



# Environmental Taxation

## A Guide for Policy Makers

This guide is based on the OECD's recently issued book *Taxation, Innovation and the Environment*.

### Overview

Environmental challenges are increasing the pressure on governments to find ways to reduce environmental damage while minimising harm to economic growth. Governments have a range of tools at their disposal, including regulations, information programmes, innovation policies, environmental subsidies and environmental taxes. Taxes in particular are a key part of this toolkit.

Environmental taxes have many important advantages, such as environmental effectiveness, economic efficiency, the ability to raise public revenue, and transparency. Also, environmental taxes have been successfully used to address a wide range of issues including waste disposal, water pollution and air emissions. Regardless of the policy area, the design of environmental taxes and political economy considerations in their implementation are crucial determinants of their overall success.

This policy guide has a few key messages:

### Why use environmental taxes?

- Taxes can directly address the failure of markets to take environmental impacts into account by incorporating these impacts into prices.
- Environmental pricing through taxation leaves consumers and businesses the flexibility to determine how best to reduce their environmental “footprint”.
  - This enables lowest-cost solutions, provides an incentive for innovation and minimises the need for government to attempt to “pick winners”.

### How to design environmental taxes?

- Environmental tax bases should be targeted to the pollutant or polluting behaviour, with few (if any) exceptions.
- The scope of an environmental tax should ideally be as broad as the scope of the environmental damage.
- The tax rate should be commensurate with the environmental damage.
- The tax must be credible and its rate predictable in order to motivate environmental improvements.
- Environmental tax revenues can assist fiscal consolidation or help to reduce other taxes.
- Distributional impacts can, and generally should, be addressed through other policy instruments.
- Competitiveness concerns need to be carefully assessed; coordination and transitional relief can be effective responses.
- Clear communication is critical to public acceptance of environmental taxation.
- Environmental taxes may need to be combined with other policy instruments to address certain issues.

The rest of this guide develops these points in greater detail.



### Why use environmental taxes?

Without government intervention, there is no market incentive for firms and households to take into account environmental damage, since its impact is spread across many people and it has little or no direct cost to the polluter. Therefore, protection of the environment generally requires collective action, usually led by government.

In the past, environmental policy was typically dominated by “command-and-control” regulations. These approaches were generally prescriptive and highly targeted – *e.g.*, banning or limiting particular substances or requiring certain industries to use specific technologies. Over recent decades, interest has grown in using market-based instruments such as taxes and tradable emission permits. There are a number of reasons for the increasing use of environmental taxes.

➤ **Taxes directly address the market failure by “pricing in” environmental costs**

Taxes directly address the market failure that causes markets to ignore environmental impacts. A well-designed environmental tax increases the price of a good or activity to reflect the cost of the environmental harm that it imposes on others. The cost of the harm to others – an “externality” – is thereby internalised into market prices. This ensures that consumers and firms take these costs into account in their decisions.

➤ **Taxes leave consumers and businesses with flexibility to determine the least-cost way to reduce the environmental damage**

Most regulatory approaches involve the government specifying how to reduce emissions or who should do the reduction. Similarly, subsidies and incentives for environmentally preferable goods or practices involve the government steering the economy in favour of certain environmental solutions over others. Both approaches involve the government trying to “pick winners” – directing the market in a prescriptive way. This requires significant information about ever-changing conditions and technologies, and carries significant risk of making suboptimal choices. Regulations generally result in higher costs than taxes, since they force particular types of abatement, even if cheaper alternatives are available.

The higher cost of the polluting activity that results from the environmental tax makes the activity less attractive to consumers and businesses. In contrast to regulations or subsidies, however, a tax leaves consumers and businesses full flexibility to decide how to change their behaviour and reduce the harmful activity. This allows market forces to determine the least-cost way to reduce environmental damage.

For example, many countries impose significant taxes on motor fuels like petrol and diesel because their use contributes to global warming and local air pollution. The resulting increase in the cost of driving a vehicle is an incentive to reduce emissions that could be achieved in a number of ways, in both the short-term and the long-term:

- Drive a smaller or otherwise more fuel-efficient vehicle.
- Drive a vehicle that uses a lower-emission power source, such as a hybrid-electric vehicle.
- Drive less, perhaps by greater use of low- or no-emission alternatives like public transit, cycling, walking, living closer to the place of work, or otherwise changing habits to reduce the need to travel.

The environmental tax provides a greater range of abatement options than instruments such as a regulation requiring a minimum fuel efficiency level for vehicles or a subsidy that privileges electric vehicles, which target only some solutions. Of course, if regulations are tough enough and strictly enforced, they can have significant effects. However, this achievement may be bought at the expense of unnecessarily high costs.



