination of two datasets for producer and consumer data, compiled and calculated by the IEA, the IMF and OECD, with high international acceptance, can complement this dataset and provide a very good basis for the SDG monitoring.

Nevertheless, to improve the monitoring of fossil fuel subsidies, several additional strategies can be pursued. First, there should be capacity-building for both statistical agencies and sectoral institutions on how to identify and measure fossil fuel subsidies. In many countries, so far only direct transfers are being monitored, which constitutes only a small subset of subsidies that could be identified.

To identify additional subsidies, and to measure their value according to international methodologies, additional support might be necessary. This includes on the one hand training in methods for accounting and evaluation of subsidies directly to national institutions. On the other hand, there might also be an interest in establishing national inventories of fossil fuel subsidies through dedicated studies. These studies, if implemented in a transparent manner, can subsequently be updated by national institutions.

Furthermore, as a second strategy, it is proposed to gradually build up an international database that combines information from different international and national sources in a consistent and coherent way. Ideally, this database would be able to integrate data from a variety of sources, building on an open-source approach while being peer-reviewed. This would allow for a much improved international comparability of datasets for different countries, and give an excellent basis for decision-making for individual countries. Such a database should ideally encompass data on prices and taxes, which would be invaluable for policy-makers and researchers around the world. A further strategy might be to publish detailed guidance notes on specific subsidy types to facilitate the identification of subsidies.

The methodologies for risk transfers and tax expenditures should be further refined through research based on existing practice. This could for example be taken up by groups of countries, or by international organisations involved in the monitoring of fossil fuels subsidies. Reforming fossil fuel subsidies has gained much traction in the past years, as countries are discovering not only the necessities, but also the benefits of subsidy removal. The SDG monitoring of fossil fuels will provide an additional impulse to these efforts, and facilitate efforts by countries to move towards a sustainable future.

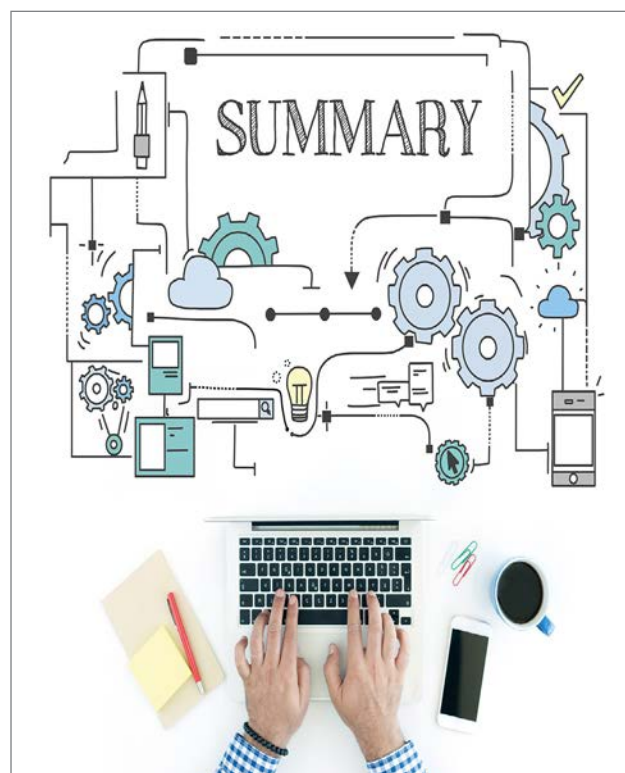


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VI



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Annexes

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- Annex 7.

Annexes

Annex 1. Case studies on the reallocation of subsidies

Indonesia – financing a policy shift with fossil fuel subsidies

Until 2014, Indonesia had high expenditures for fossil fuel subsidies for gasoline, diesel, liquefied petroleum gas (LPG) and electricity. Established at a time when Indonesia was still a large oil exporter, these subsidies became extremely costly after 2004 when Indonesia became a net oil importer. Over the following decade, Indonesia spent each year 1-4 per cent of its GDP on fossil fuel subsidies. In 2013, gasoline subsidies made up 6 per cent of all government expenditure, diesel subsidies 4.4 per cent, LPG 1.9 per cent, kerosene 0.4 per cent, and electricity 6.1 per cent (Beaton et al., 2017).

These subsidies were an inefficient instrument for supporting the poor: in 2014, over 50 per cent of subsidised fuel was used by the richest 20 per cent of the population. In 2014, just after a change in government, and supported by low international oil prices, the Government implemented the almost complete removal of subsidies for gasoline, and fixed diesel subsidies at 1,000 Indonesian Rupiah (IDR) per litre to allow the fuel's price to follow world market prices. Total fuel subsidies were reduced from IDR 246 trillion (about USD 20 billion) in 2014, which equalled 13 per cent of total state expenditure, to IDR 35 trillion in 2015, or 3 per cent of total state expenditure. Savings from subsidy reform have been reinvested in social assistance programmes.

