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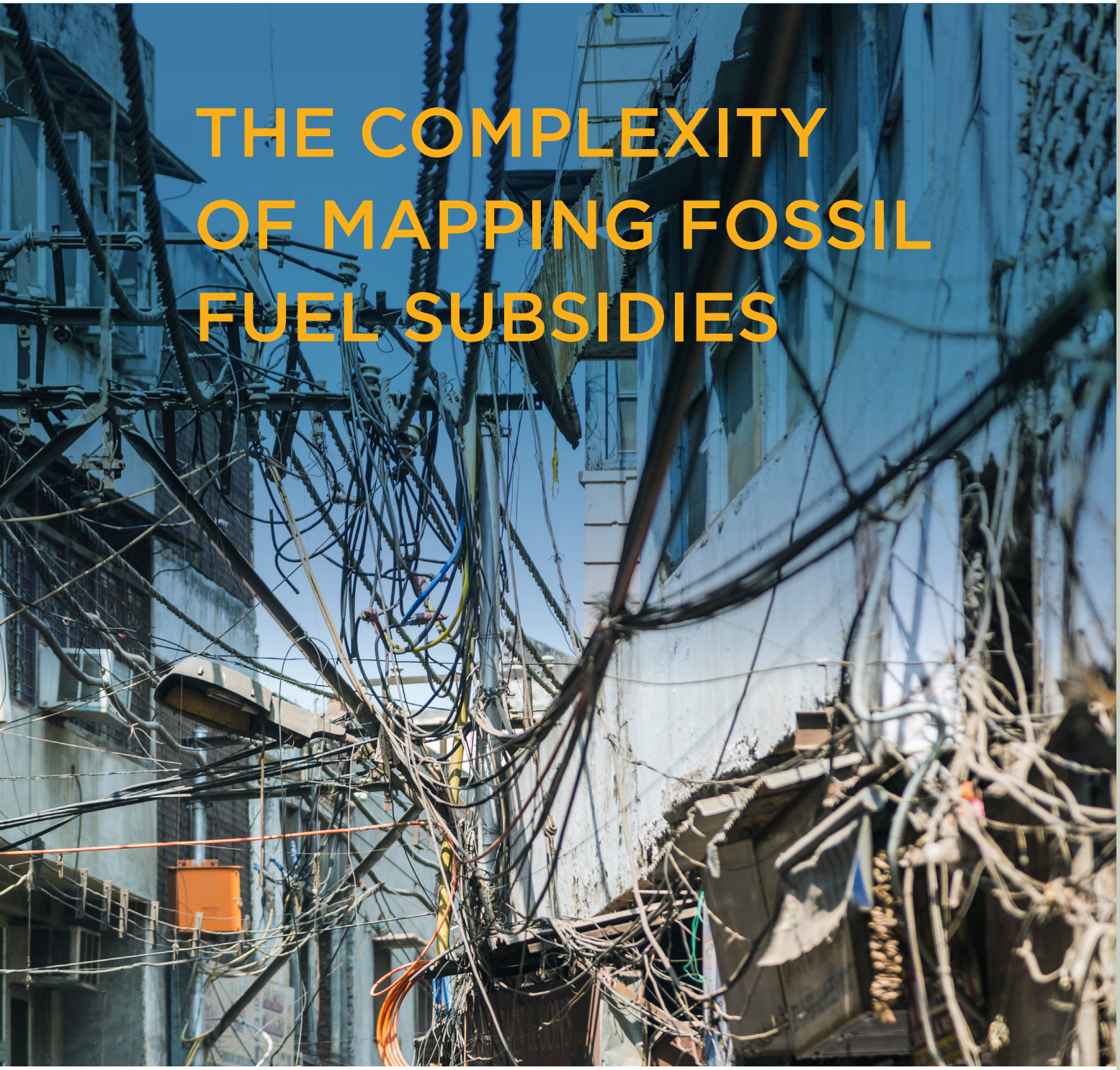

THE COMPLEXITY OF MAPPING FOSSIL FUEL SUBSIDIES

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TITLE
The complexity of mapping Fossil Fuel Subsidies

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NUMBER
2020 | 01

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PUBLISHED BY
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THE COMPLEXITY OF MAPPING FOSSIL FUEL SUBSIDIES

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EXECUTIVE SUMMARY

This study, commissioned by the Dutch Ministry of Economic Affairs and Climate Policy, takes a comprehensive look into the approaches chosen by major international institutions used to analyse fossil fuel subsidies and their potential inefficiencies. The 2009 G20 meeting in Pittsburgh, which pushed the issue of inefficient fossil fuel subsidies to the top of the public agenda, is taken as the starting point of this paper. This G20 summit led to an agreement to remove inefficient fossil fuel subsidies in G20 countries by 2020.

By means of a background explanation on the underlying economic theory implicitly used in many subsidy calculations, the Neoclassical Economic theory's (NCE) view on markets is outlined, along with the limitations of applying this simplified model. NCE assumes that perfect markets produce efficient outcomes which maximise social welfare, while an inefficient subsidy can inhibit markets to reach such an equilibrium. Alternative economic theories are also delineated, offering different perspectives on markets and institutions. One example highlighted includes New Institutional Economics (NIE) and Original Institutional Economics (OIE), which argue that the value of energy is more subjective, rather than perfectly reflected in prices found in perfect markets. Environmental economics, within the school of NCE, is also outlined in this study due to the role it plays in addressing the incomplete nature of markets.

The first fossil fuel subsidy assessment approach explored comes from the International Energy Agency (IEA). The IEA uses a price-gap method in their assessments, useful in making macro comparisons between countries worldwide. The price-gap approach compares end-user prices for the energy resource at hand with pre-defined reference prices, reflecting the full cost of energy supply to the end user. The results from the IEA highlight the challenge faced by developing nations which attempt to balance low cost energy access for their citizens with the reduction of inefficient subsidies, and the challenge of energy producers in the developing world which make such resources available to the local public at a lower cost. The IEA price-gap approach works well for aggregate macro fossil fuel subsidy comparison, while it needs a complementary analysis in order to expose the actual policies and measures in countries which in fact stimulate the use of fossil fuels.

Next, this study explores the method used by the International Monetary Fund (IMF), which also builds its methodology on the price-gap approach. It compares end-user prices for energy with pre-defined reference prices, reflecting the full cost of energy supply to the end user while additionally including 'untaxed' externalities into their analysis. The IMF thus crucially incorporates 'post-tax' subsidies in their analysis, which include environmental costs and, implicitly, state revenue requirements, essentially distinguishing it from the 'pre-tax' approaches used by the IEA. This results in vastly different conclusions to those of the IEA. The challenges in accurately quantifying external costs are also discussed in this study, cautioning policy makers to be aware of the complexity of quantifying such 'post-tax' subsidies. The IMF approach is particularly useful in assessing whether there is room for the 'greening of taxation' by scaling up environmental taxes without harming social welfare.

Albeit useful for macro analyses, the price-gap approach is limited in what it reveals. Only the net effect of policies is shown, demonstrating whether a net subsidiy on the energy resource at hand is present, without diving into specific policies along the value chain of the said fuel. Following the IEA's approach and the IMF's approach, this study therefore looks at the 'inventory approach'. It is essentially a bottom-up method for understanding the presence of subsidies in specific countries. The Organisation for Economic Co-operation and Development's (OECD) fossil fuel subsidy inventory is described, supporting governments in taking stock of their policy inventory and then analysing policy by policy whether this may constitute a subsidy. This method is laborious, but provides the clearest insights into the specific policies and schemes that could constitute inefficient energy subsidies in particular energy economies. The issue of what should qualify in the taxonomy of the inventory approach can be normative in character and political in nature at times, adding to further complexities and potential distortion of the final results. The process should therefore be an inclusive dialogue in which stakeholders can share norms and it should provide room for changing insights into such norms. This is important in order to have the necessary political support for the subsequent reform of policies and schemes that were identified as constituting a subsidy.

The methodology of the G20 is explored in this paper, which is a recent and relevant application of the inventory approach, supported by the OECD. It asks the following four analytical questions in order to pinpoint measures which could qualify as a subsidy. Firstly, are there any direct budgetary support mechanisms (or fiscal expenditure subsidies)? Secondly, are there any tax provisions (or tax preferential positions) for the fuel at hand? Thirdly, are there any government provisions at below-market charge or no charge for auxiliary goods and/or services that facilitate

fossil fuel use/production? Fourthly, are there any requirements present for non-governmental entities to provide any particular services to fossil fuel producers at below market rates (or for free), or a requirement for non-governmental entities to purchase above market quantities of fossil fuels/related services?

The process of measuring fossil fuel subsidies in the context of the UN Sustainable Development Goals (SDGs) is then discussed, specifically focusing on SDG 12, ('responsible consumption and production'), by which UN members are asked to report annually from 2020 to 2030. According to this approach, three factors are deemed appropriate in measuring potential fossil fuel subsidies. Namely, (1) direct transfers, (2) induced transfers, and (3) (optionally) tax expenditures, other government revenue foregone and the under-pricing of goods and services, including risk.

This study ends with recommendations specifically focused on analysing inefficient fossil fuel subsidies in the Netherlands following an inventory approach. While the G20 review process can greatly inform that effort, it is worth mentioning that the United Nations Environment Programme (UNEP) has provided useful guidelines in 2019, assisting governments worldwide to analyse their policy inventories, with a view to commitments made to the UN SDGs for the 2020-2030 period. The scope of the analysis suggested by these guidelines is well in line with the definition for 'subsidy' by the World Trade Organization (WTO). For the Netherlands, the issue of tax codes and forgone government revenue, which are considered optional in the UNEP guidelines, is recommended to be included by this study, given the level of socio-economic development in the Netherlands and the current political setting around the use and role of fossil fuel subsidies.

