Energy and Environmental Tax Models from Europe and Their Link to Other Instruments for Sustainability: Policy Evaluation and Dynamics of Regional Integration

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Content

I. Executive Summary

Many countries supporting Agenda 21, including the European Union and its Member States, have recognized that action for improving the environment is necessary. The EU has committed itself to binding greenhouse gas (GHG) emission reduction targets under the Kyoto Protocol, encourages and obliges its Member States to implement effective policies, and monitors their progress.

Energy systems need to change for many reasons: the requirement of more energy services due to economic growth, limited access to modern forms of energy, concerns over the security of supply, and important environmental issues, including air pollution, acidification, and climate change. These reasons are further related to issues of peace, poverty alleviation, and geopolitical stability. The main strategies are to improve energy efficiency, increase the use of renewables, the introduction of new technologies, and policies mitigating climate change.

Since the early 1970s, and as reflected at the 1992 Earth Summit, sustainability and respect for the environment in the context of development have become global political goals, marked by the following international agreements: Agenda 21, the Rio Declaration on Environment and Development, the Statement of Forest Principles, the United Nations Framework Convention on Climate Change, and the United Nations Convention on Biological Diversity. The Agenda 21 plan of action is especially seen as a "global consensus on the road map towards sustainable development".[3] The World Summit on Sustainable Development (WSSD) in 2002 underlined the importance of energy for development and the urgency for sustainable development worldwide.

China is committed to Agenda 21, and was the first nation to adopt a national Agenda 21. Cleaner, energy efficient production of goods and services is one of China's key strategies for sustainable development, recently documented by the entry in 2003 of the Cleaner Production Promotion Law[4]. Article 7 of this law stipulates the way towards introduction of ecological taxation:

"The State Council shall formulate fiscal and tax policies conducive to the implementation of cleaner production. The State Council and other relevant administrative departments having corresponding responsibility and the people's governments of provinces, autonomous regions and municipalities directly under the central government shall formulate and implement beneficial industrial development policies and technological development and popularization policies and undertake supervision and management measures conducive to the implementation of cleaner production."

[3] Global Environmental Outlook 1, United Nations Environment Programme, Global State of the Environment Report 1997, Introduction

[4] Approved by the Standing Committee of the National People's Congress (NPC) of the People's Republic of China in the 28th Session on June 29, 2002, entered into force on First of January 2003

The European Union, and many of its Member States, have gained experience in the use of tax and fiscal policy tools to pursue environmental goals. Some of the policies and experience gained in Europe may be relevant for China's own progression towards sustainable development. However, not all tools or their application have had sufficient results.

The introduction of tax instruments is integral for sustainable development. Ecological taxation normally means a shift in the tax philosophy of the respective country, applying a cost reflecting the environmental impact of a products entire life cycle through production, use, and waste. "Don't tax goods, tax bads" is the general slogan or motivation for such Ecological Tax Reforms (ETRs), or Ecological Fiscal Reforms (EFrs).

The increased use of green taxation has shown positive results in some countries through a shift from labour taxation towards pollution or resource-use taxation. Improved environmental indicators clearly underline the necessity to adopt this instrument in the future.

In the EU, energy and carbon taxation is seen as part of a country or industry's sustainable management. This management requires a variety of different tools from strict legislation to voluntary agreements. Depending on the method and stage of development, each country's priority for certain tools may vary. Overall, one binding element is a master energy and emission reduction plan, setting clear and binding targets with enforceable deadlines. The thoughtful combination of tools, and development of a balanced program can generate the most significant effect.

This paper reflects on the most important instruments used to date in Europe, especially energy taxation, and puts these efforts into perspective with other measures such as emission trading and voluntary agreements. It provides examples from selected Member States on energy taxation and their effectiveness, and outlines the strengths and weaknesses in combining different mechanisms.

Modern, flexible, and sustainability-driven policy works best with green taxation, and especially energy or carbon taxation. However, it is evident that tax models are just one important tool in a necessary range of policy instruments. Sound environmental policy requires state responsibility to enforce strict rules. These rules provide the basis for supportive measures and incentives such as eco-taxes and voluntary agreements.

Specifically, voluntary agreements and emission trading can be effectively coordinated with energy taxes. A combination of input taxes for fossil fuels and uranium, electricity taxes for end-users and careful tax rebates for industrial installations taking part in emissions trading has proven to be a productive solution.

It is important that the overall tax system is balanced in a way that shifts towards green taxation. Energy taxation is necessary to achieve climate mitigation and CO2 reduction. The tax system needs to integrate effects on the overall electricity market, including the taxation of nuclear technologies despite the fact that they do not add substantially to CO2 emission levels. In the United Kingdom, a specific supplementary "primary energy tax on nuclear fuels" was designed in conjunction with the Climate Change Levy in order to balance the market effects.

Green taxation can lead to technological modernization and a shift in consumer behaviour. Green taxation can be applied on different levels, from local to international. Energy taxation is mostly a nationwide instrument, sometimes supranational in Europe.

Harmonization of energy taxes became necessary at the European level in order to ease competition and to decrease levels of exemption for energy-intensive industry and other participants in the economic process.

In view of the respective targets, especially the CO2 emission reduction target, the tax instruments must be designed carefully and their effect on the environment must be monitored.

In general, exemption from energy taxation for specific sectors such as energy-intensive industries represents state aid in the European Treaties' definition and must be notified to the European Commission by the Member State and evaluated by the Commission according to EC State Aid Rules. The European Commission works with a set of evaluation criteria for the acceptance of state aid in the context of energy and overall environmental taxation. These published guidelines are regularly reviewed and updated.

Subsidies and the eco-tax mechanisms require the implementation of controls and surveys by an independent authority. This is necessary to increase knowledge and experience with green taxation mechanisms, including economic knowledge of the costs of not internalizing externalities.

Energy consumption in the majority of EU Member States is still rising, requiring continued attention to policy matters. These include improving energy efficiency, increasing the use of renewables in electricity, the transport and heating/cooling sector, and the encouragement of energy services.

Overall, the following lessons can be drawn from the European experience:

- Ecological taxation needs clear programming with specific environmental targets, such as monitored GHG reduction targets over a specific time period.

- The first step towards the introduction of ecological taxation is a clear design of the overall tax scheme. Planning for eco-taxation needs to be integrated into the overall fiscal development plan of a government and into ecological measures and instruments. National Sustainable Development Strategies are important to help define on which level of administration each type of taxation is appropriate. Often, the local level is best suited to execute plans decreasing pollution and minimizing waste, and to issue regulations that generate income to pay for clean-up, insure polluters take responsibility for charges, and maintain a sustainable lifestyle for local communities. The role of the central governmental level is to monitor the beneficial execution and enforcement of the tax income and to control expenditure for this specific tax revenue.

- Emission limits have to be legally defined with clear consequences for compliance failures. Ecological state governance is to be introduced, meaning an administration which cares for sustainable governance capability in combining corporate and political governance under well defined sustainability priorities.

- All exemptions from taxation must be referred to an independent agency for approval. The exemption can only be given with a review clause and should be limited and decreasing over time.

- The structure and level of the tax scheme is important, and its compatibility with other environmental measures is crucial. Too generous exemptions undermine achievement of the objectives and become counterproductive to the very environmental aim the tax was designed for.

- The tax system must, as all tax systems in democratic structures, avoid undue burdens on the individual citizen. The law must be transparent and easy to understand, meaning that the basic principles of clear tax schemes such as generality, equivalence and ability must be met.

- Harmonization of energy taxation helps to avert competition issues regarding distortion in the market place. The introduction of a harmonized energy tax in Europe will increasingly phase out concerns over competition. More challenging reduction targets for GHG emissions attached to the EU tax level will certainly increase the effectiveness and efficiency of the tax scheme.

- The use of revenues can play an important role in reinforcing the incentive signals which the levy is intended to convey.

- A careful negotiation with main stakeholders before introduction of the tax scheme and a persistent information campaign to the public is crucial to success.

II. Introduction

It is generally recognised in Europe that government actions for the protection and improvement of the environment are necessary when the activities of private enterprise have "palpable external effects that are not internalised through market processes."[5] Without strong and adequate state intervention, the German government concluded, there is a risk that private enterprise production methods and consumer behaviour will continue to burden the environment "in ways that are incompatible with the interests of the national economy."[6]

One approach is to introduce tax instruments for specific environmental reasons. Ecological taxation normally means applying a cost reflecting the environmental impact caused by production, use, and waste of a certain product during its entire life cycle. "Don't tax goods, tax bad-s" is the general slogan or motivation for such Ecological Tax Reforms, ETRs, or Ecological Fiscal Reforms (EFrs).

In the medium and long term, fair competition and beneficial socio-economic investments can only be achieved when the different parties actually cover the costs of their own environmental consequences or for appropriate clean-up.

Environmental taxation can be used as one of the most effective tools in speeding the necessary transition from the environmentally harmful use of fossil fuels to renewable sources of energy, energy efficiency, and rapid increase of use of renewable and climate-neutral

[5] German Federal Ministry of Finance, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety Economic and Financial Reports, Promotion of Environmental Protection in German Laws on Taxes and on Other Types of Levies, Published by Federal Ministry of Finance, 2001, page 4, This publication is also available on the Internet: http://www.bundesfinanzministerium.de/finwiber/

[6] ibid

energies. In Finland and Sweden, energy taxation of fossil fuels forms the "main instrument for implementation of renewables in the short term". [7]

A limited example underlines the influence of adequate administrative tools— Norway struck the balance between ecological goals and a well chosen tax level. In 2000, it introduced a solvent tax on the sale of two chlorinated solvents, trichloethylene and perchloroethylene, the first is used in dry cleaning and the second in metal cleaning. In comparison to average consumption between 1997 and 1999, sales in 2000 fell 83 % and 89 % respectively. As a result, a virtual product ban occurred through taxation and market reaction, not through direct command and control legislation.