In 2013, energy price increases were accompanied by a set of transfer programmes, including a subsidised rice programme, a supplement for poor students, and a time-bound cash transfer programme (Husar & Kitt, 2016). The major reform efforts in 2014 freed up a considerable amount of resources. A comparison between the state budget that was drafted shortly after the reforms and the previous budget gives an indication of how the savings from subsidy reform were reallocated. Pradiptyo et al. (2016) found increases in three areas: a USD 10.1 billion increase in ministries' budgets, much of this supporting "special programs" on human and economic development; a USD 4.5 billion "capital injection" to state-owned enterprises with a focus on infrastructure; and a USD 2.5 billion increase in transfer funds to regions and villages.

For example, the Government announced the launch of a social assistance scheme (Productive Family Program) in November 2014 that introduced chip cards for social services and provided payments to 152,364 students from elementary to high school. Health care insurance was expanded from 86.4 million to 88.1 million targeted recipients, with the inclusion of near-poor households. One million people received a monthly digital cash transfer of about USD 16 for November and December (Beaton et al., 2017). The reform of fossil fuel subsidies provided the fiscal space to implement the priorities of the incoming government.

Morocco – Freeing up 6.6 per cent of GDP to finance education, health, poverty reduction and renewable energy

Morocco combined extensive reforms of its fossil fuel subsidies with investments in social protection programmes, education and health. The reforms increased fiscal space and allowed investments in strategic areas such as renewable energy while mitigating impacts on the poor. Due to the balanced approach to distributional, welfare, poverty, and government budget perspectives, Verme and El-Massnaoui (2017) qualified them as "perhaps the most rational reforms undertaken in the Middle East and North Africa region in recent years". A subsidy system for petroleum products and other commodities had been in place in Morocco since the 1940s. Morocco has no developed domestic resources of fossil fuels. The provision of fuels at a fixed price led to subsidies dependent on world market prices and led to high costs for subsidies in times of high global fuel prices. In 2012, as a result of high world market prices for fossil fuels, expenditures for subsidies reached 6.6 per cent of GDP.

The government reacted by reinstalling a previous price indexation mechanism, combined with a cap on unit subsidies for gasoline, diesel, and fuel oil. These measures, combined with a decline in international oil prices, resulted in a reduction of the value of subsidies by 24 per cent (or almost 2 per cent of GDP) in 2013. In 2014, the government stopped subsidizing the prices of gasoline and industrial fuel oil, and started phasing out subsidies to diesel. This resulted in further budgetary savings of almost 20 per cent (or 1 per cent of GDP). By end-2015,

prices of all petroleum products were fully liberalised and total spending on subsidies fell to 1.1 per cent of GDP in early 2016 (Verme and El-Massnaoui, 2017). The Government of Morocco chose to make the subsidy reforms socially equitable and “pro-poor”. The reforms abolished the most regressive subsidies, namely on gasoline, diesel and fuel oil, which disproportionately benefited the wealthier strata of the population. Subsidies on liquefied petroleum gas (LPG), which benefit mostly the poorer segments, were retained. Support to the national electricity company was largely reduced by removing subsidies for fuel oil used to generate electricity.

The effect of rising electricity prices on poor consumers was mitigated by redefining the consumption brackets and freezing tariffs for those in the lowest consumption brackets. Verme and El-Massnaoui (2017) estimate that the welfare effects of reforms were mostly felt by higher-income households. At the same time, the government invested heavily to expand social cash transfer schemes and health insurance for the poor. The 2015 budget foresaw a considerable increase in spending on education, an extension of the health-care programme, and a targeted cash transfer programme to fight against school drop-outs (Government of Morocco, 2015). The Tayssir Conditional Cash Transfer programme targeting poor rural households was expanded from 80,000 families in 2009 to 466,000 families in 2014. Similarly, a health insurance scheme for the poor, Regime d’Assistance Medicale (RAMED), increased its coverage from 5.1 million beneficiaries in mid-2013 to 8.4 million beneficiaries in early 2015 (Merrill et al., 2016).

To further reduce the impact of global world market prices and take advantage of rich domestic renewable-energy resources, the government set ambitious targets for renewables: 2 GW of wind power, 2 GW of solar power by 2020 (El-Katiri, 2016). The Moroccan Nationally Determined Contribution (NDC) under the UN Climate Convention aims for “substantially reducing fossil fuel subsidies, building on reforms already undertaken in recent years” and reaching over 52 per cent of installed electricity production capacity from renewable sources by 2030 (UNFCCC, 2016). Communication about the benefits of reallocating subsidies was a key element in the government’s strategy to ensure the lasting success of its reforms (Merrill et al., 2016).



