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Environmental taxation

Rationale, experiences and implications for green economy transformation

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Sida's Helpdesk for Environment and Climate Change is a government agency collaboration between the Swedish University of Agricultural Sciences (SLU), University of Gothenburg (GU) and Sida to promote enhanced integration of environmental issues and perspectives in Swedish development cooperation.

Executive summary

The Helpdesk for Environment and Climate change has been requested by Sida (EUROLATIN Department) to write a short report on environmental taxation. Questions addressed in the study are: i) why a country should choose to work with energy-, carbon dioxide- or other environmental taxes; ii) how energy and environmental taxes work, iii) what effects they have including examples, iv) what advantages or disadvantages environmental taxation have in comparison with working with other taxes, and v) what green taxation implies for a country's adjustment or transformation towards sustainable development and attaining the global goals under Agenda 2030.

Green taxation and environmental fiscal reforms contribute to a green transition, implementation of Agenda 2030 and the Paris Agreement, and attain sustainable development as such. Green taxation is part of a broader package of policy instruments that can be used to promote environmental improvements, increased government revenues, poverty reduction and social and economic development.

Economic policy instruments (EPIs) principally include measures like pollution fees, waste charges, natural resource taxes, introduction of green subsidies or removal of wasteful/inefficient subsidies. EPIs can also include measures like tradeable pollution permits and active use of public procurement for environmental and other public goods purposes.

Establishing prices on pollution, degradation of ecosystem services or natural resources through taxation (or any other economic policy instrument) may induce reductions in these negative environmental effects. Taxation of incomes and company profits acts as dis-incentives to increase labour supply and private sector investments. By swapping incomes and company taxes for pollution and resource taxes, incentives are introduced to reduce pollution and resource depletion, and increase labour supply and employment, and company investments and production.

Successful environmental fiscal reforms are typically often complemented with use of other environmental policy instruments. They include rules and regulations (such as bans, product norms and standards, pollution limits etc.), information and awareness raising vis-à-vis stakeholders, and promotion of voluntary agreements and commitments by producers and/or consumers. The reforms are also helped by disclosure of information (or data) of environmental status and change, and involvement of stakeholders and researchers, in planning, design, implementation and follow up (monitoring, impact evaluation).

Green taxes (including carbon dioxide and energy taxes) **can replace or complement other taxes in society, such as taxes from job incomes or corporate profits.** This is beneficial to society since pollution and unsustainable natural resource depletion (of e.g. forests, minerals, waters, oil, gas and coal) are so called public bads; they are destructive to society.

In addition to the positive environmental effects, **green taxation adds important and much needed public revenues to the treasury for spending on public goods.** Tax-to-GDP ratios tend to be rather low (10-25%) in low income countries, restricting the capacity of governments to invest in poverty reduction, infrastructure, healthcare, education, or the transition to low-carbon, climate-resilient

economies. Green tax incomes would offer opportunities to invest in such measures for sustainable development.

Green taxation and environmental fiscal reforms have been used relatively less in low- and middle-income countries (compared with high-income countries). Hence, large unused potentials and opportunities remain to be harnessed in these countries. It could add much needed public financing at the same time as pollution and resource depletion decline, as well as poverty be reduced. This is particularly important as pollution and resource extraction is typically more rampant in middle- and low-income countries than in richer countries.

Design and implementation of **green taxation and environmental fiscal reforms are in principle not very different from other taxes or economic policy instruments.** As with all taxes, it presupposes careful design of cost-efficiency, analysis and appropriate management of winners and losers, transparency and accountability, impact evaluation, measures to reduce inequities and unintended negative effects, wise use of the revenues etc. However, there are two fundamental differences:

- **Successful design of green taxes will initially increase the tax base and subsequently reduce the revenues from the tax.** In other words: if a tax is designed to reduce pollution, then the introduction of the tax will start generating revenues from the pollution. Eventually it will induce changes in technology, production processes, changes in consumer behaviour etc to reduce pollution costs caused by the tax, and hence lead to declining (incomes from the) pollution as it declines with the existence of the tax. This effect can eventually be compensated by introduction of other taxes, but is nevertheless a drawback from a tax revenue sustainability point of view.
- **Green taxation needs to be designed with good knowledge of the bio-physical environment and the environmental effects such taxes may have.** There is thus a very strong need to better “understand nature” in economic planning and decision-making. Other “normal” taxes on consumption or production (such as a value added tax (VAT), income taxes or company profit taxes) may also have environmental effects. But in the case of specific taxes on pollution and natural resource extraction, it is particularly important to know if and what effects they have on pollution and natural resource extraction. Absence of such knowledge makes the effects very uncertain and may even be harmful to the environment as well as to social and economic development. Typically, ministries of finance and tax agencies do not have this knowledge, so there is also an associated need for capacity building on these issues.

Using green economy reforms to promote transformation towards sustainable development presupposes strong and capable government institutions to do the job. This implies typically that ministry of finance is strongly on board and in charge (for policy design and follow up), together with ministry of environment and other relevant line ministries, as well as strong and capable government agencies such as the tax agency, the environmental protection agency and other relevant agencies. Critical areas of expertise and data is: i) knowledge to design and implement green economy reforms including capacities to adequately collect taxes and allocate tax revenues, ii) environmental data and capacity to analyse it, and iii) capacity to conduct economic and environmental impact evaluation.

Although used to a lesser extent in low- and middle-income countries, there are several good examples of applications of green economic instruments in these countries. In this report we

present examples from e.g. removing subsidies in the district heating sector in **Ukraine**, promotion of swaps from fossil fuel subsidies to power sector development in **Ethiopia**, incentives to swap from kerosene to solar lighting in **Bangladesh**, taxing coal to fund clean energy and energy security in **the Philippines** and **India**, targeted electricity subsidies in **Rwanda**, and implementation of feed-in tariffs and reverse auctions for solar power in **India**.

To summarise, green taxation and (more broadly) environmental fiscal reforms contribute to operationalise Sustainable Development Goal 8 (sustainable economic development and decent jobs), and – rightly designed and implemented – it offers a powerful set of tools and a practical approach to attain the global development goals of Agenda 2030 and sustainable development.

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1. Introduction

The Helpdesk for Environment and Climate change has been requested by Sida (EUROLATIN department) to write a short report on environmental taxation. The Terms of Reference for the assignment states that the Helpdesk shall briefly describe or explain:

- why a country should choose to work with energy, carbon dioxide or other environmental taxes
- how energy and environmental taxes work
- what effects they have
- what advantages / disadvantages it (environmental taxation) has in comparison with working with other taxes
- what green taxation implies for a country's adjustment or transformation towards sustainable development and attaining the global goals under Agenda 2030.