It should be stressed that the question of phasing out fossil fuel subsidies in the Netherlands has essentially developed into a question of the 'greening of taxation'. The IMF recognises opportunities for the greening of taxation worldwide, and suggests that a failure to do so constitutes a subsidy. This can be explained by the idea of 'foregone government revenue', a concept that frequently arises in the fossil fuel subsidy debate. At the same time, it should be kept in mind that the IEA's analyses consistently reveal no fossil fuel subsidies in the Netherlands, since end user prices are not pushed to a level lower than what should be expected, given energy prices in international energy markets. The recommendation of this report is to perform a national assessment based on an inventory approach, which includes an analysis of the energy tax system. Estimates of external costs can inform that debate, insofar that it is difficult to determine reference levels for end-user prices otherwise.

INTRODUCTION

The topic of fossil fuel subsidies is frequently discussed in the media and in politics. With regard to the energy transition to a low carbon economy, the topic is more relevant than ever. Since 2009, international political attention increased when the G20 meeting in Pittsburgh agreed to remove inefficient fossil fuel subsidies before 2020.[1]

Following the G20 meeting in Pittsburgh several major institutions published their insights and findings on the matter, ranging from the IEA to the OECD and the IMF, assessing the situation worldwide. Other international institutions had also already reported about these practices beforehand. Furthermore, the World Bank and UNEP contributed to the understanding of the matter, by publishing on definitions and offering guidelines.

In a recent report, the European Commission (EC) also emphasised that: "It is important to note in any discussion of subsidies that there are multiple legitimate reasons for intervening in the energy sector with financial or regulatory support, to correct imperfect markets and to give long-term strategic direction not provided otherwise."[2]

1 The Pittsburgh declaration, 2009: *"Enhancing our energy efficiency can play an important, positive role in promoting energy security and fighting climate change. Inefficient fossil fuel subsidies encourage wasteful consumption, distort markets, impede investment in clean energy sources and undermine efforts to deal with climate change. The Organization for Economic Cooperation and Development (OECD) and the IEA have found that eliminating fossil fuel subsidies by 2020 would reduce global greenhouse gas emissions in 2050 by ten percent. Many countries are reducing fossil fuel subsidies while preventing adverse impact on the poorest. Building on these efforts and recognizing the challenges of populations suffering from energy poverty, we commit to: Rationalize and phase out over the medium-term inefficient fossil fuel subsidies that encourage wasteful consumption. As we do that, we recognize the importance of providing those in need with essential energy services, including through the use of targeted cash transfers and other appropriate mechanisms. This reform will not apply to our support for clean energy, renewables, and technologies that dramatically reduce greenhouse gas emissions. We will have our Energy and Finance Ministers, based on their national circumstances, develop implementation strategies and timeframes, and report back to Leaders at the next Summit. We ask the international financial institutions to offer support to countries in this process. We call on all nations to adopt policies that will phase out such subsidies worldwide."* See http://www.g20.utoronto.ca/2009/2009communique0925.html#energy

2 European Commission (2019). Energy Prices and Costs in Europe. Report From The Commission To The European Parliament, The Council, The European Economic And Social Committee And The Committee Of The Regions. Brussels, COM(2019)1 final.

The studies show a great deal of variety in their approaches and therefore also in the statistics with which they underpin their conclusions. In the public debate it is not always well understood how the differences in outcomes of studies and reports come about, and, more importantly, how they fit within the discussion on (inefficient) fossil fuel subsidies.

This study, commissioned by the Dutch Ministry of Economic Affairs and Climate Policy, sets out to explain some of the basic choices that are involved when assessing the various approaches taken for measuring and estimating fossil fuel subsidies. The first chapter explains how welfare can be negatively affected by inefficient subsidies using a simplified model of (perfect) markets, in the school of Neoclassical Economic Theory (NCE). The second chapter explains how the IEA has traditionally approached fossil fuel subsidy assessments, building on these neoclassical notions. The third chapter discusses the IMF's novel approach in the same tradition, contributing to the global discourse on the greening of taxation, by including insights from environmental economists. The fourth chapter shows that such high-level global assessments are not sufficient to identify and assess the possibilities for reform of specific distortionary policies and measures, and it argues that a bottom-up assessment of the policy inventory is the more appropriate route to follow. The OECD has facilitated such assessments for many years. In order to translate all the insights provided in Chapters 1 to 4, the final chapter sketches practical observations in the ongoing G20 review processes and pays special attention to the emerging UN SDG reporting. The concluding chapter of this report formulates recommendations in the context of The Netherlands' wish to engage in a national assessment.

1 THE INEFFICIENCY OF FOSSIL FUEL SUBSIDIES

This report is aimed at clarifying different approaches to the assessment of fossil fuel subsidies. For this purpose, it is relevant to explain how assessments have advanced in the past years, by applying some important theoretical underpinnings. Firstly, the partial model of markets will be explained, which assumes that markets establish efficient outcomes, outcomes in which welfare for producers and consumers is maximised. Next, this chapter will stress that this partial model is incomplete, since it does not take into consideration externalities. Finally, it will emphasise that markets are often international while policy responses may be national in nature, suggesting that not only the model for perfect markets, but also policy, tends to be partial.

1.1 THE (PARTIAL) MODEL OF MARKETS IN NEOCLASSICAL ECONOMIC THEORY

Subsidies are often assumed to distort the market, by inhibiting perfect markets from reaching the efficient equilibrium, and therefore such subsidies are assumed to limit welfare. Figure 1 (on the next page) shows supply and demand for a certain good or service and represents a common model for perfect markets in the school of Neoclassical Economic Theory (NCE).

The graph assumes a demand curve (in yellow) which is characterised by high consumer demand (quantity Q) when the price (P) of a certain good or service is low, while consumer demand is lower (lower quantities Q) at higher prices (P). This is a model for (aggregate) consumer preferences and behaviour. In this model, the extra benefit (marginal benefit) of consuming additional units of the good decreases as the quantity increases. When there is no extra benefit gained from the consumption of additional units, the marginal benefit is zero (this is where the yellow line crosses the horizontal axis at zero).

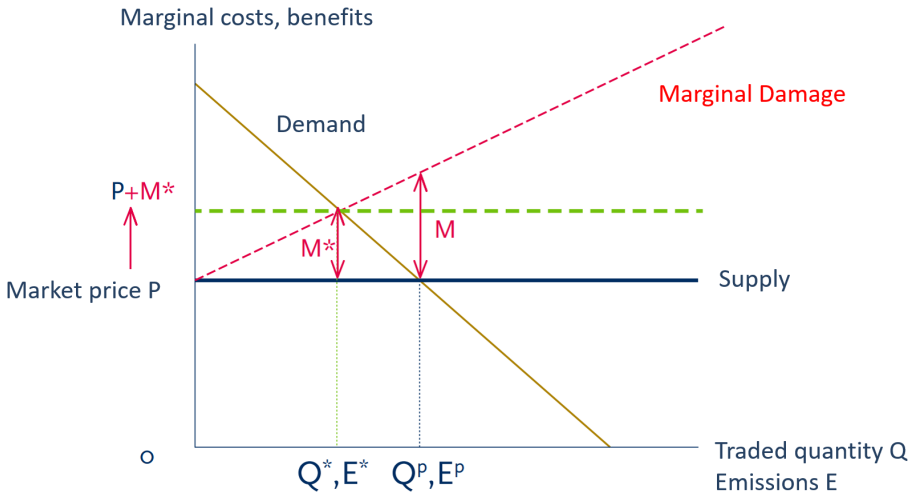

FIGURE 1. THE PARTIAL MODEL OF MARKETS INCLUDING ENVIRONMENTAL PRICING (VOLLEBERGH, 2019)[3]

In this specific example, the supply curve (blue) is horizontal, implying that the marginal cost for the producer is the same for every extra unit produced. This supply curve is a model for (aggregated) producers' characteristics and behaviour.

The efficient equilibrium in this market is at the intersection of the demand and supply curve. Market price P is the efficient price level, while quantity Q^p is the efficient quantity that is produced and consumed. In this model, total welfare is at its maximum at this point. At a higher Q, the marginal costs (for the supplier) would outweigh the marginal benefits for the consumer, decreasing total welfare. At lower quantities Q, the marginal benefit of one additional unit would still outweigh the costs, and therefore in such lower quantities, total welfare would not be maximised. A typical producer subsidy brings down the supply (cost) curve, leading to an intersection of the two curves at a higher Q than Q^p. A typical consumer subsidy would increase the benefits from consumption and shift the demand (benefit) curve upward, subsequently leading to an intersection of the two curves at a higher Q than Q^p. In this school of thinking, the producer or consumer subsidy is therefore considered inefficient, since it inhibits a perfect market from reaching the efficient equilibrium in which welfare is maximised. Public schemes having such effects have been deemed distortive and have been studied in fossil fuel subsidy assessments since at least the 1990s. The IEA has performed assessments based upon these principles for many years (see Chapter 2).

3 Prof. Dr. Vollebergh's inaugural speech, 28th September 2018, Professor of Economics and Environmental Policy at Tilburg University, available at https://www.researchgate.net/publication/330825309_2018_Oratie_Haasje_over_Instrumentering_van_transities_van_uitdaging_naar_uitvoering.

1.2 EXTERNALITIES AND MARKET FAILURE

Environmental economists in the school of NCE recognised that something is missing in the *partial model of markets* shown in Figure 1.[4] Often, some costs and benefits of production and consumption are external to the consideration of producers and consumers (see Box 2). Environmental economists in the school of NCE have recognised this as a market failure that should be addressed by public policy.[5] Some argue that a failure to do so, constitutes a subsidy. In 2014, the IMF published an extensive study based on this idea (see Chapter 3).