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Annex 2. OECD Typology of support measures by incidence

| | Statutory or Formal Incidence (to whom and what a transfer is first given) | | | | | | | | |
|-----------------------------------|---|---|---|--|---|--|---|---|---|
| | Production | | | | | | | Direct Consumption | |
| | Output returns | Enterprise income | Cost of intermediate inputs | Costs of Value-Adding Factors | | | | | |
| | | | Labour | Land and natural resources | Capital | Knowledge | Unit cost of consumption | Household or enterprise income | |
| Direct transfer of funds | Output bounty or deficiency payment | Operating grant | Input-price subsidy | Wage subsidy | Capital grant linked to acquisition of land | Grant tied to the acquisition of assets | Government R&D | Unit subsidy | Government-subsidized life-line electricity rate |
| Tax revenue foregone | Production tax credit | Reduced rate of income tax | Reduction in excise tax on input | Reduction in social charges (payroll taxes) | Property-tax reduction or exemption | Investment tax credit | Tax credit for private R&D | VAT or excise-tax concession | Tax deduction related to energy purchases that exceed given share of income |
| Other government revenue foregone | | | Under-pricing of a government good or service | | Under-pricing of access to government land or natural resources | Debt forgiveness or restructuring | Government transfer of intellectual property rights | Under-pricing of access to a natural resource harvested by final consumer | |
| Transfer of risk to government | Government buffer stock | Third-party liability limit for producers | | Assumption of occupational health and accident liabilities | Credit guarantee linked to acquisition of land | Credit guarantee linked to capital; equity conversions | | Price-triggered subsidy | Means-tested cold-weather grant |
| Induced transfers | Import tariff or export subsidy; local-content requirements and discriminatory government procurement | Monopoly concession | Monopsony concession; export restriction | Wage control | Land-use control | Credit control (sector-specific) | Deviations from standard IPR rules | Regulated price; cross subsidy | Mandated life-line electricity rate |

The classification of subsidies by the types of government mechanisms used to implement them – the transfer mechanisms – is helpful because it allows researchers to identify the sources of data and the relevant method of estimation for a particular mechanism. However, such a classification is not instructive in understanding the economic or environmental effects of a subsidy since the same type of subsidy can have varying effects on production, and the environment, depending on how it is targeted.

To understand the effects of government subsidies on production and consumption, and ultimately environmental effects, it is much more helpful to know the stage of production or consumption at which the support is targeted. For example, a direct budgetary transfer tied to output returns will not have the same effects on production as one tied to intermediate inputs such as energy used in processing. The former effectively raises the price of the output for the producer, creating a higher optimal production amount, whereas

the latter reduces the cost of specific inputs, and thus in addition to encouraging more production it will also skew the input mix towards the use of the supported inputs. A subsidy to energy inputs, for example, would encourage the increased use of fossil-fuels, and depending on their importance in the input mix, could lead to more production than would be the case in the absence of the subsidy.

In order to analyse the effects of a subsidy, one must know its incidence: who or what is the recipient of a subsidy? In economics, there are two types of incidence: initial (or statutory/formal) and ultimate. Initial incidence is focused on the aspect of production or consumption that is officially targeted by the measure, or on which the measure is based. The ultimate incidence of a subsidy may differ from its formal incidence – for example, a subsidy to a state-owned oil company might result in lower oil prices, making domestic consumers the ultimate beneficiaries. But determining ultimate incidence usually involves an additional step of

analysis and as such it is not normally used as a basis for classifying subsidies.

As outlined in the table above, there are nine types of formal incidence. Of these, seven relate to production:

- Output returns: These increase the price received by producers for the sales of a specific good, or make up for losses incurred at selling that good at an administered price. An example would be the direct subsidization by governments of unit costs of coal production.
- Enterprise income: A subsidy to enterprise income enables a firm or firms to earn more income over the course of a year than they would otherwise, such as through an annual infusion of cash to make up for overall enterprise losses, or a concessional rate of income tax that is not specifically tied to the production of a particular commodity.
- Cost of intermediate inputs: A subsidy to intermediate inputs reduces the unit cost of a particular input, typically through an input-price subsidy, or a reduction or exemption in a tax on the input. It can also include the provision of goods and services by the government at below-market prices.
- Labour: These reduce the cost of labour to companies by subsidising wages or reducing the social charges normally paid by firms. They can also increase the wages and benefits of labourers, for example through an income-tax exemption or the government provision of a benefit, such as free housing.
- Land and natural resources: This allows firms to acquire land at a reduced cost when used for a productive activity, such as coal mining, for example through various tax reductions or under-priced access to government owned land. It can also take the form of reduced resource royalties or taxes for the exploitation of natural resources, for example oil and gas wells.
- Capital: Subsidies to capital include both grants to help a firm purchase capital equipment or invest in construction works, and assistance that reduces the financing cost of the firm or a project carried out by a firm. Tax benefits may also be tied to capital investments or financing costs. In the fossil fuels industry, grants are often provided for projects that prove particular technologies or techniques, or to encourage investment in a particular region. Typical forms of financial assistance related to capital are concessional loans or loan guarantees.
- Knowledge: This category relates to government-funded R&D, other than primary research, or the

transfer of government-owned intellectual property rights to producers. Indirect forms of such support include targeted tax credits for investments in fossil fuel-related R&D.

