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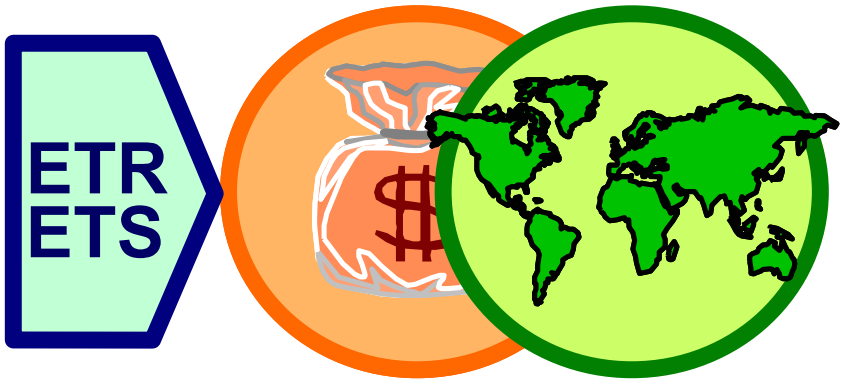

ECOTAXES AND EMISSIONS TRADING IN GERMANY AND EUROPE

MARKET-BASED INSTRUMENTS FOR THE ENVIRONMENT

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gtz

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A. EXECUTIVE SUMMARY

Market-based instruments (MBIs) have been shown to be very effective tools to advance environmental protection and climate change mitigation worldwide. These low cost measures – infinitely preferable to command and control – have been shown to have a considerable environmental impact. The most significant and widely used MBIs are environmental taxation and emissions trading.

Since the early 1990s, numerous countries within the European Union have introduced environmental taxation, making environmentally harmful products more expensive and rewarding environmentally friendly behaviour. Thus, companies and citizens receive real incentives not to damage the environment, to the benefit of the whole of society. Revenues from environmental taxation can be recycled and used to reduce taxes or for the benefit of other societal goals.

In addition to environmental tax reform, an emissions trading scheme (the ETS) has also been operative throughout the EU since 2005, enabling the EU to meet its international emissions reduction targets at half the cost predicted using other emissions reduction methods. The scheme is expected to ensure that the EU meets its Kyoto commitments at an annual cost of around € 3–3 ½ billion, reductions that would otherwise cost € 7 billion.[1]

The positive response of financial markets, politicians and business has strengthened the ETS, perhaps because the scheme offers potential 'first mover' advantages to business, thus enhancing competitiveness and innovation. CO_2 has been allocated a price, and companies involved in the scheme thus have a vested interest in technologies they can use to reduce their emissions. New businesses

[1] EEA Technical Report 08/2005: Market-based instrument for environmental policy in Europe, p. 7

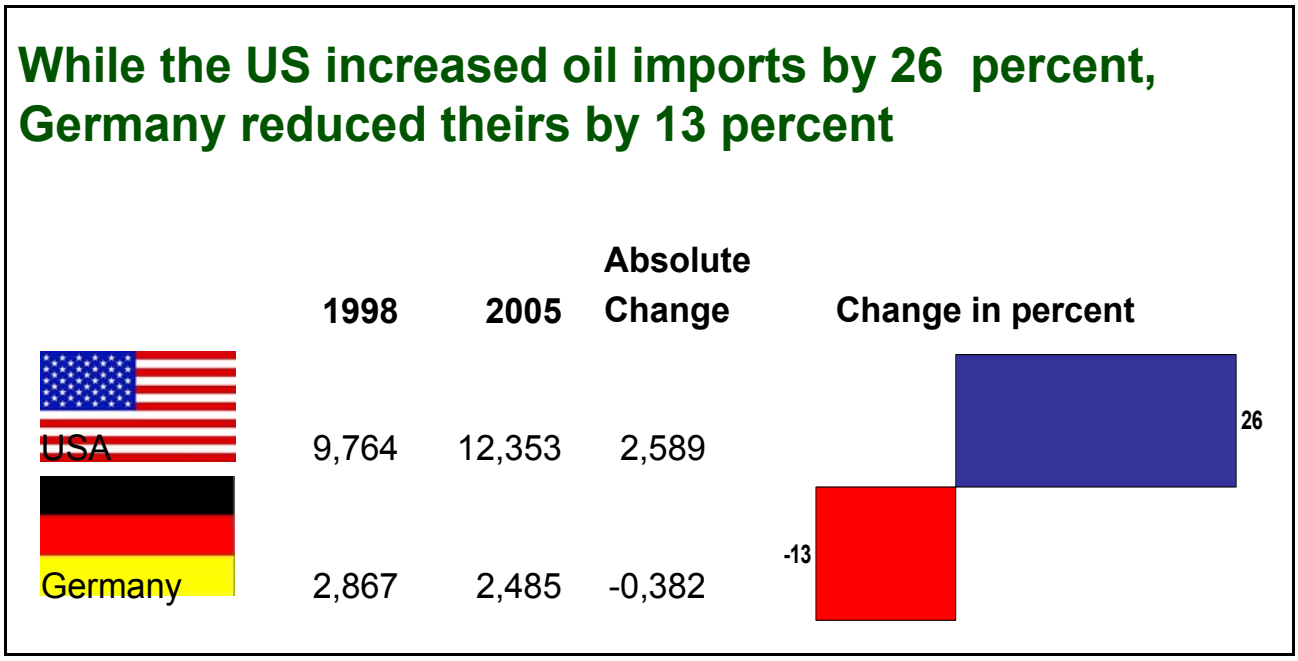
have emerged as well: carbon traders, efficiency managers and energy auditors. However, these very positive observations should be put into context: some companies were very critical of the ETS, but have become less so recently.

For countries outside Europe, the mechanisms of CDM (Clean Development Mechanism)[2] and JI (Joint Implementation)[3] are also of considerable interest.

Further market-based instruments include the dismantling of environmentally harmful subsidies and counterproductive tax exemptions, as well as environmental fees and charges on e.g. sulphur, chemicals, water use and waste.

In this report we evaluate experience with these instruments and provide some recommendations for the future. A particular focus of the report is Germany, where significant changes were achieved as a result of the implementation of an environmental tax reform (the so-called Ecotax) in 1999.

Figure 1:Total change in net oil imports from 1998-2005 in Million Barrels per day



Source: OECD 2005

[2] http://en.wikipedia.org/wiki/Clean_Development_Mechanism
http://unfccc.int/kyoto_mechanisms/cdm/items/2718.php

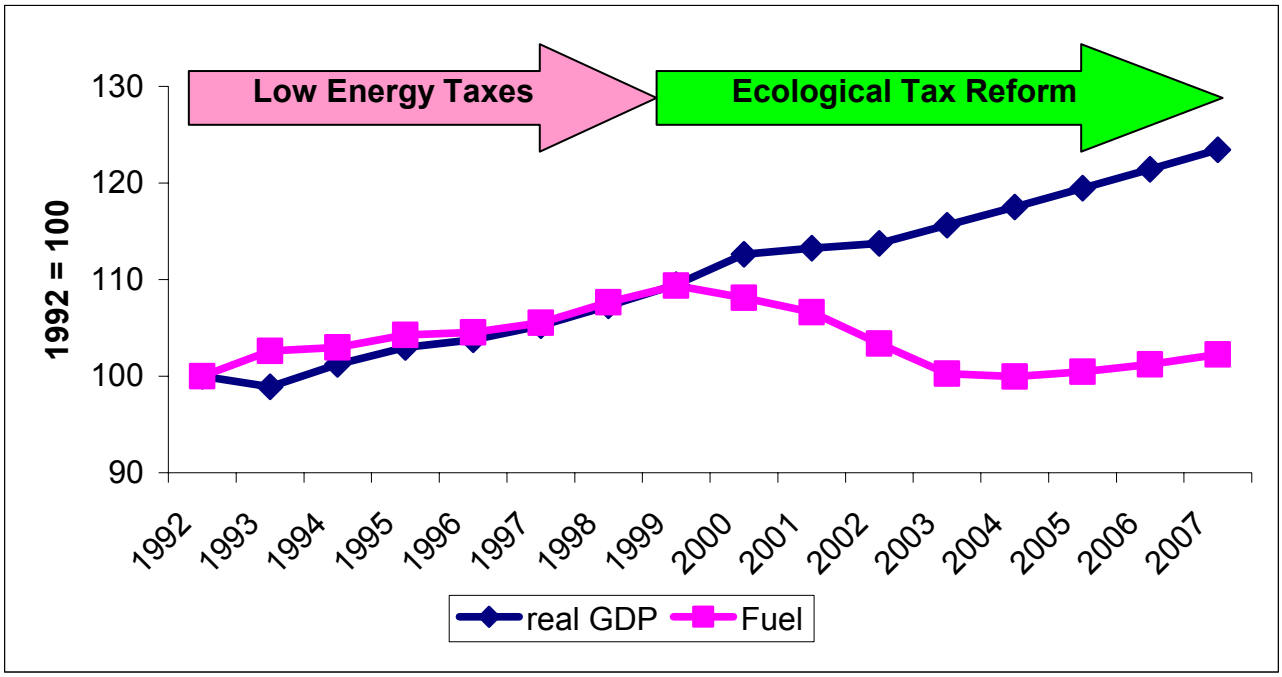
[3] http://en.wikipedia.org/wiki/Joint_Implementation
http://ji.unfccc.int/

Germany was able to reduce its dependency on crude oil, increase use of renewable energies and improve energy efficiency considerably as a result of the impact of the Ecotax Reform. From 1999 to 2005, Germany reduced its net oil imports by 13 percent, while US imports increased by over 26 percent in the same period, thus rendering Germany far less dependent on foreign oil.

Countries with the highest rates of environmental taxation also have the greatest CO_2 reductions worldwide. For example, since 1990 CO_2 emissions in the UK have fallen by 15 percent, in Germany by 19 percent, and in Sweden, in spite of considerable GDP growth, by 4 percent.

Using environmental taxation, these countries have succeeded in breaking the connection between economic growth and resource use.

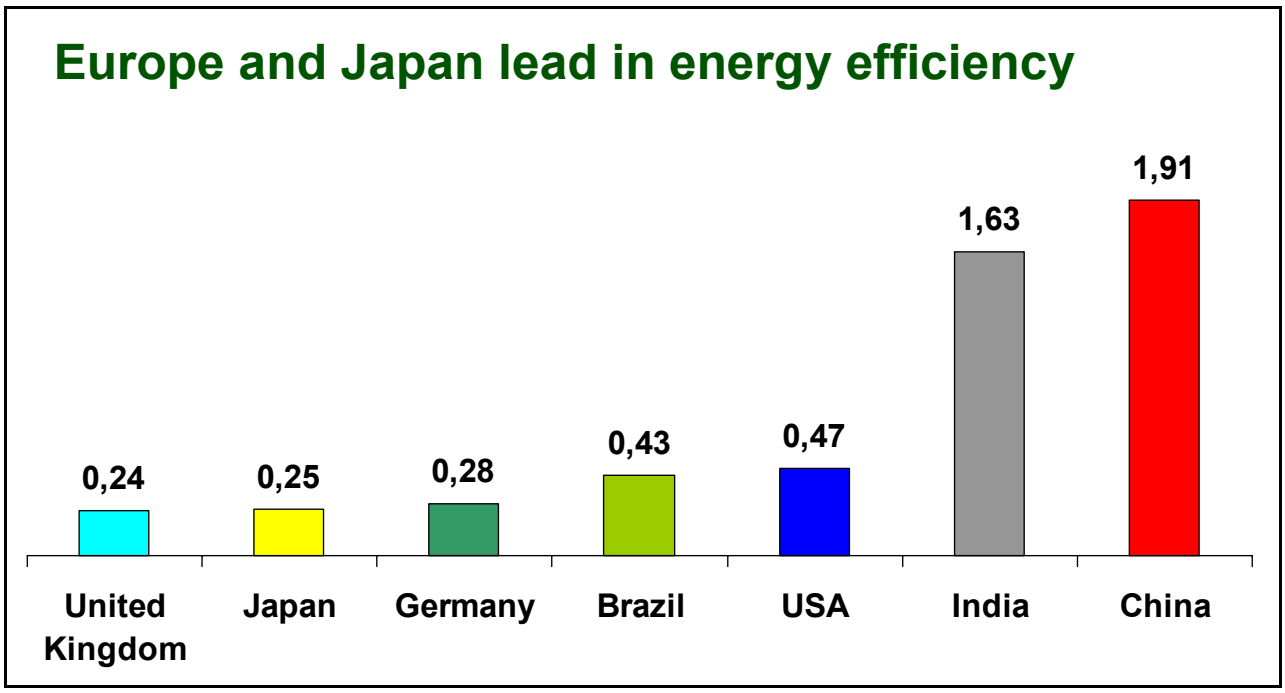
Figure 2: There is no longer a correlation between real GDP and fuel consumption in Germany



Source: German Ministry of Finance 2003

Since 2000, fuel consumption in Germany has decreased by 16 percent. Energy efficiency in relation to GDP is much higher in Japan, Germany, and Great Britain than in the USA, India or China.

Figure 3: CO_2-Emission per unit GDP (2002)



Source: IMF, UNFCC 2005

Thus, market-based instruments can help solve environmental problems, improve the efficiency of an economy and make consumer behaviour more sustainable at the same time. They are easy to implement and are the best means at our disposal for achieving the sustainable future of mankind.

B. THE IDEA OF ECOLOGICAL TAX REFORM AND EMISSIONS TRADING

1) Why market based instruments?[4]

A great deal of environmental pollution and natural resource depletion is attributable to incorrect pricing on the market of the goods and services we consume. The idea of 'market-based instruments' (MBIs) is to use economic policy instruments to protect the environment by ensuring that products produced in a sustainable way become cheaper than products that are not. As a result, consumers will buy more sustainable products, and incentives will be created for producers to take care of the environment and develop innovations to that end.

MBI's such as those in the table on the right enable us to include the cost of the externalities of production and consumption – i.e., their hidden costs to the environment – within market prices. These externalities range from damage resulting from water and air pollution, waste disposal, species loss, soil leaching and loss, climate change and its effects (storms, droughts and flooding), to health costs. If we do not take action, these costs are often paid for by those not benefiting from the polluting products (the next generation, the poor and vulnerable in society) – so such taxes are socially just, as well as being economically and environmentally sound.

Types of MBI

1. Ecological Tax Reform (ETR) *is designed to tax environmentally damaging behaviour, making it more expensive and thus changing the behaviour of producers and consumers, as well as raising revenues (which are generally recycled, as ETR tends to be revenue neutral).*

2. Emission Trading (ET): *Tradable permits available in a limited quanity designed to achieve reductions in pollution (such as emissions of CO2) or use of resources (such as fish quotas) in the most effective way through the provision of market incentives to trade.*

3. Environmental charges (EC) *designed to cover (in part or in full) the costs of environmental services and abatement measures (externalities) such as decontamination and landfill.*

4. Environmental subsidies and incentives *designed to stimulate innovation and the development of new technologies, to help create new markets for environmental goods and services and*

The theory of externalities

As mentioned above, incorporating external costs within prices constitutes the theoretical foundation of environmental taxation. Economic theory suggests that, in cases where the market fails to price goods correctly, creating a price that does re-

[4] See also: EEA Technical Report 08/2005: Market-based instrument for environmental policy in Europe.

flect the real value of goods and services will effectively regulate their use. The economist Arthur Pigou (1912) first argued in favour of using environmental taxation to compensate for market failure – hence the term 'Pigouvian taxation' – and contended that the optimum level of pollution abatement will occur where the marginal cost of abatement equals the marginal benefit yielded. Thus, a tax per pollution unit that achieves abatement to this point is the ideal Pigouvian tax and the socially optimum outcome. In effect, what this means is that the government charges for the use of commons by means of a so-called 'Pigouvian' tax to internalise the external costs in the price. A further contribution to the debate was made by Ronald Coase, who suggested assigning property rights to the environment and facilitating transactions between all parties involved, who would theoretically trade until all potential gains had been exhausted. These two theories have provided the theoretical foundations for the application of market-based instruments in environmental policy today, which, when properly applied, "are cost-effective, encourage efficiency, create dynamic incentives and hence encourage innovation" (OECD 2001).

2) Why Ecotaxes? – The "double dividend"

Governments are increasingly coming to favour the application of environmental taxes and charges because they offer a dynamic incentive to reduce pollution and natural resource use. This incentive can be more or less influential depending on the rate of the tax or scale of the charge, its point of application, the number of exemptions, and the availability of alternative responses. Taxes and charges are also extremely useful because they communicate what behavioural changes might be necessary, as they give producers and consumers clear price signals when they engage in environmentally damaging activities. However, while taxes do provide clear price signals, they are less effective than cap-and trade permit trading schemes in guaranteeing a particular environmental outcome and ensuring particular targets are met. Over the last 15 years, it has been shown that environmental taxation is an extremely effective instrument of environmental policy, and that its beneficial effects on production and consumption decision-making have been documented in many instances[5].

