Chapter 5

Using tax policy to address Costa Rica's domestic environmental challenges

This chapter discusses environmentally related taxes in Costa Rica, and some broader tax provisions that influence environmental outcomes. The chapter discusses how the environmental effectiveness of taxation can be improved while tax revenues can be increased. The chapter analyses the design of the fuel tax and discusses whether its rates could be better aligned with the external costs of fuel use. The sales and import tax exemptions for fuels translate into a de facto preferential treatment of fuels compared to other products. Costa Rica's vehicle taxes are discussed, and the chapter suggests how they could be modified to better align with environmental policy objectives. In addition, the chapter comments on the differential taxation of private and public electricity producers, the recent initiative for a tax on non-reusable plastic containers, and the cost-effectiveness of the country's Payments for Environmental Services Programme.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Reaching ambitious domestic environmental and climate policy objectives will require addressing existing and emerging challenges

Costa Rica has put forward an ambitious climate policy agenda, and promotes itself as an environmental and climate policy forerunner. The 2011 National Climate Strategy (Ministry of Environment – MINAE, 2011) commits the country to achieve carbon neutrality by 2021. This target allows Costa Rica to compensate its emissions through forests, so that total net emissions in 2021 are comparable to total emissions in 2005 (MINAE, 2015). The target included in the recent Nationally Determined Contribution (NDC), which applies in parallel, puts forward that Costa Rica will keep net greenhouse gas (GHG) emissions below 9.37 $MtCO_2e$ by 2030, including carbon removals through forests (MINAE, 2015). The domestic target to generate 100% of electricity from renewables is also worth highlighting (MINAE, 2015), though almost 100% of electricity has already been generated from renewables in the past years. Changes to tax policies proposed for 2017, but also some reforms that go beyond those already suggested, can help achieve these goals. In addition, the National Energy Plan (MINAE, 2014a) outlines important measures to achieve low-carbon development in Costa Rica by 2030, in line with the domestic targets for climate policies.

Per-capita emissions in Costa Rica remain low, but additional policies are needed to reach domestic climate policy goals. When including carbon removals from forests, total domestic GHG emissions have been relatively stable between 1990 and 2010, but emissions doubled from 6 $MtCO_2e$ in 1990 to 12 $MtCO_2e$ in 2010 when excluding removals through carbon sinks (Climate Action Tracker, 2015). Though carbon emissions per capita remain low when compared to the OECD average and Latin American OECD members, containing the rapid emissions growth especially in transport, but also in agriculture, waste, industry and the residential sector will be key to reach Costa Rica's ambitious climate policy targets.

The transport sector is the largest polluter, and also contributes significantly to local air pollution and congestion. Of the GHG emissions from the energy sector (39% of total GHG), transport accounts for the large majority (68.7%), and they are increasing rapidly. Beyond the sector's contribution to climate change, it also causes local air pollution, which increases the burden of disease in many countries (WHO, 2016; OECD, 2016b). In Costa Rica, air pollution is concentrated around the San José Greater Metropolitan Area, where almost two-thirds of the population lives (Ministry of Health, 2015; Granoff et al., 2015). The large and fast growth in the number of private cars (by 68% between 2003 and 2014) and other vehicles drives the increase in air pollution around the capital. Private cars account for 41% of emissions from road transport, followed by heavy transport (22%) and two-wheelers (16%) (MINAE, 2014a). The old age of vehicles, and thus of the motor technology, amplifies emissions per kilometre driven (ibid.). In addition, the large number of vehicles leads to high traffic congestion in the capital, in response to which driving restrictions have been in place since 2005.

The low carbon-intensity of electricity generation is impressive, but climatic factors threaten the country's high reliance on hydro-electricity. Electricity is almost exclusively generated from emissions-free sources, which are supplemented by thermal generation from fossil fuels when necessary. This is a remarkable achievement given the high shares of GHG emissions from the electricity generation worldwide. While the generation mix varies from year to year according to climatic factors, electricity is predominantly generated from hydro (up to 80%), followed by geothermal (around 15%), wind (up to 10%) and much smaller proportions of solar and biomass. However, droughts, and other environmental challenges put the country's high reliance on hydro-electricity at risk (Ministry of Environment, 2014a; OECD, 2016). Other economic sectors account for much smaller shares of emissions, and a more detailed discussion of their emissions profile is outside of the scope of this chapter.[1]

Tax policy can help address Costa Rica's environmental challenges in the transport and electricity sectors. Taxes often are levied to raise government revenue, and where this is their principal objective, behavioural responses by taxpayers are usually undesirable. In other cases, including environmental taxation, changing behaviour (to discourage harmful behaviours) can be a policy objective. Environmentally-related taxes are not levied for environmental reasons alone, but they can be effective instruments for pursuing environmental objectives, e.g. emissions reductions (Box 5.1). However, next to core environmental and climate policies, the broader tax policy framework needs to be aligned with environmental and climate policy objectives (OECD, 2015b). For example, the VAT, the corporate income tax or taxes on immovable property may affect choices around energy consumption, investment and mobility, and as result these taxes are discussed in this chapter where they interact with environmentally-related taxes and environmental policy objectives.

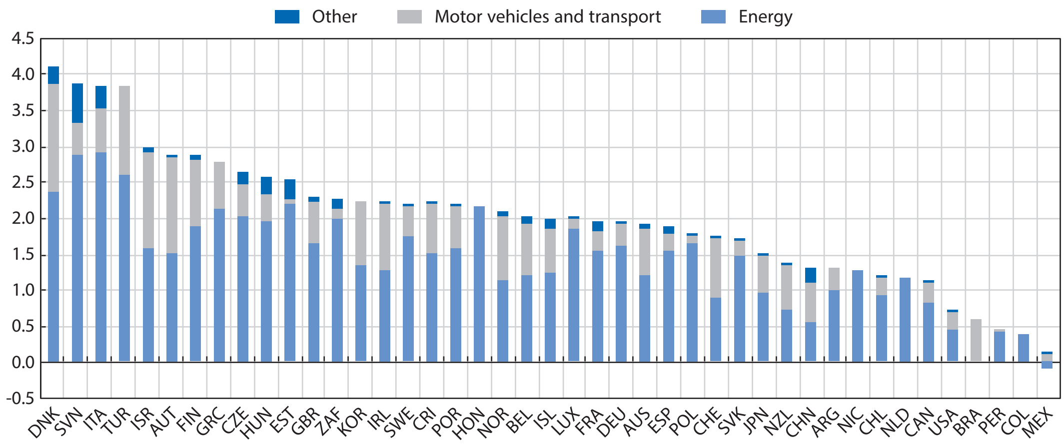
This chapter focuses on the role of tax policy in the electricity and transport sectors, and also includes brief comment on the initiative to introduce a tax on plastic containers and on the Payments for Environmental Services Programme. Other environmental challenges, such as the lack of public facilities for wastewater management, the high intensity of fertilizer use by agriculture, and management of fisheries are described in more detail in Granoff et al. (2015), but are outside of the scope of this chapter. The Costa Rican charges on water and mining are also not discussed here.