There are also two types of incidence that relate to the direct consumption of fossil fuels:

- Unit cost of consumption: Subsidies in this category reduce the price received by final consumers in the purchase of a fossil fuel, where consumers comprise both households and enterprises. Examples include price discounts and VAT or excise-tax exemptions in the purchase of fossil fuels by certain industries or social groups.
- Household or enterprise income: Subsidies in this category reduce the cost of energy purchases for households or enterprises at a rate that varies with income. For example, it includes lifeline electricity rates that reduce the price of electricity for households at a rate dependent on the total electricity consumption of the household.

The classification of subsidies according to these categories allows an analysis of their effects on fossil fuel production and consumption, and consequently on the environment. It creates greater value not only from a research perspective, but also in terms of illustrating the impacts of subsidies to policymakers.



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Annex 3. Typology of energy subsidies

| Category | Sub-category | Examples |
|--|---|--|
| Direct transfers of government funds | Direct spending, budget and off-budget transfers. | <p>Agency appropriations: Targeted spending on the sector through government budgets of different levels and budgets of individual government agencies.</p> <p>Equity infusions.</p> <p>Government procurement of energy at above-market rates.</p> |
| | Government ownership of energy-related enterprises if on terms and conditions more favourable for business than in case of private ownership. | Government ownership of strategic and other energy assets that provides returns on investment at rates below-market. |
| Induced Transfers (price support) | Price support, including through market regulation | <p>Consumption mandates and mandated feed-in tariffs: fixed consumption shares for use of a specific energy type.</p> <p>Border protection or restrictions: controls (tariff and non-tariff measures) on imports or exports leading to unfair advantages.</p> <p>Regulated prices set at below-market rates: for consumers (including where there is no financial contribution by government)</p> <p>Regulated prices set at above-market rates: for producers</p> <p>Cross-subsidies in the electricity sector</p> |
| | | <p>Income-tax expenditures: Tax expenditures are foregone tax revenues, due to special exemptions, deductions, rate reductions, rebates, credits or deferrals that reduce the amount of tax that would otherwise be payable.</p> <p>Exemptions from excise taxes and other special taxes, or other duties: Exemption of excise taxes on fuels; special targeted taxes on energy industry (e.g., based on environmental concerns or "windfall" profits); exemption of import duties on equipment for a specific industry.</p> |
| Tax expenditures, government revenue foregone and under-pricing of other goods and services, including risk. | Tax breaks and other government revenue foregone. | |



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Annex 3. Typology of energy subsidies continued

| Category | Sub-category | Examples |
|------------------|--|--|
| | Under-pricing of government-owned energy resources. | Benefits related to differences in procedures for energy resource leasing: For example, some countries auction access to larger sites, but designate a sole source for smaller sites. Royalty relief or reductions in other taxes due on extraction: reduced, delayed or eliminated royalties. |
| | Under-pricing of non-energy, government-owned natural resources or land. | Access to government-owned natural resources such as water or land at no charge or for below-market rate. |
| | Under-pricing of government-owned infrastructure. | Use of government-provided infrastructure at no charge or below-market rate. |
| | Underpricing of other government-provided goods or services. | Government-provided goods or services at below-market rates. |
| Transfer of Risk | Credit support | Loan guarantees: at below-market rates. |
| | Debt restructuring and cancellations | Debt restructuring: the government-orders the easing of the debt burden on one or more firms. Debt cancellation: the government forgives the outstanding balance of a loan it has made, with no compensation from the beneficiary. |
| | Insurance and indemnification | Government insurance and indemnification: market or below- market risk-management or risk-shifting services Statutory caps on commercial liability: can confer substantial subsidies if set well below plausible damage scenarios |
| | Assumption of risks related to occupational health and accidents | Assumption of occupational health and accident liabilities |
| | Assumption of responsibility for remediating environmental damage | Responsibility for closure and post-closure risks: facility decommissioning and clean-up; long-term monitoring; remediation of contaminated sites; litigation Waste management and environmental damages: avoidance of fees payable to deal with waste, avoidance of liability and remediation to make the environment whole. |

Sources: Based on various sources, including OECD (2015), Gerasimchuk et al. (2017), and Kojima (2017).

