OECD Taxation Working Papers No. 43

# The use of revenues from carbon pricing

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https://dx.doi.org/10.1787/3cb265e4-en

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# *The use of revenues from carbon pricing*

**Abstract**

The paper collects comprehensive and detailed data on what 40 OECD and G20 economies do with the revenues from carbon taxes, emissions trading systems, and excise taxes on energy use. It notes that constraints – which can take the form of political commitments or legal earmarks – on revenue use differ between carbon taxes, emissions trading systems, and excise taxes. Constraints are less common for excise taxes, which also raise the most revenue. Carbon tax revenues are relatively often associated with environmental tax reforms, involving reductions in personal or corporate income taxes. Revenues from emissions trading systems are frequently directed towards green spending. The results may be relevant to the political economy of ambitious carbon pricing schemes in the sense that the political expedience of choices on revenue use may depend on the amount of revenue raised.

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# 1. Introduction

While the fundamental rationale for carbon pricing lies in the abatement incentives that it creates, the question arises how the use of revenue from carbon pricing affects its economic effects and its political feasibility. To help answer this question, this paper studies the use of revenues from existing carbon pricing systems and excise taxes on fuels. More specifically, it considers the revenues from excise taxes on fuels, excise taxes on carbon emissions (carbon taxes) and emissions trading system (ETS) auctions – the three components of the Effective Carbon Rate as defined in (OECD, 2016[1]) and included in the OECD's Taxing Energy Use and Effective Carbon Rates databases.[1] The analysis covers 40 OECD and G20 countries.[2]

The use of tax or auction revenues raised is analysed in detail, with estimates of the extent to which revenues become part of general tax revenue or not. When carbon price revenues are not part of general tax revenues, their use is somehow constrained. The analysis distinguishes between legal commitments (earmarking or hypothecation) and weaker constraints taking the form of political commitments to policy packages.

Constraints on the use of revenues from excise taxes on fuels and from carbon taxes, both as legal earmarking and political commitments, are in place in about three out of five countries analysed. In the case of emissions trading systems, such constraints exist in close to all countries in which such systems exist. Additionally, across the 40 countries, the share of revenue subject to constraints on its use well exceeds 80% of total revenue from trading systems, and close to two-thirds of carbon tax revenues.[3] Less than two-fifths (38%) of revenues generated from excise taxes on fuels are subject to a form of constraint, rendering this component of effective carbon prices the least subject to constraints.

The type of spending required by constraints on carbon pricing instruments is diverse, including using revenues to support tax policy changes (e.g., tax cuts, rebates, tax-free threshold increases), transfers to other levels of government, infrastructure spending, and green and energy-related spending. In the case of excise taxes on fuels, most constrained revenues are earmarked for transport infrastructure spending, reflecting that these taxes are viewed as user charges in several jurisdictions. Carbon tax revenues are more generally committed to supporting tax policy changes, suggesting that carbon taxes are frequently elements of a broader tax reform package. Revenues from auctioned tradable emissions permits are almost exclusively earmarked to support energy efficiency, low-carbon mobility and other green spending measures, with the second highest share dedicated to energy user compensation. This suggests that emissions trading systems are perceived as

[1] Some policy-induced prices on carbon emissions are not taxes in the strict sense of the term but instead take the form of regulatory charges or levies. These are included in the present analysis on the grounds that their behavioural effects are similar to those of taxes.

[2] Indonesia and Russia are included in *Taxing Energy Use* and *Effective Carbon Rates*, but are not covered here due to data constraints.

[3] Due to data constraints and in consultation with OECD national delegations, carbon tax revenue estimates for Japan and Latvia, as well as for Poland, are not included in the revenue estimates. While included for comparative purposes in Table A.2., revenues generated from the Carbon Pricing Mechanism in Australia are also excluded from the revenue estimates, as the carbon price was abolished in 2014. Nevertheless, carbon tax revenues are currently and fully earmarked in Japan and Poland for green and energy-related purposes.

environmental policy instruments, of which the revenue is used for environmentally related spending with little interaction with other policy areas.

Constraints on the use of excise tax revenue generally apply to revenues raised through taxes on fuels used for specific purposes (e.g., excise duties on automotive fuels, often on user charging grounds). Constraints on the use of revenues from carbon taxes and emissions trading systems more frequently extend to all collected revenues from the instrument, keeping in mind that these revenues are typically much smaller than those generated from excise taxes.

The paper also presents rough estimates of revenue potential, defined as revenue that would be raised under specific benchmarks for effective carbon rates, and compares actual and potential revenue. Establishing a benchmark is perennially challenging. In this paper, two benchmarks are used for each country: raising rates to the minimum level of EUR 30/t$CO_2$ for emissions presently subject to lower rates, and the application of the median sector-level rate across countries.[4] By these measures and at the aggregate across the 40 countries covered, the revenue potential from carbon pricing significantly exceeds current revenues. As an order of magnitude, under the benchmarks revenues could more than double, with much larger potential increases where carbon prices are presently low, and in more carbon-intensive economies. Since the foregone revenue is partly the consequence of preferential tax rates and of freely allocating emission permits, this indicates not only considerable fiscal losses, but also reduced effectiveness of carbon pricing compared to the case of more uniform rates. Using a low-end estimate of carbon costs (EUR 30/t$CO_2$) results in low-end estimates of the revenue potential from carbon pricing, the more since international aviation and shipping are not included in the analysis.

The general difficulty with introducing and maintaining carbon pricing lies in balancing political feasibility and public support considerations with environmental effectiveness and sound tax policy principles. Careful design of policy packages and communication on them can help the introduction of carbon pricing, as well as ensure its longevity; see, e.g., (Carl and Fedor, 2016[2]) and (Klenert et al., 2018[3]). The present analysis confirms that constraints are often in place for the use of carbon tax and emission permit trading revenues. There are fewer constraints on the use of excise tax revenue, which presently is by far the dominant source of revenue. On the basis of these observations, it can be argued (see the discussion in the concluding section) that, since ambitious carbon pricing will raise substantial amounts of revenue, it is better considered a mainstream policy matter more than a specific and separate environment policy matter. Revenue use decisions then become integrated with overall tax and fiscal frameworks, rather than compartmentalised as environmental tax policy. Support for them then is less critically dependent on the social impacts of carbon pricing and carbon revenue itself than on the performance of the overall system.

Section two of the paper discusses context and literature. Section three describes the use of tax and auction revenues from excise taxes on fuels, carbon taxes and emissions trading systems. Section four provides estimates of revenue potential. Section five discusses and concludes.

[4] This analysis restricts attention to carbon pricing. In some jurisdictions, pricing is based on $CO_2$ equivalents and covers greenhouse gases other than $CO_2$.

# 2. Context and literature

The revenues from carbon pricing can be substantial. Overall, tax and auction revenues generated from effective carbon rates currently exceed one percent of GDP in many OECD and G20 countries (see Figure 2), and this could more than double if carbon price levels were aligned with their climate policy potential in the short-to-medium run. According to (Marron, Toder and Austin, 2015[4]), the Congressional Budget Office (CBO) estimated the revenue potential of a tax of USD 25 per tonne of $CO_2$, rising 2% faster than inflation, at 0.7% of GDP. They also suggest that, assuming rising rates, carbon tax revenues would eventually decline, but in a matter of decades, not years. Insight into the way these revenues are used and the repercussions on the economic effects and social support are essential for constructing policy packages that are socially beneficial and broadly supported.

Descriptive analyses of revenue use have focussed on revenue use from carbon taxes and ETS auction proceeds, and less on excise taxes on energy use. For example, (Sumner, Bird and Dobos, 2011[5]) examine revenue use from carbon taxes in seven countries and five subnational jurisdictions and find that revenues are often used to fund carbon mitigation programmes (especially in subnational jurisdictions), to reduce income taxes, or to supplement government budgets. (Carl and Fedor, 2016[2]) provide a detailed analysis of revenue use from carbon taxes and ETS auctions in 40 countries and 16 subnational jurisdictions. They distinguish three main categories of revenue use: green spending; general revenue; and as part of a broader tax reform (i.e. rebates or tax shifts). Carbon tax revenues are more often used in the context of a tax reform (72%) and auction revenues are more often used for green spending (70%), suggesting that the tax reform potential of carbon taxes is as important a motivation for policy makers as their climate mitigation potential. The present paper additionally considers revenue use from excise taxes on fuels, on the grounds that such taxes have similar behavioural effects to carbon taxes and trading systems, even if they have been introduced mainly to raise revenue. Excise taxes are the main component of current effective carbon rates,

Environmental taxes, if well designed, improve economic efficiency and therefore increase total economic benefits, by reducing or removing a market failure. Box 1 develops the basic case for environmental taxes, emphasising that environmental taxes will only realise their potential to improve welfare if the revenues from the tax are put to socially beneficial use. If the social value of the deployment of revenue is low, then environmental taxes may improve environmental outcomes but reduce overall economic benefits – just as with any other tax. The fact that environmental taxes address market failures, in contrast to other taxes that are introduced mainly to raise revenue, does not affect the question of how revenue ought to be used from an efficiency point of view.

Potential claims on the use of carbon pricing revenue are many, including funding fresh spending (e.g., for infrastructure or research and development, climate-related or not), boosting existing spending (e.g., on education) cutting other taxes, reducing public debt, providing compensation for increased energy costs to domestic households or firms, funding transfers to developing economies, etc. These options, alone or in combination, may or may not make economic sense depending on the conditions in the jurisdiction applying the tax. The traditional public finance mantra, that from an efficiency point of view decisions on how to spend are separate from the question of how to raise revenue, applies. However, this does not rule out that economically justifiable combinations of

spending and revenue-raising decisions can help make tax reform happen in circumstances where reform may have been more difficult or may not have otherwise been possible.

An abundant literature investigates whether environmental tax revenue can be used to change the tax mix in order to reduce the overall economic costs of raising a given amount of tax revenue. This "double-dividend" debate focusses on efficiency. Recognising that the efficiency costs of income taxes extend well beyond distortions in factor markets (including also promoting informality, fringe benefits, tax-preferred spending, etc.), and that these responses tend to be more elastic than factor supply responses, the potential for efficiency gains through cutting broader taxes with environmental tax revenues is likely to be large in many cases (Parry, Veung and Heine, 2014[6]).

If the tax system is not optimal to begin with, there can be - although this is not necessarily the case - a trade-off between efficiency and equity objectives; see, e.g., the review in (Siegmeier et al., 2017[7]). Tax simulation analyses for the United States (Marron and Morris, 2016[8]) indicate that the best efficiency results are obtained when carbon tax revenues are used to lower corporate income tax rates. More broadly, it is recognised that socially productive revenue use can take various forms (cutting other taxes, increasing spending, reducing debt, redistribution, etc.) and that productive use is as much a prerequisite for economically justifiable use of carbon pricing as is environmental effectiveness (cf., e.g., (OECD, 2017[9]); (OECD & WBG, 2015[10])).

Revenue use is not just about efficiency, however. It is crucial from a political economy angle, as combining pricing with statements of intent or legal commitments to particular types of spending can increase social and political support for pricing, see, e.g., the overview in chapter six of (UNEP, 2018[11]). Revenues can be used to dampen or entirely compensate negative direct impacts of carbon pricing on households or businesses. This can be done through uniform lump sum transfers, targeted transfers or tax reforms (i.e., reducing corporate or personal income taxes).

The choice between compensation mechanisms depends on jurisdictions' specific circumstances, and combinations of them are possible. For example, reducing pre-existing taxes is likely more appealing where income taxes are high. Lump-sum transfers are thought to be a superior choice from an acceptance point of view in many circumstances. This is because, in addition to being highly visible, lump-sum transfers imply revenue-neutrality on aggregate. Furthermore, they benefit households across the political spectrum and therefore can contribute to the robustness of carbon pricing as governments change over time, compared to situations where revenues cater to more narrow constituencies ((n.a.), n.d.[12]).

Recommendations on how to use carbon pricing revenues often involve using revenues so as to support other tax reductions, as well as "to soften the blow to lower-income households, coal workers and their communities" (Marron and Morris, 2016[8]). Targeting of transfers can help customise revenue deployment choices to alleviate cost increases where they are felt the strongest (e.g., lower income households and households with fewer short-run substitution options). Such targeting can increase support for carbon pricing, but a balance needs to be sought with maintaining the environmental effectiveness of the price signal, e.g. through limiting the transfers in time and avoiding very narrow targeting, e.g. to energy spending.

Visibility of revenue use and revenue-neutrality can also be accomplished in tax reform policy packages, e.g. through making explicit how revenues are used to cut other taxes as is the case in British Columbia. In relation to this form of revenue neutrality, (Murray and

Rivers, 2015[13]) describe decisions on the use of revenues from British Columbia's carbon tax, and note that over time revenues are offset by increasingly targeted tax measures (as opposed to broader tax cuts in corporate and personal income taxes).

Further suggestions on revenue use include using carbon tax revenues for R&D and other climate policy measures that would likely require "fresh spending", e.g. (Bowen, 2015[14]). This can strengthen support, not only with constituencies that strongly favour climate action, but also with voters that doubt the effectiveness of carbon pricing as a behavioural signal but that support climate spending ((n.a.), n.d.[12]). As discussed in the conclusion of this paper, such strategies may become less straightforward when carbon prices – and revenues – are high.

Overall, recent literature on the use of revenues from carbon pricing finds that it is possible in most circumstances to strike a balance between using the revenues in ways that are socially useful and that contribute to support for carbon pricing. Revenue use is not a panacea for building support though. ((n.a.), n.d.[12]) note that introducing carbon pricing is more difficult where trust in government is low, and that lower trust in government limits the options for revenue use, e.g. reducing space for tax reform and increasing the appeal of lump sum transfers. Caution against rigid earmarking is found throughout the literature, but there is strong evidence that clearly communicated policy reform packages help increase support for carbon pricing, including policy packages that pass a social cost-benefit test. Communication on carbon pricing is key for creating public support and should always include the revenue use dimension (Partnership for Market Readiness; Carbon Pricing Leadership Coalition, 2018[15]). Communication is not a matter of explaining a policy choice but of developing it in interaction with stakeholders.

**Box 1. Environmental taxes, revenue and economic benefits**

The costs of pollution and climate change are often external to markets, i.e., they are not reflected in market prices, and consequently producers and consumers do not take them into account when deciding whether, how much, when and where to produce or consume. The result of this market failure is that the external costs are too high, in the sense that net economic benefits would increase if the level of production and consumption would decline.

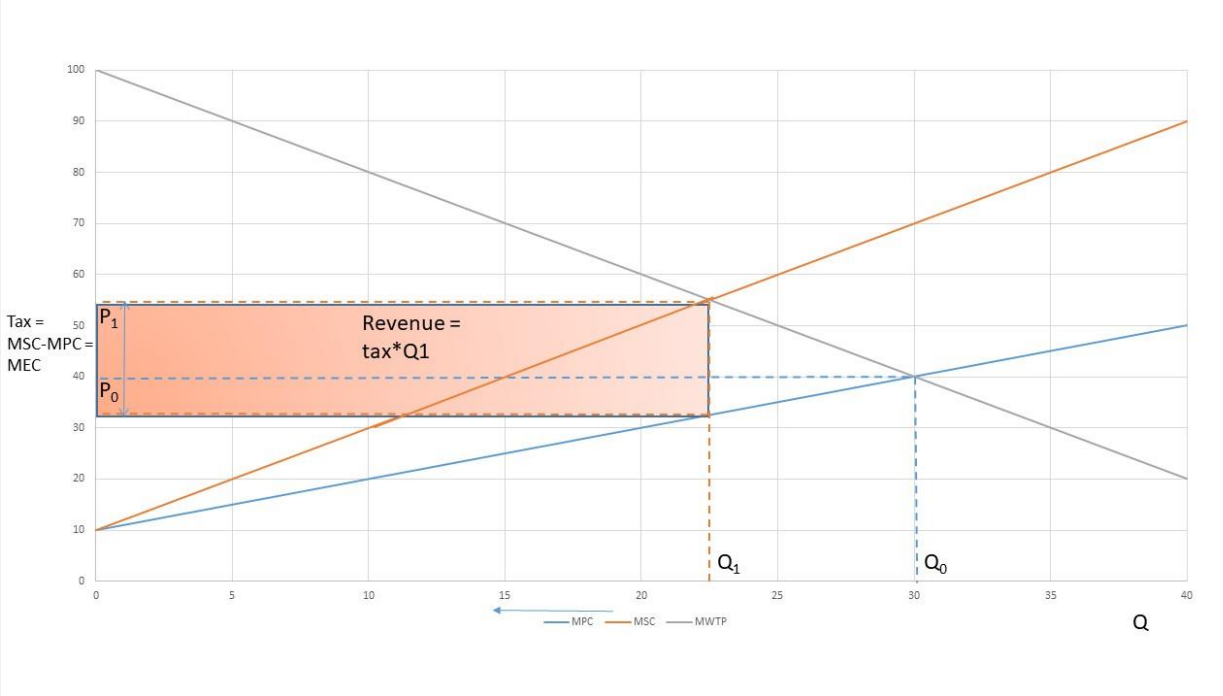
One way to reduce quantities to more efficient levels is to increase prices, using taxes or tradable permits. Such market-based instruments internalise the costs of pollution and climate change, so that producers and consumers now will take these costs into account.

Market-based instruments cut pollution in a cost-effective way. Cost-effectiveness means that abatement of pollution is produced at the lowest possible cost, and it results from the fact that decisions on how and how much to abate are left to the polluters, who are best informed about the abatement options available to them.

The principal aim of environmental taxes is to cut pollution cost-effectively. In the process, these taxes generate tax revenue. Just like in any other market, and irrespective of the environmental benefits resulting from the tax, the introduction of a tax imposes a burden on the consumers and the producers in that market: part of the benefits that accrued to them before the tax are transformed into tax revenue, and there is a net loss of consumer and producer benefits (abstracting from reduced pollution).

If tax revenue has the same or a higher economic value than consumer and producer benefits, then environmental taxes increase net benefits. However, if the economic value of tax revenue is lower than that of consumer and producer benefits, then the benefits from reduced pollution may be outweighed by the costs of raising tax revenue. Figure 1 illustrates these points.

**Figure 1. The effects of an externality tax on market equilibrium and tax revenue**




Before any tax is introduced, the market equilibrium occurs at an output level $Q_0$ of 30 units and a price $P_0$ of 40 (intersection of marginal private cost (MPC) curve and the marginal willingness to pay of consumers (MWTP) – or the inverse demand curve).

The figure shows why this equilibrium is inefficient in the sense of there being too much output. At output level $Q_0$, the marginal benefit to consumers equals 40, whereas the marginal social cost (MSC) equals 70: the social cost of the marginal unit is higher than the benefit it creates, which is inefficient. The same applies for all units of output between 22.5 and 30. The reason for this inefficiency is that private costs are below social costs, due to the presence of an external cost.

Environmental taxation reduces this inefficiency, and if well-designed can eliminate it entirely, restoring efficiency in the market. In the example, the tax reduces output from $Q_0$ to $Q_1$, the point where marginal social costs and marginal benefits are equal. The net benefit generated in this market equals 900 units before the tax. This increases to 1012.5 units – the highest possible level in this market – after the tax, *if tax revenue and consumer and producer benefits all have the same social value*.

Before taxation, net benefits consist entirely of consumer and producer benefits. After the introduction of the tax, benefits also include a tax revenue component. In the example, this component equals 506.25, precisely as large as the consumer and producer benefits. Suppose that this revenue was destroyed upon receipt, so that its value to the economy is zero. In that case, the tax reduces pollution but total benefits deteriorate (from 900 to 506.25). Environmental taxes, like other taxes, are a bad idea if their revenue is worth nothing.

Suppose alternatively, in the context of the example, that the social value of tax revenue is 0.78 per unit compared to 1 per unit for consumer and producer benefits. Under these

circumstances, total benefits are the same without and with the tax. If tax revenue values more than 0.78 per unit, total benefits increase with the introduction of the tax.

The example shows that introducing environmental taxes improves environmental outcomes, and puts a tax burden on the economy, so that producers and consumers are worse off if abstraction is made of tax revenue. As long as tax revenue is sufficiently valuable to the economy, economic benefits as a whole increase.

# 3. Use of revenue from carbon pricing

## 3.1. Definitions and scope

This section describes the use of the revenues from carbon prices as defined in the OECD's *Effective Carbon Rates* reports (OECD, 2016[1]) and (OECD, 2018[16]). Effective carbon rates (ECRs) are the sum of excise taxes on fuels, carbon taxes and emissions trading systems (ETS). Each of these three components, individually and together, alter the relative price of carbon emissions associated with the combustion of energy, so they each affect the same behavioural margins in strongly similar ways.

The ECR takes an economic, behavioural perspective to decide which policy instruments are included, making no reference to the stated intent with which these policies are introduced. This approach is complementary to, e.g., (Ecofys, 2018[17]), which includes carbon taxes and emissions trading systems but not excise taxes. Excise taxes on electricity output and other 'tax-like' charges on electricity are not included in the ECR because they do not directly provide incentives to reduce the carbon content of electricity generation.

The analysis covers 40 countries, including the 35 OECD countries[5] and 17 of the G20 countries (Russia, Indonesia and Saudi Arabia are not included). Together, these countries represent the large majority of global energy use and of the $CO_2$-emissions resulting from it.

Excise taxes on fuels exist in all 40 countries considered. Carbon taxes are in place in 17 countries (including the Chilean carbon tax implemented in 2017) and emission trading takes place in 28 countries, largely due to the scope of the EU-ETS.

Across the 40 countries, revenue from excise taxes on fuels amounted to approximately EUR 419 billion in 2016 (EUR 334 billion across OECD countries). The other two components of the ECR raise far less revenue. By our estimates, revenues generated by carbon taxes amounted to EUR 14 billion[6], followed by ETS auction revenues of EUR 7 billion. Total revenue is EUR 440 billion and consists for 95.2% of excise tax revenue, 3.2% of carbon tax revenue and 1.6% of revenue from emissions trading systems.

Several other data sources discuss revenue from energy taxes. For example, the European Commission provides yearly estimates of total revenues from energy taxes for all members of the European Union (EU) (EUROSTAT, 2016[18]). Similarly, the Database on Policy Instruments for the Environment (PINE - (OECD, 2018[19])) provides yearly estimates of revenues raised by environmentally related taxes for at least all OECD, EU and G20 countries, as well as concise information on revenue use. In this paper, revenue estimates from excise taxes on fuels are separated from revenue estimates from carbon taxes, as the political-economy properties of both taxes may differ, thereby also affecting revenue use patterns. Additionally, this paper only considers excise taxes on energy products that alter the relative prices of carbon-intensive fuels, so that revenues from excise taxes on

[5] Lithuania has recently joined the OECD and the Accession Agreement for Colombia was signed on 30 May 2018, but neither are included in the present analysis.

[6] Due to data constraints and in consultation with OECD national delegations, carbon tax revenue estimates for Japan, Latvia and Poland are not included in the revenue estimates. While included for comparative purposes in Table A.2., revenues generated from the Carbon Pricing Mechanism in Australia are also excluded from the revenue estimates, as the carbon price was abolished in 2014.

electricity output are excluded (taxes on electricity output alter the relative price of electricity consumption but are independent of the fuel mix used to generate electricity).

Given that EUROSTAT and PINE do not systematically disaggregate energy tax revenues according to definitions used here, and given the need for additional detail on revenue use, this paper largely draws on estimates from legal documents, government and budgetary reports and national statistical databases, as detailed in the notes to the tables in Annex A. The data were verified extensively with country experts. The scope of taxes and trading systems covered is largely the same as in OECD's *Taxing Energy Use* and *Effective Carbon Rates* publications.

The description of revenue use in the next section distinguishes between unconstrained revenues (proceeds becoming part of general revenue) and constrained revenue use. For the latter, two types of constraints are considered, namely earmarking and political commitments. Earmarked revenues are legal prescriptions that commit all or part of the revenue from a carbon-pricing instrument to one or several particular spending items or to a spending programme.

Political commitments are broad constraints on generated revenues, taking the form of statements on policy packages that are not enshrined into legislation. Statements about policy packages do not necessarily restrict courses of action as much as laws, and may not involve the same level of revenue monitoring or administrative scrutiny as would legal earmarks. However, since revenue is fungible, the actual difference between both types of constraints may be more limited than it appears at first sight. In addition, it is not known what expenditure patterns would have looked like in the absence of the constraints, so that the actual effect of the constraints cannot be established. The analysis of constraints therefore is best understood as a description of the type of policy packages and policy orientations that governments tend to connect carbon pricing with, rather than as describing the effect of constraints on spending outcomes.

## 3.2. The scope and nature of constraints on revenue use

This section discusses the use of revenues from excise taxes on fuels (excluding excise taxes on electricity output), carbon taxes, and tradable emissions permit auctions. It examines the level of flexibility and the nature of the constraints imposed on revenue use.

Table 1 shows the overall frequency of constraints on revenue use through earmarking and political commitments, for the three components of effective carbon rates. A first insight is that constraints on revenue use are quite common. Of the 40 countries studied, 60% to 80% (depending on the instrument) constrain the use of at least some of the revenue. Second, constraints are more common for trading systems (80%) than for taxes (around 60%). Legal earmarking and political commitments can be used alone or in conjunction. Legal constraints are more common than political commitments. Political commitments are made twice as often for carbon taxes than for the other components of the ECR. Legal earmarks are most common for emissions trading systems.