In Figure 1, the red dotted line illustrates additional costs to the producers' costs. In this example, the model assumes rising environmental costs for every extra unit produced. When such costs are taken into consideration, the 'efficient' market outcome is represented by quantity Q* and price P+M*, rather than quantity Q^p and price P. In other words, social welfare is maximised at (the lower) quantity Q* and (the higher) price P+M*.

Market-based environmental policy instruments, such as price-based taxes or quota-based systems, aim to direct the market to this efficient equilibrium, ensuring that social welfare is maximised. Taxes steer P directly to the P+M* level, while in a quota system Q is limited at the Q* level.

1.3 INEFFICIENT MARKETS REQUIRE EFFICIENT POLICY RESPONSES

An important consideration is worth mentioning here. Many markets for energy and industrial commodities are international. At the same time, governments can only introduce corrective policies and measures in their respective jurisdictions. In open markets, a corrective measure aimed at increasing the production costs of environmentally harmful goods or services (the producer may be a consumer of fossil fuels in this regard) can easily be sidestepped through product imports or the relocation of production activities elsewhere. Products are often traded across national borders. Apart from not establishing an efficient equilibrium, as a result, it cannot be ruled out that a measure aimed at internalising externalities can negatively affect social welfare *in an international context,* taking cross-border effects into account.

4 Prof. Dr. Vollebergh's inaugural speech, 28th September 2018, Professor of Economics and Environmental Policy at Tilburg University, available at https://www.researchgate.net/publication/330825309_2018_Oratie_Haasje_over_Instrumentering_van_transities_van_uitdaging_naar_uitvoering.

5 Consider Keohane & Olmstead (2016). Markets and the Environment. Second Edition. Island Press, Washington, DC.

The partial model of (international) markets can in theory be made complete by the introduction of efficient policies and measures aimed at internalising externalities. However, in such a model, only an international concerted effort to do so can ensure that the new international market equilibrium is efficient. Only then, social welfare is truly maximised, in the international context.

Apart from the international dimension of energy markets and policy responses, it is worth stressing that errors in the estimation of 'external costs' by researchers and analysts, can also lead to inefficient policy responses. That is to say, price interventions or quotas are no guarantee for achieving maximum social welfare, and specific attention should be devoted to the mechanisms and the institutional framework (and the checks and balances therein) which are set up for determining tax levels or quotas, in order not to merely replace a market failure by a policy failure.

1.4 CONCLUSION

Subsidy assessments initially focused on public policies and measures that inhibit perfect markets from reaching an efficient equilibrium in which producer surplus and consumer surplus are maximised (i.e. in which welfare is maximised), without taking externalities into account. For many years, the IEA has performed subsidy assessments in this tradition by studying end-user prices and international market prices, which is further explained in Chapter 2. More recently, the IMF has also published analyses taking externalities into account, which is further discussed in Chapter 3. While embracing the theoretic principles of such an analysis, it is worth recognising that many markets for energy and industrial commodities have an international nature. Public policy responses are often national or regional at best, which strongly complicates the degree to which such responses can be organised effectively and efficiently in practice.

2 THE IEA AND THE EFFICIENCY OF INTERNATIONAL ENERGY MARKETS

The IEA has performed assessments of energy subsidies for many years by identifying price gaps.[6] Such 'price-gap assessments' provide valuable insights at an aggregate or macro level of analysis, which is useful for making global comparisons of different countries.

2.1 THE SUBSIDY AMOUNT FOLLOWS FROM THE CHOSEN REFERENCE

The IEA compares end user prices worldwide with pre-defined reference prices which reflect the full cost of energy supply to the end user. In the case that the end user price is lower than the reference price, a subsidy is exposed, i.e. *Subsidy = (Reference price - End-user price) × Units consumed*.

In the case that the end user price is equal to, or higher than, the reference price, no subsidy is revealed. This is not to say that a subsidy scheme somewhere in the energy value chain is ruled out. However, in such a case, the net effect of policies, measures, and schemes are demonstrated to not lead to end user prices lower than the reference level. At the end user, 'the price is right'. The IEA approach thus assesses the net effect of different policies, measures, and schemes. Clearly, when different policies, measures or schemes target different actors in different parts of the energy supply chain, it is possible that one scheme cancels out the other, i.e. while at the macro level no subsidy may be visible, some actors could theoretically be subsidised, potentially by others in a single value chain. Crucially, the subsidy amount identified by the IEA is strongly determined by the chosen reference level. In the work of the IEA, international energy market prices are considered the norm, whereas end user prices below this norm are considered 'too low', and hence a 'subsidy' is exposed.

2.2 INTERNATIONAL MARKET PRICES AS THE REFERENCE LEVEL

The IEA has historically used international energy market prices as the reference level. Specifically, for net importers, "*reference prices are based on the import parity price: the price of a product at the nearest international hub, adjusted for quality differences if necessary, plus the cost of freight and insurance to the net importer,*

6 IEA website, section 'Energy subsidies, Tracking the impact of fossil-fuel subsidies', see https://www.iea.org/weo/energysubsidies

plus the cost of internal distribution and marketing and any value-added tax (VAT)."[7] It is fair to say that this approach is rooted in the school of NCE, which is explained further in Box 1.

DIFFERENT THEORETICAL INSIGHTS

The IEA approach is rooted in Neoclassical Economics (NCE). It is based on the premise that perfect markets lead to an (international) market price for an energy carrier, and that this price reflects the value of the energy carrier. For instance, well-developed liquid oil markets, supported by an extensive global infrastructure and financial markets, ensure that the oil price reflects the true value of oil. Next, it can be argued, that any state intervention leading to prices (locally) that are not in line with this global reference, constitutes an aberration. If local prices are 'too low', then the argument can be made that a subsidy is at play. If local prices are 'too high', this is obviously not the case.

It is fair to say that through NCE theory, the strategies of the Organization of Petroleum Exporting Countries (OPEC) and the impacts of OPEC production policies are relatively difficult to explain. One could argue, however, that value is not objectively revealed by the price equilibrium in the international market. The subjectivist value theory explains this. In short, the premise here is that society determines the value of goods and services, such as energy supply. New Institutional Economics (NIE) and Original Institutional Economics (OIE) argue that the subjectivist value of energy supply can be established in prices paid for the goods and services through a (potentially) complex set of institutions. When (incomplete) markets fail, institutional (re)arrangement can be legitimised through NIE and OIE. Coming back to the oil example, if a society deems it appropriate to safeguard its oil wealth for future generations, it may choose not to flood the market with cheap oil sold at low prices, but rather it may pursue a certain price level that limits oil use and exports, prolonging the oil production time horizon for that society. The resulting price may be higher than the price that would emerge when a 'laissez-faire' approach to oil production is chosen (e.g. market liberalisation and free enterprises starting oil production in an unrestricted fashion). NIE and OIE would explain this price based on the subjectivist value of energy. NCE would interpret it as an aberration from the ideal.

7 IEA website, section 'Energy subsidies, Tracking the impact of fossil-fuel subsidies', sub-section 'Methodology and assumptions', see https://www.iea.org/weo/energysubsidies https://www.iea.org/topics/energy-subsidies#methodology-and-assumptions

Alternatively, it is possible that a society seeks to produce oil for international markets and optimise public revenues. At the same time, the price in international markets may be unaffordable for important parts of the local population. Such a society may opt for an institutional arrangement that leads to a lower price paid by local end users rather than the price paid in international markets. In some countries such domestic pricing was introduced after the nationalisation of oil production, while in others the pricing of oil products is targeted at individual oil products, and/or the poor part of the population. Once again, NCE would interpret this as an aberration. By the IEA's standard, this would be called an energy consumption subsidy. At the same, time NIE and OIE would observe the phenomenon and have no normative value judgement on it. These theories would explain that it is the logical result of the subjectivist value of the energy product, which is determined in the societal context of the product. In such theoretical frameworks, OPEC is one of many phenomena in the institutional arrangements that several societies have produced.

NCE is deeply embedded in much of the political, societal, and institutional mind frame. It can be recognised in the IEA's work on fossil fuel subsidies, but also in the IMF's work, explained in more detail in the next chapter. In both cases, 'aberrations' of a chosen norm are identified. For the IEA, international market prices are the norm, while the IMF also includes external costs in its assessment.

BOX 1. NEOCLASSICAL ECONOMIC THEORY (NCE), AND ORIGINAL AND NEW INSTITUTIONAL ECONOMIC THEORIES (OIE & NIE).

For example, in the case of the Netherlands, one could argue that end user prices for natural gas can be compared to the full cost of natural gas supply to end users, starting with gas prices at the Title Transfer Facility (TTF, the relevant gas hub). In the United States, in contrast, Henry Hub is the relevant marker, and is therefore the starting point for determining the full cost of natural gas supply to energy users. A range of oil products, including gasoline and diesel, are also internationally traded. In the case of the Netherlands, one could argue that any comparison between end user prices for oil products should be compared to international prices, for instance as quoted by Standard & Poor's (S&P) Global, specifically for the Amsterdam-Rotterdam region.[8] For coal, one could argue that the comparison should start with

8 See S&P Global Platts. Specifications guide. European and Africa refined oil products. Available at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/our-methodology/methodology-specifications/europe-africa-refined-products-methodology.pdf

internationally traded coal as priced in the ARA (Amsterdam-Rotterdam-Antwerp) cluster, for instance, as quoted by Argus-McCloskey.[9]

Although electricity is exchanged across national borders within the EU internal energy market, it is generally more complicated to trade in large volumes, internationally, and is certainly not traded globally. Reference prices for electricity are therefore derived by the IEA from annual average prices in particular countries. In the words of the IEA, *"Unlike oil, gas and coal, electricity is not extensively traded over national borders, so there is no reliable international reference price. Therefore, electricity reference prices were based on annual average-cost pricing for electricity in each country (weighted according to output levels from each generating option). In other words, electricity reference prices were set to account for the cost of production, transmission and distribution, but no other costs, such as allowances for building new capacity."*[10] In Europe, well-developed spot markets (as well as future markets and markets for other derivatives) for electricity trading have been established. One could therefore argue that the starting point for determining the reference price level for electricity should be the Amsterdam Power Exchange (APX) price levels, as well as transportation costs (transmission and distribution grid costs), similary to the approach chosen for oil products, natural gas, and coal.