Annex 4. Data used by the IMF in its estimates of consumer pre-tax subsidies (consumer price support) for different fuels.

| Fuel | Retail prices | Supply cost |
|--------------------|---|---|
| General | <p>Retail prices are taken in various frequencies (monthly, quarterly, annual average, end-of-period). In the calculation of subsidies, these prices are converted to a single annual average.</p> <p>End-of-year prices are assumed to be equal to the beginning of the following year, and are included in the calculation of average price for both years, although they are only weighted one-half the weight of all other observations during the year.</p> | <p>Supply cost is calculated on an annual basis. The observations used to calculate supply cost correspond to the given fuel's retail price. So, if a country has only an end-year retail price then the only supply price used should be based on end-year data.</p> <p>Conversely, if a country has an annual average retail price, or monthly price data, then an average supply price is calculated.</p> |
| Petroleum products | <p>For petroleum products, prices are taken from two sources: the International Energy Agency's quarterly database on fuel prices and taxes, and IMF's existing fuel price dataset. IEA's dataset, which provides annual average retail prices as well as prices net of existing taxes, is used when available.</p> <p>The IMF dataset is primarily monthly, and only includes retail pump prices. It is compiled from data provided by national regulatory agencies, IMF staff, and monitoring of news reports.</p> <p>Other prices come from single points in time, usually mid-year and/or end-year, and are provided by IMF staff. The IMF database is used when observations are unavailable from the IEA.</p> | <p>For petroleum products, the supply price has two components: port (or hub) price and the cost of margins and shipping. Port prices are taken from the IEA and correspond to the United States, NW Europe, and Singapore. Countries are mapped to one of these three ports based on region.</p> <p>The cost of margins and shipping are included in the pre-tax price provided by the IEA. For all other countries these costs are assumed to be USD 0.20 per liter if the country is a net-importer of oil and zero otherwise.</p> |
| Natural gas | <p>For natural gas, retail prices are imputed based on estimates of energy pre-tax subsidies from the IEA. A per-unit pre-tax subsidy is estimated and is subtracted from the world price.</p> <p>This retail price includes any existing taxes. Retail prices are assumed to be equal to supply prices for countries where estimates of pre-tax subsidies are not available.</p> | <p>For natural gas, the supply cost is taken from the IMF and has only one component, the port price. Port prices come from Henry Hub USA, the Russian export price to Germany, and Japan.</p> <p>Countries are mapped to one of these three prices based on region. No adjustment is done for shipping and margins.</p> |
| Coal | <p>For coal, retail prices are imputed based on estimates of energy pre-tax subsidies from the IEA. A per-unit pre-tax subsidy is estimated and is subtracted from the world price.</p> <p>This retail price includes any existing taxes. Retail prices are assumed equal to supply prices for countries where estimates of pre-tax subsidies are not available.</p> | <p>For coal, retail prices are imputed based on estimates of energy pre-tax subsidies from the IEA. A per-unit pre-tax subsidy is estimated and is subtracted from the world price.</p> <p>This retail price includes any existing taxes. Retail prices are assumed equal to supply prices for countries where estimates of pre-tax subsidies are not available.</p> |

| | | |
|--------------------|---|---|
| <p>Electricity</p> | <p>For electricity, prices are taken from the IEA quarterly database on household electricity prices when available.</p> <p>Otherwise they are taken from the EIA, IMF and World Bank staff, or from monitoring of news reports. Prices from the IEA and EIA are annual average prices. All other prices are a mix of annual average price and prices at specific points in time.</p> | <p>Electricity supply cost is difficult to measure, since cost varies greatly depending on input mix and the scale of operations.</p> <p>For countries with pre-tax subsidy estimates by the IEA or by IMF and World Bank staff, supply cost is assumed to equal the electricity retail price plus the unit pre-tax subsidy. For all other countries, the supply cost is unknown and subsidies are not estimated.</p> |
|--------------------|---|---|



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Source: Adapted from IMF, tab labelled "Data Sources", at <http://www.imf.org/external/np/fad/subsidies/data/subsidiestemplate.xlsx>

Annex 5. List of fossil fuels, based on CPC Rev. 2.1 Division, group and class codes for classifying primary products of fossil fuels, as well as electrical energy and steam