The particular point of departure and operational purpose of this assignment is to inform and support the Swedish embassies/Sida and the Swedish Tax Agency in their respective dialogues and cooperation with partner tax agencies. It can be prior to, or in adjustment of current contributions (projects/programmes) in the area of taxation. Currently Sida supports strengthening of taxation agencies in several low- and middle-income countries.

Caveats and delimitations: The questions above are indeed very broad and comprehensive, and cover large areas of research as well as practice, in a range of country contexts and sectors. Within the time limit and scope of this assignment (three weeks, max 15-20 pages) it is thus impossible to give a full treatment of all of them. Nevertheless, it is possible to provide *some* evidence and lessons learned. They are described below. As a major delimitation the presentation below does not provide technical details on how environmental taxation can be designed, or include more technically advanced types of environmental economic policy instruments like cap-and-trade/emissions trading schemes, refundable emissions charges, auctions etc.

2. Rationale: why work with energy-, carbon-, and other environmental taxes?

Taxes and other economic policy instruments (such as fees, charges, subsidies) address failures created by the market, where producers and/or consumers through their actions impose negative environmental effects on others without taking economic responsibility for these effects. To exemplify, **market failures** can be industries which through their production pollute rivers and downstream areas on which poor people depend for their livelihoods. Here, the unregulated market does not prevent these negative effects (indeed costs) to happen and affect others. Similarly, it can be consumers who purchase goods (clothes, food, vehicles etc) that are produced from natural resources that are being depleted unsustainably. It can be consumers who purchase and use energy, (e.g. oil, natural gas, coal and firewood) for their livelihoods which depletes limited natural resources, produce a lot of pollution and impose costs on others.

Addressing these market failures is typically done by increasing the price of an activity with a tax or a charge/fee that reflects the cost of environmental harm it imposes on others. Introducing such environmental taxes reduces the intensity of the activity and therefore integrates (*internalise*) the environmental cost (the externality) into the market price. Using this policy approach normally provides a powerful incentive for the producer or consumer to reduce its negative impacts imposed on others. Normally the tax would reduce production and/or consumption and its negative environmental effects, or cause the producer to shift technology to reduce the negative environmental effects. Of course this depends on the level of the tax, charge or fee, and whether it in fact is collected, and follow up is conducted. If the tax is very low or not enforced, it may not change production or consumption behaviour, and hence pollution or natural resource depletion, to a very large extent. Increased and enforced taxes will induce change (OECD, 2017; 2019; UNEP 2019).

Economies are distorted and give rise to environmental degradation not only due to market failures, but also due to policy failures. **Policy failures** appear in the form of unclear or absent property rights, and weak (environmental) regulations and insufficient follow up and enforcement. If farmers and small holders have unsure user/property rights to natural resources on which they depend, such as farmland, forests, grazing areas, wetlands, fisheries etc, they have weaker incentives to invest in these resources. It is not inevitable, but the incentives to manage the resources sustainably are considerably weaker than if they had clear and secure user or property rights. Effects of policy failures include e.g. negative environmental effects hitting vulnerable groups in society and people living in poverty. These groups rarely have the means or opportunities to protect themselves or their resources or prevent these effects to happen.

Economic policy instruments are a stronger and more cost-effective incentive than legal regulations to prevent pollution or natural resource depletion: Setting limits through legal regulations for the allowed amount of pollution or natural resource depletion makes it free for producers and/or consumers to pollute or deplete up to the legal limit. This cost less approach imposes small incentives to change behaviour. One rationale for environmental taxation is that it corrects for this shortcoming (“free up to the limit”) associated with legal regulations. Another rationale is the possibility to shift the economic burden from taxation of public goods - i.e. things that

are socially desirable, such as incomes from sustainable investments and employment - to taxation of environmental “bads”, i.e. various forms of pollution and unsustainable depletion of natural resources. Promoting taxation of pollution and natural resource depletion supports public goods such as clean water, clean air, functioning wetlands, and thriving biodiversity and ecosystems. Moreover, introducing environmental taxes help implementation of the polluter pays principle, as they directly confront polluters. Regulating market failures can be done through prescriptive regulations, called command-and-control, or economic incentives such as taxes and subsidies.

Pricing pollution is an effective way of reducing the pollution: There is a wide agreement amongst economists that putting a price on pollution is an effective way of reducing the pollution. This also applies to local, regional as well as global pollution such as emissions of carbon dioxide and other greenhouse gas emissions causing global climate change. Measures to cost-effectively deal with the problem is to set a pollution/emissions limit, and allow trade of emissions rights within the total limit, or introduce a carbon tax (Metcalf and Stock, 2020). Pricing instruments, like environmental taxes, reduce environmental damage, provide incentives for further efficiency gains and green investments, and shift harmful consumption patterns towards greener alternatives. This applies generally but is also applicable in the area of energy, where taxes on “brown” sources of energy (oil, gas and coal) introduce incentives to make their production cleaner and/or phase out those types, and promote “green” sources of energy such as wind, solar, hydro and geo-thermal.

Environmental taxation is a more flexible approach towards reducing pollution or natural resource depletion: Environmental taxes – much like other traditional taxes - hold several advantages compared with regulation or very specific and targeted subsidies for certain green technologies. A tax is an incentive aimed at reaching certain effects. Taxes are not necessarily only to prevent negative effects but also to induce positive effects. A tax leaves consumers and businesses with flexibility to decide how to change their behaviour, reduce harmful activities, and promote positive economic, social and environmental changes. Unlike subsidies or incentives for environmentally friendly practices, a tax does not rely on the government to steer the economy in favour of certain solutions over others.

Unlike for instance set pollution limits, environmental taxes provide a *continuous* incentive to abate, even if significant pollution abatement already has occurred. A tax also improves competitiveness on low-emission alternatives, like public transport, without the need for subsidies. Furthermore, environmental taxes can increase firms’ incentives to develop innovations and adapt to existing ones. Innovations can lead to new and less harmful technologies, processes, and products. In addition to these advantages, environmental taxes offer a powerful set of tools to reduce pollution and natural resource depletion on cost-effective ways, compared with e.g. regulations. They also raise revenue to the national treasury and offers opportunities to enhance income equity across income groups (Cottrell et al. 2016). As indicated earlier, a pollution or resource extraction tax could have initial revenue boosting effects but as implementation reduces the pollution or resource extraction, the revenue from the specific tax may decline. In developing countries, a proportion of revenues (so called earmarking) could be used to resolve social equity issues, protect the vulnerable, and reduce poverty via pro-poor investments (Cottrell et al. 2016).

Some traditional taxes are also “environmental taxes”: While designated taxes on pollution or natural resource depletion indeed are environmental taxes, traditional taxes on incomes or consumption VAT (value added tax) on goods and services also function as environmental taxes, although more indirectly and implicitly. This should be kept in mind when designing taxes or tax reform. Taxes on e.g. income reduce consumption of goods that are made from (unsustainable extraction of) natural resources such as timber, minerals, water, oil, coal and gas. Similarly, VAT on consumption goods play a similar role. Richer people consume more, use more resources and pollute more than people living in poverty. The revenues from income taxes or VAT can be used for public goods and services with less environmental footprint, e.g. education, health, development of democratic institutions, research, institutional development etc.