Over half of all countries apply some form of legal earmarking on revenues from excise taxes, and five countries (13% of the total; Denmark, Finland, the Netherlands, Norway and the United Kingdom) politically commit to using all or a portion of fuel tax revenues to support other tax policy measures. Only Finland and the Netherlands constrain separate portions of excise tax revenues through both legal earmarking and political commitments. The non-OECD G20 countries (Argentina, Brazil, China, India and South Africa) covered in the study all apply legal earmarks to at least a portion of their fuel tax revenues (see

Table A.1.) and do not constrain their use of revenue through political commitments as defined in this paper.

Concerning carbon taxes, almost half (47%) of countries with such a carbon pricing system apply some form of legal earmarking to generated revenues, and three countries (Ireland, Norway and Portugal) additionally politically commit revenues to support tax policy measures. Denmark and Finland only constrain carbon tax revenue use by political commitments. Committing all or a portion of carbon tax revenues to fund other tax policy measures is a legal commitment in the Canadian subnational jurisdictions, France and Switzerland. This relatively high frequency of political commitments on revenue use from carbon taxes is also noted in (Carl and Fedor, 2016[2]), and appears to be connected to carbon taxes often featuring as elements of broader tax reform.

As noted, earmarking of revenues is more frequent with emissions trading systems than with taxes, as close to two-thirds of countries apply legal earmarks to auction revenues. Four countries (Austria, Denmark, Ireland and the United Kingdom) make only statements of political intent. For European Union Member States, both types of constraints may reflect EC recommendations to Member States on how to deploy auctioning revenue (European Union, 2003[20]).

Most political commitments concern the use of revenues to fund cuts in other taxes, while legal earmarks for this type of spending are rare. Two examples of legal earmarks for tax cuts are British Columbia (see the Revenue Neutral Carbon Tax Report published (British Columbia Ministry of Finance, 2018[21]); see paragraph 54) and Switzerland (see the $CO_2$ Tax Law (*Loi sur le $CO_2$*) which specifies the use of carbon tax revenues by percentage shares of total generated revenues (Swiss Federal Council, 2018[22])).

**Table 1. Constraints on revenue use from carbon pricing instruments, share of countries applying constraints across 40 OECD and G20 countries (%)**

| Carbon pricing instrument | Nature of constraint | | At least one constraint |
|---|---|---|---|
| | Legal earmarking | Political commitment | |
| Excise taxes on fuels | 55 | 13 | 63 |
| Carbon taxes | 47 | 29 | 59 |
| ETS permit auctions | 64 | 14 | 78 |

The more frequent use of earmarks for ETS revenues may indicate that revenues generated from ETS auctions are perceived differently from tax revenues. This may be because smaller amounts of revenues are involved. In addition, trading systems perhaps are more often seen as “add-on” policies, i.e. as a form of climate policy that is additional to and separate from other policies, including tax policy. The observation made below, that constraints are not only relatively common under trading systems, but that they also often concern green spending (see Table 2), seems consistent with this interpretation.

As noted earlier, revenues generated from carbon taxes are more frequently used as a form of political commitment than the other carbon pricing instruments, suggesting that the tax reform potential of carbon taxes is an important motivating factor to policy makers, apart from their climate mitigation potential, see also (Carl and Fedor, 2016[2]).

Table 1 provided an overview of revenue use patterns by pricing instrument, by counting the use of any constraint, irrespective of what share of revenue raised that it applies to. A similar picture emerges when considering how many systems constrain particular shares of revenue. For excise taxes, 70% of systems do not constrain at least half of revenue raised,

whereas that share is lower for carbon taxes (35.3%) and emissions trading systems (32.2%). This means that more revenue accrues to the general budget from excise taxes compared to the other components of the ECR. Only 22.5% of excise tax systems put legal earmarks on more than half of the revenue, and 7.5% subject more than half of the revenue to political commitments. For carbon taxes, the corresponding shares are 35.3% and 29.4%, confirming the relatively extensive use of political commitments for carbon taxes. For ETS, the corresponding shares are 46.4% and 17.8%, confirming the relatively high degree of legal earmarking in Emissions trading systems.

Table 2 summarises the total amount of generated revenues from the three carbon-pricing instruments, the shares of constrained and unconstrained revenues, as well as the shares of constrained revenues by a tentative classification of revenue use. It more specifically summarises the Tables (A.1., A.2 and A.3) included in Annex A, where extensive notes on the calculation of estimates and on revenue use are provided. As before, unconstrained revenue refers to revenues that directly flow to the general budget without any constraint on their use. The table distinguishes six types of constrained revenue use categories:

- **Tax policy changes** refer to using revenues generated from a carbon-pricing instrument to support the implementation of other tax policy measures. Such revenue use is also generally meant to offset the additional burdens caused by higher energy costs on households and businesses, see (Marron and Morris, 2016[8]) and (Carl and Fedor, 2016[2]).
- **Intergovernmental transfers** occur when portions of revenue flow to budgets of subnational jurisdictions. Sometimes these jurisdictions have further obligations to use the received revenues for specific purposes (e.g. for road construction and maintenance).
- **Transport-related funding** refers to the use of revenues from components of effective carbon rates for transport-related funding, maintenance and construction projects. When earmarked, road and aviation excise tax fuels are almost exclusively used for such infrastructure projects, which reflects the user charges view of fuel excise taxes in several countries. However, auction revenues that are used to support and encourage electric and low-carbon mobility are also included in this category.
- **Green and energy-related spending** refers to all revenues used for environmentally related programmes and projects, including promoting or subsidising the use of renewable energies and low-carbon technologies, the conservation and protection of biodiversity, waste and water management, and other green programmes. It also refers to revenues used to fund energy efficiency and savings measures, and spending for energy security purposes.
- **Compensation to energy users** refers to using revenues to offset directly, partly or fully, the additional costs associated with the carbon price. This includes the use of revenues to help offset the costs associated with using more renewable energy sources to produce power. The main beneficiaries are energy or electricity-intensive industries. Cost-offsetting measures delivered through income taxes are included under **Tax policy changes**).
- **Other** refers to all other revenues directed to purposes, programmes, projects or funds different from those described above. Further detail is provided in Annex A.

**Table 2. Total carbon pricing revenues, share of constrained revenues (%), and type of constrained spending**

(2+3+4 = 100% of revenue in column 1; 5+6+7+8+9+10 = 100% of shares in column 2+3)

| | Genera-ted Revenue *(EUR million)* | Constrained revenues | | Unconstrained revenues *(%)* | Type of constrained spending (%) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Legal earmarking (%) | Political commitment (%) | | Tax policy changes | Inter-gov''tal transfers | Transport-related funding | Green and energy-related spending | Compensation to energy users | Other |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Excise taxes on fuels | 419107 | 36 | 2 | 62 | 2,8 | 16,7 | 69,4 | 5,5 | 0 | 5,5 |
| Carbon taxes | 14 236 | 43 | 22 | 35 | 85,2 | 0 | 0 | 4,9 | 3,3 | 6,6 |
| ETS permit auctions | 6 905 | 78 | 8 | 14 | 0 | 0 | 21,8 | 51,7 | 25,3 | 1,1 |

For excise taxes on energy, Table 2 shows that constrained revenue use is concentrated in transport-related funding. The second largest number of constraints relate to environmental purposes, but they represent a small proportion of constrained revenues overall. Inter-government transfers represent the second largest share of constrained revenues. Overall, constraints on revenue use from excise taxes fall mostly in the user charge category for road transport fuels.

Constraints on the use of revenue from carbon taxes are strongly concentrated in the "Tax policy changes" category, both as a share of revenues and by number of constraints. To a lesser extent, constraints are imposed for green spending, albeit representing a significantly lower share of revenues (earmarked revenues in Poland and Japan for Green and energy-related spending are not included due to data constraints, but would likely increase the category's share if included). The revenues generated from the $CO_2$ tax paid by the petroleum sector in Norway, together with the rest of the State's net cash flow from the petroleum industry, are transferred in full to the Government Pension Fund Global, as shown in the "Other" category, represents the second highest share of constrained revenues. The Norwegian fiscal rule specifies that the transfers back from the fund to the central government budget over time equal the expected real return on the fund, estimated at 3 per cent per year. The revenue is not earmarked for specific spending.

Constrained ETS auction proceeds are largely concentrated in "Green and energy-related spending", both in terms of number of constraints and as a share of constrained revenues. The second largest share of constrained revenues concerns "Compensation to energy users", even if slightly more constraints are applied for transport-related measures (low-carbon mobility).

## 3.3. Revenue use from excise taxes on fuels

Table A.1 provides detailed estimates and descriptions of the amount of revenues generated from excise taxes on the consumption of liquid, gaseous and solid fuels in 2016, and their use if constrained. The country table-notes explain how estimates were calculated and their sources, as well as any additional detail on revenue use. The scope of the analysis is limited to taxes that are included in the Taxing Energy Use (TEU) Database and that are directly interpretable as carbon prices, in the sense of implying a rate that can be expressed per

tonne of $CO_2$, in line with the Effective Carbon Rate concept (OECD, 2016[1]). As taxes on electricity output alter the relative price of electricity consumption but not the relative prices of carbon-intensive fuels for electricity generation (see, e.g., (OECD, 2018[23]); in contrast to the effect of an excise tax on fuel oil or petroleum coke, for example), these revenue estimates are not included in Table A.1.

Most countries do not subject excise tax revenues to any type of constraint. Among OECD countries, 28% of revenues (around EUR 94 billion) are constrained, either as an earmark or as a political commitment. If taxes on electricity output were included, the amount of hypothecated revenues might increase as revenues generated from electricity consumption are sometimes distributed back to electricity providers.

When excise tax revenues are constrained, this is often justified by reference to user charging or benefit principles, i.e., the tax functions as payment for a particular service. Among countries that hypothecate excise tax revenues, most allocate at least a portion of revenues for the construction and maintenance of road and transport-related infrastructures, including Australia, the Czech Republic, France, Japan, Korea, Poland, Portugal, Argentina, Brazil, China, India and South Africa. Iceland, New Zealand, Switzerland, and the United States allocate at least half of total generated energy tax revenues to this purpose. In Australia, the Aviation fuel excise tax is the primary source of funding of the Civil Aviation Safety Authority (CASA) (Civil Aviation Safety Authority (CASA), 2016[24]). In Poland, the Fuel Surcharge (*Opłata paliwowa*) on automotive fuels is earmarked to the National Land Transport Fund (80%) and to the Railway Fund (20%) (Polish Parliament, 2018[25]). In Switzerland (a country with relatively high transit traffic), all revenues collected from the Mineral Oil Surcharge and half of revenues collected from the Mineral Oil Tax on fuels used for propellant purposes are earmarked for road and airport infrastructure (Swiss Federal Customs Administration, 2017[26]).

The revenues generated from the introduction of excise taxes and their subsequent rate increases may be used to justify or support other tax policy measures (that are generally simultaneously introduced or implemented). Finland, the Netherlands, Norway, and the United Kingdom politically commit revenues to at least partially offset revenue losses associated with tax cuts and other measures, generally on personal and corporate income. In the Netherlands, the additional income collected from excise taxes are used to lower such rates (Dutch Government, 2018[27]). In the United Kingdom, the Climate Change Levy (CCL) was introduced to recover revenues losses from rate cuts on National Insurance Contributions paid by employers (British National Audit Office, 2007[28]).

Excise tax revenues are also often distributed to states, provinces, regions or municipalities in some federal systems, including in Argentina, Brazil, India, France, Japan, Mexico, Spain and South Africa. In South Africa, since the abolishment of the Regional Council (RSC) levies, around a third of the General Fuel Levy is distributed back to municipalities (South African National Assembly, 2015[29]). In France, a large portion of revenues generated from the TICPE is distributed back to regional governments within the framework of a "transfer of competencies" (*transferts des compétences)* programme to encourage the implementation, and to increase the scope, of locally based public measures (Ministère de la Transition écologique et solidaire, 2018[30]); (Assemblée des Communautés de France (AdCF), 2016[31])).

Constraints on excise taxes are also used to help ensure energy security in Finland, Japan, New Zealand and the United States. In Japan, revenues from the Petroleum and Coal Tax are used to ensure the stability of the fuel supply (Japanese Ministry of the Environment, 2017[32]), an important national objective in a relatively energy resource poor country. In

Belgium, an Inspection Fee (*Redevance de contrôle (sur gasoil de chauffage)*) is partially earmarked to the Petroleum Products Analysis Fund (*Fonds d'analyse des produits pétroliers (Fapetro)*) to ensure the quality of petroleum products ( (Belgian Parliament, 1995[33]); (Inter-Environnement Wallonie, 2007[34])). In Finland, revenues from the Strategic Stockpile Fee contribute around EUR 50 million per annum to the National Emergency Supply Agency (NESA) (National Emergency Supply Agency, 2018[35]).

A number of countries use excise tax revenues for social-related spending. Luxembourg applies a social contribution rate to energy products earmarked to an Employment Fund (*Fonds pour l'emploi* - (Luxembourg Ministry of Finance, 2017[36])). Revenues in New Zealand and in South Africa fund insurance coverage schemes for victims of road injuries ( (New Zealand Ministry of Business, Innovation, 2001[37]); (Road Accident Fund (RAF), 2018[38])). Argentina dedicates revenues to the National Administration for Social Security (ANSES) and to the National Housing Fund (*Fondo Nacional de la Vivienda*) (Argentine Ministry of Finance, 2017[39]). Beyond social spending, Korea also earmarks an Education Tax levied on fossil fuel consumption to its education budget.

Belgium, Luxembourg and South Africa apply a rate to energy products to the benefit of associated economic unions (in this case, the Belgo-Luxembourg Economic Union (UEBL) and the Southern Africa Customs Union (SACU)).

In terms of green spending, a portion of the Transportation-Energy-Environment Tax (TEET) in Korea is directed towards environmentally related projects (Korean Ministry of Finance, 2018[40]); the climate change contribution in Luxembourg is earmarked to the Climate and Energy Fund (*Fonds Climat et Energie* - (Luxembourg Ministry of Finance, 2017[36]), and some revenues in Portugal (capped at EUR 30 million) are earmarked to the Forest Fund (Institute for the Conservation of Nature and Forestry, 2016[41]). In the Netherlands, the Sustainable Energy Surcharge (*Opslag Duurzame Energie* – (ODE)) subsidises renewable energy projects.

As of 2017, some modifications to the constraints imposed on excise tax revenues are made in a number of countries. Some of the revenues earmarked for energy security via the Petroleum or Engine Fuel Monitoring Levy (PEFML) in New Zealand are instead allocated to the Energy Efficiency and Conservation Authority (EECA) (Energy Efficiency and Conservation Authority, 2016[42]). Exceptionally in 2017 in Portugal, revenues raised from the excise tax on coloured and marked diesel (capped at EUR 10 million) are used for a rural development (PDR 2020) programme and for the European Maritime and Fisheries Fund (MAR 2020) (Portuguese Public Ministry, 2016[43]). In France, the additional revenues generated by the increase in the tax rate of diesel use are used to lower the tax burden on low-income households and pensioners, as well as to increase the premium granted when replacing old diesel vehicles in 2017 (Ministère de la Transition écologique et solidaire, 2018[30]). In India, all revenues generated from the Clean Environment Cess (CEC) which were previously earmarked to the National Clean Energy & Environment Fund (NCEEF), are currently allocated to the Goods and Services Tax (GST) Compensation Fund to compensate states for potential revenue losses from GST reform (Indian Department of Expenditure, 2017[44]).

## 3.4. Revenue use from excise taxes on carbon emissions

Table A.2 in Annex A provides detailed estimates and descriptions of the amount of revenues generated from carbon taxes in 2016 and their use when constrained. The country table-notes further explain how estimates were calculated, their sources and additional detail on revenue use. Around 65% of total generated carbon tax revenues (or EUR 9 billion) are subject to a type of constraint, whether a legal earmark or a political commitment.

As for excise taxes on fuels, carbon taxes are sometimes introduced (and their rates subsequently increased) as part of broader tax policy packages that generally aim to shift the tax burden away from labour and capital. The Canadian provinces of British Columbia and Alberta, Finland, France, Norway, Portugal and Switzerland utilise carbon tax revenues to support other tax policy measures. In Norway, the 2015 and 2016 tax programmes indicate a "clear shift" towards green and environmentally related taxes ( (Norwegian Ministry of Finance, 2015[45]); (Norwegian Ministry of Finance, 2016[46])). Furthermore, since the 2008 financial crisis, carbon tax revenues in Ireland have been used to maintain or reduce payroll taxes (Irish Ministry of Finance, 2009[47]), and Portugal helps relieve large families from paying personal income tax (Portuguese Ministry of the Environment, 2015[48]). In France and until 2016, all carbon tax revenues were earmarked to a business tax credit (*Crédit d'impôt pour la compétitivité et l'emploi* (CICE))

Carbon tax revenues are also earmarked for green purposes. In Ireland, a portion of revenues (EUR 50 million) fund per annum the National Energy Efficiency Retrofit Programme (Irish Ministry of Finance, 2009[47]); (Carl and Fedor, 2016[2]), and a third of revenues in Switzerland mostly fund energy efficiency measures in buildings (capped at CHF 300 million in 2016) (Swiss Federal Council, 2018[22]). The Tax for Climate Change Mitigation in Japan is also largely earmarked for energy efficiency and renewable energy programmes (Japanese Ministry of the Environment, 2017[32]).

Finally, all revenues raised from the carbon tax applied to petroleum activities in Norway flow to the Government Pension Fund (Government Pension Fund Global, 2015[49]), which is a part of the Norwegian fiscal framework that delinks the earnings of petroleum revenue from the use of petroleum revenue. Revenues from the Carbon Levy in Alberta are also partly used to regulate electricity prices, understood as a form compensation to energy users (Alberta Queen's Printer, 2017[50]).

While not included in Annex A, the carbon tax in Colombia is fully earmarked to the Fund for Environmental Sustainability and Sustainable Rural Development in Conflict-Affected Areas (*Fondo para una Colombia Sostenible*), and the tax paid is also deductible against the income tax (District Legal Department of Colombia, 2016[51]).

As of 2017 some changes were made to the earmarking of carbon tax revenues. In France, a portion of these revenues (EUR 1.7 billion) is earmarked to a special "Energy Transition" account (*compte d'affectation spéciale (CAS) « Transition énergétique »*) to compensate electricity providers for using renewable energies to generate electricity in France ( (Ministère de la Transition écologique et solidaire, 2017[52]); (French Senate, 2018[53])), and all remaining revenues are used for tax base shifting purposes. Starting in 2018, the government of British Columbia plans to adjust its use of carbon tax revenues as rates increase annually through 2022. All additional revenues are used as climate action tax credits for low and moderate-income households; to fund a clean growth incentive programme for industries at risk of carbon leakage; and to fund other environmentally

related initiatives (e.g. the Innovative Clean Energy Fund) (British Columbia Ministry of Finance, 2018[21]). In Switzerland, the imposed cap on revenues used for energy efficiency measures increases to EUR 450 million in 2018 (or a third of total generated revenues).

## 3.5. Revenue use from tradable emission permit auctions

Table A.3 in Annex A provides detailed estimates and descriptions of the amount of revenues generated from the auctioning of permits in emissions trading systems in 2016 and their use if constrained. The EU Commission recommends that participants in the EU-ETS commit – or spend an equivalent of – at least 50% of revenues generated from the auctioning of allowances among fixed installations (e.g. power-plants), and all revenues raised from aviation activities, for environmental purposes (European Union, 2003[20]). Revenue use estimates for EU-ETS participants are largely sourced from the Reporting Obligations Database (ROD) (Eionet, 2017[54]), based on reports detailing revenue use in 2016 (or in 2015 if the former was not yet available for public view at the time of writing). The European Commission also provides a detailed analysis of revenue use of EU-ETS auction proceeds from 2013 through 2015 (European Commission, 2017[55]).

ETS auction revenues are the most constrained of the three carbon pricing instruments, with 86% of revenues earmarked or politically committed to a specific programme, fund or purpose. The bulk of ETS auction revenues aim to boost energy savings among households and businesses, to compensate energy-intensive industries and electricity providers for the higher carbon prices and for the use of renewable energies, and to promote electric mobility and public transport.

ETS auction revenues are frequently used to subsidise the renovation and retrofitting of homes and buildings, with the long-term objective to lower energy consumption and bills. For example, the New Green Saving Programme in the Czech Republic fully sources its programme spending from auction revenues (State Environmental Fund of the Czech Republic, 2015[56]). A number of programmes especially targets public administration, welfare and school buildings, as in Estonia, Italy or Latvia. In Italy, the amount of auction revenues to renovate schools and hospitals is capped at EUR 30 million per annum (Official Journal of the Republic of Italy, 2016[57]), whereas in Estonia (from 2015 through 2017) and in Latvia, 46% and 90% of auction revenues, respectively, are earmarked for such purposes ( (Estonian Parliament, 2017[58]); (Latvian Government, 2016[59])). These programmes are also often income-based or conditions-based, such as the *Habiter Mieux* Programme in France (Cour des Comptes, 2018[60]) or the Saving at Home Programme in Greece (Greek Ministry for the Environment and Energy, 2016[61]).

France, Germany, Greece and the Slovak Republic provide compensation to industries considered at risk of carbon leakage due to the higher electricity prices caused by the ETS allowance price (although in the case of France this is not funded from ETS revenues). Portugal compensates electricity providers for the costs incurred from using less-carbon intensive fuels for power generation. In Portugal all auction revenues are earmarked to its Carbon Fund (*Fundo Português de Carbono*), and the amount of revenues allocated to the National Electricity System (*Sistema Elétrico Nacional* (SEN)) is calculated every year by the Portuguese Environment Agency (Portuguese Ministries of Finance and Environment, 2014[62]). Spain compensates the costs of the Electricity System related to the incentive for renewable energy. It caps the amount earmarked to the electricity sector at EUR 450 million (Spanish government, 2014[63]). In the state of California, around a third of ETS auction revenues are distributed back to electricity and natural gas utilities, although proceeds must

be used to the benefit of rate-payers (largely in the form of bill credits for households (California Air Resources Board (ARB), 2018[64]).

The use of revenues as compensation to energy users can blunt the incentive provided by the carbon price to invest in lower-carbon technologies and to use lower-carbon fuels. Furthermore, perhaps partly because of various forms of relief offered, there has been little evidence of any significant impact of carbon prices on competitiveness (OECD, 2015[65]). Additionally, (Dechezleprêtre, Lovo, Martin & Sato, 2017[66]) indicate that even "in the worst case scenario" the impact of an increase in energy costs on employment in the most energy-intensive industries is rather moderate.

A number of countries use revenues to develop, improve and increase public accessibility to electrified mobility, notably in Austria, Canada, Germany, Hungary and Portugal. One example is the *Ányos Jedlik* Plan in Hungary, a comprehensive strategy to encourage the use of electro-mobility, which, among other measures, aims to provide a blueprint for the establishment of a country-wide network of charging stations and the streamlining of taxation and legal requirements (Hungarian Ministry for National Economy, 2014[67]). Italy, Slovenia, and (to a larger extent), the provincial Canadian government of Quebec and the state of California use revenues to promote public mobility. Auction revenues fully fund the National Home-School and Home-Work Experimental Programme (*programma sperimentale nazionale di mobilità sostenibile casa-scuola e casa-lavoro*) in Italy (Official Journal of the Republic of Italy, 2016[57]), which encourages individuals to walk, bike or car-pool to school or work. In California, a quarter of proceeds are allocated to fund the ongoing construction of a High-Speed Rail, which links major cities in the state (The Legislative Analyst's Office (LAO), 2017[68]).

Several countries spend a significant amount of auction revenues subsidising the consumption of renewable energies, such as in the form of large and small-scale construction of heating and power infrastructures (e.g., Austria, Slovenia). In the United Kingdom, auction revenues represented half of the total funding allocated to the Renewable Heat Incentive (RHI) in 2016. Denmark is the only identified ETS participating country that reportedly allocates all revenues to R&D grants via the Energy Technology and Demonstration Programme (EUDP). Additionally, Ireland is the only identified ETS participant that spends most of auction revenues on protection and conservation measures (an afforestation programme).

# 4. The revenue potential from carbon pricing

This section presents a rough estimate of the revenue potential of carbon pricing. More specifically, it compares the current revenues from the measures discussed in the previous section to revenues that would be raised in the hypothetical situation where a benchmark carbon price or emissions permit allocation method would apply, and not taking into account any behavioural responses that would result from the application of the benchmark rates and allocation process. Two benchmark price levels are considered, one based on the median country's current effective carbon rates, and one with a minimum effective carbon rate of EUR 30/t$CO_2$.

The potential revenue can be interpreted as foregone revenue and as a form of revenue use earmarked to apply a preferential effective carbon rate – compared to the benchmark – to some or all emitters. This form of earmarking has adverse consequences for the effectiveness and cost-effectiveness of carbon pricing, since prices are reduced for some emitters and because carbon prices are no longer uniform.

Allowing lower carbon prices obviously reduces incentives to reduce emissions, but so does free allocation of emission permits, because the resulting lower average carbon rates tend to weaken incentives for investing in low-carbon equipment (OECD, 2017[69]). For this reason, this paper takes the view that foregone revenues arise from awarding some or all ETS participants with free permits. The benchmark then is the situation where permits are acquired at auction at the prevailing market price.

By this benchmark, and abstracting from behavioural change, the estimation of foregone revenues within an ETS is relatively straightforward: it is the product of the amount of allowances allocated for free and the market price of an allowance. For example, the revenue forgone from the free allocation of allowances in Italy was estimated at EUR 654 million in 2015 (Italian Ministry for the Environment, 2016[70]), which, according to Table A.3, is close to twice the amount of revenues actually raised from ETS auctioning.