Aside from reducing demand for environmentally harmful products, environmental taxes can also produce a so-called 'double dividend'. By using the tax revenue from environmental taxation to reduce other, more distortionary taxes or ancillary wage costs, Ecological Tax Reform (ETR) can

[5] For OECD: The Polictical Economy of Environmentally Related Taxes, OECD 2006;
For Germany: http://www.umweltbundesamt.de/uba-info-presse-e/2004/pe04-109.htm

both reduce pollution (the first dividend) and increase employment, social welfare and economic growth by reducing the cost of labour (the second dividend).

3) Why Emissions-Trading? – The cost-effective way

Emissions trading schemes (also called cap-and-trade schemes) are market-based environmental policy instruments used to achieve the cost-effective reduction of environmentally harmful pollutants. A central feature of an emissions trading scheme is the 'cap', which sets a predefined limit on the emissions of a group of emitters, thus ensuring that targets set in environmental legislation are achieved. The cap is determined prior to the start of the trading period and decreases over time.

The thinking behind an emission trading scheme is that those who wish to pollute require emission allowances to do so. These allowances (or permits or certificates as they are sometimes known) are tradable, therefore ensuring that emissions cuts are made where it is most cost-effective. Polluters with low emissions reduction costs can cut emissions and sell their allowances at a profit; polluters who face high costs when cutting emissions can buy allowances, if this proves to be cheaper than reducing emissions themselves. Allowances can be 'grandfathered' (given to emitters) or sold (usually at auction). Finally, non-compliance with the scheme results in (generally financial) sanctions.

There are four main arguments that underline the importance and suitability of emissions trading schemes when intending to introduce measures for the protection of the environment.

Predictability – Applying emissions trading schemes enables countries to accurately reach their emission reduction targets. Emissions trading schemes are highly reliable and render the achievement of targets predictable. They are therefore a suitable tool to ensure compliance with national or international environmental regulation. In addition, predictability also increases the investment security of enterprises, which is why these often prefer the introduction of emissions trading schemes over taxes or regulations.

Cost-effectiveness – One of the most important qualities of emissions trading schemes is their cost-effectiveness. When implemented correctly, emissions trading schemes are a powerful tool for reducing emissions at low costs. In 2005, the European Environment Agency noted: "The [European

Emissions Trading] scheme is estimated to allow the EU to achieve its Kyoto target at an annual cost around EUR 3-3 ½ billion compared with nearly EUR 7 billion without it."[6]

Innovation – Emissions trading schemes trigger innovation. Where emissions have a price, new kinds of production processes are invented and applied which are less carbon-intensive. These new technologies are likely to play a role on a global scale as well, once they are demanded in more and more countries as environmental targets become more ambitious.

Flexibility – Another quality of emissions trading schemes is the flexibility they provide to emitters, who can choose between reducing their emissions and buying extra allowances. The emitters in question therefore tend to favour the introduction of such a scheme in comparison to the introduction of environmental taxes or 'command and control'.

These four main arguments clearly speak strongly in favour of the implementation of emissions trading schemes in the field of environmental protection. However, there are plenty of design options for such a system, and correct implementation is crucial to its success. For this reason, such design options are discussed in more detail in section C(d).

4) The correct instrument mix

Particularly in recent years, the emphasis on an *either / or* approach to policy instruments for the achievement of environmental goals has changed, to be replaced by an acknowledgement that a wide spectrum of instruments is necessary to achieve environmental goals. MBIs are now used alongside other environmental measures, such as regulation, and entail environmental, economic and social objectives, e.g. ETR and subsidy reform.

The German experience shows for example that ETR is a very effective instrument to influence the behaviour of households and traffic, whereas emissions trading is more cost-effective and practicable in the industry and the energy sector. Some environmental charges, such as charges on sulphur, pesticides, or water pollution, are effective instruments for dealing with special environmental problems like acid rain or poor land use.

[6] EEA 2005, p. 7

C. OVERVIEW: MARKET-BASED ENVIRONMENTAL INSTRUMENTS IN GERMANY

The German government has set itself the goal of "environmental modernisation" – that is, protecting natural resources while promoting employment and sustainable economic growth. A central policy aimed at achieving this goal is the ecological tax reform (ETR) or "Ecotax". With the Ecotax, the German government is aiming to encourage energy saving and efficient energy use, and to promote renewable energies.

Since 2004, Germany has also participated in the successful European Emissions Trading Scheme and was one of the promoters and proponents of this instrument as well.

1) The Ecological Tax Reform[7]

Germany is by no means alone in using tax policy to advance environmental goals. Denmark, Sweden, Norway and Finland introduced their own ecological tax reforms in the 1990s. Great Britain automatically raised its fuel tax by six percent every year from 1993 to 1999 and since 2000 has taxed energy use in industry under the Climate Change Levy. Sweden has implemented a ten-year-program for a tax shift from labour to environment (details see section E).

After a long and controversial public debate, Germany launched the biggest Ecological Tax Reform in history in 1999. From 1 April 1999, taxes on petrol and diesel, electricity, heating oil and natural gas were increased in five annual steps, and the bulk of the tax revenue generated used to reduce pension insurance contributions.[8] Taxes on transport fuels, for example, were increased by 3 Euro cents per year, i.e. by 15 Euro cents in total.

In the case of electricity, a new tax was introduced; in all other cases, existing energy taxes were increased.

[7] http://www.bmu.de/english/ecological_tax_and_financial_reform/current/aktuell/3822.php

[8] English Information from the German Environment Ministry: http://www.eco-tax.info/downloads/BMUinfo.pdf

Figure 4: Steps of the Ecological Tax Reform in Germany (in Eurocent per unit)

Energy tax rate	1998	1999	2000	2001	2002	2003	2003	Total
	Before ETR	Annual change					After ETR	Tax Increase
Petrol (litre)	50,1	+3,1	+3,1	+3,1	+3,1	+3,1	65,6	**+ 15,5**
Diesel (litre)	31,7	+3,1	+3,1	+3,1	+3,1	+3,1	47,2	**+ 15,5**
Fuel oil (litre)	4,1	+2,1	-	-	-	-	6,2	**+ 2,1**
Natural gas (kWh)	0,2	+0,2	-	-	-	+0,2	0,6	**+ 0,4**
Electricity (kWh)	-	+1,0	+0,3	+0,3	+0,3	+0,3	2,1	**+ 2,1**

Source: Federal Ministry for Finance <BMF>,

For environmental reasons there were some exemptions:

Public transport by bus or train received a 50 percent reduction to the Ecotax.

In order to give efficient technologies a competitive boost, **efficient combined heat and power plants** (cogeneration and use of electricity and heat) with a utilisation rate of 70 percent or more are fully exempt from the existing mineral oil tax.

Highly efficient (more than 57.5 percent) gas-steam power plants also receive a tax exemption.

For systematic reasons, all electricity sources were taxed. **To promote renewable energies** more, an increasing part of the electricity tax was used to subsidise the launch of renewable energies to the market (1999: 0.1 bn. Euro, 2006: 0.23 bn. Euro).

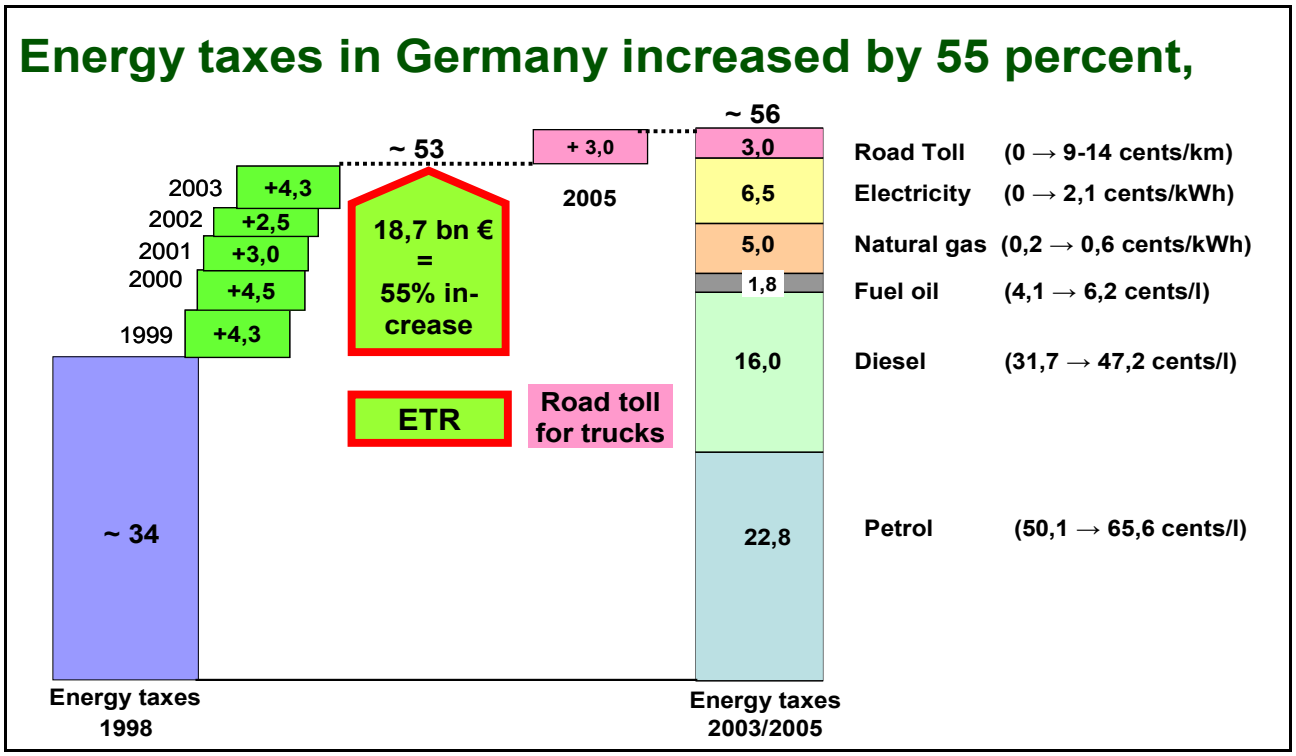
For the **implementation of low sulphur and sulphur-free fuels**, Germany introduced an additional fuel tax (1.6 Cents) for non-low sulphur fuels (sulphur content over 50 ppm) in 2001. In 2003, the limit value was decreased to 10 ppm (sulphur free fuels). This tax differentiation significantly reduces vehicle sulphur emissions and facilitates the development and use of more efficient engine technology.

For **social reasons**, night storage heating systems (which tend to be present in poor households) installed before 1 April 1999 are only subject to half of the increased rate of the electricity tax.

For **competitiveness reasons**, energy-intensive industry pays a reduced tax rate (in 1999: 20 percent of the full rate; in 2003, 50 percent of the full rate). If the tax burden remains unduly high, in spite of these reductions, an additional option has been made available to the manufacturing indus-

try to apply for a tax cap (the so-called *Spitzenausgleich*). As long as the burden from increased ecotax rates is 1.2 times greater than the tax relief from the reduction in pension contributions, enterprises will, on application, be refunded the full differential amount. This gives due consideration to the competitiveness of energy-intensive enterprises and there is no question of production being transferred to locations abroad which do not at present have high energy taxes.

Figure 5: Financial Effects of Ecological Tax Reform in Germany (in Billion Euro)

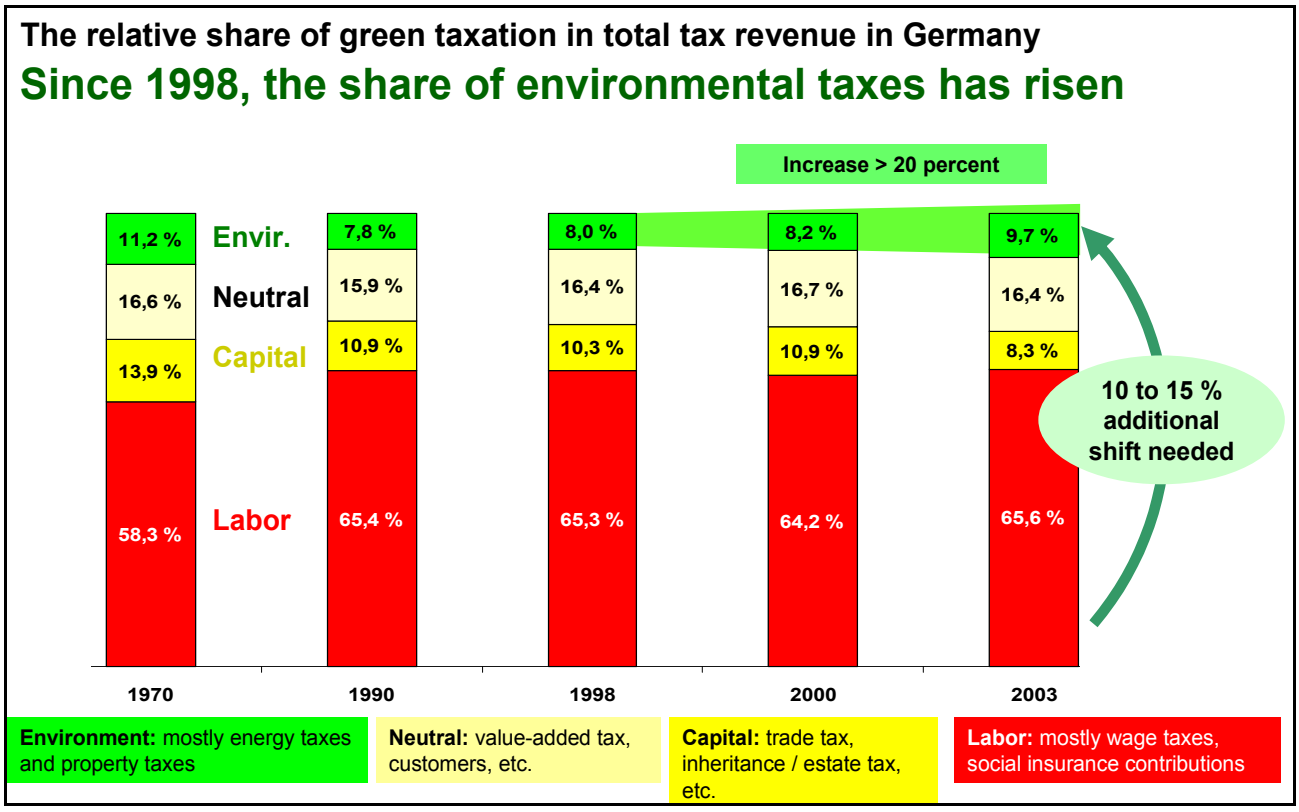


Source: Federal Ministry for Finance <BMF>, Federal Ministry for the Environment <BMU>, Federal Statistical Office.

Tax shift from labour to environment

The Ecological Tax Reform in Germany from 1999 to 2003 increased the total volume of energy taxes from 34.1 billion Euros in 1998 to around 52.7 billion – an increase of 55 percent.

Figure 6:Distribution of the overall tax ratio between the factors employment, capital and environment (in percent)



Source: Ministry of Finance, GBG 2005.

In 2003, the exemptions were reduced and in 2005, the road toll for trucks was introduced.

The revenue of the Ecological Tax Reform was completely recycled (giving revenue neutrality) to the general public by reducing pension costs and supporting environmental projects.

At 16.4 billion Euros (approximately 88 percent of revenue), the federal subsidy to statutory pension insurance contributions was increased from around 60 billion Euros in 1998 to more than 76 billion Euros in the following years. As a result, the rate of contributions to pension insurance is now some 1.7 percentage points lower than it would have been without this increased subsidy. On average, this represents tax relief amounting to 480 Euros per job.

2-3 billion Euros (more than 10 percent of revenue) was used for ecological programmes, particularly the federal government's market incentive programme to promote investments in renewable

energies (0.2 bn), for the CO_2 building renovation programme for the energy-efficient renovation of old buildings (1.5 bn) and for tax exemptions for bio-fuels (1 bn).

Measured in terms of the country's overall tax revenues (2003: around 864.3 billion Euros), **the socio-ecological tax reform of 1999 to 2003 increased the proportion of taxes levied on the factor 'environment' from 8.0 percent in 1998 to 9.7 percent in 2003**.

2) Other Environmental Taxes and Charges

Even though the Ecological Tax Reform is the most important instrument of environmental policy in Germany, especially in terms of climate protection, there are still a number of other environmental taxes and charges which work very well.

Deposits for drinks cans

The government has set out to promote the consumption of drinks in reusable bottles or in ecologically advantageous disposable packaging. Since 1. January 2003, a compulsory deposit has applied to all disposable drinks packaging containing mineral water, beer and carbonated soft drinks9. This deposit has stabilised the reusables share in these drink sectors and has put an end to the "throw-away" mentality. A uniform deposit of 25 cents is charged on all one-way drinks packaging.

In surveys10, 75 per cent of the German population have come out in support of the drinks can deposit, especially because the landscape was freed from throwaway cans. In many supermarkets, disposable cans were no longer sold, being replaced by reusable packaging[11].