[7] See for Finland. Brussels, 26.5.2004, SEC(2004) 547, Commission Staff Working Document, The Share Of Renewable Energy In The EU Country Profiles - Overview Of Renewable Energy Sources In The Enlarged European Union, {COM(2004)366 Final}, Page 28; "Sweden has followed the route of promoting new renewable sources by a combination of energy taxation and environmental bonus schemes up to early 2003. Since May 2003, however, a major policy change has been implemented by introducing a tradable certificate scheme in order to achieve the cost-effective and market-oriented promotion of renewables.", see page 101

III. Definition of environmental taxation

1. Environmental taxation in the strict sense

The term "environmental taxation" is used for varied charges and from different administrative levels and actions. It can span from water charges, waste collection charges, landfill tax on a local level, to an overall energy tax or specific chemical tax on national or supranational level. These taxes may be designed in very simple and straightforward ways or within a more complex system.

The definition of an environmental tax commonly applied by the European Commission, the OECD and the International Energy agency (IEA) is a tax whose base is "a physical unit of something that has a proven, specific negative impact on the environment." These institutions include in this definition all taxes on energy and transport but exclude value added-type taxes. This also means that the motivation for introducing the taxes – fiscal or environmental – is not decisive for the classification. Therefore the OECD also uses a broader classification: "environmentally related taxes".[8] According to OECD, environmental taxes can be defined as compulsory payments levied on environmentally harmful goods or processes so that the market price for that product or process reflects its environmental costs more accurately, while at the same time creating revenue that can be used either to reduce other taxes, especially labour taxes (taxes on wages), or reduce the front costs of environmentally beneficial substitution goods or processes. There is a difference between such fairly new, sustainability-driven ecological taxation schemes and the classic mineral oil taxation, as the latter was not designed to internalise external burdens to the environment but to generate state income.

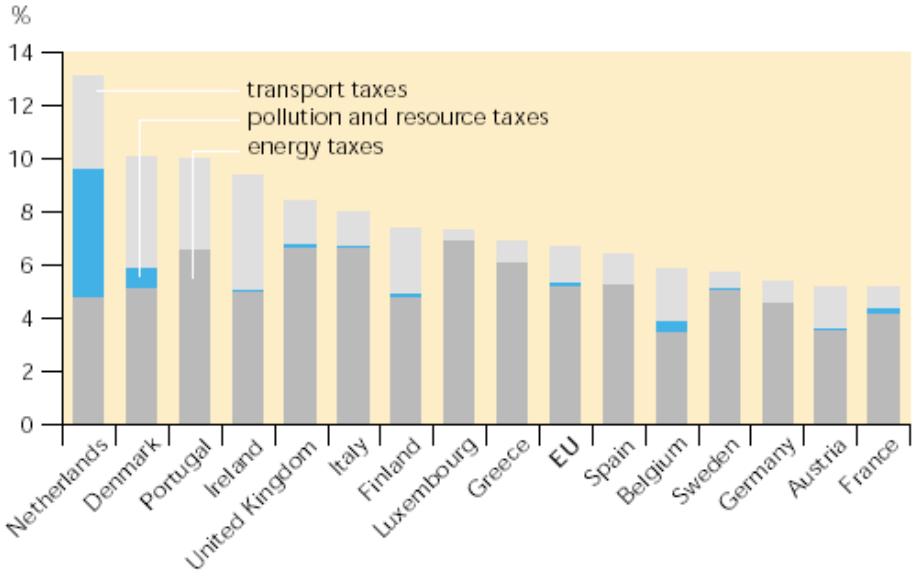
Taxes increase the prices of certain goods and services, thereby decreasing the quantity demanded, thus creating a "price effect."

There are several groups of environmental taxation in use since the mid-90s in the European Union at the Member States level. These cover energy taxes (including excise duties on car fuels and carbon dioxide taxes), followed by transport taxes, whereas taxes on pollution and resources are still of minor importance in terms of revenue raised.

These environmental taxes in 1999 represented between 5 and 13 % of total tax revenues in different EU-15 Member States. See Figure 1.

[8] Eurostat, Structure of the taxation systems in the European Union, 2004, p. 105

Figure 1. Percentage of total revenues from taxes and social contributions in the year 1999



Note: Percentage of total revenue from taxes and social contributions.
Source: Eurostat

The main characteristics of these taxes are the following:

a. Transport taxes

Transport taxes are related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g. planes) and related transport services (e.g. duty on charter or scheduled flights) are also included here when they conform to the general definition of environmental taxes. Transport taxes may be "one-off" taxes related to imports or sales of the equipment or recurrent taxes such as an annual road tax. Taxes on petrol, diesel and other transport fuels are included under energy taxes.

The European Commission policy on infrastructure charging in the transport sector is based on "user-pays" and "polluter-pays" principles. The key policy message is that transport taxes and charges, in every mode of transport, should be varied to reflect the cost of different levels of congestion and pollution, as well as accident risk and infrastructure costs.[9]

The White Paper of the European Commission on Transport[10] from 2001 underlines the EC has as strategic objectives to specifically deal with the reduction of greenhouse gases and pollutant emissions, the security of energy supply, and the balanced use of the various transport modes.[11]

[9] Revenue Use from Transport Pricing Contract: GMA2-2001-52011, Funded by European Commission – DG TREN Fifth Framework Programme, Competitive and Sustainable Growth Programme, Key Action 2 – Sustainable Mobility and Intermodality, page 14

[10] Commission of the European Communities, Brussels, 12.9.2001, COM(2001) 370 final, White Paper, European transport policy for 2010: time to decide

[11] Ibid, p. 122

It points out that transport problems are caused by the way in which transport taxes and charges differ between EU Member States and between transport modes[12]. According to the Commission, these differences are distorted by the modal balance and route choice. In failing to reflect transport costs, it also sends out false price signals to transport users. These two effects lead to the main problems in transport today: congestion, environmental pollution, and accidents.

Local transport taxation, especially in densely populated towns, can limit Heavy Good Vehicles by specific charges on the highway. Since cities suffer increasingly from congestion and its air pollution of CO_2 and other GHG emissions, efforts by city councils over the last decade to cut down on congestion and emission via taxation/charge appeared. A recent prominent example for such a local approach in transport taxation is the introduction of the London congestion charging scheme in early 2004.[13] Austria and Germany, for example, introduced a Heavy Goods Vehicle (HGV) kilometre charging scheme on their motorways. Germany, UK and Sweden have so-called differentiation instruments in place. Charge differentiation concentrates mainly on air pollution in the road sector and noise in the aviation sector. Only first steps have yet been taken in Europe to internalise costs of congestion and CO_2 emission, or rail impact and road noise[14].

These taxes and schemes will not be covered further in this overview.

b. Pollution and Resource taxes

Pollution taxes encompass measured or estimated emission in the air and water, plus the management of solid waste and noise. They are often also referred to as *effluent charges*[15]. Examples include the Dutch, French and German waste water charges. In general, proceeds from these charges are directly applied to pollution prevention or clean-up activities. An exception is the tax on carbon dioxide (CO_2), which is generally included under energy taxes. Perhaps this is because energy taxes are, in general, national taxes, whereas taxes on the above-mentioned emissions are often managed and levied by local or regional authorities.

Resource taxes are related to water consumption, forestry, and mining. Taxes on oil and gas extraction are not included in the definition of environmental taxes, as these are often designed to generate public income.

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[12] Ibid, p. 11

[13] The Netherlands, on the other hand, terminated a tax breaks mechanism, which it had in place for new fuel-efficient vans.

[14] The White Paper developed first guidelines for future EC policies, such as:
– harmonisation of fuel taxation for commercial users, particularly in road transport.
– alignment of the principles for charging for infrastructure use; the integration of external costs must also encourage the use of modes of lesser environmental impact and using the revenue raised in the process, allow investment in new infrastructure, as proposed by the European Parliament. The Commission stipulates the need for a modern framework for infrastructure-use charging systems so as to encourage advances such as these while ensuring fair competition between modes of transport and more effective charging, and ensuring that service quality is maintained, ibid, p 16.

[15] Ernst Ulrich von Weizsäcker and Jochen Jesinghaus, Ecological Tax Reform, a policy proposal for sustainable development,1992,

There often exists a variety of environmental taxes in different EU Member States which are often combined to reach a coherent environmental taxation structure. These targeted taxes are especially those environmental taxes and charges covering the following pollution emissions, resource use, and polluting products:

· Nitrogen Oxides (NOx);
· Water Abstraction;
· Waste Water Discharge;
· Pesticides;
· Manure and Fertiliser;
· Landfill;
· Aggregates;
· Disposable Containers (Packaging); and
· Batteries.

These taxes and schemes will not be covered further in this overview. [16]

c. Energy taxation

Energy taxes include taxes on energy products used for both transport and stationary purposes. The most important energy products for transport purposes are petrol and diesel. Energy products for stationary use include fuel oils, natural gas, coal, and electricity. CO_2 taxes are included under energy taxes rather than under pollution taxes because they partly substitute for other energy taxes.[17] Carbon taxes, as specific environmental taxes, generate direct payments to the administrative body based on the carbon content of the fuel being consumed. Carbon taxes affect the externality (carbon) directly. Coal generates the greatest amount of carbon emissions and is therefore taxed in greater proportion than oil and natural gas, which have lower carbon concentrations and lead to lower carbon emission per unit of energy.