Box 1. What well-designed environmental taxes can contribute with

In summary, energy-, carbon dioxide- and other environmental taxes that are well designed can:

- Correct for market and political failures by internalising external environmental costs,
- Create incentives to shift away from damaging behaviour and unsustainable production- and consumption patterns,
- Trigger innovation to phase out “brown” economic activities and promote “green” economic activities

Generate revenues that are based on economic activities one wants to discourage (pollution intensive industries, unsustainable resource use etc.) and facilitate growth of economic activities one wants to encourage and see grow, e.g. those that are pro-poor, inclusive, labour intensive, climate smart, low in carbon and emissions, and resource efficient.

3. How energy and environmental taxes work

Policymakers can use several policy tools to encourage companies/producers and households/consumers to reduce harmful pollution of air, waters and land, or unsustainable resource depletion. The two main categories are regulatory policies and fiscal policies. **Regulatory policies** are formulated by the government to impose restrictions on certain activities or behaviour, e.g., command-and-control regulations that require polluters to meet a specific emission-reduction target. **Fiscal policies** are the mean by which government adjust its tax rates or spending (e.g. via subsidies) to meet environmental and other political objectives. It designs or adjusts economic instruments like taxes, charges, fees or subsidies to regulate harmful environmental activities (IMF, 2019).

Pollution imposes environmental, social, and economic costs on society. These costs are typically not reflected in market prices. Thus, both producers and consumers have little incentives to consider or reduce these costs (UNEP, 2019). Environmental taxes work as a charge per unit of emission levied by a regulator, usually the government, on a polluter. A tax puts a price on the emission and ideally captures the external costs of the emissions; i.e. the cost that otherwise would be paid by the public, in the form of local air or water pollution, reduced crop yields, reduced income due to environment-related diseases, or increased health care costs or loss of biodiversity. A cost of emissions (charge per unit) shifts the burden from the public (the victim) back to those who are responsible for the emissions and their associated costs. Typically, such increased costs of production will reduce the emissions (World Bank Group, 2021). A tax on emissions, set on an appropriate level, will increase the price of emission-intensive goods and services and thereby function as an incentive for consumers to buy, and producers to produce, goods with less emissions (Cottrell et al. 2016).

An environmental tax is appropriate if pollution or the unsustainable natural resource depletion are reduced at the same time as the general economy and its actors are not unduly hurt. Timing and sequencing are key, and it is usually wise if reforms are gradual to allow for economic actors to respond flexibly in relation to the new legislation/regulations. When designing an environmental tax, there is a need to ensure that the tax base - the amount and intended target group(s) on which the tax rate is applied - is clearly set and correctly targeted, to increase pollution costs while keeping administration costs as low as possible. More formally, the tax rate should be set to be equivalent to the marginal social cost of pollution or natural resource depletion. Ideally new tax rates should be announced as early as possible, with gradual increases, allowing target groups time to adjust their activities. These considerations can minimize negative economic impacts, increase ownership and reduce potential opposition (UNEP, 2019).

Sometimes using fees and charges are preferred over a tax: Similar to an environmental tax, fees and charges increase the cost of polluting or natural resource extraction, and hence discourage consumption and production of emission- or resource-intensive products or activities. However, there is a difference between a tax and a fee. A fee is a required payment, meaning the payer of the fee gets something in return in proportion to the payment made. In contrast, a tax is a compulsory, unrequited payment. To exemplify the difference, a wastewater payment that varies according to the *volume of water consumed* is a fee, while a wastewater payment that varies according to the *amount of pollution generated* is a tax (OECD, 2017). When designing the most appropriate economic policy

instrument it is important to weigh use of a tax or a fee/charge (and other economic instruments) against each other.

Promote appropriate subsidies and remove/phase out harmful subsidies: Subsidies are used by governments world-wide to influence behaviour of producers and consumers, on what and how to produce, and what to consume. For producers, subsidies affect the choice and competitiveness of different technologies. For consumers, subsidies can make different goods (and services) more or less affordable, and more or less attractive. For instance, subsidising renewable energy can help consumers afford clean energy, reduce emissions and health impacts, and encourage investors to take risks in new markets (IISD, 2020). Using subsidies governments can increase the employment potential in the renewable-energy sector. By removing fossil fuel subsidies and instead subsidising clean energy, governments can promote investments and create employment opportunities in the clean energy sector, as it is more labour intensive than fossil fuels. The renewable energy sector also has higher employment rates for women than fossil fuel industries (IISD, GSI, The Green Initiative, 2017).

Fossil fuel subsidies are common in low-and middle-income countries and have large impacts on emissions and climate change. Subsidies on fossil fuels slow down the transition to cleaner fuels, and consume a significant portion of government revenues (Skovgaard and Van Asselt, 2018). Maintaining subsidies on e.g. water and electricity typically results in more wasteful or inefficient use, compared with a situation when there is no subsidy, and the resources are most costly. Then user need to economy more on the use of the resource. Removing fossil fuel subsidies is thus an important strategy to reduce pollution and cut greenhouse gas emissions. While these subsidies are often advocated as measures to fight poverty, studies show that benefits from fuel subsidies are captured mainly by the richest households. Reducing or fully removing costly and harmful subsidies saves government funds that can be used for other more precious public spending, e.g. on education, health, improving public transport and transitioning to a greener economy (UNEP, OECD, IISD, 2019).

Combine green taxation with regulatory measures and information and encourage voluntary agreements: Economic policy instruments are typically powerful tools to influence behaviour among producers and consumers. However, environmental problems are not always best dealt with by using only a tax, subsidy or a fee. Sometimes other policy instruments are more cost-effective. A drawback is that richer and more powerful consumers or producers can “buy their way out” from the environmental problems they create. In other cases, it is not wise at all to introduce a tax to prevent or minimize the effect of an environmental problem. In the case of very hazardous pollutants such as arsenic, mercury, cadmium and lead, it is more appropriate to introduce a prohibition and strict pollution limits. In most cases it is wise to keep an open mind with respect to the choice of policy instrument and combine green taxation with regulatory measures (e.g. pollution limits), information, and encourage voluntary agreements. Voluntary agreements are usually made by a group of producers which commit to limit their negative environmental impacts in production, ensure that their products meet certain environmental standards (shown by designated labels or similar), and build environmental disclosure systems that show their environmental footprints, management plans etc.