Road tolls for Trucks

In 2005, the German government implemented a new road toll system for trucks on motorways in Germany. Every truck has to pay a road toll per kilometre driven on Germany's motorways. The amount is also related to vehicle emissions, and three emissions classes have been introduced. In the first year, road tolls collected revenues of 3 billion Euros in total. In 2006, the government broad-

[9] http://www.bmu.de/english/waste_management/downloads/doc/3386.php

[10] http://www.bmu.de/pressearchiv/15_legislaturperiode/pm/4821.php

[11] Study: Waste Sector's Contribution to Climate Protection: http://www.bmu.de/files/pdfs/allgemein/application/pdf/klima_abfall_en.pdf

ened the scope of these tolls to include some major trunk roads and have been discussing an all-encompassing system of road tolls, perhaps including cars as well12.

Ecological motor vehicle tax (MVT)

The annual taxation of motor vehicles in Germany is relatively high. On average every German person pays 89 Euros annually for MVT, which represents 1.1 percent of total taxation (7.8 billon Euros per year). In Germany, the MVT is based on engine capacity and environmental emission classes.

In May 2005, Germany abolished tax reductions for environmental harmful Sports Utility Vehicles. As a result, 800,000 heavy cars have to pay as much as 500 percent more vehicle taxes than previously – amounting to 300 million Euros in total.

The EU[13] plans to reform the whole MVT system along the lines of the environmental damage caused by vehicles, because in most countries, the main criteria for MVT is not vehicle emissions, but engine capacity. As things stand at present, only Great Britain and Denmark collect MVT in proportion to emissions or fuel consumption.

Other taxes and charges in Germany:

Aircraft noise charges: Landing charges vary by airport.

Water charges: In some regions there are charges on the abstraction of groundwater, as well as waste water charges and water extraction charges.

Charge on dangerous waste: The additional charge for the disposal of dangerous waste differs between 50 and 150 Euros per ton.

Germany has enjoyed positive experiences with a tax differentiation on MVT and/or Mineral Oil Tax for lead, sulphur, particulate emissions and other pollutants. Shortly after the introduction of this tax differentiation – lowering taxes on environmentally friendly cars and fuels and increasing MVT on environmentally harmful cars and fuels – the harmful substances almost completely disappeared from the market.

3) Subsidy Reform

Neither the definition nor the reporting of subsidies is harmonised. Taking the energy sector as an example, international literature on energy subsides applies a wide definition (including regulations that favour certain energy sources, even when the subsidy value is granted off-budget), as shown in Figure 7.

[12] http://www.heise.de/newsticker/meldung/49648

[13] http://www.euractiv.com/en/environment/eu-attempt-link-car-taxes-co2-pollution/article-157492

Figure 7:Energy Subsidy Definitions

UNEP/ OECD/ IEA (2002, p.9)	EU (EC 2002, p.4)
Any government action that concerns primarily the energy sector that:	All measures that offer direct or indirect advantages to energy sources, in particular:
• lowers the cost of energy production	• reduce costs for consumers and producers
• raises the price received by energy producers	• maintain producer prices higher than market prices
• lowers the price paid by energy consumers	• maintain consumer prices below market prices

Subsidies – especially environmentally harmful subsidies – cause some severe problems:

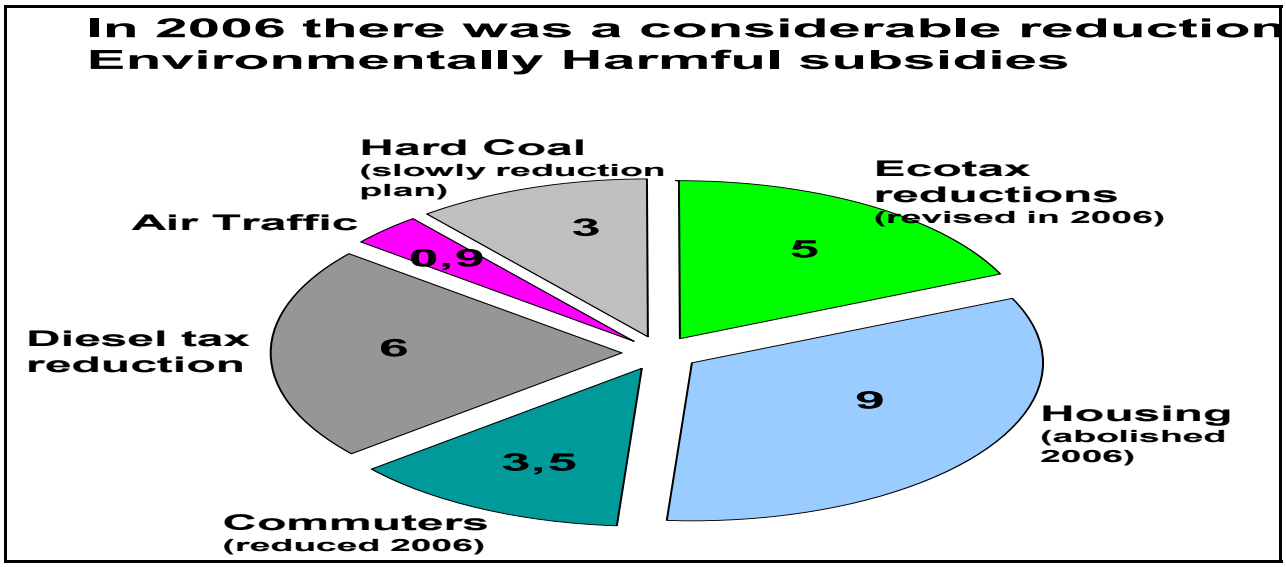
- Market competition is distorted, allocation of resources is suboptimal.
- They have negative – economic and ecological – impacts.
- There is a risk of establishing permanent subsidies that hinder structural change and modernisation; development of a subsidy mentality and subsidy dependency.
- They are the subject of considerable international pressure (e.g. WTO, EU).
- They can lead to deficits in the public budget.
- In terms of bureaucracy, subsidies are costly.
- There is a risk of subsidy misuse and corruption.

To counteract these problems, subsidy policy should be based on the following guidelines:

- In the long run, any energy source must be able to achieve its market position in fair competition – and without public support.
- Fair competition includes full internalisation of external cost – and the chance for renewables to get a fair starting position against coal and nuclear energy, which were heavily supported – directly and indirectly – by public policy over the last five decades.
- Public support in the long run can be justified as far as positive externalities are involved (e.g. in the field of research and development).

These guidelines, combined with an analysis of the problems associated with subsidies, lead to the conclusion that especially environmentally harmful subsidies should be reduced, whereas subsidies for less harmful technologies can have an important function in terms of ‘levelling the playing field’.

Figure 8:Environmentally Harmful Subsidies in Germany in Billion Euros (2005)



Source: EEB 2004, GBG 2006

Before an Ecological Tax or Emissions Trading Scheme is introduced, or at least at the same time as such legislation is implemented, environmentally harmful subsidies should be examined as well. Reducing and eliminating environmentally harmful subsidies is the other side of the coin of ETR – there cannot be an 'either / or' policy, but only an 'as well as' policy, which will help to redirect the fiscal system towards the needs of sustainable development.

It is important to understand explicitly the impacts of subsidies on the different dimensions of sustainable development and whether the benefits merit the costs of the instrument. Studies can also help to find hidden subsidies – like tax-exemptions – in some areas.

The reduction of subsidies is widely discussed in Germany, both in the media and by politicians of all parties. In 2006, the largest reduction and subsidy reform thus far was introduced in legislation initiated by the new coalition government.

Subsidies for buildings

The premium for buying owner-occupied houses has been completely abolished in Germany. This subsidy was criticised by environmental organisations because it created an incentive to build new houses in suburban areas rather than renovate existing houses. This premium amounted to 1,250 Euros per year for a period of 8 years.

Urban sprawl and excessive land-use is a widespread problem in Germany, where 97 hectares of land are developed each day. The government's national sustainable development strategy has set a target of reducing this rate to 30 hectares per day by 2020.

Tax deductions for commuters

In Germany, commuters used to be able to deduct 30 cents per kilometre travelled per working day from their income prior to taxation. This subsidy had very negative effects on the environment, as it created significant incentives for employed people to move out of the city and to commute long distances from suburban areas to their workplaces in the city by car. As of 1. January 2007, the government has abolished tax deductions for commuters for the first 20 kilometres. Total tax deductions in this area will be reduced by 2.5 billion Euros as a result, from an initial figure of 3.5 billion Euros in total.

Tax Exemptions for Aviation

Air traffic emissions pose a serious threat to the climate and generate a considerable amount of noise pollution besides, and air traffic emissions are increasing rapidly. However, in spite of this, kerosene used for commercial aviation is exempted both from excise duties and from energy taxes. Domestic flights are subject to VAT, but international flights are not. In contrast, rail travel is obliged to pay excise duty on electricity and diesel, as well as the full VAT rate on long-distance domestic and international journeys. For this reason, competition between air and rail travel is very unfair – a situation that makes no sense in view of the environment or cost-effectiveness.

The federal German government tried to introduce VAT on international flights and reduce VAT for railways in 2003, but the federal states refused to approve the legislation. The introduction of a ticket-tax on flights in the G8-initiative is currently also being debated[14]. The EU permitted its Member States to tax kerosene in domestic or bi-national flights in the 2003 Energy Tax Directive for the first time. In 2005, the Federal Environment Agency (UBA) promoted a study of the possibilities of a kerosene tax for domestic flights[15] and as well, comprehensively researched the subsidies for aviation[16].

[14] http://www.timesonline.co.uk/article/0,,2087-1650902,00.html
[15] http://www.umweltdaten.de/publikationen/fpdf-l/2905.pdf
[16] http://www.umweltdaten.de/publikationen/fpdf-l/2298.pdf

This year France, Sweden, Great Britain, Brazil and ten other countries started a ticket tax initiative on aviation to increase development aid[17].

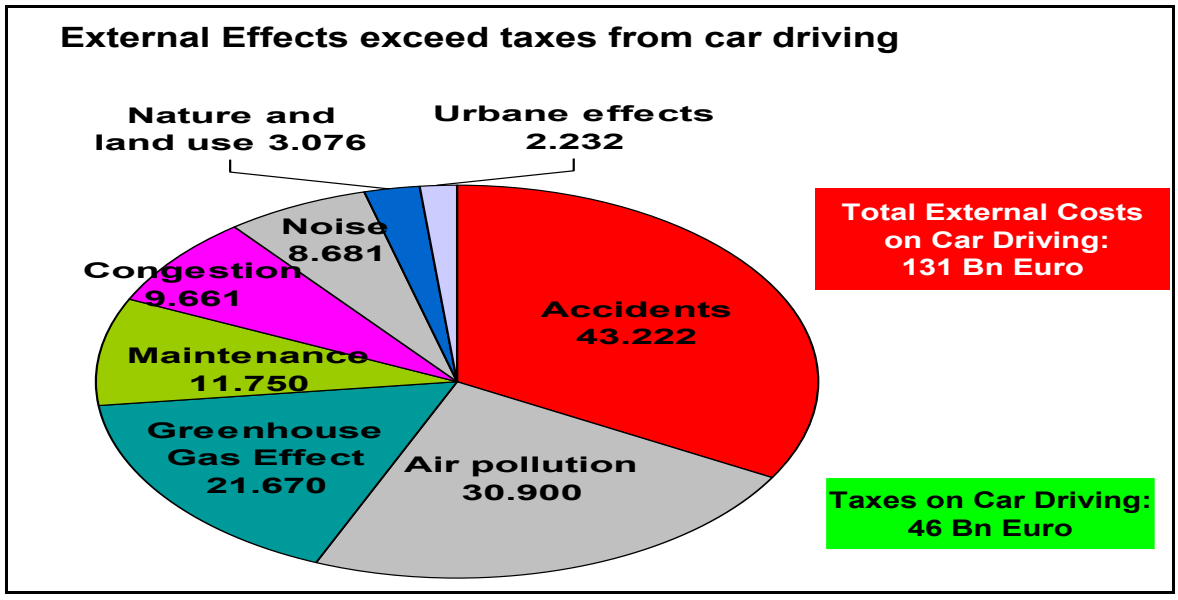
Subsidies for coal mining in Germany

The high level of subsidies for hard coal mining has long been a tradition in Germany. Since 1980, around 100 billion Euros worth of subsidies have been paid to the coal mining industry. Production costs in German coal mines are approximately 140 Euros per ton, while the world market price is only between 38 and 55 Euros. The number of employed workers in the coal-mining sector fell from 130,000 in 1990 to 44,000 in 2003. The subsidies were reduced from yearly 4.5 billion Euro in 1997 to 2.8 billion Euro in 2005. They will continue to be reduced, falling to 1.8 billion Euros by 2012.

Other environmentally harmful subsidies in Germany include the diesel tax-reduction[18], tax privileges for the private use of company cars, and exemptions from VAT for the construction of motorways.

It is fact: The general level of excise duties and energy taxes on motor fuels does not cover external costs of road transport (see below).

Figure 9:External costs caused by traffic in million Euro (2000)



Source: Federal Environment Agency, 2000.

[17] http://www.usatoday.com/travel/flights/2006-03-01-airline-tax_x.htm

[18] Diesel is taxed 18 Euro Cents less than petrol.

4) Emissions Trading

With the implementation of the EU Emissions Trading Scheme in 2004/2005, Germany has started to fulfil its climate change obligations in the industrial and energy sectors, two sectors largely excluded from the Ecological Tax Reform.

Emissions Trading in Germany is based on the European Emissions Trading Scheme (EU-ETS). It is a cap-and-trade system covering EU wide around 12,000 big point sources[19] in the sectors of electricity & heat, iron & steel, refining, glass, pottery, building materials and pulp & paper, which account for 45 per cent of all CO_2 emissions in the EU (the biggest share being the electricity and heat generating sector, which by itself accounts for almost 30 per cent of all CO_2 emissions in the EU).[20]

Participation in the scheme is mandatory for all 25 EU Member States. The EU Directive[21] only determines the broad framework of the scheme. Every Member State had to implement the EU Directive into national law. The Directive leaves some room for the Member States to decide on certain details. The aspects described in this chapter are valid for all Member States.

The EU-ETS covers CO_2 as the only greenhouse gas (GHG) during the first two trading periods. Starting in 2008, EU Member States will have the option to include (or 'opt-in') further GHGs, as for example methane (CH_4), or other sectors.

Trading activities are carried out in consecutive phases, starting with a three-year warm-up period from 2005 to 2007, and continuing with five year periods that are identical to the trading periods of the Kyoto Protocol, thus making it compatible with the international ETS that will start in 2008. The first Kyoto phase (and the second EU-ETS phase) will run from 2008 to 2012 and more five-year periods will follow. Prior to the beginning of each trading period, all participating countries have to draw up a **National Allocation Plan (NAP)** and hand it in to the European Commission. Once handed in, the European Commission has three months to either accept or reject the plans, in which case certain changes have to be made. National Allocation Plans have several main purposes:

- They define the total quantity of allowances that will be given out to all participating emitters (setting the 'cap' in the cap-and-trade system),

[19] Having a specific production capacity above a threshold defined in the EU Directive.

[20] European Commission (2005).

[21] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community.

- They specify the allocation procedure (i.e. decision on whether the allowances will be given out for free, or sold, or auctioned off),
- They include a list of all the installations that will take part in the scheme, and
- distribute the allowances among all installations taking part in the EU-ETS.

One allowance in the EU-ETS covers the emissions of one metric ton of CO_2 equivalent. The allowances are valid for one trading period and in all EU-Member States. Compliance is determined annually, however. For this reason, allowances are distributed until the end of February every year. The amount of allowances corresponding to an installation's real emissions in that respective year has to be handed in by the end of April in the following year. In the time between, facility operators can trade allowances on the market. In the case of non-compliance at the end of the year, operators are subject to severe penalties. These penalties are an important aspect of the trading scheme, which would not work without them.

The allocation of allowances to the installations can be done in different ways and EU Member States can decide individually how this should take place. The Directive only determines that Member States are allowed to auction up to 5 per cent of the allowances during the first trading period (a possibility that has only been used by very few Member States[22]), and starting in 2008, Member States will be allowed to auction up to 10 per cent of the allowances. The rest of the allowances have to be given out for free.

The allocation method used in most EU Member States is the so called 'grandfathering' method, in which allowances are given out for free according to the historical emissions of an installation multiplied by a certain compliance factor, which represents the percentage by which the allocation is reduced. This compliance factor depends on the cap and can vary from sector to sector.