The flexibility of response associated with environmental taxes also provides other benefits:

- **Ongoing incentive to abate.** A target-based or technology-based regulation provides no incentive to abate once the target or technology standard is met. By contrast, environmental taxes provide a continuous incentive to abate at all levels of emissions, even after significant abatement has already occurred.
- **Improves competitiveness of low-emission alternatives.** Environmental taxes increase demand for low-emission alternatives, like public transit and cycling in the case of taxes on automotive fuel. This results in economies of scale that help to make such alternatives more viable, without a need for direct subsidies.
- **Strong incentive to innovate.** Taxes increase the cost to a polluter of generating pollution, providing incentives for firms to develop new innovations and to adopt existing ones. For example, in the example above, the increased demand for more fuel-efficient and alternatively powered vehicles induced by fossil fuel taxes provides an important incentive for automakers to develop such vehicles and for consumers to adopt them. Under regulation-based approaches these incentives disappear once firms have complied with the regulated standard. Enhanced innovation lowers the cost to society of addressing environmental challenges in the long run. (This issue is further discussed in the related OECD brief “*Taxation, Innovation and the Environment – A Policy Brief*”.)

Environmental taxes also have other important features:

- **Transparency.** Well-designed taxes are highly transparent in terms of their coverage and costs. It is generally clear what is taxed, which polluters are exempt, and what the cost to polluters will be per unit of pollution generated. By contrast, the impact of regulations on different firms is typically more difficult to discern, and preferential policies for particular industries or constituencies can be harder to identify.
- **Cost certainty vs. environmental certainty.** Environmental taxes increase the cost of particular products and activities in a fairly direct and generally predictable way. This makes it easier to judge the first order financial impact on consumers and firms. It is somewhat more difficult, however, to predict how they will react to such price changes, and thus to determine the quantum of the environmental impact. By contrast, with regulatory approaches such as technology prescriptions, emissions standards and renewable portfolio standards, the first order impact on emissions may be easier to ascertain, but there tends to be less clarity about financial impacts. Second-order effects, however, increase the complexity of determining longer-term results in both cases, reducing the dichotomy.

### Environmental Tax Incentives

An alternative to taxing environmental “bads” is to provide tax relief for environmental “goods”. The tax system can be used to subsidise environmentally beneficial goods or actions by, for example, VAT exemptions for energy-efficient appliances or favourable depreciation rates for capital investments in renewable energy or pollution abatement.

Like other subsidies, however, tax expenditures have a number of important limitations:

- Since it is difficult to subsidise all the environmentally beneficial alternatives to the harmful activity, tax subsidies inevitably involve “**picking winners**”, which may prejudice other good alternatives. For example, unlike a tax on road fuel, a subsidy for low-emission vehicles does not provide any incentive for commuters to consider alternative forms of transportation such as public transit or cycling.
- By reducing costs, tax subsidies **may indirectly increase pollution**. For instance, unlike a tax on vehicle emissions or road fuel, a subsidy for hybrid electric vehicles may encourage people to drive more.



- Subsidies are **costly**, and have to be paid for by other taxpayers, reducing their real disposable incomes. Further, since it is difficult to restrict the benefit of subsidies to those who required the subsidy to induce them to undertake the environmentally preferred activity, a significant portion of the cost typically relates to “**free-riders**” – those who would have undertaken the activity even without a subsidy.
- The fiscal cost of tax subsidies tends to be **less transparent** than direct spending, and they are often not subject to the same level of legislative scrutiny as spending programmes.

### *How to design effective environmental taxes*

Effective implementation of “green” taxes requires careful consideration of a number of factors. Poorly designed taxes can have a reduced environmental effect and higher economic costs.

#### *Defining the tax base*

##### ➤ **Environmental tax bases should be targeted to the pollutant or polluting behaviour**

An environmental tax generally should be levied as directly as possible on the pollutant or action causing the environmental damage. Using the tax to increase the market cost of the polluting activity helps to incentivise the full range of potential abatement options: cleaner production processes; end-of-pipe abatement (*i.e.*, measures to capture and neutralise emissions before they enter the environment); adoption of existing products which cause less pollution; development of new, less-polluting products; and reducing output or consumption.

The available abatement options tend to be reduced if the tax is not levied on the polluting activity itself but rather on proxies. For example, if a tax to reduce sulphur emissions is levied on an intermediate good such as coal (an important source of sulphur emissions), it provides no incentive to deploy end-of-pipe technology such as scrubbers or to adopt cleaner production processes that would reduce sulphur emissions from coal use.