| Code | Commodity description |
|-------|--|
| 11 | Coal and peat |
| 1101 | Hard Coal |
| 1102 | Patent fuel and similar solid fuels manufactured from hard coal |
| 1103 | Brown coal [lignite and sub-bituminous coal] |
| 1104 | Brown coal briquettes and similar solid fuels manufactured from brown coal |
| 1105 | Peat |
| 12 | Crude petroleum and natural gas |
| 1201 | Petroleum oils and oils obtained from bituminous minerals, crude |
| 1202 | Natural gas, liquefied or in the gaseous state |
| 1203 | Bituminous or oil shale and tar sands |
| 17 | Electricity, town gas, steam and hot water |
| 171 | Electrical energy |
| 172 | Coal gas, water gas, producer gas and similar gases, other than petroleum gases and other gaseous hydrocarbons |
| 173 | Steam and hot water |
| 331 | Coke and semi-coke of coal, of lignite or of peat; retort carbon |
| 332 | Tar distilled from coal, from lignite or from peat, and other mineral tars |
| 333 | Petroleum oils and oils obtained from bituminous materials, other than crude; preparations n.e.c. containing by weight 70% or more of these oils, such oils being the basic constituents of the preparations |
| 3331 | Motor gasoline and aviation gasoline |
| 33311 | Motor gasoline |
| 33312 | Aviation gasoline |
| 3332 | Gasolene-type jet fuel |
| 3333 | Naphtha |
| 3334 | Kerosenes |
| 33342 | Kerosene-type jet fuel |
| 33349 | Other kerosene |
| 3335 | White spirit and special boiling point industrial spirits |
| 3336 | Gas oil [diesel] |
| 3337 | Fuel oils n.e.c. |
| 3338 | Lubricants |
| 3339 | Other petroleum oils n.e.c. |
| 334 | Petroleum gases and other gaseous hydrocarbons, except natural gas |
| 335 | Petroleum jelly; paraffin wax, micro-crystalline petroleum wax, slack wax, ozokerite, lignite wax, peat wax, other mineral waxes, and similar products; petroleum coke, petroleum bitumen and other residues of petroleum oils or of oils obtained from bituminous materials |

Source: <https://unstats.un.org/unsd/cr/registry/regcs.asp?Cl=31&Lg=1&Co=1>

Annex 6. Draft guidance for national reporting

The following is based on the guidance provided to consultants developing subsidy inventories for the GSI.

Methodology for identifying and measuring fossil fuel subsidies for national reporting

The first step in establishing an inventory of fossil fuel subsidies is to identify all existing subsidies in a sector, without judging whether those subsidies can be quantified (GSI, 2010). The next step is to narrow the focus to those subsidies that are measurable and able to be fully assessed and quantify them. Finally these subsidies should be recorded and submitted in a template.

Step 1 – Identification of subsidies: The overview of subsidies included in Annex 3, which is based on the definition of a subsidy in the WTO ASCM, forms a comprehensive framework and check-list for identifying subsidies in any country. The inventory should cover at least the categories of direct transfers and induced transfers. It is recommended to include Tax expenditure, other revenue foregone, and under-pricing of goods and services where possible, building up this dataset over time. For each fuel type, covering all stages of fossil fuel production and use, individual subsidy measures should be identified.

It is recommended to use existing sources as much as possible, for example:

- Individual country studies
- OECD Inventory
- Peer-reviews in the context of APEC and G20
- National studies

Other sources can be information from sectoral ministries (e.g. energy, statistics, trade, industry, agriculture, social protection), finance ministries or government agencies (e.g. regulatory authorities, other public bodies at national and sub-national level).

Step 2 – Measuring subsidies: Assess the financial value for the subsidies identified. It is recommended to use existing sources as much as possible, as for many countries fossil fuel subsidies have already been quantified.

Where no estimates are readily available, research is necessary based on available data to calculate subsidy estimates. The measurement should follow the methods set out in section III.C of this paper. The following documents can be used for an analysis of the value of the subsidies.

- Annual budgets (e.g. budget statements, public accounts or budget statistics)
- Reports on the execution of budgets
- Clarification notes prepared by the Ministry of Finance as part of the budget drafting process
- Tax expenditure reports (attached to budget or as a stand-alone document)
- Tax Policy Guidelines
- Tariff and Customs Policy Guidelines
- Reports by the Tax Collection Service, Customs Service
- Reporting by the office of the Auditor General
- Materials of budget committees parliament
- Accounts of State Owned Enterprises (SOEs)

It is possible that not all subsidies can be quantified. In this case, it is recommended to include the subsidies without a financial value.

Step 3 – Recording the subsidy: Each identified subsidy should be recorded in the SDG 12.c.1 reporting template provided in this Annex.

Additional data to be reported for the price-gap calculation

In addition to information on subsidies, countries are invited to report data necessary for the price-gap calculation to improve existing estimates.