Use feed-in tariffs for emerging industries, technologies or markets: Another subsidy-related policy tool designed to support the development of renewable energy sources is feed-in tariffs. This policy instrument is often necessary in the early stages of development when production is not economically feasible, giving producers an above-market price. Feed-in tariffs have been implemented in several Asian countries, e.g. Thailand, Indonesia, the Philippines, Malaysia, India, and China. The overall evidence shows that feed-in tariffs in Asia have attracted private investments in diverse forms of renewable energy and induced an impressive amount of investments in renewable energy (Coria, Köhlin and Xu, 2019).

When planning for or using environmental taxes, there are some issues planners and decisionmakers need to keep in mind and integrate in their work:

Address equity issues and distributional impacts: When designing pollution taxes, it is essential to understand the distributional impacts of the tax, to analyse who bears the burden of it, and consider complementary policies when it is necessary. Without accounting for re-distribution of tax-revenues or any differentiation in the pollution tax or resource tariff, low-income households will be affected disproportionately as they have the least margins to cope with a tax or resource price increase.

A tax can be progressive and take a larger percentage from taxpayers as their income rises, but it can also be regressive when lower-income taxpayers pay a larger percentage than higher-income taxpayers (UNEP, 2019). Environmental taxes are often assumed to be regressive, and it is a common argument against implementing them. Generally, however tax increases are progressive as richer households generally pollute more or use more of a resource (water, energy) than poorer households. To exemplify, increases in costs of petrol will affect richer households more and they will contribute more to tax revenues as they typically drive more car, and use more road transport. People in poorer households typically do not have a car and transport themselves much less than richer people. However, whether environmental taxes are regressive or progressive, depends on the policy context, and it is not possible to know a priori without empirical evidence.

There are many examples of progressive environmental taxes, not least because countries have implemented the measures as a broader package of fiscal reform, including measures to reduce labour taxes and compensate citizens that are more vulnerable (Cottrell et al. 2016). The distributional impacts of environmental taxes vary, and equity issues and resistance among affected groups are often barriers to implement such taxes. Taxes on transport are often considered to be progressive or neutral in low-income countries. Sterner (2012) finds progressive tendencies in lower-income countries compared with European countries. Similarly, raised tariffs on water and energy tends to be progressive since richer households consume much more water and energy than low-income households.

Consider compensating the poor for income losses due to tax increases: An increase in taxes or fees on transport, energy or water will de facto increase the costs for people living in poverty. Although smaller in absolute amount compared with richer households, the increase in cost can be difficult to bear. Hence, governments in these reforms may consider compensatory measures and e.g. recycle some of the tax revenue back to the poorer and most vulnerable consumers, or introduce some other benefit that compensate for the cost increases (Sterner and Köhlin, 2015). In low-income countries, there is a high revenue potential from taxes on natural resource depletion since the

economies are often dominated by these kinds of industries/activities, e.g. extraction of minerals, forest timber, water, fisheries, oil, gas and coal. Taxes on natural resources are generally paid by businesses, not households, unless the taxes affect the prices of the final products. If the natural resources are exported, households are left unaffected by the tax and might benefit from the revenues (Cottrell et al. 2016).

Fiscal policies are often part of a bigger toolbox with other complementary policy instruments that together can create profound systematic changes, and changes in behaviour among producers and consumers, needed to reduce pollution or unsustainable resource use. Thailand is one example where the government adopted a combination of measures to enhance environmental-economic management in the transport sector, including fiscal incentives, regulatory policies, information tools, traffic management measures, vehicle maintenance and inspections, etc. Eventually, this package of measures phased out leaded petrol (UNEP, 2019).

Critical to ensure social inclusion and public acceptance: Engagement of the public in the design and introduction of a new pollution tax or charge/fee is important to gain public acceptance once it is introduced. Similarly, how the revenues from the tax are used, and how it is communicated to the public, can greatly impact the public acceptance of the fiscal policy measure (UNEP, 2019). Here transparency from the government is critical as well as the need to clearly explain why the tax is needed, what it is intended to accomplish, and what measures are planned to compensate for potential negative effects.

Public participation through a transparent and effective environmental information system can help planning and implementation of a tax change or tax reform. In order to ensure effective enforcement, it is important to build a strong compliance culture within responsible government institutions, and among targeted private sector actors and (stakeholders within) the public community more generally. Typically in these reforms, there is a need for well-targeted provisioning of relevant and timely information and education about the reform and its compatibility with current environmental, economic, social development policies, and how it can enhance the country's performance (UNEP, 2018).

Acknowledge importance of good governance and effective institutions: Key conditions when implementing environmental policy measures are good governance and effective institutions. These factors make it possible for society to respond to pollution in fair, just and socially acceptable ways. Conversely, corruption, poor governance and weak institutions are typically major obstacles to good management of pollution (the environment) as well as sustainable economic and social development. Corrupt regimes and administrators may accept bribes from polluters to allow illegal activities to continue, or issue resource use licenses without consideration of sustainability issues. Such behavior leads to lost revenues, public distrust and sometimes even open conflict among stakeholders, and inability to prevent or minimize pollution and unsustainable natural resource extraction (UNEP, 2018).

Box 2. Procedural issues to promote successful green taxation reforms

There is not one process that ensures successful reform, but lessons from experience shows that some procedural issues are of great important: If institutional capacity is weak, start with simple scheme, build gradually and consolidate each step as it expands. **Ensure support from the very top of the government**, ideally with the prime minister or president as an explicit supporter of the reform. As it deals with tax instruments, preferably ministry of finance is in charge in tandem with the tax authority (and the relevant line ministries) to ensure technically feasible reforms. Get key ministries to cooperate, typically they need to talk to each other. Sometimes there is lack of trust among ministries. Hence, there is a need to build trust across them. In order to anticipate any institutional constraints that can hamper reforms, it may be necessary to first conduct an institutional analysis of key ministries and agencies that can reveal potential planning and implementation problems.

Introduce a tax/taxes on inputs or resources, rather than pollution as it is easier and less costly to administrate. Pollution taxes are more difficult to measure. Aim at a low number of taxpayers, which implies fewer collection points. It is easier to introduce a tax vis-à-vis oil in refineries, than emissions from individual cars. This is especially important for weak tax agencies, where collection and monitoring capacity is low.

Ensure good timing and sequencing: The more the reform is planned, analysed and understood in advance by the responsible government institutions, the better the introduction will be. Involve researchers, do pre-studies, build trust and confidence, involve all relevant ministries. Conduct stakeholder mapping and analysis and sector analysis, on how different sectors are likely to be affected; how negative effects can be prevented, which are likely winners and losers from the reform and how they can be managed properly. Consider compensation for losers, to be phased out across time.

Start with a measure that shows **big/tangible positive effects**, e g energy or transport taxes. It opens up opportunities for revenue sharing. Seek early positive impacts but have a long-term plan (5-10 years). Keep stakeholders informed on what is planned and in the making. Invite comments and suggestions. Avoid negative surprises and ensure early announcement of planned reforms to facilitate adjustment and investments among operators or investors to cope with the new taxes. To prevent backlashes, create an open information and communication scheme for the reforms.