Revenues from environmentally-related taxes are relatively high

Environmentally-related tax revenue as a share of GDP is relatively high in comparison with OECD and other Latin American countries. The OECD defines environmentally-related taxes as any tax levied on environmentally-relevant tax-bases, such as air or water, energy sources or motor vehicles, regardless of the reason why they were introduced. In Costa Rica, the revenue raised from these taxes is in the order of magnitude of 2.2 % of GDP in 2014, compared to 2% on average across the OECD and selected partner economies (Figure 5.1). As in most countries, a major part of these revenues is from energy taxes (1.5% of GDP) and taxes on motor vehicles (0.7% when compared to GDP). Revenues from charges on water consumption are much lower (0.01% of GDP).

High levels of environmentally related tax revenues require careful interpretation before strong policy conclusions can be drawn. High environmentally-related tax revenues (as a percentage of GDP) could be seen as a measure of success in the sense that they indicate more attention for environment policy using taxes. They could, however, also point to weakness since high revenues could indicate high remaining pollution. Most analyses emphasise the first interpretation, i.e. taking higher revenue shares as mainly indicative of stronger effort. Based on the trends in the growth of road transport in Costa Rica, as outlined earlier, the base for fuel and motor vehicle taxes could substantially increase in the next years. In the case of Costa Rica, the second interpretation could thus merit more emphasis, in particular going forward. At the same time, raising revenues is a legitimate reason for introducing, aligning or increasing the rates of environmentally related taxes, but it is crucial to take account of the behavioural incentives in tax design as well.

Figure 5.1. **Revenues from environmentally related taxes as a % of GDP**



StatLink http://dx.doi.org/10.1787/888933545101

Source: OECD Database on Instruments Used for Environmental Policy.

Costa Rica could consider reviewing its practice of earmarking the revenues from environmentally-related taxes. Revenues from environmentally-related taxes, more often than other taxes, are subject to multiple claims on their use. For example, it is often discussed to employ the proceeds from proposed carbon taxes or emissions trading systems to finance public or private investment into low-carbon infrastructure, use it to reach internationals goals for climate finance, or finance other specific purposes, such as funds to invest into environmental improvements. As discussed in chapter 1, earmarking the proceeds of environmentally-related taxes for specific environmental funds is relatively prevalent in Costa Rica, and imbalances between revenue-raising and spending proceeds occur frequently. In general, public finance theory and practice tends to discourage strict legal earmarking of the revenues of a particular tax or revenue-raising instrument, as they are unlikely to map very closely to the appropriate or desired levels of government spending on a particular policy area. While it can often be easier to justify the introduction of environmentally-related taxes on the grounds of earmarking their proceeds, Costa Rica may want to review this practice to increase the flexibility of attending to specific financing needs and priorities.

Box 5.1. **Why taxes are among the best environmental policy instruments**

The environmental, health and climate impacts (in short, pollution) of energy use are not directly borne by producers and consumers, so these costs are not taken into account in decisions based on market prices: they are external to the market. The result is that unregulated market outcomes lead to too much pollution, and public policy is needed to improve upon the market outcome by reducing pollution. Governments can intervene with various policy instruments, including taxes, cap-and-trade systems (tradable permits), emission standards, direct technology requirements and restricting the level of pollution-generating activity.

Taxes or auctioned tradable permits tend to outperform other environmental policy instruments in terms of cost-effectiveness. This is because putting a price on pollution provides polluters with incentives to find the cheapest ways of reducing their tax bill. They can reduce the level of the pollution-generating activity or search for less pollution-intensive

Box 5.1. **Why taxes are among the best environmental policy instruments** *(continued)*

ways of carrying it out. Alternative instruments, for example energy efficiency standards, imply more prescriptive policy decisions on how to reduce pollution, and given asymmetrical information and heterogeneity among economic agents, the proposed solutions risk not being cost-effective. Polluters possess more information than the government about how they can cut pollution, so they are better placed to choose the cheapest option. Since economic agents differ, the best options can differ as well. For example, some households would be better off by responding to a higher fuel tax by investing in more fuel efficient cars, whereas others would primarily respond by driving less. A fuel economy standard, however, would force the second household to (also) invest in fuel economy, even though this would not be their preferred response. Furthermore, once polluters comply with an energy efficiency standard, they do not have an incentive to further reduce pollution, whereas with a tax the incentive to cut pollution is on-going.

Market-based instruments have strong appeal on theoretical grounds and there is evidence that they often work better in practice than other policy instruments (see e.g. OECD, 2013a). Nevertheless, direct regulation, for example with efficiency or emission standards, can be useful in particular circumstances, either in combination with market-based instruments or instead of them. One complication with the use of taxes is that it may be difficult to tax pollution directly and that taxes have to be levied on activities or types of consumption that are more or less strongly related to pollution. When the correlation is weak, taxes become less effective and the relative appeal of direct regulation rises. Fuel taxes, for example, can very accurately reflect the carbon content of fuels and therefore the marginal contribution of fuel use to climate costs, but they correlate less directly with emissions of local pollutants and still less with the ultimate pollution costs resulting from such emissions. Emission standards for local pollutants can usefully complement fuel taxes, but the case for fuel economy standards is weaker. Furthermore, designing effective emission standards is not easy, with e.g. the risk that emission profiles differ substantially between test- and real-world conditions. Using standards to cut pollution is also more likely to work well in the early stages of abatement, when pollution is high and cheap technological approaches to reduce it are available. Market-based approaches become more attractive when abatement costs rise and across-the-board measures should make way for more decentralised abatement choices.

Source: OECD (2015a).

There is scope to adapt the policy mix to curb the external costs from road transport in Costa Rica

Pricing road externalities can help contain the external costs of road transport. There is a wide range of external costs from road transport: some of the main externalities for which measurement has been attempted include climate change, local air pollution, traffic congestion, and road damage (Van Dender and Parry, forthcoming). Ideally, the different nature and sources of each of these externalities would require its own policy instrument, but practical solutions exist and are used in a range of countries (Table 5.1).

Costa Rica operates a number of tax instruments which could be adapted to better address the negative side effects of road transport. These instruments – irrespective of the precise motivation for their introduction and design – can be loosely mapped to the different externalities from road transport. For example, the Costa Rican fuel tax can be thought of as an attempt to address the contribution of fuel use to climate change, though the Costa Rican specific tax rates do not map very closely to the GHG content of the underlying fuels. Furthermore, the reduction of the vehicle tax for electric and hybrid vehicles can be interpreted as an attempt to reduce air pollution, but, as explained further down, this type of tax differentiation is not the first choice to influence the emissions profile of the vehicle fleet. While it is difficult to quantify the relative importance of the different external costs of road transport in the Costa Rican context, a range of changes to the existing tax policy framework could help target these costs more precisely. This can be expected to result in reducing pollution and other undesirable side effects of transport.