Establishing a benchmark for carbon pricing levels is difficult if approached by setting benchmark sector or country tax rates. Reported tax expenditures in national budgets provide some indication of the extent of revenue foregone from carbon pricing through the tax code. The OECD's Inventory of Support to Fossil Fuels (OECD - IEA, 2018[71]) provides detailed information on the extent of fossil fuel subsidies, including those delivered through preferential tax rates on fossil fuel use. However, definitions of tax expenditures, and the benchmarks used to estimate their size, are nationally determined and thereby provide little opportunity for international comparability. To illustrate, the United States only recognises tax expenditures that operate through the income tax system (corporate and income taxes), so there is no baseline from which to estimate tax expenditures for excises (alternatively, the applicable rates are the baseline and there are no tax expenditures).

This paper proposes two benchmarks for calculating foregone tax revenue, or alternatively, for estimating the revenue potential from carbon pricing. The Effective Carbon Rates (ECR) database ( (OECD, 2016[1]))provides unique data on the extent of carbon pricing in various economic sectors across OECD and G20 countries, allowing for a relatively straightforward implementation of these two benchmarks. The first benchmark refers to currently applicable effective carbon rates, taking as a point of reference the median effective carbon rate among (non-zero) sector-level effective carbon rates across all

countries. The median rates for this "first benchmark" are shown in Table 3. Estimated median ECRs as first benchmark to calculate foregone tax revenues (EUR/tCO2)

**Table 3. Estimated median ECRs as first benchmark to calculate foregone tax revenues (EUR/tCO2)**

| Economic sector | Road | Off-road | Industry | Agriculture & Fisheries | Residential & Commercial | Electricity |
|---|---|---|---|---|---|---|
| Median ECRs (>0) | 160.43 | 24.45 | 3.83 | 21.70 | 7.01 | 8.63 |

*Note*: The table shows median ECRs (in EUR per tonne of $CO_2$ emissions) calculated among non-null sectoral-level ECRs across all OECD and G20 countries

The second benchmark is a low-end estimate of the social cost of carbon emissions, EUR 30/t$CO_2$, also used in the Effective Carbon Rates report. This benchmark is normative in the sense of reflecting the view that effective carbon rates should at a minimum reflect a low-end estimate of the social cost of carbon emissions. Foregone revenue then is an estimate of the extent to which current prices fall short of that benchmark, in revenue terms. An alternative interpretation is that foregone revenue is an estimate of the revenue potential from pricing carbon at EUR 30/t$CO_2$. EUR 30/tCO2 is a conservative estimate of the social cost of carbon emissions, and as a result the estimates of the revenue potential should be seen as low end figures, at least for the short and medium term. It is also worth noting that potential revenues from carbon pricing for international aviation and shipping are abstracted from.

The benchmarks are the minimum rates applied to the $CO_2$ emissions base in each country, which means that if the actual sectoral-level ECRs are below the applicable benchmark rates, the foregone revenue is the difference between the actual revenues and the revenues generated if the entire emission base were priced at the benchmark rates.

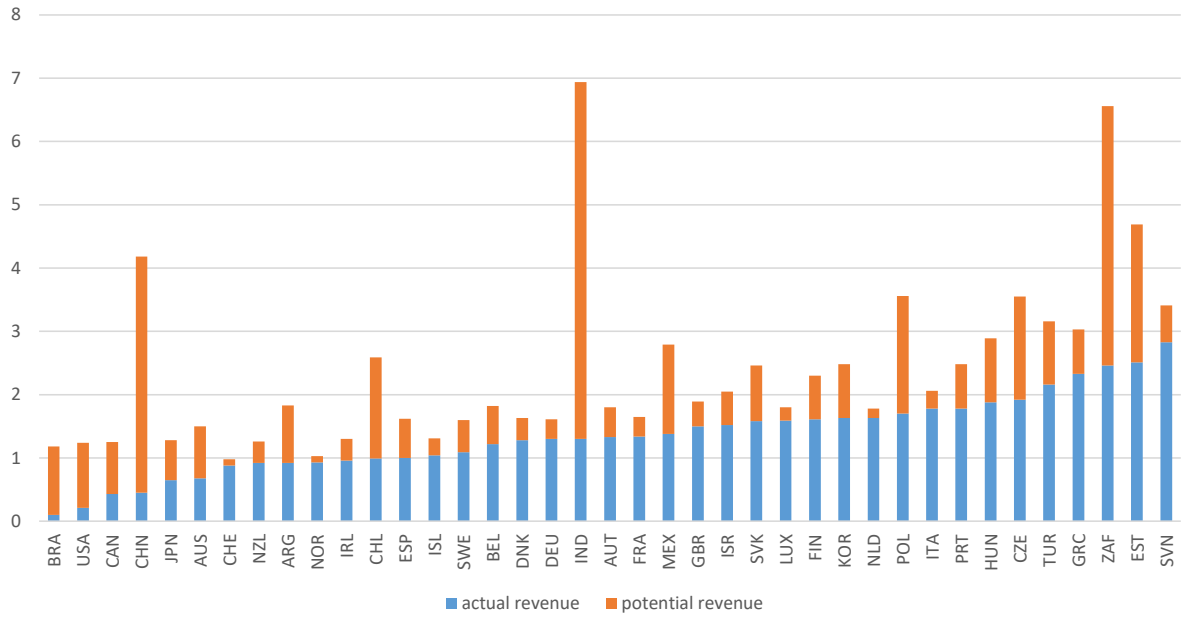
Figure 1 shows actual and potential (foregone) revenues as a share of GDP by carbon pricing instrument (excise and carbon taxes and ETS). The actual revenue shares are calculated based on the aggregate carbon pricing revenues by country as shown in Annex A. Potential revenue shares are estimated based on the methodology discussed above.

The actual revenues from the effective carbon rate measures included in this paper are estimated to amount to 0.76% of GDP across all OECD and G20 countries and 0.82% of GDP across only OECD countries. Potential (foregone) carbon pricing revenues estimates differ between the two benchmarks. Across all OECD and G20 countries, total foregone revenues from taxes and auction permits exceed actual revenues by a range between 1.32 (based on median prices) and 1.12 (based on EUR 30/t$CO_2$) percentage-points as a share of GDP. Foregone revenue as a share of GDP is particularly large in some emerging economies, including China and India. This reflects low current prices and relatively high carbon-intensity of the economy, and it suggests that the value of the benchmarks as concrete policy objectives may presently be limited in at least these countries. Across the OECD, foregone revenue is estimated at 0.72% to 0.88% of revenue, which is about as large as current revenues.

Higher prices will erode the tax base, but this is a gradual process and the negative impact on revenues can be compensated (and should be compensated, according to normative carbon pricing prescriptions) by increasing rates. As mentioned, (Marron, Toder and Austin, 2015[4]) suggest that carbon tax revenues, assuming rising rates, would eventually decline, but in a matter of decades, not years.

In most countries (with the exception of Canada, Luxembourg, Mexico, New Zealand, the United States and Brazil ), there are more foregone tax revenues under the second benchmark (EUR 30/tCO2), than under the first benchmark (based on median prices). Sector-specific medians imply high transport taxes and low taxes in other sectors, reflecting the prevailing pattern in nearly all countries at present. In contrast, a uniform minimum benchmark implies higher prices in all sectors, which raises more revenue.

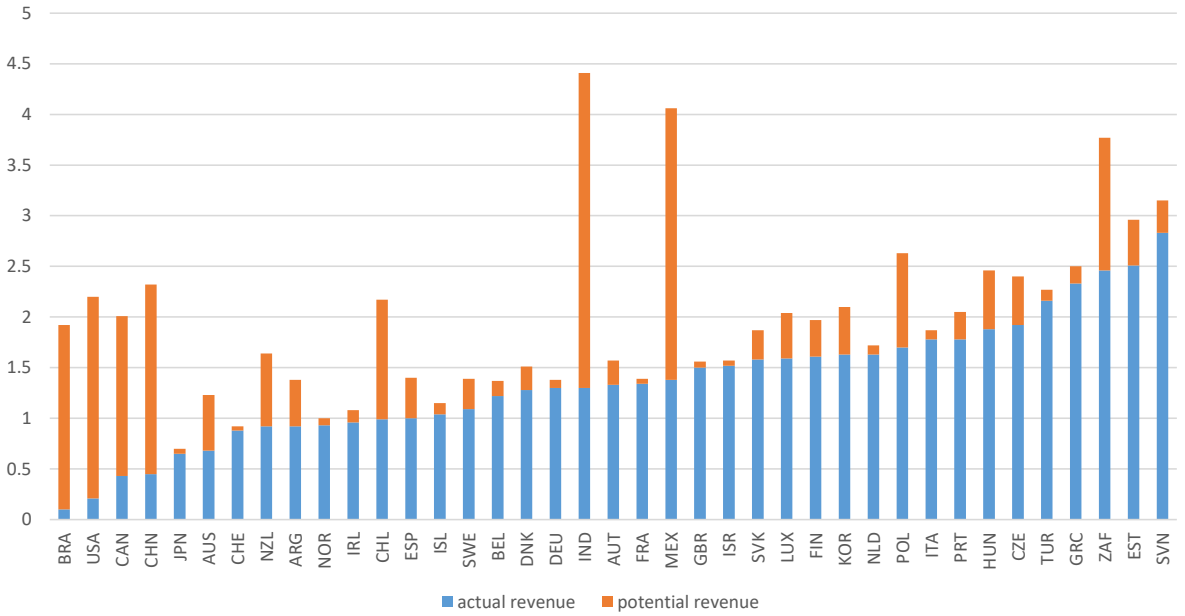
**Figure 2. Actual and potential revenues from carbon pricing instruments, EUR 30t/CO2 benchmark, as a share of GDP (%)**




Note: Actual revenue estimates are based on the sum of energy taxes, carbon taxes and ETS auction proceeds, for the taxes included in Annex A. Potential revenue estimates are based *Effective Carbon Rates Pricing CO2 through Taxes and Emissions Trading Systems, OECD 2016*.[7]

[7] The PINE database (OECD, 2018[19]) also provides yearly estimates of the shares revenues generated from energy taxation over GDP across at least all OECD, EU and G20 countries. Given differences in the methodological approach (e.g., the PINE estimates includes excise tax revenues from subnational taxes, whereas the present analysis only includes revenues from national or federal taxes), the PINE estimates are not used here. GDP estimates and exchange rates are taken from the OECD.Stat (OECD, 2018[246]) database for year 2016, with the exception of Brazil (2015). The GDP estimate for India for 2016 is taken from the World Bank database (World Bank, 2018[247])

**Figure 3. Actual and potential revenues from carbon pricing instruments, medians benchmark, as a share of GDP (%)**




Note: Actual revenue estimates are based on the sum of energy taxes, carbon taxes and ETS auction proceeds, for the taxes included in Annex A. Potential revenue estimates are based on *Effective Carbon Rates Pricing CO2 through Taxes and Emissions Trading Systems, OECD 2016*.[8]

[8] The PINE database (OECD, 2018[19]) also provides yearly estimates of the shares revenues generated from energy taxation over GDP across at least all OECD, EU and G20 countries. Given differences in the methodological approach (e.g., the PINE estimates includes excise tax revenues from subnational taxes, whereas the present analysis only includes revenues from national or federal taxes), the PINE estimates are not used here. GDP estimates and exchange rates are taken from the OECD.Stat (OECD, 2018[246]) database for year 2016, with the exception of Brazil (2015). The GDP estimate for India for 2016 is taken from the World Bank database (World Bank, 2018[247])

# 5. Conclusion

This paper analyses the use of revenues from carbon pricing in detail. It shows that carbon taxes and emissions trading systems often come with legal or political constraints on the use of revenues while constraints are less common for excise tax revenue. Revenue use constraints can emphasise the environmental vocation of carbon pricing, by connecting it to environment-related spending; this is often the case with emissions trading systems. The revenues from carbon taxes frequently are frequently the subject of a political commitment to reducing corporate income taxes, personal income taxes or social security contributions. In as far as specific revenue use initiatives are a way of seeking public support for carbon pricing, carbon taxes tend to do so with broad constraints, whereas emissions trading systems more narrowly focus on climate policy, including climate-related spending.

Where the use of revenues from excise taxes on energy use is constrained, this often reflects user charging principles, with road fuel taxes assigned to infrastructure spending. However, constrained excise tax revenues represent small shares of total constrained revenues when used for other purposes than on user charging grounds, which suggests that excise taxes are primarily introduced for revenue raising purposes.

While it is uncontroversial to argue that carbon pricing will meet with stronger public support if there is transparency about how the revenues from carbon pricing will be used, it is less obvious what types of revenue use should be preferred and how strong commitments to them should be. Comparing patterns across emissions trading, carbon taxes and excise taxes suggests a continuum ranging from carbon pricing and climate spending, over a mix of carbon pricing with broader tax policy objectives (related to the tax mix and to revenue raising) with weaker and broader constraints on revenue use, to full integration with broad revenue raising without constraints on revenue use.

Spending constraints are classically associated with risks of less efficient public spending, given that the connection between the revenue sources and spending needs in general is weak and can change over time. However, even with strict and narrow earmarking, budgets are fungible and this implies that risks of inefficiencies are more limited where earmarking is likely to have little or no effect on ultimate spending levels, in the sense that similar spending would have occurred without the constraints. Nevertheless, narrow earmarking of tax revenues risks resulting in fragmented and non-transparent spending, e.g. when such revenues are assigned to different agencies, and can result in cost inflation. This risk may be present for some of the earmarking practices described in this paper.

The paper shows that foregone carbon pricing revenue is large, regardless of whether the benchmark refers to current median rates or to a minimum carbon price. To the extent that foregone revenue results from differential rates and free allocation of permits (as opposed to resulting from all rates falling short of the chosen benchmark), it can be seen as a form of earmarked spending, with the associated risks of inefficient use of public funds. In addition, the downside of such spending is that it blunts the environmental effectiveness and efficiency of carbon pricing. This is because rates are reduced for some sources, resulting in weaker abatement incentives for them, and because the rates end up being more differentiated across sources, resulting in reduced cost-effectiveness.

Eliminating and henceforth avoiding compensation through preferential tax rates, which amounts to a form of base broadening, is an important ingredient of carbon pricing and revenue use reform. This requires better alignment of rates with fuels' carbon content and

moving towards uniform carbon pricing components of tax rates across sectors. A second step is to increase the benchmark rate, in order to arrive at carbon prices that are in line with emission abatement objectives as required to reduce risks of high climate change costs and as implied by the Paris Agreement.

Commitments to particular types of deployment of revenues can strengthen support for stronger carbon pricing, but efficiency and transparency require that constraints be broad and flexible rather than narrow and strict. Literature on the topic, some of which was reviewed in Section 2, stresses the importance of transparent, clearly communicated revenue use decisions that are well adapted to local conditions to help create support for carbon pricing. This literature focusses on carbon taxes and emissions trading. The present paper in addition also considers revenues from excise taxes on energy use, and finds that such revenues are comparatively high and less frequently constrained.

Should it be expected that, with considerable increases in carbon taxes and emission permit prices, political expediency would tend to lead to use of the revenues of carbon taxes in ways more similar to how currently excise tax revenue is used? Or should one instead expect that further increases in excise taxes will increasingly be accompanied by constraints of the type currently seen for carbon taxes and emissions trading systems?

Arguably, practice may evolve to a combination of both these tendencies. Narrow constraints are likely to attract less support when revenues are high, e.g., when the carbon pricing base is broad and the price is high, and in these circumstances, earmarking for green spending may fail to convince a sufficiently broad constituency. Instead, tax reform and transfers will more likely help generate public support. With very high revenues, potential transfers will be high too, and integration with broad redistributive policies may be preferred over uniform transfers. Phasing out transfers as decarbonisation takes place may also be harder than changing the funding of broad redistribution policy frameworks.

# Annex A. Revenue use tables and notes

**Table A.1. Overview of use of constrained revenues generated from excise taxes on fuels (EUR million)**

| | Generated revenues | Constrained revenues | | Unconstrained revenues | Revenue use in detail | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Legal earmarking | Political commitment | | Tax policy changes (e.g. tax cuts, rebates) | Inter-governmental transfers | Transport-related construction, maintenance & funding | Green & environmental spending | Energy & energy security spending | Other |
| AUS[1] | 7 997 | 268 (3%) | 0 | 7 729 (97%) | | 185 | 84 | | | |
| AUT[2] | 4 624 | 0 | 0 | 4 624 (100%) | | | | | | |
| BEL[3] | 5 032 | 354 (7%) | 0 | 4 678 (93%) | | | | | 5 | 350 |
| CAN[4] | 3 796 | 0 | 0 | 3 796 (100%) | | | | | | |
| CHL[5] | 2 006 | 0 | 0 | 2 006 (100%) | | | | | | |
| CZE[6] | 3 265 | 292 (9%) | 0 | 2 973 (91%) | | | 292 | | | |
| DNK[7] | 3 019 | 0 | 3 019 (100%) | 0 | | | | | | |
| EST[8] | 506 | 0 | 0 | 489 (100%) | | | | | | |
| FIN[9] | 1 999 | 50 (3%) | 1 949 (97%) | 0 | 1,949 | | | | 50 | |
| FRA[10] | 25 910 | 12 808 (49%) | 0 | 13 102 (51%) | | 12 093 | 715 | | | |
| DEU[11] | 40 100 | 0 | 0 | 40 091 (100%) | | | | | | |
| GRC[12] | 3 918 | 0 | 0 | 3 918 (100%) | | | | | | |
| HUN[13] | 2 079 | 0 | 0 | 2 079 (100%) | | | | | | |
| ISL[14] | 160 | 125 (78%) | 0 | 35 (22%) | | | 125 | | | 1 |
| IRL[15] | 2 179 | 0 | 0 | 2 179 (100%) | | | | | | |
| ITA[16] | 29 450 | 0 | 0 | 29 450 (100%) | | | | | | |
| ISR[17] | 4 362 | 0 | 0 | 4 362 (100%) | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| JPN[18] | 28 909 | 8 613 (30%) | 0 | 20 296 (70%) | | 2 341 | 439 | | 5 833 | |
| KOR[19] | 20 808 | 13 696 (66%) | 0 | 7 112 (34%) | | | 9 535 | 1 788 | | 2 373 |
| LUX[20] | 835 | 649 (78%) | 0 | 186 (22%) | | | | 56 | | 593 |
| LVA[21] | 487 | 0 | 0 | 487 (100%) | | | | | | |
| MEX[22] | 13 430 | 3 980 (30%) | 0 | 9 450 (70%) | | 3 980 | | | | |
| NLD[23] | 11 426 | 421 (4%) | 0. | 11 005 (96%) | n.a. | | | 421 | | |
| NZL[24] | 1 580 | 1 580 (100%) | 0 | 0 | | 19 | 1 433 | | 2 | 126 |
| NOR[25] | 1 819 | 0 | 1 819 (100%) | 0 | 1 819 | | | | | |
| POL[26] | 7 110 | 940 (13%) | 0 | 6 170 (87%) | | | 940 | | | |
| PRT[27] | 3 093 | 704 (23%) | 0 | 2 390 (77%) | | | 683 | 21 | | |
| SVK[28] | 1 214 | 0 | 0 | 1 214 (100%) | | | | | | |
| SVN[29] | 992 | 0 | 0 | 992 (100%) | | | | | | |
| ESP[30] | 10 785 | 6 769 (63%) | 0 | 4 016 (37%) | | 6 769 | | | | |
| SWE[31] | 2 488 | 0 | 0 | 2 488 (100%) | | | | | | |
| CHE[32] | 4 301 | 2 998 (70%) | 0 | 1 303 (30%) | | | 2 998 | | | |
| TUR[33] | 16 853 | 0 | 0 | 16 853 (100%) | | | | | | |
| GBR[34] | 34 406 | 0 | 244 (1%) | 34 161 (99%) | 244 | | | | | |
| USA[35] | 32 869 | 32 869 (100%) | 0 | 0 | | | 32 686 | 183 | | |
| ARG[36] | 4 635 | 4 184 (90%) | 0 | 451 (10%) | | 451 | 1 510 | 200 | 11 | 2,012 |
| BRA[37] | 1 476 | 428 (29%) | 0 | 1 048 (71%) | | 428 | | | | |
| CHN[38] | 45 875 | 45 875 (100%) | 0 | 0 | | | | 45 875 | | |
| IND[39] | 26 745 | 11 061(41%) | 0 | 15 684 (59%) | | | 9 356 | 1 705 | | |
| ZAF[40] | 6 576 | 3 507 (53%) | 0 | 3 070 (47%) | | 66 | 1 | 17 | 4 | 3,418 |
| TOTAL | 419 107 | 152 172 (36%) | 7 032 (2%) | 259 904 (62%) | 4 013 | 26 331 | 106 671 | 4 391 | 5 906 | 8 873 |
| OECD | 333 800 | 87 117 (26%) | 7 032 (2%) | 239 652 (72%) | 4 013 | 25 386 | 49 929 | 2 469 | 5 890 | 3 443 |

*Note*: The excise tax rates and their collected revenues presented in this table are those that directly apply on the physical consumption of energy use (exclusive of any carbon tax, presented in Table A.2) and that have an impact on the relative prices of fuels. Hence taxes on electricity consumption are excluded from the estimates. Non-earmarked revenues are assumed to flow to the general budget. Revenue and revenue use estimates are for calendar year 2016 or fiscal year 2015/2016, unless noted otherwise. The applied exchange rates are taken from the OECD Database. Estimates are in millions of euros. When revenue information is lacking, revenue amounts are estimated based on the *Taxing Energy Use* (TEU) Database (OECD, 2018[23]). Constraints on revenue use in Table A.1. are understood in the broadest sense, where revenue use based on legal and political commitments are included in the estimates.

1. In **Australia**, the Commonwealth fuel excise, net of fuel tax credits, contributed approximately AUD 11.9 billion to the Budget in the 2015-16 financial year, consisting of fuel excise revenue of approximately $18.0 billion, less $6.1 billion paid out in fuel tax credits ( (Australian Taxation Office (ATO), 2016[72]) ; (Australian Treasury, 2017[73])).If a business uses fuel in a heavy vehicle travelling on a public road, then the amount of fuel tax credits they can claim is reduced by the Road User Charge. The Road User Charge is a negative expense (it reduces expenditure instead of increasing revenue) and does not provide a revenue stream capable of being directly hypothecated towards particular spending. In the 2016 financial year, AUD 6.1 billion represents the amount of fuel tax credits claimed by businesses via business activity statements. Self-assessing businesses deduct any amounts of Road User Charge from their claims for fuel tax credits; consequently, AUD 6.1 billion is net of the road user charge. As the road user charge is not reported separately, the Australian Government does not publish figures on it (Australian Treasury, 2018[74]). As part of the 2014-15 Budget, the Government committed to allocate the net additional revenue collected from the reintroduction of fuel excise indexation to the states and territories for road funding. This reintroduction of indexation has increased Commonwealth fuel excise, net of fuel tax credits, by AUD 275 million in the 2015-16 year (Australian Treasury, 2017[75]). The Aviation Fuel Excise Tax is earmarked to the Civil Aviation Safety Authority (CASA), amounting to AUD 124 million in 2016 (67% of its source of income (Civil Aviation Safety Authority (CASA), 2016[24]). The remainder of fuel excise goes into consolidated revenue and is not formally hypothecated. The Commonwealth provides most of its infrastructure funding (including for road infrastructure) out of consolidated revenue.

2. In **Austria**, revenues generated from the Mineral Oil Tax (*Mineralölsteuer*) and from the Energy Output Tax (*Energieabgabe*) amounted to EUR 4,250 million and EUR 1, 301 million in 2016, respectively, (Austrian Ministry of Finance, 2016[76]) . The ax on electricity output represents 71% (EUR 928 million) of revenues generated from the Energy Output Tax (Austrian Federal Ministry for Sustainability and Tourism, 2018[77]), and this amount is deducted from the total collection generated from the latter. Hence, Table A.1. shows the sum of revenues generated from the Mineral Oil Tax and from the Energy Output Tax (net of the tax on electricity output, or EUR 374 million).

3. In **Belgium**, revenues raised from Excise Taxes and Special Excise Taxes (*Accises spéciales*) on energy products and electricity amounted to EUR 2, 108 million and EUR 2, 522 million, respectively, in 2016 (FPS Finance, 2017[78]). The revenues generated from the Special Excise Taxes are inclusive of all reimbursement and refunds. Revenues generated from the excise taxes earmarked within the framework of the Belgium-Luxembourg Economic Union (UEBL) amounted to EUR 10 million. Additionally, the amount generated from the Energy Contribution (*Cotisation sur l'énergie*) amounted to EUR 340 million, and the amount generated from the Inspection Fee (*Redevance de contrôle (sur gasoil de chauffage)*) to EUR 33 million. Based on (European Commission, 2017[79]), revenues generated from the excise tax on electricity consumption amounted to EUR 52.07 million in 2016 which are deducted from the total. Hence a total amount of EUR 5, 032 million is included in Table A.1.The Energy Contribution is earmarked to the Social Security Balance Fund (*Fonds pour l'équilibre financier de la sécurité sociale*) (Belgian Parliament, 1993[80]). Only EUR 4.5 million of revenues generated from the Inspection Fee is earmarked to the Petroleum Products Analysis Fund (*Fonds d'analyse des produits pétroliers (Fapetro*)) ( (Belgian Parliament, 1995[33]); (Inter-Environnement Wallonie, 2007[34])).

4. In **Canada**, federal revenues generated from the taxation of gasoline, aviation gasoline and diesel fuel (*Energy Taxes*) amounted to CAD 5,565 million in fiscal year 2015-16 (Receiver General for Canada, 2016[81]). Revenues generated from provincial and territorial excise taxes on fuel are not included.