In other cases, however, a close proxy for the polluting activity can provide a good tax base. For example, it would be very difficult to tax directly the emissions from motor vehicles because of the administrative cost of measuring emissions from individual vehicles. Since the release of carbon into the atmosphere is highly correlated with fuel use, however, taxes on motor vehicle fuels are efficient proxies for taxing CO<sub>2</sub> emissions, since the CO<sub>2</sub> intensity of petrol and diesel combustion is essentially fixed (at least in the absence of carbon capture and storage). These taxes can also be collected efficiently at the level of the refinery or wholesaler. By contrast, for pollutants such as NO<sub>x</sub> emissions, where the level of emissions varies across different combustion processes, levying the tax at higher levels of the supply chain would not treat the full range of solutions equally.

An additional concern with levying taxes on intermediate goods is that the implicit tax rates on emissions are not necessarily transparent, which can contribute to mis-specification of tax rates. For example, a “carbon” tax of a fixed amount per litre that applies to both gasoline and diesel would not reflect the fact that a litre of diesel produces more CO<sub>2</sub> emissions than a litre of gasoline. This kind of mis-specification can weaken the efficacy of carbon taxes by implicitly favouring a “dirtier” fuel.

A poorly designed environmental tax that does not bear directly on the source of environmental damage can impose additional economic costs. A general principle of taxation is that taxes should as far as possible be levied on final production, consumption and incomes. Taxes levied on intermediate products impose additional economic costs by distorting methods of production. Of course, the aim of environmental taxes is precisely to provide incentives to change production techniques to make them less polluting. Hence the





importance of good environmental tax design to ensure that they do just that; and do not introduce other distortions to production technologies.

### *The scope of an environmental tax*

- **The scope of an environmental tax should ideally be as broad as the scope of the environmental damage**

The appropriate scope of an environmental tax depends on the scope of the environmental damage being addressed. This has implications for the level of the political jurisdiction that imposes the tax. For some problems, like soil contamination, the impacts are generally limited to a relatively small area. Therefore, a tax or charge on waste disposal or harmful garden chemicals might effectively be imposed at the level of a municipality or township.

At the other extreme, greenhouse gas emissions from one location contribute to atmospheric changes that affect climate on a global basis. Such a problem therefore would ideally be addressed by a global tax. An intermediate case is an issue like air or water pollution, where the effects of pollution at one location may be felt over a region that might implicate one or more sub-national jurisdictions and even potentially one or more countries. The fact that it is not always politically feasible to apply taxes uniformly across multiple jurisdictions gives rise to a number of issues that are dealt with below in the discussion on competitiveness.

### *Broad base, consistent incentives*

- **Environmental taxes should apply uniformly with few (if any) exceptions**

One of the advantages of environmental taxes is their ability to provide similar abatement incentives on every unit of pollution. Homogenous taxes encourage abatement at the lowest-cost source, helping to ensure that environmental goals are achieved at the lowest social cost. A tax applied on a uniform basis also minimises the costs of compliance for taxpayers and the costs of administration for government, and reduces the opportunities for tax evasion.

Nevertheless, policy makers need to consider the impact of such taxes on groups such as low-income households or pollution-intensive, trade-exposed businesses. Lower tax rates or exemptions are sometimes put into place to limit impacts on such groups. This reduces the incentive provided by the tax for some but not others. Differing incentives increase the costs of meeting a given environmental target since abatement falls disproportionately on some polluters, creating a different kind of inequity.

Governments should therefore try to implement environmental taxes as broadly as possible, with few or no exemptions. It is usually preferable to address distributional impacts outside the tax in order to preserve the incentive effect of the tax. These points are discussed further below in the discussions on distributional and competitiveness impacts.

### *Setting the tax rate*

- **The tax rate should be commensurate with the environmental damage**

The tax rate should generally be set to reflect society's value of the environmental damage, other negative spillover effects of the activity, as well as the need to raise public revenues:

- **Reflecting environmental damage.** Setting the tax rate to reflect the environmental damage ensures that prices faced by producers and consumers reflect the environmental cost of their actions. This provides them with a financial incentive to take those impacts into account in their decisions. Some environmental damages are relatively easy to measure – e.g. damage from acid rain to commercial



timber production. The valuation process can be more difficult, however, where the damage is done to something that does not have a clear market value, like clean air or biodiversity. Given the implications of the environment for human health, calculations based on the value of human life and of quality of life are implicit in this valuation process. The process is easier when a specific environmental outcome is adopted as a target as the tax rate can be derived to achieve this target, especially where the target is to reduce the rate of flow of environmentally harmful emissions by a given amount, or to a given rate. Where the target is a stock, such as a ceiling on atmospheric concentrations of greenhouse gases, *e.g.* 450 ppm CO<sub>2</sub>e, there may be a number of different time paths to the same objective, with the degree of success in the short to medium term influencing how high tax rates would need to be in the long run.