Table 5.1. **Ideal and practical policies to address the external costs of road transport**

Externality	Cause	Ideal policy	Most practical policy	Countries with similar policies
Climate change	Fuel use emits carbon and other GHG, emissions, roughly proportionate to the amount of fuel combusted	Fuel tax	Fuel tax	All OECD and G20 economies, and beyond
Air pollution	Fuel use produces air pollution, either through combustion directly, or indirectly through reactions with ambient air	Tax tailpipe emissions per vehicle kilometre, with rates varying proportionally to local population exposure, topography, weather, interaction with other pollutants and ultimate pollution impact	Driving-based charge with component to reflect air pollution cost. Fuel tax to reflect differences in pollution profiles between fuels or to substitute for driving-based charge.	Distance-based charges for trucks in some EU countries.
Congestion	Drivers do not account for the road space used by their vehicle, which leads to congested roads and may raise travel time and reduce travel time reliability for all vehicles	Per-kilometre charges for vehicles driven on busy roads, with charges aligned across roads and time of day with marginal external costs	Bottom-up pricing schemes (e.g. local cordon fees) Top-down pricing schemes (e.g. country-wide systems)	Cordon fees in Singapore, London, Milan, Stockholm, and others
Accidents	Drivers are not charged for the risks their extra driving poses to others	Per-kilometre tax, with rates scaled to the driver risk (e.g. on ratings from insurance companies accounting for age, prior crash record, etc.) and vehicle risks (heavier vehicles pose higher risks to other vehicle occupants).	Pay-as-you-drive (PAYD) insurance, with payments in proportion to km driven	PAYD system in Norway, Japan, Australia and others
Road damage	Driving causes road wear, mostly caused by trucks in relation to axle load	Per-kilometre tolls on heavy trucks, scaled by axle weight, ideally with higher rates for driving on more vulnerable road classes		Tolls for heavy vehicles in several EU countries, Switzerland, New Zealand

Source: Van Dender and Parry (forthcoming).

The fuel tax prices oil products at relatively high rates but the carbon content of underlying fuels is taxed at differing rates

Costa Rica levies a fuel tax on oil products but statutory rates differ across fuels. Costa Rica's fuel tax ("Impuesto Unico sobre los Combustibles") applies to most oil products used in the country. As in all OECD and G20 economies, taxes on fuels used in road transport are higher than the taxes on fuels used in other economic sectors (OECD, 2016). This is because, in the absence of more targeted policy instruments, taxes on transport fuels are often thought of as also addressing other externalities from road transport (Table 5.1). In contrast to practice in some other countries, which apply surcharges to fuel used for transport purposes to increase taxes on road fuels compared to fuel tax rates in other sectors, the differentiation in Costa Rica is not explicit and rather a result of higher taxes rates on gasoline and diesel, which are predominantly used in transport. Of the transport fuels, the highest rate is levied on super gasoline (CRC 245.5 per litre), and a slightly lower rate on regular gasoline (CRC 234.7 per litre). Diesel is taxed at a much lower rate (CRC 138.75 per litre). LPG, kerosene, fuel oil, bunker fuel and naphtha, which are predominantly used in the residential and industry sectors, and to a minor extent to generate electricity, are all taxed at rates substantially below the rates applied to road transport fuels (CRC 50 per litre). Fisheries are tax exempt, as are fuels used in international aviation and shipping, in line with international agreements. Natural gas and coal are not subject to the fuel tax. Natural gas and coal are not currently used much in Costa Rica, but this could change if the share of hydro to generate electricity were to decrease (see OECD, 2016 and above).

Where energy use is taxed, the tax rates in Costa Rica translate into relatively high effective tax rates on carbon. Figure 5.2 plots the rates of the fuel tax (on the vertical axis), as they applied on 1 April 2017, against carbon emissions from energy use in thousand tonnes of CO_2 (on the horizontal axis). Carbon emissions from energy use are divided by three economic sectors (transport, heating and process use, and fuels used to generate electricity). Figure 5.2 permits appreciating differences in the taxation of different fuels and sectors across the economy. Fuels used in transport (i.e. mostly gasoline and diesel) are taxed at the highest rates, while fuels used for heating and process purposes are taxed at much lower rates. Box 5.2 gives further detail on the interpretation of Figure 5.2, and provides background on OECD analyses of energy use and taxation in OECD and G20 economies.

The Costa Rican fuel tax prices carbon emissions at relatively high levels, also when compared to effective tax rates on energy use in OECD and G20 economies (see OECD, 2015a; OECD, 2016b for a full cross-country analysis of effective tax rates by fuel and sector). More specifically, the Costa Rican fuel tax translates into relatively high effective tax rates on carbon emissions. OECD (2016b) has chosen EUR 30 per tCO_2 as a *minimum* benchmark for the climate cost of carbon. Figure 5.2 shows that, where it applies, the Costa Rican fuel tax prices carbon emissions from energy use at rates which exceed EUR 30 per tCO_2 by far. This benchmark for the climate cost of carbon has been chosen as a lower-end reference for carbon prices. Selecting this lower-end estimate as a benchmark does not imply that carbon prices are sufficiently high at EUR 30 per tCO_2, and this is not a policy conclusion that should be drawn from this comparison. In addition, in contrast to practice in most OECD and G20 economies, the sales tax exemptions for fuels that exist in Costa Rica introduce strong variation in the relative prices of fuels in Costa Rica. However, taxes that usually apply to a very broad range of goods (such as value added and retail sales taxes) are not included in the graphical profiles. The *de facto* specific incidence of the Costa Rican sales tax on fuel prices complicates direct comparison of effective tax rates on fuels in Costa Rica with effective tax rates on fuels and sectors in other countries (see also Box 5.2, and the discussion some paragraphs further down).

Box 5.2. **Analysing taxes on energy use in Costa Rica, OECD and G20 countries**

The OECD has published detailed analyses of the taxation of energy use in OECD and G20 countries in *Taxing Energy Use: A Graphical Analysis* (OECD, 2013) and *Taxing Energy Use 2015: OECD and Selected Partner Economies* (OECD, 2015a). A key component of these analyses are the graphical profiles of energy use and taxation, which are prepared for each country included in the *Taxing Energy Use* database ("TEU database"), which contains comprehensive information on the rates and coverage of carbon and other specific energy taxes on energy use. Such a graphical profile of energy use and taxation (Figure 5.2) has been prepared for the purposes of this first OECD Tax Policy Review for Costa Rica. Figure 5.2 shows the composition of energy use in Costa Rica, and the effective rate of tax on various types of energy use.