2. Greenhouse gas emission trading -- a tax-like policy instrument

The EU has initiated an own Emissions Trading System (ETS) as one of the mechanisms under the Kyoto Protocol to meet its emissions reduction targets in the Protocol. This "cap-and-trade" system entered into force on the 1st of January 2005.[18] It limits CO_2 emissions from large industrial sources. A cap is set at the level of allowed emissions for certain sectors in the EU now including the power sector with all fossil fuel generators over 20 MW, oil refining, cement production, iron and steel manufacturing, glass and ceramics, and pulp and paper production. The European Commission and Member States are obliged to monitor ETS and the Commission will initiate a review in 2005 which may propose to include additional

[16] A good source concerning these taxes can be found in: Study on economic and environmental implication of the use of environmental taxes and charges in the European Union and its Member States, EU supported study by Ecotec in cooperation with CESAM, CLM, University of Gothenburg, UCD, IEEP, April 2001
[17] See: EUROSTAT, Environmental Protection Expenditure and Environmental Taxes Statistics, Metadata in SDDS format: Summary Methodology
[18] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC

sectors. The system focuses only on CO_2 emissions. Emissions from other sectors are addressed through other policies. The cap level may change as objectives for emissions reductions change. The allowed emissions under the "cap" are divided into units such as tonnes of carbon dioxide equivalent. These units are equivalent to tradable permits and are often denominated as "GHG units," "quotas" or "allowances." Each corporation or other entity covered by the trading scheme is required to show at the end of each period that they own permits covering their emissions, or face a significant penalty.

Initial allowances in a trading scheme must be allocated either by auctioning, sales or "grandfathering", that means free of charge. In the European Union, allowances in the allocation period before 2012 will be allocated mainly by grandfathering. According to the ETS Directive, Member States have only an option to auction a small proportion (up to 5% 2005-7, up to 10% 2008-12). The initial allocation for existing industries was exclusively organized via grandfathering, meaning free allocation of allowances based on emissions in a selected time period. These permits are then tradable on the specific greenhouse gas market. Those that fall under the application of the law can reduce their emission and then use their permits for trading.

Carbon taxes fix the *marginal costs* for carbon emissions, and generate specific revenues for the state budget, while tradable permits fix the *total amount* of carbon emitted and allow price levels to fluctuate according to market forces.

IV. Green taxation evolution in Europe

1. Green taxation increase in Europe

Fiscal instruments of "green taxation" have become established in the European Union with front runners in Western Europe, EU-15, and adaptation to Southern and Eastern Europe. August 2003 figures published by Eurostat, the EU's statistical information service, show a general trend since 1990 toward increases in green taxes accompanied by a reduction in taxation on labour. Taxation or charge schemes are designed and used on local, regional, national or supranational level.

Over the last fifteen years, several member states including Denmark, Germany, Italy, the Netherlands, Sweden and the UK have introduced "green tax reforms" and others plan to introduce similar measures in the near future.

Finland introduced the first CO_2-tax in the world in 1990. The Netherlands, Norway and Sweden adopted eco-taxes in 1991. Denmark followed suit in 1992 and the United Kingdom in 1993.

The latest example for the introduction of green taxation in the form of energy taxation comes from Portugal. The Portuguese government has approved linking vehicle taxes to carbon dioxide emissions as part of the 2006 budget. For Portugal, this would "mark the beginning of a progressive reform to make vehicle taxation work to combat pollution".[19] The somewhat slower uptake in Southern Europe on green taxation may thus gain more strength.

[19] Portuguese government declaration on: Definitive figures have not yet been released but according to ENDS Daily News Service from 23rd of September 2005, the finance ministry said there would probably be a 10% reduction for cleaner vehicles.

A joint or harmonised European effort towards a general green tax shift has gained importance in recent years, though tax policy is still a stronghold of national sovereignty in Europe and unanimity voting for harmonised tax scheme decisions is needed in the European Council.

In general, the main aim of all these tax reforms has been primarily to avoid an increase in the overall tax burden, reduce environmental damage by taxing pollution while at the same time decreasing employment taxes, thereby increasing employment through reducing labour costs.

Most recently, in July 2005, the European Commission proposed that all EU states should increasingly base car taxes on CO_2 emissions.[20]

The situation concerning environmental taxation and energy taxation differs broadly in the EU Member States. This results from traditional differences of tax schemes, sovereignty of EU Member States in the most important field of taxation. The taxation mix and structure the objective of state policy linked to taxation varies in the EU: Sweden, Denmark, and Finland, traditionally have relatively high shares of direct taxes (more than 40% compared to an EU-average of 34.9%) whereas Ireland, Portugal and Greece have relatively high shares of indirect taxes (more than 40% compared to an EU-average of 33.7%). In 2001, social security contributions in Germany accounted for more than 40% of total taxes compared to 31.4% for the EU. France, the Netherlands and Spain, with around 36% each, also recorded high shares of social security contributions. In Denmark (4.4%), Ireland (14.5%) and the UK (17.1%), the shares of social security contributions were relatively low; Denmark's social security system being mostly financed out of general taxation.

Ireland, The Netherlands, Portugal and the UK operate few pollution and resource taxes, but are among the countries with the highest share of environmental tax revenue originating from the energy and transport sectors.

According to Eurostat, 2001 revenues from environmental taxes in the EU-15 amounted to €238 billion, or 6.5 percent of total revenues from taxes and social contributions. The revenues from energy taxes grew faster in the EU-15 than the revenues of all taxes and social contributions in the period between 1985 and 1999, see Figure 2. Whereas since 1995 labour taxes have decreased (from 23.8 % to 23 % of the average GDP), environmental taxes have shown an increase, but only by 0.7 % of EU GDP, (from 2.77 % to 2.84 % of GDP).[21] This underlines that an immediate effect is feasible with introduction of eco-taxes.

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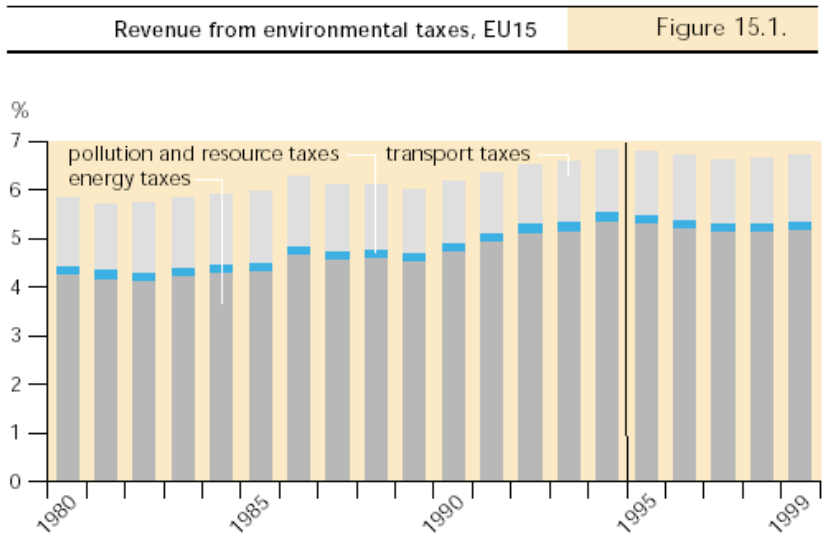
http://www.portugal.gov.pt/Portal/PT/Governos/Governos_Constitucionais/GC17/Conselho_de_Ministros/Comunicados_e_Conferencias_de_Imprensa/20050922.htm.

[20] (ED 06/07/05) (ED 06/07/05 http://www.environmentdaily.com/articles/index.cfm?action=article&ref=19152

[21] EEA report, environmental issues No. 18, environmental signals 2002, Page 126

Figure 2. Revenue from environmental taxes by country 1980-1999,



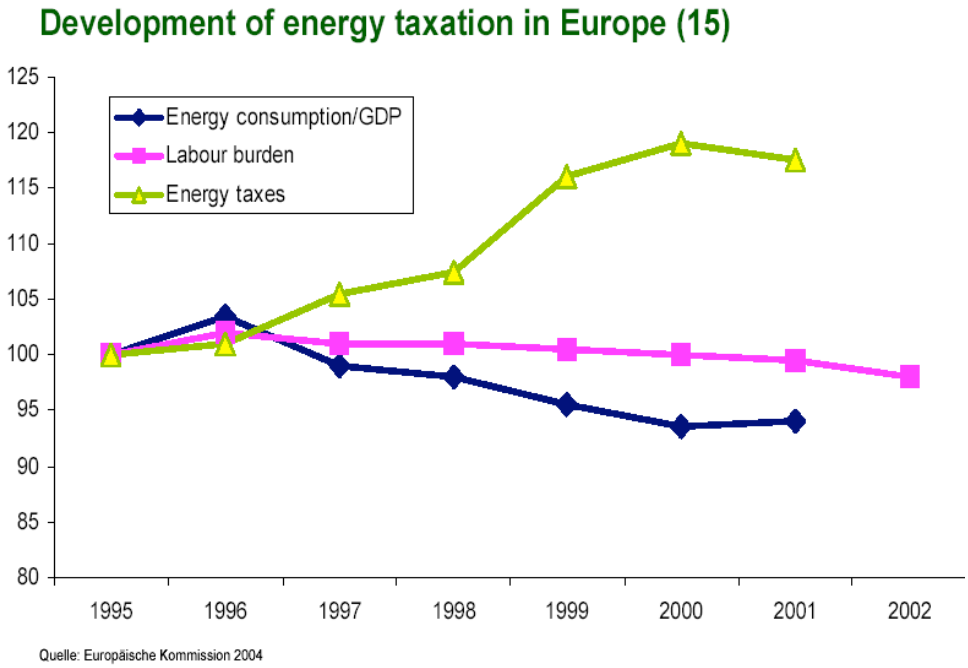
Note: Percentage of total revenue from taxes and social contributions. The vertical line indicates a change of definitions used.
Source: Eurostat

EU15

From: Environmental Signals 2002, European Environmental Agency (EEA) report, chapter 15

The constant increase of eco-tax revenue and decrease of traditional tax revenue is shown in the following graph:

Figure 3



Quelle: Europäische Kommission 2004

2. Tax exemption to parts of industry and other parties as state aid mechanisms

States that introduced green taxation also use different levels of taxation are completely exempt from taxation especially for energy intensive industries, small and medium sized companies, and public transport and other public service sectors. Often, Renewable Energy Technology and production is exempted from energy taxation in order to increase and stimulate positive effects by the increased use of these technologies as sources. These provisions create economic benefits in the form of burden avoidance for this sector and the State loses income in the process. In line with European legislation, Article 87 consecutive EC Treaty, Member States who use this exemption must notify such schemes to the European Commission, Directorate General for Competition before entry into force for approval. State Aid is only authorised if it follows certain rules and responds to specific guidelines the European Commission publishes and updates regularly concerning the relevant sector in which aid is given or the specific type of state aid accorded. Community Guidelines on State Aid especially for Environmental Protection, which are currently under review procedure, are important in this process.

