

Towards more environmental taxes ?

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Introduction

In recent decades, there has been a considerable increase in the attention paid to both local and international environmental issues. On an international level, the depletion of fossil fuels, the availability of drinking water, and global warming caused by emissions of CO₂ and other greenhouse gases have become hot topics.

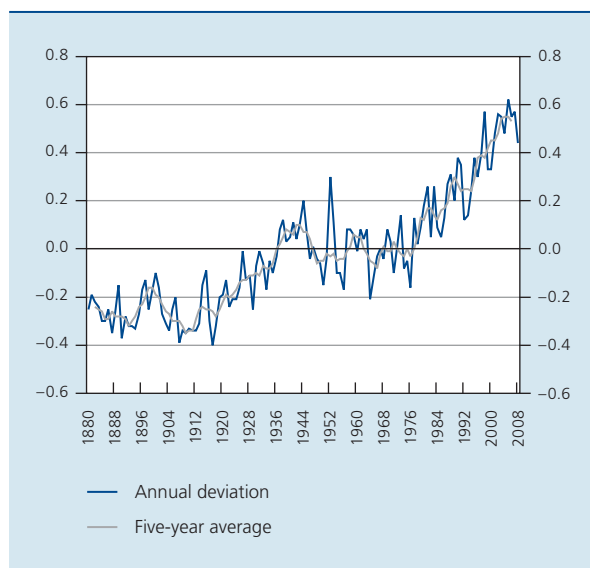
During the last century, the average temperature gradually increased. Most scientists agree that there is a link between human activity and global warming. For instance,

the concentration of greenhouse gases in the Earth's atmosphere is rising as a result of the burning of fossil fuels, deforestation, and certain industrial and agricultural activities. In its fourth report in 2007, the United Nations Intergovernmental Panel on Climate Change stated that the temperature could rise by more than 3 degrees Celsius between now and 2100. In that same year, the influential Stern Review described the economic implications of global warming, which is expected to have a serious impact: rising sea levels, damage to ecosystems, falling agricultural productivity as a result of longer periods of drought, drinking water shortages, the spread of diseases such as malaria, more frequent extreme weather events such as flooding and hurricanes, etc. The report therefore argues that the advantages of immediate action to curb greenhouse gas emissions far outweigh the costs involved.

Various international institutions have developed activities relating to environmental protection, in view of the geographical spread of the causes and effects of a number of environmental problems. In 1992, in Rio de Janeiro, the Framework Convention on Climate Change was adopted under the aegis of the United Nations, with the aim of cutting greenhouse gas emissions and thus avoiding or limiting the adverse impact of climate change. Under that Convention, the Kyoto Protocol was concluded in 1997, whereby the industrialised countries agreed to reduce their emissions of six greenhouse gases by at least 5 p.c. between 2008 and 2012, compared to their 1990 level. In December 2009, in Copenhagen, an effort will be made to conclude an agreement on reducing emissions for the post-2012 period.

Clearly, the environmental challenges in the decades ahead will be very considerable. Governments have a key role to play here, and have a wide range of instruments

CHART 1 TEMPERATURE OF THE EARTH'S SURFACE
(deviation from the average 1951-1980)



Source : Godart Institute for Space Studies.

available for achieving environmental objectives. A distinction is usually made between regulatory instruments, such as prohibitions or technological standards imposing mandatory rules, and market instruments such as environmental taxes, subsidies or systems of tradable emission rights, where the aim is to reduce pollution by adjusting relative product prices. Softer instruments can also be deployed, such as raising public awareness, or preventive measures. When selecting which to use, it is necessary to weigh up the advantages and disadvantages of each instrument for each type of pollution. In the case of very harmful products, prohibition could clearly be the most efficient approach. However, in some cases, market instruments are the cheapest way of achieving the desired reduction in pollution. Moreover, international institutions favour the “polluter pays” principle: this was included in the EU Treaty, and was accepted by the OECD as long ago as 1970. In the market instrument category, environmental taxes or tradable emission rights are therefore the preferred option, rather than subsidies which do not conform to that principle.

This article focuses first on the implications of choosing market instruments, and in particular environmental taxes, rather than more traditional instruments such as regulations. Next, it examines the changes which have occurred in the application and scale of environmental taxes in the EU. It also looks at environmental taxes in Belgium, and considers the Kyoto Protocol and the system of trading CO₂ emission rights in the EU. Finally, the article draws some conclusions.

1. Environmental taxes as a policy instrument: theoretical background

1.1 Theory of environmental taxes

Excessive environmental pollution may be caused by the failure of market forces, owing to the existence of negative external effects accompanying certain forms of production and consumption. Negative external effects are the damage done to society without the producer or consumer having to compensate for that damage. The producer or consumer consequently receives a price signal which is too low, and produces or consumes an amount which is excessive from society's point of view.

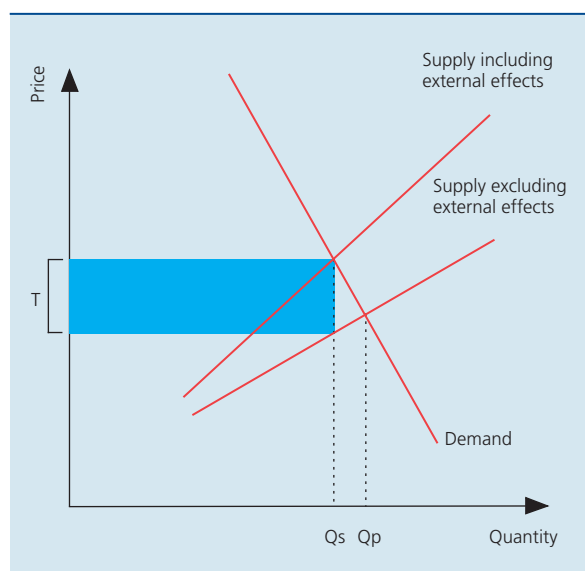
A traditional environmental tax – also known as a “Pigovian tax” – is based on the welfare theory, and tries to correct this false price signal in order to bring the level of production and consumption of a particular product down to its social optimum. Owing to the failure of the

market, the marginal costs on which the producer bases his supply of a product are lower than the marginal costs to society, which include the negative external effects of pollution. Without the tax, the price of the product is determined on the basis of consumer demand and the supply excluding external costs. Introduction of a tax (T) per unit of product makes it possible to internalise the negative external effects. The tax ensures that consumption is reduced to the point where consumer demand intersects with the supply including external effects. The decline in consumption of the product (from Q_p to Q_s) is accompanied by an increase in the price, and tax revenue equal to $T \times Q_s$. In many cases, this tax revenue is quite considerable, because environmental taxes are often levied on products which are price inelastic, which means that the quantity consumed varies little in response to the price of the product.

It should be noted that the aim is not necessarily zero tolerance where pollution is concerned, but rather a level of pollution which is acceptable in economic terms, taking account of the costs for current and future generations. It is not easy to determine the amount of the tax, the proceeds of which accrue to the government, or the optimum level of pollution.

Environmental taxes and systems for trading emission rights may be very similar in their effects. If an environmental tax per unit of product T results in a quantity of output Q_s , the same result can be achieved by providing tradable emission rights for that level of production which, on a competitive market, will result in a price for the emission rights corresponding to T per unit of output.

CHART 2 INTERNALISATION OF EXTERNAL EFFECTS BY INTRODUCTION OF AN ENVIRONMENTAL TAX



Furthermore, the level of pollution reduction and its distribution among firms will be the same for both types of instruments. In both cases, the firms concerned will face additional costs T per unit of output, so that firms will reduce their pollution so long as that costs them less than T . If such a reduction in pollution is too expensive, on the other hand, they will opt to purchase emission rights or pay the environmental taxes. If the emission rights are bought by competing bids, the proceeds for the government will be the same as the revenues generated by an environmental tax.

However, implementation of the two instruments may result in very different practical effects. For example, tradable emission rights that can be effectively enforced safeguard an overall level of greenhouse gas emissions, but owing to the uncertainty over the costs entailed for firms in cutting emissions, they may impose very heavy costs on those firms. Conversely, while environmental taxes imply a ceiling on the marginal costs of cutting pollution per firm, they cannot offer any guarantees regarding the total volume of emissions.

1.2 Advantages and disadvantages of market instruments

As already stated, governments have a wide range of instruments for designing their environmental policy. In certain cases, there are a number of advantages in using market instruments, especially environmental taxes.