2.3 THE IEA ASSESSMENT OF FOSSIL FUEL SUBSIDIES

Figure 2 shows the results of a recent IEA assessment. The IEA does not have *"a number for fossil fuel consumption subsidies for the Netherlands because our methodology doesn't reveal any subsidies, i.e. the average end-user prices paid by consumers are higher than the reference prices that we use as a benchmark."*[11]

In past years, the price-gap assessments of the IEA suggest that at least two interrelated factors play an important role in the emergence of fossil fuel subsidies worldwide. One is that low income countries may be tempted to adopt policies and measures that are aimed at keeping energy affordable for large parts of the population. And secondly, countries which possess substantial energy resources may be tempted to make (part of) these resources affordable for their local population, irrespective of international market prices for the specific energy carriers.

9 See CME Group. Coal (API2) CIF ARA (ARGUS-McCloskey) Futures Quotes. Globex. Available at https://www.cmegroup.com/trading/energy/coal/coal-api-2-cif-ara-argus-mccloskey.html

10 IEA website, section 'Energy subsidies, Tracking the impact of fossil-fuel subsidies', see https://www.iea.org/weo/energysubsidies.

11 Answer by Tim Gould, IEA, on the question if the IEA can supply a number for the Netherlands in conformity with the numbers for other countries.

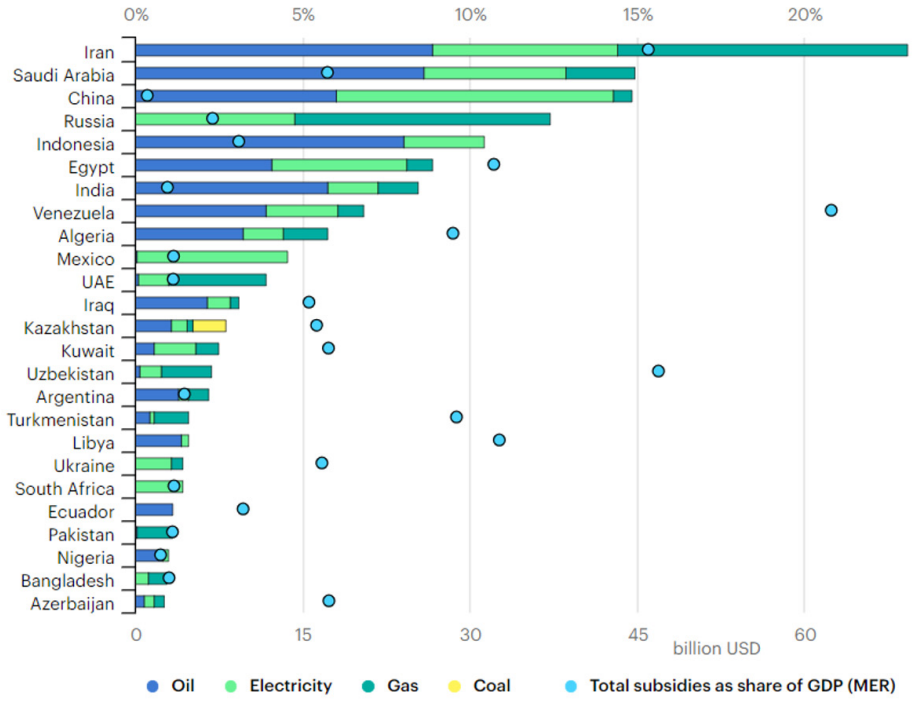

FIGURE 2. FOSSIL-FUEL CONSUMPTION SUBSIDIES BY COUNTRY, 2018 (BILLION USD) (IEA, 2020).[12]

In 2019, the IEA concluded, with regard to the development of 2018 subsidies that: *"Higher average oil prices in 2018 pushed up the value of global fossil fuel consumption subsidies back up toward levels last seen in 2014, underscoring the incomplete nature of the pricing reforms undertaken in recent years, according to new data from the IEA."*[13]

Energy priced at the level reflecting the full cost of energy supply taking the international market as the norm may be too expensive and unaffordable for parts of the population in less developed energy producing countries. In other words, if fossil fuel subsidies were to be eliminated in these countries, the purchasing power

12 IEA website, section 'Energy subsidies, Tracking the impact of fossil-fuel subsidies', see https://www.iea.org/data-and-statistics/charts/fossil-fuel-consumption-subsidies-by-country-2018.

13 The IEA continues: "The new data for 2018 show a one-third increase in the estimated value of these subsidies, to more than $400 billion. The estimates for oil, gas and fossil-fuelled electricity have all increased significantly, reflecting the higher price for fuels (which, in the presence of an artificially low end-user price, increases the estimated value of the subsidy). The continued prevalence of these subsidies – more than double the estimated subsidies to renewables – greatly complicates the task of achieving an early peak in global emissions. The 2018 data sees oil return as the most heavily subsidised energy carrier, expanding its share in the total to more than 40%. In 2016, electricity briefly became the sector with the largest subsidy bill." IEA, 31 June 2019. Fossil fuel consumption subsidies bounced back strongly in 2018. Available at https://www.iea.org/commentaries/fossil-fuel-consumption-subsidies-bounced-back-strongly-in-2018.

of citizens and businesses in the country may be insufficient, compared to the purchasing power of consumers in international markets. This could mean that consumers in certain developing countries are effectively denied (affordable) access to energy. This situation has inhibited particular governments to fully liberalise their energy sectors, and eliminate 'fossil fuel subsidies' as measured by the IEA. It is crucial to stress that this problem is not so pertinent in Western countries.

2.4 CONCLUSION

This chapter explains the way in which the IEA assesses energy consumption subsidies. It is particularly useful for global assessments comparing different countries. Rather than exposing policies and measures that stimulate fossil fuel use, this method is useful for exploring relative energy prices worldwide and exposing international distortions. This approach is therefore frequently referred to as a specific application of a 'price-gap' approach. Price gaps can only be determined by picking a certain reference level, to be used as the norm. The IEA approach does not reveal any fossil fuel subsidies in the Netherlands, because end-user prices are not lower than the reference levels based on international energy market prices which are used as the reference point. Chapter 3 will explain how the IMF has applied a related approach, rooted in the same economic theory, but, the IMF has also included insights from the School of Environmental Economics on externalities, arguing in favour of the greening of taxation to address these externalities, and at the same time identifying tax space for governments worldwide.

3 THE IMF AND THE 'GREENING OF TAXATION'

More recently, the IMF has also entered the field of assessing fossil fuel subsidies. Just as with the IEA, the IMF calculates 'price-gaps' which are useful in obtaining aggregate or macro-level insights into the situation worldwide. However, such an assessment is not enough for identifying the actual public policies and measures in a country that may constitute a fossil fuel subsidy. For that, the mapping of policy inventory is needed (see Chapter 4). In its global analysis, the IMF comes to vastly different conclusions than the IEA, due to the inclusion of 'untaxed' externalities in its assessment.

3.1 THE REFERENCE USED BY THE IMF

Before explaining the manner in which the IMF assesses fossil fuel subsidies and externalities, it is important to point out that the IMF uses a very specific definition of what constitutes a fossil fuel subsidy. The IMF assesses what it calls 'post-tax' subsidies, and distinguishes these from the 'pre-tax' subsidy concept implicitly used by other institutions, such as the IEA.

INTERNALISATION OF EXTERNALITIES

Environmental economists in the NCE school of thinking have pointed out that markets are often not 'perfect'.[14] Specifically, some costs or benefits in the production and consumption of a good may not be borne or incurred by the consumer and producer, but by other actors. Such costs are outside the scope of (external to) the considerations of producers and consumers of the good. As a result, the outcome produced by the market is not 'Pareto efficient' for society and is not maximising social welfare.

While positive externalities (external benefits) exist, most attention is usually devoted to negative externalities (external costs).[15] For instance, when a producer releases

14 Consider, for instance, Keohane & Olmstead (2016). Markets and the Environment. Second Edition. Island Press, Washington, DC.

15 An example of external benefits is the following: Imagine a logging company that needs to transport its logs overseas from a remote arctic location, with few public services, to its clients in remote markets. In winter, it may keep an essential local shipping lane open in order to be able to move logs to buyers, by use of an ice breaker. As a positive by-result, the local community adjacent to the logging operations is also connected to the outside world throughout winter, leading to local socio-economic benefits in the community. The logging company does not take such benefits into consideration when deciding to continue or to halt its logging operations. In case prices for its produce are low, its logging operations could become unprofitable, and it could stop the operations and no longer provide the ice-free shipping lane. In such a case, the benefits to the community are external to the producer's considerations. The community would suffer from this example. Now, when the producer would receive a payment for the ice breaker services from other beneficiaries, i.e. when the external benefits are internalised to the logging operation, its operations may continue to be sufficiently profitable, all activity may continue, and the local community continues to be connected to the outside world in winter.

polluted waste water into a river, and does not bear the cost of cleaning the water further downstream, then the cleaning costs are unlikely to be part of his consideration when offering the good on the market. Hence, the selling price may be relatively low, and consumers may consequently be incentivised to consume more than the amount that would maximise societal welfare. Environmental economists would argue that the producer should incur the costs for the wastewater treatment, in this case, through the imposition of a tax on every litre of untreated wastewater released. Then, the external costs have become 'internalised', and these costs become part of the considerations of the relevant economic actors. By definition, the theoretical tax that establishes 'Pareto efficiency' is referred to as a 'Pigouvian tax'.