The German NAP[23] – Macro-level allocation

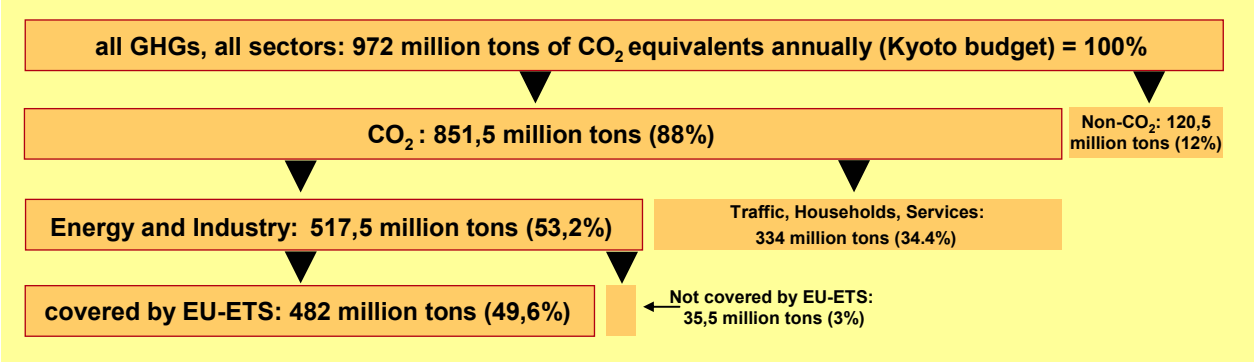
Starting from total emissions of 1,230 million tons CO_2-equivalents in 1990 and taking the reduction target of the EU Burden Sharing Agreement into account (21% by 2008-2012), Germany has a total emission budget of 972 million tons of CO_2 equivalent annually in the period between 2008 and 2012. After substracting non-CO_2 greenhouse gases and the sectors not participating in the EU-ETS, the resulting cap for all installations covered by the ETS in Germany is 482 million tons of

[22] Denmark (5 %), Ireland (0.75 %), Lithuania (1.5 %). Source: Wuppertal Institute, 2006, p. 27.

CO_2 annually after 2008. The emissions trading scheme thus covers around half of all greenhouse gas emissions in Germany.

Between 2005 and 2007, the cap for installations taking part in the scheme has been set at 499 million tons of CO_2 per year and the overall emissions budget is 982 million tons.

Figure 10: Determination of the German emission budget and cap for the period between 2008 and 2012



Source: BMU 2006

Micro-level allocation

Allocation method – As in most other EU Member States, allowances are distributed at no cost to participating installations. They are distributed using the grandfathering method, which requires the definition of a base period and compliance factors, both of which will be explained below.

Base period – The allocation of allowances to single emitters is based on their emissions in a predefined base period and reduced by a certain factor in order to ensure compliance with the cap. The base period for the first trading period was determined to be 2000 to 2002. In the second trading period, the allocation of allowances will be measured against the installations' average emissions between 2000 and 2005. A base period that comprises a longer time period allows for emitters to compensate for years in which their emissions were unusually high or low.

Compliance factors – The compliance factor for the first trading period was set at 92.6 per cent. However, special provisions were introduced for emitters who had already reduced their emissions prior to the start of the trading scheme, as well as for combined heat and power plants, energy-intensive industry, etc. These sectors face higher compliance factors of between 92.6 and 100 per cent. They are favoured because of their greater environmental friendliness and their higher degree of vulnerability to competition, respectively.

[23] National Allocation Plan.

There will only be three compliance factors in the second trading period.

Power plants and heating plants will be subject to a compliance factor of 85 percent.

Installations of the industry sector and environmentally friendly combined heat and power plants, on the other hand, will face a higher compliance factor of 98.75 percent. This higher compliance factor has been assigned to the industry sector in order to avoid production capacity moving to other countries where no emission trading schemes are applied. Industrial installations compete directly with other installations worldwide, whereas energy generation is not usually exposed to such competitive pressures.

Participation in the emissions trading scheme is comparatively laborious and costly for small installations (emitting less than 25,000 t CO_2/a). In order to relieve them of this burden, a compliance factor of 100 per cent was attributed to them.

New entrants – Since newly built facilities did not operate during the base period, the allocation method described above cannot be applied to them. This is why allowances are allocated according to the best available technology (BAT). To enable this process, BAT-benchmarks are defined in the German NAP specifying the levels of emissions that result from certain activities (e.g. the production of one ton of cement) using the best available technologies. Allowances of that amount are then given to the new installations at no cost, in order to provide an incentive for new, more efficient facilities to be built.[24]

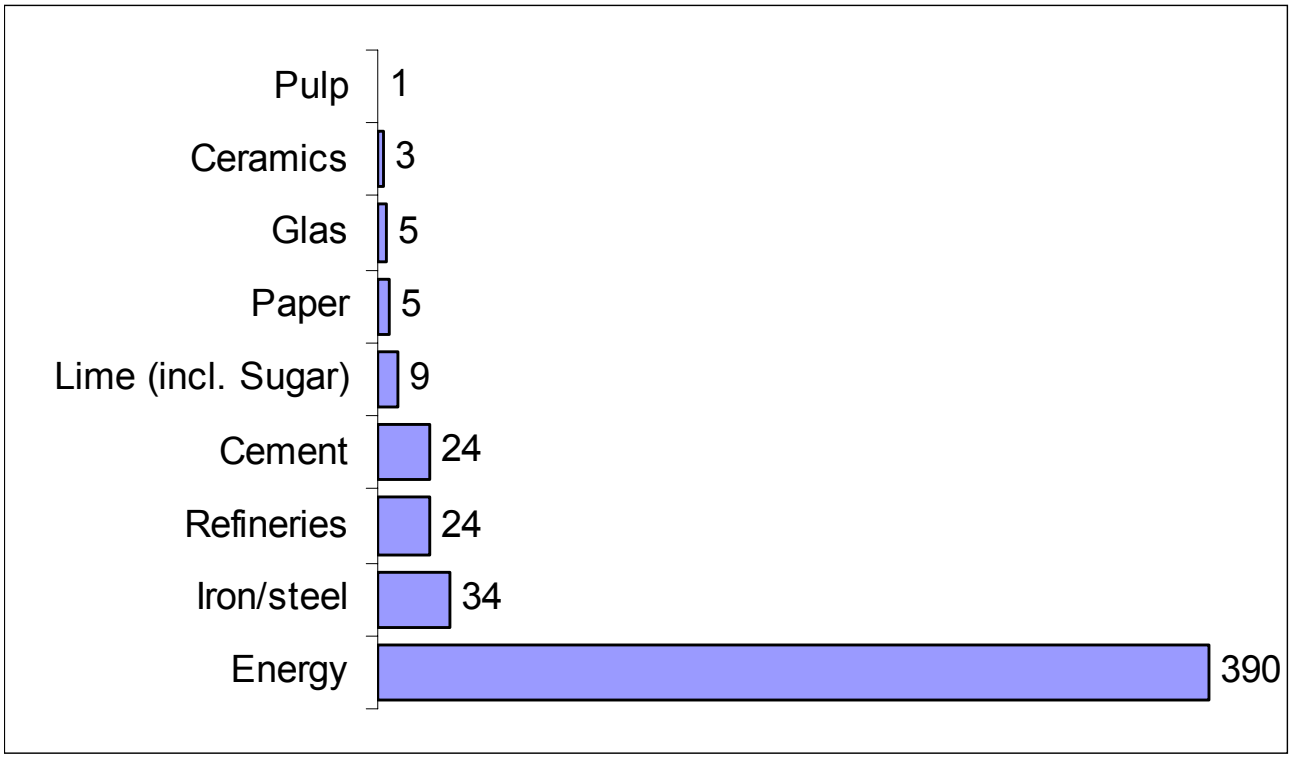
Results of the allocation procedure

In total, 1849 installations are taking part in the first phase of the ETS in Germany, which runs between 2005 and 2007. Most allowances (79%) were allocated to the electricity sector and some (21%) to the industry sector. The biggest emitters in the industry sectors are the iron and steel industry, refineries and the cement industry.[25]

[24] In total, 19 different benchmarks have been defined for new installations taking part in the EU-ETS, of which only a few are named here: coal-fired power plants: 750g CO_2 per kWh, natural gas-fired power plants: 365g CO_2 per kWh, production of cement: 805-845 g CO_2 per kWh (depending on the technology used).

[25] A coal power plant received the highest allocation (29 million tons, equalling 5.8 per cent of the total emissions budget in Germany). The lowest allocation was only 4 tons a year (for a reserve heating plant). The average size of an installation taking part in the ETS is lowest in the ceramics industry and highest in the iron/steel industry.

Figure 11: Allocation of allowances to the different sectors in Germany in 2005-2007, in mio. allowances p.y.



Source: Federal Environment Agency (UBA) 2005

Smaller installations only receive a small share of the total emission allowances. 53 percent of all installations received an allocation of less than 25,000 t CO_2/a, corresponding to only 1.9 percent of the total allocation budget. That means, on the other hand, that 98.1 per cent of all allowances in the scheme were allocated to only 47 per cent of the installations. Nearly the same emission reductions could thus have been achieved by including only half of the installations.

D. Positive Effects of Ecological Tax Reform and Emission Trading

The actual effects of market-based instruments have often been better than theoretical predictions had previously suggested. The increase in world oil prices, the strong public debate about environmental concerns and some technological innovations (energy efficiency, renewables) have influenced this process in a positive way.

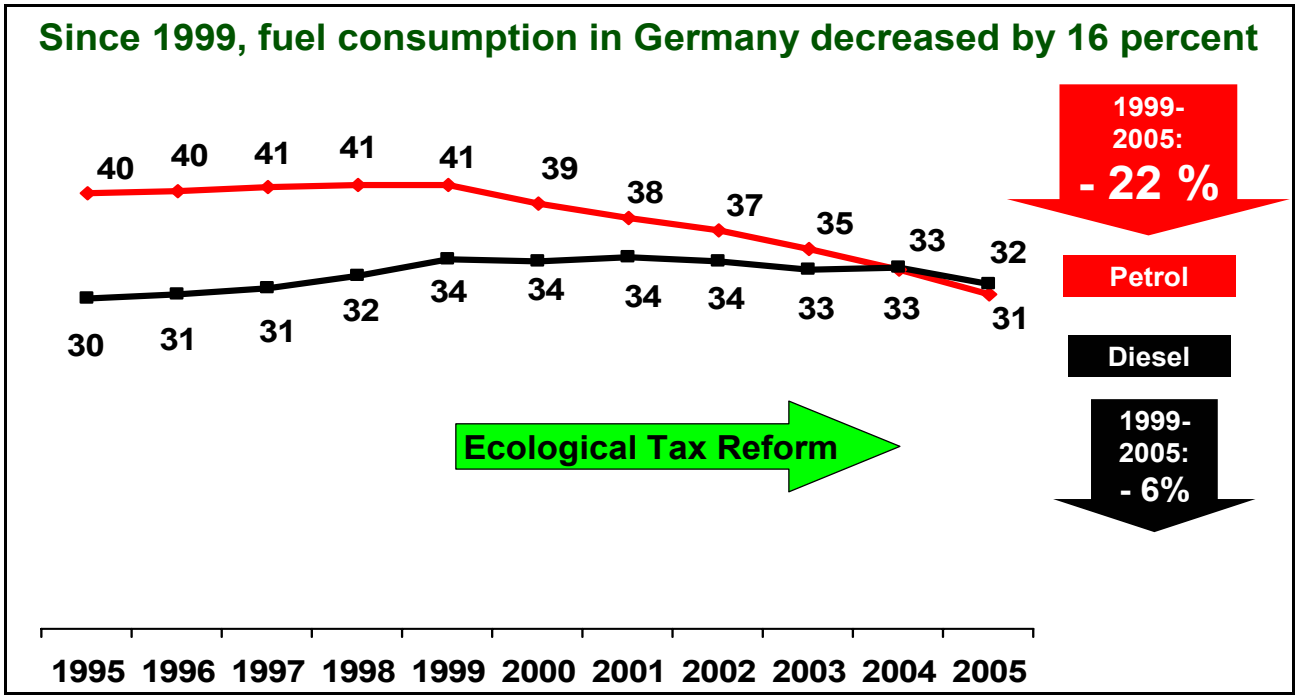
1) Environmental Effects of the Ecological Tax Reform in Germany

During its first five years in force, the ecological tax reform brought tangible environmental improvements:

For the first time since the establishment of the Federal Republic of Germany, fuel consumption, and hence CO2 emissions in the transport sector as well, fell for six consecutive years (2000-2005), whereas prior to this they had increased almost every year without exception. According to figures from the Federal Statistical Office, fuel consumption in road traffic has been decreasing continually, with decreases of 2.8 percent in 2000, 1.0 percent in 2001, 2.3 percent in 2002, 3.5 percent in 2003, 2.3 percent in 2004 and 5.9 percent in 2005.

The reasons given for this decrease include efficient, more cautious driving habits and overall mileage reductions, due to the higher petrol prices, and the lower specific mileage fuel consumption of new vehicles.

Figure 12: Fuel Consumption in Germany in Million Litres (1995-2005)



Source: Federal Statistic Office, 2006

Since 1999, the number of passengers using public transport has increased – for the first time in many years. Up until 1998, passenger numbers on public transport had been falling continuously but since that time, the trend has been reversed and numbers have increased for five years in succession.

Figure 13: Increases in the number of passengers using public transport, 1999 to 2003

1999	2000	2001	2002	2003	2004	2005
+0.4%	+0.8%	+0.8%	+0.5%	+1.5%	+0.9%	+1.0%

Source: Federal Statistical Office 2006

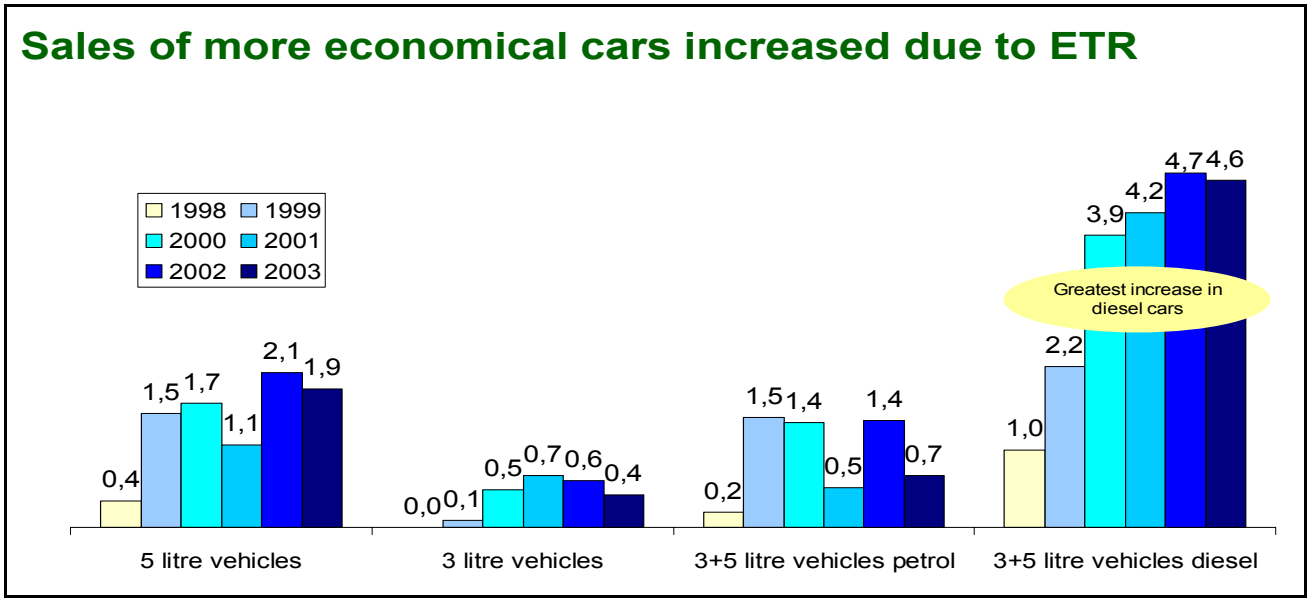
As a result, CO_2 emissions were cut by around six to seven percent in relation to the all time high reached in 1999.

Fuel consumption has also reverted to being a key decision-making factor when purchasing a vehicle: The consumer research organisation GfK undertook a representative survey of German car drivers and ascertained that for 63 percent of all those questioned, high fuel prices influence the purchase decision of their next car. According to a recent survey by the market research institute Emnid, 89 percent of respondents claimed that environmental compatibility is their top priority when buying a car.

As well as the reduction in fuel consumption, the number of natural gas-powered vehicles in Germany also increased by 2,000 between 2000 and 2004, to more than 20,000 in total. This reflects the tax advantages of using natural gas in the transport sector, as well as the commitment to develop a nation-wide network of natural gas filling stations by 2006.

The number of new registrations of efficient cars has also increased significantly.