Thus, market instruments can ensure that where the cost of reducing pollution differs from one firm to another, pollution is reduced in those where that process is least expensive. Firms which already use the latest green technologies will no longer have to research other expensive ways of achieving further reductions in their pollution, but will have the option of paying the tax. Conversely, firms using older, more polluting technologies will be more inclined to reduce their tax bill by switching to newer, cleaner technologies, thus helping to curb pollution. In general, it is far more difficult for non-market instruments to deliver an equally efficient reduction in pollution, particularly owing to the absence of the detailed information which would be required for each firm. Another advantage of market instruments is that there is no need for individual negotiations with each firm.

Environmental taxes also provide a permanent incentive to continue seeking new methods which further reduce pollution, or to speed up the implementation of new technologies, and in so doing to reduce the tax bill. Fixed targets for pollution or emissions will not encourage

firms to make an extra effort once they have met those targets.

Finally, the revenues generated by the introduction of an environmental tax can be used to reduce other levies, particularly taxes on labour, and thus gaining a double advantage. An improvement in the environment would then be accompanied by a stronger competitive position and higher employment. However, the creation of this "double dividend" clearly depends on the exact way in which the reform is implemented. If the higher prices resulting from the introduction of the environmental taxes are passed on directly in wages, this effect will be largely lost and could actually become negative.

However, the use of market instruments also has its drawbacks.

If the impact of the pollution is dependent on the location, timing or method of production and consumption, it can sometimes be very complicated to take that into account in designing a differential rate of tax, and it may be expedient to use other instruments which curb production or consumption at that location or time.

Moreover, it is sometimes difficult to secure widespread support from the public for environmental taxes, owing to the associated price increases, even though this approach generates tax revenues and reduces consumption or production to levels more acceptable to the community. An environmental tax may also cause firms to close down; in that case, there are of course serious social consequences.

In addition, environmental taxes are generally regressive, which means that – in relative terms – the financially vulnerable sections of the population shoulder more of the tax burden. This can be overcome by devising compensatory measures, but in that case, it is essential to preserve the price signal.

Finally, the additional costs of environmental taxes for firms operating internationally may cause competition problems or lead to relocation of the activities and pollution to regions where taxation is low or non-existent. However, the same concern applies to the use of non-market instruments. Cooperation via international organisations offers a way of endeavouring to limit such relocation.

Since environmental policy is generally very complicated, it is common to use a mix of instruments, e.g. taxation combined with regulations which restrict the location of production or consumption, or limit certain types of pollution.

2. Environmental taxes in the EU

2.1 Statistical definition of environmental taxes

In order to improve the international comparability of data on environmental taxes, Eurostat, the OECD and the International Energy Agency have developed a harmonised statistical framework in which the allocation of government revenues to the environmental tax category is determined exclusively by the tax base. The definition applied by these institutions reads: "An environmental tax is a tax whose tax base is a physical unit that has a proven specific negative impact on the environment." The assessment takes no account of the government's aim in introducing the tax. Owing to the statistical problems of identification, the VAT due on these goods is not regarded as an environmental tax.

Like other taxes, environmental taxes are compulsory payments to the government without any direct counter-consideration. They are therefore different from charges which imply the existence of a counter-consideration and are viewed as payment for a service. For instance, the price paid for household refuse disposal is regarded as payment for the collection and processing of household refuse, so that the proceeds are not recorded as an environmental tax. The way in which the systems are organised is also a factor. In some countries, the systems of

charging tolls on motorways are run by private operators and are not included at all in the public sector accounts. These differences hamper international comparison of environmental taxes.

The problem of comparability can also be illustrated by the sewage charges paid by Belgian households, charges which used to be collected and recorded by the regions as taxation. These charges are no longer collected by the regions, but the sewage treatment costs are included in the water bills issued by the water supply companies. This means that these charges have disappeared from the government accounts, but the water supply companies' customers in fact pay the same amount for their sewage treatment.

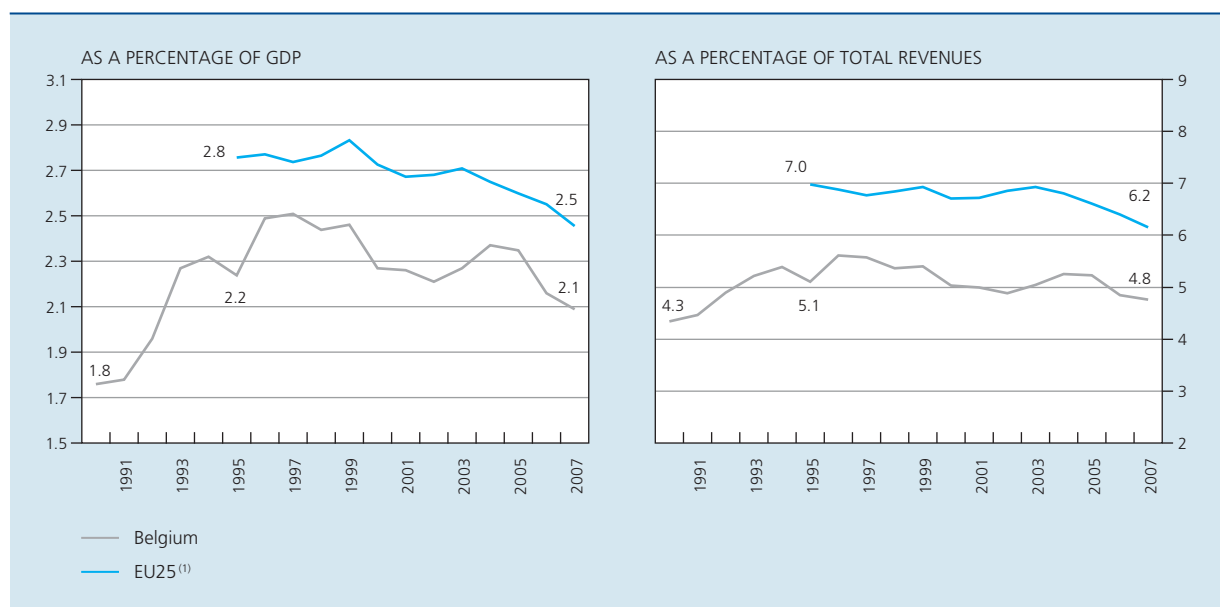
Finally, it should be noted that environmental taxes may generate substantial proceeds as a result of either a low tax on a high level of pollution, or a high tax on a lower level of pollution. An in-depth analysis of the data must therefore always be based on comparison of the actual rates of the environmental taxes.

2.2 Use of environmental taxes in the EU

2.2.1 Trends in environmental taxation

Although environmental taxes have long been the focus of attention, their importance has not increased in recent years. Between 1999 and 2007, the amount represented

CHART 3 LEVEL OF ENVIRONMENTAL TAXATION



Source: EC.

(1) Weighted average.

by these taxes in the EU as a whole declined from 2.8 to 2.5 p.c. of GDP. In Belgium, in the first half of the 1990s, their weight increased strongly, peaking at 2.5 p.c. of GDP in 1997, a level which was regained in 1999. Since then, there has been a decline in the proceeds from these taxes, down to 2.1 p.c. of GDP in 2007.

Although the past decade has brought a decline in the proceeds from environmental taxes, there does seem to be a tendency towards more widespread application of such taxes. In the 1990s, excise duties were levied almost exclusively on petroleum products, but since then, the range of environmental taxes has been considerably extended. Apart from Luxembourg and Portugal, where environmental taxes are confined to petroleum products and vehicle ownership or use, all other EU15 countries have introduced at least one other environmental tax.