Ensure cost-effective administration: The administration necessary to introduce, maintain and follow up environmental taxes are vital parts of the design and implementation of policy instruments or more broadly environmental fiscal reform. Considerations pertaining to administration should enter the discussions early on in the policy design to minimize bureaucratic costs (GGKP, 2015). It is usually the tax agency responsible for collecting the taxes, which is a part of the central government. However, there are exceptions when local authorities set the tax rate and collect the taxes, or fees, charges, tariffs or equivalent economic policy instrument (UNEP, 2019). While administrating environmental taxes needs sufficient capacity, most countries already have a tax system in place, which makes introduction of environmental taxes a lot easier than if the required system was not in

place (Pegels, 2016). For countries lacking a robust tax system, it will be beneficial to strengthen the existing system collecting and managing taxes. In Chile, for example, introduction of new green taxes required new institutional infrastructure and better inter-institutional relationships. With this in place, the system could support future expansions and use of more complex tax instruments (UNEP, 2019).

One fundamental challenge with fiscal policy instruments is to ensure maximization of revenues and minimizing administrative costs. When the cost per unit of revenue decreases, administrative efficiency increases. Hence, administrative efficiency increases with the size of revenues. Implementing fiscal policy instruments generating low revenues would therefore not be efficient. Likewise, administrative efficiency decreases when the complexity of the instrument increases. Because of this, governments need to assess the expected amount of tax revenues. Since governments often have solid data on imported fuels or produced electricity, this is often quite simple. In comparison, estimating revenues from an income tax in a country with a large informal sector is much more complex than assessing the amount of petroleum used in a year (GGKP, 2015).

Address political economy, ownership, power and accountability issues: In government reforms, that involve winners and losers and organizational changes, it is typically necessary to address issues related to political economy, ownership, power and accountability. Here there is no fundamental difference between environmental taxation and other taxation (or fiscal) reforms. It is critical to build a process that is accepted and understood by all relevant key stakeholders. Ensuring buy-in is essential and the need to come to a joint agreement. Experience shows that successful reforms are typically labour intensive in the planning, where it is necessary to spend a lot of time with key stakeholders to explain and discuss. Implementation is usually more successful if it is gradual in character with consolidation of each step. Transparency is necessary on the intended use of the tax revenue, to increase acceptance and avoid resistance. Allocation of revenue is an important tool to ensure buy-in among potential losers, and to prevent resistance tax exemptions can be used initially to minimize the negative effects. It also allows for adjustment among those affected by the tax, e.g. industries which need to re-organize their production processes, invest in new abatement technologies, or similar green mitigation measures.

4. What effects do they have – some general experiences and examples

This chapter describes different types of effects environmental taxation (or more broadly, environmental fiscal reforms, including subsidies or removal of subsidies) may have, some general experiences and empirical examples. As a general point of departure, by changing fiscal incentives governments can affect behaviour of producers and consumers. Studies e.g. in Asia on taxes, charges, and subsidy cuts show significant environmental efficacy, and that polluters are highly responsive to price signals (Coria, Köhlin and Ju, 2019).

Environmental taxation is useful in countries with a large informal sector: A general advantage with environmental taxes is that they can help broaden the tax base and increase the total tax income in countries with large informal sectors (Edenhofer et al. 2015). Environmental taxes apply to both the formal and the informal sector in a country. To exemplify, if a tax is introduced on petrol (or water or energy more broadly) then it will affect consumers who operate in the formal as well as in the informal sector, since both sectors consume petrol, energy or water. Taxing work income, capital or profits in the informal sector is much more difficult. Due to this effect, replacing income and profit taxes with environmental taxes can reduce incentives to stay in the informal sector (Pegels, 2016). Studies show that the impacts of environmental taxes in informal employment can result in a triple dividend: a better environment, lower unemployment, and a higher after-tax income of the private sector (Kuralbayeva 2013). So if a higher tax burden within the informal sector reduces employment in this sector and leads to higher pressure for formal employments, then governments also need to promote employments in the formal sector to meet this demand.

Box 3. Swaps from fossil fuel subsidies to the power sector in Ethiopia

In Ethiopia, the removal of virtually all fossil fuel subsidies in 2008 (worth more than USD 600 million a year) acted as a swap and a strong enabling policy to enhance renewable energy deployment. By investing a further USD 1.5 billion between 2005 and 2010, the country was able to **scale up hydro, solar, and wind electricity generation significantly**. In the case of wind, it moved from 29 gigawatt hours (GWh) of generation in 2011 to 533 GWh in 2018. Via such policies and its overall political commitment to clean energy, **Ethiopia's power sector has also attracted foreign direct investment and financing** from several multilateral development banks. The investment of USD 1.26 billion in the Ethiopia–Kenya Power Interconnection project by the Ethiopian government in conjunction with the African Development Bank, the French Development Agency, and the World Bank is one example that has significantly reduced the vulnerability of a sector highly dependent on hydropower and subject to droughts. Through such projects, **Ethiopia has been able to increase renewable energy integration** and domestic electricity consumption, as well as to export surplus power to neighbouring countries. Electricity access increased from 31% to 45% from 2008 to 2018. The country is now prioritizing electricity access in rural regions, including through its National Electrification Program, to reach universal electricity access by 2025. Ethiopia has also seen a growth in interest from foreign investors. China has become the main investor in the sector, investing USD 1.8 billion in 2019 into transmission and distribution and supporting smart grid technology development. Additional investments in on- and

off-grid mini grids could increase energy access in rural regions even further and boost agricultural productivity, with an estimated increase in annual agricultural revenue of USD 4 billion by 2025. (Sanchez et al, 2021, p 39)

Environmental taxation can reduce the need for, or complement, other taxes and thus strengthen the tax base: Effective use of environmental taxes can shift the tax burden away from personal incomes and company profits, and instead build on tax incomes from activities a country wants to discourage (e.g. pollution) and contribute to fiscal consolidation (OECD, 2021). Transition of the national taxation system, from tax on labour and capital to activities generating environmental pressure, can be operationalized via Environmental Fiscal Reform (EFR). Increasing environmental taxes and using the raised revenues to reduce income taxes, i.e., keeping the same government revenue, generates a double effect consisting of a better environment and economic benefits to households. This is known as the “double dividend”, and sometimes the triple dividend if employment also increases. Moreover, the revenues from environmental taxes can be used for desired political objectives. EFR can strengthen public finance even further if it also includes elimination or reduction of environmentally harmful or wasteful subsidies (Abdullah and Morley, 2013; Freire-Gonzales and Ho, 2018). To illustrate the effectiveness of an environmental tax, a successful example is the case of the United Kingdom where they increased the carbon prices in the electricity sector from 7 EUR/tCO₂ to more than 30 EUR/tCO₂ between 2012 and 2016. During this period, emissions from the electricity sector decreased by 58%, and the overall emissions from energy use decreased by 25%, mainly due to the generation of cleaner electricity (OECD, 2018).