5. In **Chile,** revenues raised from the Excise Tax on Fuels (*Impuesto a los combustibles*) amounted to CLP 1,502,039 million in 2016 (Chilean Ministry of Finance, 2017[82]).
6. In the **Czech Republic**, total revenues from the Excise Duty on Mineral Oils (*Spotřební daň z minerálních olejů*) and from other Energy Taxes (*energetických daní*) amounted to CZK 86.68 billion and CZK 5.0 billion, respectively (Ministry of Finance of the Czech Republic, 2018[83]). The other Energy Taxes include the excise dutu on natural gas (CZK 1.17 billion) and on solid fuels (CZK 0.42 billion), as well as the excise duty on electricity (CZK 1.45 billion) and on electricity from solar PV plants (CZK 1.93 billion). Table A.1. only shows revenues from the excise Duties on Mineral Oils, on natural gas and on solid fuels, amounting to CZK 88.27 billion. The State Fund for Transport Infrastructure (*Státní fond dopravní infrastruktury*) receives 9.1% of revenues generated from the Excise Duty on Mineral Oils per annum (Ministry of the Environment of the Czech Republic, 2013[84]).
7. In **Denmark**, total revenues raised from the duty on petrol, on "certain oil products", on gas, on "coal, etc." and on natural gas amounted to DKK 22, 478 million in 2016 (Statistics Denmark, 2017[85]). The main focus of tax reforms in Denmark since the mid-1990s has been to lower the taxation of work and transfer income while increasing indirect taxation, namely of energy use (Statistics Denmark, 2016[86]). Green tax reforms in the mid-1990s gradually shifted the tax base from labour to green taxes, which include taxes on energy fuels. The 1996 Green Tax Reform recycled revenues from energy taxes (including the $CO_2$ tax) as reductions on the pay-roll tax, reduction on pension contributions paid by employers, as subsidies for energy efficient technologies and to finance a fund for small businesses. Green tax revenues generated from the 1998 Green Tax Reform were partly used to lower income tax rates, but also for fiscal consolidation ( (Danish Treasury, 2009[87]); (Danish Ministry of Taxation, 2003[88]); (Larsen, 2011[89])). As part of the 2009 tax reform ("Spring Package 2.0"), the taxation of space heating (energy use by households and businesses) increased (in additional to other green taxes) and the revenues generated are returned back to families "*for example in the form of a green check, higher personal deductions and lower taxes at work*." The income-based green check compensates households for the increased burden of taxation on energy, environmental and health-related goods. Additionally, the indexation of energy taxes are only used for budget balancing purposes, which is also seen as a form of political commitment in Denmark ( (Danish State Ministry, 2009[90]); (Danish Ministry of Taxation, 2009[91]); (Ministry of Finance of Denmark, 2018[92])).
8. In **Estonia,** revenues generated from the Excise Duty on Fuels (*Kütuseaktsiis*) as amounted to EUR 506.1 million in 2016 (Estonian Ministry of the Environment, 2018[93]).
9. In **Finland**, revenues raised from the Excise tax on Motor Gasoline (*Moottoribensiini*), on diesel and on 'other' petroleum products in 2016 amounted to EUR 3,447 million (Finnish Ministry of Finance, 2017[93]). Based on the TEU Database, it is assumed that the share of revenues generated from the Carbon Tax is 42%, and the resulting amount is deducted from the total (hence a sum of EUR 1, 999 million is included in Table A.1.). Revenues raised from the Strategic Stockpile Fee contribute around EUR 50 million per annum to the National Emergency Supply Agency (NESA) (National Emergency Supply Agency, 2018[35]). As part of the 2011 tax reform, the abolishment of the national pension contribution paid by employers was offset by increases in taxes on energy use (Milne & Skou Andersen, 2012[94]). Moreover, budgetary measures focus on shifting the tax base away from "*labour and entrepreneurship*" towards environmentally and health-related taxation (Finnish Ministry of Finance, 2016[99]). Exclusive of the amount dedicated to NESA, it is assumed all energy tax revenues in Finland are used to make changes to tax policy as a form of political commitment

10. In **France**, revenues raised in 2016 from the Consumption Tax on Energy Products (*Taxe Intérieure de Consommation sur les Produits Énergétiques* – (TICPE)) amounted to EUR 28.5 billion and the sum of revenues generated from the Consumption Tax on Natural Gas (*Taxe Intérieure de Consommation sur le Gaz Naturel* – (TIGCN)) and the Consumption Tax on Solid Fuels (*Taxe intérieure de consommation sur les houilles, lignites et cokes* – (TICHLC)) amounted to EUR 1.193 billion (after deducting the amount raised by the tax on electricity – EUR 6.2 billion) (Ministère de l'Économie et des Finances, 2016[95]). Revenues raised from the $CO_2$ tax (EUR 3.8 billion) are deducted from the total (Ministère de la Transition écologique et solidaire, 2017[52]). In 2016, revenues generated from the TICPE, amounting to EUR 715 million, were earmarked to the Transport Infrastructure Financing Agency (*Agence de financement des infrastructures de transport de* France – (AFTIF)), to compensate for the abolishment of the EcoTaxe ( (French Ministry of Public Accounts, 2017[96]); (French Ministry of Public Accounts, 2016[97])). Additionally, around EUR 12 billion were distributed to departments and provinces to improve the decentralization of administrative competencies (*transferts des compétences*). Revenues were also used to finance a premium granted to businesses that recruit apprentices. As of 2017 a supplementary transfer of EUR 24 million from the TICPE is also earmarked to regions through the programme "NACRE" (*Nouvel Accompagnement à la Création ou à la reprise d'Entreprise*). Also, the additional revenues (EUR 300 million) generated from the increase of the rate applied to diesel consumption (to address the diesel differential) are used to lower the tax burden on low-income households and pensioners, as well as to increase the premium granted when replacing old diesel vehicles ( (French Ministry of Public Accounts, 2017[96]); (Ministère de la Transition écologique et solidaire, 2018[30])). These earmarks are not shown in Table A.1. As part of the 2017tax reform, tax reductions on corporate income and on the property wealth tax are compensated by increases in taxes on energy (including on $CO_2$ emissions).

11. In **Germany**, revenues generated from the Energy Tax (*Energiesteuer*) (formerly the Mineral Oil Tax - *Mineralölsteuer*) amounted to EUR 40, 091 million in 2016 (Destatis, 2017[98]).

12. In **Greece**, revenues collected from the Special Consumption Tax on energy products (*Ε.Φ.Κ. ενεργειακών προϊόντων*) amounted to EUR 4,093 million in 2016 (Greek Ministry of Finance, 2017[99]). Based on (European Commission, 2017[79]), revenues generated from the excise tax on electricity consumption amounted to EUR 175 million in Greece in 2016. This amount is deducted from the total generated revenues, resulting in EUR 3, 918 million as shown in Table A.1.

13. In **Hungary**, revenues generated from the Energy Tax (*Energia adó*) and from the Excise Tax (*Jövedéki adó*) amounted to HUF 18,176 million and HUF 1,011,806 million in calendar year 2016 (Hungarian Central Statistical Office, 2018[100]). Excise taxes on fuels represent 62.2% of total revenues from the Excise Tax (Hungarian Parliament, 2016[101]), hence an amount of HUF 629, 343 million of fuel tax revenues is included in Table A.1.

14. In **Iceland**, revenues raised from the Excise Duties on Petrol and Petroleum Products (*Vörugjöld af bensíni og olíuvörum*), the Special Excise Tax on Gasoline (*Sérstakt vörugjald af bensíni*) and the Oil Tax (*Olíugjald*) were ISK 4,690 million, ISK 7,503 million and ISK 9, 226 million, respectively in 2016 (The Financial Management Authority (FJS) of Iceland, 2016[102]). Both the Special Tax on Gasoline and the Oil Tax are earmarked for road construction (99.5%) and to the Treasury to cover the costs associated with collecting and charging the fee (0.5%) ( (Icelandic Parliament, 2018[103]) (Icelandic Parliament, 2018[104])).

15. In **Ireland**, revenues generated from the duty on light and other hydrocarbon oil products amounted to EUR 725 and EUR 1, 454 million, respectively, in 2016 (Irish Central Statistical Office, 2017[105]).

15. In **Italy**, revenues generated from Energy Taxes (*Accisa sui prodotti energetici, loro derivati e prodotti analoghi*), the Excise Tax on Incondensable Gases (*Accisa e imposta erariale sui gas incondensabili*) and the Excise Duty on Natural Gas (*Accisa sul gas naturale per combustion*) amounted to EUR 25,425 million, EUR 599 million and EUR 3,399 million, respectively in calendar year 2016 (Italian Ministry of Finance, 2017[106]).

17. In **Israel**, revenues generated from the Excise duty on Fuel Products (*דלק מוצרי על בלו*) amounted to ILS 18, 532 million in 2016 (Israeli Ministry of Finance, 2016[107]).

18. In Japan and in fiscal year 2017, revenues generated from the Gasoline Tax (揮発油税) and the Local Gasoline Tax (地方揮発油税) amounted to JPY 2,396 billion and JPY 256 billion, respectively. Additionally, revenues collected from the Liquefied Petroleum Gas (LPG) Tax (石油ガス税) amounted to JPY 16 billion; from the Aviation Fuel Tax (航空機燃料税) to JPY 67 billion and from the Petroleum and Coal Tax (石油石炭税) to JPY 691 billion (Japanese Ministry of Finance, 2018[108])Revenues generated from the Petroleum and Coal Tax include revenues from the Tax for Climate Change Mitigation (carbon tax), and total amount of the revenues from the Local Gasoline Tax is distributed to prefectures and municipalities (including special wards) (Japanese Ministry of Internal Affairs andCommunication, 1999[109])The Aviation Fuel Tax is reserved for airport construction and maintenance, including around two ninth to prefectures and municipalities for the same purpose ( (Japanese Ministry of Internal Affairs and Communications, 2009[110])
Moreover, half of revenues generated from the LPG tax are distributed to prefectures ( (Japanese Ministry of Internal Affairs and Communications, 1965[111])The Petroleum and Coal Tax is largely earmarked for energy security policies ( (Japanese Ministry of Finance, 2018[108])Until 2008, all revenues from the Gasoline Tax were also earmarked for road funding ( (OECD, 2013[112])

19. In **Korea**, revenues generated from the Transportation-Energy-Environment Tax (*교통·에너지·환경세* – (TEET)) and from the Individual Consumption Tax (*개별소비세* – (ICT)) on gas and coal products amounted to KRW 15.3 trillion and KRW 4.7 trillion, respectively in 2016 (Korean National Assembly Budget Office (NABO), 2016[113]). The Automobile Tax and the Education Tax also apply to the consumption of fossil fuels in Korea. The Automobile Tax represents 26% of all TEET rates, and it generated KRW 3.97 trillion in 2016 (Korean Ministry of Finance, 2018[114]). The Education Tax represents 15% of all TEET rates, amounting to KRW 2.28 trillion in 2016. The Education Tax also represents between 15% and 30% of all ICT rates (the rate depends on the fossil fuel consumed), amounting to KRW 0.46 trillion in 2016 (although this amount is inclusive of revenues generated from golf courses and casinos) (Korean Ministry of Finance, 2018[114]). Hence, an additional KRW 4.0 trillion generated from the Automobile Tax and KRW 2.7 trillion from the Education Tax are included to the total estimate. Revenues generated from the TEET are earmarked to road and transport infrastructure funding and maintenance (80%), for environmental-related projects (15%) and for regional development (2%). The remaining revenues (3%) flow to the general budget (Korean Ministry of Finance, 2018[40]). All revenues from the Education Tax are earmarked to the federal education budget.
20. In **Luxembourg**, the Autonomous Excise Duties on Mineral Oils (*Droits d'accise autonomes sur certaines huiles minérales*), the Excise Duties on Mineral Oils (*Droits d'accise sur les huiles minérales*), the Consumption Tax on Natural Gas (*Taxe de consommation sur le gaz naturel*), and the Inspection Fee (*Redevance de contrôle sur le fuel domestique*) amounted to EUR 178.5 million, EUR 479.4 million, EUR 4.7 million and EUR 2.1 million, respectively, in 2016. Additionally, revenues collected from the Additional Tax on Motor Fuels (*Taxe complémentaire prélevée sur les carburants*, also known as *Contribution Sociale*) amounted to EUR 114.3 million, and the Kyoto Tax (also known as *Contribution Changement Climatique*) amounted to EUR 56.0 million in 2016 (Statec, 2016[106]). Revenues from the Excise Duties on Mineral Oils are earmarked within the framework of the Belgium-Luxembourg Economic Union (UEBL). Revenues from the Kyoto Tax are earmarked to the Climate and Energy Fund. Revenues from the Additional Tax on Road Fuels are earmarked to the Employment Fund (*Fonds pour l'emploi*).
21. In **Latvia**, revenues generated from the Excise Taxon PetroleumProducts (*Naftas produktiem*) and the Excise Tax on Natural Gas (*Dabasgāzi*) amounted to EUR 465.7 million and EUR 21.4 million in 2016, respectively (Latvian State Revenue Service (SRS), 2016[115]). As it is not possible to disaggregate revenues generated from the taxation of solid fuels (coal, coke and lignite) from total revenues generated from the Natural Resource Tax (*Dabas resursu nodoklis)* (Latvian Ministry of Finance, 2018[116]), the former estimate is not included in Table A.1.

22. In **Mexico**, total revenues raised from the Special Tax on Production and Services (*Impuesto Especial sobre Producción y Servicios* – (IEPS)) on gasoline and diesel at the federal and at the subnational level amounted to MXN 277, 264 million in 2016 (Mexican Tax Administration (SAT), 2018[117]). A portion of federally-raised revenues is distributed back to subnational governments, amounting to MXN 55, 830 million in 2016. IEPS revenues collected at the subnational level (MXN 26, 343 million) are also redistributed back to subnational governments. Table A.1. shows the sum of IESP inter-government transfers from both collections at the federal and subnational level (MXN 82, 173 million).

23. In the **Netherlands**, the Excise Duty on Light Oil (*Accijns van lichte olie*), the Excise duty on Mineral Oils (other than light oil) (*Accijns van minerale oliën, anders dan lichte olie*), the Energy Tax (*Energiebelasting*) and the Fuel Taxes (*Brandstoffenheffingen*) amounted to EUR 4, 226 million; EUR 3, 862 million; EUR 4, 543 million and EUR 3 million, respectively, in 2016 (Dutch Ministry of Finance, 2017[118]). Additionally, a Sustainable Energy Surcharge (*Opslag Duurzame Energie* – (ODE)) applies to natural gas and electricity consumption, and amounted to EUR 421 million in 2016 (Dutch Ministry of Finance, 2018[119]). The Energy Tax includes the Excise duty on Electricity Consumption. Based on (European Commission, 2017[79]), the Excise duty on electricity consumption amounted to EUR 1, 629 million in 2016 in the Netherlands, and this amount is deducted from the Energy Tax. Due to data constraints, it is not possible to deduct the amount of revenues generated from the extra ODE charge on electricity output from total ODE revenues. Hence the total amount of revenues generated from energy taxes is EUR 11 426 million, as included in Table A.1. In the Netherlands, when policy decisions are made on increasing energy tax rates, the projected revenue is used to lower other taxes, such as personal income and corporate income taxes (Dutch Government, 2018[27]). However the Dutch government does not track the amount of revenues generated from the increases to excise tax rates on fuels so as to lower PIT or CIT rates. Therefore there is no direct earmarking of revenues, albeit there is a political commitment to use the additional revenues to make changes in tax policy. ODE revenues finance measures and subsidies of the Sustainable Energy Production Stimulation (*Stimulering Duurzame Energieproductie* – (SDE +)) projects.

24. In **New Zealand**, total revenues generated from excise taxes on petroleum products from domestic production and from imports amounted to NZD 2, 277 million in 2016 (Treasury of New Zealand, 2018[120]). All revenues generated from excise taxes on petroleum products for domestic production and from imports are channelled to the National Land Transport Fund (NLTF) (New Zealand Ministry of Transport, 2017[121]). Also, an Accident Compensation Corporation (ACC) levy amounted to around NZD 201 million, based on the assumption that income generated from the excise tax on petrol use represents around 27.5% of the "total net levy and other income" allocated to the Motor Vehicle Account in 2016 ( (Accident Compensation Corporation, 2014[122]); (Accident Compensation Corporation, 2016[123])). Revenues generated from the ACC levy pay for road-related injuries through an accident compensation scheme (New Zealand Ministry of Business, Innovation, 2001[37]).In 2015-16 financial year, the total amount budgeted for the Petroleum or Engine Fuel Monitoring Levy (PEFML)-related energy security activities amounted to NZD 2.8 million (New Zealand Ministry of Business, 2015[124]). Additionally, revenues from the Local Authorities Tax amounted to 29.4 million in 2017 (Treasury of New Zealand, 2018[120]) and the revenues are distributed back to local governments (New Zealand Department of Internal Affairs, 2017[125]) As of 2017, some of the revenues generated from the PEFML are instead earmarked to the Energy Efficiency and Conservation Authority (EECA) (Energy Efficiency and Conservation Authority, 2016[42])), not shown in Table A.1.

25. In **Norway**, revenues generated from the Petrol Tax, the Diesel Tax and the Road Tax on Natural Gas and LPG amounted to NOK 5, 486 million; NOK 9,563 million and 5 million, respectively, in 2016 (Statistics Norway, 2017[126]). Additionally, the Fee on Mineral Oil was budgeted as NOK 1,850 million in 2016 (Norwegian Parliament, 2016[127]). The 2015 and 2016 tax programme for Norway demonstrates a "clear shift" towards green and environmentally related taxes, which include energy and $CO_2$ taxes ( (Norwegian Ministry of Finance, 2015[45]); (Norwegian Ministry of Finance, 2016[46])). Additionally, the 2017 budget indicates that channelling "*revenue increases from environmental taxes back to taxpayers in the form of sectoral reductions in taxes and compensations via the expenditure side of the budget*" is a national priority (Norwegian Ministry of Finance, 2017[128]). All changes of revenues in Norway due to discretionary changes in energy tax bases and rates are used to make changes to tax policy (Norwegian Ministry of Finance, 2018[129]) as a form of political commitment.

26. Revenues from excise taxes on energy products in **Poland** amount to PLN 33,368 million in 2016 (OECD, 2018[19]). Based on (European Commission, 2017[79]), revenues generated from the excise tax on electricity consumption amounted to PLN 2, 358 million in 2016 in Poland, and this amount is deducted from the total. The Surcharge on Automotive Fuels is earmarked to the National Land Transport Fund (80%) and to the Railway Fund (20%) (Polish Parliament, 2018[25]), amounting to a total collection of around PLN 4.1 billion in 2016 (Civil Development Forum (FOR), 2017[130]). The additional revenues generated from the increase in the fuel surcharge in 2017 are meant for social spending purposes, not included in Table A.1.

27. In **Portuga**l, total revenues collected from Excises Taxes on Petroleum and Energy Products (*Imposto sobre os Produtos Petrolíferos e Energéticos* – (ISP)) on gasoline, diesel, fuel oil, gases (*GPL e Gás*) and kerosene amounted to EUR 3,093 million in 2016 (exclusive of the $CO_2$ tax) (Portuguese Tax and Customs Authority, 2016[131]). Since 2008, a portion of revenues is earmarked as a Contribution to Road Service (*Contribuição de Serviço Rodoviário)* for road construction and maintenance, amounting to EUR 683 million in 2016 (Portuguese Parliament, 2017[132]), although this estimate may be somewhat overestimated as it may include revenues from the $CO_2$ tax. Revenues are also earmarked to the Forest Fund (*Fundo Florestal Permanente* – (FFP)) (capped at EUR 30 million per annum) and amounted to EUR 20.6 million in 2016 ( (Portuguese Public Ministry, 2016[43]); (Institute for the Conservation of Nature and Forestry, 2016[41])). Exceptionally in 2017, revenues raised from the ISP on coloured and marked diesel (capped at EUR 10 million) are earmarked to a rural development (PDR 2020) programme and a programme to support the purposes of the European Maritime and Fisheries Fund (MAR 2020) (Portuguese Public Ministry, 2016[43]), which are not shown in Table A.1. As of 2018, the revenues generated from the taxation of solid fuels for electricity generation flow to the Environmental Fund (50%) and the National Electricity System (SEN) (50%) for tariff reduction purposes. These revenues are not shown in Table A.1.

28. In the **Slovak Republic**, revenues generated from excise taxes on mineral oils (*z miner.olejov, dobeh spotr. dane z uhľ.palív a mazív*), coal (*z uhlia*) and natural gas (*zo zemného plynu*) amounted to EUR 1, 189 million; EUR 363 thousand and EUR 24 million in 2016 (Slovak Financial Administration, 2016[133]).

29. In **Slovenia**, the Excise duty on Energy Products and Electricity amounted to EUR 1,026 million in 2016 (Slovenian Ministry of Finance, 2018[134]). Based on (European Commission, 2017[79]), the Excise tax on Electricity amounted to EUR 33.73 million in 2016, which is deducted from the total (as the tax on electricity output is independent of the fuel mix used to generate electricity, and thereby not included in Table A.1.). The total collection from the Excise Duty on Energy Products (net of electricity) is EUR 992 million, as shown in Table A.1. The Strategic Stockpiling Levy, as well as the Energy Saving Contribution Surcharge (*Dodatek za zagotavlj. prihrankov energije*) and the Support to Electricity Generation Contribution (*Prispevek za zagotavlj. podpor proizvodnji el. energije*), which are levied on the consumption of various fossil fuels, are not included in Table A.1.

30. In **Spain**, revenues generated from on the Excise Tax on Hydrocarbons (*Impuesto sobre Hidrocarburos*) and the Special Excise Tax on Coal (*Impuesto Especial sobre Carbón*) amounted to EUR 10, 556 million and EUR 229 million, respectively, in 2016 (Spanish Tax Agency, 2017[135]). Local communities and cities receive 58% of revenues generated from the Excise Tax on Hydrocarbons per annum, (Ministry of Finance of Spain, 2009[136]). In 2016, around EUR 6, 769 million of tax revenues were used as inter-governmental transfers.

31. In **Sweden**, revenues generated from the Energy Tax on Fuels (*Energiskatt bränslen*) amounted to SEK 23, 559 million in 2016 (Statistics Sweden, 2017[137]). Energy excise duty rate increases (and the introduction of the $CO_2$ tax), as part of the 1990-91 tax reform, were used to finance reduced taxes on labour (Swedish Government, 1997[138]), and increased energy taxes in 1996 helped fund Sweden's EU membership. Furthermore from 2001 through 2006, the green tax shifts (*gröna skatteväxlingen*) amounted to "*SEK 17.6 billion in reduced income taxes and employers' fees and SEK 17.3 billion in increased energy and environmental taxes*" (Swedish National Audit Office, 2009[139]). There has not been any more use of green tax shifting since 2006 and all energy tax revenues in 2016 flow to the general budget.

32. In **Switzerland**, generated revenues from the Mineral Oil Tax on Motor Fuels (*Impôt sur les huiles minérales grevant les carburants*) amounted to CHF 2, 805 million; the Mineral Oil Surcharge on mMotor Fuels (*Surtaxe sur les huiles minérales grevant les carburants*) amounted to CHF 1,866 million and the Mineral Oil Tax on Other Combustible Fuels (*Impôt sur les huiles minérales grevant les combustibles*) amounted to CHF 17 million in 2016 (Swiss Federal Customs Administration, 2017[26]). All revenues from the Mineral Oil Surcharge and half of revenues from the Mineral Oil Tax on road fuels are earmarked for road and airport infrastructure funding and maintenance.

33. In **Turkey**, revenues raised from the Special Consumption Tax on Petroleum Products amounted to TRY 56.3 billion in 2016 (Turkish Ministry of Development, 2017[140]). The Gas Consumption Tax amounted is earmarked for inter-governmental transfers, although its total revenue amount is not included in Table 1.A due to data constraints.

34. In the **United Kingdom**, revenues generated from the Excise Duty on Hydrocarbons and the Climate Change Levy (CCL) amounted to GBP 27, 987 million and GBP 783 million in calendar year 2016, respectively. Revenues from the Excise Tax on Electricity output (GBP 583 million) are deducted from the total revenues collected from the CCL, amounting to GBP 200 million (HM Revenue & Customs, 2018[141]). The CCL was introduced to recover revenues losses from rate cuts on National Insurance Contributions paid by employers, as well as to fund the Carbon Trust (British National Audit Office, 2007[28]). The initial budget allocated to the Carbon Trust and to the Energy Efficiency Best Practice Programme was GBP 100 million of CCL revenues over three years from April 2001 (HM Treasury, 2001[142]). It is assumed CCL revenues are no longer linked to Carbon Trust funding, but that that the political commitment to use CCL revenues to support tax policy changes does continue in 2016. As a result, it is assumed the purpose of all CCL revenues is to make or support changes to tax policy.

35. In the **United States**, the Internal Revenue Service (IRS) collected USD 36, 358 million in excise tax revenue on motor fuels in fiscal year 2016, including fuels for domestic aviation and navigation transport (Internal Revenue Service (IRS), 2017[143]). At the federal level, all motor fuel excise taxes are earmarked either for transportation-related infrastructure, such as through the Federal Highway Trust Fund, the Inland Waterways Trust Fund and the Airport and Airways Trust Fund (AATF), or to the Leaking Underground Storage Tank (LUST) Trust Fund. In fiscal year 2016, the Inland Waterways Trust Fund, the LUST Trust Fund and the AATF collected USD 111 million, USD 203 million and USD 624 million (including refunds), respectively, in excise tax revenues from motor fuels (U.S. Department of the Treasury, 2018[144]). All remaining revenues (USD 35, 421 million) are channelled to the Federal Highway Trust Fund. The LUST Trust Fund addresses and manages activities related to clean-ups of petroleum releases from federally regulated underground storage tanks (USTs) (United States Environmental Protection Agency (EPA), 2017[145]).