Figure 14: Number of new registrations of three- and five-litre cars in the vehicle fleet



Source: Own calculations based on figures provided by the Federal Vehicle Traffic Agency 2004

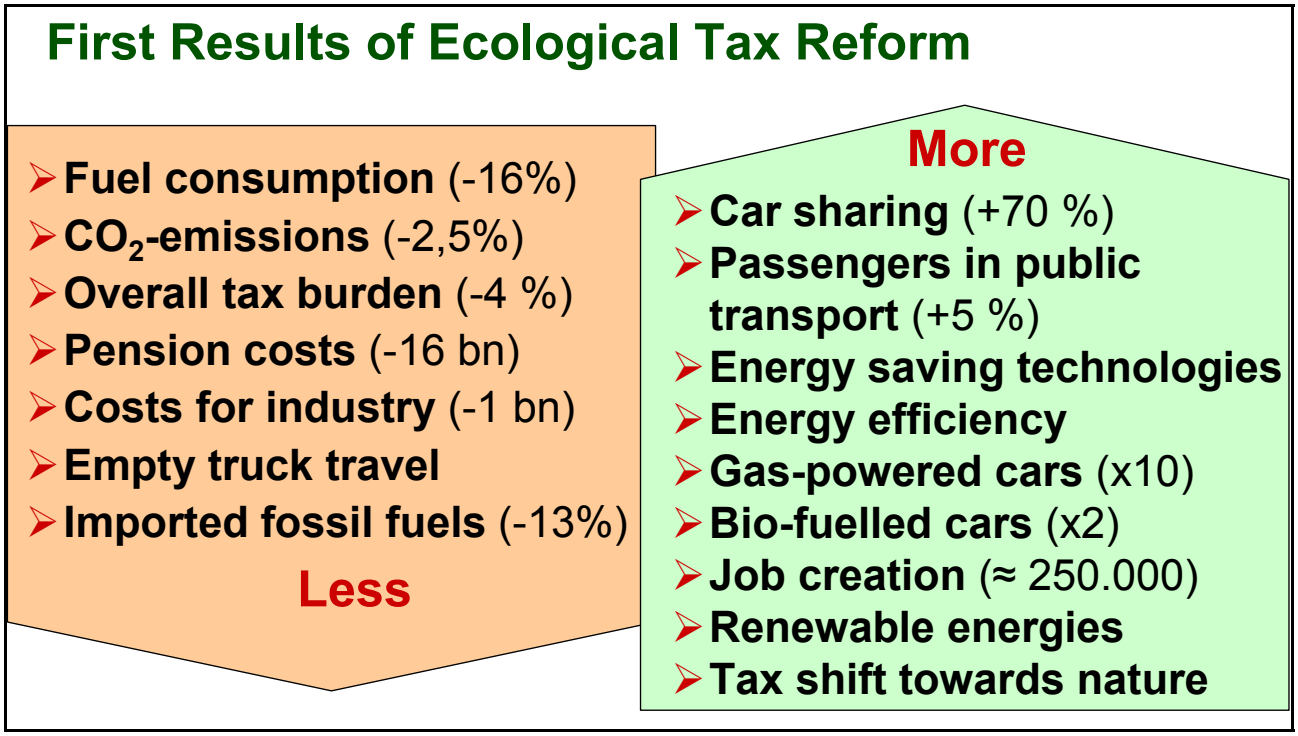
According to figures provided by the umbrella organisation for German CarSharing providers (Bundesverband CarSharing), the number of customers who are members of a car sharing organisation increased by 26 percent in 2000, 22 percent in 2001, 8 percent in 2002 and 15 percent in 2003 in relation to the previous year.

Goods transports on roads have also decreased in the past few years. The Federal Statistical Office reports that tonnage in road transport of goods decreased by 2.9 percent in 2001, 4.3 percent in 2002 and 1.5 percent in 2003. In 2003, railway goods transports actually increased by four percent.

Transport companies are responding to the increased pressure to adapt by using their vehicles more and more efficiently. According to the Federal Office for Goods Transports, total no-load mileage of German trucks, as a percentage of total mileage, has continued to decrease, while the percentage share of with-load kilometres has increased further – in 2000, somewhat more strongly than in the years before: with-load kilometres as a percentage share of total kilometres increased from 71.4% in 1995 to 73.4% in 1998, to 74.1% in 1999 and to 75.3% in 2000.

The manufacturers of solar thermal installations for the supply of hot water are likewise showing double-figure growth rates – renewable energies are booming, thanks in part to the ecotax on heating fuels and the market incentive programme for renewable energies funded from the ecotax. At the end of 2002, there were more than 4.2 million square metres of solar panels in total in Germany, twice the number installed in 1998.

Figure 15: Positive effects on the environment, innovation and employment



Source: Federal Ministry for the Environment <BMU>, GBG 2006

The climate, the environment, the job market and innovative enterprises all benefit from the ecological tax reform, as the reform makes it possible to reduce automobile traffic, with its high external costs; replaces automobile transports with more environmentally sound modes of transport; and reduces energy consumption and related environmental pollution by promoting use of alternative fuels. These positive trends need to be reinforced via a reliable framework, as a reliable planning framework is one of the keys to incentivising energy-saving investments, which can take a number of years to pay off. A current research project points out single technologies and entrepreneurs benefiting from the ETR through increased energy cost savings, increased turnover due to new energy-saving technologies, and more job opportunities through reduced labour costs26.

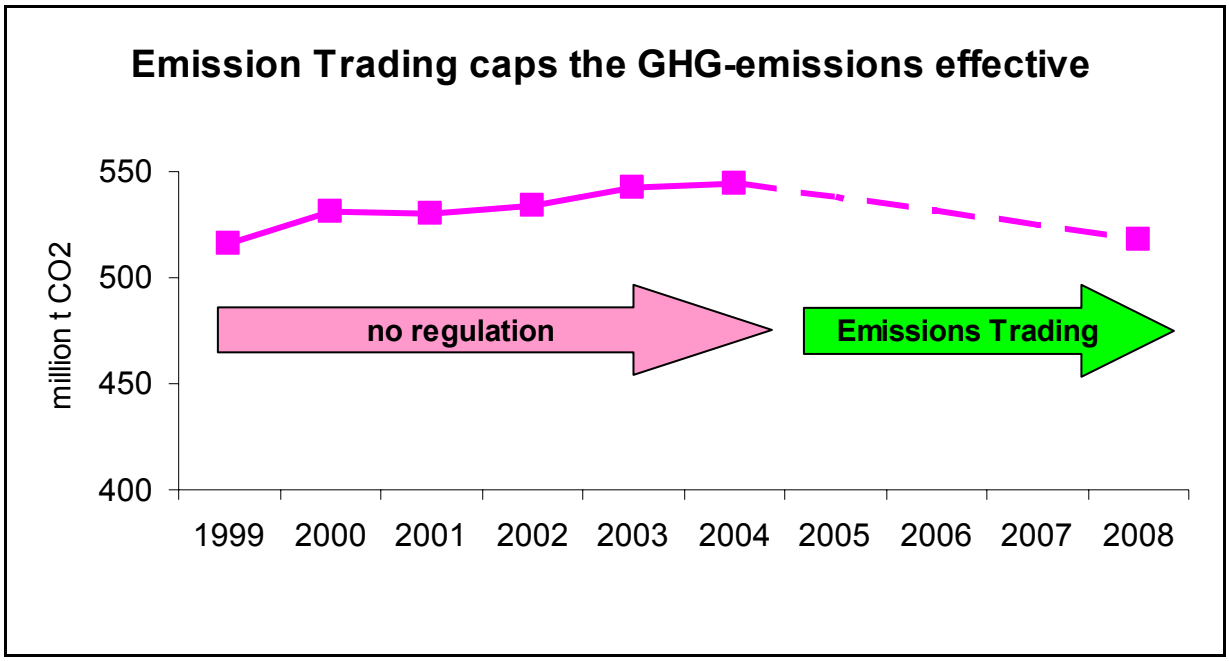
These developments cannot be attributed to the ecological tax reform alone. The world market price for crude oil, the dollar exchange rate, the economy, and government subsidy programmes all likewise play a key role. However, the decisive fact is that higher energy prices influence consumer behaviour, and the ecological tax reform lends additional impetus to this process. Looking back to the year 2000, it becomes clear that successful savings were essentially triggered by the socio-ecological tax reform. Rarely has energy saving been publicised so comprehensively. This took place despite the supposed perception that the ecotax is primarily 'to blame' for the high oil prices (although at the time, the ecotax only accounted for one-quarter of the increase in petrol prices). As the first stages of the ecotax were very moderate, it would be unrealistic to expect a miracle in the few years since its introduction. Consumers and companies will only permanently increase their investments in energy-saving technologies and significantly reduce energy consumption if they can be reasonably confident that ecotaxes will continue to rise in the longer term.

2) Environmental effects resulting from emission trading

The most important environmental effect is, of course, the reduction of greenhouse gases. Between 2000 and 2002, the German installations covered in the ETS emitted 501 million t/a. From 2005 to 2007, they are only allowed to emit 499 million t/a. After 2008, their emissions can only amount to 482 million t/a. The absolute cap thus stops the trend of increasing emissions in the energy and industry sectors, a trend that has been established since 1998, and in so-doing achieves the overall target of the emission trading scheme: reducing greenhouse gas emissions (see figure 3). A positive side effect of reducing greenhouse gas emissions is also the reduction of other air-pollutants.

[26] http://www.umweltdaten.de/uba-info-presse/hintergrund/oekosteuer.pdf

Figure 16: Emissions of the energy and industry sector 1999 to 2008

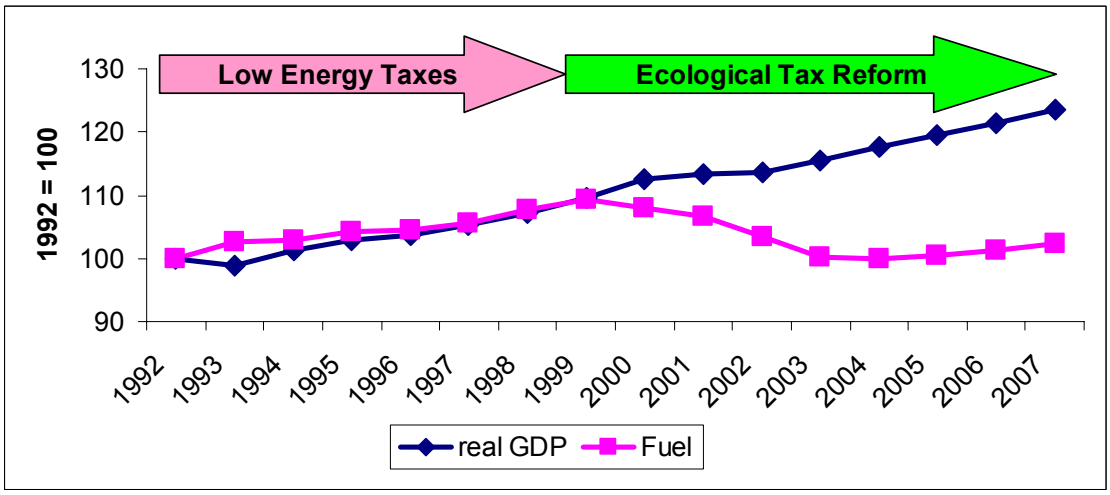


Source: own illustration, based on UBA 2006, BMU 2006

3) Increase in Energy Efficiency

Traditionally, economic growth has been correlated to increased energy use – and according to expectations, growth required increased fuel consumption. Since 2000, however, this link has been broken and while GNP has been steadily increasing, the amount of fuel consumed has been decreasing. This can be attributed to higher fuel prices, resulting from crude oil price increases and increasing energy taxes as a result of the Ecotax.

Figure 17: There is no longer a correlation between real GDP and fuel consumption in Germany



Source: Ministry of Finance 2003

As the graph clearly shows, GNP has continued to increase steadily since 1999, while fuel consumption has decreased since the introduction of the Ecotax Reform and in 2003, even reached 1992 levels. The link between fuel consumption and economic growth has been broken.

At the same time as the Ecotax was introduced, the proportion of taxes and charges fell.

Several studies show that greenhouse gas emissions reductions can be achieved at a lower cost by applying emissions trading schemes. Cost savings are estimated to be €230-545 million for Germany27 and € 3.5 - 4 billion for the EU28.

Emissions trading schemes provide incentives for the construction of new power plants because they are more efficient and have lower specific CO2 emissions. Consequently, the German energy sector has announced it will invest in the construction of new, highly efficient power plants. Planned projects (until 2012) will have a capacity of about 20 GW29 and will replace about 20 percent of the currently installed capacity.

Electricity production has also shifted from inefficient power plants to already existing ones that are more efficient, and to power plants that use less carbon intensive fuels. Therefore, the generation of electricity in natural gas fired power plants increased by 8.5 TWh or 14 percent. At the same time, lignite-fired power plants generated 3 TWh or 2 percent less, and hard coal-fired power plants 6.9 TWh or 5 percent less electricity in the year 2005.30

The emissions trading scheme also provides incentives for the modernisation of existing power plants in order to make them more efficient.

4) Growth and Economy

The positive impacts of the ETR in Germany were also confirmed by a research report produced in 2001 by four institutes, led by the German Institute for Economic Research (the DIW). For the transport sector, it predicted that CO2-emissions in the transport sector would be reduced by 3.84 percent by 2010 in relation to 1998 levels. Here, policy advice helped to inject more rationality into the public debate, though this was basically a report produced for interested stakeholders. However, the government used the findings to underline the appropriateness of the ETR. An update of that

[27] Ökoinstitut et. al (2003), page 150.

[28] EEA (2005), page 7.

[29] BMWT / BMU (2006), page 69.

[30] AG Energiebilanzen (2006).

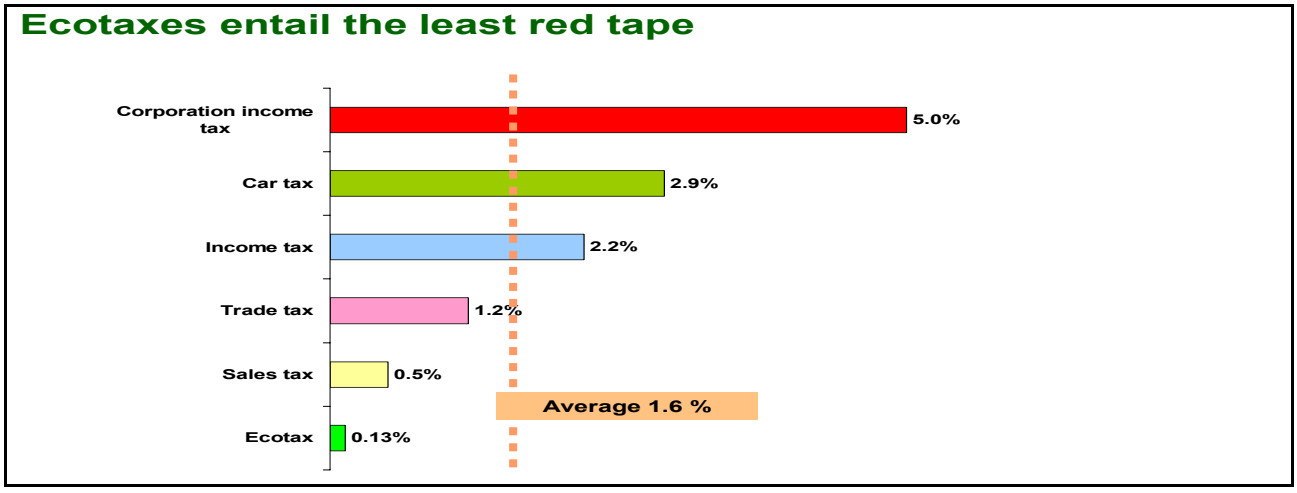
study in 2005, now also including an ex-post evaluation of the ETR, empirically based in part on a series of interviews, showed that about half of the population had taken additional measures due to the incentives created by the ETR. The reduction in CO2 emissions as a result of the Ecotax amounted to 20 million tons in 2003. To put this in context: total CO2 emissions from all private households in Germany amount to 120 million tons. As well, 250,000 new jobs were created, mainly in labour-intensive companies (such as the service industry), and in the energy efficiency and renewables sectors31.

Less Bureaucracy

The ecological tax reform is often incorrectly associated with additional bureaucracy. In fact, it is the tax with the lowest administrative input of all in Germany. Unlike an income tax declaration, there is no work involved for the average car driver or electricity consumer, who may not even notice paying the ecotax. Particularly in relation to the administrative costs of direct taxes and social security contributions, the ecological tax reform performs very favourably in terms of cost.

Just 275 employees in the customs administration and Federal Ministry of Finance are involved in handling the ecotax. The annual financial expenditure on public administration of the ecotax, including material costs, is 18 million Euros[32]. At 0.13 percent of total revenue, the ecotax entails the lowest administrative costs of all German taxes!

Figure 18: Administrative cost of various tax types compared with total revenue (percentage)



Source: Federal Ministry of Finance, German Bundestag <Lower House of Parliament>

[31] http://www.umweltbundesamt.de/uba-info-presse/2005/pd05-059.htm

[32] Response by the Federal Government to the oral question by the CDU/CSU parliamentary party, "Prevention of and obstacles to corporate development as a result of excessive bureaucracy" of 7 October 2002, publication 14/9993.