In the context of energy use, the external costs of fuel combustion have drawn much attention, particularly the societal and environmental costs of air pollution, and greenhouse gas emissions. In recent years, the IMF has published a series of articles on this matter, as is discussed in this chapter.[16]

BOX 2. EXTERNAL COSTS AND BENEFITS IN ENVIRONMENTAL ECONOMICS.

The IMF describes 'pre-tax' subsidies as *'reflecting differences between the amount consumers actually pay for the fuel use and the corresponding opportunity cost of supplying the fuel'*.[17] For instance, if local oil consumers in a producing country pay only the production cost for the oil, while supplying the fuel to consumers in export markets would generate higher revenues (since it could be sold for better prices abroad), then local oil consumption is considered to be subsidised, in the same vein as the IEA assesses this situation. The IMF would use the word 'pre-tax' subsidy here, to stress the difference between the different assessment approaches and effectively the different definitions.

The IMF indicates that the international debate (e.g. at the G20 meeting in Pittsburgh in 2009) typically focuses on 'pre-tax' subsidies.[18] In recent studies, however, the IMF puts forward an extended definition of the term subsidy, that is the 'post-tax'

16 IMF (2014). Getting The Prices Right. From Principle To Practice. Authors: Ian Parry, Dirk Heine, Eliza Lis, and Shanjun Li. IMF (2015). How large are Global Energy Subsidies. Authors: David Coady, Ian W.H. Parry, Louis Sears, and Baoping Shang. IMF (2019). Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. IMF Working Paper. WP/19/89. Authors: David Coady, Ian Parry, Nghia-Piotr Le, and Baoping Shang.

17 IMF (2019), page 7.

18 IMF (2019), page 7.

subsidy.[19] The IMF states that this concept reflects *'the difference between actual consumer fuel prices and how much consumers would pay if prices fully reflected supply costs plus the taxes needed to reflect environmental costs and revenue requirements*'. [20] In other words, it integrates the concept of external costs (see Box 2), as explained in the previous section, as well as the need for governments to collect revenues, with the question as to whether energy consumption is subsidised or not.

3.2 IDENTIFYING TAX SPACE FOR GOVERNMENTS WORLDWIDE THROUGH EXTERNALITIES

At this point, it is important to realize that the IMF concept of 'post-tax subsidies' allows for the statement that 'energy consumption is subsidized', even while such consumption is in fact taxed and generating government revenues. Following the logic of the 'post-tax subsidy' definition, the argument goes that the tax level should be higher.

The economic theory underpinning this idea is well developed. In its most recent update on the matter, the IMF estimates that the gap between actual end-user prices, globally, and the appropriate post-tax price level (the Pigouvian rate, based on an assessment of external costs of energy use) is 5.2 trillion USD.[21] This does not necessarily refer to government schemes and policies that actively transfer public funds to energy consumers or actors in the energy sector. Eliminating the gap can therefore not be achieved by cancelling schemes and policies. Rather, the IMF argues that taxes need to be introduced or increased. It is relevant to stress that for environmental economists in the NCE school, it makes no difference whether subsidy schemes need to be eliminated or taxes need to be raised for 'getting the prices' right. At the same time, the choice to present 'untaxed externalities' and subsidies as one and the same has led to quite some confusion in the societal and political discourse in recent years.[22] Moreover, as the World Bank writes, *"[t]here are divergent views on whether or not and how to capture uninternalized externalities in subsidy measurements, ranging from not counting them as subsidies to classifying all uninternalized externalities that are in any way associated with energy production or*

19 IMF (2014). Getting The Prices Right. From Principle To Practice. Authors: Ian Parry, Dirk Heine, Eliza Lis, and Shanjun Li. IMF (2015). How large are Global Energy Subsidies. Authors: David Coady, Ian W.H. Parry, Louis Sears, and Baoping Shang. IMF (2019). Global Fossil Fuel Subsidies Remain Large: An Update Based on Country-Level Estimates. IMF Working Paper. WP/19/89. Authors: David Coady, Ian Parry, Nghia-Piotr Le, and Baoping Shang.

20 IMF (2019), page 7.

21 IMF (2019), page 19.

22 Apart from societal and political discourse in the Netherlands, consider, for instance: The Atlantic, 9 May 2019. The Hidden Subsidy of Fossil Fuels. Available at https://www.theatlantic.com/science/archive/2019/05/how-much-does-world-subsidize-oil-coal-and-gas/589000/.

consumption as energy subsidies. Inclusion or exclusion of uninternalized externalities is what accounts for the difference of trillions of dollars in the calculation of global fossil fuel subsidies."[23]

3.3 FROM THEORY TO PRACTICE

While a 'Pigouvian tax' is the efficient tax rate level, by its very definition, leading to maximum welfare, it requires a careful approach in practice to quantify a corrective tax, and determine which actors should be charged, and which not, so as not to create new distortions that harm social welfare. Calculating external costs at the macro-level is delicate and, in the process, normative judgments must be made. It is also contextually and culturally dependent. For example, what is the monetary value of a human life, how should pre-mature deaths be quantified, what is the economic value of biodiversity, how can the value of animal and plant life be quantified, etc.[24]

Moreover, energy consumption takes place in complex systems. This is certainly the case for energy, as examples will demonstrate. The use of gasoline in a car contributes to air pollution and therefore premature deaths. However, one litre of gasoline burned in a car with a catalytic converter results in less negative environmental externalities, than one litre burned in a car without such environmental technology, so a universal external cost per litre of fuel burned cannot easily be determined. Societal costs resulting from car accidents and road congestion, result not only from the use of gasoline and diesel fuelled cars, but equally from the use of carbon emission free electric vehicles. The combustion of one tonne of coal in an aging (not-so-advanced) coal-fired power plant results in significantly more air pollution than burning the same amount of coal in a modern (state-of-the-art) power plant with flue gas scrubbers, which limit NOx, SOx, and particulate matter emissions significantly and therefore limit public health effects. The same line of reasoning applies to the potential future use of carbon capture and storage technologies, as identified by the Intergovernmental Panel on Climate Change as indispensable for keeping greenhouse gas emissions in check with the ambitions laid

23 World Bank (2017). Energy Subsidies. Good Practice Note 1. Identifying and Quantifying Energy Subsidies. Energy Subsidy Reform Assessment Framework (ESRAF). Page 4. http://documents.worldbank.org/curated/en/391181511162479831/Identifying-and-Quantifying-Energy-Subsidies-Energy-Subsidies.

24 Economists in the school of NCE theory would suggest that this can be an objective exercise. In contrast, economists in the schools of NIE or OIE would argue that the (subjectivist) value of a good or service, is revealed in a socio-political process in society at large.

down in Paris.[25] That is to say, the external (climate) cost of coal burned in an old coal plant, is significantly higher than the external cost of coal burned in a modern coal plant retrofitted with carbon capture and storage technology.

The point here is that it is not fuel use in itself that results in a fixed amount of external costs which can be calculated and incorporated in a tax at the 'Pigouvian' level. But it is the way in which it is used.

All such aspects must be taken into consideration when determining tax measures aimed at internalizing external costs. It is complicated to determine a *fuel* tax that in fact maximizes social welfare perfectly in line with the theory. Albeit complex as well, it is easier to defend a public measure targeting the *actual pollution* that is responsible for the external costs, such as greenhouse gas emissions, but also NOx emissions, SOx emissions, and particulate matter emissions, rather than targeting the fuel. Nevertheless, for practical reasons, such as data availability, fuels may still be the subject of targeting. Exact data on emissions may not be available or registered to the extent that it can serve as a basis for taxation. Taxation of fuel use is therefore sometimes chosen as a second-best option to internalise the external costs. Furthermore, it is worth stressing that environmental taxation is not the only way an externality can be internalised. Regulations prescribing environmental norms and standards are often used, as well as quota systems (see Box 3).

EMISSION TRADING

Externalities can also be internalised through a quota system, such as an emission trading scheme. The advantage of such a system is that environmental targets are reached with more certainty. Another advantage is that under a quota system, there is no need to attempt to calculate a 'Pigouvian' tax. A disadvantage can be that the price signal is uncertain and that effectively designing such measures can also be challenging. For example: how do you make the system adaptable to economic ups and downs (the EU Emission trading Scheme, ETS, has long had an abundance of emission permits as a result of the economic slowdown following the global financial crisis in 2008) in order to avoid booms and busts in emission reducing technologies.

25 "At the global level, scenarios reaching about 450 ppm CO2-eq are also characterized by more rapid improvements in energy efficiency and a tripling to nearly a quadrupling of the share of zero- and low carbon energy supply from renewables, nuclear energy and fossil energy with carbon dioxide capture and storage (CCS), or bioenergy with CCS (BECCS) by the year 2050". Page 12 of: IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_summary-for-policymakers.pdf.

One early example of a quota system is the SOx scheme in the USA, while a contemporary example is the EU ETS, which has defined the limits to greenhouse gas emissions of Europe's major emitters, in line with the long-term international climate obligation. In the context of greenhouse gas emissions, a quota system is particularly appealing, since greenhouse gas emission targets are often formulated in terms of the acceptable emission levels in a future year. Also, the cumulative amount over a longer period is a more relevant figure to aim for. Different countries and regions aim to limit greenhouse gas emissions to a certain number of tonnes of CO_2.