- **Reflecting non-environmental externalities.** The activities on which environmental taxes are levied are often associated with other social impacts. For example, while the burning of fuel in motor vehicles contributes to climate change and results in local air pollution that can cause respiratory problems, vehicle use also creates traffic congestion, causing negative economic and social repercussions due to wasted time, and is a source of injury when accidents occur. A number of different instruments may then be required, including, for instance, road pricing. In the absence of an ideal set of policy instruments, determining the appropriate rates for the available environmental taxes becomes more complex given the trade-offs between not adequately correcting externalities and the risks of introducing other distortions in production techniques.
- **Raising revenue.** Governments also levy explicit environmental taxes and other taxes on environmentally related bases simply for the purpose of raising revenue to fund public spending. Many environmentally related taxes (*e.g.* on motor fuel and motor vehicles) are prime candidates for such taxation, given that the imposition of taxes tends to have only a modest impact on demand *in the short-run* (*i.e.* demand is relatively inelastic). The revenue-raising objective may result in tax rates for environmentally related taxes that are higher than the estimated value of the social externalities. Such tax rates increase the cost of certain activities or goods beyond the “correction” needed to incorporate externalities. In the case of final consumption, this may be justified where elasticities (and the associated deadweight efficiency losses) are sufficiently small. However, there are likely to be distortionary effects from taxing intermediate products (such as commercial transport, wholesale and retail trade, etc.).

Other environmental policy instruments, such as consumer subsidies, typically have a much higher implicit cost than the optimal tax required to achieve the same reduction in pollution. For example, in an analysis of European countries, it was found that applying reduced VAT rates to energy-efficient refrigerators would lead to a reduction in CO<sub>2</sub> emissions of 1.6 million tonnes over an average fifteen-year life. This would cost treasuries EUR 119 million in foregone revenues, implying an implicit carbon price of EUR 73 per tonne of CO<sub>2</sub> avoided. This considerably exceeds the estimated implicit carbon price under the EU emission trading system of EUR 15 - 25 per tonne of CO<sub>2</sub>.

### *Policy credibility and predictability*

#### ➤ **The tax must be credible and its rate predictable in order to motivate environmental improvements**

Environmental policy, especially taxes, can affect pollution abatement through both short-term and structural responses. In the short-term, firms may reduce output and consumers may adopt less polluting behaviours in response to price changes, including those induced by tax changes. If the changes were quickly reversed, however, economic agents could easily resume former behaviours without much cost or effort.

Structural responses are more fundamental changes with longer-term consequences, such as changes to decisions relating to capital investment, innovation programmes or purchases of housing and consumer durables. These changes depend on households', firms' and investors' long-term views and expectations, especially about prices. For an environmental tax to induce structural changes in abatement and innovation



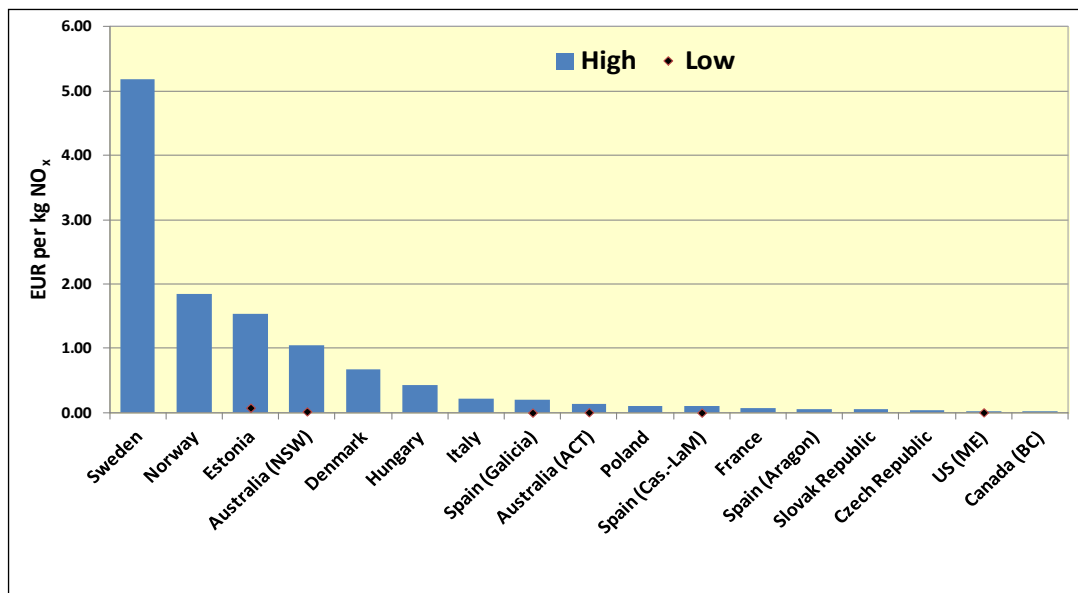
efforts, the policy must be credible – the public must be convinced that the government has ‘done its homework’ and is committed to implementing the tax. Planning, dialogue with stakeholders and clear communication are important tools for building such credibility.