On the basis of the progress of environmental taxation in the EU, there seems to have been no question of any large-scale green tax reforms. It was only in the late 1990s that the tax systems in most EU countries acquired an ecological slant, but after that the significance of environmental taxation again declined. The reason for this tendency could be that environmental taxes are usually

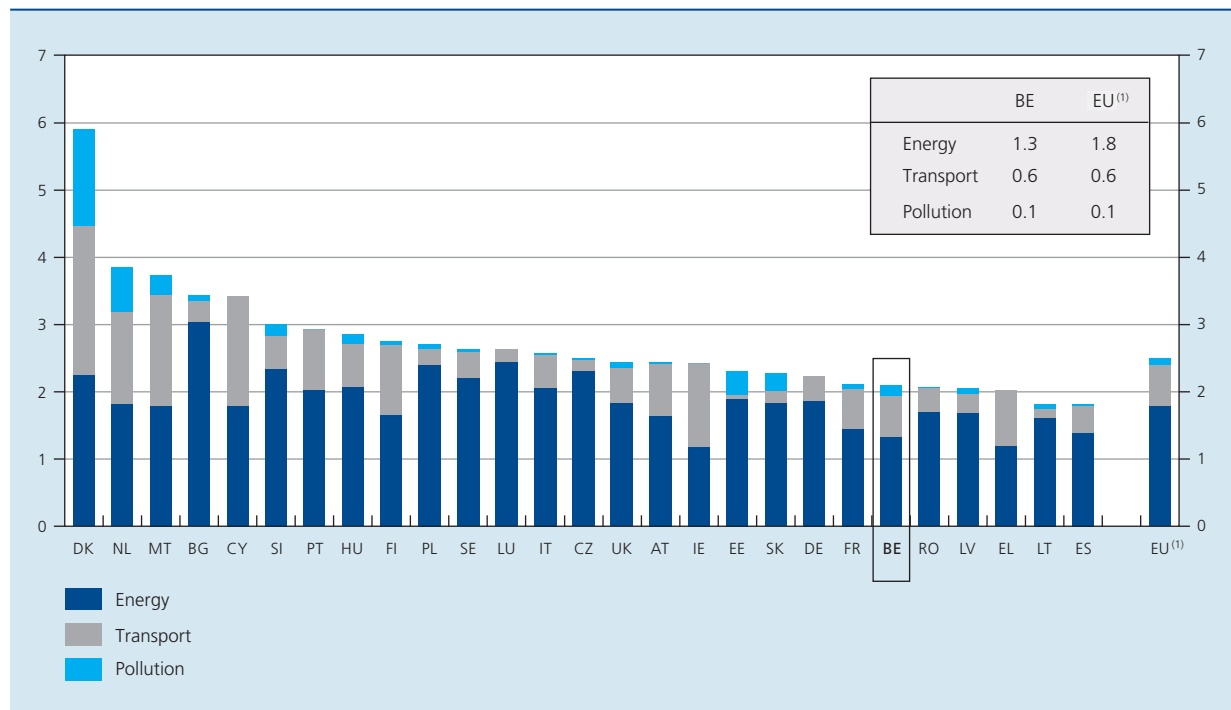
fixed nominal amounts, expressed per unit of output. The real proceeds from these taxes therefore tend to diminish over time⁽¹⁾. In addition, environmental taxes are explicitly intended to curb the growth of consumption of goods which harm the environment, so that in many cases it is logical for the proceeds not to keep pace with GDP growth.

2.2.2 Composition of environmental taxes

The relative importance of environmental taxes varies between EU Member States, but in general the proceeds ranged between 2 and 3.5 p.c. of GDP in 2007. Only two Member States have lower environmental taxes, while in three Member States the proceeds are higher. The outstanding performer in the EU is Denmark, where environmental taxes represent 5.9 p.c. of GDP, but the figures for the Netherlands and Malta are also substantial, at 3.9 and 3.7 p.c. of GDP respectively. Lithuania and Spain have the lowest levels of environmental taxes as a percentage of GDP.

(1) That would not be the case if environmental taxes were adjusted periodically in line with prices. Among the EU Member States, only Denmark has introduced a system of regular indexation of the nominal rates of environmental taxes.

CHART 4 COMPOSITION OF ENVIRONMENTAL TAXES IN THE EU MEMBER STATES
(percentages of GDP, 2007)



Source: EC.

(1) Weighted average.

In Belgium, environmental taxes represent a fairly small percentage of GDP, compared to other EU countries. Belgium is in 21st position among the EU27. In the neighbouring countries of France, Germany and the United Kingdom, proceeds from environmental taxes are comparable to the Belgian figure. In Luxembourg, the proportion of GDP represented by environmental taxes is close to the EU average. That is achieved by relatively low tax rates combined with high consumption, including by foreigners.

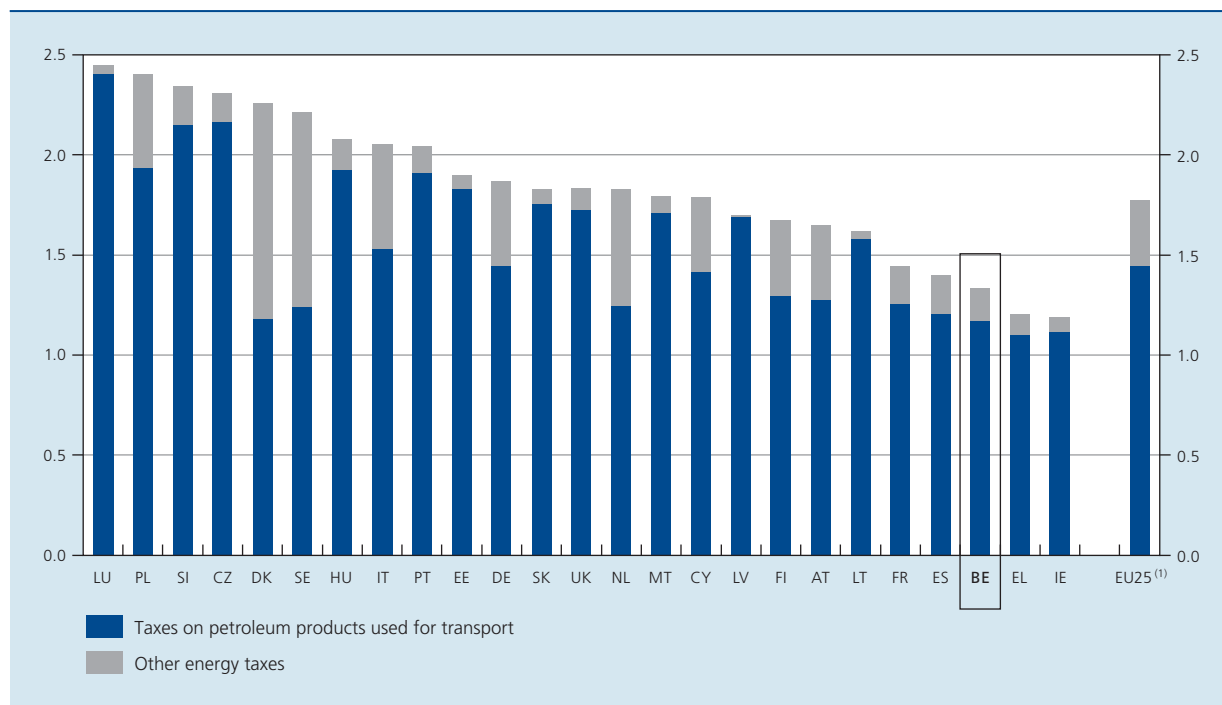
From a statistical point of view, environmental taxes are generally divided into three categories, namely taxes on energy, transport and pollution. Taxes on energy include taxes on energy products, both those used for transport and other products. Energy taxes on transport mainly concern taxes on petrol and diesel. With the exception of those applicable to transport, energy taxes consist mainly of taxes on heating oil, gas, coal and electricity. This category also includes CO₂ taxes, because they often form an inseparable part of the taxes on energy. Taxes on transport include taxes relating to the ownership and use of a vehicle. They comprise both one-off taxes on the

purchase of a vehicle and recurring charges, but not the excise duties on petrol or diesel. Taxes on pollution and resources include taxes on packaging, atmospheric pollution, waste or water usage.

Energy taxes make up the bulk of environmental taxes in the EU as they account for almost three-quarters of all environmental taxation. Taxes on transport excluding the consumption of energy products correspond to rather less than a quarter of that total. Taxes on pollution form only a small fraction at roughly 5 p.c.

In the energy taxes category, taxes on fuel used for transport predominate. On average, they account for roughly 80 p.c. of the total energy taxes. In most of the Member States that joined the EU in 2004, that percentage is far higher. In the EU15 Member States, the proportion of taxes on energy products represented by taxes on fuel used for transport ranges from over 90 p.c. in Luxembourg, Ireland, Greece, Portugal and the United Kingdom to just over 50 p.c. in Denmark and Sweden, these last two being countries that charge substantial taxes on electricity and natural gas.