While a corrective tax creates certainty with respect to the cost for emitting carbon emissions, it is no guarantee for actual actions by emitters to lower the emissions to the necessary level. In contrast, a quota system like the EU ETS does not pre-define any price level, but rather pre-defines a limit to the amount of emissions allowed by the industry in the current and future years. Breach of those limits comes with severe penalties, since actors participating in the EU ETS incur serious fines for any emission not covered by an allowance.

Under a quota system, there is no need to attempt to calculate a 'Pigouvian' tax. Rather, an undefined price for tradable emission allowances emerges in the marketplace, which puts a cost on greenhouse gas emissions, at a level that incentivises enough actors in the system to collectively stay within the quota. The first ground breaking international agreement on containing greenhouse gas emissions within pre-defined limits, the Kyoto Protocol to the UNFCCC attempted to introduce a global quota system, and it incentivised the EU to enforce a (decreasing) cap onto its industrial emissions. Since 2005, European industrial emissions have been capped by a quota that is increasingly more stringent year after year, enabling member states to collectively keep emissions of large industrial players within the limits set for 2030 and 2050, as agreed in Paris in 2015.

BOX 3. KEEPING CARBON EMISSIONS WITHIN LIMITS.

A 'subsidy amount' calculated using the theoretical Pigouvian tax as the basis for the reference level should be treated with caution. But this is not to say that, from a fiscal perspective, a government may find legitimacy and comfort in raising an environmental tax *more towards* this theoretical Pigouvian level. This is the idea behind the 'greening of taxation', which is particularly defendable, if it is fairly clear that there is room to do so, due to the large difference between the current tax level on one hand and the theoretic Pigouvian level on the other. However, the international nature of many markets for energy and industrial commodities may

prevent national governments from acting unilaterally in this regard due to unwanted cross border effects. As will also follow from section 4.3, fiscal questions stretch beyond discussions over fossil fuel subsidy definitions and assessments.

3.4 CONCLUSION

This chapter explains the price-gap approach used by the IMF in recent years, which enables governments worldwide to identify their energy tax space. The IMF did so by studying what they call 'post-tax' fossil fuel subsidies. The IEA's approach sketched in the previous chapter does not include externalities in its analysis. Hence, in recent years the IEA's approach has been increasingly referred to as an analysis of 'pre-tax fossil fuel subsidies', stressing the difference between the two assessments. The IMF analyses have particular relevance for those who argue for the 'greening of taxation'.

The IMF's approach is rooted in principles studied in the tradition of Environmental Economics. Researchers in this school state that markets do not automatically produce efficient outcomes, due to external costs which are not necessarily considered by market players. This constitutes a market failure. In their pursuit for corrective measures, national governments are often confronted with dynamic international markets for energy and industrial commodities, complicating their efforts.

When interpreting the 'subsidy amount' calculated by the IMF, it is important to take note of the limitations in the methodology discussed in this chapter. Overall, the work by the IMF can be best understood as indicative in nature and is particularly relevant in relation to the 'greening of taxation'. For the actual identification of specific policies and measures in a specific country which may constitute as a subsidy, complementary efforts are required, which will be discussed in the next chapters.

4 PRAGMATISM: TAKING STOCK OF THE POLICY INVENTORY

Chapters 2 and 3 discuss the assessment approaches used by the IEA and the IMF, respectively. The IEA has informed the public discourse on fossil fuel subsidies for many years and more recently the IMF started reporting on the matter by adopting an alternative approach, informing governments on measures to 'green' tax codes. Their 'price-gap' analyses are valuable for obtaining insights at the aggregate and global level. However, when pursuing policy reform in specific countries, such 'price-gap' analyses need to be complemented by assessments of existing policies and practices in the respective countries.

4.1 MAPPING POLICIES AND MEASURES

For meaningful reform, the policies and measures that are at the root of the distortions exposed by the IEA and IMF must be mapped. While their price-gap analyses are useful for identifying the gap between the actual price level of energy on the one side and the preferred price level on the other, they provide insufficient insights into the question of which public schemes or policies actually contribute to the observed difference.

Consider the following example. In a certain region, labour costs in a brown coal mining operation are subsidised by the government because of the socio-economic situation in the region, e.g. high unemployment. Such public support lowers the labour cost for mining operations, aiming to make it attractive for the operator of the mine to employ local workers. At the same time, however, such support could also make the fuel available to a local power plant at a low cost, contributing to the availability of cheap electricity from the grid. Now, an aggregate or macro level analysis of electricity market prices might reveal (but does not necessarily do so) that the electricity is priced at a less than preferred price level, leading to an amount of electricity consumption which is higher than the efficient level, to the detriment of societal welfare. Having exposed this, a corrective tax on electricity consumption could be proposed, in order to raise the consumer price of electricity, limit consumption, and reduce environmental harm. Following the definition of the IMF, such a 'corrective tax' would ensure that the post-tax subsidy is no longer observed when performing the price-gap analysis.

Crucially, however, the tax does not necessarily have an impact on brown coal mining operations. At the same time, cleaner electricity generation capacity is pushed out of the market, due to a decline in electricity demand, resulting from the corrective tax on electricity. Meanwhile, the policy at the root of the distortion continues to be in place, namely the brown coal mining operations continue to run on subsidised labour, lowering the production cost of the brown coal power plant. So, while electricity is now priced at the 'efficient' level, the actual subsidy was not eliminated since public support continues to exist for labour in brown coal mining operations.

A fossil fuel subsidy assessment based on the inventory approach, for instance, informed by the OECD's inventory of fossil fuel subsidies, can subsequently expose and assess such labour policies. Ideally, policies and measures are identified in a transparent process involving an inclusive dialogue with a range of stakeholders, enabling policy makers to identify and assess the possibilities to reform distortionary policies.

4.2 THE OECD TYPOLOGY OF FOSSIL FUEL SUPPORT MEASURES

An assessment based on the inventory approach, can only succeed if a practically applicable taxonomy of potential government schemes, measures and policies is available for use in the assessment. This is complicated. In a 2014 report, the EC attempted to improve the comparability of data on fossil fuel subsidies. It noted explicitly that this work took place in *"a highly political setting"*.[26] The EC argued that *"[t]he current lack of uniform fossil fuel subsidy reporting can in part be explained by different views among Member States on the need for reform and its scope, and different preferences for specific reform options."* This observation is at the heart of the matter.

The OECD provides support to governments which seek to map their policy inventory.[27] It administers a vast inventory of public policies, schemes and measures that are widely considered to constitute support to fossil fuel use.

26 European Commission (2014). Enhancing comparability of data on estimated budgetary support and tax expenditures for fossil fuels. Final Report. Authors: Frans Oosterhuis, Helen Ding (BIO), Laurent Franckx (VITO), Paolo Razzini (IEEP), and Member States experts. Page 4.

27 The database is available at https://www.oecd.org/fossil-fuels/data

	Statutory or Formal Incidence (to whom and what a transfer is first given)							
	Production							
	Output returns	Enterprise income	Cost of intermediate inputs	Costs of Value-Adding Factors				
				Labour	Land and natural resources	Capital	Knowledge	Unit cost of consumption
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
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
Other government revenue foregone			Underpricing 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
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

TABLE 1. OECD TYPOLOGY OF SUPPORT MEASURES BY INCIDENCE, INCLUDING EXAMPLES.[28]

The OECD typology shown in Table 1 covers a broad spectrum of policies targeting different parts of supply chains (from production to consumption) and includes (1) direct transfers of funds, (2) tax revenue foregone, (3) other government revenue foregone, (4) transfers of risk to the government, and (5) induced transfers.

4.3 THE QUESTION OF FOREGONE GOVERNMENT REVENUES

One aspect of the OECD's taxonomy, revenue foregone, is particularly delicate. This is relevant in analyses of tax rebates or tax discounts, but also in the analysis of tax exemptions, i.e. deviations from a tax level that is considered 'the norm', or one could even consider tax differentiation, i.e. different rates for different groups that are obliged to pay the tax.

28 United Nations Environmental Programme (UNEP) & International Institute for Sustainable Development (IISD) (2019). Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals. Core drafting team: Peter Wooders, Anna Zinecker, Ronald Steenblik, Joy Aeree Kim, Jillian Campbell, David Goodman, Laura Merrill, Meryem Torun, Jian Liu, Ligia Noronha, Ludgarde Coppens, Steven Stone, Lowri Rees, Diana Ngina and Alexandre Caldas. Page 60.

The question that arises is: Which tax rate should be considered as the norm? At one extreme, it can be argued that the tax rate applied to some, lower than the highest applied to others, is a deviation from the norm, and the difference between the rates is considered to be a subsidy to those paying the lower rate. At the other extreme, it can be argued that the lower rate is the norm and that the higher rate is the deviation from that norm, which would underpin the argument that those paying the higher rates are paying more than their fair share and are overtaxed. Effectively, both views are two sides of the same coin and it is hard to determine the absolute truth here. The more differentiated the tax regime is, the more difficult it is to choose the norm from which to measure. The energy tax regime of The Netherlands, for example, is differentiated with various brackets and different rates. An analysis of externalities and the degree to which they are incorporated in a tax regime does not follow from the OECD taxonomy. In the OECD framework, the question of foregone government revenues revolves around targeted instruments such as corporate tax credits that have a very specific aim, for instance, incentivising oil and gas production. Nevertheless, as will become clear in the next chapter, questions around external costs have become part of the discourse in relation to the G20 self/peer reviews.