Box 4. Removing subsidies in the district heating sector in Ukraine

Ukraine was historically one of the most energy-intensive economies in the world and energy subsidies created a significant financial burden. Supported by the World Bank, the Government of Ukraine implemented energy and tariff subsidy reforms in an affordable and socially acceptable manner. The process started in 2014 and involved dialogues, analysis, communication campaigns and improved social assistance programmes.

To meet cost recovery, the government **increased tariffs** in 2015 and 2016 for a combined increase of 470% for residential gas and 193% for district heating. It unified household and industrial natural gas tariffs and set them at import parity level. The gas tariff increases for households and district heating **significantly improved the financial situation of the gas sector...** On the social protection front, in 2014 and 2015, the government simplified social assistance mechanisms by eliminating privileges and provided an option for eligible households to enroll into housing and utility subsidy (HUS) program. It also approved the Gas Sector Reform Implementation Plan, which included the tariff increases and associated social protection measures.

Social Assistance Program reforms increased the share of **targeted assistance reaching low-income households**. Improved targeting helped contain regressive social assistance spending. From a coverage of approx. 1 million to 6.5 million households in early 2017, the scaling up of the HUS program was a successful mitigating policy measure to the large gas and district heating tariff increases especially for the bottom 30%. This would have been impossible without the media engagement plan that endeavored to improve the general understanding of subsidy reforms, especially among journalists. While Ukraine has made significant

progress in this complex area of reform, there remain important areas that need attention. These include further tariff adjustment that respond to changes in import prices and exchange rates, recovery of non-fuel operating expenses, increased coverage and level of support to low income households and reduced compensation/leakages to higher income households.

Adapted from: World Bank, 2017, Ukraine – Energy Subsidy Reform Facility [World Bank Document](#)

Taxes usually more cost-effective than regulatory measures: Compared with command and control measures such as imperatives to introduce a certain new cleaner technology, or adhere to certain absolute pollution limits, an environmental tax leaves producers and consumers with total flexibility to decide how to change their behaviour and reduce harmful activities. A tax does not rely on the government to steer the economy in favour of certain solutions over others. Environmental taxes provide a continuous incentive to abate, even if significant abatement already occurred. A tax also improves competitiveness on low-emission or low-resource alternatives, like public transport, without the need for subsidies or prescriptions for certain technical solutions. Environmental taxes can increase firms' incentives to develop innovations and adapt to existing ones. Innovations can lead to new and less harmful technologies, processes, and products. Well-designed environmental taxes incentivise citizens and businesses to make cleaner choices and thereby reduce pollution or resource use. Taxes raise revenues that can be used for government services and protect the vulnerable, to adjust to higher prices. Likewise, reducing costly subsidies (which typically benefit the richer more than the poor) will create fiscal space and result in more sustainable consumption and production patterns (OECD, 2021c).

Environmental taxes effective on pollution reductions can cause self-elimination and thus decrease tax income: Environmental taxes serve the purpose to reduce harmful pollution or resource extraction. As indicated above, they also serve the purposes to generate tax revenues for public goods and reduce the need for other taxes. However, if they are highly effective in reducing pollution or resource extraction, they will gradually reduce tax revenues, and eventually eliminate themselves. This may not be a big problem as long as they are replaced with, or complemented by, another tax that can compensate for the loss of tax incomes.

Box 5. Taxing coal to fund clean energy in India and energy security in the Philippines

Coal production and consumption play an important role in India and the Philippines, but both countries have implemented coal taxes in recent years. India's cess (tax) on coal production was put in place in 2010, when around 30% of the revenues were channelled to a National Clean Energy and Environment Fund that supported projects including renewable energy. In 2017, the cess revenue was redirected to states to compensate for possible losses arising from the introduction of a goods and services tax (GST). Currently standing at about USD 5.4/tonne of coal produced or imported (or a **carbon tax** equivalent of about USD 2/tonne of CO₂ the cess is a **significant source of revenue**, with USD 3.72 billion collected in 2019. India also provides coal subsidies totalling USD 2.3 billion in 2019, derived mainly from a GST that is lower than most other minerals.

The Philippines imports 80% of its coal and recently **increased coal taxes with the aim of improving energy security**. In 2018, increases in the coal excise were phased in (from USD 0.2/tonne to USD 3/tonne in 2020) as part of a broader fiscal reform package. A higher excise is expected to curb imports, reduce the trade deficit (which reached USD 35 billion in 2019, of which coal represents 7%) and lower electricity prices by encouraging diversification into lower-cost renewables. The electricity price was not affected because generators cannot pass the excise on to consumers. In October 2020, the government announced a temporary moratorium on new coal power plants that is expected to result in the scrapping of at least 8 GW of planned projects. The Philippines' tax package was accompanied by **social compensation measures**, including a cash transfer scheme for lower-income groups and a reduction in personal income taxes. Economic modelling projected that the measures would increase employment in the agricultural sector and service sectors, despite drops in the mining and oil and gas sectors. Projected impacts on poverty were marginal, with even a decrease in poverty of more than 8% among transport workers. However, inflation increased slightly since the reform and not all cash transfers were disbursed on time. To be a truly effective mitigation tool, such coal taxes should be accompanied by fiscal and regulatory measures to ensure that coal plants comply with air and water pollution regulations. (Sanchez et al, 2021, p. 26)

Box 6. Bangladesh's swap from kerosene to solar lighting

Through its SHS [Solar Home System] Program, launched in 2003, Bangladesh sought to increase energy access in off-grid rural regions while encouraging a shift away from kerosene to solar lighting. This program was initiated by the government-owned Infrastructure Development Company Limited (IDCOL) and supported by numerous international donors. The program is unique, as it relies on local partner organizations (POs) based in rural areas where there is a lack of energy access and provides micro-financing solutions to households to purchase SHSs. The main difference with traditional off-grid service models is that instead of a fee-for service model, households become the owners of the SHSs after repaying their loan, which increases their sense of responsibility and caretaking for the system. POs have also played a key role in installing and maintaining SHSs and are well connected locally with households to follow up on any financial or technical queries they may have—an element missing in other countries for similar types of programs.