The following section presents some country models for energy taxation and will also present exemplarily experience with state aid notification procedure.

V. Examples of energy/carbon tax schemes in Europe: Sweden, United Kingdom and Germany

The following report on energy taxation schemes in Sweden, the United Kingdom, and Germany provide a more detailed view on:

- Structure, focus and dedication of the taxation scheme,
- Targets Dynamics,
- Exemption level, and
- Effectiveness.

1. Sweden

Environmental taxes, fees and other economic instruments for environmental purposes are widely used in Sweden. The Swedish Government has underlined, that Sweden with its almost 70 market-based instruments, "probably has more economic instruments of environmental policy than any other country. The total revenue from environment-related taxes and fees amounted to roughly SEK 68 billion (EUR 7 billion) per year".[22]
Sweden already introduced its carbon specific tax in 1991 as supplementary tax to the existing established structure of energy taxes, which then were all reduced by half with the introduction of the carbon tax. Since 1991, the system had been modified several times. The stable common denominator was to have lower taxes for industry and electricity production than for other sectors. Until 2004, industrial consumers paid no energy tax and only 50% of the general carbon tax.

[22] http://www.sweden.gov.se/sb/d/5400/a/43594

Neither energy nor carbon tax are applied on electricity production.

Most of such environmental taxes and fees are used in the transport and energy sectors, such as taxes on energy, carbon dioxide and sulphur. The government also said it intends to shift the tax burden in favour of green taxes by a further SEK 30 billion (EUR 3.3 billion) in the period of 2001 – 2010.

Swedish ecological tax measures are also accompanied by a variety of support programmes. The Government decided in 1996 to start funding Local Investment Programmes (LIP) for transition to an "ecologically sustainable society in Swedish municipalities". In 2002, Local Investment Programmes were replaced by Climate Investment Programmes (Klimp), which aimed more specifically at reducing the emissions of greenhouse gases. During the period 1998-2003, grants totalling SEK 6.2 billion (EUR 650 million) were awarded in the Local Investment Programmes. A total of almost SEK 1040 million (EUR 100) was allocated during 2002-2006 in the Climate Investment Programmes.[23]

The green tax shift means higher taxes have been charged on environmentally harmful activities while taxes on labour were reduced. One purpose was to reduce emissions of carbon dioxide that contribute to the greenhouse effect.

2004 saw the introduction of higher taxes on non-eco friendly consumption, primarily on energy and carbon dioxide, and lower income tax. Energy tax is levied on electricity and fossil fuels in full by households and companies in the service sector, and also by manufacturing companies in regards to fuels used for heating other than in production processes. For 2004, the energy tax on electricity is SEK 0.241 per kWh.

The objective of the tax is to steer towards energy saving and efficiency. In order to maintain the competitiveness of the manufacturing sector, a tax relief has been allowed for the electricity used in industrial processes since 1993 with a duration of 10 years, which was approved by the State Aid administration f the European Commission[24]. Since 1 July 2004, companies in the manufacturing and mining sectors pay an energy tax of SEK 0.005 (ca. € 0.00055)2 per kWh on electricity used in the production by companies in these sectors. That rate slightly exceeds the minimum levels set out in Council Directive 2003/96/EC of 27 October 2003 restructuring the Community Framework for the taxation of energy products and electricity.

Specific tax cuts on one hand and tax increase on the other hand had been published with the 2004 budget:

Tax cuts

- There were to be a tax cut of SEK 200 per year for everyone who pays income tax.
- The social insurance contributions paid by employers and the self-employed were to be lowered by 0.12 percentage points.

Energy and environmental tax increases

[23] http://www.sweden.gov.se/sb/d/5400/a/43594
[24] State aid decision of 22nd of October 2004, N 253/2004 . Sweden

- The carbon dioxide tax was to go up by 18 percent per kilogram of carbon dioxide.
- The tax on diesel was to be raised by SEK 0.10 per litre.
- The electricity tax charged to industry was to go up by SEK 0.005 per kWh.
- The electricity tax charged to households and other business sector users was to rise by SEK 0.01 per kWh.
- The tax on pesticides was to go up by SEK 10 per kilogram of active ingredient.

Their tax shift effect is tabled as following:

Table 2. Tax shift in 2004 millions

	Reduction	**Increase**
Income tax	-1360	
Social insurance contributions	-640	
Carbon dioxide tax		+820
Tax on diesel		+270
Electricity tax*		+90
Electricity tax (households, other business users)		+770
Tax on pesticides		+13
TOTAL as budgeted	-2 billions	-2 billions

*applies from 1 July 2004

Source: Ministry of Finance

In the budget for 2005 the Swedish Government proposed a further green tax shift of SEK 3.4 billion.
· The Petrol tax was to be increased by SEK 0.15 per litre, and diesel tax by SEK 0.30 per litre, excluding VAT.
· The Vehicle tax for cars was to be increased by SEK 340 for petrol-driven cars in the most common weight class and by SEK 110 for diesel-driven cars.
· The Vehicle tax for light lorries and light buses was to be increased by 40 percent.
· Electricity tax for households and the service sector were to be increased by SEK 0.01/kWh. Industry is exempted from this increase.
These tax increases were to be offset for 2005 by increased basic deductions providing tax relief of between SEK 600 and SEK 800 for low and middle income earners.

The above figures are translated into the following budget reduction and increase comparison model:

Table 1.

Tax shift 2005, SEK million	**Reduction**	**Increase**
Income tax	-3 720	
Tax on petrol +SEK 0.15/litre		+ 920
Tax on diesel +SEK 0.30/litre		+ 820
Electricity tax (households and services) SEK 0.012/Kwh		+ 880
Vehicle tax, cars		+ 1 180

Vehicle tax, light lorries and light buses		+ 100
Reduction of diesel tax, agriculture and forestry, SEK 2/litre		- 520
TOTAL as budgeted	-3,7 (SEK billions)	+3,4 (SEK billions)

Source: Swedish Ministry of Finance, May 2005, http://www.sweden.gov.se/sb/d/4426/a/30550

The carbon tax stimulated an increased use of biomass in the Swedish district heating system. Biofuels currently contribute about one quarter of primary energy in Sweden and two thirds of the energy supply to the Swedish district heating systems. The demand for biomass has encouraged the development of new methods for utilising wood fuels which in turn have led to price reductions on these fuels.

The impact of the carbon tax on the energy and resource efficiency of the Swedish industry has been reported as being limited for three reasons:

- the carbon tax on industry was only 50% of the general tax level
- only a relatively small fraction (30%) of the energy supply to industry was fossil fuel-based when the tax was introduced
- for most industrial companies the energy cost is a relatively small part of the total production cost and has therefore "low priority".[25]

Until 1 July 2004, companies in the Swedish manufacturing industry had been fully exempted from the energy tax on electricity used in their production. Since July 2004, they also pay an amount of the tax on electricity amounting to SEK 5 (ca € 0.55) per MWh. The European Commission declared this first rebate for the manufacturing sector as incompatible with the common market but did not request full recovery of the tax exemption for the entire period during which the aid was not in line with the State aid rules. It only asked for recovery of that difference between the exemption and the tax burden that would have accrued under the 2004 EU energy tax directive which sets minimum tax rates. The Commission took into account that the tax relief is in line with state aid rules where companies still pay the minimum tax rates of a harmonised tax. Thus, it accepted to apply the same principle to the Swedish national tax also before the energy tax directive actually took effect. [26]

In 1997, SEPA, the Swedish Environmental Protection Agency had come to the conclusion that the CO_2 tax has helped to reduce emissions of carbon dioxide in line with Swedish environmental policy.[27] CO_2 emissions in 1995 were evaluated as being about 15% lower than they would have been without carbon tax. By the year 2000, it was estimated that the CO_2 emissions would be 20-25% lower than if the 1990 policy instrument package still would have been in use. According to Bengt Johansson from SEPA almost 90% of this reduction

[25] Bengt Johansson, Economic Instruments in Practice 1: Carbon Tax in Sweden, , Swedish Environmental Protection Agency
[26] See press declaration of EC Commission, **IP/04/833,** Brussels, 30 June 2004
[27] Swedish Environmental Protection Agency (SEPA) "Environmental Taxes in Sweden - Economic Instruments of Environmental Policy." Report 4745. Stockholm. 1997, page 52

was the result of the reformed tax system, whereas the remaining 10% were a result of investment grants and official programmes on energy efficiency.[28]

2. United Kingdom

The United Kingdom has set several greenhouse gas reduction targets.

In 2003, The British Government accepted the Royal Commission on Environmental Pollution's (RCEP's) recommendation that the UK should put itself on a path towards a reduction in carbon dioxide emissions of some 60% from current levels (base line 1990) by about 2050[29].

The first reduction target, under the EU-wide burden sharing agreement linked to the Kyoto Protocol, set a 12.5 percent reduction in all gases relative to 1990 by 2008-12. The second is a domestic 20 percent reduction in carbon emissions by 2010. The third is a longer run domestic conditional target of 60 percent reduction on 1990 emissions by 2050. The two domestic targets are not directly linked to international agreements but indicate the willingness of the Government to control climate change.[30]

Using increasingly negotiated agreements as instruments of environmental policy, the UK Government has sought to get deliberate concessions from its industry under threat of taxation.[31]

The UK Climate Change Levy has incorporated this approach. Major energy producing sectors would receive substantial exemptions from the levy if they succeed in reducing energy use by agreed amounts.