CHART 5 SIGNIFICANCE OF TAXES ON PETROLEUM PRODUCTS USED FOR TRANSPORT IN RELATION TO TOTAL TAXES ON ENERGY (percentages of GDP, 2007)



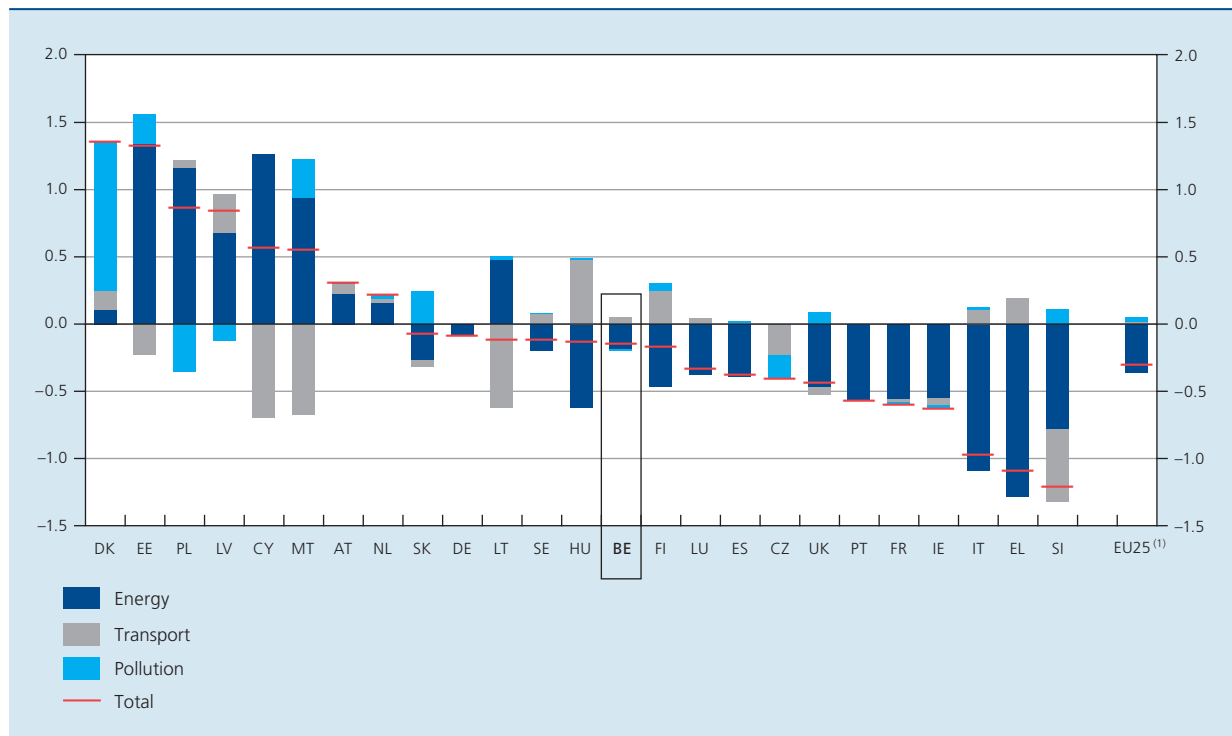
Source: EC.
(1) Weighted average.

2.2.3 Determinants of the evolution of environmental taxation

During the period 1995-2007 there was some convergence regarding the proceeds of environmental taxes as a percentage of GDP between the EU15 Member States and the countries which joined the EU in 2004. Most of the latter Member States decided to increase their environmental taxes, partly in order to comply with the European rules on minimum excise duties on energy products. In contrast, many EU15 Member States experienced a decline in the proceeds from environmental taxes, especially those generated by taxes on energy, so that the EU average fell. Denmark, the Netherlands and Austria formed exceptions to this trend, since they recorded an increase in the proceeds from environmental taxes as a percentage of GDP between 1995 and 2007. In the Netherlands and Austria, that was due almost entirely to higher proceeds from taxes on energy, while Denmark proved to be the only country which achieved a substantial increase in taxes on pollution.

The movement in the proceeds of taxes on energy as a percentage of GDP is determined by changes in both the energy intensity of the economy and the implicit tax rate on energy products. The fall in taxation on energy in the EU as a whole appears to be due mainly to the reduction in the economy's energy intensity. Between 1995 and 2006, this intensity declined in all the countries considered. There was a particularly dramatic fall in energy intensity in the countries which recently joined the EU, although the level there is still considerably higher than in the EU15. Over the same period, the implicit tax rate on energy have risen in most EU Member States, with the exception of Finland, Spain, France, Portugal, Italy and Greece. In Belgium, the decline in taxes on energy as a percentage of GDP is due to a relatively small reduction in the economy's energy intensity combined with a stable implicit tax rate on energy.

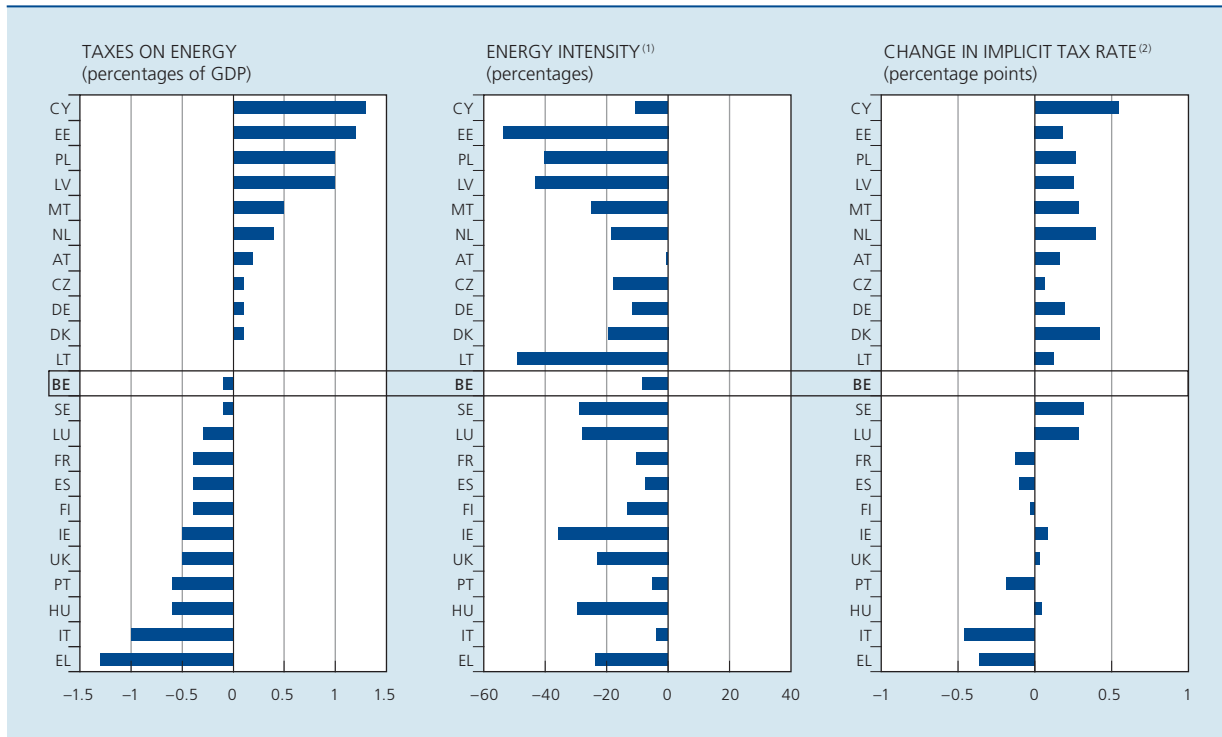
CHART 6 ENVIRONMENTAL TAXATION
(percentage of GDP, 1995-2007)



Source : EC.

(1) Weighted average.

CHART 7 TAXES ON ENERGY
(1995-2006)



Source: EC.

(1) Energy intensity is calculated as energy consumption converted to kg of oil-equivalent per thousand euro of GDP expressed in chained euros.

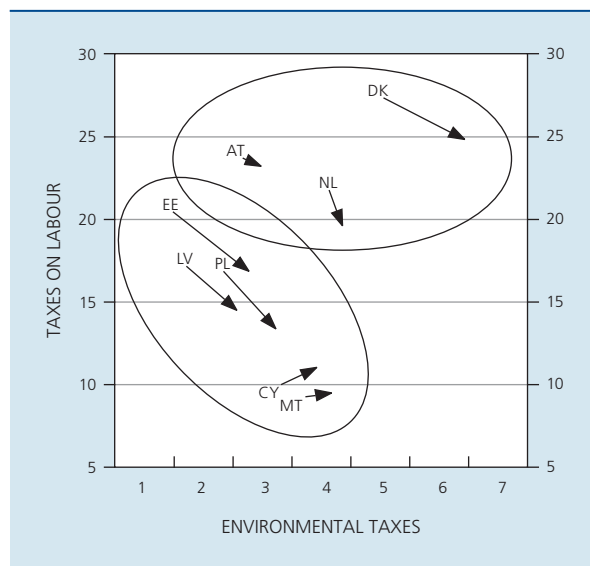
(2) The implicit tax rate is calculated as the proceeds of the energy taxes as a percentage of GDP divided by the energy intensity.