5) Innovations

Market research has shown that the demand for energy-efficient products has significantly increased in countries with ETR. The boom in renewable energies, energy-efficient technologies, insulation and energy saving services has created new jobs. In the renewable energy sector alone, 150,000 jobs have been created in Germany and average annual growth in the manufacture of energy-efficient products has reached 4.6 percent, and the export of such products has achieved an annual growth rate of 9 percent! In contrast, manufacturing achieved annual growth rates of 2.6 percent, and manufacturing exports of 3.9 percent per year.

Energy efficient vehicles have also made considerable progress on the market. CO_2 emissions from newly registered vehicles throughout the EU have decreased by more than 10 percent since 1995. The EU aims to reduce emissions from new vehicles by 35 percent by 2010 at the latest.[33]

6) Social Reforms and employment

The social effects of the Ecological Tax Reform have been intensively discussed. Poor households are often non-motorised, and thus increases in transport fuel taxes are not important to them. To address any potential regressive effects of the reform, the heating costs of welfare recipients are refunded and public transport only has to pay reduced Ecotax rates. In addition, the reduced electricity tax rate for night storage heating systems was introduced for social reasons, because such heating systems tend to be installed in poor households.

Studies have shown that the Ecological Tax Reform has a low regressive effect on medium incomes and a progressive effect on incomes between €55,000 and €250,000 per year.

The reduction of emissions and noise pollution from road vehicles is particularly helpful for low-income households, which tend to live near busy streets.

In Germany, it was important that the ETR was embedded in a greater Social (Tax) Reform[34]. Income taxes for working people were reduced during the implementation period of the ETR, in particular taxes on low incomes (which fell from 25.9 % in 1998 to 15 % in 2005). The overall tax ratio fell by more than four percent from 1999 to 2003, while energy taxes increased by 55 percent in the same period.

[33] Press release of the European Commission, 13th February 2004.

[34] http://www.deutschebotschaft-china.org/de/home/Aktuelles/Die_Reformen.htm

The reduction of social contributions by means of recycling Ecotax revenues and the efficiency revolution in new products and technological innovation stimulated by the implementation of the ETR has created up to 250,000 new jobs[35].

Jobs in renewable energies have more than doubled since 199836. Now more than 150,000 people work in the solar, wind energy, geothermal, hydro-electric and biomass energy sectors. In comparison: in the "old energy sectors" like coal, nuclear power and lignite, there are only 107,000 jobs in the whole of Germany.

Thus, the Ecological Tax Reform could make an important contribution to both the social and the environmental aims of the government.

7) Employment and Economy

As was claimed by researchers at the start of the 1990s, environmental taxation can result in a so-called 'double dividend' – i.e. other positive effects, aside from improved environmental protection, relating to the use of ecotax revenues. These revenues are used to reduce other distortionary taxes, most notably taxes on labour, while balancing the budget at the same time. In addition, ecotaxes improve efficiency in consumer and investor behaviour in business and among the general public. Thus, the economic effects of the reform are extremely positive.

Research has shown that up to 250,000 jobs have been created in Germany as a result of the ETR, particularly in energy-efficient industries, services, renewable energies and in exports. Research in the relevant sectors has shown that the highly competitive manufacturing industry has profited to the tune of 1 billion Euros net as a result of the Ecological Tax Reform. Thus, the reform has enabled Germany to strengthen its position as world leader in terms of export surplus .

Emissions trading schemes only have a very small influence on employment. Several research projects carried out about this topic have only attested to very modest losses or gains[37].

As for competitiveness implications, there is reason to assume that the EU-ETS has a positive impact on most sectors, which may profit from the scheme. Only one of the participating sectors (alu-

[35] http://www.umweltbundesamt.de/uba-info-presse/2005/pd05-059.htm

[36] http://www.bmu.de/files/erneuerbare_energien/downloads/application/pdf/arbeitsmarkt_ee_2006.pdf

[37] http://www.wwf.de/fileadmin/fm-wwf/pdf_misc-alt/klima/ZEW-Studie_zum_Europaeischen_Emissionshandel__ETS_.pdf

minium smelting) is clearly disadvantaged, since rising electricity prices have strongly exposed the industry to the full pressure of international competition. According to the Carbon Trust (2004), the impact on the steel industry may be positive or negative, depending on the strength of the scheme and the steel market behavior.[38]

8) Political Acceptance

The OECD has contended that the political acceptance of environmentally related tax among the public at large appears to be related to the degree of awareness of the environmental problem the instrument is trying to address. For example, the introduction of tolls on HGVs crossing the Alps, which had been the focus of negative attention for many years, met with widespread acceptance in Switzerland. Similarly, a plastic bag tax in Ireland received widespread acceptance, as the campaign targeted the awareness of the population of the nuisance caused by plastic bags. Conversely, it may prove more difficult to generate acceptance for instruments tackling less visible environmental problems, such as climate change, or the destruction of the ozone layer.

In Germany the Ecological Tax Reform was hotly discussed by all political parties and NGOs. In the early 1990s, there was a great deal of sympathy felt for environmentally-related instruments from the Conservatives in German politics and industry as well. Then, the Social Democrats and the Greens developed comprehensive Ecotax proposals and included them in their political programs. Following the electoral victory of the Social Democrats and the Greens in 1998, the ecological-social tax reform was implemented with the support of Trade Unions and environmental NGOs, in spite of the opposition of the Conservative and Liberal opposition parties and industry. In the wake of oil price rises in the year 2000, there were Europe-wide protests from car drivers and farmers against high petrol prices. But because a considerable proportion of the revenues from the Ecotax in Germany were used to reduce pensions payments, the German government was not prepared to go back on the Ecotax and stood up against the protestors. In 2002, following a series of floods in Germany, the government was re-elected as voters acknowledged the impact of climate change on their everyday lives.

The conservatives today also acknowledge the successes of the Ecotax for the environment, the economy and the social security system and did not call for the withdrawal of the Ecotax during their 2005 election campaign. In the coalition agreement between the Christian Democrats and the

[38] Carbon Trust (2004).

Social Democrats, keeping the Ecotax was explicitly agreed upon and included within the government program, as were further steps to reduce environmentally damaging subsidies.

An important factor for this success was almost certainly the German government's public information campaign for the Ecotax. Cinema advertisements (save fuel / climate protection) and a poster campaign ('What are the benefits of the Ecotax?') were used to enhance the political acceptance of the Ecotax. NGOs like Green Budget Germany were involved in this acceptance building, publishing information materials for schools and universities[39].

E. Other Market Based Instruments in European Countries

Other EU and European countries also levy several environmentally related taxes, the vast majority on energy products and motor vehicles. As the box shows, there are also a number of taxes related to waste management and other pollution issues. Recently, some countries have also introduced new energy / climate change related taxes, such as taxes on CO2 or other GHG emissions.

Environmentally-related taxes used in European countries

- Transport related taxes – motor vehicle tax, road tolls, charges for infrastructure use
- CO_2 taxes
- Air pollution: levy on NOx , SO_2
- Products: taxes or charges on a wide range of polluting products, including: batteries, plastic carrier bags, disposable beverage containers, different deposit-refund schemes, chlorofluorocarbons (CFCs) and/or halons, disposable cameras, lubricant oil, or oil products.
- Waste: waste taxes (landfill tax) in many EU Member States, hazardous waste taxes or charges in a number of countries, user charges in many municipalities.
- Water: user charges for water, water extraction tax, wastewater tax/charge.
- Agricultural inputs: taxes or charges on pesticides
- Fisheries: levies on boat owners, levies on recreational fishing.
- Mining taxes.
- Others: Aggregates taxes, covering sand, gravel and/or crushed rock, air transport (noise charges), chlorinated solvents, disposable tableware, light bulbs, PVC, phthalates, junk mail, vehicle scrapping charges, electronic and electric waste, nuclear waste management, and air polluting emissions from incinerators.

A database operated in co-operation between OECD and the European Environment Agency (EEA) currently details about 375 such *taxes* in OECD countries – plus *i.a.* some 250 environmentally-related fees and charges.

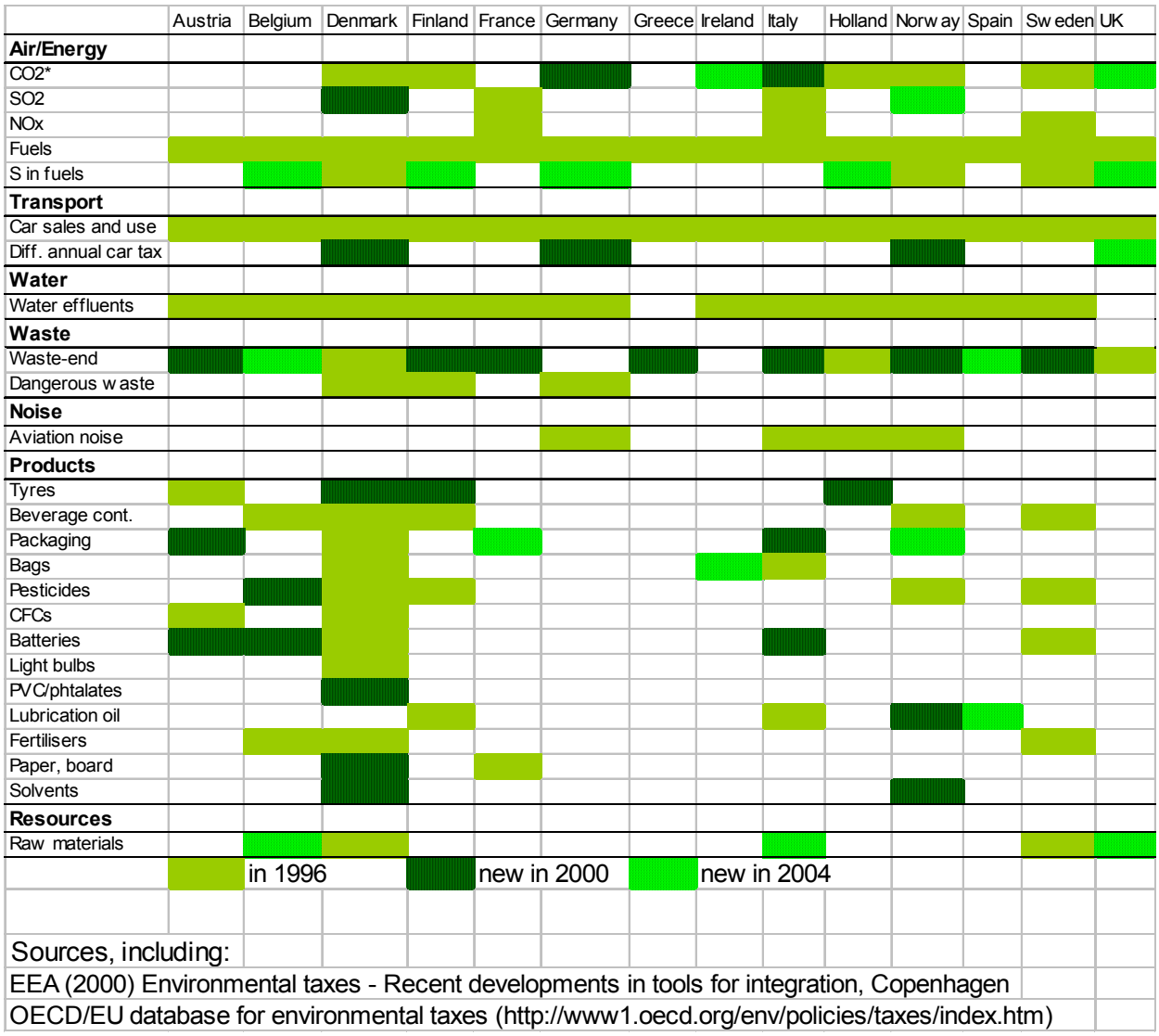
See: www.oecd.org/env/tax-database

Germany was not the first country to introduce an ETR. Before, Finland (1990), Den-mark (1992), the Netherlands (1996), Sweden (1991), the United Kingdom (1993), Slovenia (1997) and Norway (1991). Italy and France esta-blished some elements of an ETR 1999 and 2000[40].

[39] http://www.foes.de/de/unterrichtsmaterialien.php?PHPSESSID=c9b020d1a8d64b93fffe47ea194f6202

[40] http://www.levego.hu/kiadvany/allamhaz/kai_schlegelmilch_presentation.ppt

Figure 19: Environmental Taxes in some European Countries



Source: Hans Vos, OECD, EEA database 2005

Pesticides and Fertilizer Taxes

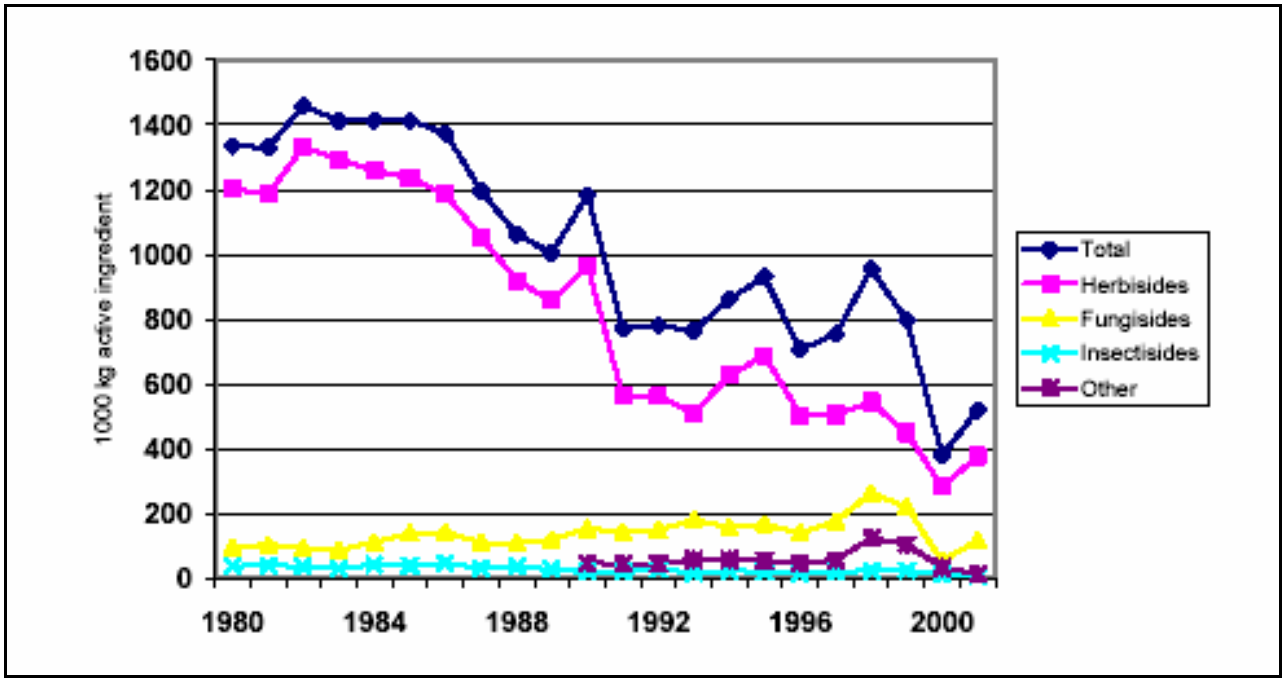
Taxes or charges on pesticides are currently in place in five European countries (Belgium, Denmark, Finland, Norway and Sweden) and on fertilisers or nutrients in three (Denmark, the Netherlands and Sweden). The design of these taxes, and consequently their effectiveness, differs from country to country[41]. In most cases, the taxes are reinvested in the agriculture sector. These taxes resulted in improved efficiency in the use of fertilizers and decreased the dangers attributable to toxic pesticides.

[41] http://www.foes.de/de/downloads/tagungvilm2005/scandinaviastudy.pdf
http://www.foes.de/de/downloads/tagungvilm2005/netherlandsstudy.pdf

In 1999, the tax system for pesticides in Norway was changed from a flat rate tax to a tax differentiated according to environmental and health risks. The change in the tax system seems to have changed the use of pesticides in the desired direction. Differentiation according to risk is advisable and also seems to work[42].

The costs of running the system are rather low, about 1% of the tax revenue.

Figure 20: Use of pesticides in Norway (1 t active ingredient)



Source: Ifls 2004

The Irish Plastic Bag Tax – An Easy Solution for a Serious Waste Problem

In 2002, Ireland very successfully introduced a tax on plastic shopping bags. Plastic bags were a big environmental problem in Ireland at the time because they were a highly visible component of litter and had a negative impact on habitats and wildlife. Prior to the introduction of the levy, some 1.2 billion plastic shopping bags were used by the Irish consumer (about 325 bags per person per year). The new levy is fixed at 0.15 Euro per bag. Retailers have reported a reduction of over 90 % in the provision of disposable plastic bags since the levy's introduction. The levy is very popular in Ireland because of their environmental benefits and a more cleaner landscape and streets.

http://www.nabu.de/landwirtschaft/oekofinanzreform.pdf

[42] http://www.foes.de/de/downloads/tagungvilm2005/norwaystudy.pdf

This example shows how great environmental changes can be achieved using taxes. In this case, the plastic bag tax is very simple and transparent and an easy alternative is readily available: people can use their own bags easily as a substitute for plastic bags.