The levy itself has features explained by the need, as government saw it, to avoid taxing households, keep industrial cost burdens to a minimum, but bring industry on board with the UK climate change programme. In this way, the levy was linked to the other measures in the climate change programme via a so-called "climate change agreement" in which an 80 % levy rebate can be reached by industries. Industries doing more than the agreement could trade the resulting credits into the UK emissions trading scheme, along with permits and renewable energy certificates under a separate renewable energy requirement on generators.

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[28] Bengt Johansson, Economic Instruments in Practice 1: Carbon Tax in Sweden, , Swedish Environmental Protection Agency, p. 8

[29] The UK Government's Energy White paper of 2003 "Our energy future - creating a low carbon economy, Presented to Parliament by the Secretary of State for Trade and Industry by Command of Her Majesty", February 2003explains: - This would lead to 2050 emissions of 64 million tonnes of carbon (MtC). The Kyoto Protocol, and the UK's current domestic targets, use 1990 as a baseline. A precise reduction of 60% in emissions from 1990 would result in emissions of 65.8 MtC in 2050. As the RCEP recommendation implies, absolute precision five decades before 2050 is not possible. This white paper uses 'around 65 million tonnes' to describe the level of carbon emissions which a 60% cut would deliver by 2050.

[30] David Pearce, The United Kingdom Climate Change Levy, OECD, Environment Directorate, Centre for Tax Policy and Administration, COM/ENV/EPOC/CTPA/CFA(2004)66/Final, 28th February 2005, p 5

[31] Study on Environmental Taxes and Charges in the EU Final Report, Ecotoc, April 201, Annex 4: Supporting information

The UK had introduced a Climate Change Levy (CCL) as energy tax, where Renewable Energies and high efficient Combined Heat and Power (CHP) are excluded but Nuclear Electricity is included.

Households are exempt, although encouraging increase of household energy efficiency is a very efficient way of decreasing energy consumption overall.

CCL again is designed as revenue-neutral tax for the treasury. All revenues are "recycled" to reduce other taxes and a small amount of these net revenues is banked and dedicated to "specific expenditures."

The majority of UK industries will have many cost effects and little, if any employment tax rebates. Exceptions can be found in some industrial sectors such as in the food, iron and steel, oil extraction, and pulp and paper industries. But even there, the net tax obligation is very small in comparison to their overall annual turnover. And most of these industries are energy intensive industries which can benefit from the Climate Change Agreement provisions.[32] Therefore there is no real income generating from CCL and it has no real effect on reducing labour taxes.

The above voluntary agreement scheme is the so-called Climate Change Agreement (CCL). The CCL offers conditional exemption for energy intensive industries. It is open to industries in UK which falls under the EU Directive on Integrated pollution and Prevention Control (IPPC), requiring industries to operate efficiently in their energy demand. Industry within the scope of IPPC can enter into a legally binding agreement with the relevant authority in the form of specific CCA for a specific energy savings or carbon emission reduction programme. The sector then can receive an exemption from 80 % of the CCL. There are specific targets set in the agreement with defined sub-targets. If an industry fails to achieve target dates in 2002, 2004, 2006 and 2008, the tax reduction will be taken away for the subsequent two years following. If industries under the CCA do not comply with the 2010 target, it will have to repay all tax reductions received during the whole life-span of the agreement period. There was the experience of "over-compliance" of the industry with the targets in the first two years of CCA. This may have its reasons in the danger of above punishment scenario, but experts point out that the targets were not ambitious enough to stretch encouragement of industry further than the business as usual scenario.[33] Recent statistics published on 28 July 2005 by the Department of Trade and Industry (DTI)[34] showed the country's CO_2 emissions in 2004 were up 1.5% on the previous year.

This rise in emissions is due to increased burning of coal and oil for transport and electricity generation, while the amount of gas burnt for electricity has fallen, especially because of higher gas prices. This gas price increase and the enforced use of coal have also effected other instruments in Europe such as the European Emission Trading scheme, which will be outlined below. Great Britain's CO_2 emissions in 2004 remained 4.2% below 1990 levels, the reference year under the Kyoto Protocol. This compares with a 5.6% overall reduction achieved in 2003, when CO_2 emissions climbed up again.

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[32] David Pearce, The United Kingdom Climate Change Levy, OECD, Environment Directorate, Centre for Tax Policy and Administration, COM/ENV/EPOC/CTPA/CFA(2004)66/Final, 28th February 2005, page 36 with some total figures

[33] David Pearce, The United Kingdom Climate Change Levy, OECD, Environment Directorate, Centre for Tax Policy and Administration, COM/ENV/EPOC/CTPA/CFA(2004)66/Final, 28th February 2005, p. 38

[34] UK ENERGY IN BRIEF, JULY 2005 - http://www.dti.gov.uk/energy/inform/energy_in_brief/energyinbrief2005.pdf

3. Germany

Germany as a highly industrialised and densely populated country in Europe must deliver substantially to the EU Kyoto obligations. In the spring of 1997, during the European Council of Environment Minister's meeting, the German government declared the intent to cut its greenhouse gas emissions CO_2, CH4, and N2O by 25 % between 1990 and 2010. This commitment was part of the proposal of the European Union for the Kyoto conference in December 1997.

Mineral and ecological taxation are important tools for Germany in this respect and rates are set as shown in Table 3.

Table 3

Mineral-oil tax plus eco-tax stages / Energy source	Mineral-oil tax until 31 March 1999	Mineral-oil tax plus 1st stage of eco-tax (1 April 1999)	Mineral-oil tax plus 2nd stage of eco-tax (Jan. 2000)	Mineral-oil tax plus 3rd stage of eco-tax (Jan. 2001)	Mineral-oil tax plus 4th stage of eco-tax (Jan. 2002)	Mineral-oil tax plus 5th stage of eco-tax (Jan. 2003)	Eco-tax percentage in 2003
Electricity (ct/kWh)	---	1.02	1.28	1.54	1.8	2.05	2.05
Motor fuels							
Diesel fuel (ct/litre[1])	31.70	34.77	37.84	40.91	43.98	47.04	15.34
Petrol (ct/litre[1])	50.11	53.18	56.25	59.32	62.39	65.45	15.34
Natural gas (ct/litre[2])	6	7	7	8	8	8	2
LP gas (ct/litre[2])	6	7	7	7	8	8	2
Heating fuels							
Light heating oil (ct/litre)	4.09	6.14	6.14	6.14	6.14	6.14	2.05
Heavy heating oil (ct/kg)	1.53	1.53	1.79	1.79	1.79	2.5	0.97
Natural gas (ct/kWh)	0.18	0.344	0.344	0.344	0.344	0.55	0.37

Source: Federal Ministry of Finance (BMF) 2004, and own calculations; figures have been rounded off.

1) As of 1 November 2001 for low-sulphur fuels, as of 1 January 2003 for sulphur-free fuels)

2) As part of scheduled reductions in tax breaks, beginning in 2004, the mineral-oil tax on natural gas and LP gas used as fuel was increased by one cent for each fuel, to 9 ct/litre.

(Source, BMU, February 2004, The ecological tax reform)

In 1999, Germany introduced a distinctively new and different environmental tax on the consumption of electricity, and also increased the tax on the consumption of mineral oils. The Federal Government's aim, in connection with the ecological tax reform (ETR), is to provide incentives for energy saving and energy efficiency, and to promote use of renewable energy sources. The new direction in energy policy, together with the phase-out of nuclear power, was crucial for the last German government under outgoing Chancellor Schroeder for climate protection and creating new jobs. Following the introduction of this ecological tax reform in 1999, the decision was taken to continue the reform until 2003. Furthermore, in 2003, the Act on the Further Development of the Ecological Tax Reform entered into force, and the expansion to an ecological fiscal reform (EFR) was initiated. In early 2004, the expansion to

an EFR 2 was continued.[35] The ecological tax reforms aim is to reduce the tax burden on labour, and shift part of it to environmental consumption, thus energy taxes are being introduced or increased in open and calculable steps. At the same time, pension insurance contributions should be reduced and stabilised. The ecological tax reform claims to be largely revenue-neutral. Its revenue is returned to industry and the public via reduction of other taxes. Only a small part of the revenue, about 13 %, will be used directly for environmental programmes and tax reductions that benefit the environment.[36]

The ecological tax reform in Germany is part of a major, ongoing reform of the countries' tax structure since unification. Since this stands out as major shifting reform in Europe of a tax system, the overall picture will be briefly looked at in this overview as well.

German tax law defines taxes ("Steuern") in the following manner: "monetary payments that do not represent payment for specific services and that a community under public law exacts, in order to generate income, from all those who fulfil the prerequisites that the law establishes for payment obligations; income generation may be a secondary purpose" (Article 3, (1), 1st sentence, German Tax Code (Abgabenordnung – AO)).

Fees ("Gebühren") are defined as payment for public-sector services that can be individually allocated to those obligated to pay fees, and their primary purpose is to finance such services (principle of equivalence). Examples of environmentally oriented fees include waste-water and waste-management fees and administrative fees for issuance of licenses under emissions-control law.[37]

The total tax-to-GDP ratio in Germany is above the European average[38]. Due to the unification process, the tax-to-GDP ratio rose significantly in the early 1990s. This was largely a consequence of increased need for social contributions. In the second half of the 1990s, the tax-to-GDP ratio increased by close to 2 percentage points to 42.5% in the year 2000, mostly because of increased tax revenues from direct taxes. It fell back again from 2001 onwards, as a result of reductions in personal and in corporate income tax and due to the tax reform adopted in 2000. Germany has the highest share of social contributions in total tax receipts in the EU-15. On the contrary, the shares of direct taxes and indirect taxes are among the lowest in the Union. The relatively low share of corporate income taxes is to a large extent the result of the high share of unincorporated companies that are taxed under personal income taxes and benefiting from a comparatively attractive depreciation system

In Germany, the federal regions ("Länder") have a substantial share in the tax revenues such as of VAT, the wage withholding tax, the personal income tax, and the withholding tax on

[35] See Last revision: Publication by the Federal Ministry for Environment, February 2004, The ecological tax reform: introduction, continuation and development into an ecological fiscal reform, p 1

[36] The ecological tax reform, p. 3

[37] For the above overview see: Promotion of Environmental Protection in German Laws on Taxes and on other Types of Levies, prepared jointly by Federal Ministry of Finance and Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (January 2000) page 7 cons. ; in addition to collecting taxes and fees, lawmakers may also exact **special levies** ("Sonderabgaben") in special cases. Since special levies compete directly with taxes, but apply only to certain groups and normally do not accrue to the general budget, they must conform to strict prerequisites, pursuant to the jurisprudence of the Federal Constitutional Court, that are intended to ensure that such levies conform to the country's financial system and to the Basic Law's principle of equality (cf. for example Federal Constitutional Court vol. 82, p. 159 [178 ff.]).