### Environmental Tax Rates in Practice

What is the actual experience with environmental taxes? Except for taxes on motor vehicles and motor vehicle fuels, the rates of environmentally related taxes in OECD countries are typically low and in most cases below the value of the relevant damage. Few OECD economies are at risk of levelling environmentally related taxes that are too high. The disparity between tax rates in different jurisdictions can also be striking, as shown by this graph of taxes on nitrous oxide emissions.

#### Taxes on NO<sub>x</sub> emissions to air

As of 01.01.2010



One advantage of environmental taxes is that they can provide greater cost predictability for market participants than other instruments. Predictability is aided by a clear process for establishing the tax rate. It is sometimes helpful to phase in an environmental tax gradually, with the rate gradually being increased to the “mature” level according to a pre-announced schedule. This allows economic actors time to adjust.

Once set, tax rates should continue to reflect a range of factors, including: inflation and real economic growth; citizens’ changing preferences for environmental protection; and the effect of innovation on the cost of pollution abatement. The process of updating tax rates should be transparent so that the public understands the potential determinants and timing of future modifications. Denmark, for instance, has recently built such a feature into their system: excise taxes on environmentally related bases will now be automatically indexed to annual inflation, removing the need for ad hoc adjustments at typically infrequent intervals.

### Using the revenue generated

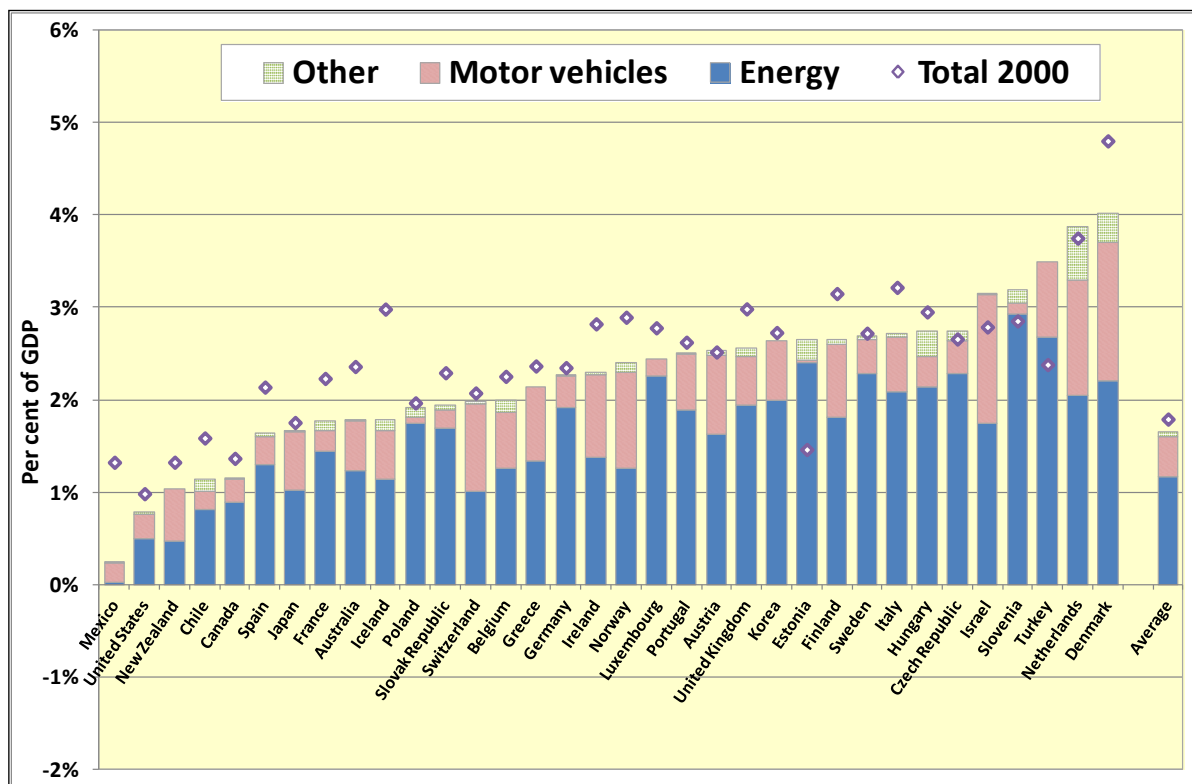
#### ➤ Environmental tax revenues can assist fiscal consolidation or help to reduce other taxes