2.3 Green tax reforms

In the 1990s, international institutions recommended “green” tax reforms. Such reforms aim to reduce the taxes on labour, making use of the additional proceeds from new or existing environmental taxes which improve the operation of market forces by taking account of external effects. Green tax reforms were thus intended to achieve two simultaneous goals, namely a better environment and higher employment. That is why those reforms were sometimes said to produce a “double dividend”.

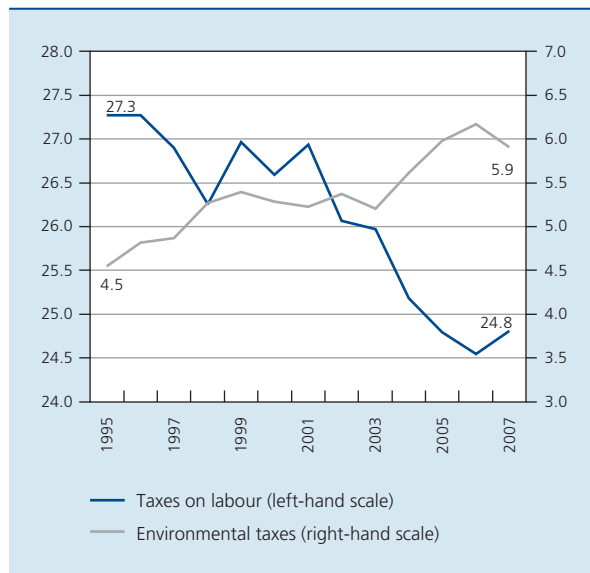
However, it is evident from the pattern of revenues generated by environmental taxes and taxes on labour that only a few countries have switched to increased environmental taxes and reduced taxes on labour. As already stated, during the period 1995-2007, there was no increase in environmental taxes as a percentage of GDP in a number of countries. Those which did record an increase can be divided into two groups. One group consists of the countries which have recently joined the EU and have increased their environmental taxes to comply with the minimum European requirements. Estonia, Latvia and Poland used

CHART 8 COUNTRIES WHICH HAVE INCREASED ENVIRONMENTAL TAXES
(percentages of GDP, change 1995-2007)



Source: EC.

CHART 9 TAXES ON LABOUR AND ENVIRONMENTAL TAXES IN DENMARK
(percentages of GDP)



Source: EC.

these additional proceeds to cut the taxes on labour. The other group comprises Denmark, the Netherlands and Austria which decided at a given point to introduce green tax reforms⁽¹⁾. The reforms in those countries show that the individual EU Member States can develop their own environmental policy and taxation to some extent.

Denmark provides the best example of green tax reforms, with the taxes on labour cut by 2.5 p.c. of GDP between 1995 and 2007. Of that, 1.4 p.c. of GDP was financed by additional environmental taxes. These are very varied and provided the inspiration for reforms in other countries, including Belgium. The principal examples are: a general tax on packaging, the rate varying according to an environmental index of the material used; a general CO₂ tax on energy products, varying according to emissions; very heavy taxes on vehicle ownership and use (the tax payable on entry into service of a large car for private use amounts to more than 100 p.c. of the purchase price); and a 5 to 10 euro tax on airline tickets, though that was abolished in 2007.

(1) Green tax reforms have also been implemented in other EU Member States, such as Germany, Finland, Sweden and the United Kingdom, but in those countries there was a decline in environmental taxes as a percentage of GDP in the period 1995-2007.

3. Environmental taxes in Belgium

3.1 Summary of environmental taxes in Belgium

Belgium has various taxes which are classed as environmental taxes according to current international definitions. In 2008, excise duties on mineral oils accounted for 54 p.c. of the total environmental tax revenues. The annual road tax also accounts for more than one-fifth of those revenues. The energy tax on mineral oils, gas and electricity, the entry-into-service tax and the tax on drink packaging each represent around 5 p.c. of those taxes, while the federal contribution on electricity and gas amounts to just over 3 p.c.

In Belgium, environmental policy is essentially the responsibility of the regions, but the right to raise environmental taxes is shared among the various levels of power. Taxes on energy accrue mainly to the federal government, while those on transport accrue to the regions. With the exception of the tax on drink packaging, taxes on pollution accrue mainly to the regions.

In Belgium, it is possible to distinguish two periods in which measures were taken regarding environmental taxes.

In the first wave, between 1993 and 1995, various new taxes were introduced. Previously, revenues had consisted almost exclusively of excise duties on mineral oils and the annual road tax. During that period, the heating oil inspection fee was introduced, as was the general tax on energy, the entry-into-service tax, the eco tax on batteries and disposable cameras, and the Eurovignette for lorries.

The period 2003-2005 brought a second wave of measures relating to environmental taxes. Initiatives on that subject were announced mainly in connection with the July 2003 federal government agreement. For instance, by increasing the excise duty on diesel and petrol and gradually abolishing the registration fee and the excise compensatory levy on diesel cars, the government tried to make the cost of transport by car more dependent on car use than on car ownership. The excise duties on diesel and petrol were increased via the ratchet system, whereby the rates of duty increase when there is a fall in the price of these road fuels. In addition, the government introduced the federal contribution on electricity and gas and the tax on drink packaging.

While the taxes on energy and pollution were increased by various measures during the period 2003-2005, since 2006 there has been a structural reduction in

TABLE 1 SUMMARY OF ENVIRONMENTAL TAXES IN BELGIUM

(millions of euro, unless otherwise stated)

	1980	1990	2000	2008	As a percentage of total environmental taxes in 2008
Taxes on energy	1,109	2,017	3,614	4,297	63.3
Excise duties on mineral oils	1,109	2,017	3,392	3,675	54.2
Energy tax on mineral oils, gas and electricity	0	0	193	330	4.9
Federal contribution on electricity and gas ⁽¹⁾	0	0	0	203	3.0
Other ⁽²⁾	0	0	29	89	1.3
Taxes on transport	396	768	1,622	1,974	29.1
Entry-into-service tax	0	0	209	358	5.3
Road tax	368	712	1,132	1,477	21.8
Eurovignette	0	0	82	121	1.8
Other ⁽³⁾	28	56	199	18	0.2
Taxes on pollution	0	93	485	509	7.5
Tax on drink packaging	0	0	0	308	4.5
Taxes on industrial waste	0	27	74	72	1.1
Water charge	0	66	378	108	1.6
Other ⁽⁴⁾	0	0	33	21	0.3
Total	1,506	2,877	5,721	6,780	100.0
<i>p.m. as a percentage of GDP</i>	<i>1.7</i>	<i>1.7</i>	<i>2.3</i>	<i>2.0</i>	

Sources: NAI, NBB.

(1) Including the "Elia" tax.

(2) Inspection fee on heating oil and contribution on petroleum products intended for heating.

(3) Excise compensatory levy (abolished in 2008) and registration fee.

(4) Eco taxes on batteries (and disposable cameras), taxes on waste fertilizer and domestic refuse, and tax on specific products such as disposable cutlery, disposable bags and aluminium foil.

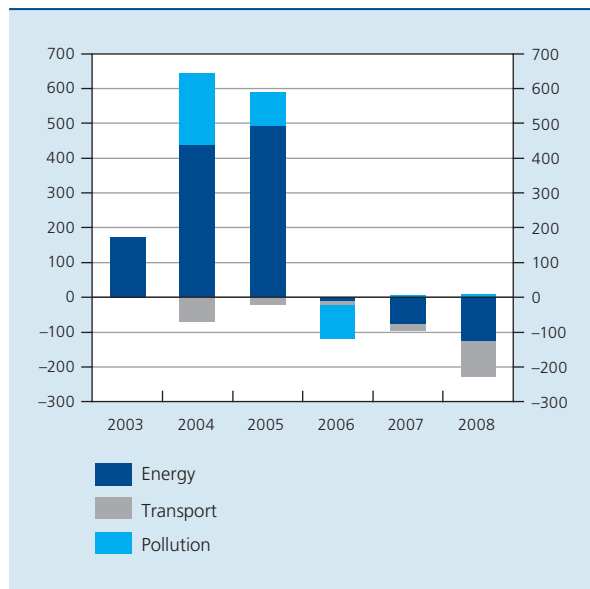
environmental taxes, due primarily to the operation of the reverse ratchet system for petrol and diesel. However, the ratchet system for increasing the excise duties on petrol and diesel was reactivated in 2009. Throughout the period from 2003 to 2008, the taxes on transport were lowered, mainly by abolition of the excise compensatory levy on diesel cars.