Today, Bangladesh's SHS Program is one of the world's largest off-grid SHS programs. It has been credited for creating significant benefits, including increasing energy access, reducing energy costs for households and the government, and increasing local green jobs. Energy access in rural areas increased from 25% before the implementation of the program to a current 80%, and at least 1.14 million tons of kerosene (worth almost half a billion USD) has been saved. Beyond promoting a shift away from kerosene consumption, the program also led to high local job creation, with jobs emerging for the manufacturing of solar batteries and PV modules. The program itself led to the creation of 75,000 direct and indirect jobs as of 2014 and contributed to Bangladesh's wider renewable energy employment numbers, estimated at 113,000 in 2013 alone. A study by Samad et al. (2013) showed that the SHS program has had other co-benefits, including increased household

expenditure, improved study time for children, health benefits for households, and increased empowerment for women in household affairs. In addition to the involvement of local POs, the success of the SHS Program was led by a combination of good policy design and coordination. In terms of design, there was a clear political commitment to increase energy access, even before the implementation of the SHS Program, with a target to achieve universal electricity access by 2020. (Sanches et al, 2021, IISD, 2021, p 38)

Box 7. Case Study on Feed-in Tariffs and Reverse Auctions for Solar Power in India

India has a significant ability to use solar power for electricity generation but is still heavily dependent on non-renewable fuels, particularly coal. Under the Jawaharlal Nehru National Solar Mission (JNNSM) launched in 2010, 100 gigawatts of electricity were to be produced using solar power by 2022. A nation-wide feed-in tariff rule was designed to accelerate investment in renewable energy technologies. The tariff rate unleashed investment in solar rooftop plants in urban India, and eventually, renewable energy production reached the capacity limit (20%) set by the government (for example, in the state of Gujarat). However, rapid developments in solar technology and hence reduction in costs of production led to significant increases in the supply of power which the grid was not capable of handling. Against this backdrop, the government introduced an “auction” system under which renewable energy prosumers (producer and consumer) offer their bid to fix the tariff rate to sell their electricity. The system resulted in nearly a 50% drop in the tariff rate compared to that under the feed-in tariff system. Expansion of solar power has curbed air emissions, increased the supply of clean energy, and reduced the cost of electricity for consumers. ...

...Generalizable findings. Auctions appear better than a regulator-designed tariff in discovering prices, subject to the caveat that a winner’s curse may operate. Dynamically, auctions avoid the lag induced by periodic tariff revisions under a regulator-designed tariff. Auctions almost certainly imply a lower informational burden on the regulators’ part. However, the burden shifts over to auction design and follow up after the auction is carried out, rather than carrying out periodic tariff revisions. Politically, auctions are increasingly popular worldwide, as they are viewed to be relatively free from corruption or nepotism. Economically, solar is competitive with coal and natural gas. These factors will help auctions scale. The only hurdle politically appears to be how entrenched the suppliers of traditional fuels are in the political system..(ADB, 2021, . p29)

Box 8. Rwanda's targeted electricity subsidies

Rwanda approved an electricity connection policy in 2017 that eliminates upfront payment of an electricity connection fee and allows the fee to be paid over time. The connection fees, which are subsidized for poor households, can be repaid monthly along with electricity consumption charges. This connection subsidy made grid electricity significantly more affordable for the poor and accelerated Rwanda's electrification program. The country is targeting universal electricity access by 2024, with 52% of the population to be grid connected and 48% accessing off-grid solutions. This connection subsidy was introduced along with electricity tariff reforms that introduced a "lifeline" tariff for electricity consumption below 15 kilowatt hours (kWh) per month, effectively halving the tariff for low-income households. Together, these reforms led to a rapid doubling of new connections, from an average of 74,000 per year from 2012 to 2016 to 154,000 in 2017/18. The government is further improving affordability by focusing on off-grid electrification through solar home systems, mini grids, and solar lanterns, to areas with a higher share of low-income households. (Sanchez et al, 2021, p 39)

5. Implications of green economy reforms, including environmental taxation, for transformation towards sustainable development

Agenda 2030 calls for transformation of all countries towards sustainable development. Agenda 2030 also focuses on the urgency to decouple economic growth and environmental degradation, in so doing reduce poverty, ensure a healthy planet and socially, economically *and* ecologically sustainable development.

Environmental taxation is an important part of environmental fiscal reforms (or green economy reforms). They are in turn an important and necessary operationalization of Agenda 2030's Sustainable Development Goal (SDG) 8: sustainable economic development and decent jobs. In turn, **green economy reforms constitute a realistic path and practical approach to promote Agenda 2030 and sustainable development**. As environment and economy are so linked and pervasive factors for social and economic development, indeed sustainable development, green economy reforms are linked with all other SDGs. Rightly designed and implemented, green economy reforms can be a strong promotor and force for transformation towards sustainable development.

A caveat in this context is the **strong need to make the green taxation and environmental fiscal reforms inclusive**. There is always the risk that economic and environmental objectives (e.g. economic growth and environmental protection) are attained at the expense of the poor, vulnerable and marginalized groups in society. Protection of forest lands, wetlands, grazing areas, or coastal zones may sometimes be attained by eviction of, or denying access among the poor. Green economic development may be "jobless". Hence, environmental taxation policies and green economic development must be accompanied with, and be built on, expansion of green jobs, fair income distribution, equity, "leaving no one behind", and pervasive poverty reduction.

Hence, attaining SDG 8 of sustainable economic development via green taxation policies must be designed and implemented so that it promotes several other SDGs that represent social transformations in areas such as enhanced public health, democratic development, strengthened human rights and gender equality, education for all, reduced risk for conflict, etc.

Moreover, using **green economy reforms** to promote transformation towards sustainable development **presupposes strong and capable government institutions** to do the job. This implies typically that ministry of finance is strongly on board and in charge (for policy design and follow up), together with ministry of environment and other relevant line ministries, as well as strong and capable government agencies such as the tax agency, the environmental protection agency and other relevant agencies. Critical areas of **expertise and data** is: i) knowledge to design and implement green economy reforms, ii) environmental data and capacity to analyse it, and iii) capacity to conduct economic and environmental impact evaluation.

Failure to design and implement green taxes "with a human face" **can disproportionately affect poorer and more vulnerable social groups, and run create protests and reversal of the taxes** (or other proposed green economic policy instruments). This has been the case in many countries where individuals and stakeholder groups have strongly and sometimes even violently opposed green

economic reforms. Without compensating mechanisms in place, regressive taxes or fossil fuel subsidies cuts can be of big social and political concern (UNEP, 2019). One example of this is Ecuador in 2019. Cuts in fossil fuel subsidies caused a rise in gasoline and diesel prices by 25-75% overnight without renewable fuel alternatives. The decision to cut the subsidies led to 11 days of civil unrest, costing seven people their lives. The subsidies were later reinstated (Wood, 2019). Another recent example is the mass demonstration known as the “yellow vest movement” in France in 2018. The movement started as a protest against an unsuccessful increase in fuel taxes affecting especially people in the rural areas who felt the tax placed a disproportionate burden on them. The government later suspended the fuel tax increase (UNEP, 2019).