The new Chinese tax on chopsticks works in a similar way[43].

Congestion Charges in London and Stockholm

In the United Kingdom, a road toll system was introduced in London in 2003 that levied a significant fee on any vehicle that enters the city centre. A recent review of the charging system shows that congestion within the charging zone has been reduced by 30 % and the volume of traffic by 15 %. Public transport volumes have increased. Stockholm launched a congestion charge in 2005. After a test period of 6 months, local inhabitants voted to continue with the charge in a local referendum.

The Green Budget Shift in Sweden – A ten year program

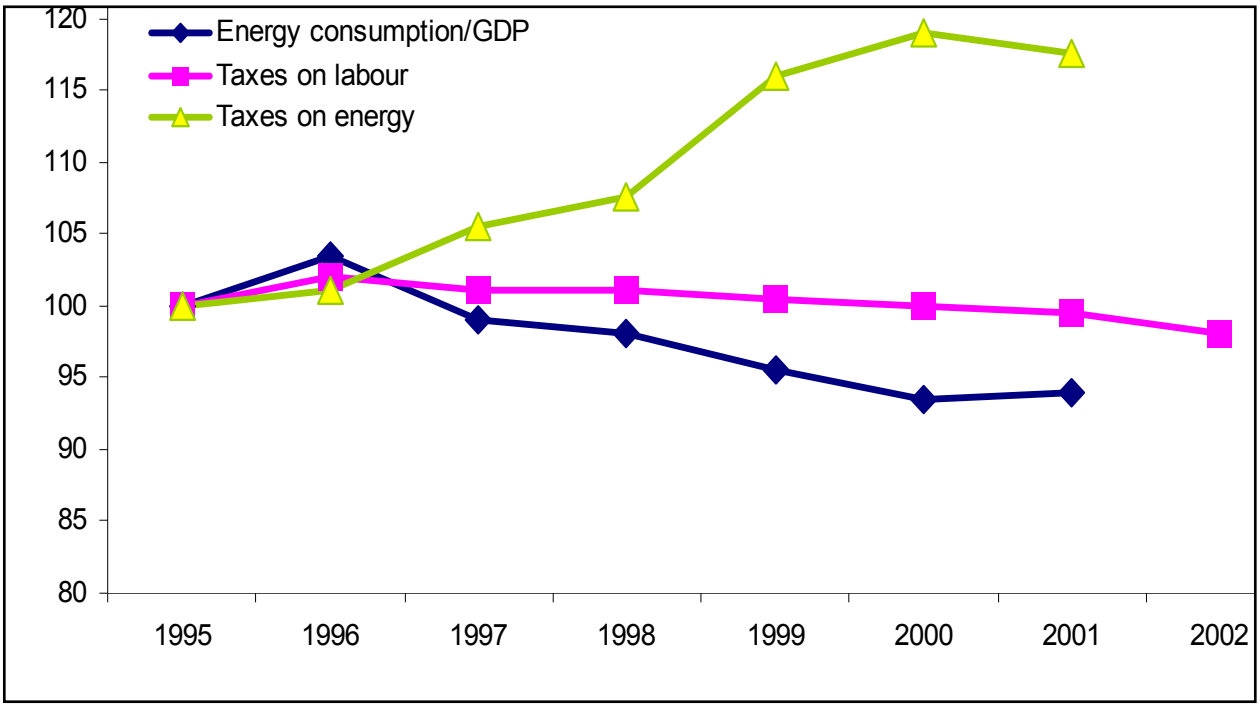
Sweden was one of the first countries in Europe to introduce an ETR. In particular in 1991 and 1999, Sweden increased taxes on energy and CO_2. In 2001, the Swedish Government started a ten-year-program for a tax shift from labour to the environment. By 2004, tax shifts of 1 billion Euros had already been implemented. By 2010, environmental taxes should increase by 3.3 billion Euros, while income tax and social security contributions should fall by the same amount.

In this plan, the carbon dioxide tax rate will go up by 18 %, the tax on diesel will be raised by 1 Euro Cent per litre and the electricity tax charged on industry will go up by 0.0005 Euro Cent per kilowatt-hour. The tax on pesticides will be increased by 1.08 Euros per kilogram of active ingredient.

Research on the Swedish environmental taxation model have revealed some interesting results: The CO_2-tax has supported the dynamic expansion of bioenergy, especially for heating purposes.

[43] http://www.chinadaily.com.cn/english/doc/2005-11/24/content_497554.htm

Figure 21: Ecological Tax Reform in Sweden supports increases in energy efficiency



Source: EU 2004

Emission Trading

As already mentioned in section C, all EU-Member States must take part in the EU Emissions Trading Scheme. Consequently, they also have to draw up a National Allocation Plan (NAP). It is beyond the scope of this paper to discuss all these NAPs. However, two examples of well designed NAPs will be presented here in brief:

Denmark 2005-2007 – Denmark already auctioned 5 percent of emissions allowances in the first trading period from 2005 to 2007, thereby raising revenues for the state.

Denmark also uses an electricity-benchmark (allocation is based on historical production) according to which all power plants get the same amount of allowances per unit of electricity produced.

Most other countries use the grandfathering method (where allocation is based on historical emissions). Benchmarking is preferable, because inefficient power plants with high emissions face higher incentives to reduce their emissions, and because early emissions reduction measures do not have to be rewarded. This renders the system less complex and more transparent.

United Kingdom 2008-2012: The UK is planning to auction 7-10 percent of emissions allowances in the second ETS trading period.[44] Seven percent of allowances will definitely be auctioned, and up to three more percent may be auctioned to cover administrative costs. The British NAP has reserved 17.2 million allowances annually for that purpose. Assuming a price of €15 per allowance, the auctioning process will generate revenues worth €258 million annually.

Trading schemes in other areas:

Acid Rain The USA, Slovakia and the Netherlands have sucessfully implemented emissions trading schemes to reduce sulphur dioxide emissions.

Further reading on US permit trading:

http://www.epa.gov/airmarkt/trading/index.html

Renewable Energy: Italy, Sweden and the United Kingdom use renewable energy certificates to support the use of environmentally friendly renewable energy sources.

Further reading on the UK-system:

F. Energy Taxation on EU-Level

After almost eleven years of negotiation, on 21. March 2003, Finance Minister of the EU-15 finally came to an agreement on EU-wide minimum tax rates for almost all energy products. The most important aspect of this agreement is that new EU Member States have to develop and expand their energy taxation systems considerably to encompass these energy tax regulations. For this reason, the EU is now the first region in the world with an energy taxation system at the centre of its fiscal policy.

Content of the Energy Taxation Directive:

- (first) increase of minimum tax rates on mineral oils (fuels and oil for heating) since 1993, there will be a second round of increases for diesel from 2010.
- Introduction of minimum tax rates on all energy types such as mineral oil, electricity, natural gas and coal.
- Depending on use, (transport fuel or heating), different minimum tax rates apply.

At the latest by 1. January 2012, the Council must decide on new minimum tax rates for 2013 onwards, on the basis of a report and proposal from the EU Commission. One problem does remain: changing these minimum tax rates requires unanimity – tax sovereignty does not lie with the EU,

[44] Defra (2006) p.17.

but with individual Member State governments. On the other hand, there is no upper limit to energy taxation in the EU, and so every Member State can – and many certainly will – implement national energy tax increases. A trend is already recognisable in this direction.

Figure 22: Taxation of energy products and electricity in the EU-15, in Euro

	Minimal taxation rate from 2004	Existing Tax rate (2002)														
		A	B	DK	FI	FR	D	GR	IRL	IT	LUX	NL	P	E	S	UK
Leaded petrol 1000l	**359**	407	507	543	568	574	655	318	506	540	372	627	480	427	502	787
Unleaded petrol 1000l	**421**	479	565	630	643	623	721	337	512	0	424	698	549	429	572	882
Diesel 1000 litre	**302/330**[45]	282	290	406	329	376	470	245	354	400	253	359	272	293	201	504
Gasoil 1000 kg	**125**	261	0	468	0	108	161	100	100	284	102	126	100	794	140	145
Kerosene 1000 kg	**302**	282	565	406	304	574	654	245	302	337	295	359	258	315	396	834
Natural gas GJ	**2,6**	1,1	0,3	11	0,7	2,2	3,4	0	0	0,3	0	0,3	1,9	0	3	0,7
Light heating oil 1000 litre	**21**	69	13	281	67	43	61	18	47	400	5	198	33	79	396	50
Heavy heating oil (sulphur content 1%) 1000 litre	**15**	36	6	320	57	19	25	19	14	130	6	32	13	13	396	44
Another heavy oils 1000kg	**15**	36	19	320	57	25	25	19	14	130	19	32	27	13	396	44
Kerosene 1000 litre	**0**	282	13	281	57	0	0	18	32	337	0	196	104	145	396	16
Gasoil 1000 kg	**0**	43	17	468	0	0	61	14	36	190	0	178	7,5	0	219	0
Natural gas GJ	**0,3**	1,1	0,3	7,9	0,7	0,7	1,5	0	0	2,1	0	3,5	0,1	0	4,5	0,7
Solid fuels GJ	**0,3**	0	0	8,5	2,1	0	0	0	0	0	0	0,6	0	0	10	0
Electricity MWh	**1**	15	1,4	90	7	6,4	21	0	0	2,1	2,4	60	5	2	21	6,9

Source: Ministry of Environment, Umwelt 05/2003[46]

In addition, air traffic may now also be taxed to some extent – an important step towards creating a level playing field in the transport sector. As well, the relationship between energy taxation and other instruments, such as emissions trading, can also be regarded as positive. What is also very positive and progressive is that no EU state, since the Energy Tax Directive came into force, has cut back on or withdrawn their environmental taxes, but rather the opposite – almost every year additional taxes or charges are introduced on environmentally damaging substances.

Thus, the trend towards an ecological tax reform in the European Union is unanimously acknowledged and cannot be reversed.

[45] 330 Euro will be the minimum taxation rate in 2010.

[46] For up-to-date tax rates please see:
http://ec.europa.eu/taxation_customs/taxation/excise_duties/energy_products/index_en.htm

Energy-related taxes and charges are widespread in the EU and their use is increasing. From 1995 to 2004, the implicit energy tax rate increased on average from 160.8 Euros per ton of oil equivalent to 192.8 Euros per ton of oil equivalent – an increase of almost 20 percent.

Figure 23: Implicit tax rates on energy in the EU-15

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Growth 1995-2004
Belgium	98.9	97.9	98.5	98.6	101.3	101.7	101.0	106.2	105.8	118.0	+19,1
Danmark	200.5	212.9	218.0	248.9	284.6	301.3	317.8	326.4	329.3	332.7	+132.2
Germany	168.6	151.8	149	149.7	176.5	183.8	193.5	205.4	217.0	209.5	+40.9
Greece	158.0	161.6	157.5	138.9	132.5	118.5	118.3	111.1	116.3	114.5	-43.4
Spain	128	134.4	129.1	138.2	143.6	138.2	135.1	141.9	142.9	148.7	+20.7
France	169.8	168.1	170.8	171.7	178.0	173.9	161.6	177.7	169.3	146.6	-23.2
Ireland	112.2	121.7	138.4	140.6	145.9	142.7	125.3	144.9	149.9	172.9	+60.7
Italy	237.5	261.3	271.8	261.0	265.3	249.4	240.8	236.4	243.6	240.7	+3,3
Luxem-burg	141.8	139.4	143.0	151.6	159.1	164.7	164.8	170.2	174.7	204.8	+63.0
Nether-lands	114.1	113.8	130.0	135.5	152.9	162.6	169.2	171.9	173.9	187.5	+73.4
Austria	127.5	120.7	140.9	133.5	142.1	148.7	152.8	155.1	152.5	164.7	+37.3
Portugal	172.1	170.1	159.1	164.4	158.0	116.2	133.2	157.7	167.8	-	-4.3
Finland	93.1	94.5	105.7	105.8	110.0	107.1	110.0	111.7	112.2	115.0	+21.8
Sweden	138.2	168.7	167.2	172.4	175.6	181.3	182.6	193.2	202.7	207.3	+69.1
UK	142.5	148.0	185.6	211.2	226.3	251.3	239.0	245.9	224.4	237.4	+94,9
EU-15	**160.8**	**161.5**	**169.8**	**174.1**	**187.1**	**189.1**	**186.8**	**194.3**	**193.9**	**192,8**	**+32,0**

Source: Structures of the taxation systems in the European Union, EU-Commission, 2004

As shown in the table, only three countries decreased their taxes. The highest increases were introduced in Denmark, the Netherlands, Great Britain, Sweden, Ireland, Luxembourg and Germany, most of them within the framework of an Ecological Tax Reform.

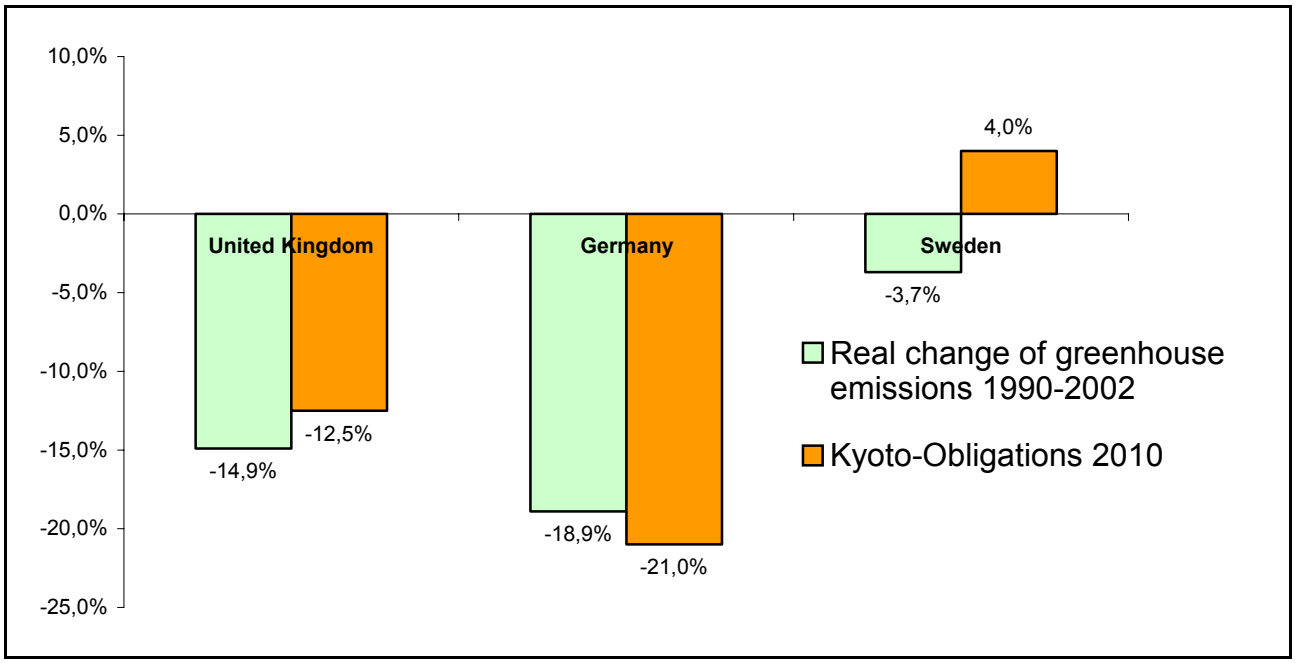
Ecological Tax Reforms Helps to Reach the Kyoto targets

In the view of the responsibility to meet the Kyoto obligations, it is interesting that the EU-countries with the strongest Ecological Tax reforms are the best in CO_2-reduction, too.

[47] Energy taxes in Euro per tons of oil equivalent.

Great Britain, Germany and Sweden are the leading countries on the way to reducing their GHG-emissions sufficiently for their Kyoto targets, even though the industry and energy sector in these countries is very important. While the EU has reached a reduction of only 2.9 percent in total (Kyoto obligation 2010: 8 percent), Great Britain and Sweden will overstep their targets, and Germany is very much on the way towards fulfilling its obligation to reduce GHG emissions by 21 percent by 2010.

Figure 24: Ecotax-Promoters and Fulfilling the Kyoto Commitment



Source: IWR, European Commission

Positive Environmental Impact

It is difficult to make statements regarding the significant effects of ecological fiscal reform for Europe as a whole, because the many environmental taxes and charges are used to realise a series of differing fiscal reforms. In addition, the environmental impact of EFR in particular is dependent on the design of the reform and the rate of tax or charge levied. Research carried out by the EEA on ecological tax reform in Europe came to the following conclusions:

Taxes researched revealed *positive environmental impacts* and, even bearing in mind the limited nature of the evaluation carried out, it seemed that these impacts were in most cases cost-effective.

Examples for particularly effective taxes were taxes on air pollution in Sweden, taxes on water pollution in the Netherlands and in Norway, charges on pesticide use and differing tax rates on fuels.

Taxes as steering mechanisms are generally ecologically effective, if the tax *is high enough to create incentives to take measures to reduce environmental pollution*.