36. In **Argentina**, revenues raised from the Tax on Liquid Fuels and Compressed Natural Gas (CNG) (*Impuesto sobre los Combustibles líquidos y el GNC*) amounted to ARS 45 billion, a Tax on Automotive Diesel (*Impuesto sobre el gas oil*) amounted to ARS 27 billion, a Surcharge on Natural Gas (*Recargo consumo de gas*) to ARS 187 million and another Tax on Gasoline (*Impuesto a la transferencia de naftas*) to ARS 3 billion in 2016 (Argentine Federal Administration of Public Revenues, 2017[146]). The tax on Automotive Diesel is largely earmarked to a transportation infrastructure fund (*Sistema de Infraestructura del Transporte* (SIT)), and a small amount is also reserved to lower tariffs paid in public transport systems (outside of the capital city and its metropolitan area). The Surcharge on Natural Gas is earmarked to the Trust Fund for Residential Gas Consumption Subsidies (*Fondo Fiduciario para Subsidios de Consumos Residenciales de Gas*) and the Tax on Gasoline is earmarked to the Water Infrastructure Fund *(Fondo de infraestructura Hídrica)*. Excise taxes on diesel, kerosene and CNG are earmarked to the National Administration for Social Security (*Administración Nacional de la Seguridad Social* (ANSES)); as well as 21% of taxes on other liquid fuels (gasoline). Taxes on other liquid fuels (gasoline) are also distributed back to provinces (23%) and finance the National Housing Fund (*Fondo Nacional de la Vivienda* (FONAVI)) (33%), as well as the National Treasury (23%) (Argentine Ministry of Finance, 2017[39]).

37. In **Brazil**, revenues raised from the taxation of CIDE (*Contribuição de Intervenção no Domínio Econômico*) fuels amounted to BRL 5,700 million in 2016 (Brazilian Ministry of Finance, 2018[147]). A portion of revenues from CIDE fuels are distributed back to states (29%) (Brazilian Department of Treasury, 2018[148]), although reserved for specific purposes: subsidies for the payment or transportation of various fossil fuels; funding environmental projects implemented by the oil and gas industry; and funding transport infrastructure programmes (Presidency of the Republic of Brazil, 2001[149]).

38. In **China**, total revenues generated from the Excise Tax (*国内消费税*) amounted to CNY 1, 022 billion (Ministry of Finance of the People's Republic of China, 2017[150]). It is assumed revenues generated from the Refined Oil Excise Tax (ROCT) (*成品油消费税*) represents around a third of total revenues from the Excise Tax (People's Daily Online, 2015[151]). The 1994 tax reform introduced excise taxes on refined oil products, and generated revenues were used for general budgeting purposes. The Refined Oil Consumption Tax Reform launched in 2009 with the motivation to use the additional revenues generated from excise tax increases to fund transport infrastructure (as road maintenance fees and other charges were eliminated) ( (State Administration of Taxation of the People's Republic of China, 2008[152]); (Ministry of Finance of the People's Republic of China, 2008[153])). Refined Oil Excise Tax rates were also increased in 2014 and in 2015, and the newly additional generated revenues are mostly used for environmental spending and renewable energy projects (e.g. haze control, the construction and improvement of urban sewage treatment pipeline facilities, drinking water quality control), as well as to promote access to low-carbon mobility (The State Council of the People's Republic of China, 2015[154]). Due to data constraints, it is not possible to disaggregate the revenues used to fund transport infrastructure funding from the revenues used for green projects, although it is assumed all generated revenues are legally earmarked.

39. In **India**, the Additional Duty of Excise (ADE) on Motor Spirit and High Speed Diesel amounted to Rs. 69, 540 crores; the Special Additional Duty of Excise on Motor Spirit amounted to Rs. 18, 171 crores; the Cess on Crude Oil to Rs. 14, 311 crores and the Clean Environment Cess to Rs. 12, 676 crores in actual receipts in 2015-2016 (Ministry of Finance of India, 2017[155]). Basic and Excise Duties (CENVAT) apply to petroleum products beyond motor spirits. Based on (Comptroller and Auditor General of India, 2017[156]), total revenues from the taxation of petroleum products amounted to Rs. 198, 793 crores. Accordingly, it is assumed revenues generated from the CENVAT applied to all other petroleum products amounted to Rs, 84, 095 crores (the latter total amount minus all former amounts). The ADE taxes (also known as road cesses) are earmarked for road funding, construction and maintenance ( (Indian Ministry of Road Transport & Highways, 2011[157]); (Indian Transport Department, 2000[158])). The CEC was earmarked to the National Clean Energy Fund (NCEF) for clean energy initiatives and R&D until 2017, as shown in Table A.1. As of 2017, the CEC is earmarked to Goods and Services Tax (GST) Compensation Fund to compensate states for potential revenue losses from the GST reform (Indian Department of Expenditure, 2017[44]), not shown in Table A.1. Due to data constraints, Table A.1. does not include the National Calamity Contingency Duty, an additional excise duty on crude oil, as it also applies to other non-energy-related commodities. The National Calamity Contingency Duty is earmarked to the National Disaster Response Fund (NDRF).

40. In **South Africa**, total revenues generated from the General Fuel Levy (net of diesel refunds and including the Road Accident Fund (RAF) Recoupment) amounted to ZAR 55, 607 million in fiscal year 2015/16 (South Africa Revenue Service (SARS) and the National Treasury, 2018[159]). The amount generated from the General Fuel Levy and shared with metropolitan municipalities (ZAR 10.7 billion in 2015/16 - (National Treasury of the Republic of South Africa, 2017[160])) is included in the total amount. Additional to the General Fuel Levy (GFL) are revenues generated from the customs and excise SACU (Southern African Customs Union) pool levy, which amounted to ZAR 51, 022 million, as well as a Petroleum Pipeline Levy of around ZAR 72 million (South African Department of Energy, 2015[161]) and an Aviation Fuel Levy amounting to ZAR 21.1 million in fiscal year 2015/16 (South African Civil Aviation Authority, 2017[162]). Also additional to the GFL are revenues generated from the Demand-Side Management Levy (DSML) and the Illuminating Paraffin (IP) Tracer Dye Levy, amounting to ZAR 279 million in fiscal year 2015/2016 (South African Treasury, 2018[163]) and ZAR 1 million in fiscal year 2012/2013 (South African National Assembly, 2014[164]), respectively. The RAF Levy (Recoupment) provides social security insurance to victims of road transport, and is the main source of income of the RAF compensation scheme (Road Accident Fund (RAF), 2018[38]). The SACU pool levy is transferred to the SACU common revenue pool. The Petroleum Pipeline Levy flows to the National Energy Regulator (NERSA) to reimburse pipeline users for the NERSA tariff paid. The Aviation Fuel Levy is channelled to SACCA, and represents around 4% of its total revenue collection. The IP Tracer Levy is earmarked to reimburse the oil industry for buying and using IP tracer dye for curtailing the use of mixed diesel; and the DSML is applied to gasoline 95 octanes for inland use to curb its further use (South African Department of Energy, 2014[165]).

**Table A.2. Overview of use of constrained revenues generated from carbon taxes (EUR million)**

| | Generated revenues | Constrained revenues | | Unconstrained revenues | Revenue use in detail | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Legal earmarking | Political commitment | | Tax policy changes (e.g. tax cuts, rebates) | Green & environmental spending | Energy and energy security spending | Compensation to energy users | Other |
| AUS[1] | 2 995 (FY2013-14) | 2 995 (100%) | 0 | 0 | 1 361 | 278 | 88 | 934 | 286 |
| CAN[2] | 1 520 | 1 520 (100%) | 0 | 0 | 1 211 | | | 309 | |
| CHL[3] | 233 (2018) | 0 | 0 | 233 (100%) | | | | | |
| DNK[4] | 480 | 0 | 480 (100%) | 0 | | | | | |
| FIN[5] | 1 402 | 0 | 1 402 (100%) | 0 | 1 402 | | | | |
| FRA[6] | 3 800 | 3 000 (79%) | 0 | 800 (21%) | 3 000 | | | | |
| ISL[7] | 26 | 0 | 0 | 26 (100%) | | | | | |
| IRL[8] | 434 | 50 (12%) | 384 (88%) | 0 | 384 | | 50 | | |
| JPN[9] | n.a. | n.a. (100%) | 0. | 0 | | | n.a. | | |
| LVA[10] | n.a. | 0 | 0 | n.a. (100%) | | | | | |
| MEX[11] | 22 | 0 | 0 | 22 (100%) | | | | | |
| NOR[12] | 1 246 | 551 (44%) | 696 (56%) | 0 | 696 | | | | 551 |
| POL[13] | n.a. | n.a. (100%) | 0 | 0 | | n.a. | | | |
| PRT[14] | 134 | 15 (11%) | 119 119 (89%) | 0 | 119 | 15 | | | |
| SVN[15] | 132 | 0 | 0 | 132 (100%) | | | | | |
| SWE[16] | 2 549 | 0 | 0 | 2 549 (100%) | | | | | |
| CHE[17] | 985 | 985 (100%) | 0 | 0 | 657 | | 328 | | |
| GBR[18] | 1 273 | 0 | 0 | 1,273 (100%) | | | | | |
| **Total[9]** | 14 236 | 6 120 (43%) | 3 081 (22%) | 5 035 (35%) | 7 469 | 15 | 378 | 309 | 551 |

[9] The total generated revenues estimate does not include revenues generated from the (abolished) Carbon Pricing Mechanism is Australia.

*Note*: Revenue and revenue use estimates are for calendar year 2016 or fiscal year 2015/2016, unless noted otherwise. The applied exchange rates are taken from the OECD Database. Estimates are in millions of euros. When revenue information is lacking, some revenue amounts are estimated based on the Taxing Energy Use (TEU) Database (OECD, 2018[23]). Constraints in Table A.2. are understood in the broadest sense, where revenue use based on legal and political commitments are included in the estimates.

1. **Australia** implemented a Carbon Pricing Mechanism from 2012 to 2014. For comparative purposes, the amount of revenues generated from the $CO_2$ tax is shown in Table A.2, amounting to AUD 4, 363 million in cash receipts in financial year 2013-2014 (Australian Treasury, 2014[166]). Collected revenues funded a host of green and energy-related programmes, mostly as revenue recycling and compensation to industries and households (Australian Treasury, 2012[167]). Based on (Carl & Fedor, 2012[168]), it is assumed that around 46% of revenues are used for tax cut purposes (e.g. direct transfer payments), 32% is used as compensation to energy users (e.g. the Jobs and Competitiveness programme), 9% is used for green spending (e.g. land and carbon sink programmes) and 3% for energy spending (e.g. energy efficiency measures), and 10% is used for other domestic measures, notably for government buyouts of inefficient coal-fired power plants.

2. The total amount of Carbon Tax revenues generated in **Canada** is the sum of estimated revenues generated in ***Alberta*** (CAD 1, 038 million in fiscal year (FY) 2017-18) and in ***British Columbia*** (CAD 1, 190 million in FY 2015-16 ( (Alberta Ministry of Finance, 2017[169]); (British Columbia Ministry of Finance, 2017[170])).

The revenue amount reportedly raised in FY 2016-17 in Alberta does not apply to the full financial year, hence the following period is taken into account instead. In Alberta, CAD 175 million of revenues are distributed to small businesses as tax cuts and CAD 410 million are distributed to households as income-based rebates. All remaining revenues (CAD 453 million) are used for GHG reduction programmes and to regulate the costs of electricity prices ( (Alberta Ministry of Finance, 2017[169]); (Alberta Queen's Printer, 2017[50])).

As spending measures exceeded revenues raised from the Carbon Tax in British Columbia, revenue use estimates are based on percentage shares of total spending for personal and business tax measures. Hence it is assumed that around 28% of Carbon Tax revenues in British Columbia are distributed to households as tax cuts and tax credits, particularly for low-income and vulnerable households, and around 72% of carbon tax revenues are distributed to industries, business and small businesses as tax cuts and tax credits as well. As the tax rate on $CO_2$ equivalent emissions rises starting in 2018, generated revenues in British Columbia will fund a "carbon tax relief" tax credit for low-income and vulnerable households (CAD 40 million per annum), a Clean Growth Incentive Programme for industries at risk of carbon leakage, as well as other green initiatives and spending measures, notably on research on fugitive emissions in the oil and gas sector and on slash burning (British Columbia Ministry of Finance, 2018[21]).

3. The estimated amount of revenues generated from Green Taxes (*Impuestos Verdes*) in **Chile** is USD 298.3 million in 2018, and revenues from the $CO_2$ tax would represent 88% of total revenues (Chilean Ministry of the Environment, 2017[171]). Green taxation was introduced in 2014 as part of a broader tax reform where new permanent fiscal revenues would help finance an education reform, among other measures (Government of Chile, 2014[172]).

4. Collected revenues from the $CO_2$ Futy in **Denmark** amounted to DKK 3,577 million in 2016 (Statistics Denmark, 2017[85]). It is assumed the political intent of introducing and raising Carbon Tax rates in Denmark is akin to that of excise taxes on fuels.

5. In **Finland** and based on the TEU Database, it is assumed $CO_2$ Tax revenue represents around 42% of total energy tax revenue. It is also assumed the political intent of $CO_2$ taxation is similar to that of excise taxes on fuels, hence revenues are used for tax policy change purposes.

6. In **France**, total revenues from the $CO_2$ Tax amounted to EUR 3.8 billion in 2016, of which EUR 3 billion funded a tax credit for businesses (*crédit d'impôt pour la compétitivité et l'emploi* – (CICE)) until 2016, as shown in Table A.2 (https://www.ecologique-solidaire.gouv.fr/fiscalite-carbone). Starting in 2017, EUR 1.7 billion of revenues is earmarked to a special energy transition account (*compte d'affectation spécial pour la transition énergétique*) which largely compensates industries for the higher costs associated with using renewable energies for electricity generation ( (Ministère de la Transition écologique et solidaire, 2017[52]); (French Senate, 2018[53])), not shown in Table A.2

7. In **Iceland**, revenues from the CO2 Tax (*Kolefnisgjald*) amounted to ISK 3,464 million in 2016 (The Financial Management Authority (FJS) of Iceland, 2016[102]).

8. In **Ireland**, collected revenues from the Carbon Tax amounted to EUR 434 million in 2016 (Irish Central Statistical Office, 2017[105]). As of 2010 and per annum, some revenues (EUR 50 million) fund energy efficiency measures (the National Energy Efficiency Retrofit Programme) to help households at risk of fuel poverty, as well as to provide support to rural transport. Additionally, the Carbon Tax helps maintain or reduce payroll taxes (Irish Ministry of Finance, 2009[47]). Exclusive of the amount destined to the retrofit programme, it is assumed all revenues generated from the carbon tax in Ireland are used to make changes to tax policy.

9 In **Japan**, the amount of collected revenues from the Tax for Climate Change Mitigation is not publically available (Japanese Ministry of Finance, 2018[108]). Nevertheless, revenues are used for energy efficiency and renewable energy programmes (Japanese Ministry of the Environment, 2017[32]).
10. In **Latvia**, it is not possible to disaggregate revenues generated from the $CO_2$ Tax from revenues generated from the Natural Resource Tax (*Dabas resursu nodoklis)* (Latvian Ministry of Finance, 2018[116]), hence the former estimate is not included in Table A.2..
11. In **Mexico**, total revenues raised from the Special Tax on Production and Services (*Impuesto Especial sobre Producción y Servicios (IEPS*)) on carbon emissions (*carbono*) amounted to MXN 446 million in 2016 (Mexican Tax Administration (SAT), 2018[117]).
12. In **Norway**, revenues collected from the Tax on $CO_2$ Emissions amounted to NOK 6,464 million and the Tax on $CO_2$ Emissions in the Petroleum Sector to NOK 5,116 million in 2016 (Statistics Norway, 2017[126]). All revenues generated from the petroleum sector flow to the Government Pension Fund Global. The Norwegian fiscal rule specifies that the transfers back from the fund to the central government budget shall over time equal the expected real return on the fund, estimated at 3 per cent. The revenue is thus not earmarked to specific spending. Exclusive of the amount generated from the petroleum sector, the political intent of introducing and raising $CO_2$ taxes in Norway is akin to that of excise taxes on fuels (Norwegian Ministry of Finance, 2018[129]).
13. Revenues generated from the $CO_2$ Fee (*Dwutlenek węgla*) in **Poland** are not shown in Table A.2 due to a lack of information, although all collected revenues flow to the National Fund for Environmental Protection and Water Management (*Narodowego Funduszu Ochrony Środowiska i Gospodarki Wodnej*)( (Polish Parliament, 2016[173]); (Polish Government, 2015[174])).
14. In **Portugal**, revenues collected from the $CO_2$ Tax (*Adicionamento $CO_2$*) amounted to EUR 134.2 million in 2016 (Portuguese Tax and Customs Authority, 2016[131]). As part of the Green Fiscal Reform (*Reforma Fiscalidade Verde*) in 2015, most $CO_2$ Tax revenues are used to reduce income taxes for households (with large families). Additionally and of revenues generated from the reform, EUR 17.5 million is earmarked for electric and public transport programmes and for conservation and climate mitigation programmes (Portuguese Ministry of the Environment, 2015[48]). It is assumed around 11% of $CO_2$ Tax revenues are also earmarked for such programmes.
15. Generated revenues from the $CO_2$ Tax in **Slovenia** amounted to EUR 132 million in 2016 (Slovenian Ministry of Finance, 2018[134]). Total collection from the $CO_2$ Tax represent the sum of the Environmental Levy on air pollution with $CO_2$ emissions on liquid fuels, on gaseous fuels, on solid fuels and on combustible organic substances. From 2005 until 2008, some revenues were used to finance carbon-reduction projects and green subsidies for industries (Slovenian Ministry of the Environment and Spatial Planning, 2018[175]), not shown in Table A.2
16. In **Sweden**, revenues generated from the Carbon Dioxide Tax (*Koldioxidskatt*) amounted to SEK 24,139 million in 2016 (Statistics Sweden, 2017[137]). The introduction of the $CO_2$ Tax (and energy excise rate increases), as part of the 1990-91 tax reform, were used to finance reduced taxes on labour (Swedish Government, 1997[138]), and increased energy taxes in 1996 helped fund Sweden's EU membership. Furthermore from 2001 through 2006, the green tax shifts (*gröna skatteväxlingen*) amounted to "*SEK 17.6 billion in reduced income taxes and employers' fees and SEK 17.3 billion in increased energy and environmental taxes*" (Swedish National Audit Office, 2009[139]). There has not been any use of green tax shifting since 2006 and all carbon tax revenues in 2016 flow to the general budget.
17. In **Switzerland**, collected revenues from the $CO_2$ Tax amounted to CHF 1,074 million in 2016 (Swiss Federal Finance Administration, 2018[176]). One third of revenues fund energy efficiency measures in buildings (capped at CHF 300 million per annum, which includes a cap of CHF 30 million per annum to promote geothermal heating), as well as to fund the Technology Fund (capped at CHF 25 million per annum), resulting in a total amount of CHF 358 million for such measures. Two-thirds of $CO_2$ Tax revenues are used for used as reductions on social security contributions (SSCs) for businesses, and as deductions on health care premiums (Swiss Federal Council, 2018[22]), resulting in a total amount of CHF 716 million for such measures.
18. In the **United Kingdom**, revenues generated from the Carbon Price Floor (CPF) amounted to GBP 1,043 million in calendar year 2016 (HM Revenue & Customs, 2018[141]).

**Table A.3. Overview of use of revenues generated from emission trading system auctions (EUR million)**

| | Generated revenue | Constrained revenues | | Unconstrained revenues | Revenue use in detail | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Focus on energy efficiency** | **Support to renewable energy use** | **Promoting sustainable mobility** | | **Subsidising green R&D** | **Climate change conservation & mitigation** | **Compensation to Energy Users** | **Other green spending** | **Other** |
| | | Legal earmarking | Political commitment | | Energy savings, renovations, insulation & retrofitting | Construction, extension, installation replacement & purchase of infrastructure & appliances | Electric | Public | | Forestry, water, waste, land & biodiversity management, protection & conservation | Electricity & energy-intensive industries, carbon leakage | GHG abatement & cross-cutting projects, training & education, ETS management | |
| AUT[1] | 79 | 0 | 70 (89%) | 9 (11%) | 28 | 28 | 6 | | | | | 8 | |
| BEL[2] | 108 | 20 (19%) | 0 | 88 (81%) | 20 | | | | | | | | |
| CAN[3] | 586 | 586 (100%) | 0 | 0 | 19 | 11 | 21 | 179 | 2 | 0.5 | | 353 | |
| CZE[4] | 117 | 117 (100%) | 0 | 0 | 60 | 56 | | | | | | 2 | |
| DNK[5] | 54 | 0 | 54 (100%) | 0 | | | | | 21 | | | | 33 |
| EST[6] | 24 | 12 (51%) | 0 | 11 (49%) | 11 | 1 | | | | | | 0.1 | |
| FIN[7] | 71 | 0 | 71 (100%) | 0 | | | | | | | | | |
| FRA[8] | 235 | 235 (100%) | 0 | 0 | 235 | | | | | | | | |
| DEU[9] | 850 | 850 (100%) | 0 | 0 | 447 | 43 | 106 | | 69 | 6 | 129 | 51 | |
| GRC[10] | 148 | 148 (100%) | 0 | 0 | 19 | | | | | | 129 | | |
| HUN[11] | 64 | 51 (80%) | 0 | 13 (20%) | 37 | 3 | 10 | | | | | | |
| ISL[12] | 5 | 0 | 0 | 5 (100%) | | | | | | | | | |
| IRL[13] | 40 | 0 | 40 (100%) | 0 | 13 | | | | | 26 | | 1 | |
| ITA[14] | 412 | 117 (28%) | 0 | 295 (72%) | 68 | 4 | | 40 | 3 | 0.03 | | 2 | |
| LUX[15] | 5 | 0.1 (0.02%) | 0 | 5 (99.98%) | | | | | | | | 0.1 | |
| LVA[16] | 12 | 7 (65%) | 0 | 4 (35%) | 7 | | | | | | | 0.2 | |
| NLD[17] | 188 | 0 | 0 | 188 (100%) | | | | | | | | | |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NOR[18] | 56 | 0 | 0 | 56 (100%) | | | | | | | | | |
| POL[19] | 136 | 64 (47%) | 0 | 72 (53%) | | | | | | | | 64 | |
| PRT[20] | 75 | 75 (100%) | 0 | 0 | | 5 | 2 | | | 1 | 56 | 1 | 10 |
| SVK[21] | 65 | 26 (39%) | 0 | 39 (41%) | 15 | | | | 0.4 | | 10 | 0.1 | |
| SVN[22] | 19 | 19 (100%) | 0 | 0 | 8 | 16 | | 3 | | | | 0.03 | |
| SWE[23] | 39 | 0 | 0 | 39 (100%) | | | | | | | | | |
| ESP[24] | 369 | 369 (99.7%) | 0 | 1 (0.3%) | | | | | | 26 | 0 | 0.2 | |
| CHE[25] | 4 | 0 | 0 | 4 (100%) | | | | | | | | | |
| GBR[26] | 423 | 0 | 387 (92%) | 36 (8%) | | 306 | | | 81 | | | 0.2 | |
| USA[27] | 2 710 | 2 710 (100%) | 0 | 0 | 244 | 39 | | 954 | | 43 | 839 | 577 | 14 |
| CHN[28] | 14 | 14 (100%) | 0 | 0 | | | | | | | | 14 | |
| **Total** | 6 905 | 5 419 (78%) | 551 (8%) | 935 (14%) | 1 228 | 506 | 146 | 1 174 | 176 | 103 | 1 164 | 1 074 | 57 |

*Note*: The EU Commission *recommends* that participants in the EU-ETS commit – or spend an equivalent of – at least 50% of revenues generated from the auctioning of allowances among fixed installations (e.g. power-plants), and all revenues raised from aviation activities, for environmental spending purposes (European Union, 2003[20]). Among EU-ETS participants, some apply earmarking of auction revenues (in the legal sense, such as in Estonia or France), and others report revenue use as part of their reporting obligations (as part of political commitments, such as in Austria or Denmark). Constraints in Table A.3. are understood in the broadest sense, where revenue use based on legal and political commitments are included. Revenue use estimates for EU-ETS participants are largely sourced from the Reporting Obligations Database (ROD) (Eionet, 2017[54]) based on reports detailing revenue use in 2016 (or in 2015 if the former was not yet available for public view at the time of writing). The country provides additional information on revenue use. The reports provided in ROD sometimes distinguish revenue use for a particular purpose or programme as "disbursed" and 'committed" revenues. If both estimates are provided for the same purpose or programme in a report, the higher estimate is included in Table A 3. Additionally, the total estimate of generated auction revenues among EU-ETS participants and provided in ROD is the sum of auction proceeds pursuant to Article 10 and Article 3d of (European Union, 2003[20]). Only revenue use for domestic measures is included in Table A.3. (except for Denmark). This means that the amount of unconstrained revenues may also include constrained revenue use for international purposes. The European Commission also provides a detailed analysis of revenue use of EU-ETS auction proceeds from 2013 through 2015 (European Commission, 2017[55]). Exchange rates are taken from the OECD Database, and estimates are in millions of euros

1. In **Austria** auction revenues are not earmarked in the legal sense, hence reported revenue use corresponds to at least a portion of the financial value of generated revenues. As part of its reporting obligations, some revenues are reported as channelled to the Climate and Energy Fund (*Klima- und Energiefonds)*, notably to support the Climate and Energy Model Regions programme, as well as to support to electric mobility and the installation of private photovoltaic systems (PV). The Fund's 2016 budgeting programme shows that EUR 8.46 million was budgeted for the Model Regions programme, suggesting that allocated auction revenues represented 95% of its total budget. Additionally, allocated revenues for electric mobility represents over a third of the budget destined for all electricity mobility programmes; and allocated auction revenues for PV installations, amounting to EUR 8.7 million, represented close to three-fifths of the budget for similar programmes (Climate and Energy Fund, 2016[177]). The bulk of revenues financed the construction or extension of large and small-scale renewable-sourced heating systems, as well as energy efficiency measures for businesses, under the Austrian environmental support scheme (*Umweltförderung*). Austria emphasizes that this ex-post allocation was done only for the purpose of reporting under the EU GHG Monitoring Mechanism Regulation. The allocation to specific funds and projects is completely arbitrary; any other allocation to purposes according to Art. 10 (3) of Directive 2003/87/EC (ETS Directive) would be justified as well (Austrian Federal Ministry for Sustainability and Tourism, 2018[178]).