The Belgian policy on environmental taxes is not always clear, and often appears to be a process of trial and error, in which a long-term view is sometimes lacking. That is due partly to the uncertainty over the impact on the poorest sections of the population, and the possible shift of consumption or production. A number of measures on which there was a consensus were implemented only partially, if at all. Both the eco tax introduced in 1993

and the general tax on packaging proposed during the preparation of the 2007 federal budget were ultimately reduced to a tax on a small number of products⁽¹⁾. Moreover, the air travel tax proposed during preparation of the 2009 budget had already been scrapped before the budget was finally approved by parliament. Another example is the tax on drink packaging introduced in 2004, which was increased by 5 euro cents in January 2005. This led to large-scale displacement of consumption to neighbouring countries, so that in June of that year the increase in the tax on drink containers was reversed. The grant of various reductions on electricity, gas and heating oil bills and the simultaneous increases in the taxes on some of

(1) Conversely, Denmark and the Netherlands have succeeded in introducing a general packaging tax which is differentiated according to CO₂ emissions.

CHART 10 STRUCTURAL MEASURES CONCERNING ENVIRONMENTAL TAXES IN BELGIUM
(millions of euro, changes compared to the previous year)



Source : NBB.

these products also give rise to questions. From an economic point of view, a direct increase in the income level of the target groups is always preferable to such specific reductions, otherwise there is nothing to encourage energy saving.

Finally, it should be noted that in recent years the federal government has introduced various other adjustments to the tax system, intended to bring about a change of behaviour in order to achieve environmental goals. Thus, the corporation tax allowance for company cars was made conditional upon the CO₂ emissions, and personal income tax allowances were introduced for various energy-saving investments. These adjustments to tax allowances are disregarded in calculating the total environmental tax revenues.

3.2 Excise duties on mineral oils

Excise duties on mineral oils account for the bulk of the environmental tax revenues. They vary widely from one product category to another. Thus, in the EU, hardly any excise duties are levied on kerosene, owing to legal obstacles under most bilateral aviation agreements⁽¹⁾. The excise duties on heating oil are relatively low, certainly compared to the excise duties charged on diesel and especially petrol.

Excise duties on petrol

With excise duties of 599 euro per thousand litres of petrol at the end of March 2009, Belgium is among the countries charging fairly high rates of duty on petrol. At that time, the EU15 average was 545 euro per thousand litres. However, the neighbouring countries – France, Germany and the Netherlands – charge even higher rates, at 606, 655 and 701 euro per thousand litres respectively. Conversely, Luxembourg charges a much lower rate, namely 462 euro per thousand litres. In the EU, the minimum excise duty on petrol is currently 359 euro per thousand litres.

While the excise duties on petrol had remained fairly steady in Belgium in the latter half of the 1990s, the July 2003 federal government agreement aimed to effect a radical change from fixed to variable transport costs. In August 2003, the ratchet system was introduced for petrol, with a maximum increase in duty set at 14 euro per thousand litres per annum. In 2004 and 2005, the maximum was raised to 28 euro per thousand litres per annum. Between August 2003 and May 2005, the excise duties on petrol were thus increased by a total of 70 euro per thousand litres.

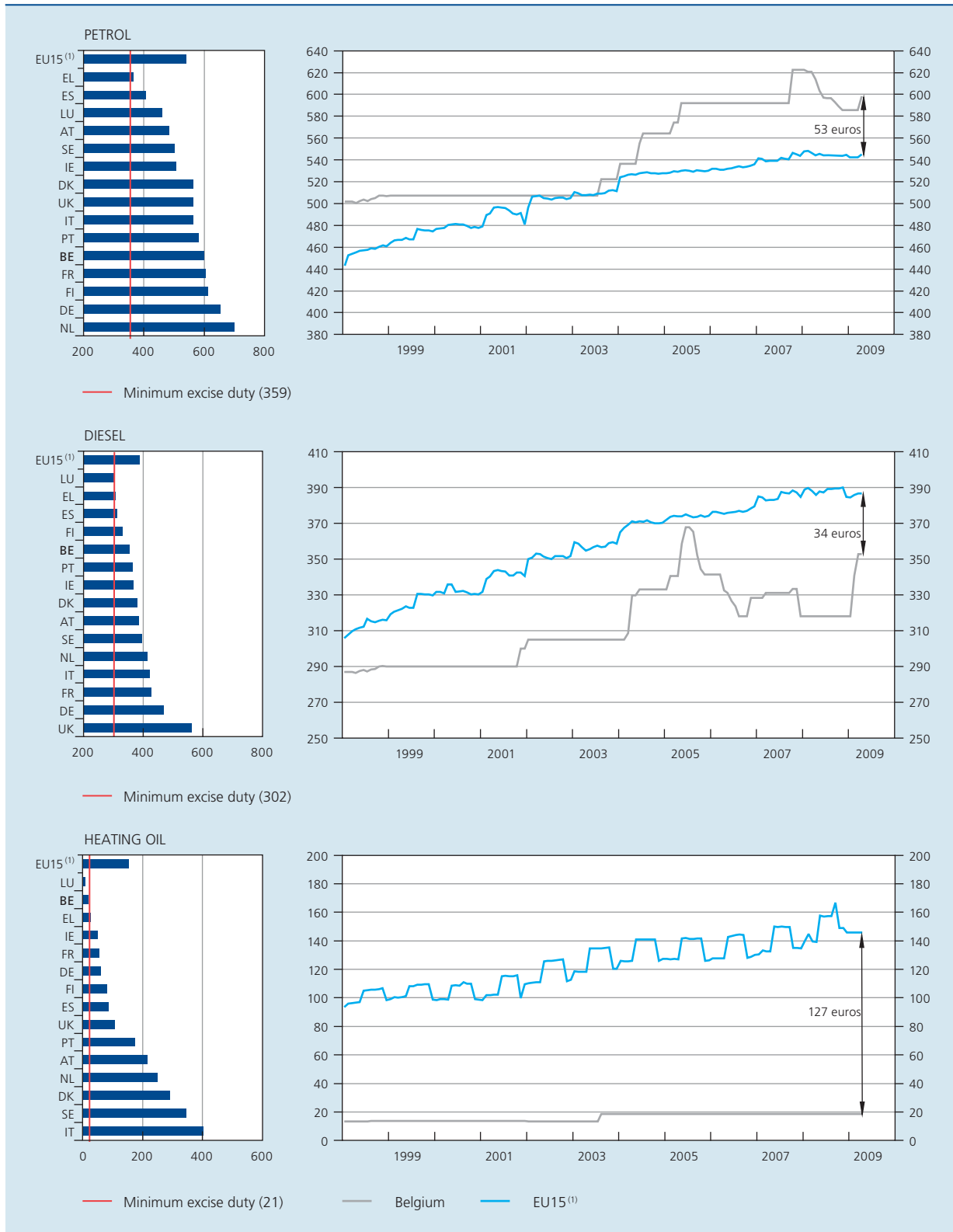
At first, the intention was to maintain the original ratchet system until 2007, but in May 2005, in order to curb the rise in petrol prices, the federal government took the decision to suspend the application of this system. It then introduced a reverse ratchet system with the aim of reducing the excise duties. Under the reverse ratchet system, every increase in VAT revenues resulting from a price rise was totally neutralised by a reduction in excise duties as soon as the prices set for petrol under the programme contract passed the threshold of 1.50 euro per litre. In late 2007 and early 2008, the excise duties on petrol were lowered under this system. In 2009, the ratchet system was reactivated, increasing the excise duties on petrol by 28 euro per thousand litres per annum. The first effects were felt during March.

Excise duties on diesel

In Belgium, excise duties on diesel – at 353 euro per thousand litres in March 2009 – are below the EU15 average (387 euro per thousand litres) and below the levels of duty in the Netherlands (413 euro per thousand litres), France (428 euro per thousand litres) and Germany (470 euro per thousand litres), which are among the countries charging the highest rates in the EU. The minimum excise duty in

(1) However, the EC is trying to ensure that, in future, the quantity of CO₂ emissions generated by aircrafts is included in the scope of the European emission trading system (cf. chapter 4) in order to influence air fares.