Finally, with respect to energy taxation, it may be fair to note that governments choose to impose taxes on certain groups and activities for a range of reasons, including (1) raising revenue, (2) correcting market failures, and (3) steering behaviour by influencing relative prices.

4.4 CONCLUSION

Performing an analysis following the 'inventory approach' is a bottom-up assessment of policies and measures that may constitute fossil fuel support. It is an essential task for any government aiming to eliminate distortionary policies and measures. The OECD has supported governments in performing such assessments for many years. In 2019, the United Nations Environmental Programme (UNEP) also published guidelines for assessments. In the next chapter, two relevant processes are described, that are recent applications of such an inventory approach in an international context, from which lessons can be drawn. Both the G20 self/peer reviews, supported by the OECD secretariat, and the emerging processes in the context of the UN Sustainable Development Goals, supported by UNEP guidelines, will be discussed.

5 UN SDG REPORTING AND THE G20 SELF/ PEER-REVIEWS

In 2009, as mentioned in the introduction of this paper, the G20 countries agreed to remove inefficient fossil fuel subsidies before 2020.[29] To this aim, the G20 countries agreed to a process in which country pairs engage in self-reviewing and peer-reviewing practices. Also, fossil fuel assessment in the context of the United Nations (UN) Sustainable Development Goals (SDGs) is under development, a process which will gain more traction from 2020 to 2030. The G20 assessments and the upcoming UN SDG reporting are specific applications of an inventory approach. Both are further discussed in this chapter.

5.1 THE SCOPE OF THE G20 REVIEWS

In the context of the G20 assessment processes, countries publish a self-assessment report first, and in the subsequent peer review, the partnering country takes the lead in an assessment team. At the time of writing, China & the United States provided a self-assessment and a subsequent peer-review, as well as Germany & Mexico, and Indonesia & Italy.

In order to expose policies and measures that constitute inefficient fossil fuel subsidies, the reviews define the following scope for the assessment of the policy inventory:

(1) direct budgetary support (or fiscal expenditure subsidies);
(2) tax-code provisions (or tax-preference provision);
(3) government provision, either at no charge or below-market rates of auxiliary goods or services that facilitate fossil-fuel use or production;
(4) and requirements that non-government entities provide particular services to fossil fuel producers at below market rates, or that require non-government entities to purchase above market quantities of fossil fuels or related services.[30]

The question of foregone government revenues plays a role in the reviews carried out in the context of the G20. The analysis of 'tax code provisions' in the country

29 Pittsburgh declaration, 2009. See http://www.g20.utoronto.ca/2009/2009communique0925.html#energy.

30 See, for instance, OECD (2019). Indonesia's Effort to Phase Out and Rationalise Its Fossil-Fuel Subsidies. A report on the G20 Peer-Review of Inefficient Fossil-Fuel Subsidies that Encourage Wasteful Consumption in Indonesia. Prepared by the Members of the Peer-Review Team: China, Germany, Italy, Mexico, New Zealand, World Bank, IEA, IISD-GSI, GIZ Indonesia and the OECD (Chair of the Peer-Review).

reports involves tax exemptions as well as differentiated tax schemes. As stated, it can be best understood with a view to the notion of 'foregone government revenue'. Although tax exemptions and differentiated tax schemes are included in the assessments, they are not indisputably framed as inefficient fossil fuel subsidies, but rather as schemes that require specific attention. This careful approach to tax code provisions is in stark contrast to other policies and measures, such as a number of existing practices that fall within the category of direct budgetary support. This includes grants for the sale of German hard coal for electricity generation, for sale to the steel industry and to offset the impact of what is referred to as capacity adjustments, as well as grants of adjustment benefits to employees in the hard coal mining industry. Such direct budgetary support has been criticised for many years, and Germany for instance is in the process of phasing these grants out. Consensus over the fact that such budgetary support constitutes a subsidy to fossil fuels seems to be well established. This is not the case for tax exemptions and differentiated tax schemes.

So, while tax exemptions and differentiated tax schemes are not explicitly recognised as fossil fuel subsidies in the reports, they are brought forward in the assessments, implicitly sending out the message that they, at the very least, inhibit risks of constituting inefficient fossil fuel subsidies. The narrative in the reports is thus carefully chosen.

Specifically, both Italy and Germany claim to have meaningfully high taxes, as promoted by the IMF from the viewpoint of externalities, for a great range of economic activities. Both countries highlight that excise taxes on gasoline and diesel are high in relation to such taxes in many other countries; and so too, Italy and Germany have energy taxes on the use of natural gas or electricity by a range of groups in society. Crucially, both Italy and Germany appear to refuse to accept these high taxes as *the norm* that should be applied to all groups imaginable in their societies. Rather, the idea seems that universally high taxes for all groups and sectors can only be realised in an internationally coordinated effort, to ensure that a level playing field exists for industries, fair competition amongst industries in various countries is guaranteed, and that environmental gains are not annulled by cross-border effects (e.g. relocations of economic activities). Then, the argument is made that existing tax exemptions and tax differentiation in fact allow countries to have meaningfully high taxation for groups that are not exposed to such international dynamics. Such meaningfully high taxation levels would not be possible if the countries were prevented from differentiating taxes.

What must be stressed here is that the G20 reports are particularly specific, because they focus on *inefficient* fossil fuel subsidies. Since the condition of 'inefficient' is not specified further, different reports approach the topic of 'inefficiency' differently. In some cases, countries acknowledge favourable treatment of one group vis-à-vis another, but claim that the choice is not inefficient (depending on the exact definition), because it is not harming social welfare, and that it is therefore not an *inefficient* fossil fuel subsidy.

5.2 DIFFERENT PRIORITIES FOR DIFFERENT COUNTRIES

The picture that emerges from the G20 assessments is one of great 'unease' with unilateral reform of tax code provisions, perfectly in line with 'external cost' estimates, without acknowledging that national economies are internationally highly integrated. In short, there is little enthusiasm for reforming tax codes on a national basis, since such policy action could turn out to be a very inefficient choice in the international context, which will not increase social welfare in this international context, due to the relocation of economic activities and environmental harm across borders.

Nevertheless, some countries, i.e. Italy and Germany, do transparently map a great range of differentiated tax schemes and tax exceptions, relate tax questions to 'external cost' assessments, and acknowledge that internationally concerted reforms should be welcomed. It must also be noted, however, that this is only the case in the reports of Italy and Germany, and not so much in the other reports. The actual application of the inventory approach in the G20 reviews differs significantly from one country to another.

This seems to relate to the development stage of the countries under investigation, i.e.

(1) In the non-market economy of China, the focus is on a move towards (competitive) markets ('marketization', as it is referred to in the China report);
(2) In market economies with regulated prices in a range of sectors, such as Indonesia and Mexico, the focus is on the introduction of more competitive elements in those sectors and the establishment of market prices that reflect some sort of supply and demand balance;
(3) In market economies of any kind where governments provide budgetary support to fossil fuel producing or consuming sectors, the first priority is to remove the inefficient subsidies, and the subsequent task might be to remove other (potentially efficient) fossil fuel subsidies later; this goes for all countries assessed in the context of the G20, but it certainly is a solid point of attention in the advanced market economies of the United States, Italy and Germany.

(4) In advanced market economies with only very limited budgetary support to fossil fuel use, the focus appears to shift to tax code reforms in order to 'internalise' externalities; by increasing taxes (and therefore government revenues) rather than eliminating government transfers of money to those activities (as the transfers do often not exist); one prime example here is the idea of improving EU carbon pricing mechanisms (a point touched upon in the reports about Italy and Germany).

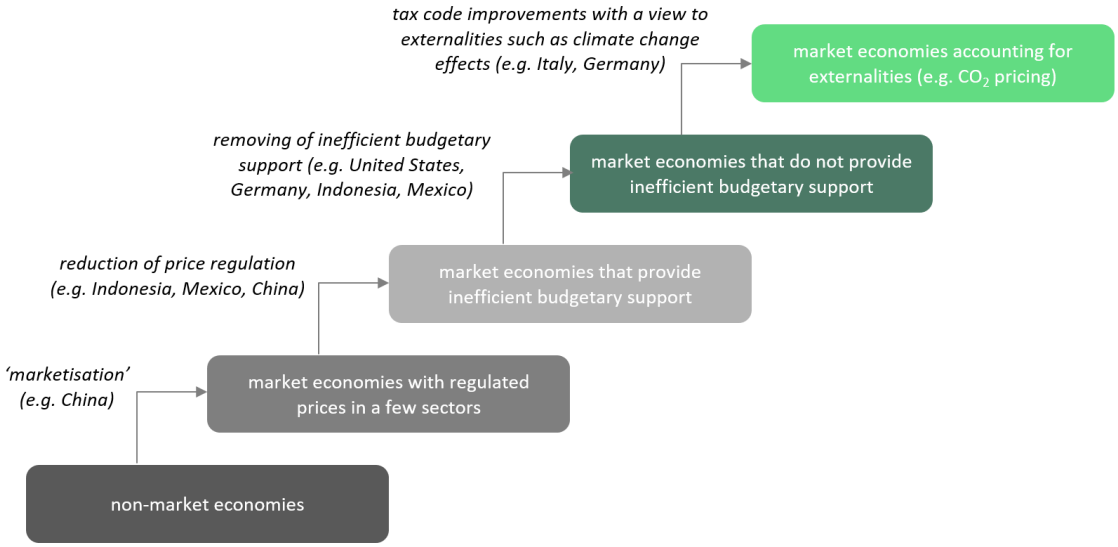

FIGURE 3. DEVELOPMENT IN FOSSIL FUEL SUBSIDY ASSESSMENTS (CIEP CONCEPTUAL FRAMEWORK).