[38] The following data are mainly taken from Eurostat, Structure of the taxation systems in the European Union, 2004, p 146 cons.

interest distributions. The 'Länder' have access to a share in revenues from other taxes, such as estate, inheritance and gift taxes, taxes on transfer of property and tax on motor vehicles.

The ecological tax reform entered into force on 1 April 1999. As a first step, a new tax on electricity was introduced and existing taxes on mineral oils and gas were increased. The additional revenues from the ecological tax reform are being used to decrease contributions to the old age pension system (i.e. non-wage labour costs) from 20.3% to 19.3% of gross wages at the end of 1998. The manufacturing industry and agriculture are only taxed at 60% of the standard rate. Manufacturing companies, which pay 60% more in energy taxes than they receive in the form of reduced social contributions, are refunded 40% of the energy taxes.

Also, on 1 April 1999 the income tax reform ("Tax Burden Reducing Law Steuerentlastungsgesetz 1999/2000/2002") entered into force. In July 2000, another comprehensive income tax reform was passed. The latest stage of this reform came into effect in 2005. The highest personal income tax rate was to be reduced from 53% (1998) to 42% (2005) and the lowest rate from 25.9% (1998) to 15% (2005). At the same time the tax-exempt income would be increased from about 6,322 euro in 1998 to 6,664 euro in 2005. The corporation tax system was also reformed in two major steps[39].

Germany chose, in order not to endanger the competitiveness of energy intensive industries, to provide several tax rebates in favour of energy intensive users in the manufacturing industry with the new eco-tax law.

Since such tax rebates confer an advantage on the undertakings and the sectors concerned, they were assessed under the EU State aid rules as in all other countries using rebates schemes, as shown, for example in Sweden.

On 13 February 2002, the EU Commission approved tax rebates for energy intensive users.
The tax reform was continued in 2000. Tax rates are being increased in four steps over a period of four years, including a raise at the beginning of 2003. Germany applied several tax reductions. These reductions confer an advantage to the sectors concerned.

The Commission assessed the prorogation of the tax reductions notified by the German government mainly on the basis of the EC's environmental state aid guidelines and found them to be compatible with the provisions on State aid of the EC and ECSC Treaties.[40]

Germany applied an 80% tax reduction for ten years applied to the increase of the mineral oil tax for heating purposes for the producing industry, including companies active in sectors covered under the ECSC Treaty: agriculture, forestry, and fishery. This measure was acknowledged to be compatible, since companies would still pay a tax rate higher than the

[39] Eurostat: As of January 2000, the corporate tax rate for non-distributed profits was reduced from 45% to 40%, and more importantly, as of January 2001 only a single tax rate of 25% on corporate income was introduced replacing the 40% rate for non-distributed profits and the 30% rate for distributed profits. For 2003 this rate was increased for one year to 26.5 to finance reconstructions in the aftermath of the disastrous floods. In order to finance the corporate income tax reductions, rates depreciation rates for machinery and buildings were reduced. At the same time, the full imputation system was replaced by a 'half-income system' in order to avoid double taxation of corporate profits by corporation tax and personal income tax of the shareholder. Only 50% of distributed profits are subject to the shareholder's individual income tax, there is no imputation of taxes paid by corporations. From 2002 onwards, corporate profits from the sale of shares of other corporations are tax-free if the shares have been held for at least one year.

[40] For this and the following Commission's evaluation see Press declaration European Commission IP/04/406 Brussels, 30 March 2004

Community minimum rate of the harmonised tax on oil for heating purposes and a significant amount of the tax on gas for heating purposes.

Germany also introduced a reduced tax rate of 20% of the relevant tax on electricity for the same sectors for ten years. The Commission specifically took into account the continuous increase in the tax over the previous years, and the planned increase in 2003. It also noted the overall energy tax paid by companies due to the energy taxation system in Germany. The Commission concluded that the measure will have an incentive effect to invest in energy saving and that companies can be considered to pay still a significant amount of the tax on electricity.

Germany structured a tax cap for the most energy intensive users (the so-called "Spitzenausgleich") until 2005. The Commission took into account the voluntary agreement that the German industry entered, which sets emission reduction targets for 2005 and 2012. The Commission favourably noted that this tax reduction measure was limited to 2005, and that further notification extending the measure to ten years will be assessed constructively by the Commission if it fulfils the environmental aid guidelines. According to the European Commission, such a long exemption requires that environmental targets are agreed to, which are a sufficient counterpart for the tax benefits, and furthermore, that a sanction mechanism penalises the non-respect of such targets.

In 1999, favourable tax treatments of Combined Heat and Power (CHP) installations, in regards to their input fuels, oil, and gas, were introduced for a ten year period. Insofar as the measure constitutes State aid, it fulfils the requirements of the environmental aid guidelines for operating aid for CHP.

Further ensured were:

- a 50% tax reduction from the electricity tax for rail transport operations for ten years;
- a 50% reduction of the tax increase on the mineral oil tax on engine fuel for local public passenger transport for ten years.

In its state aid decision to these rebate schemes, the Commission outlined that the mineral oil tax for heating purposes is covered by Council Directive 92/81/EEC of 19 October 1992 on the harmonisation of the structures of excise duties on mineral oils. In application of this directive, the Council adopted Decision 2001/224/EC of 12 March 2001 concerning reduced rates of excise duty and exemptions from such duty on certain mineral oils when used for specific purpose which limits the exemption to 31 December 2006. According to the above mentioned directive, the decision on the duration of the State aid and aspects of the notified tax reductions on mineral oil cannot be understood as authorising the exemption. It is also without prejudice to any Commission proposal for prolonging in this respect Council Decision 2001/224/EC.

Since introduction of the Eco-Tax in Germany in 1999, petrol consumption has fallen during the first three years after introduction for the first time in fuel history. Purchases of three- to five-litre cars have increased. The Eco-Tax provided incentives for investment in environmentally friendly technology and creates competitive advantages. The increase in overall electricity consumption was though not appreciably reduced.

VI. EU harmonisation in Energy Taxation

"The EU will have to rely on pricing policies to implement its 8 per cent emissions reduction target"[41], to which Europe is committed to since Kyoto. In the early 90's, the European Commission had published a proposal for CO_2 taxation. But the Commission ran against opposition on the Council level and the directive was deadlocked for many years, since unanimity in the Council for voting on taxation issues is required, as outlined above.

Europe took many years, until October 2004, when the EU finance ministers (ECOFIN) agreed finally to introduce minimum tax rates on all energy sources. As early as 1992, the EU Commission had proposed a new CO_2 energy tax for environmental reasons. Energy taxes were to increase each year by one US dollar per barrel of oil (159 liters) from 1993 to 2000[42]. In 1997, the Commission proposed an even weaker, modified directive to even the playing field on the Single Market merely by prescribing minimum taxes rates for all energy sources for inclusion in current national energy taxes. In other words, unlike in previous proposals, the EU tax was not to be added to current national taxes.

With the new directive on energy taxation, countries must adjust their national energy tax systems. While all EU member states have had taxes, even if sometimes insufficient, on mineral oil for motor fuels and heating oil since 1993, some countries taxes will now have to be added to natural gas, electricity, and solid fuels, especially coal. Countries which already had introduced energy taxation do not face much restructuring. Germany, for example, only must introduce a coal tax for heating, which reflects just 3 % of coal consumption in the country. In contrast, a tax on coal for the generation of electricity, which makes up some 70% of coal consumption, only must be introduced if the tax on natural gas, an old, special mechanism in the German tax system, stays in effect.

The new Member States will have to introduce new energy taxes or to raise existing ones considerably. The EU cannot determine what will be done with the revenue; therefore, the possibility of making these energy taxes revenue-neutral is merely mentioned in the preamble.

Air traffic will also be taxed, but at a very modest level.

A policy mix favoured by this directive, such as linking energy taxation with other instruments (for example, the EU emissions trading scheme) is progressive. Since entering into force, no European country has reduced or abolished its environmental taxes. Quite to the contrary, new environmental taxes are levied nearly every year.

Environmental taxes may be introduced with accompanying subsidies or tax exemptions that are environmentally beneficial.

The Directive entered into force on the 1st of January 2004.[43] The Directive sets a Community minimum rate system, which before, was limited to mineral oils, to all energy products (mainly coal, gas, and electricity) as well as updating the minimum rates for mineral oils which had not been revised since 1992.

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[41] Ernst Ulrich Von Weizsäcker, Hermann E. Ott, „Tax bads, not goods", Article http://www.ourplanet.com/imgversn/96/ott.html (1998)

[42] Kai Schlegelmilch, Green Budget News **5 – 11/2003,** p. 1

[43] see for the following overview especially publication of Commission in SCADPlus, entitled: Community framework for the taxation of energy products and electricity, http://europa.eu.int/scadplus/leg/en/lvb/l27019.htm

According to the Directive, energy products are taxed only when used as fuel or for heating, but not when used as raw materials, or in chemical reductions, in electrolytic, or metallurgical processes. Furthermore, energy products used in stationary engines and for agricultural purposes will normally be taxed at lower levels than the levels applicable to fuel used in motor cars.