CHART 11 EXCISE DUTIES ON MINERAL OILS
(euro per 1,000 litres)



Source: EC.
(1) Arithmetic average.

the EU stands at 302 euro per thousand litres. That is the rate charged in Luxembourg. At the beginning of 2009, before entry into force of the ratchet system, this was also the rate which Belgium charged on biodiesel (the excise duties on biodiesel are 15 euro per thousand litres lower than on ordinary diesel). The minimum excise duties in the EU will increase to 330 euro per thousand litres in 2010. There is a proposal for a Directive increasing the minimum rates to 380 euro per thousand litres by 2014.

In 2004, Belgium also introduced a ratchet system for diesel, with the same maximum as for petrol, namely 28 euro per thousand litres. In 2005, that threshold remained in force for petrol, but the maximum for diesel was increased to 35 euro per thousand litres per annum. Thus, between the beginning of 2004 and May 2005, the excise duties on diesel were increased by a total of 63 euro per thousand litres. In May 2005, the federal government decided to suspend this system, just as it did for petrol. It then introduced a reverse ratchet system with the aim of reducing the excise duties as soon as the diesel price set under the programme contract exceeded the threshold of 1.10 euro per litre. By this mechanism, the excise duties on diesel were reduced, bringing them close to the minimum level set by the EC⁽¹⁾. The ratchet system was reactivated in 2009, to increase the excise duties on diesel by a maximum of 35 euro per thousand litres. That maximum was already applied in full by the end of March.

Excise duties on heating oil

At the end of March 2009, Belgium's excise duties on heating oil amounted to 18.49 euro per thousand litres, putting them among the lowest in the EU alongside those charged in Luxembourg (10 euro per thousand litres). These rates are well below the average for the EU15 (146 euro per thousand litres) and below those charged in the neighbouring countries: France (57 euro per thousand litres), Germany (61 euro per thousand litres) and the Netherlands (249 euro per thousand litres). The European minimum excise duty on heating oil is 21 euro per thousand litres, but Belgium and Luxembourg secured a waiver allowing them to apply lower rates.

The low taxes on heating oil in Belgium are hard to justify on environmental grounds, since heating oil is essentially the same product as diesel. One reason for the fairly low level of tax is that the product forms a large proportion of the expenditure of relatively low-income households. The data from the household budget surveys indicate that

households in the lowest income decile spend 3.3 p.c. of their income on heating oil, against 0.6 p.c. for households in the highest income decile. In general, expenditure on energy represents a heavier burden for households in the lowest income deciles.

3.3 Possible future developments

If the goals for the reduction of greenhouse gas emissions by households and other sectors are to be achieved efficiently, it will probably be necessary to increase environmental taxes, and this could boost the revenues from that source in the future. In any case, Belgium does have scope for generating additional revenues from environmental taxation.

In Belgium, the excise duties on diesel are relatively low, both in comparison with the rates applied in other EU Member States and in relation to the fairly heavy excise duties on petrol. That is also reflected in the structure of consumption, since Belgium has the highest consumption of diesel in relation to petrol consumption in the EU. However, there is no environmental justification for the differential tax treatment of the two types of fuel. The preliminary draft "Federal Plan for Sustainable Development 2009-2012", prepared by the Interdepartmental Commission for Sustainable Development, to be submitted to the federal government following public consultation, proposes that the excise duties on petrol and diesel other than for commercial use should be harmonised by 2015. The plan also proposes using part of the proceeds to reduce the road tax and part to reduce the taxes on labour.

Taxes on heating oil in Belgium are very low compared to those in most other EU Member States. Belgian taxes on natural gas for domestic use are also below the EU15 average. However, since 1990, domestic heating has accounted for the second biggest increase in CO₂ emissions, after transport. Partly as a result of the lower excise duties on heating oil and diesel, concentrations of particulates – a form of atmospheric pollution produced mainly by diesel vehicles, industrial activities and the heating of residential buildings – are higher in Belgium than elsewhere in Europe. It is therefore advisable to put into practice a long-term strategy on the use of heating fuels. Apart from subsidies, tax allowances for energy-saving investments, and legislation, higher taxes could encourage more efficient use of energy by households.

Also, in the context of Benelux, the Regions are working on a mileage tax on lorries, while various options are under consideration for passenger cars.

(1) The excise duties on biodiesel, which are 15 euro per thousand litres lower than those on ordinary diesel, reached that minimum level at the end of 2007, precluding any further reduction.

Finally, revenues will be obtained in the future from the auctioning of emission rights. The next chapter explains how this mechanism works.

4. The Kyoto Protocol and tradable emission rights

4.1 The Kyoto Protocol

The Kyoto Protocol was concluded in 1997 under the Framework Convention on Climate Change adopted under the aegis of the United Nations in 1992. The industrialised countries entered into an agreement whereby, between 2008 and 2012, they would reduce their emissions of six greenhouse gases – carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride – by at least 5 p.c. against their 1990 levels. The EU Member States committed themselves to cut their emissions by 8 p.c. over that period. On 31 May 2002, the EU and its Member States ratified the Kyoto Protocol. Following ratification by Russia in 2004, the Protocol entered into force on 16 February 2005 and became binding upon the signatory countries. The United States, which causes one-third of the world's greenhouse gas emissions, did not ratify the Protocol. In December 2009, the UN Climate Change Conference in Copenhagen will endeavour to conclude a new agreement setting targets for the post-2012 period.

Greenhouse gas emissions vary widely between regions. At present, the biggest emitter of greenhouse gases (converted to CO₂ equivalents) is China, at almost 20 p.c., but its per capita emissions of CO₂ are relatively low. In contrast, the United States generates almost the same

proportion of emissions, but per capita emissions are five times as high as in China. In the EU15, emissions are just over 10 p.c. of the global total. Per capita emissions are significantly lower than in the United States, but much higher than in the other regions.

Similarly, the changes in emissions compared to their 1990 levels also vary widely. In China and India, which are not covered by the Kyoto Protocol, emissions have risen dramatically. In the United States, which is covered by the Kyoto Protocol but has not ratified it, emissions increased by 16.5 p.c. between 1990 and 2005. Over the same period, the EU15 succeeded in keeping their emissions stable. It is clear from these findings that during the post-Kyoto period, it is vital that more countries should commit to a reduction of their annual emissions of greenhouse gases.

The Kyoto Protocol provides for three market-based mechanisms which countries can apply in order to achieve the planned environmental targets. Countries which have signed the protocol can trade emission rights with one another (International Emission Trading). By this system, countries which cannot achieve a sufficient reduction in their emissions can purchase emission rights from countries which have a surplus. The global system of emission right trading entered into effect in 2008. However, this system of emission trading should not be confused with the European system of tradable emission rights for industrial plants, which the EU introduced in 2005. Countries can also invest in projects for reducing emissions in other industrialised countries, in exchange for additional emission credits (Joint Implementation). Finally, industrialised countries can invest in emission reduction in developing countries, a mechanism that may also generate additional emission credits for donor countries (Clean Development Mechanism).

TABLE 2 GREENHOUSE GAS EMISSIONS BY REGION
(CO₂ equivalents)

	Total emissions in 2005 (megatonnes)	Idem, as a percentage of the total	Tonnes of CO ₂ , per capita in 2005	Change 1990-2005 (percentages)
China	7,219	19	5.5	+101.5
United States	6,963	18	25.5	+16.5
EU15	4,121	11	10.7	+0.5
India	1,853	5	1.7	+68.0
Other	17,611	47		+24.7
World	37,767	100	5.8	+25.7

Source: World Resources Institute.

As already mentioned, the EU Member States have committed themselves to cut their greenhouse gas emissions by 8 p.c. in relation to 1990 levels. This overall target for the then EU15 was allocated among the Member States. For Belgium, the emission reduction target is just below the overall target at 7.5 p.c. The Member States which joined the EU recently are not covered by this joint target, but they do have individual targets for emissions, with the exception of Cyprus and Malta which have not set one.

Since the regions are responsible for the distribution of emission rights in Belgium, the overall target for reducing greenhouse gases had to be allocated among the regions. Under the Cooperation Agreement concluded by the Consultation Committee on 8 March 2004 concerning the allocation of the Kyoto efforts between the regions and the federal government, it was agreed that the Walloon Region would cut emissions by 7.5 p.c., and the Flemish Region by 5.2 p.c. The Brussels Capital Region could increase its emissions by 3.475 p.c. in relation to the base year. Since this allocation would not achieve the required overall reduction of 7.5 p.c., the federal government would try to buy additional emission rights via the mechanisms permitted under the Kyoto Protocol, amounting to 2.46 million tonnes per annum according to the initial estimates.