Most environmentally related taxes do not raise significant revenues for governments. Most of the revenue from environmental bases is drawn from only a few taxes and charges, including CO<sub>2</sub> (energy) taxes and taxes on driving (fuel, vehicles and tolls). This is illustrated in the graph on the next page.



Environmentally related taxes account for approximately 5% of total tax revenues in OECD countries. Moreover, the intent of these taxes is to shrink the tax base, in contrast to most other taxes which attempt to raise revenues at least cost to the base. On the other hand, the scale of the reduction in greenhouse gas emissions needed if atmospheric concentrations are to be limited to, say, 450 ppm CO<sub>2</sub>e, is so great that (once sufficient international co-operation is in place) tax rates on fossil fuels in particular may have to be much higher than at present, and thus generate significantly more tax revenues for at least the foreseeable future.

### Revenues from environmentally related taxes in per cent of GDP, by tax-base. 2000 and 2009



Generally, revenue from environmental taxes should be treated as general government revenue and used to maintain spending in other areas, reduce debt, or reduce taxes. While in theory some of the revenues could be used to compensate those most affected by the environmental damage, in practice this may not be possible:

i) measuring the impact of environmental damage from a range of pollutants on individuals is extremely difficult;

ii) the environment itself is a public good with the impacts of environmental damage spread widely, suggesting that revenues could be deployed widely to offset increased costs for hospitals, adaptation to environmental damage, etc; and

iii) many environmental issues also have significant intergenerational aspects.

It is sometimes suggested that “earmarking” revenues from an environmental tax – *e.g.* to fund public spending on environmental innovation or subsidies – can help to increase the political acceptability of the tax. In practice, however, the level of revenues from a particular tax is unlikely to track the appropriate level of spending in a particular policy area, resulting in under-funding or over-funding or continual adjustments in the tax rate. As a matter of fiscal planning, therefore, it is normally more prudent for governments to manage their individual revenue sources and spending needs independently. This does not, however, prevent a new tax from being linked in a general sense with a roughly offsetting “use” of the new revenues earned.





At one point, there was considerable interest in the potential of a “double dividend” from environmental taxes. According to this hypothesis, “green” taxes would yield environmental improvements – the first dividend – and the revenues could be used to reduce the effects of existing distortions in the tax system – the second dividend. This argumentation does not take into account that an environmental tax may itself distort tax bases, or accentuate pre-existing distortions, with adverse effects on economic activity. For instance, an environmental tax will increase production costs. This may mean that other factors of production get paid less (e.g. lower wages) or costs get passed on to consumers. Nonetheless, using part of the revenues to offset some of these effects, for example by reducing personal and corporate income tax rates, can help to offset some of the unintended effects of environmental taxes while creating a tax system that is less damaging to economic growth. (Environmental regulations would similarly reduce real wages and push up prices – and probably by a greater amount – albeit less transparently and with no additional government revenues available to offset such effects.)

In a political economy context, a reduction of other taxes can also help to garner political support for environmental taxes. The Climate Change Levy in the United Kingdom was announced simultaneously with a 0.3 percentage point reduction in employers’ social security contribution rates. In Canada, revenues from British Columbia’s carbon tax are explicitly “recycled” by way of targeted and general reductions in corporate and personal income taxes. More direct approaches have seen cheques being sent to all households to accompany a “green” tax implementation. Revenues can also be used to offset some of the more direct effects of environmental taxation, such as distributional aspects, as outlined in the following section.

### *Overcoming challenges to implementing environmental taxes*

Given that the effective incidence of environmental taxes is likely to differ from their formal incidence (e.g. because of the pass-through to wages and prices) addressing distributional and competitiveness concerns can be a significant challenge.