Data for price gap calculation

For each fuel, by type of end-user:

- End-user price
- Units consumed

For each fuel:

- Product price at the nearest international hub
- Cost of freight
- Cost of insurance
- Cost of internal distribution and marketing
- Applicable taxes

Subsidy Title (name of the support measure)

| | |
|--|--|
| Weblink to Legislation or Regulation (page #) | |
| Subsidy Type – i.e., direct transfer, tax expenditure, induced transfer, or transfer of risk | |
| Recipients (Please specify whether producers or consumers, or both) | |
| Incidence (i.e., product(s) or activity(ies) supported, and stage(s) of production or consumption) | |
| Beginning and expected end date of the subsidy (if known, and if applicable) | |
| Financial Value (currency, year) | |
| Current Status | |
| Description | |

Additional information

| | |
|--|--|
| Scope of data reported | Short information on data availability and data used, as well as potential gaps. |
| Additional reports and reviews | Please insert links. |
| Information on past and ongoing fossil fuel subsidy reform | Short description or links to documents. |



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Annex 7. Current state of data availability

The following table summarises the current status of data availability for all UN countries by subsidy category. Overall, there are reasonably good data coverage on measuring market transfers to consumers, with existing databases covering most countries in the world. Increased transparency on the sources of data for existing estimates would enable alignment of domestic price data used.

Where price data are currently unavailable, countries could report their domestic fuel prices to avoid reliance on proprietary data. In addition, common reference prices would need to be established among those currently determined by international organizations. Data on producer subsidies and tax revenues foregone are currently available mainly for OECD countries;

however, these could be compiled from budget and tax expenditure reports where such documents provide the necessary details. Estimates of fossil fuel subsidies have not been compiled for some of the countries that do publish detailed budget documents, and could easily be generated. Governments could be asked to inform UN Environment on the state of their budget reporting to enable a better overview of data availability.

Data on public finance are more sparse, and mainly available for G20 countries. Moreover, the subsidy components of these loans and guarantees have yet to be quantified. Therefore, the existing data would need to be supplemented with national data, and quantified.