The horizontal axis of each graphical profile shows all final use of energy by businesses and individuals, including the net energy used in energy transmission and in the transformation of energy from one form to another (e.g. crude oil to gasoline, coal to electricity). Energy use has been grouped into three broad categories: transport, heating and process use, and electricity. These three categories are further disaggregated for each country, generally reflecting the particular tax bases of that country. The subcategories therefore differ between countries depending on the nature of the fuel, its user, or its use.

All forms of energy are converted into common units of carbon emissions (tonnes of CO_2), using standard conversion factors. Figure 5.2 expresses the quantities of the various energy sources in terms of the carbon emissions associated with their use (in tonnes of CO_2). The re-expression of tax bases in terms of carbon content permits a focus on the structure of taxation with respect to one purpose for which fuel can be taxed – to reflect the social cost of carbon emissions. Electricity is different from most of the other energy types shown in that it is a secondary energy product which must be generated by use of some primary energy (e.g. coal, natural gas, nuclear power, and hydro). The electricity category of the graphical profiles therefore show the energy content or carbon emissions of the underlying primary fuels used to generate the electricity domestically rather than of the electricity itself. Data on energy use is taken from the Extended World Energy Balances (IEA, 2014).

On the vertical axis, Figure 5.2 shows the Costa Rican excise tax on fuels ("Impuesto Unico sobre los Combustibles") as at 1 April 2017. OECD analyses of energy use and taxation covers those taxes levied on a physical measure of energy product consumed, whether quoted in a monetary amount per unit of fuel (per-unit taxes), or as a percentage of the sales price (ad valorem taxes). In Costa Rica, the excise tax on fuels is quoted on a per-unit basis, in line with practice in most other countries.

Taxes that apply to a very broad range of goods (such as value added and retail sales taxes) are not included in the graphical profiles. Since these taxes usual apply at equal rates to a wide range of goods, they do not change relative prices. However, where an energy product is subject, for example, to a concessionary rate of VAT, the concession would affect relative prices. In order to gauge to what extent VAT rate differentiation takes place for energy products, OECD (2015) discusses VAT and concessionary VAT rates on energy products separately. Also excluded from the analysis are taxes that that may be related to energy use but that are not imposed directly on the energy product (such as vehicle taxes, road user charges or billing charges and taxes on emissions such as NO_X and SO_X) and those which do not have a fixed relationship to fuel volume (e.g. congestion charges).

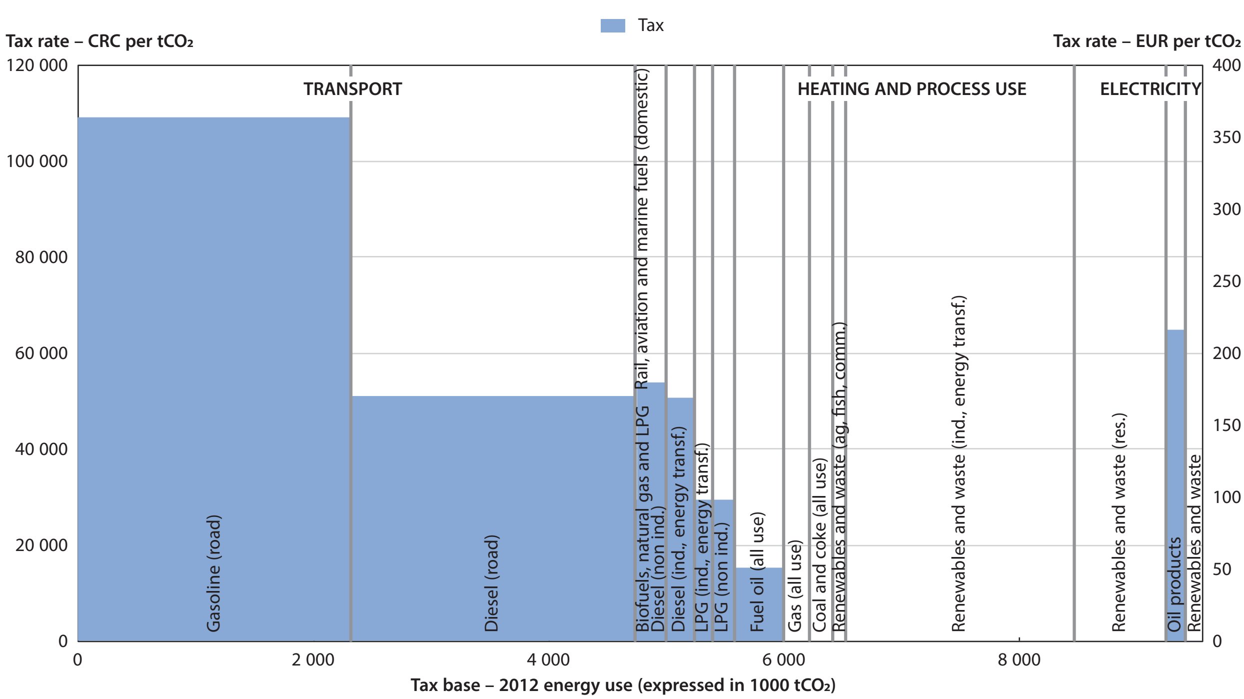
The OECD also analyses *Effective Carbon Rates* (OECD, 2016b), defined as the total price that applies to CO_2 emissions from energy use as a result of market-based policy instruments. Compared to effective tax rates on carbon emissions from energy use, *Effective Carbon Rates* also include price signals from taxes and tradable emission permit prices. However, since Costa Rica does not operate a tradable permit system for carbon emissions, its effective tax rate on carbon emissions from energy use equals the effective carbon rate.

Source: adapted from OECD (2015b).

The tax rate on diesel could be increased at least to the level of the tax rate on gasoline, to reflect better the impact of diesel on climate change and air pollution. While gasoline is taxed at the highest rate in terms of the fuels' carbon content (Figure 5.2 shows the weighted average of the rates on premium and regular gasoline), diesel is taxed at a much lower effective tax rate on carbon. However, at current state of equipment and technology, diesel emits higher levels of harmful air pollutants per litre than gasoline (Harding, 2014), and the carbon content of diesel per litre is also higher than that of gasoline. To contain emissions from the road sector, and in particular the emissions of heavy transport – which is usually a heavy diesel user – Costa Rica could increase the tax rate on diesel at least to the level of the tax rate on gasoline.