This observation, illustrated in Figure 3, suggests that the concept of 'fossil fuel subsidies' is a fluid one, contextually determined, and not static over time. In the inventory approach, used for mapping fossil fuel subsidies, this must be recognised. Specifically, the taxonomy used cannot be a static one, but rather should be discussed and adapted constantly, depending on new insights. The OECD's inventory of support measures for fossil fuels provides a highly useful starting point.

Ultimately, the process of mapping fossil fuel subsidies must be an inclusive dialogue in which stakeholders can share their norms and discuss the taxonomy, in order to ensure that the assessment has credibility, can build on trust, and will have the necessary political support for the subsequent reform process. To this regard, it is recommended that the Netherlands have a close look at where its peers are at present and may want to adopt an approach similar to its EU peers of Italy and Germany. This implies that it must be recognised that tax exemptions and tax differentiation can be at odds with the principle of internalising external costs. But it must also be accepted that policy reform is ideally realised in an internationally concerted effort, to ensure that positive gains are not nullified by cross border effects, making reforms symbolic rather than effective.

5.3 MEASURING FOSSIL FUEL SUBSIDIES IN THE CONTEXT OF THE UN SDGS

While the G20 countries are already actively engaged in a self/peer-review processes, an alternative fossil fuel assessment framework is emerging in the context of the UN. SDG 12 involves rationalising inefficient fossil fuel subsidies that encourage wasteful consumption, which is consistent with the G20 Pittsburgh Declaration.[31]

UN members are asked to report annually, from 2020 to 2030, on the matter.[32] In 2019, UNEP published extensive guidance in this regard, jointly with the International Institute for Sustainable Development (IISD).[33] Experiences gained through the OECD inventory have informed it. The UNEP guidelines are well in line with the WTO definition of a 'subsidy', as formulated under the Agreement on Subsidies and Countervailing Measures, shown in Box 4.

31 United Nations Environmental Programme (UNEP) & International Institute for Sustainable Development (IISD) (2019). Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals. Core drafting team: Peter Wooders, Anna Zinecker, Ronald Steenblik, Joy Aeree Kim, Jillian Campbell, David Goodman, Laura Merrill, Meryem Torun, Jian Liu, Ligia Noronha, Ludgarde Coppens, Steven Stone, Lowri Rees, Diana Ngina and Alexandre Caldas. Page VII.

32 International Institute for Sustainable Development (IISD), 27th May 2019. What We Can Measure, We Can Manage: Methodology for global fossil fuel subsidy reporting launched. Article available at https://www.iisd.org/gsi/subsidy-watch-blog/what-we-can-measure-we-can-manage-methodology-global-fossil-fuel-subsidy.

33 United Nations Environmental Programme (UNEP) & International Institute for Sustainable Development (IISD) (2019). Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals. Core drafting team: Peter Wooders, Anna Zinecker, Ronald Steenblik, Joy Aeree Kim, Jillian Campbell, David Goodman, Laura Merrill, Meryem Torun, Jian Liu, Ligia Noronha, Ludgarde Coppens, Steven Stone, Lowri Rees, Diana Ngina and Alexandre Caldas.

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);

(iii) a 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

BOX 4. WTO DEFINITION OF A 'SUBSIDY', AS FORMULATED IN ARTICLE 1 OF THE SCM AGREEMENT.[34]

34 The WTO Subsidies and Countervailing Measures (SCM) Agreement "addresses two separate but closely related topics: multilateral disciplines regulating the provision of subsidies, and the use of countervailing measures to offset injury caused by subsidized imports". This is a generic definition for 'subsidy', not specific for fossil fuels. See https://www.wto.org/english/tratop_e/scm_e/subs_e.htm.

The scope defined in the UNEP guidance report involves:

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

UNEP describes the third category as *optional*.[35] This is understandable, with a view to what has been argued in previous sections and chapters regarding the delicate issue of foregone government revenues and tax codes, and the different situation (stage of development) of various UN members across the world (see section 4.3 and section 5.2). Now, considering the G20 self/peer-reviews of Italy and Germany, two relevant peers for The Netherlands, it is reasonable to suggest that the analysis of the (energy) tax code should be included in future assessments of fossil fuel subsidies in the Netherlands, albeit with caution.

While the issue of externalities is not prescribed by the UNEP guidelines when estimating 'government revenue foregone', it is worth suggesting that estimates of external costs could potentially serve as a guiding principle. Namely, tax code provisions are complex, and in the case of the Netherlands, different rates (regressive rates) apply to a great number of energy consumers. It is difficult to pick one specific rate as 'the norm'. For instance, it is difficult to argue that the rate applied to Dutch households should be the norm for industrial energy consumers which operate in international markets (see the theoretic rationale of 'subsidy' assessment in Chapter 1 and specifically section 1.3, highlighting that inefficient markets require efficient policy responses). In this regard, the more relevant question is perhaps whether the external costs caused by an energy consumer are addressed, and if not, whether the Dutch government can do so in an efficient matter, considering cross-border (external) effects.

To conclude, it is worth mentioning that from 2020 onwards more experience will be gained with fossil fuel subsidy reporting in the context of the UN SDGs and it is recommended to take note of such experiences when conducting fossil fuel subsidy assessments in the Dutch context.

35 United Nations Environmental Programme (UNEP) & International Institute for Sustainable Development (IISD) (2019). Measuring Fossil Fuel Subsidies in the Context of the Sustainable Development Goals. Core drafting team: Peter Wooders, Anna Zinecker, Ronald Steenblik, Joy Aeree Kim, Jillian Campbell, David Goodman, Laura Merrill, Meryem Torun, Jian Liu, Ligia Noronha, Ludgarde Coppens, Steven Stone, Lowri Rees, Diana Ngina and Alexandre Caldas. Page 54.

5.4 CONCLUSION

This chapter explains how assessments are performed in the context of the G20, and how they are being developed in the context of the UN SDGs. These assessments are specific applications of an 'inventory approach', aimed at mapping the policies and measures in a given country that could constitute fossil fuel subsidies, from which relevant lessons can be drawn.

From the G20 reviews it follows that the international context is important for the countries under investigation, as it is uncertain in cases whether actual reforms will lead to better social welfare in practice, given cross-border effects. While a policy or measure may constitute a fossil fuel subsidy, some governments in the G20 context suggest that unilateral reform may not lead to desired outcomes.

It must be stressed that the assessments carried out by the G20 countries differ significantly from one country to the next. Notably, the assessments appear to vary greatly with the stage of socio-economic development in different countries. Additionally, norms may change over time. In the case of the Netherlands, it is recommended to take note of the assessments of Italy and Germany, more so than the assessments focusing on countries such as China, Indonesia, and Mexico. This not only implies a need to take note of 'uninternalised externalities', but also that this issue is preferably addressed in an international, concerted effort, rather than unilaterally.

Fossil fuel subsidy assessments in the context of the UN SDGs are under development. UN members are asked to report annually from 2020 onwards. UNEP provides useful guidelines, closely in line with the WTO definition of the term 'subsidy'. It is relevant to stress that the analysis of tax codes and foregone government revenue is optional under the UNEP guidelines. But given the work done in the context of the G20, and specifically by Italy and Germany, the relevant peers for the Netherlands, inclusion of an analysis of the energy tax code is worth contemplating. The UNEP guidelines do not suggest to include an analysis of externalities, when analysing tax codes. However, in some cases it may prove to be difficult to determine reference tax levels. At times, estimates of external costs can therefore be helpful, as a guiding principle.

CONCLUSION

The final chapter discusses the assessments carried out in the context of the G20. The reports reviewing Italy and Germany are particularly informative to future fossil fuel subsidy analysis in the Netherlands, but at the same time leave questions unresolved, specifically in relation to tax codes, foregone government revenues, and externalities. Additionally, the chapter brings forward the assessment processes underway in the context of the UN SDGs, and the guidelines provided by UNEP. UN members are asked to annually report on the matter from 2020 onwards.

Against this background, it is suggested that from 2020 onwards, assessments of fossil fuel subsidies in the Netherlands could be done following the UNEP guidelines. These guidelines are closely in line with the WTO definition for what constitutes a 'subsidy' (see Box 4) and it defines the following scope for the analysis:

- direct transfers;
- induced transfers (reporting on regulated prices and calculation of the total amount);
- tax expenditures, other government revenue foregone and under-pricing of goods and services, including risk (optional).

The analysis of tax codes and foregone government revenue is *optional*. This is understandable, given the complexity of such an analysis, and given the fact that different UN members are in very different stages of socio-economic development. That being said, with a view to the G20 reviews of Italy and Germany, as well as ongoing political and societal discussions following the work done by the IMF, the inclusion of such an analysis in a future assessment of The Netherlands is recommended.

The Dutch energy tax code is differentiated in nature. In some cases, it will be difficult to determine reference levels for tax rates from which to measure 'foregone government revenue'. UNEP does not argue for the analysis of externalities. Yet, estimates of external costs can potentially serve as a guiding principle in the assessment of The Netherlands, when it is otherwise difficult to determine a reference tax level. Such estimates should always be treated with great caution, and should take note of alternative policies that already internalise externalities, such as the EU ETS, in order to prevent double counting.

It should be stressed that the question of phasing out fossil fuel subsidies in The Netherlands has essentially developed into a question of the 'greening of taxation'. The IMF recognises opportunities for the greening of taxation worldwide, and suggests that a failure to do so constitutes a subsidy. This can be explained from the idea of 'foregone government revenue', a concept that frequently occurs in the fossil fuel subsidy debate. At the same time, it should be kept in mind that IEA analyses consistently reveal no fossil fuel subsidies in The Netherlands, since end user prices are not pushed to a level lower than what is expected, given energy prices in international energy markets.

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