#### *Addressing distributional concerns*

##### ➤ **Distributional concerns can and generally should be addressed through policies outside the tax**

Environmental taxes often give rise to distributional concerns. For example, increased taxes on water usage or on fossil-based energy for heating or transportation could have a particularly significant impact on low-income households. The first inclination in such cases is often to reduce the burden of the tax on such segments of society. For example:

- i)* households may be exempted from the tax, as under the United Kingdom’s Climate Change Levy;
- ii)* a reduced rate may be applied to economically depressed regions, such as with a reduction of duties on natural gas for Southern Italy; or
- iii)* a progressive rate structure, based on the amount consumed, may be used (e.g. for water or electricity) to provide reduced rates on “necessary” consumption and apply full rates on subsequent consumption.

Attempting to address both environmental issues and distributional concerns within the tax itself risks undermining the ability of the tax to do either. For example, an exemption for low-income families from a tax on heating fuel eliminates the incentive otherwise provided to economise on fuel use and to consider alternatives. Moreover, while these features are typically intended to be progressive, their impact may sometimes be regressive since the wealthy tend to use more of the affected commodities like fuel.

Rigorous analysis is important to determine the actual impact of an environmental tax, which may not always be obvious. Where there are significant negative impacts on, for example, low-income people, these usually are better addressed by other redistributive policy responses such as lowering personal income taxes, supplementing low-income supports within or outside the tax system, or even providing “green cheques”. This



approach preserves the incentives created by the environmental tax, reduces its administrative complexity, and can take advantage of existing redistribution platforms.

### *Preserving competitiveness*

➤ **Competitiveness concerns need to be carefully assessed; coordination and transitional relief can be effective responses**

By seeking to reduce polluting behaviours, environmental taxes by definition are intended to alter production decisions and to have a disproportionate impact on polluters. There are concerns, however, that high rates of environmental taxation can encourage businesses to relocate to lower-taxed jurisdictions or result in them being subject to “unfair” competition from foreign firms that are not subject to similar policies. If the type of pollution in question has only a local, regional or national impact, then the jurisdiction to which businesses relocate will presumably be prepared to accept a higher level of pollution than the taxing jurisdiction. However, in the case of emissions such as greenhouse gases, relocation to a low or no tax jurisdiction would cause economic detriment in the taxing country, with minimal environmental gain. This is one part of what sometimes referred to as “carbon leakage” in the climate change context.

Competitiveness impacts need to be carefully evaluated. These impacts need to be placed in the context of the myriad factors affecting business location decisions and business competitiveness if their true significance is to be assessed. Where the expected impacts are in fact material, various policy strategies have been developed to preserve competitiveness when environmental taxes are introduced:

- **International co-ordination in environmental policies** so that gains from relocation are reduced. The OECD estimated that if the European Union were to act alone to cut CO<sub>2</sub> emissions by 50% of 2005 levels by 2050, carbon leakage would be 11.5%. With all Annex I countries of the Kyoto Protocol acting to achieve this target, leakage would be only 1.7% in 2050. There is less rationale for co-ordinated global action for pollutants that are more local in nature, such as NO<sub>x</sub> and SO<sub>x</sub>, given that the optimal rate of taxation will likely differ between countries and regions. In such cases, it may be difficult to address the competitiveness concerns of industries situated in regions where tax rates are, or should be, high (for example, because of pre-existing levels of local pollution).
- **Provision of a transition period** to allow affected firms to undertake mitigation measures. A lead-in period can enable firms to revise their operations and invest in new capital without being penalised for historical decisions. An escalating tariff over a set time-period can also ease the initial burden of an environmental tax and leave financial flexibility for firms to invest in mitigation or R&D.
- **Recycling revenues** from environmental taxes to affected firms (on a basis different from the collection). In this way, the marginal abatement incentive is generally maintained, even though the average firm is little worse off financially. Such mechanisms, however, violate the polluter pays principle since production costs are effectively subsidised for relatively pollution-intensive goods and processes.
- **Rate reductions and exemptions for energy-intensive users.** This shifts some of the abatement burden to other users or results in a lower environmental outcome, providing an implicit subsidy to environmentally harmful activities.
- **Border adjustment taxes or tariffs** on imported products to place domestic and imported goods on a level playing field. While such policies may in some cases be compliant with trading rules of the World Trade Organization, real-world implementation issues make this a highly contentious topic. Comparing complex domestic policies with the policy context of different exporting countries and then setting a compensating figure for the thousands of import codes poses many challenges. These policies also risk aggravating international dialogue to liberalise trade. As international co-ordination grows, these measures should become significantly less important.