| Legend | |
|-------------|---|
| Green | countries and measures for which estimates of fossil fuel subsidies are currently available. |
| Orange | existence of data that would allow estimates or at least partial estimates to be calculated. |
| Red | absence of basic information to calculate estimates at present. |
| Blank Cells | estimates have not yet been calculated and there is no information on whether adequate data are available for their estimation. |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|---------------------|---|---|---|
| Afghanistan | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Albania | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Algeria | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Andorra | | | Consumer price support estimates by IMF |
| Angola | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Antigua and Barbuda | | | Consumer price support estimates by IMF |
| Argentina | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Armenia | | | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|--------------------|---|---|---|
| Australia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Austria | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Azerbaijan | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Bahamas | | | Consumer price support estimates by IMF |
| Bahrain | | | Consumer price support estimates by IEA and IMF |
| Bangladesh | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Barbados | | | Consumer price support estimates by IMF |
| Belarus | | | Consumer price support estimates by IMF |
| Belgium | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Belize | | | Consumer price support estimates by IMF |
| Benin | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Bhutan | | | Consumer price support estimates by IMF |
| Bolivia | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Bosnia Herzegovina | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Botswana | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Brazil | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Brunei | | | Consumer price support estimates by IMF |
| Bulgaria | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Burkina Faso | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Burundi | | | Consumer price support estimates by IMF |
| Cabo Verde | | | Consumer price support estimates by IMF |
| Cambodia | | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Cameroon | | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|----------------------------------|---|---|---|
| Canada | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Central African Republic | | | Consumer price support estimates by IMF |
| Chad | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Chile | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| China | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Colombia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Comoros | | | Consumer price support estimates by IMF |
| Congo | | | Consumer price support estimates by IMF |
| Costa Rica | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Côte d'Ivoire | | | Consumer price support estimates by IMF |
| Croatia | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Cuba | | | Consumer price support estimates by IMF |
| Cyprus | | | Consumer price support estimates by IMF |
| Czech Republic | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Democratic Republic of the Congo | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Denmark | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Djibouti | | | Consumer price support estimates by IEA and IMF |
| Dominica | | | Consumer price support estimates by IMF |
| Dominican Republic | Estimates could be calculated from budget report | Estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Ecuador | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Egypt | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| El Salvador | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Equatorial Guinea | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|---------------|---|---|---|
| Eritrea | | | Consumer price support estimates by IEA and IMF |
| Estonia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Ethiopia | | | Consumer price support estimates by IMF |
| Fiji | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Finland | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| France | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Gabon | | | Consumer price support estimates by IMF |
| Gambia | | | Consumer price support estimates by IMF |
| Georgia | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Germany | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Ghana | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Greece | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Grenada | | | Consumer price support estimates by IMF |
| Guatemala | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Guinea | | | Consumer price support estimates by IMF |
| Guinea-Bissau | | | Consumer price support estimates by IEA and IMF |
| Guyana | | | Consumer price support estimates by IEA and IMF |
| Haiti | | | Consumer price support estimates by IEA and IMF |
| Honduras | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Hungary | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Iceland | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| India | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Indonesia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|---|---|---|---|
| Iran | | | Consumer price support estimates by IMF |
| Iraq | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Ireland | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Israel | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Italy | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Jamaica | | | Consumer price support estimates by IMF |
| Japan | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Jordan | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Kazakhstan | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Kenya | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Kiribati | | | Consumer price support estimates by IMF |
| Kuwait | | | Consumer price support estimates by IMF |
| Kyrgyzstan | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Lao People's Democratic Republic (Laos) | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Latvia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Lebanon | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Lesotho | | | Consumer price support estimates by IMF |
| Liberia | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Libya | | | Consumer price support estimates by IMF |
| Liechtenstein | | | Consumer price support estimates by IMF |
| Lithuania | | | Consumer price support estimates by IMF |
| Luxembourg | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Macedonia | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|----------------------------------|---|---|---|
| Madagascar | | | Consumer price support estimates by IMF |
| Malawi | Estimates could be calculated from budget report | Estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Malaysia | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Maldives | | | Consumer price support estimates by IMF |
| Mali | Estimates could be calculated from budget report | Estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Malta | | | Consumer price support estimates by IMF |
| Marshall Islands | | | Consumer price support estimates by IMF |
| Mauritania | | | Consumer price support estimates by IMF |
| Mauritius | | | Consumer price support estimates by IMF |
| Mexico | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Micronesia (Federated States of) | | | Consumer price support estimates by IMF |
| Monaco | | | Consumer price support estimates by IMF |
| Mongolia | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Montenegro | | | Consumer price support estimates by IMF |
| Morocco | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Mozambique | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Myanmar | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Namibia | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Nauru | | | Consumer price support estimates by IEA and IMF |
| Nepal | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Netherlands | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| New Zealand | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Nicaragua | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|----------------------------------|---|---|---|
| Niger | Estimates not available and budget reporting insufficient | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Nigeria | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Norway | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Oman | | | Consumer price support estimates by IMF |
| Pakistan | Estimates could be calculated from budget report | Estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Palau | | | Consumer price support estimates by IMF |
| Panama | | | Consumer price support estimates by IMF |
| Papua New Guinea | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Paraguay | | | Consumer price support estimates by IMF |
| Peru | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Philippines | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Poland | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Portugal | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Qatar | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Republic of Korea | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Republic of Moldova | | | Consumer price support estimates by IEA and IMF |
| Romania | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Russian Federation | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Rwanda | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Saint Kitts and Nevis | | | Consumer price support estimates by IMF |
| Saint Lucia | | | Consumer price support estimates by IMF |
| Saint Vincent and the Grenadines | | | Consumer price support estimates by IMF |
| Samoa | | | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|-----------------------|---|---|---|
| San Marino | | | Consumer price support estimates by IMF |
| Sao Tome and Principe | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Saudi Arabia | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Senegal | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Serbia | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Seychelles | | | Consumer price support estimates by IMF |
| Sierra Leone | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Singapore | | | Consumer price support estimates by IMF |
| Slovak Republic | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Slovenia | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| Solomon Islands | | | Consumer price support estimates by IMF |
| Somalia | | | Consumer price support estimates by IEA and IMF |
| South Africa | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IEA and IMF |
| South Sudan | | | Consumer price support estimates by IMF |
| Spain | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Sri Lanka | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Sudan | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Suriname | | | Consumer price support estimates by IMF |
| Swaziland | | | Consumer price support estimates by IMF |
| Sweden | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Switzerland | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Syrian Arab Republic | | | Consumer price support estimates by IMF |
| Tajikistan | Partial estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |

| Country | Direct transfer of funds | Tax revenue foregone | Induced transfers |
|-----------------------------|---|---|---|
| Thailand | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Timor-Leste | Partial estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Togo | | | Consumer price support estimates by IMF |
| Tonga | | | Consumer price support estimates by IMF |
| Trinidad and Tobago | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Tunisia | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Turkey | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Turkmenistan | | | Consumer price support estimates by IEA and IMF |
| Tuvalu | | | Consumer price support estimates by IMF |
| Uganda | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IEA and IMF |
| Ukraine | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IEA and IMF |
| United Arab Emirates | | | Consumer price support estimates by IMF |
| United Kingdom | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| United Republic of Tanzania | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| United States | Estimates by OECD | Estimates by OECD | Consumer price support estimates by IMF |
| Uruguay | | | Consumer price support estimates by IMF |
| Uzbekistan | | | Consumer price support estimates by IMF |
| Vanuatu | | | Consumer price support estimates by IMF |
| Venezuela | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Vietnam | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Yemen | Estimates not available and budget reporting insufficient | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |
| Zambia | Estimates could be calculated from budget report | Partial estimates could be calculated from budget report | Consumer price support estimates by IMF |
| Zimbabwe | Estimates could be calculated from budget report | Estimates not available and budget reporting insufficient | Consumer price support estimates by IMF |

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