A significant contribution towards the ecological effectiveness of revenues raised is made by *using the revenues to finance environmental protection measures associated with the tax itself*[48].

An investigation of the introduction of the CO_2 tax in Norway revealed a drop in total CO2 emissions of 3-4 percent within 3 years, reversing the previous trend of rising emissions. Differing tax rates on lead-free and leaded petrol in Sweden proved very effective: differing tax rates contributed significantly to the gradual phasing out of leaded petrol over 5-7 years. Higher taxation rates obviously covered the cost of producing unleaded petrol and had a strong incentive effect.

In Sweden, the NO_x-charge resulted in a 4 percent reduction in emissions over 6 years; in Denmark and the Netherlands, taxes on water resulted in 13 percent reduced consumption. Above all in Scandinavia, pesticide use fell sharply following the introduction of environmental charges on pesticide use. One impact of the Ecotax in Germany of particular importance is the reduction in greenhouse gas emissions by 19 percent, as well as the shift in individual consumer behaviour in relation to transport.

Taxes on transport fuels (applied in all EU Member States) and motor vehicle taxes on the sale or registration of vehicles account for over 90 percent of total environmental taxation in the EU. Taxes make up between 40 and 60 percent of the sales price of transport fuels in EU countries – considerably more than in the USA, for example.

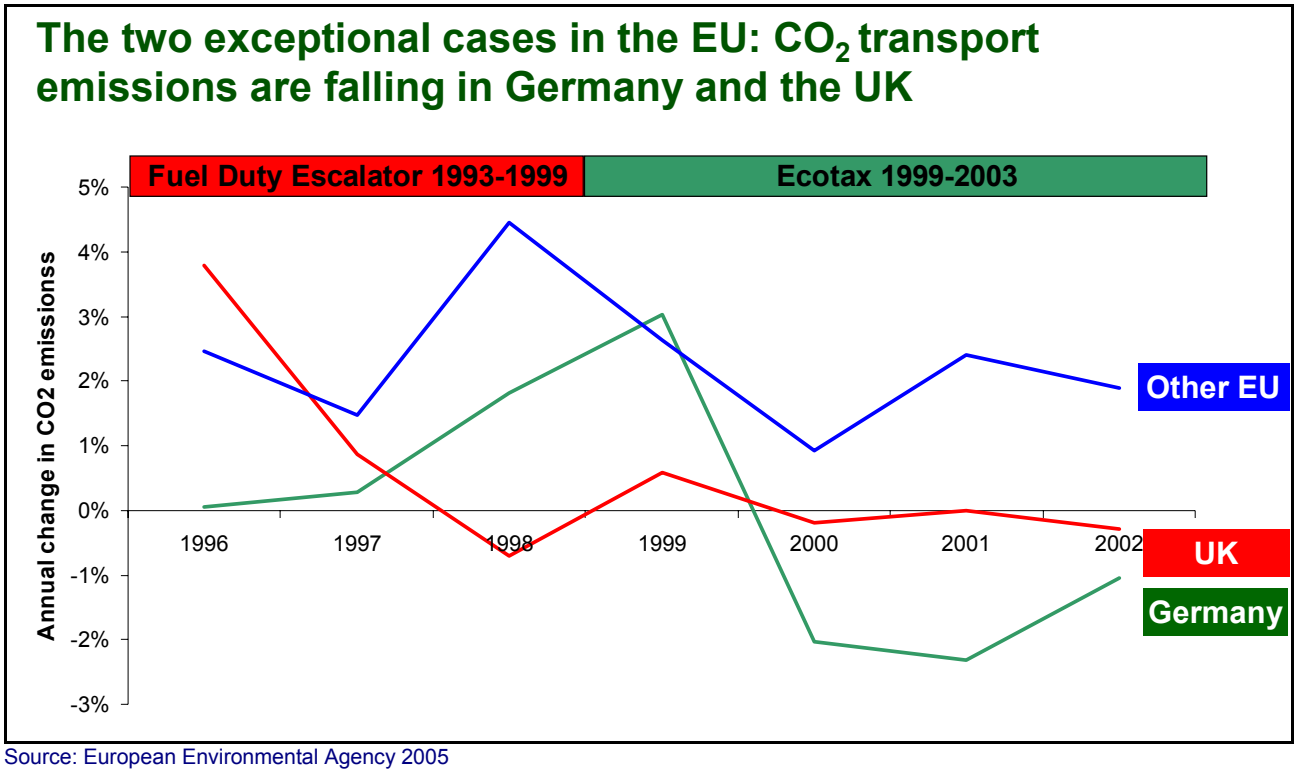
For this reason, the European car fleet is far more energy efficient than the US fleet and has up to 2-3 times lower unit emissions of CO2 from transport than transport in the USA49.

The countries with the highest fuel taxes, the United Kingdom and Germany, are the best examples of countries that have managed to break the trend of increasing CO2 emissions in transport.

[48] http://www.foes.de/de/downloads/schweizstudie2005/studyger.pdf

[49] EEA 2005.

Figure 25: Impact of ecotax on transport emissions in Germany and United Kingdom



Source: European Environmental Agency 2005

G. Some Lessons of the Introduction of ETR and ET

The effectiveness of market-based instruments was demonstrated in the previous sections. In this section, we would like to provide some advice for the implementation of this environmentally related instrument in other countries.

It is not easy to generalise the process and explore the lessons learned in order to help other countries which are also working on the implementation of economic policy instruments. Every country has a very special set of national agendas, priorities and actors. Nevertheless, what is particularly important is to really bring together different actors from the government, the bureaucracies, scientific institutions, industries and environmental NGOs with their counterparts in other countries to allow for the creation of a good network and to ensure that the same 'language' is spoken between the stakeholders.

Such a transfer was agreed in the area of Introducing Ecological Tax Reforms between the Czech Ministry for the Environment and the German Ministry for the Environment back in 2002. Such a transfer could be implemented between the Peoples Republic of China and Germany, too. First con-

tacts between officials from the German Ministry for the Environment, Nature Conservation and Nuclear Safety and the Chinese Finance Ministry have already been established.

1) Introducing Ecological Taxes

An Ecological Tax Reform can be the key element of a progressive Environmental Policy. In Germany, Great Britain and Sweden, it was the most effective instrument for the reduction of emissions in a cost-effective way and for realising increased employment, social welfare and innovations.

The major conclusions that can be drawn are:

1. Integrate the implementation of Ecological Taxes within a broader reform and use the tax revenue to lessen the tax burden on the poorest or to soften potential negative impacts on the competitiveness of very energy intensive industries. In general, revenues should be used to build a societal alliance by pursuing issues which are at the top of the national policy agenda – independent of the environmental agenda.
2. Keep it simple and understandable. A public information campaign – like in the German case – could help generate public support and communicate a more environmentally friendly behaviour in accordance with the tax. This could strengthen the positive results, over and above those achieved by the price effect itself.
3. Make sure that people can respond. The availability of substitutes – for example in the Irish plastic bag case – and the introduction to the market of new technologies like renewable energies, energy-efficient cars and environmentally friendly products is necessary for success.
4. Indexation of the tax or charge in line with inflation to avoid the erosion of value over time.[50]
5. A mid-term announcement and implementation of increasing tax rates is very crucial to create a dynamic incentive structure and to thoroughly allow for adaptation to the new fiscal situation.
6. Design environmental taxes closely to the environmental issue that is being addressed. For example, the revenues of a tax on chemicals in the agriculture sector should be used to soften the burden in rural areas and strengthen alternative innovations.
7. A fiscal driver appears to be crucial for the introduction and survival of an ETR in crisis situations; environmental arguments alone will not be sufficient. Still, fiscal and environmental stakeholders should become more aware of their joint interests and thus their ‘natural’ alliance to exploit their full potential for the sake of the environment and the budget.

2) Introducing an Emissions Trading Scheme

Requirements

When introducing an emissions trading scheme and opting for the grandfathering method as the main allocation method, data availability about past production and past emissions of the participat-

[50] This happens for example with the relatively high Russian pollution taxes from the early ’90s, but also the Netherlands and others have such a mechanism in place. In fact, Germany is in this case a negative example, as it has not yet implemented such an important measure.

ing installations is one of the most important things to investigate. This data is generally difficult to obtain but necessary for the functioning of the system.

In order to allow for the maximum exploitation of available reduction options, the allowance market should be large in size. The greater the number of installations taking part, the better the principle of emission reduction at the lowest cost can be realised. Abuse of market power may become a problem when allowance prices are manipulated in small markets including only a few installations that belong to a fistful of enterprises.

Experiences

As could be seen during the process of drawing up the first and second National Allocation Plans in 2004 and 2006, different interest groups affected by the trading scheme quickly started to lobby in their interest. These lobbying activities resulted in a complex allocation system with lots of possible rule combinations in the first German NAP. It was realised later that this special treatment of some sectors and installations had been introduced at the expense of transparency and efficiency. Some of these special rules were therefore not re-introduced in the second German NAP.

In Germany, free allocation to emitters resulted in windfall profits for power companies. These windfall profits increased power company profits at the expense of consumers. They can only be avoided by applying auctioning as the main allocation method – a possibility that was not permitted under the Emissions Trading Directive. In the case of auctioning, the collected money can be used by the state to compensate the losers of the scheme (such as the aluminium industry or households), or for the reduction of other taxes.

In addition to the above-mentioned windfall profits, the grandfathering method also provides unintended incentives for old installations to keep operating at a low level in order to retain their allocation levels. At the same time, new entrants are discriminated against. Since allocation to them is calculated using a best-available-technology benchmark, it is usually lower than the one given to an existing facility (which is measured against the installations' historical emissions). If all installations received allowances calculated with this benchmark, these new and more efficient installations would have the intended advantage over the old ones.

The above-mentioned problems may be solved by using auctioning as the main allocation method. However, emitters usually dislike this method because it means they have to pay for the damage they create.

Problems

During the first year of trading, official data on real emissions had not yet been published. This lack of information led to artificially high prices which collapsed after the publication of the data in May 2006, as can be seen below. Artificial prices led to insecurity for the participating companies as it is not clear, which reduction options will pay off in the long run.

Figure 26: Price for CO_2-Emmission allowances in Euro

Source: UBA 2005

The average price for one allowance was €20-30 in 2005, but declined to €13 in October 2006.

Since allowances are traded EU-wide, different allocation methods in the EU Member States led to market distortions within the sectors. Enterprises may be treated differently depending on where they are operating. In order to reduce this distortion, an EU-wide harmonisation of allocation methods will be necessary in the medium-term.

The differentiation of benchmarks for new power plants in the electricity sector provides an incentive to built polluting coal-fired power plants rather than natural gas-fired power plants. This malfunctioning of the scheme can only be remedied by applying the same benchmark for all electricity generating facilities – independent of which fuel they are using. In that case, power plants with lower emissions per generated kilowatt hour of electricity (e.g. natural gas-fired power plants) would have an advantage over those with high emissions (e.g. coal-fired power plants).

Keep it simple

Experience and economic theory shows that emission trading schemes work best when their design is kept simple. The more complex the system, the more low-cost emission reduction options are excluded because transaction costs rise and predictability decreases. If exemptions are granted to some groups, or if special allocation rules are introduced, these must be temporary. Interest groups might try to lobby for change in their interest. In case they are heard, the outcomes of these activities gen-

erally complicate the system and add costs. Try to avoid pressure from interest groups and to keep the system simple.[51]

Auction the allowances

The advantages of auctioning are numerous[52]:

- application of the polluter pays principle,
- auctions help to determine the allowance price because all participants offer bids at the same time
- higher efficiency of the system, and
- generation of state income to a) compensate losers or b) lower other taxes (e.g taxes on labour, like in the ecological tax reform).

If auctioning is not possible, the next best solution is a hybrid scheme (e.g. 50 percent auctioning and 50 percent benchmarking).

Define long-term targets

Emission reduction measures often require substantial investment in new, clean technologies. In order to minimise the uncertainty for market participants about future reduction requirements, it is useful to clearly state long-term reduction targets in advance.

Impose taxes on other sectors

An emissions trading scheme generally only covers big point sources. It is important to have a mechanism in place to avoid a shift of emissions to smaller installations in other sectors. This can be done by imposing a tax on the sectors not covered by the emissions trading scheme.

A summary of further recommendations for the design of an emissions trading scheme can be found at EEA (2005).

3) Subsidy Reform

Before introducing an Ecological Tax or Emission Trading Scheme, or at least at the same time as doing so, it is necessary to look into environmentally harmful subsidies.

[51] EEA (2005) p. 35.

[52] A summary of the arguments in favour of auctioning allowances in the EU-ETS are given by Hepburn et al (2006).

From an environmental perspective, there are two important parallel approaches that need to be taken with respect to subsidies. First, subsidies can be used in the short term to address market failures or encourage environmentally beneficial behaviour. Second, it is important to reform those subsidies that are currently harmful for the environment. It is important to understand explicitly the impacts of the subsidies on the different dimensions of sustainable development and whether the benefits merit the costs of the instrument. Studies could also help you to find the hidden subsidies – like tax-exemptions – in some areas.

In the end, reducing and eliminating environmentally harmful subsidies is just the other side of the coin of ETR, hence there is no 'either / or' policy, but only an 'as well as' that policy will help to redirect the fiscal system towards the needs of sustainable development (see Chapter Cc).

4) Conclusions on combinations of taxes and tradable permit systems

While the intention and motivation for the use of taxes as permit price caps and penalties as legal deterrents are often quite different, in practice they can often have similar effects. This is because if the penalty is set too low, firms will see it as a feasible "compliance" strategy. Similarly, if the tax is too high, it will serve as a deterrent, perhaps encouraging greater vigilance but not being seen as an economic option. In any event, in order for a price cap to be efficient its use should be explicit, and its size known ex ante. A penalty which serves as a default price cap is unlikely to be efficient since penalties are often of uncertain size – for the reasons discussed above. This will have the effect of introducing uncertainty into the market – precisely the opposite effect as the usual motivation for the introduction of a tax.

In some cases, it may also be advisable to introduce taxes on the windfall rents associated with the free allocation of permits. This is likely to be most important when the permits relate to commercial products (such as CFC's) and not pollutants per se. However, this may also be important under certain emission-based permit regimes, depending upon how important the rents are in relation to total compliance costs.

Industry, and the energy sector in particular, is the only area within which significant overlaps between environmental taxation and emissions trading occur. This is because those participating in emissions trading are specific businesses within the energy sector and in industry as a whole, while the catchment area of environmental taxation tends to be more broadly structured and takes in industry, transport, trade, retail and services and private households, all of which are – if at all – only indirectly affected by emissions trading in the form of higher energy prices. However, this theoreti-

cal overlap does not necessarily result in a greater burden on industrial energy users, for two reasons. First, industrial businesses in Germany, for example, are only liable to pay the Ecotax at a greatly reduced rate, while the energy sector is only liable to pay it in isolated cases, if at all. Second, the impacts of one instrument can be cushioned by the impacts of the other: businesses affected by both instruments can profit from the emissions reductions they achieve in response to ETR incentives by selling the emissions allowances they generate as a result. Thus, there are no convincing grounds on which to justify making significant changes to or even completely revoking either instrument, as there is a great deal of complementarity between them. Indeed, in order to provide incentives for as many sectors as possible, both ETR and ET should be implemented, as few sectors are affected by both instruments, as has been shown above.

Market-Based Instruments are essential to solve ecological problems

According to the marked increase of environmental problems all over the world, the discussion about the policy instruments that should be used has switched from an either / or approach to acceptance that the way forward is to focus on a mix of different instruments. A modern ecology policy uses all the instruments available to it, placing market-based instruments alongside other environmental measures, such as command and control.

Market-based instruments have the advantage that they solve environmental problems in a very efficient and cost-effective way. They are essential for every government wishing to achieve ambitious environmental goals for its people.

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Green Budget Germany is a non-party lobby organisation campaigning for ecological fiscal reform. While it focuses on the most central element of EFR, ecological tax reform, the organisation also lobbies for other important eco-fiscal instruments such as emissions trading and the dismantling of environmentally damaging subsidies.

GREEN BUDGET GERMANY

GBG was established in 1994 as a single issue movement to support the development of an Ecological Tax Reform (ETR) in Germany. GBG co-operates with other German-based partners as well as international organisations.

GBG's work is strictly non-party and independent from particular organisations and interest groups – as reflected in the highly varied nature of our members. In mid-2006, among our about 150 members were experts from industry, business and the research community, politicians from all German democratic parties and journalists, as well as a multitude of motivated individuals. GBG perceives itself as a collective movement of independent progressive thinkers, as an inspirational force, and a means of consensus in the ETR debate. Our most important target groups are decision-makers and multipliers.

Since 2001, GBG has published an electronic newsletter in German, ÖkoSteuerNews, and a newsletter in English, GreenBudgetNews, on a regular basis.

We would be delighted if you can contribute your own constructive comments to the debate and the development of GBG's future position on ETR. If you wish to order our english newsletter Green Budget News, you can send an email to foes@foes.de

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