### *Gaining trust and communicating a plan*

#### ➤ **Clear communication is critical to public acceptance of environmental taxation**

Past environmental tax plans have sometimes been greeted with public suspicion that the tax is more a “revenue grab” than a plan to achieve environmental outcomes. Business groups whose profits might be adversely affected by higher taxes may lobby hard against such taxes, stressing the potential losses to consumers and the competitiveness of the economy.

In the mid-1990s, a number of European countries undertook significant “ecological tax reforms” to varying degrees of success. In all cases, the path to implementation was not smooth and there were significant barriers. Focus group assessments of ecological tax reform in Denmark, Germany, the United Kingdom and France, as well as in Ireland, where ecological tax reform did not take place, highlighted significant commonalities:

- i)* lack of knowledge about the overall scheme;
- ii)* citizens were highly sceptical about governments using the funds to reduce other taxes and instead felt that ecological tax reform was a guise to generally increase taxes;
- iii)* the connection between the introduction (or augmentation) of environmental taxes and reduction in other taxes was perceived as not necessarily appropriate;
- iv)* according to taxpayers, the revenue should be used for environmental purposes.

These findings suggest that open, transparent communication of all elements of the plan – including the use of revenues, distributional and competitiveness impacts, and how the government intends to deal with them – are a key to successful implementation. The utilisation of independent green tax reform commissions can help to ensure that the policy prescriptions are perceived as credible and not as politically driven.

### *Environmentally related taxes alone are not the answer*

#### ➤ **Environmental taxes may need to be combined with other policy instruments to address certain issues**

Despite the advantages of environmental taxation, taxes alone cannot always bring about the intended environmental outcome. Distortions within the economy may prevent optimal actions from occurring. In such circumstances, additional policy tools may be needed to provide an optimal instrument mix. Three examples of when other policy measures may be required are illustrated below.

- **Consumers may be unaware of the environmental impacts of their purchases.** This is generally true of a wide range of goods, but in particular of large household appliances, where consumers often have little sense of the ongoing energy costs required to operate them. Therefore, the imposition of a tax on energy may not induce changed behaviour or altered consumption patterns because consumers are not able to evaluate how the tax affects utility bills. This information constraint can be overcome through, for example, government schemes that provide easy-to-understand and comparable information on energy consumption across different household appliances.
- **Incentives that are not fully realised can limit the scope for enhanced environmental performance.** Tenants that pay utility bills have an incentive to minimise their energy use; however, many of the most efficient ways to do so are the responsibility of the landlord: *e.g.* insulation, or replacing aging windows. If the landlord does not pay the energy bills, there are fewer incentives to undertake investments. For the tenant, the transitory nature of renting makes it unlikely such investments will be profitable. In similar cases, taxes would not have as great an impact as on owner-occupied housing so changing building codes may be more efficient in achieving the environmental objectives.



- **Innovation plays a critical role in delivering improved environmental outcomes at lower costs.** Environmentally related taxes can encourage the development and adoption of market-ready innovations; however, the breakthrough technologies that will lead to fundamental environmental improvements are less likely to be developed under a tax-only regime than under a regime that includes particular incentives for research and development. The long-term and more fundamental nature of such projects creates uncertainty for investors and entails a high probability of failure. In such cases, environmental taxes may need to be supplemented by targeted investments in R&D.

Therefore, using a range of policy tools can play an important role when they are mutually reinforcing and do not apply similar deterrents to the same environmentally harmful activity.

On the other hand, if multiple environmental policy instruments in respect of the same pollutant overlap, they can have a negligible effect or, more perversely, distort abatement and innovation decisions, leading to a less efficient overall strategy. It was for such reasons, for example, that the advent of the European Union's carbon emission trading system (ETS) encouraged the Danish government to abolish carbon taxes on emissions that are covered by the ETS.

### *Conclusions*

Environmental taxation has a significant role to play in addressing environmental challenges. Taxes can be extremely effective when they are properly designed, are levied as close to the environmentally damaging pollutant or activity as possible, and are set at an adequate rate. Administration costs or barriers may necessitate the taxation of proxies to environmentally harmful activities, but care should be taken to ensure this does not impair environmental outcomes. The revenues generated can be used to help with fiscal consolidation or reduce other tax rates. Environmental taxes give rise to distributional or competitiveness concerns, but these are usually best addressed through other policies tools. Providing information, transparency, and certainty is critical to public acceptance and to the effectiveness of environmental taxation. Finally, taxes may need to be combined with other instruments to obtain the most efficient and effective environmental policy package, but care should be taken to assess the impact of overlapping instruments.

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For more information, please see *Taxation, Innovation and the Environment* available at [www.oecd.org/env/taxes/innovation](http://www.oecd.org/env/taxes/innovation), or contact:

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