In Costa Rica, the effective tax rates on carbon emissions from fuels used for heating and process purposes and electricity generation do not consistently reflect the external costs of carbon emissions. In general, ensuring that a uniform carbon price covers as many emissions as possible maximises the cost-effectiveness of abating emissions and prevents future emissions growth. In Costa Rica, the mix of fuels used for residential heating, industry and the public and commercial sector (presented in Figure 5.2 as "heating and process use"), is very diverse and consists of a range of oil products, coal, natural gas, biomass, waste and renewables. Of these, all oil products (LPG, fuel oil and diesel) are taxed although at lower rates on average than gasoline and diesel, which are predominantly used in the transport sector. This is usual practice in most countries, since – in the absence of more targeted policy instruments – taxes on transport fuels are commonly thought of as also addressing other (non-carbon) external costs from the road transport sector (see Table 5.1).

Figure 5.2. **Effective tax rates on energy use in Costa Rica, in terms of carbon content**

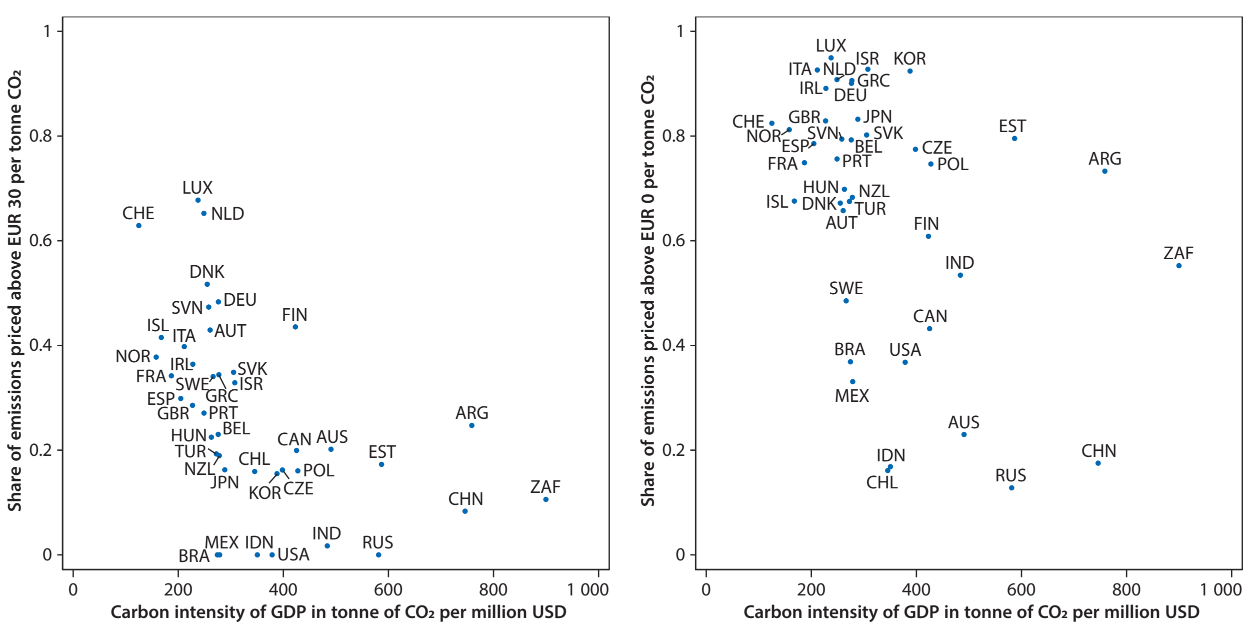


Source: OECD calculations. Tax rates are as of 1 April 2017; energy use data is for 2012 from IEA (2014), "Extended world energy balances", *IEA World Energy Statistics and Balances* (database), http://dx.doi.org/10.1787/data-00513-en.

The external cost of combusting other fossil fuels, such as coal, is entirely unpriced. While coal currently accounts for a small share of total carbon emissions from energy use in Costa Rica (around 2%), extending a tax to all fossil fuels (including coal and natural gas) could help prevent future increases in their use in industry, by households and for electricity generation. This would reduce the likelihood that these fossil fuels would replace electricity generation from hydro in the future (i.e. in case the use of hydro decreases further as a result of climatic change). As mentioned earlier, electricity production currently produces almost no carbon emissions in Costa Rica. Within the fossil fuels used to produce electricity, oil products dominate, and are priced at the same rates as the fuels used for heating and process purposes. Pricing all fuels, including those used in electricity generation, at rates that reflect their carbon content (so, at the very least at EUR 30 per tCO_2, and, where possible, also of other GHG emitted on combustion) would ensure that energy users consider the external costs of combusting fuel in their usage decisions, and prevent future emissions increases.

Countries that price larger shares of carbon emissions also have a lower carbon-intensity of GDP. Analysis included in OECD (2015a) and (OECD, 2016b) shows that most countries do not consistently price carbon emissions from energy use at rates that reflect the carbon content of fuels. However, Figure 5.3 suggests that countries which price a larger share of carbon emissions from energy use tend to have a lower carbon-intensity of GDP. In view of Costa Rica's target to achieve carbon-neutrality by 2021, it could thus be considered to work towards enlarging the share of carbon emissions which are taxed, and pricing them in line with the carbon content of fuels.

Figure 5.3. **Proportion of CO_2 emissions priced above EUR 30 (left) and EUR 0 (right) per tonne of CO_2 relative to the carbon intensity of GDP, 41 countries, 2012**



Source: OECD (2016b), using GDP data from the World Development Indicators (database), http://data.worldbank.org/.

Costa Rica could consider introducing a tax on electricity output over the coming years in order to raise revenue at low economic cost. In contrast to most OECD and G20 economies, Costa Rica does not levy a tax on electricity output. Taxes on electricity can be efficient revenue-raising instruments, because the demand for electricity is not very price-elastic. In addition, taxes on electricity tend to be more difficult to avoid than direct taxes, such as CIT, since they are usually included in the price of electricity and are thus paid directly with the electricity bill. There is widespread concern that lower income households would be hit particularly hard by taxes on electricity output. There are, however, effective and proven ways to compensate for any potential regressive effects of electricity taxes. Policy makers can, for example, provide targeted compensation payments to poor households (e.g. using income-tested compensation or lump sum transfers). An alternative way to address distributional concerns would be to exempt small amounts of electricity consumption from taxation. To facilitate adjustment for electricity users, rates could be introduced at low rates, and gradually increased over time.

A tax on electricity output should go hand in hand with taxing fossil fuel inputs to electricity generation under a fuel tax, with rates aligned with the carbon content and the broader pollution profile of the respective fossil fuel, as described in the preceding paragraphs. This is because, if the fuel mix is not fixed, then taxes on input fuels and taxes on electricity use affect different behavioural margins. For example, a tax on electricity use does not steer fuel mixes in a particular direction (low carbon), whereas taxes on input fuels do have that potential. Although the fuel mix to generate electricity in Costa Rica is currently low-carbon, levying a tax on fuel inputs to electricity can help preventing increases in the carbon intensity of the electricity generation mix in the future.