Belgium's emissions of greenhouse gases increased during the early 1990s. They reached a peak in 1996 when the harsh winter caused a particularly sharp rise in the use of heating, driving up greenhouse gas emissions. Thereafter the volume of emissions remained comparable to the 1990 level. However, since 2004, there has been a significant decline. That decline is due to the combined effect of measures to reduce greenhouse gas emissions, rising energy prices, the slackening pace of economic activity and – above all – the milder winters of 2005 and 2006, which brought a substantial fall in the consumption of energy for heating. In 2006, Belgium's emissions amounted to 137 million tonnes of CO₂ equivalent, down by 5.2 p.c. against the 1990 figure of 144.5 million tonnes of CO₂. On the basis of the latest medium-term forecasts prepared by the Federal Planning Bureau, Belgium should meet its Kyoto target without having to buy additional emission rights, partly on account of the economic recession.

(1) Though the Kyoto Protocol concerned six greenhouse gases, it is only CO₂ emission rights that are referred to here. The other greenhouse gases are nevertheless taken into account via conversion to CO₂ equivalents.

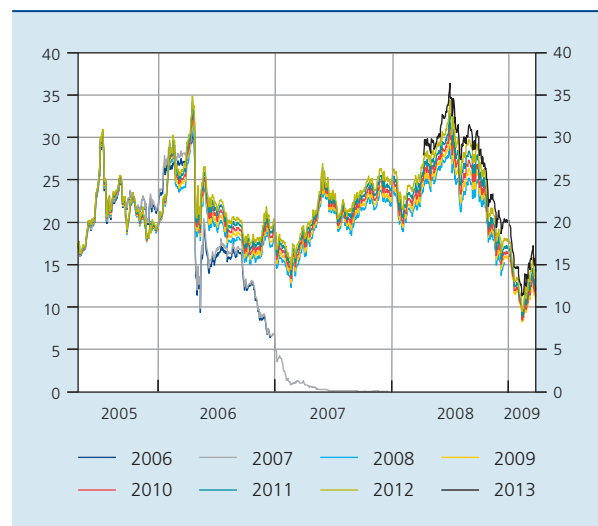
(2) Member States must allocate 95 p.c. of the emission rights free of charge. The United Kingdom, Austria and Germany have already sold a small percentage of their emission rights. In the second half of 2009, the Netherlands is to sell for the first time some of the emission rights which are normally allocated to energy producers.

4.2 The European system of tradable emission rights

Directive 2003/87/EC established a system of tradable emission rights for firms in the EU. The system was launched on 1 January 2005 and concerns over 10,000 installations (electricity generating stations, combustion plants, oil refineries, coking plants, iron and steel plants, and factories producing cement, glass, bricks, ceramics, pulp and paper), together accounting for over 40 p.c. of Europe's CO₂ emissions. The countries themselves allocate the total CO₂ emission rights to their firms under national allocation plans⁽¹⁾. The aim is to restrict the CO₂ emissions of the energy sector and industry, thereby creating a shortage and encouraging the development of a market in which emission rights are traded.

Implementation of the European system of tradable emission rights will push up the prices of various products, but in principle these will be the smallest price increases necessary to achieve the environmental goals. Firms will in fact have a free choice: they can either reduce their own emissions or buy additional rights on the market. Some firms will find it cheaper to cut their emissions than to buy emission rights on the market. Firms which would incur high costs in reducing their emissions will prefer to buy emission rights on the market from firms which can reduce their emissions more cheaply. Up to 2013, the emission rights will largely be allocated free of charge⁽²⁾. At the end of each year, firms have to hand over the emission rights due to the government. Firms whose emissions

CHART 12 PRICES OF EMISSION RIGHTS ACCORDING TO THE DUE DATE
(euro per tonne of CO₂)



Source : European Climate Exchange.

exceed the rights held have to pay a fine for each emission right not submitted. The following year, they still have to hand over the corresponding emission rights. Countries keep a stock of emission rights in reserve to permit the creation of new plants.

During the period 2005-2007 when the market was being developed, the price of emission rights was highly volatile, peaking at over 35 euro per tonne of CO₂. Up to 2007, it was not permissible to transfer the rights to later periods, and as a result of excess allocations of emission rights before 2007 the price slumped as the due date approached. In subsequent years the price became less volatile, though there was a perceptible upward trend. The rise in energy prices made it more attractive to make more use of coal for generating electricity, but that fuel is associated with higher CO₂ emissions, so that demand for emission rights increased. In the wake of the financial and economic crisis and the resulting decline in energy prices, the price of emission rights has fallen by more than half.

In the EU, the European emission trading system is the best way for industry and the utilities sector to meet the Kyoto targets. The Member States must also take other measures to restrict emissions by transport, households and the agricultural sector.

The Kyoto Protocol and the targets for 2008-2012 are only a first stage in the battle against climate change. At the March 2007 European Council, the EU unilaterally undertook to cut its CO₂ emissions by 20 p.c. by no later than 2020, and possibly even by 30 p.c. if a new international agreement can be concluded. The reduction target is based on the aim of limiting the temperature rise in this century to less than 2°C. The Copenhagen climate change summit in December 2009 will consider a new international agreement on the subject.

In order to achieve that additional reduction in greenhouse gas emissions, the rules of the European emission trading system will be adjusted during the phase from 2013 to 2020 to include aviation and international shipping. The rules will cease to apply to small installations, so as to limit the administrative burdens, at least if the countries introduce comparable taxes on those installations. Furthermore, an ever-increasing percentage of the emission rights will be auctioned, and that will actually apply to all the rights by 2027. For the electricity sector, all emission rights are to be allocated by auction as early as 2013. Sectors with a risk of "carbon leakage" – i.e. a reduction in emissions in Europe could lead to higher emissions in countries which are not parties to the Kyoto Protocol – will initially still receive most of their rights free of charge.

According to European Commission estimates, the auctioning of emission rights could generate up to 50 billion euro annually by 2020. The rights are to be allocated among the Member States according to a fixed formula, in which 88 p.c. are allocated on the basis of the relative share of each Member State in the emissions under the system in 2005, or the average for the period 2005-2007. A further 10 p.c. will be allocated to Member States with the lowest per capita GDP, and 2 p.c. to Member States which in 2005 had already reduced their emissions by 20 p.c. against their 1990 level. On the basis of the emission rights allocated to Belgian installations in 2005, Belgium should be entitled to around 2 to 2.5 p.c. of the total proceeds from the sales.

Conclusion

The environmental challenges for the decades ahead should not be underestimated. Global warming caused by the emission of greenhouse gases is undoubtedly one of this century's biggest problems which urgently requires an appropriate solution. That solution necessarily involves many aspects, but governments will clearly have a key role to play.

Governments have various instruments for tackling those challenges. When selecting which one to use, they need to weigh up the advantages and disadvantages of each instrument for each type of pollution. In some cases, market instruments such as environmental taxes and tradable emission rights are appropriate because they are the cheapest way of achieving the desired reduction in pollution.

In the early 1990s, there was an increase in environmental tax revenues as a percentage of GDP in both Belgium and the EU as a whole, but in the past decade there has been no further rise in environmental taxation. On the contrary, the trend has been downwards. Nevertheless, use was made of an ever wider spectrum of environmental taxes applied to a varied range of products. The main reason for the downward trend is that the energy intensity of GDP has diminished, and new taxes plus the increases in the rates of existing environmental taxes have led to changes in behaviour and have reduced or curbed consumption.

For the future, there is clearly scope for increasing revenue from environmental taxes in Belgium. A substantial proportion of those new revenues is linked to the commitments concerning the reduction of emissions of CO₂ and other greenhouse gases. For one thing, the sale of an ever-increasing proportion of the emission rights can generate government revenues. Also, steadily expanding

use of environmental taxes could prove necessary in order to achieve an efficient reduction in the emission of greenhouse gases by households. In the process, the inequality between excise duties on diesel and petrol could be reduced. Moreover, the best approach is to devise a long-term strategy on energy efficiency and domestic heating. Owing partly to the scarcity of budget resources as a result of the financial and economic crisis, and taking account of the expected impact of population ageing and the “polluter pays” principle, it is desirable to step up taxation of the main energy sources and introduce legislation on energy performance standards, rather than grant additional tax relief.

Since Belgium is a small country, the relocation of production or consumption may prove a serious obstacle for environmental policy. It is therefore essential to maximise the international coordination of the initiatives. The fact that less well-off households have to bear much of the burden of taxation on energy may also hamper the introduction or raising of those taxes. However, it is possible to devise compensatory arrangements for those households, without losing the price signal. If these obstacles are overcome, environmental taxes and the auctioning of emission rights could become important instruments for the government to deploy in addressing the environmental challenges.

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