2. Half of auction revenues in **Belgium** are distributed between the federal government and the Flemish, Walloon and the Brussel regional governments, and the amounts distributed are based on GHG reduction objectives verified by the National Climate Commission for Residential and Tertiary Buildings (*Commission nationale Climat pour les bâtiments des secteurs résidentiel et tertiaire*) every year (Belgian Ministry of Finance, 2014[179]). Furthermore, the amounts distributed to regions are capped to 50% of their respective shares in generated proceeds from the ETS auctions. At the time of writing, only the Flemish Climate Fund has been reported on allocated auction revenues, which mostly subsidizes home improvement renovations and retrofitting, especially for households living in social housing, as well as supports efficient heating and small-scale fermentation projects on farms (Flemish Goverment, 2016[180]). The Fund mostly draws from auction revenues for programme spending (International Energy Agency (IEA), 2017[181]).

3. All auction revenues in the ***Quebec*** province of **Canada** are earmarked to the Green Fund (*Fonds vert*) to finance its Climate Change (*Changements climatiques*) activities, as well as the Land Transportation Network Fund (*Fonds des réseaux de transport terrestre*- (FORT)). In 2015-2016, ETS auctions raised CAD 858.5 million, and CAD 244.4 million were directly channelled to the FORT. In 2016-2017 revenues earmarked to FORT significantly increase to 97% of total generated auction revenues (Quebec Government, 2017[182]). Climate change programmes particularly focus on promoting greater use of low-carbon, public and electric mobility, such as through the *Roulez électrique* (CAD 28 million), the *Écocamionnage* (CAD 7 million), the *PETMAD* and the *PREGTI* programmes (CAD 6 and CAD 5 million). Revenues are also used to fund energy efficiency measures in commercial buildings (*ÉcoPerformance* programme -CAD 27 million), as well as to promote the greater use of forestry biomass among businesses (the *Biomasse forestière résiduelle* -CAD 10 million). Some revenues also finance low-carbon R&D (the *Technoclimat* programme – CAD 3 million), among other activities (Quebec Government, 2017[183]).

4 Auction revenues in the **Czech Republic** can only be earmarked for green spending (capped at CZK 12 billion annually or up to 100 % of revenues from auctions of air transport emission permits if higher). Half of earmarked revenues are distributed to the State Environment Fund and the other half to the Ministry of Industry and Trade (Czech Parliament, 2013[184]). The State Environment Fund manages the New Green Saving Programme which is only funded by auction revenues (State Environmental Fund of the Czech Republic, 2015[56]), amounting to CZK 1, 586 million in 2016. A same amount co-funds the Czech renewable support scheme. Revenues from permits sold in the international trading mechanism by the Czech Republic are distributed to the State Environment Fund and earmarked for green spending. As the total amount of reported earmarked revenues in the Czech Republic exceeds the amount of reported generated revenues in ROD, Table A.3 was modified so that the sum of earmarked revenues equals the amount of generated revenues, hence auction revenues used for energy efficiency purposes represent 51% of total revenues, auction revenues used to support renewable energy use represent 47% of total revenues, and the rest is placed as other green-related spending (the EFEKT programme).

5. **Denmark** does not earmark auction revenues in the legal sense. Under the EU Monitoring Mechanism Regulation (MMR) Denmark reported for 2017 100% use of an equivalent to the revenues in financial value - with at least EUR 21 million spend on the Energy Technology Development and Demonstration Programme (*Energiteknologisk Udviklings- og Demonstrations Program* (EUDP)) which provides grants to low-carbon and green technology R&D. Additionally, at least EUR 33 million of auction revenues are spent on support for developing countries. Both spending objectives are included in the list of purposes mentioned in EU ETS directive.

6. In **Estonia**, earmarked auction revenues follow the guidelines detailed in (European Union, 2003[20]) (Estonian Parliament, 2017[185]). Out of the 50% of revenues earmarked for climate policy objectives (in accordance with Directive 2003/87/EC and the Act on Protection of Atmospheric Air), the majority is used for improving energy efficiency and the use of renewable energy in public sector buildings. In the case of revenues received in 2015-2017, the focus within this measure was on buildings used by local municipalities for child and elderly (approximately EUR 14 million and EUR 12 million, respectively (Estonian Ministry for Social Affairs, 2017[186])), thus also contributing to social and employment policy objectives. Furthermore, the Estonian government plans to continue using auction revenues (in addition to improving energy efficiency of public sector buildings and multi-apartment buildings) for the purposes of contributing to climate policy measures in developing countries, promoting the use of alternative transport fuels, and the implementation of flood related risk management plans (Estonian Ministry of the Environment, 2018[187]).

7. **Finland** does not earmark auction revenues in the legal sense and did not provide reported revenue use estimates of auction proceeds in ROD, although it did spend 100% of the financial value of auction revenues for 2016, on renewable energy measures such as “the sliding premium for wind energy”.

8. All auction revenues in **France** are earmarked to the *Habiter Mieux* programme managed by the National Housing Agency (*L'Agence nationale de l'habitat* – (Anah)), which subsidizes thermic renovations for low-income households. In 2016, the programme’s expenditure amounted to EUR 349.5 million, hence earmarked auction revenues represented close to 70% of its spending (as reported in ROD), albeit represented half of its total income from earmarked taxes (Cour des Comptes, 2018[60]). Auction revenues seemingly replaced revenues from the Housing Action Contribution (*Contribution Action Logement*) in 2013 and in 2014, until a complementary allocation of EUR 50 million from the Contribution was included in 2015 (and raised to EUR 150 million in 2016).

9. All auction revenues in **Germany** flow to the Energy and Climate Fund (EKF). After deducting the costs associated with administering the ETS (EUR 17 million), EUR 834 million were used to fund EKF programme expenditure. In 2016, an additional EUR 713 million from the federal budget was added to the Fund to cover its entire programme spending, which in addition to auction revenues, amount to EUR 1.6 billion. This allocation suggests that auction revenues in Germany would need to nearly double to independently fund the EKF. Based on total EKF programme spending as reported in ROD (inclusive of the additional revenue allocation from the federal budget), it is assumed around 53% of auction revenues fund retrofitting and thermic renovation measures, such as the $CO_2$ Building Refurbishment Programme (managed by the KfW, a state-owned development bank). The EKF also notably subsidizes electricity-intensive industries as a compensation for the increase in electricity prices and to prevent any carbon leakage (15% of auction revenues) as well as promote electric mobility with the adoption of the National Electromobility Development Plan (13% - *Nationalen Entwicklungsplans Elektromobilität*).
10. In **Greece**, 72% of auction revenues flow to a special account for renewables (ELAPE), managed by LAGIE (the operator of the Greek electricity market) and HEDNO S.A (Hellenic Electricity Distribution Network Operator).Furthermore, 15% of revenues are specially earmarked to industries at risk of carbon leakage; and 13% to the Saving at Home programme, managed by ETEAN S.A (the National Entrepreneurship and Development Fund) to subsidize renovations for low-income households (Greek Ministry for the Environment and Energy, 2016[61]). As of 2017, a tenth (0.1%) of the share allocated to the programme is instead earmarked to the National Centre for the Environment and Sustainable Development (EKPAA) (Greek Ministry of Finance, 2017[99]), not shown in Table A 3.
11. In **Hungary**, a quarter of auction revenues is earmarked to fund the Economic Greening System (GZR) (*Gazdasági Zöldítési Rendszer*) and another quarter to fund the Green Economy Financing System (ZFR) (*Zöldgazdaság Finanszírozási* Rendszer). GZR auction revenues fund the Ányos Jedlik Plan, which, among other measures, aims to improve and promote further use of electric mobility. ZFR auction revenues primarily fund the Warmth of Home programme and other similar programmes (Hungarian Parliament, 2015[188]).The report provided in ROD detailing revenue use in 2016 also includes use of revenues generated before this period.
12. The amount of auction revenues in **Iceland** was estimated based on verified emission data (net of allocations) provided in the Union Registry (European Commission, 2018[189]) and the simple average of the auction price in euros per tonne of carbon emissions for year 2016 (European Energy Exchange (EEX), 2017[190]).
13. **Ireland** does not earmark auction revenues in the legal sense, hence reported revenue use corresponds to at least a portion of the financial value of generated revenues. As part of its reporting obligations, EUR 26 million is allocated to an afforestation programme and EUR 13 million to the Better Energy programme to finance retrofitting projects.
14. In **Italy**, earmarked revenues (as detailed in (European Union, 2003[20])) are distributed to the Ministry of the Environment (70%) and to the Ministry of Economic Development (30%). Up to EUR 30 million per annum from auction revenues is earmarked for renovation and retrofitting projects in public administration buildings, especially schools and hospitals. Furthermore, the National Energy Efficiency Fund receives per annum up to EUR 50 million of proceeds, and up to EUR 15 million is earmarked to regional programmes to support energy diagnoses among small businesses. The National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA) receives up to EUR 0.3 million of proceeds to provide database and statistical support to the energy efficiency programmes, as well as up to EUR 1 million per annum for a collaborative three-year programme to raise awareness and know-how on more efficiency energy practices among businesses and households. Moreover, auction revenues fully fund the National Home-School and Home-Work Experimental Programme (the programme's budget is EUR 35 million) (Official Journal of the Republic of Italy, 2016[57]). Revenues from the auctioning of allowances in the aviation sector are used for further promote the use of biofuels in aircraft and related- R&D activities (Italian Ministry for the Environment, 2017[191]). The 2016 ROD report are based on revenue generated before 2015, as a decision on how to use revenues generated in 2015 and 2016 had not yet been issued at the time of writing.

15. In **Luxembourg**, a decision on how to use auction revenues, outside the aviation sector, has not yet been made by the Government Council at the time of writing. Revenues from the auctioning of allowances in the aviation sector – only 1% of the total auctioning revenues in 2017 - are allocated to the Climate and Energy Fund**.**
16. In **Latvia**, auction proceeds primarily finance investment projects and initiatives (90%), such as the Reducing Greenhouse Gas Emissions – Low-Energy Buildings programme, and the Reduction of Greenhouse gas emissions - Low Energy Consumption Buildings programme. Five percent of revenues are used for R&D and technology projects, and the remaining for covering administration expenses and for training and raising awareness (Latvian Government, 2016[59]).
17. In the **Netherlands**, revenues generated from the auction of emissions permit amounted to 188 million in 2016 (Dutch Ministry of Finance, 2018[192]). There is no legal earmarking of auction revenues.
18. In **Norway**, the imputed tax on emission permits amounted to NOK 520 million in 2016 (Statistics Norway, 2017[126]).
19. Auction revenues in **Poland** flow to the National Fund for Environmental Protection and Water Management (*Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej*) (Polish Parliament, 2016[173]), and to other provincial environmental funds.
20. All auction revenues in **Portugal** flow to the Portuguese Carbon Fund (*Fundo Português de Carbono*), a major portion of which, calculated yearly by the Portuguese Environment Agency, is earmarked to offset the extra cost of generating electricity from renewable energies (the amounts are deducted from the tariffs set by the National Electricity System (*Sistema Elétrico Nacional* (SEN)) (Portuguese Ministries of Finance and Environment, 2014[62]). Moreover, auction revenues made up the bulk of the initial allocation granted to the Fund for Innovation, Technology and Circular Economy (*Fundo de Inovação, Tecnologia e Economia Circular* (FITE)) (EUR 10 million of auction revenues were earmarked to the Fund, or two-third of its initial budget) (Portuguese Ministry of the Economy, 2016[193]). Auction revenues also represent two thirds of the 2016 allocated budget for the WindFloat project, which supports the development of a pre-commercial floating offshore wind farm (its total budget is EUR 7.5 million in 2016) (Portuguese Environment Agency, 2016[194]). The total amount of reported earmarked revenues in ROD exceeds the total generated revenues from auction permits. Table A.3. was modified so that the two sums equal each other, hence compensation to energy user make up 75% of revenue use, the amount dedicated to the FITE represents 10% of revenues, and the amount to support renewable energies (WindFloat) represents around 6% of total auction revenues in Portugal.
21. In the **Slovak Republic**, auction proceeds flow to the Environmental Fund (*Environmentálneho fondu*), and according to the law, 60% of revenues should be used as part of the State Aid Scheme (30% for renewable energy and energy efficiency projects and 30% to compensate electricity-intensive industries at risk of carbon leakage due to the higher electricity prices caused by the quota system. Remaining revenues should be used to reach national environmental objectives and to fund green projects and initiatives (Slovak Government, 2012[195]). Currently four-fifths of funds are not used (Slovak Ministry of the Environenment, 2018[196]).
22. In **Slovenia**, all auction revenues flow to the budgetary Climate Change Fund (*Sklad za podnebne spremembe*). Auction revenues are fully earmarked and used to finance climate change mitigation measures, in particular to improve the energy efficiency of residential buildings, to encourage the purchase and use of buses for public transport, as well as to fund measures to promote the greater use of renewable sources of energy. As reported earmarked auction revenues in ROD exceed total generate revenues, Table A.3. was modified so that the two sum equal each other, hence revenues used to support renewable energy use (the building of a hydro-power plant) represents 60% of total revenue use and energy efficiency measures in buildings and the promotion of public mobility represent around 30% and 10%, respectively, of auction revenue use.
23. **Sweden** does not earmark auction revenues in the legal sense and did not provide reported revenue use estimates of auction proceeds for domestic purposes in ROD.
24. In **Spain**, from 2013 and each year, 90% of auction revenues (capped at EUR 450 million) finance the costs associated with promoting renewable energies in the electricity sector (Spanish government, 2014[63]). Additionally, 10% of revenues (capped at EUR 50 million) are earmarked to fund a host of climate change mitigation programmes, notably Pima programmes (*Planes PIMA*), including PIMA ADAPTA which promotes the protection and conservation of forests, land and biodiversity (Spanish government, 2016[197]).

25. In **Switzerland**, total auction revenues amounted to CHF 4 million in 2016 (Swiss Emissions Trading Registry, 2018[198]). All auction revenues remain with the federal government.
26. The **United Kingdom** does not earmark auction revenues in the legal sense, hence reported revenue use corresponds to at least a portion of the financial value of generated revenues. As part of its reporting obligations, most revenues fund the Renewable Heat Incentive (RHI), which subsidizes the purchase of renewable heat technologies among households, communities and businesses. In 2016, auction revenue represented half of total RHI funding.
27. In the **United States**, total proceeds from ***RGGI*** auctions amounted to USD 266 million in 2016 (auctions 31-34) (RGGI, 2018[199]). It is assumed close to two-thirds of RGGI proceeds are used for energy efficiency measures (64%). Proceeds are also used to promote renewable energy use (16%), to provide direct bill assistance to electricity consumers (10%), and to finance GHG reduction abatement programmes (4%). Remaining revenues (7%) are used to cover costs associated with administering programmes and the ETS. These assumptions are based on the investment of RGGI proceeds in 2015 (RGGI, 2017[200]) and the assumption that all 2016 proceeds were invested in 2016. Adjusting for fiscal year reporting, 77% of cumulative proceeds through end 2015 were invested in the types of programmes described above, and USD 333 million are used for future RGGI investment projects (14%). All remaining revenues were transferred to general funds (the state of New York in 2009 and the state of New Hampshire in 2010) or were collected by the state of New Jersey (2009-2010).
During fiscal year 2015-2016 in ***California***, total auction proceeds amounted to USD 2,731 million, of which USD 762 and USD 140 million were distributed back to investor-owned and publicly-owned electricity utilities and natural gas suppliers, which must use redistributed proceeds to the benefit of ratepayers. . These redistributed proceeds have been used for bill credits to households and, to a lesser extent, for other activities including energy efficiency and renewable energy projects ( (California Air Resources Board (ARB), 2015[201]); (California Air Resources Board (ARB), 2018[202]); (California Air Resources Board (ARB), 2018[64])). All remaining proceeds are deposited into the California Greenhouse Gas Reduction Fund (GGRF). The state of California uses 60% of the GGRF proceeds as continuous appropriations: a quarter is earmarked to the High-Speed Rail Authority to fund the High Speed Rail Project; 20% fund the Affordable Housing and Sustainable Communities Program; 10% fund the Transit and Intercity Rail Capital Program; and 5% is earmarked to the Low-Carbon Transit Operations Program. The remaining (non-continuous) appropriations in FY 2015-16 funded the Low-Carbon Transportation (LCT) Program (USD 95 million); the Low-Income Weatherisation Program (USD 79 million), the Climate Smart Agriculture (USD 40 million), the Water Energy Efficiency Program (USD 20 million), the Waste Diversion Program (USD 6 million) and the Wetlands and Watershed Restoration Program (USD 2 million) (California Air Resources Board (ARB), 2016[203]). Some proceeds also fund the administrative costs associated with administering GGRF programmes.
28. In **China**, auction revenues (from the province of Guangdong) are exclusively used to fund carbon reduction and other related-work (Guangzhou Institute of Carbon, 2015[204]). Around 100 million yuan of revenues was channelled to a low-carbon fund in 2014, as shown in Table A.3. (China Carbon Emissions Trading Portal, 2015[205]).

# References


(n.a.) (n.d.), . [12]

Accident Compensation Corporation (2016), *Annual Report 2016*, https://www.acc.co.nz/assets/corporate-documents/acc7529-annual-report-2016.pdf. [123]

Accident Compensation Corporation (2014), *Annual Report 2014*, https://www.acc.co.nz/assets/corporate-documents/acc7015-annual-report-2014.pdf. [122]

Alberta Ministry of Finance (2017), *FISCAL PLAN 2017-20*, https://open.alberta.ca/dataset/aa40ded0-75b3-48fe-9bbf-ea33802b8825/resource/da23ee3c-b79c-4971-8f75-e28ab7684983/download/fiscal-plan-complete.pdf. [169]

Alberta Queen's Printer (2017), *CLIMATE LEADERSHIP ACT*, http://www.qp.alberta.ca/1266.cfm?page=C16P9.cfm&leg_type=Acts&isbncln=9780779791682&display=html. [50]

Argentine Federal Administration of Public Revenues (2017), *ESTADÍSTICA TRIBUTARIA Recaudación - Serie Anual [TAX STATISTICS Collection - Annual Series]*, http://www.afip.gob.ar/institucional/estudios/. [146]

Argentine Ministry of Finance (2017), *DESTINO DE LA RECAUDACION DE LOS IMPUESTOS AL 31/12/2017 [DESTINATION OF TAX COLLECTION As of 12/31/2017]*, https://www.economia.gob.ar/sip/dniaf/destino_recaud.pdf. [39]

Assemblée des Communautés de France (AdCF) (2016), *Le transfert de compétences aux communautés et métropoles*, https://www.adcf.org/files/DOCS/AdCF-Mairie-conseils-transfert-cptce-sept2016.pdf. [31]

Australian Taxation Office (ATO) (2016), *Commissioner of Taxation Annual report 2015–16*, https://annualreport.ato.gov.au/sites/g/files/net1861/f/ATO_AR_15-16_Vol1-Full.pdf. [72]

Australian Treasury (2018), *Personal communication on June 6, 2018*. [74]

Australian Treasury (2017), *Fuel Indexation (Road Funding) Special Account Determination 2017 (No. 1)*, https://www.legislation.gov.au/Details/F2017L00479. [75]

Australian Treasury (2017), *Statement 5: Revenue (Budget 2017-18)*, http://www.budget.gov.au/2017-18/content/bp1/download/bp1_bs5.pdf. [73]

Australian Treasury (2014), *Final Budget Outcome 2013-14*, http://www.budget.gov.au/2013-14/content/fbo/download/Consolidated.pdf. [166]

Australian Treasury (2012), *SECURING A CLEAN ENERGY FUTURE: IMPLEMENTING THE AUSTRALIAN GOVERNMENT'S CLIMATE CHANGE PLAN*, http://www.budget.gov.au/2012-13/content/ministerial_statements/climate/download/climate_change.pdf. [167]

Austrian Court of Auditors (2006), *Energiebesteuerung in Österreich [Energy taxation in Austria]*, http://www.rechnungshof.gv.at/fileadmin/downloads/2006/berichte/teilberichte/bund/Bund_2006_04/Bund_2006_04_3.pdf. [214]

Austrian Federal Ministry for Sustainability and Tourism (2018), *Personal communication on June 11, 2018*. [178]

Austrian Federal Ministry for Sustainability and Tourism (2018), *Personal communication on May 29, 2018*. [77]

Austrian Ministry of Finance (2016), *Budgetbericht 2017 [Budget Report 2017]*, https://www.bmf.gv.at/budget/das-budget/Budgetbericht_2017.pdf. [76]

Belgian Court of Audit (2017), *174e Cahier de la Cour des comptes*, 2017, https://www.ccrek.be/FR/Publications/Fiche.html?id=9fa5461b-4acc-481f-b9b4-973e56a034d4. [221]

Belgian Ministry of Finance (2014), *6 JANVIER 2014. — Loi spéciale portant réforme du financement des communautés et des régions, élargissement de l'autonomie fiscale des régions et financement des nouvelles compétences*, http://finances-budget.brussels/loi-speciale-6-janvier-2014-financement. [179]

Belgian Parliament (1995), *8 FEVRIER 1995. - Arrêté royal fixant les modalités de fonctionnement du Fonds d'Analyse des Produits pétroliers.*, http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=1995020833&table_name=loi. [33]

Belgian Parliament (1993), *22 JUILLET 1993. - Loi instaurant une cotisation sur l'énergie en vue de sauvegarder la compétitivité et l'emploi.* -, http://www.ejustice.just.fgov.be/cgi_loi/arch_a1.pl?sql=(text+contains+(%27%27))&rech=1&language=fr&tri=dd+AS+RANK&value=&table_name=loi&F=&cn=1993072231&caller=archive&fromtab=loi&la=F&ver_arch=004#LNK0002. [80]

Bowen (2015), "Carbon pricing: how best to use the revenue?", http://www.lse.ac.uk/GranthamInstitute/wp-content/uploads/2015/11/Bowen-policy-brief-2015.pdf. [14]

Brazilian Department of Treasury (2018), *Personal communications on May 30, 2018*. [148]

Brazilian Ministry of Finance (2018), *Relatórios do Resultado da Arrecadação [Results of the Collection]*, http://idg.receita.fazenda.gov.br/dados/receitadata/arrecadacao/relatorios-do-resultado-da-arrecadacao. [147]

British Columbia Ministry of Finance (2018), *Budget and Fiscal Plan - 2018/19 to 2020/21*, http://bcbudget.gov.bc.ca/2018/bfp/2018_Budget_and_Fiscal_Plan.pdf. [21]

British Columbia Ministry of Finance (2017), *Budget and Fiscal Plan - 2017/18 to 2019/20*, http://bcbudget.gov.bc.ca/2017/bfp/2017_Budget_and_Fiscal_Plan.pdf. [170]

British National Audit Office (2007), *THE CLIMATE CHANGE LEVY AND CLIMATE CHANGE AGREEMENTS*, https://www.nao.org.uk/wp-content/uploads/2012/11/climate_change_review.pdf. [28]

British Parliament (1999), *Stability and Steady Growth For Britain Pre-Budget Report November 1999*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/260769/cm4479.pdf. [228]

British Treasury (2002), *Budget 2002 The strength to make long-term decisions: Investing in an enterprising, fairer Britain*, http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/media/4/1/Budget_2002.pdf. [230]

California Air Resources Board (ARB) (2018), *CALIFORNIA CAP-AND-TRADE PROGRAM SUMMARY OF PROCEEDS TO CALIFORNIA AND CONSIGNING ENTITIES*, https://www.arb.ca.gov/cc/capandtrade/auction/proceeds_summary.pdf. [202]

California Air Resources Board (ARB) (2018), *Personal communication on June 1, 2018*. [64]

California Air Resources Board (ARB) (2016), *ANNUAL REPORT TO THE LEGISLATURE ON California Climate Investments Using Cap-and-Trade Auction Proceeds*, https://arb.ca.gov/cc/capandtrade/auctionproceeds/cci_annual_report_2016_final.pdf. [203]

California Air Resources Board (ARB) (2015), *Cap-and-Trade Program Summary of Vintage 2013 Electrical Distribution Utility Allocated Allowance Value Reports*, https://www.arb.ca.gov/cc/capandtrade/allowanceallocation/edu-v2013-allowance-value-report.pdf. [201]