Fuels subject to the fuel tax are exempt from all taxes on imports, including the sales tax, which translates into a *de facto* preferential tax treatment of energy products. As discussed earlier in this chapter, fuel taxes are an appropriate way to have consumers factor the external costs of fuel use into their consumption choices. Other taxes, such as import duties, VAT or sales taxes also increase the prices of energy products, but these taxes are usually not specific to energy products. Thus, they do not change the relative price level of energy products versus other goods and services. However, if the rates of these taxes are differentiated in such a way that they strongly affect the relative price of energy products, they become *de facto* specific to such products. In Costa Rica, fuels subject to the fuel tax are exempt from all sales taxes. Reducing these sales taxes selectively for energy products counteracts the intention to increase the relative end-user prices of energy (for environmental and revenue-raising reasons). This effect is particularly pronounced if the differential rates apply only to energy products, as is the case in Costa Rica. To counteract this effect, it could be considered to also levy VAT and import duties on the goods subject to the fuel tax (see chapter 4). Any attempts to reflect the external costs of fuel use, and differentiate the prices of energy products via à vis other goods should be implemented via excise taxes, and not via sales taxes, VAT or taxes on import, which should ideally apply to the broadest possible range of goods and services.

There is scope to adapt the taxation of motor vehicles to reflect the external costs of vehicle use more closely

Costa Rica taxes the ownership and purchase of vehicles via different instruments. Vehicle ownership is taxed on an annual basis, at differential rates according to vehicle type and use (Table 5.2). While private vehicles are taxed at rates that increase with the price of the vehicle, motorcycles are taxed according to engine displacement. Taxis, buses and trucks pay a flat rate under the ownership tax, at roughly a third of the minimum tax for private cars. With regard to vehicle purchases, two taxes apply. The selective consumption tax levies *ad valorem* rates on the cost, insurance and freight (CIF) value of vehicles. The tax also applies to domestic car purchases, but, due to the absence of a domestic car industry, the tax falls on vehicle imports only. Higher differential rates are levied on vehicles older than seven years, lower rates on hybrid vehicles, and electric cars are zero-rated. The sales tax (13%) and a tax based on Law 6946 (1%) apply on top of these taxes, but their rates do not vary by type of vehicle or the type of fuel used. Since, in most countries, value-added and sales taxes do not introduce *de facto* specific variation in the relative prices of different products, these taxes are not counted as specific taxes on vehicle use, and are also not included in Table 5.2.[2]

Table 5.2. **Specific taxes levied on motor vehicles in Costa Rica, as in 2016**

		Import or purchase		Domestic re-sale	Ownership
		Import duty	Selected consumption tax	Tax on the sale of used vehicles	Annual tax on the ownership of motor vehicles
Fuel type	**Vehicle type**	Sales price			
100% fossil	Private passenger cars (new, <7 years)	0%	30%	2.5%	Increasing with vehicle value
	Private passenger cars (>7 years)	0%	48%		
	Buses	5%	23%-43%		Flat at CRC 80 000
	Taxis	0%	30%		
	Trucks	14%	14%-48%		
Hybrid	All vehicles, new	0%	10%		Like other private passenger cars vehicles (see above)
Electric	All vehicles, new	0%	0%		

Note: The sales tax (13%) and a tax based on Law 6946 (1%) apply in addition to the taxes included in this table, but these two taxes do not vary by type of vehicle or the type of fuel used.

Source: Collected from laws and regulations.

The design of these taxes could be adapted to encourage purchasing less-polluting vehicles. While the tax rates differentiate by vehicle age and type to some extent, there is scope to tailor them more closely to the external costs of road use. The existing taxes on vehicle ownership and transfer could be supplemented with rate components based on the average emissions of the car in grams per kilometre, to encourage consumers to shift towards less polluting cars, as was done in Chile (Box 5.3). Moreover, the flat rates paid by buses, taxis and trucks under the tax on vehicle ownership could be reconsidered, and would ideally map to the rates paid by other vehicles. This would extend the incentives to move towards less polluting cars to these user groups. Furthermore, it could be useful to analyse whether the tax on the sale of used vehicles provides adequate incentive to renew the vehicle fleet.

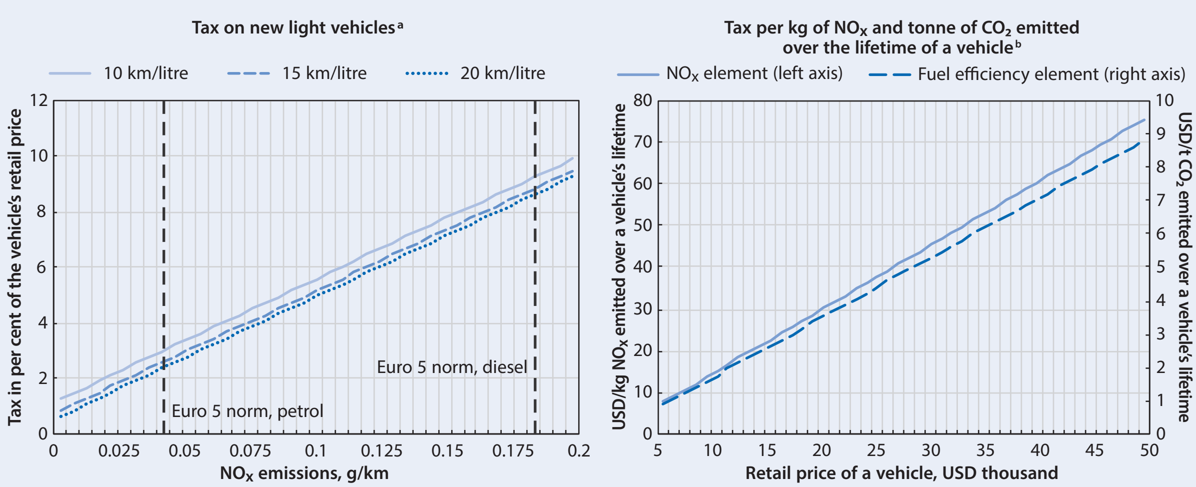
To raise revenues, the design of vehicle taxes should nevertheless remain simple. Achieving a well-targeted vehicle tax that raises revenues while also reducing transport emissions is difficult. For example, the French experience with the "bonus-malus" system – a vehicle sales tax varying in line with the cars' carbon emissions – has shown that a too granular variation in vehicle taxes by the vehicle's environmental impact risks unnecessarily foregoing revenues, with uncertain additional impacts on emissions (d'Haultfoeuille et al., 2014).[3] In contrast, the government of Israel introduced a purchase tax on vehicles, which has been very effective at influencing purchase behaviour and reducing the emissions of the vehicle fleet, but tax revenues have quickly eroded after the introduction of this tax (Roshal and Tovias, 2016). In many cases, a fuel tax that differentiates between the carbon content of different fuels, as described above, can achieve emissions reductions at a lower cost than a very differentiated vehicle tax. Consequently, in Costa Rica, maintaining a vehicle tax rate component based on the price of the vehicle, motor size, or similar, together with some differentiation by environmental criteria could strike a balance between revenue-raising and environmental objectives.