Protests like these have not only effectively stopped proposed reforms, but also worked against necessary transformation and implementation of Agenda 2030. However, rightly designed and implemented, green taxation and **environmental fiscal reforms have the potential to promote** - not only sustained economic development and improved environmental quality - but also **contribute to implementation of Agenda 2030, and attain sustainable development** as such.

6. Summary

Environmental taxation, or green taxation is part of a broader package of economic policy instruments (EPIs) that can be used to promote environmental improvements, increased government revenues, equity and poverty reduction. These other EPIs include pollution or natural resource fees, levies or charges, tradeable pollution permits, introduction of green subsidies or removal of wasteful/inefficient subsidies, and active use of public procurement for environmental and other public goods purposes.

Introduction of EPIs is often done as part of a bigger environmental fiscal reform (EFR). Experiences show that **successful environmental fiscal reform is complemented with use of other policy instruments** such as rules and regulations, information and awareness raising, and promotion of voluntary agreements and commitments by producers and/or consumers. It is also helped by disclosure of information (or data) and involvement of stakeholder groups and researchers. This strengthens ownership, buy-in, and knowledge-/science-based guidance and backstopping.

Green taxes (including carbon dioxide and energy taxes) **can replace or complement other taxes in society**, such as taxes from job incomes or profits. This is beneficial to society since pollution and unsustainable natural resource depletion (of e.g. forests, minerals, waters, oil, gas and coal) are so called public bads; they are destructive to society. By putting a price on them through taxation (or removing subsidies) the pollution or depletion will decline. Taxation of incomes and company profits act as incentives to reduce labour supply and private sector investments. By swapping incomes and company taxes for pollution and resource taxes, incentives are introduced to reduce pollution and resource depletion and increase labour supply and employment and company investments and production. In addition to these positive effects, green taxation add important revenues to the treasury, which offer opportunities to reduce poverty and make public investments in education, health, infrastructure and other public goods.

Use of green taxation and environmental fiscal reforms have been relatively more widely used in high-income countries compared with low- and middle-income countries. Hence, large unused potentials and opportunities to use green taxes still remain to be harnessed in these countries. It could add much needed public financing at the same time as pollution and resource depletion can decline, as well as poverty be reduced. This is particularly important as pollution and resource extraction is typically more rampant in middle- and low-income countries.

Although less used, there are several good examples of applications of green economic instruments in low- and middle-income countries. In this report we present **examples from e.g. Bangladesh, Ethiopia, the Philippines, India, Rwanda and Ukraine.**

To summarize, **green taxation** and (more broadly) environmental fiscal reforms constitute a practical set of tools to operationalize Sustainable Development Goal 8; I.e. sustainable economic development and decent jobs, and – rightly designed and implemented - indeed **a realistic and practical way to promote Agenda 2030 and sustainable development.**

- Kuralbayeva, K. (2013). Effects of carbon taxes in an economy with large informal sector and rural-urban migration (OxCarre Research Paper 125). Oxford, United Kingdom: University of Oxford
- Metcalf GE, Stock JH. (2020). The Macroeconomic Impact of Europe’s Carbon Tax. *Efd Discussion Paper Series*, 20-32.
<https://www.efdinitiative.org/sites/default/files/publications/DP%20Metcalf%20Stock%20Carbon%20Taxes1.pdf>
- OECD. (2021a). Environmental taxation. Retrieved from:
<https://www.oecd.org/environment/environmentaltaxation.htm> [2021-05-06] OECD Publishing Paris.
- OECD. (2021b). Environmental tax (indicator). doi: 10.1787/5a287eac-en (Accessed on 06 May 2021) OECD Publishing Paris.
- OECD. (2021c). Taxing Energy Use for Sustainable Development: Opportunities for energy tax and subsidy reform in selected developing and emerging countries. OECD Publishing Paris.
- OECD. (2021d). Effective Carbon Rates 2021 (brochure). OECD Publishing Paris.
- OECD. (2018). Effective Carbon Rates 2018 (brochure). OECD Publishing Paris.
- OECD. (2011). Environmental Taxation: A Guide for Policymakers. OECD Publishing Paris.
- OECD. 2019. Taxing Energy Use in 2019: Using Taxes for Climate Action, OECD Publishing, Paris, <https://doi.org/10.1787/058ca239-en>
- OECD. (2013). The Swedish Tax on Nitrogen Oxide Emissions: Lessons in Environmental Policy Reform. *OECD Environment Policy Paper*. NO. 2, OECD Publishing, Paris, <https://doi.org/10.1787/5k3tpspfqgzt-en>.
- OECD. (2020). Green budgeting and tax policy tools to support a green recovery. OECD Publishing, Paris
- OECD. (2017). Policy Instruments for the Environment 2017. OECD Publishing, Paris
- Pegels, A. (2016). Taxing carbon as an instrument of green industrial policy in developing countries, Discussion Papers 23/2016, *German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE)*.
- Sanchez, Lourdes, Richard Bridle, Vanessa Corkal, Philip, Gass, Anna Geddes, Ivetta Gerasimchuk, Jonas Kuehl, Tara Laan, Tom Moerenhout, Greg Muttitt, Chido Muzondo, Aditya Pant, Joachim Roth, Shruti Sharma, Anjali Viswamohan, and Balasubramanian Viswanathan, (2021). [Achieving a fossil-free recovery](#), International Institute for Sustainable Development.
- Skovgaard, J., Van Asselt, H. (2018). The Politics of Fossil Fuels Subsidies and Their Reform. Cambridge University Press.
- Sterner, T. (2012). Distributional effects of taxing transport fuel. *Energy Policy*, 41, 75-83.
<https://doi.org/10.1016/j.enpol.2010.03.012>

Sterner, T., Köhlin, G. (2015). Pricing Carbon: The Challenges. *Towards a Workable and Effective Climate Regime*, Pp 251-266.

The Global Goals. (2021). 8 Decent Work and Economic Growth. Retrieved from:
<https://www.globalgoals.org/8-decent-work-and-economic-growth> [2021-05-30]

UNEP. (2018). Towards a Pollution-Free Planet.
https://wedocs.unep.org/bitstream/handle/20.500.11822/21213/Towards_a_pollution_free_planet_advance%20version.pdf?sequence=2&isAllowed=y

UNEP. (2019). Reducing pollution and health impacts through fiscal policies – A selection of good practices. *UNEP Working Paper*.

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

Wood, L. (2019). After 11 days of civil unrest, Ecuador reinstates fossil fuel subsidies. Retrieved from:
<https://www.climatechangenews.com/2019/10/14/11-days-civil-unrest-ecuador-reinstates-fuel-subsidies/> [2021-06-03]

World Bank Group. (2021). Pricing Carbon. Retrieved from:
<https://www.worldbank.org/en/programs/pricing-carbon#CarbonPricing> [2021-05-11]