The Directive included specific provisions concerning the taxation of commercial diesel to limit the distortions of competition with which road hauliers are confronted. But the EC Energy Tax Directive only provides for minimum rates of taxation. The existing important differences in the rate of diesel taxation are not remedied by the Directive. Here the Commission will need to call for future harmonisation of commercial diesel taxation.[44]

Member States have the right to differentiate between commercial and non-commercial diesel, which will allow them, for example, to provide a lower rate of duty on commercial diesel, as long as the minimum levels set by the Directive are observed and as long as the rate for commercial diesel does not fall below the national level of taxation in force on 1 January 2003. This possibility to differentiate will enable Member States to reduce the gap in excise duty levels between non-commercial diesels used in cars and petrol since there are no environmental or other reasons to justify the presently lower minimum rate on diesel in these circumstances.

Member States can also apply other exemptions or reduced levels of taxation where this will not be detrimental to the proper functioning of the Internal Market, and will not result in distortions of competition.

Member States will be free to apply differentiated rates to similar products, provided that these rates are higher than the Community minimum levels and Internal Market, and competition rules are respected. This tax structure approach is used by Member States in other fields to encourage consumers to switch to more environmentally-friendly products.

Member States will be obliged to exempt energy products used for the purpose of international air transport and products used for maritime transport within Community waters.

Member States can also exempt renewable energy sources including biofuels as well as energy used for the carriage of goods and passengers by train, metro, tram, or trolleybus.

The latter is an important link to two directives in the European Union:

- The Directive 2001/77/EC on the Promotion of Renewable Energies in the Internal Energy Market targeting a doubling of the share of renewable energies concerning the EU internal market energy consumption from 5.4 % in 1997 to 12.0 % by 2010, meaning an increase of the share of renewables in the electricity production from 14 % in 1997 to 21,0 % in 2010 (for EU 25)
- Directive 2003/30/EC on the promotion of the share of biofuels in the transport sector which foresees an increase of 5.75% of biofuels until 2010 and 20 % until 2020.

Like the above examples from Member States regulations, the EC Directive also takes into account the competitiveness of Community firms by providing for measures to reduce the tax

[44] If the gap widens and distortions of competition would increase, the European Commission could propose a further harmonisation Directive under Article 96 ECT provision, via qualified majority voting and thus there would be no unanimous voting needed in the Council.

burden on energy-intensive firms that have put the greatest effort into reducing their consumption. This transposes the above-described individual Commission state aid decisions to the exemption schemes, for example in the German and Swedish energy tax structure.

The directive also opens the way for voluntary agreements with industries following the UK example. There is provision for Member States to refund part of the taxes paid by firms which have invested in their efficient use of energy. The tax reduction in the case of firms that have entered into such energy efficiency commitments would be down to zero in the case of energy-intensive businesses and to 50% in the case of non-energy-intensive businesses.

For two products of general consumption, unleaded petrol and diesel, the proposal will lead to only a limited increase in consumer prices in a small number of Member States. The limited increase is an inevitable consequence of the approximation of the national rates needed to put an end to the present shortcomings in the smooth functioning of the Internal Market. The benefits expected for the environment and transport as a result of the improvement in the price structure is, on the other hand, very substantial.

The Directive includes transitional periods for some Member States, during which the Member States in question are required to progressively reduce their deficiencies with respect to the new minimum levels of taxation. However, when the difference between the national level and the minimum level does not exceed 3% of the minimum level, the Member State concerned may wait until the end of the period to adjust its national level.

In addition to these transitional periods, Member States are allowed to continue to apply various derogations until 31 December 2006, subject to a prior review by the EU Council on the basis of a proposal by the Commission.

Furthermore, notwithstanding any of the specific transitional arrangements, Member States with difficulties in implementing the new minimum levels of taxation will be allowed a transitional period of until 1 January 2007, in order to avoid jeopardising price stability.

The following table shows the minimum levels of excise duty on energy products at the time of implementation by the Directive and as agreed to be implemented with introduction of the directive and later:

Table 4.

Motor fuels			
	Current minimum rate	Minimum rate from 1/1/2004	Minimum rate from 1/1/2010
Petrol (€/1000 l.)	337	421	421
Unleaded petrol (€/1000 l.)	287	359	359
Diesel (€/1000 l.)	245	302	330
Kerosene (€/1000 l.)	245	302	330
LPG (€/1000 kg.)	100	125	125

Natural gas	100 (€/1000 kg)	2.6 (€/gigajoule)	2.6 (€/gigajoule)

Fuels used for industrial or commercial purposes		
	Current minimum rate	Minimum rate from 1/1/2004
Diesel (€/1000 l.)	18	21
Kerosene (€/1000 l.)	18	21
LPG (€/1000 kg.)	36	41
Natural gas	36 (€/1000 kg)	0.3(€/gigajoule)

Heating fuels and electricity			
	Current minimum rate	Minimum rate from 1/1/2004 (business)	Minimum rate from 1/1/2004 (non-business)
Diesel (€/1000 l.)	18	21	21
Heavy fuel oil (€/1000 kg.)	13	15	15
Kerosene (€/1000 l.)	0	0	0
LPG (€/1000 kg.)	0	0	0
Natural gas (€/gigajoule)	N/A	0.15	0.3
Coal and coke (€/gigajoule)	N/A	0.15	0.3
Electricity (€/MWh)	N/A	0.5	1.0

VII. Relationship and interaction between taxation models and other policy instruments

The following chapter will introduce other important instruments in the European Union in the field of environmental tools for sustainable production, internalisation of externalities, of climate change.

1. Voluntary agreements

Before, many member states and the European Union promoted the use of voluntary agreements instead of or parallel to introducing eco-taxes. They are in fact still the most frequently used schemes in the field of climate protection policy.[45]

The EU creates and favours binding efforts in the field of environmental protection but also continues encouraging voluntary agreements for the sake of flexible industry policy. In its recent Green paper on Energy Efficiency[46], the European Commission underlined the following: *"The EU will continue to develop market instruments as much as possible, particularly voluntary agreements with industry and information campaigns to increase consumer awareness. But whereas these instruments can prove highly effective, they cannot always be a substitute for adopting regulatory measures designed to correct market inadequacies and to provide."* Often the European Commission calls for binding targets and regulations whereas the European Council rather normally favours non-binding targets.[47]

Overall, voluntary agreements alone are often not effective or efficient. Already voluntary agreements between industry and state are often designed to be too weak and the targets not challenging industry for a major shift. The latest OECD report on sustainable development comes to the conclusion, which is based on specific country surveys, to "terminate" those ineffective agreements by binding regulations as "the most appropriate instrument" and especially by "greater use of taxes or tradable emission permits".[48]

Some voluntary agreements are not agreements between the state authorities and a singular industry or industry groups, but directly between the energy provider and the consuming industry. These agreements may help to reduce carbon emission. Reasons for such agreements, which have a long tradition in the US and in Europe, were often not based on environmental consideration but on peak management, but may nevertheless lead to reduced carbon emission as well. On the other hand, they carry the risk of prolonging the lifetime of heavy polluters and inefficient centralised power stations.

Another example of a specific set of voluntary agreements is the emission trading schemes installed within a large industry structure, such as the BP emission trading scheme which proved to be very effective.

OECD has indicated various conditions under which voluntary agreements can be implemented most effectively[49]:

- clear targets are set prior to the agreement;
- the agreement specifies the baseline against which improvements will be measured;
- the agreement specifies reliable and clear monitoring and reporting mechanisms;
- technical solutions are available to reach the agreed target;

[45] Sustainable Development in OECD countries, (OECD 2004), p. 27
[46] Commission of the European Communities, COM (2005) 265 final
[47] Examples for this tendency are the EC directive on promotion of renewable energies in the electricity market and the latest proposal for a directive on energy efficiency –in both cases the Council waters down the binding approach of the Commission
[48] Sustainable Development p, 12
[49] UNEP,WMO, Climate Change 2001, Working Group, Mitigation; Policies, Measures and Instruments

- costs of complying with the agreement are limited and are relatively similar for all members of the target group; and
- third parties are involved in the design and application of voluntary agreements.

On 17 July 2002, the European Commission issued a Communication on an EU-level framework for environmental agreements. It sees voluntary environmental agreements as a form of co-regulation that can complement the traditional command-and-control approach.

The Communication aims to create a framework for the use of such agreements. It was issued in response to criticism from the European Parliament on how the Commission had handled voluntary agreements in the past. The main area of discussion is what legal form an environmental agreement should take.

The Communication of 17 July 2002 highlighted the potential cost-effectiveness and flexibility as the main positive aspects of voluntary agreements. It stated that industry's willingness to act proactively should be encouraged and supported. It set out three possible types of agreements at the EU level:

- *Own-initiative*: Industries take initiative in an area where the Commission has no intention to propose legislation. The agreement can be endorsed by the Commission through a formal recognition.
- *Self-regulation*: Industries might react in a field where there is a political debate and possible future legislation. The Commission can acknowledge the agreement by a Commission Recommendation, and additional monitoring obligations can be added by a Decision of the European Parliament (as was the case of the agreements with the car industry to reduce CO_2 emissions). The only sanction existing is the threat of future legislation.
- *Co-regulation*: If the Commission believes an area needs legislation, it can chose to use a stricter form of environment agreement, where the Council and the European Parliament set the targets and monitoring requirements, while the industry decides what measures to take and how.

In addition to the form of the agreement, there are also other aspects that might be considered when concluding an agreement:

- Agreements aim at a high level of environmental protection, and they must set ambitious targets beyond "business as usual".
- The agreements should comply with the internal market and competition rules.
- Trade aspects should be considered when concluding agreements.
- The Aarhus convention should be applied. Information should be made available on the negotiations and public participation in decision making should be ensured.
- The monitoring and reporting systems should be well-designed.

Policy areas in which the EU level environmental agreements could play a role are the PVC strategy, integrated product policy, climate change, and waste management.