Box 5.3. **Examples from Chile: Vehicle taxation and road pricing**

A number of OECD member countries apply vehicle taxes that vary with the fuel efficiency or CO_2 emissions of the vehicles; fewer countries address local air pollutants in their vehicle taxes (Israel and Norway are among the exceptions). Since January 2015, Chile has been phasing in a tax on new private passenger vehicle registrations. Such a tax can help gradually modify the composition of the car fleet. From an environmental point of view, however, it is less efficient than taxes on vehicle fuels and road pricing because it is not linked to vehicle use.

The Chilean tax is differentiated according to the vehicles' test-cycle urban fuel efficiency, their NO_x emissions, and their retail price. The government has been phasing in the NO_x element of the tax gradually; with the full value applied from 2017. Since the tax has been applied only for a short period, it is not yet possible to assess its overall impact. Some indications, however, suggest that consumption is changing in the expected directions, with increasing market share for low-emission vehicles. Analysis included in OECD and ECLAC (2016) illustrates how the tax varies depending on the NO_x emissions for different levels of fuel efficiency. It uses a passenger vehicle with an assumed retail price of approximately USD 10 000 as the example. The tax in per cent of the retail price increases proportionally with NO_x emissions. At the Euro-5 NO_x emission limit for diesel vehicles, the tax rate is 8% to 9% of the retail price, given the selected fuel efficiency levels. For a petrol vehicle complying with the Euro-5 limit, the tax rate is 3% to 4% (the Euro-5 emission limit is stricter for petrol vehicles than for diesel vehicles). Accordingly, in absolute terms, the petrol vehicle would pay in the order of USD 500 less in tax than the diesel one, in line with the higher NO_x emissions from diesel use, compared to petrol.

Figure 5.4. **The Chilean vehicle tax is lower for cleaner and cheaper vehicles**



StatLink http://dx.doi.org/10.1787/888933545120

Notes: a. The tax level depends on the price of the vehicles. In this chart, data refer to vehicles with an assumed retail price of CLP 6 000 000 (approximately USD 9 000). The tax rates shown are for 2017.

b. The calculation assumes that each vehicle is driven 200 000 km over its lifetime. The tax rates shown are for 2017.

Source: OECD/ECLAC (2016).

Box 5.3. **Examples from Chile: Vehicle taxation and road pricing** *(continued)*

Toll road concessions, which Chile has been granting to private operators since the 1990s, helped significantly expand the country's highway network, including around the Santiago Metropolitan Region. Santiago was the world's first city to implement urban highways almost simultaneously with interoperable free-flow toll charges.[1] Tolls reflect both the cost of road use and externalities linked to traffic, namely congestion. They increase with the length of road stretches and weight of vehicles, and vary with time of day (off-peak, peak or saturation).[2] Congestion charges have economic and environmental advantages. They allow not only for recovery of investment costs, but also for adequate pricing of limited space, environmental externalities (e.g. air pollution) and fairer competition among different transport modes. Linking the tolls to emission levels and fuel efficiency of vehicles would further stimulate a shift towards cleaner vehicles.

Notes: 1. Highways were tendered to different operators. An inter-operable free-flow tele-toll allows users to avoid stopping when paying the toll, passing under a portico that permits information to be exchanged for automatic invoicing.

2. Peak time rates come into effect when traffic reduces the average travelling speed to levels below the road's design speed; saturation rates come into effect when average speeds are far below the level designed for the road.

Source: OECD/ECLAC (2016).

Costa Rica is discussing new policies to stimulate the electrification of the transport sector. Current plans include exempting all electric vehicles and their spare parts, from all import tariffs, the selective consumption and the sales tax, the restrictions on vehicle circulation in the San José Metropolitan Area and all parking fees. These exemptions will apply irrespective of the vehicle's value, size and type, though a maximum exemption is discussed, based on vehicle price. In addition, the purchase of electric vehicles would be partially deductible from the income tax. These policies would be valid for 5 years, or until the number of electric vehicles in Costa Rica arrives at 100 000.

The proposed tax exemptions for electric vehicles appear not very well targeted, and will likely be regressive and expensive. The electrification of the transport sector can be an effective way to decrease the environmental impact of road transport, if electricity is produced from clean sources as in Costa Rica. However, to the extent that electric cars consume less fuel, and thus contribute to decreasing the impact of transport on climate change and air pollution, their users already benefit from decreased expenditure on fuel taxes. Just like any other vehicle, electric cars contribute to increasing the other external costs of road transport (congestion and accidents, and to an extent also road damage in the case of heavy vehicles). In that sense, these wide tax exemptions appear not to be merited, and do not map very well to the external costs of using these vehicles. In addition, the wide proposed tax exemptions can prove relatively expensive in terms of revenue foregone, while their impact on fostering additional hybrid and electric car purchases and emissions reductions remains unquantified. Moreover, as electric cars tend to be relatively expensive, the tax exemption may provide a disproportionately large benefit to richer households, which are more likely to buy those vehicles. An alternative policy to accelerate the electrification of the transport sector could be to increase investment into charging stations and other necessary infrastructure for electrification. For the same reasons, the zero-rating of electric vehicles and the reduced rate for hybrid cars under the selective consumption tax could be reconsidered as well.

Costa Rica could consider moving away from driving restrictions in the capital area, and extending price-based measures

Despite driving restrictions in the San José Metropolitan Area, congestion and air pollution remain high. To regulate traffic and congestion, private cars are banned from the San José Greater Metropolitan area on one day per week, depending on the last digit of their license plate. Exemptions exist for motorcycles, public transport and taxis, rental cars, or for vehicles carrying five or more persons in peak hours. However, though the driving restrictions have been in place largely uninterrupted since August 2005, congestion and air pollution around the capital are large.

There is evidence that driving restrictions are a relatively expensive policy. While driving restrictions encourage reduced driving (e.g. through encouraging alternate travel modes, and pointed reductions of travel on the specific days the drivers' car is concerned), they do not allow drivers to adapt in all possible ways (e.g. avoiding trips during rush hours). As a result, the welfare cost associated with driving restrictions can be high. Furthermore, evidence from similar policies (e.g. in Mexico City) shows that richer drivers respond to driving restrictions by purchasing additional cars, which tend to be older and more polluting (Davis, 2008). In consequence, Costa Rica could consider gradually moving away from driving restrictions towards more price-based measures, such as making parking in the city centre more expensive. In the mid- to longer run, it could be considered to move towards cordon fees, as was done in Santiago de Chile (Box 5.3), Singapore, London and Stockholm.