Carl & Fedor (2012), "Revenue-Neutral Carbon Taxes in the Real World Insights from British Columbia and Australia", Hoover Institution, https://www.hoover.org/sites/default/files/research/docs/117649691-revenue-neutral-carbon-taxes-in-the-real-world-insights-from-british-columbia-and-australia.pdf. [168]

Carl, J. and D. Fedor (2016), "Tracking global carbon revenues: A survey of carbon taxes versus cap-and-trade in the real world", *Energy Policy*, http://dx.doi.org/10.1016/j.enpol.2016.05.023. [2]

Chilean Ministry of Finance (2017), *Informe de Finanzas Públicas*, http://www.dipres.gob.cl/598/articles-166194_doc_pdf2.pdf. [82]

Chilean Ministry of the Environment (2017), *Impuestos Verdes En Chile: Implementación y seguimiento [Green Taxes in Chile: Implementation and follow-up]*, http://www.sma.gob.cl/index.php/documentos/publicacion/doc_download/620-taller-sma-mma. [171]

China Carbon Emissions Trading Portal (2015), *广东2015年首期省低碳发展基金1亿元安排计划公示 [Carbon fund Home page Carbon fund text Guangdong's first provincial low-carbon development fund in 2015, plans to announce 100 million yuan]*, http://www.tanpaifang.com/tanjijin/2015/1027/48353.html. [205]

China Emissions Exchange (2015), *广东省发展改革委 广东省财政厅关于2015年首期省低碳发展基金安排计划的公示 [Guangdong Provincial Development and Reform Commission, Guangdong Provincial Department of Finance, Public Announcement of the First Provincial Low-carbon Development Fund Arrangement Plan for 2015]*, http://www.cnemission.com/article/news/ssdt/201510/20151000000975.shtml. [242]

Civil Aviation Safety Authority (CASA) (2016), *Annual Report 2015-16*, https://www.casa.gov.au/sites/g/files/net351/f/ar1516.pdf?v=1476937580. [24]

Civil Development Forum (FOR) (2017), *Communication 12/2017: Fuel charge - After a record increase in social spending, the government is looking for money in the pockets of taxpayers*, https://for.org.pl/en/a/5393,communication-12/2017-fuel-charge-after-a-record-increase-in-social-spending-the-government-is-looking-for-money-in-the-pockets-of-taxpayers. [130]

Climate and Energy Fund (2016), *Jahresprogramm 2016 des Klima- und Energiefonds [Annual program 2016 of the Climate and Energy Fund]*, https://www.klimafonds.gv.at/assets/Uploads/Jahresprogramme/Jahresprogramm-2016.pdf. [177]

Comptroller and Auditor General of India (2017), *Report of the Comptroller and Auditor General of India*, https://www.cag.gov.in/sites/default/files/audit_report_files/Report_No.42_of_2017_%E2%80%93_Compliance_Audit_on_Indirect_Taxes_%E2%80%93_Central_Excise_Union_Government.pdf. [156]

Congressional Budget Office (2015), *The Status of the Highway Trust Fund and Options for Paying for Highway Spending*, https://www.cbo.gov/sites/default/files/114th-congress-2015-2016/reports/50297-transportationtestimony-senate.pdf. [231]

Cour des Comptes (2018), *LE PROGRAMME « HABITER MIEUX » DE L'AGENCE NATIONALE DE L'HABITAT (ANAH)*, https://www.ccomptes.fr/sites/default/files/2018-04/20180404-rapport-programme-habiter-mieux.pdf. [60]

Czech Parliament (2013), *Zákon č. 383/2012 Sb. Zákon o podmínkách obchodování s povolenkami na emise skleníkových plynů [Act No. 383/2012 Coll. Act on the Conditions for Trading in Allowances for GHG Emissions]*, https://www.zakonyprolidi.cz/cs/2012-383. [184]

Danish Ministry of Energy, U. (2017), *Energipolitisk redegørelse 2017 [Energy Policy Statement 2017]*, http://efkm.dk/media/8382/energipolitisk_redegorelse_2017.pdf. [237]

Danish Ministry of Finance (2016), *Finanslov for finansåret 2016 [Finance Act for the financial year 2016]*, https://www.fm.dk/publikationer/2016/finanslov-for-2016. [216]

Danish Ministry of Taxation (2009), *Danish Tax Reform 2010*, http://www.skm.dk/media/139042/danish-tax-reform_2010.pdf. [91]

Danish Ministry of Taxation (2003), *The Economic influence of Carbon Taxes*, https://www.norden.ee/images/rohemajandus/info/hans_larsen.pdf. [88]

Danish State Ministry (2009), *Forårspakke 2.0 - Vækst, klima, lavere skat [Spring Package 2.0 - Growth, climate, lower tax]*, http://www.stm.dk/publikationer/foraarspakke/forarspakke_2_0.pdf. [90]

Danish Treasury (2009), *Skattereformer og -omlægninger fra 1987 til 2009 [Tax reforms and transfers from 1987 to 2009]*, http://www.skm.dk/skattetal/analyser-og-rapporter/notater/2009/februar/kort-overblik-over-skattereformer-og-omlaegninger-fra-1987-til-2009. [87]

Dechezleprêtre, Lovo, Martin & Sato (2017), "Does climate change pose a risk to competitiveness? - Global firm level evidence", http://conference.iza.org/conference_files/environ_2017/lovo_s6000.pdf. [66]

Destatis (2017), *Environmental protection measures - Revenues from taxes related to the environment*, https://www.destatis.de/EN/FactsFigures/NationalEconomyEnvironment/Environment/EnvironmentalEconomicAccounting/EnvironmentalProtectionMeasures/Tables/RevenuesTaxes.html . [98]

District Legal Department of Colombia (2016), *Ley 1819 de 2016 Nivel Nacional*, http://www.alcaldiabogota.gov.co/sisjur/normas/Norma1.jsp?i=68189. [51]

Dupuis, J. (2016), *The Gas Tax Fund: Chronology, Funding and Agreements*, Library of Parliament, Ottawa Canada, https://lop.parl.ca/Content/LOP/ResearchPublications/2016-99-e.pdf. [209]

Dutch Government (2018), *Energiebelasting [Energy taxes]*, https://www.rijksoverheid.nl/onderwerpen/milieubelastingen/energiebelasting. [27]

Dutch Ministry of Finance (2018), *Personal communication on June 13, 2018*. [119]

Dutch Ministry of Finance (2018), *Personal communication on June 13, 2018*. [192]

Dutch Ministry of Finance (2017), *Dataset 5: Overzicht van belasting en premie ontvangsten [Overview of tax and premium receipts]*, http://opendata.rijksbegroting.nl/#dataset_5. [118]

Ecofys, W. (2018), *State and Trends of Carbon Pricing 2018*, http://dx.doi.org/10.1596/978-1-4648-1292-7. [17]

Economista, E. (2016), *IEPS a gasolina y el ISR ?alivian finanzas de entidades*, https://www.eleconomista.com.mx/estados/IEPS-a-gasolina-y-el-ISR-alivian-finanzas-de-entidades-20160104-0105.html. [222]

Eionet (2017), *Reporting Obligations Database (ROD): Deliveries for Use of auctioning revenue and project credits*, https://rod.eionet.europa.eu/obligations/698/deliveries. [54]

Energy Efficiency and Conservation Authority (2016), *Annual Report 2016/2017*, https://www.eeca.govt.nz/assets/Resources-EECA/corporate-strategic/eeca-annual-report-16-17.pdf. [42]

Estonian Ministry for Social Affairs (2017), *Laste ja vähekindlustatud inimeste toetamine saab lisaraha [More financial support for children and disadvantaged people]*, https://www.sm.ee/et/uudised/laste-ja-vahekindlustatud-inimeste-toetamine-saab-lisaraha. [186]

Estonian Ministry of Finance (2017), "2017. AASTA RIIGIEELARVE SEADUSE SELETUSKIRI [State Budget Legislation Explanatory Statement]", https://www.rahandusministeerium.ee/et/system/files_force/document_files/2017-aasta-riigieelarve-seaduse-seletuskiri-09032017.pdf?download=1. [217]

Estonian Ministry of the Environment (2018), *Personal communication on July 5, 2018*. [187]

Estonian Ministry of the Environment (2018), *Personal communication on June 21, 2018*. [93]

Estonian Parliament (2017), *Atmosfääriõhu kaitse seadus (lühend - AÕKS) [Atmospheric Air Protection Act (Abbreviation - AWPC)]*, https://www.riigiteataja.ee/akt/130122017026. [185]

Estonian Parliament (2017), *Kohaliku omavalitsuse hoolekandeasutuste hoonetes energiatõhususe ja taastuvenergia kasutuse edendamise toetuse kasutamise tingimused ja kord [Conditions and procedure for the use of support for energy efficiency and promotion of the use of renewable energy in local government welfare institutions]*, https://www.riigiteataja.ee/akt/107062017003. [58]

Estonian Parliament (2016), *Avaliku sektori kohaliku omavalitsuse allsektori lasteaiahoonetes energiatõhususe ja taastuvenergia kasutuse edendamise toetuse kasutamise tingimused ja kord [Conditions and procedure for the use of support for energy efficiency and promotion of the use of renewable energy in nursery schools of the public sector local government sub-sector]*, https://www.riigiteataja.ee/akt/106072016041. [238]

European Commission (2018), *Union Registry*, https://ec.europa.eu/clima/policies/ets/registry_en#tab-0-1. [189]

European Commission (2017), *Analysis of the use of Auction Revenues by the Member States*, https://ec.europa.eu/clima/sites/clima/files/ets/auctioning/docs/auction_revenues_report_2017_en.pdf. [55]

European Commission (2017), *Excise Duty Tables: Tax receipts – Energy products and Electricity*, https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/excise_duties/energy_products/rates/excise_duties_energy_products_en.pdf. [79]

European Energy Exchange (EEX) (2017), *Emissions Auctions*, https://www.eex.com/en/products/environmental-markets/emissions-auctions/archive. [190]

European Union (2003), *Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC (Text with EEA relevance)*, http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02003L0087-20140430. [20]

EUROSTAT (2016), *Energy taxes*, http://ec.europa.eu/eurostat/web/products-datasets/-/t2020_rt300. [18]

Financial Times Chinese (2015), "燃油税调整需遵循税收法定 [Fuel tax adjustments are subject to statutory tax]", http://www.ftchinese.com/story/001060207?full=y&archive. [233]

Flemish Goverment (2016), *VOORTGANGSRAPPORT 2015 VLAAMS KLIMAATBELEIDSPLAN 2013-2020 [PROGRESS REPORT 2015 FLEMISH CLIMATE POLICY PLAN 2013-2020]*, https://www.lne.be/sites/default/files/atoms/files/VR%202016%201504%20MED.%20VORA2015%20-%202%20bijlage.pdf. [180]

FPS Finance (2017), *5.3.2 - RECETTES TOTALES PAR L'AG DOUANES ET ACCISES (EN EUROS)*, https://finances.belgium.be/fr/statistiques_et_analyses/rapport-annuel/chiffres/budget-recettes/recettes-ag-douanes-et-accises/532. [78]

French Ministry of Public Accounts (2017), *ÉVALUATIONS DES VOIES ET MOYENS*, https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/farandole/ressources/2017/pap/pdf/VMT1-2017.pdf. [96]

French Ministry of Public Accounts (2016), *Compte Général de l'État 2016*, https://www.performance-publique.budget.gouv.fr/sites/performance_publique/files/files/documents/budget/comptes/2016/CGE2016.pdf. [97]

French Senate (2018), *Projet de loi de finances pour 2018 : Fiscalité de la transition écologique*, http://www.senat.fr/rap/a17-113-1/a17-113-1.html. [53]

Fullerton & Karney (2017), "POTENTIAL STATE-LEVEL CARBON REVENUE UNDER THE CLEAN POWER PLAN", https://doi.org/10.1111/coep.12221. [207]

German Federal Statistical Office (Destatis) (2018), *58,0 Milliarden Euro umweltbezogene Steuereinnahmen für das Jahr 2016 [€ 58.0 billion in environmental tax revenues for 2016]*, https://www.destatis.de/DE/ZahlenFakten/GesamtwirtschaftUmwelt/Umwelt/UmweltoekonomischeGesamtrechnungen/Umweltschutzmassnahmen/Aktuell.html. [218]

Government of Chile (2014), *MENSAJE Nº 24-362/*, https://www.camara.cl/pley/pdfpley.aspx?prmID=9500&prmTIPO=INICIATIVA. [172]

Government Pension Fund Global (2015), *GOVERNMENT PENSION FUND ACT*, https://www.nbim.no/en/the-fund/governance-model/government-pension-fund-act/. [49]

Greek Ministry for the Environment and Energy (2016), *ΑΠΟΦΑΣΕΙΣ Αρ. Οικ. 47692 (1) Τρόπος κατανομής εσόδων από πλειστηρια- σμούς δικαιωμάτων εκπομπών αερίων θερμο-κηπίου για το έτος 2016. [DECISIONS No. Article 47692 (1) How to allocate revenue from auctions- emission allowances for the year 2016.]*, http://www.lagie.gr/fileadmin/groups/EDRETH/Manuals/2016.10.10_FEK.3245_YA.47692_Katanomi_Esodon_Pleistiriasmon_Dikaiomaton_CO2.pdf. [61]

Greek Ministry of Finance (2017), "ΕΚΤΕΛΕΣΗ ΚΡΑΤΙΚΟΥ ΠΡΟΫΠΟΛΟΓΙΣΜΟΥ - ΜΗΝΙΑΙΟ ΔΕΛΤΙΟ - ΔΕΚΕΜΒΡΙΟΣ 2017 [Implementation of State Budget - Monthly Bulletin - December 2017]", http://www.skai.gr/files/1/000000/EKTELESH%20PROYPOL%202017%20YPOIK.pdf. [99]

Guangzhou Institute of Carbon (2015), *《广东省发展改革委关于碳排放配额管理的实施细则》[Implementation Rules of the Guangdong Provincial Development and Reform Commission on the Management of Carbon Emission Quotas]*, http://www.cnemission.com/article/zcfg/201502/20150200000863.shtml. [204]

HM Revenue & Customs (2018), *TAX AND DUTY BULLETINS*, https://www.uktradeinfo.com/Statistics/Pages/TaxAndDutybulletins.aspx. [141]

HM Treasury (2002), *Tax and the environment: using economic instruments*, http://webarchive.nationalarchives.gov.uk/+/http:/www.hm-treasury.gov.uk/media/D54/07/adtaxenviron02-332kb.pdf. [229]

HM Treasury (2001), *BUDGET 2001 Investing for the Long Term: Building Opportunity and Prosperity for All*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/266041/hc279.pdf. [142]

Hungarian Central Statistical Office (2018), *3.7.3. A központi költségvetés bevételei és egyenlege [Revenues and balances of the central budget]*, http://www.ksh.hu/docs/hun/xstadat/xstadat_evkozi/e_qse006h.html. [100]

Hungarian Ministry for National Economy (2014), *Ányos Jedlik Plan is about to be finalized*, http://www.kormany.hu/en/ministry-for-national-economy/news/anyos-jedlik-plan-is-about-to-be-finalized. [67]

Hungarian Parliament (2016), *XLII. A költségvetés közvetlen bevételei és kiadásai [Direct revenue and expenditure of the budget]*, http://www.parlament.hu/irom40/04730/adatok/fejezetek/42.pdf. [101]

Hungarian Parliament (2015), *Válasz K/6953 . számú írásbeli kérdésre : „Mire költi az Orbán-kormány az ország kvótabevételeit? " [Reply K / 6953. written question: "How will the Orbán government spend the quota revenues of the country? "]*, http://www.parlament.hu/irom40/06953/06953-0001.pdf. [188]

Icelandic Parliament (2018), *Lög um olíugjald og kílómetragjald [Oil tax and mileage bills]*, https://www.althingi.is/lagas/145a/2004087.html. [104]

Icelandic Parliament (2018), *Lög um vörugjald af ökutækjum, eldsneyti o.fl. [Law on excise tax on vehicles, fuel, etc.]*, http://www.althingi.is/lagas/146a/1993029.html. [103]

Indian Department of Expenditure (2017), *National Clean Energy & Environment Fund (NCEEF)*, https://doe.gov.in/sites/default/files/NCEF%20Brief_post_BE_2017-18.pdf. [44]

Indian Ministry of Finance (2016), *Receipt Budget, 2016-2017 Tax Revenue*, http://www.indiabudget.gov.in/budget2016-2017/ub2016-17/rec/tr.pdf. [234]

Indian Ministry of Road Transport & Highways (2011), *Realisation of Road-Cess for Construction of Roads*, http://pib.nic.in/newsite/PrintRelease.aspx?relid=78305. [157]

Indian Transport Department (2000), *THE CENTRAL ROAD FUND ACT, 2000*, http://transport.bih.nic.in/Acts/The-Central-Road-Fund-Act-2000.pdf. [158]

Institute for the Conservation of Nature and Forestry, I. (2016), *Plano de Atividades 2016 Fundo Florestal Permanente [Activities Plan 2016 Permanent Forest Fund]*, http://www2.icnf.pt/portal/fundos/fundo-florestal-permanente/resource/doc/FFP_Plano-de-Atividades-2016_Aprovado.pdf. [41]

Inter-Environnement Wallonie (2007), *La composition des prix de l'énergie*, http://www.iewonline.be/IMG/pdf/587position-070219-prixbaril.pdf. [34]

Internal Revenue Service (IRS) (2017), *SOI Tax Stats - Excise Tax Statistics*, https://www.irs.gov/statistics/soi-tax-stats-excise-tax-statistics. [143]

International Energy Agency (IEA) (2017), *Flemish Climate Fund*, https://www.iea.org/policiesandmeasures/pams/belgium/name-50539-en.php. [181]

Irish Central Statistical Office (2017), *Environment Taxes*, http://www.cso.ie/en/releasesandpublications/er/eaet/environmenttaxes2016/. [105]

Irish Ministry of Finance (2009), *FINANCIAL STATEMENT OF THE MINISTER FOR FINANCE MR. BRIAN LENIHAN, T.D. 9 DECEMBER 2009*, http://budget.gov.ie/Budgets/2010/FinancialStatement.aspx#item9. [47]

Israeli Ministry of Finance (2016), *State Budget Proposal for Fiscal Years 2017 and 2018*, http://mof.gov.il/en/PolicyAndBudget/Documents/StateBudgetProposal_2017-2018.pdf. [219]

Israeli Ministry of Finance (2016), *דלק מיסוי יג פרק, המדינה הכנסות דוח [State Revenue Report, Chapter 13- Fuel Taxation]*, http://mof.gov.il/ChiefEcon/StateRevenues/StateRevenuesReport/DocLib/2015-2016/Report2015-2016_13.PDF. [107]

Italian Ministry for the Environment (2017), *Accordo di Cooperazione in materia di produzione dei biocombustibili e loro utilizzo nel settore dell'aviazione [Cooperation agreement on the production of biofuels and their use in the aviation sector]*, http://www.minambiente.it/sites/default/files/archivio/allegati/trasparenza_valutazione_merito/CLE/AdC_CNR_ENEA_AM_Mattm_decreto.pdf. [191]

Italian Ministry for the Environment (2016), *ITALIAN CATALOGUE OF ENVIRONMENTALLY FRIENDLY SUBSIDIES AND ENVIRONMENTALLY HARMFUL SUBSIDIES 2016*, http://www.minambiente.it/sites/default/files/archivio/allegati/sviluppo_sostenibile/Italy_Catalogue_EHS_EFS_Synthesis_ENG.pdf. [70]

Italian Ministry of Finance (2017), *Entrate tributarie gennaio-dicembre 2017 [Tax revenue January-December 2017]*, http://www.finanze.it/opencms/it/archivio-evidenza/evidenza/Entrate-tributarie-gennaio-dicembre-2017/. [106]

Japanese Ministry of Finance (2018), *Personal communication on June 5, 2018*. [108]

Japanese Ministry of Internal Affairs and Communications (2009), *昭和四十七年法律第十三号 航空機燃料譲与税法 [Act No. 13 of 1972, Aircraft fuel concession tax law]*, http://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=347AC0000000013&openerCode=1. [110]

Japanese Ministry of Internal Affairs and Communications (1965), *昭和四十年法律第百五十七号 石油ガス譲与税法 [Act No. 157 of 1965, Petroleum gas transfer tax law]*, http://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=340AC0000000157. [111]

Japanese Ministry of Internal Affairs andCommunication (1999), *昭和三十年法律第百十三号 地方揮発油譲与税法*, [Act No. 113 of 1955, Local gasoline transfer tax law], http://elaws.e-gov.go.jp/search/elawsSearch/elaws_search/lsg0500/detail?lawId=330AC0000000113. [109]

Japanese Ministry of the Environment (2017), *Greening of Whole Tax System and Carbon Tax in Japan*, https://www.env.go.jp/en/policy/tax/20170130_greening.pdf. [32]

Klenert, D. et al. (2018), "Making carbon pricing work for citizens", *Nature Climate Change*, Vol. 8/8, pp. 669-677, http://dx.doi.org/10.1038/s41558-018-0201-2. [3]

Korean Ministry of Finance (2018), *Personal communication on June 11, 2018*. [40]

Korean Ministry of Finance (2018), *Personal communication on June 25, 2018*. [114]

Korean National Assembly Budget Office (NABO) (2016), *2016회계연도 국세수입 결산 분석 [Analysis of the National Tax Revenue Settlement for Fiscal Year 2016]*, http://korea.nabo.go.kr/downloadPub.do?fileSID=1525. [113]

Lammam and Jackson (2017), "Examining the Revenue Neutrality of British Coumbia's Carbon Tax", https://www.fraserinstitute.org/sites/default/files/examining-the-revenue-neutrality-of-bcs-carbon-tax.pdf. [208]

Larsen, T. (2011), *Greening the Danish Tax System*, https://financien.belgium.be/sites/default/files/downloads/BdocB_2011_Q2e_Larsen.pdf. [89]

Latvian Government (2016), *Informatīvais ziņojums „Par izsoļu ieņēmumu izmantošanu 2016.gadā" [Informative Report "On the Use of Auction Revenue in 2016"]*, http://www.varam.gov.lv/in_site/tools/download.php?file=files/text/Finansu_instrumenti/EKII/Normativie%20akti//VARAMZin_EKII_2016_11072017.pdf. [59]

Latvian Ministry of Finance (2018), *Personal communication on May 31, 2018*. [116]

Latvian State Revenue Service (SRS) (2016), *Kopsavilkums par budžeta ieņēmumu daļas izpildi 2016.gada 12 mēnešos [Summary of the implementation of the revenue side of the budget in the 12 months of 2016]*, https://www.vid.gov.lv/sites/default/files/ien_12_2016_p.pdf. [115]

Luxembourg Ministry of Finance (2017), *Projet de Budget 2018*, http://budget.public.lu/content/dam/budget/lb/budget2018/links-dokumenter/minfinances-vol1-de-budget-2018.pdf. [36]

Marron and Morris (2016), "HOW TO USE CARBON TAX REVENUES", https://www.brookings.edu/wp-content/uploads/2016/07/howtousecarbontaxrevenuemarronmorris.pdf. [8]

Marron, Toder and Austin (2015), "TAXING CARBON: WHAT, WHY, AND HOW", http://www.taxpolicycenter.org/sites/default/files/alfresco/publication-pdfs/2000274-Taxing-Carbon-What-Why-and-How.pdf. [4]

Mexican Tax Administration (SAT) (2018), *Recaudación | Ingresos tributarios del Gobierno Federal [Collection | Tax revenues of the Federal Government]*, http://www.sat.gob.mx/cifras_sat/Paginas/datos/vinculo.html?page=IngresosTributarios.html. [117]

Milne & Skou Andersen (2012), *Handbook of Research on Environmental Taxation*, https://www.e-elgar.com/shop/handbook-of-research-on-environmental-taxation?___website=uk_warehouse. [94]

Minister for Infrastructure and Transport (2017), *Fuel Tax (Road User Charge) Determination 2017*, https://www.legislation.gov.au/Details/F2017L00532/Explanatory%20Statement/Text. [212]

Ministère de la Transition écologique et solidaire (2018), *Fiscalité des énergies*, https://www.ecologique-solidaire.gouv.fr/fiscalite-des-energies. [30]

Ministère de la Transition écologique et solidaire (2017), *Fiscalité carbone*, 2017, https://www.ecologique-solidaire.gouv.fr/fiscalite-carbone. [52]

Ministère de l'Économie et des Finances (2016), *Présentation des résultats de la Douane pour l'année 2016*, http://www.douane.gouv.fr/Portals/0/fichiers/douane/resultat-2016/resultats-2016.pdf#page=2. [95]

Ministry of Finance of Denmark (2018), *Personal communication on June 22, 2018*. [92]

Ministry of Finance of India (2017), *Tax Revenue, Receipt Budget, 2017-2018*, https://www.indiabudget.gov.in/budget2017-2018/ub2017-18/rec/tr.pdf. [155]

Ministry of Finance of Spain (2009), *Ley 22/2009, de 18 de diciembre, por la que se regula el sistema de financiación de las Comunidades Autónomas de régimen común y Ciudades con Estatuto de Autonomía y se modifican determinadas normas tributarias.[Law 22/2009, of December 18, which regulates the financing system of the Autonomous Communities of common regime and Cities with Statute of Autonomy and certain tax regulations are modified.]*, https://www.boe.es/buscar/act.php?id=BOE-A-2009-20375. [136]

Ministry of Finance of the Czech Republic (2018), *Personal communication on May 29, 2018*. [83]