There is scope to increase the neutrality of the taxation of electricity producers and electricity use

To level the playing field for electricity producers, it could be considered to align the tax treatment of private and municipal electricity producers. While public entities, such as the national electricity producer ICE (which controls 74.1% of generation capacity), and all private electricity producers (7.2% of generation capacity) are subject to CIT, municipal electricity producers (11.01% of generation capacity), are exempt from CIT. The differential tax treatment of electricity producers appears to create a competitive advantage for municipal electricity producers, with no apparent underlying economic rationale.[4]

The wide range of tax exemptions provided for energy-efficient goods are a relatively expensive policy to encourage their use. A range of goods which are deemed as energy efficient or low-carbon is exempt from import taxes (i.e. from the selective consumption tax and the sales tax). This policy does not appear to be cost-effective in reducing emissions. While, in principle, tax incentives or other subsidies do modify relative prices of environmental goods just like carbon prices do, they have a number of important limitations. For example, tax subsidies inevitably involve "picking winners", and tax incentives are frequently found to subsidise actions that would have been taken in their absence, while resulting in limited additional carbon abatement (see Greene and Braathen, 2014, for a more detailed discussion). As a result, approaches that tax energy-inefficient goods rather than subsidise energy-efficient goods are preferred. Well-designed carbon prices and, possibly, incentives for better insulation of buildings, are alternative and cheaper ways to foster energy efficiency and low carbon production of electricity.

The proposed tax on non-recyclable plastic containers can be an effective way to reduce their use

Costa Rica is considering the introduction of a specific tax on non-recyclable plastic containers. In other countries, low tax rates on non-reusable waste, such as the tax on plastic bags levied in the UK and Ireland, have been shown to be very effective at reducing waste from these products. For example, in the United Kingdom, a small charge on plastic bags has decreased the use of plastic bags by 6 billion in the first months of 2016, compared to the previous year (Barkham, 2016). The environmental effects of such a tax can be large, though, due to the potentially large elasticity of the tax base and the low rate, public revenues from this tax are likely to be relatively modest.

There is opportunity to increase the cost-efficiency of the Payments for Environmental Services Programme

Costa Rica operates a broad and well-known Payments for Environmental Services Programme. Through the Payments for Environmental Services Programme (PSA, by its acronym in Spanish), operated by the designated National Fund for Forest Financing (FONAFIFO), the government contracts forest owners for the services provided by their land and prevent deforestation. Four environmental services are recognised by the Costa Rican government, which are assumed to be equally provided by each hectare of forest; mitigation of greenhouse gas emissions, water protection, conservation of biodiversity and landscape beauty.

The PSA Programme overlaps with a range of competing regulations, and the direct impacts of the programme could be quantified better. The PSA is cited as a large success in reversing deforestation in Costa Rica. Over half of the country's territory is now covered by forests, compared to just 26% in 1983 (World Bank, 2016). The programme overlaps with a range of other policies, such as a ban on land-use change and a law promoting the recovery of secondary forests (IIED, 2013). As a result, it is difficult to trace back which part of environmental benefits results from the PSA, or other policies. To increase the cost effectiveness of the programme in delivering environmental services, it could be considered to conduct a cost-benefit analysis of the policy.

The levels of PSA payments could be aligned more closely with the likelihood of deforestation of a given hectare. Forest owners are paid a lump sum per hectare of forest conserved, at levels fixed each year by the government. However, applications by farmers for participating in the programme consistently exceed available funding. Further decreases in the level may make certain parts of the land more amenable to land use change, in particular when the opportunity cost of the land is high. A potential way forward would be to align the amount of payments per hectare more closely with the opportunity cost of the land use. For example, payments could be varied in line to their distance from a city, and other indicators determining land value. This is would be in line with recent efforts to move away from the first-come, first-serve basis of awarding PSA contracts, towards prioritising areas more critical to conservation. Furthermore, it could be considered to de-link the funding of the programme from fluctuations in fuel tax revenues.

The tax policy recommendations that can be drawn from this analysis are as follows:

Recommendations

- Align the rates of the fuel tax with the carbon content of the underlying fuels. This includes increasing the tax rate on diesel at least to the level of the tax on gasoline, and introducing tax rates on coal and natural gas.
- Phase out the import and sales tax exemptions for fuels.
- Introduce over time a tax on electricity output to foster a more efficient use of electricity, while addressing the distributional effects of such a tax.
- Adapt the vehicle taxes to better address pollution and congestion, for example by supplementing the vehicle taxes by a rate on pollution (e.g. NO_x emissions).
- Align the taxation of taxis, trucks and buses with that of other vehicles.
- Replace the proposed broad tax exemptions for electric cars with increased investment into transport infrastructure, including the infrastructure necessary to use electric cars.
- Align the taxation of municipal and private electricity producers.
- Evaluate the tax exemptions for energy-efficient products with regards to their cost-effectiveness in achieving emissions reductions.
- Evaluate the additionality of the PSA programme in providing environmental services.

Notes

1. The manufacturing and energy production industry, the residential and commercial sector, and the agriculture sector accounted for 23.9%, 1.7%, and 4.5% of emissions, respectively, in 2012. Note that the estimates of the shares of GHG emissions by sector vary, depending on the method used to account for emissions from biomass. While the United Nations Framework Commission for Climate Change (UNFCCC) generally takes a lifecycle approach to accounting for the emissions from biomass (and counts them as zero), OECD (2015 and 2016) does not zero-rate emissions from the combustion of biomass. The figures shown in this chapter are aligned with the approach taken in OECD (2015) and OECD (2016).

2. Domestic transactions involving used vehicles are taxed at 2.5% of the sales price, with no differentiation by vehicle or motor type.

3. An evaluation of the French policy has shown that granting overly generous reductions in vehicle taxes can be counterproductive, by increasing automobile sales and carbon emissions compared to the baseline. Braathen (2009, 2011) shows that CO_2 abatement achieved through differentiated vehicle taxes can be relatively costly.

4. OECD (2016c) discusses the way electricity tariffs are set in Costa Rica, and compares them to the tariff-setting methodology in selected OECD countries. The key take-away of that discussion is that the way electricity tariffs are set by the Public Services Regulatory Authority (*Autoridad Reguladora de las Servicio Públicos*, ARESEP) does not provide strong incentives for cost reductions by electricity producers.

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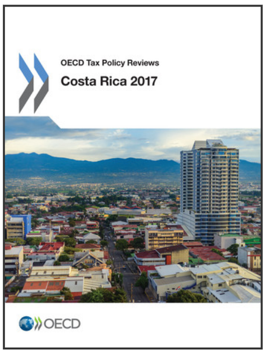

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