Ministry of Finance of the Czech Republic (2017), *Stát v roce 2016 hospodařil s rekordním přebytkem 62 mld. Kč [The state managed a record surplus of CZK 62 billion in 2016]*, 2017, http://www.mfcr.cz/cs/aktualne/tiskove-zpravy/2017/stat-v-roce-2016-hospodaril-s-rekordnim-27109 (accessed on 9 April 2018). [206]

Ministry of Finance of the People's Republic of China (2017), *2017年中央一般公共预算收入预算表 [Central General Public Budget Income]*, http://yss.mof.gov.cn/2017zyys/201703/t20170324_2565785.html. [150]

Ministry of Finance of the People's Republic of China (2008), *成品油价税费改革"生逢其时" [Reform of finished product oil prices and taxes "took place at the right time]*. [153]

Ministry of the Environment of the Czech Republic (2013), *Přehled poplatků a daní v ČR souvisejících s ochranou životního prostředí (poslední aktualizace - září 2013) [Overview of environmental taxes and charges in the Czech Republic (last update - September 2013)]*, https://www.mzp.cz/C1257458002F0DC7/cz/poplatky/$FILE/oedn-poplatky_dane_CR-20130918.pdf. [84]

Murray, B. and N. Rivers (2015), *British Columbia's revenue-neutral carbon tax: a review of the latest "grand experiment" in environmental policy*. [13]

National Emergency Supply Agency (2018), *Funding and legislation*, https://www.nesa.fi/organisation/funding-and-legislation/. [35]

National Transport Commission (2015), *Heavy vehicle road user charge annual adjustment Consultation report February 2015*, https://www.ntc.gov.au/Media/Reports/(ADA50ABE-29C9-4B10-94D3-E1B6EC5B1C18).pdf. [211]

National Treasury of the Republic of South Africa (2017), *Budget Review 2017*, http://www.treasury.gov.za/documents/national%20budget/2017/review/FullBR.pdf. [160]

New Zealand Department of Internal Affairs (2017), *Local Government Act 1974*, http://legislation.govt.nz/act/public/1974/0066/latest/DLM415532.html. [125]

New Zealand Ministry of Business, Innovation, A. (2001), *Accident Compensation Act 2001*, http://www.legislation.govt.nz/act/public/2001/0049/latest/DLM99494.html?src=qs. [37]

New Zealand Ministry of Business, I. (2015), *Petroleum or Engine Fuel Monitoring Levy*, http://www.mbie.govt.nz/info-services/sectors-industries/energy/previous-reviews-consultations/energy-petroleum-or-engine-fuel-monitoring-levy-regulations-2015/consultation-on-proposed-parameters/levy-rate-calculation.pdf. [124]

New Zealand Ministry of Transport (2017), *Land Transport Management Act 2003*. [121]

New Zealand Ministry of Transport (2014), *Future Funding Uses of hypothecated revenue*, http://www.transport.govt.nz/assets/Uploads/Our-Work/Documents/ff-uses-of-hypothecated-revenue.pdf. [224]

New Zealand Treasury (2017), *Budget Economic and Fiscal Update*, https://treasury.govt.nz/sites/default/files/2017-05/befu17.pdf. [223]

New Zealand Treasury (2014), *Budget Economic and Fiscal Update 2014*, https://treasury.govt.nz/publications/budget-economic-and-fiscal-update-2014-html#section-7. [225]

Norwegian Ministry of Finance (2018), *Personal communication on June 27, 2018*. [129]

Norwegian Ministry of Finance (2017), *Main tax policy features*, https://www.statsbudsjettet.no/upload/Statsbudsjett_2017/dokumenter/pdf/Chapter1_tax2017.pdf. [128]

Norwegian Ministry of Finance (2016), *Main features of the tax proposal for 2016*, https://www.statsbudsjettet.no/upload/Statsbudsjett_2016/dokumenter/pdf/chapter_1_prop1.pdf. [46]

Norwegian Ministry of Finance (2015), *Main features of the tax programme for 2015*, https://www.statsbudsjettet.no/upload/Statsbudsjett_2015/dokumenter/pdf/chapter1_tax_budget2015.pdf. [45]

Norwegian Parliament (2016), *Statsbudsjettet for 2016 [Government budget for 2016]*, https://www.stortinget.no/globalassets/pdf/statsbudsjettet-2016/blabok2016.pdf. [127]

OECD (2018), *Effective Carbon Rates 2018: Pricing Carbon Emissions Through Taxes and Emissions Trading*, OECD Publishing, Paris, http://dx.doi.org/10.1787/9789264305304-en. [16]

OECD (2018), *OECD.Stat*, https://stats.oecd.org/. [246]

OECD (2018), *PINE database*, https://pinedatabase.oecd.org/. [19]

OECD (2018), *Taxing Energy Use (TEU)*, http://www.oecd.org/ctp/taxing-energy-use-2018-9789264289635-en.htm. [23]

OECD (2018), *Taxing energy use 2018: Companion to the taxing energy use database*, OECD Publishing, Paris. [248]

OECD (2017), *Environmental Fiscal Reform PROGRESS, PROSPECTS AND PITFALLS*, https://www.oecd.org/tax/tax-policy/environmental-fiscal-reform-G7-environment-ministerial-meeting-june-2017.pdf. [9]

OECD (2017), "Permit allocation rules and investment incentives in emissions trading systems", https://www.oecd-ilibrary.org/taxation/permit-allocation-rules-and-investment-incentives-in-emissions-trading-systems_c3acf05e-en. [69]

OECD (2016), *Effective Carbon Rates Pricing CO2 through Taxes and Emissions Trading Systems*, http://www.oecd.org/tax/effective-carbon-rates-9789264260115-en.htm. [1]

OECD (2015), *Impacts of Carbon Prices on Indicators of Competitiveness*, https://www.oecd-ilibrary.org/environment/impacts-of-carbon-prices-on-indicators-of-competitiveness_5js37p21grzq-en. [65]

OECD (2013), *JAPAN: INVENTORY OF ESTIMATED BUDGETARY SUPPORT AND TAX EXPENDITURES FOR FOSSIL-FUELS*, http://www.oecd.org/site/tadffss/JPN.pdf. [112]

OECD (2012), *OECD Economic Surveys: Korea 2012*, https://www.oecd-ilibrary.org/economics/oecd-economic-surveys-korea-2012_eco_surveys-kor-2012-en. [220]

OECD (2008), *OECD Economic Surveys: Korea 2008*, http://dx.doi.org/10.1787/19990707. [210]

OECD - IEA (2018), *OECD-IEA analysis of fossil fuels and other support*, http://www.oecd.org/site/tadffss/. [71]

OECD & WBG (2015), *The FASTER Principles for Successful Carbon Pricing: An approach based on initial experience*, http://documents.worldbank.org/curated/en/901041467995665361/pdf/99570-WP-PUBLIC-DISCLOSE-SUNDAY-SEPT-20-4PM-CarbonPricingPrinciples-1518724-Web.pdf. [10]

OECD-IEA (2018), *OECD-IEA analysis of fossil fuels and other support*, http://www.oecd.org/site/tadffss/. [245]

Official Journal of the Republic of Italy (2016), *LEGGE 28 dicembre 2015 , n. 221 . Disposizioni in materia ambientale per promuovere misure di green economy e per il contenimento dell'uso eccessivo di risorse naturali. [LAW December 28th 2015, n. 221. Environmental provisions to promote measures of green economy and for the containment of excessive use of natural resources.]*, http://www.gazzettaufficiale.it/eli/gu/2016/01/18/13/sg/pdf. [57]

Parliament of Australia (2014), *Reintroduction of fuel excise indexation*, https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/pubs/rp/BudgetReview201415/FuelExcise (accessed on 9 April 2018). [213]

Parry, Veung and Heine (2014), "How Much Carbon Pricing is in Countries' Own Interests? The Critical Role of Co-Benefits", https://www.imf.org/en/Publications/WP/Issues/2016/12/31/How-Much-Carbon-Pricing-is-in-Countries-Own-Interests-The-Critical-Role-of-Co-Benefits-41924. [6]

Partnership for Market Readiness; Carbon Pricing Leadership Coalition (2018), *Guide to communicating carbon pricing*. [15]

People's Daily Online (2015), "45天三提成品油消费税合法吗 [Is it legal to raise the consumption tax of refined oil for 45 days?]", http://finance.people.com.cn/n/2015/0126/c1004-26447107.html. [151]

Polish Government (2015), *Rozporządzenie Rady Ministrów z dnia 12 października 2015 r. w sprawie opłat za korzystanie ze środowiska [Regulation of the Council of Ministers of October 12, 2015 on fees for using the environment]*, http://www.dziennikustaw.gov.pl/du/2015/1875/1. [174]

Polish Parliament (2018), *USTAWA z dnia 27 października 1994 r. o autostradach płatnych oraz o Krajowym Funduszu Drogowym [LAW of October 27, 1994 on toll motorways and on the National Road Fund]*, http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU19941270627/U/D19940627Lj.pdf. [25]

Polish Parliament (2016), *USTAWA z dnia 27 kwietnia 2001r. Prawo ochrony środowiska [THE ACT dated April 27, 2001 Environmental law]*, http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20160000672/U/D20160672Lj.pdf. [173]

Portuguese Environment Agency (2016), *Plano de Atividades dos Fundos Ambientais 2016 [Environmental Funds Activity Plan 2016]*, https://www.apambiente.pt/_zdata/FUNDOS/RelatorioAtividades/2016_PlanoAtividades.pdf. [194]

Portuguese Ministries of Finance and Environment, S. (2014), *Portaria n.º 3-A/2014 [Ordinance no. 3-A / 2014]*, https://www.apambiente.pt/_zdata/DPAAC/CELE/Portaria_3A_2014.pdf. [62]

Portuguese Ministry of the Economy (2016), *Decreto-Lei n.º 86-C/2016 [Decree-Law No. 86-C / 2016]*, https://dre.pt/web/guest/pesquisa/-/search/105658706/details/normal?l=1. [193]

Portuguese Ministry of the Environment (2015), *Green Taxation Reform*, http://www.crescimentoverde.gov.pt/wp-content/uploads/2014/10/ReformaFiscalidadeVerde_GreenTaxReform_emagazine.pdf. [48]

Portuguese Parliament (2017), *Análise da Receita Fiscal dos Combustíveis em 2016 [Analysis of the Fuel Tax Revenue in 2016]*, http://app.parlamento.pt/webutils/docs/doc.pdf?path=6148523063446f764c324679626d56304c334e706447567a4c31684a53556c4d5a5763765130394e4c7a564454305a4e51533942636e463161585a765132397461584e7a59573876565652425479394262734f6862476c7a5a584d6c4d6a426b5a5355794d4. [132]

Portuguese Public Ministry (2016), *Lei n.º 42/2016, de 28 de Dezembro [Law no. 42/2016 of 28 December]*, http://www.pgdlisboa.pt/leis/lei_mostra_articulado.php?ficha=1&artigo_id=&nid=2622&pagina=1&tabela=leis&nversao=&so_miolo=. [43]

Portuguese Tax and Customs Authority (2016), *Receita Fiscal dos Impostos Cobrados Pelas Alfandegas [Tax Revenue from Taxes Collected by Customs]*, https://sitfiscal.portaldasfinancas.gov.pt/geral/search/click?PageInfo=7282311_1378_1033&BlockType=0&ClickedItemId=10070&SourceId=27d64c28-9fa7-40bb-984c-472a7733230e&OriginalSearchQuery=receita%20fiscal%202016&ClickedResultTitle=(receita_fiscal_2007_2016. [131]

Presidency of the Republic of Brazil (2001), *LEI No 10.336, DE 19 DE DEZEMBRO DE 2001. [LAW NO. 10.336, DECEMBER 19, 2001.]*, http://www.planalto.gov.br/ccivil_03/LEIS/LEIS_2001/L10336.htm. [149]

Quebec Government (2017), *Comptes du Fonds vert 2015-2016*, http://www.mddelcc.gouv.qc.ca/ministere/fonds-vert/comptes/comptes-fonds-vert-2015-2016.pdf. [183]

Quebec Government (2017), *Comptes du Fonds vert 2016-2017*, http://www.mddelcc.gouv.qc.ca/cgfv/documents/comptes/comptes-fonds-vert-2016-2017.pdf. [182]

Receiver General for Canada (2016), *Public Accounts of Canada 2016*, https://www.tpsgc-pwgsc.gc.ca/recgen/cpc-pac/2016/pdf/2016-vol1-eng.pdf. [81]

RGGI (2018), *Auction Results*, https://www.rggi.org/auctions/auction-results. [199]

RGGI (2017), *The investment of RGGI proceeds in 2015*, https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2015.pdf. [200]

Road Accident Fund (RAF) (2018), *FUEL LEVY*, https://www.raf.co.za/About-Us/Pages/Fuel-Levy.aspx. [38]

Siegmeier, J. et al. (2017), "The fiscal benefits of stringent climate change mitigation: an overview", *Climate Policy*, Vol. 18/3, pp. 352-367, http://dx.doi.org/10.1080/14693062.2017.1400943. [7]

Slovak Financial Administration (2016), *Prehľad o plnení daňových a nedaňových príjmov štátneho rozpočtu SR k 31.12.2016 [Overview of the tax and non-tax revenues of the state budget of the Slovak Republic at 31.12.2016]*, https://www.financnasprava.sk/_img/pfsedit/Dokumenty_PFS/Infoservis/statistiky/plnenie_sr/2016/ppsr_12_dr.pdf. [133]

Slovak Government (2012), *Zákon č. 414/2012 Z. z. Zákon o obchodovaní s emisnými kvótami a o zmene a doplnení niektorých zákonov [Act no. 414/2012 Coll. The Act on Emission Trading and the Amendment and Supplementation of Certain Acts]*, http://www.zakonypreludi.sk/zz/2012-414#f3909921. [195]

Slovak Ministry of the Environenment (2018), *Personal communication on June 19, 2018*. [196]

Slovenian government (2018), *Zakon o varstvu okolja [Environmental Protection Act]*, http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO1545#. [239]

Slovenian government (2016), *PROGRAM PORABE SREDSTEV SKLADA ZA PODNEBNE SPREMEMBE V LETIH 2017 IN 2018 [PROGRAM OF CONSUMPTION FUND FOR CLIMATE CHANGE IN THE YEAR 2017 AND 2018]*, https://www.uradni-list.si/files/RS_-2016-084-03649-OB~P001-0000.PDF. [241]

Slovenian Ministry of Finance (2018), *Public Finance Budgets - State Budget*, http://www.mf.gov.si/en/areas_of_work/general_government_finance/public_finances/public_finance_budgets/. [134]

Slovenian Ministry of Finance (2017), *OBRAZLOŽITEV SPLOŠNEGA DELA PRORAČUNA REPUBLIKE SLOVENIJE ZA LETO 2017 [EXPLANATION OF THE GENERAL WORK THE BUDGET OF THE REPUBLIC OF SLOVENIA YEAR 2017]*, http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/Prora%C4%8Dun/Sprejeti_prora%C4%8Dun/2017/OBR_2017_SPLOSNI_DEL.pdf. [235]

Slovenian Ministry of Finance (2016), *III.1.2. OBRAZLOŽITEV SPLOŠNEGA DELA ZAKLJU Č NEGA RA Č UNA PRORA Č UNA [EXPLANATORY STATEMENT OF THE GENERAL WORK OF THE CONCLUSION OF THE BUDGET]*, http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/Prora%C4%8Dun/Zaklju%C4%8Dni_ra%C4%8Dun/2016/ZR2016-012-III_1_2_OBRAZLOZITEV_SPLOSNEGA_DELA_ZR.pdf. [244]

Slovenian Ministry of Finance (2004), *OBRAZLOŽITEV SPLOŠNEGA DELA PREDLOGA SPREMEMB PRORAČUNA RS ZA LETO 2004 [EXPLANATION OF THE GENERAL WORK PROPOSAL FOR AMENDING THE BUDGET OF THE REPUBLIC OF SLOVENIA FOR 2004]*, http://www.mf.gov.si/fileadmin/mf.gov.si/pageuploads/Prora%C4%8Dun/Sprejeti_prora%C4%8Dun/2004/Obrazlozitve_splosnega_dela_proracuna/2004_OBR_SPL_DEL.pdf. [236]

Slovenian Ministry of the Environment and Spatial Planning (2018), *Personal communication on May 30, 2018*. [175]

Slovenian Ministry of the Environment and Spatial Planning (2015), *PROGRAM PORABE SREDSTEV SKLADA ZA PODNEBNE SPREMEMBE V LETIH 2015 IN 2016 [APPLICATION PROGRAMS OF THE FUND FOR CLIMATE CHANGE IN 2015 AND 2016]*, http://www.mop.gov.si/fileadmin/mop.gov.si/pageuploads/zakonodaja/varstvo_okolja/operativni_programi/sklad_podnebni_program_15_16.pdf. [240]

South Africa Revenue Service (SARS) and the National Treasury (2018), *TAX STATISTICS*, http://www.sars.gov.za/About/SATaxSystem/Pages/Tax-Statistics.aspx. [159]

South African Civil Aviation Authority (2017), *2016/17 Annual Report*, http://www.caa.co.za/Corporate%20Publications/CAA%20Annual%20Report%202016-2017.pdf. [162]

South African Department of Energy (2015), *Proposed Levy on the Piped -Gas and Petroleum Pipeline Industries for 2016/17*, http://www.exclaim.co.za/fileadmin/Issue_No.9_of_2015/Doc_23.pdf. [161]

South African Department of Energy (2014), *PRESENTATION TO THE PARLIAMENTARY PORTFOLIO COMMITTEE ON ENERGY ON FUEL PRICING*, http://pmg-assets.s3-website-eu-west-1.amazonaws.com/140902doe2.pdf. [165]

South African National Assembly (2015), *NATIONAL ASSEMBLY QUESTION FOR WRITTEN REPLY QUESTION NUMBER: 2360 [NW2722E] DATE OF PUBLICATION: 19 JUNE 2015*, http://www.treasury.gov.za/publications/other/MinAnsw/2015/Reply%20to%20PQ%202360%20[NW2722E].pdf. [29]

South African National Assembly (2014), *(a) What levies are currently being imposed on fuel, (b) on what date did each levy that has been introduced come into force, (c) what is the (i) amount and (ii) specified objective of each separate levy, (d) what amount has been recovered by each levy at the latest specified date for which information is available and (e) to what purpose have the funds that were recovered through each separate levy been appropriated?*, http://www.treasury.gov.za/publications/other/MinAnsw/2014/Reply%20to%20PQ%20236%20%5BNW285E%5D.pdf. [164]

South African Treasury (2018), *Personal communication on June 19, 2018*. [163]

Spanish government (2016), *Ley 48/2015, de 29 de octubre, de Presupuestos Generales del Estado para el año 2016. [Law 48/2015, of October 29, of the General Budgets of the State for the year 2016.]*, https://www.boe.es/buscar/act.php?id=BOE-A-2015-11644. [197]

Spanish government (2014), *Ley 22/2013, de 23 de diciembre, de Presupuestos Generales del Estado para el año 2014. [Law 22/2013, of December 23, of the General Budgets of the State for the year 2014.]*, https://www.boe.es/diario_boe/txt.php?id=BOE-A-2013-13616. [63]

Spanish Tax Agency (2017), *INFORME MENSUAL DE RECAUDACIÓN TRIBUTARIA Diciembre 2017 [MONTHLY REPORT ON TAX COLLECTION December 2017]*, http://www.agenciatributaria.es/static_files/AEAT/Estudios/Estadisticas/Informes_Estadisticos/Informes_mensuales_recaudacion_tributaria/2017/IMR_17_12.pdf. [135]

State Administration of Taxation of the People's Republic of China (2008), *关于实施成品油价格和税费改革的通知 [Notice on the implementation of refined oil price and tax reform]*, http://www.chinatax.gov.cn/n810341/n810765/n812171/n812675/c1190752/content.html. [152]

State Environmental Fund of the Czech Republic (2015), *ANNUAL REPORT 2015*, https://www.sfzp.cz/wp-content/uploads/2017/11/17641-vyrocni_zprava_sfzp_cr_2015_aj_web.pdf. [56]

Statec (2016), *Portail des statistiques*, http://www.statistiques.public.lu/fr/index.html. [243]

Statistics Denmark (2017), *Taxation total, divided into rates and dues*, http://m.statbank.dk/. [85]

Statistics Denmark (2016), *Syv skattereformer siden 1995: Udviklingen i provenuet fra indkomstskatter [Seven tax reforms since 1995: Developments in revenue from income taxes]*, https://www.dst.dk/Site/Dst/Udgivelser/nyt/GetAnalyse.aspx?cid=28125. [86]

Statistics Norway (2017), *Environmental economic instruments*, https://www.ssb.no/en/natur-og-miljo/statistikker/miljovirk/aar. [126]

Statistics Sweden (2017), *Total environmental taxes in Sweden 1993–2016*, http://www.scb.se/en/finding-statistics/statistics-by-subject-area/environment/environmental-accounts-and-sustainable-development/system-of-environmental-and-economic-accounts/pong/tables-and-graphs/environmental-taxes/total-environmental-taxes-in-sweden/. [137]

Sumner, Bird and Dobos (2011), "Carbon taxes: a review of experience and policy design considerations", https://www.tandfonline.com/doi/pdf/10.3763/cpol.2010.0093?needAccess=true. [5]

Swedish Government (1997), *1990-91 års skattereform - en värdering [1990-91 tax reform - a valuation]*, https://www.regeringen.se/contentassets/093a2523a04c43ca83d6b2e21d9e5088/bilaga-6-1990-91-ars-skattereform---en-vardering. [138]

Swedish Ministry of Finance (2017), *Budgetpropositionen för 2018 [Budget Bill for 2018]*, https://data.riksdagen.se/fil/B8F270A2-0BAC-4BBE-82DE-F81F3B9B0892. [227]

Swedish National Audit Office (2009), *EFTER SKATTEREFORMEN - En genomgång av svensk skattepolitik 1992-2009 [AFTER TAXATION - A review of Swedish tax policy 1992-2009]*, https://www.riksrevisionen.se/download/18.78ae827d1605526e94b2e846/1518435483344/RiR_2010_11_bilaga_1.pdf. [139]

Swedish Parliament (2017), *Skatteutskottets seminarium om Skattereformen 25 år – dess historia och framtid [Tax Committee's 25th anniversary of tax reform - its history and future]*, https://data.riksdagen.se/fil/81BF2021-66D9-414D-B35F-7BC8F02CC3D4. [226]

Swiss Emissions Trading Registry (2018), *Auctions*, https://www.emissionsregistry.admin.ch/crweb/public/auction/list.do?org.apache.struts.taglib.html.TOKEN=9e6a594568b922403e0384ba3cce1832. [198]

Swiss Federal Council (2018), *Loi fédérale sur la réduction des émissions de CO2*, https://www.admin.ch/opc/fr/classified-compilation/20091310/index.html. [22]

Swiss Federal Customs Administration (2017), *Impôt sur les huiles minérales*, https://www.ezv.admin.ch/ezv/fr/home/infos-pour-entreprises/impots-et-redevances/importation-en-suisse/impot-sur-les-huiles-minerales.html. [26]

Swiss Federal Finance Administration (2018), *Recettes et dépenses*, https://www.efv.admin.ch/efv/fr/home/finanzberichterstattung/daten/datencenter.spa.EIS.app/eisui/index.html?#/home. [176]

The Financial Management Authority (FJS) of Iceland (2016), *RÍKISREIKNINGUR 2016 [Government Accounts 2016]*, https://www.fjs.is/media/rikisreikningur/Rikisreikningur-arid-2016--Heildaryfirlit.pdf. [102]

The Legislative Analyst's Office (LAO) (2017), *The 2017-18 Budget Cap-and-Trade*, http://www.lao.ca.gov/Publications/Report/3553. [68]

The State Council of the People's Republic of China (2015), *财政部税政司、国家税务总局货物与劳务税司有关负责人就调整成品油等部分产品消费税政策答记者问 [Responsible person in charge of the Department of Tax Administration of the Ministry of Finance and the State Administration of Taxation of the Ministry of Goods and Services Taxation on the adjustment of consumption tax policies for certain products such as refined oil]*, http://www.gov.cn/xinwen/2015-01/12/content_2803417.htm. [154]

Treasury of New Zealand (2018), *Personal communication on June 19, 2018*. [120]

Turkish Ministry of Development (2017), *2017 PRE-ACCESSION ECONOMIC REFORM PROGRAM*, http://www.mod.gov.tr/Lists/PreAccessionEconomicPrograms/Attachments/16/Pre-Accession%20Economic%20Reform%20Programme%202017.pdf. [140]

U.S. Department of the Treasury (2018), *Trust Fund Financial Reporting*, https://www.treasurydirect.gov/govt/reports/tfmp/tfmp.htm. [144]

U.S. Federal Highway Administration (2016), *FEDERAL TAX RATES ON MOTOR FUELS AND LUBRICATING OIL*, https://www.fhwa.dot.gov/policyinformation/statistics/2015/pdf/fe101a.pdf. [232]

UNEP (2018), *The Emissions Gap Report 2018*. [11]

United States Environmental Protection Agency (EPA) (2017), *Leaking Underground Storage Tank (LUST) Trust Fund*, https://www.epa.gov/ust/leaking-underground-storage-tank-lust-trust-fund#what. [145]

Vítek, Leoš & Pavel, J. (2010), "Compliance Costs and Energy Taxes in the Czech Republic", Prague University of Economics, http://kvf.vse.cz/wp-content/uploads/2010/06/1239811520_sb_vitekpavel.pdf. [215]

World Bank (2018), *World Bank Open Data*, https://data.worldbank.org/. [247]