The European Parliament criticised the legal approach of the Commission, and especially the non-binding character of this communication. It agreed with the distinction made by the Commission between two types of environmental agreements (self-regulation and co-regulation), but asked the Commission to define a clear set of criteria for determining the choice between those two instruments. In addition, it has pressed for more quantifiable targets and more transparent monitoring systems.

A recent example of a broad voluntary agreement in the energy sector in form of a co-regulation is the voluntary agreement with car industry operating in Europe. In 1998, the European Commission and the European car industry represented by the European Automobile Manufacturers Association (ACEA) reached an agreement on the reduction of CO_2 emissions from cars. In this agreement, ACEA's main commitments were:
• To achieve an average CO_2 emissions figure of 140 g/km by 2008 for all new passenger cars sold in the EU classified as M1 in Council Directive 93/116/EEC
• To bring to the market individual car models with CO_2 emissions of 120 g/km or less by 2000

The European Commission also concluded agreements on CO_2 emissions from cars with the Japan Automobile Manufacturers Association (JAMA) and the Korean Automobile Manufacturers Association (KAMA) for their sales in the EU. The only deviations are the time frame (2009) and the estimated target for 2003 (JAMA).

In early 2005, a report by Transport and Environment (T&E) was published which underlined that the car industry's voluntary agreement with the EU to cut average CO_2 emissions from passenger cars was failing to deliver. The NGO report said that the 140g/km target set for 2008 can only be reached if the industry now makes "unprecedented emissions cuts". It concludes that EU legislation is needed to create both legally-binding limits as well as incentives to encourage innovation in low emissions technology and "to boost the market for cars that pollute less"[50].

Overall, voluntary agreements can, if used carefully and in a logical framework with taxation instruments, help to achieve clear targets in a more flexible way than relying only on strict taxation or other measures.

In countries where the legislative framework concerning environmental protection is still evolving and developing in parallel with rapidly increased industrial production, it has to be seen that such evaluation could be adapted to the existing situation and availability of governing tools.

A good combination of voluntary agreements, when linked to conditions in the respective productions, can be a useful first step to proceed and bring industry more rapidly towards sustainable production. Nevertheless they might be integrated in a legislative structure which sets binding maximum emission levels.

2. Emission Trading in Europe

Energy taxation in Europe as a scheme "competes" with the newly established energy trading scheme. The following shall give a short overview on the current emission trading scheme and will look into questions of compatibility of both instruments.

[50] T&E, News Release ,Brussels, 20/01/05

a. Principles of emission trading scheme in Europe

The IEA's World Energy Outlook 2004 Reference Scenario projects that the industry sector will increase its CO_2 emissions in EU-25 by 0.1 per cent per year from 2002 to 2030. Power generation CO_2 emissions will rise from 1308 Mt CO_2 in 2002 to 1669 Mt CO_2 in 2030 (+0.9 per cent per year), taking into account government policies and measures on climate change and energy security that had been adopted by mid-2003.[51]

One answer to this emission challenge and to enable Europe to meet its overall CO_2 reduction target is Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 which established a scheme for greenhouse gas emission allowance trading within the European Union.

According to Article 1:

"This Directive establishes a scheme for greenhouse gas emission allowance trading within the Community (hereinafter referred to as the 'Community scheme') in order to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner."

When the European Emission Trading Scheme (EU ETS) entered into force October 2003, Member States had to comply and to bring into force the laws, regulations and administrative provisions necessary to comply with this Directive by 31st December 2003 at the latest.

Approximately 12,000 installations[52] across 25 EU countries have to take part in the scheme. These large scale CO_2-emittants in industry and the electricity sector will now have to hold certificates equivalent to the amount of their CO_2 emissions. The emissions trading system is expected to contribute significantly to achieving the Kyoto emissions-reduction target of the EU.

EU ETS is seen as one strategic part in the overall goal of the EU to meet their emission reduction targets under the Kyoto Protocol which itself entered into force 16th February 2005. Emissions trading do not, according to the European Commission, imply new environmental targets, but rather allow for cheaper compliance with existing targets under the Kyoto Protocol. Letting participating companies buy or sell emission allowances means that the targets can be achieved at the least cost.[53]

The EU ETS is basically a cap and trade scheme. By facilitating trade, the European Commission estimates that Kyoto targets can be achieved at an annual cost of €2.9 to €3.7 billion, representing less than 0.1 percent of the GDP in the EU, compared to double that cost estimated with €6.8 billion without the EU ETS. The stated purpose of the EU ETS is to cap industry's emissions with a policy instrument that helps to minimize cost, so that it affects its

[51] Julia Reinaud, International Energy Agency, Information paper, Industrial Competitiveness under the European Union Emissions Trading Scheme, February 2005,

[52] European Commission, Press Release, IP/04/862, Brussels, 7 July 2004

[53] see EU Commission Press declaration, Memo 0/04/44, updated 6th of January 2005: Questions and answers on emission trading and national allocation plans

competitiveness the least. The economic reasoning behind emission trading is that no source should pay more, at the margin, than another to reduce its emissions and joint efforts enable the different Member States and Europe to reach its reduction targets. Fines of 40 euros per excess tonne of CO_2 emitted will be imposed on companies exceeding their target, rising to 100 euros three years after their entry into the scheme.

The EU ETS is embedded in the broader regime created by the Kyoto Protocol, but it applies only to a subset of countries whose industry, in some cases, competes with producers whose emissions are not limited. The industry under EU ETS had, in the beginning, strongly outlined how much the EU ETS would affect their competitiveness while leaving other sectors unaffected.

Article 9 of the ETS Directive stipulates that for each in the Directive Article 11 defined allocation period each Member State "shall develop a national plan stating the total quantity of allowances that it intends to allocate for that period and how it proposes to allocate them". The national allocation plans (NAP) show how many CO_2 emission allowances Member States plan to allocate for the 2005-2007 trading period, and how many each plant will receive.

The Commission had to examine all NAP plans against eleven allocation criteria listed in an annex to the Emissions Trading Directive[54]. The most important criteria seek to ensure that the plan fits in with the country's overall strategy to reach its Kyoto target. Other criteria relate to non-discrimination issues, EU competition and state aid rules and technical aspects. The Commission could accept a plan in part or in full. If it accepted a plan unconditionally, the Member State can take a final allocation decision. The Commission did reject some of the first Plan proposals.

NAP design and negotiation between Member States and the Commission was a challenging undertaking. Apart from the question of how much emissions would be allocated to the respective company, based on detailed questionnaires and survey, it was, for example, also difficult to find a balanced attitude between companies who wanted to enter a market with new production and the question related to if they should have to buy their emission allowances whereas existing industry received it for free. This was especially discussed concerning CHP power producers and the EU and Member States Programmes to promote CHP production and foremost concerning independent CHP power producers wishing to enter a national electricity market.

Another issue was the question of whether ceasing of operation of industry, which had received allocation, if these could be transferred to another industry at least in the same production line.

In July 2004, the Commission published its approval of eight Member States' allocation plans, after sometimes difficult negotiations on modifications of those proposals. In mid-July, the Commission also opened infringement procedures against a number of Member States that had not yet submitted their plans and/or transposed the Emissions Trading Directive. Greece and Italy had failed to submit their allocation plans as required by 31 December 2003. Until July 2004 only Austria, Germany, France and Sweden had done their work of full transposition of the Directive.

54 Directive 2003/87/EC

The eight plans assessed by July 2004 met most of the necessary criteria. The Commission had asked for changes in two areas of general importance:

- if the volume of allowances for the 2005-2007 trading period does not allow the country to meet its Kyoto target during the first commitment period 2008-2012
- if a Member State intends to make so-called "ex-post adjustments" to allocations i.e. it plans to redistribute allowances among the participating companies during the 2005-2007 period. This would create uncertainty for business and hamper the market exchange of allowances.

In each case where changes were necessary, the Commission had indicated the steps to be taken by the Member State to make the plan acceptable to the Commission.

The following table gives an overview on the allowances accepted and the number of installation in eight Member States:

Table 5
Cleared allowance volume and plants

Member State	CO2 allowances in million tonnes	Installations
Austria	98.2	205
Denmark	100.5	362
Germany	1497.0	2419
Ireland	67.0	143
Netherlands	285.9	333
Slovenia	26.3	98
Sweden	68.7	499
United Kingdom	736.0	1078
Total	**2879.6**	**5137**

Source : EC Commission, Press declaration : IP/04/862

In 2005, it became apparent that the costs of buying CO_2 quotas under EU ETS were rising sharply. One reason is seen in increased CO_2 emission by increased power production from coal fired power plants in some EU countries, in response to rising oil prices. Quotas are currently traded around €20 per tonne of CO_2 and have had peak prices of €30 per tonne, which will increase of traded electricity price, as was happening for example at the Nordic Energy Bourse Nord Pool, whereas Swedish utility company Vattenfall declared, that 10 € per tonne should be the correct price tag.[55] The Swedish Sustainability Minister outlined in this context that the trading scheme was still too new for conclusions to be drawn, and in any case "the whole point of the system is that electricity from polluting sources should be more expensive"[56].

[55] See Nils Andersson, business development director of Vattenfall, in Dagens Nyheter Newspaper on 7th August 2005
[56] Minister Mona Sahlin, in Dagens Nyheter article of 7th August 2005

b. Emission trading and Energy taxation

Since January 2005, the European Emissions Trading System (ETS) first phase is in operation. The link and correlation between emissions trading and ecological tax reform is complicated. While the framework for emissions trading is roughly equal in all EU countries, energy taxes as part of ecological tax reform are far less harmonised as shown above.

One reason for the lack of harmonisation of the eco-tax is that eco-taxes rely on various and different schemes, traditions, and structures in the various Member States and Europe, leaving a diverse, non-harmonised picture. Whereas the EU Emission trading directive, from the beginning, introduces a harmonised system to be applied more or less in the same way in all EU member states. Before the introduction of this Directive only very few countries, such as Great Britain, had already installed such a system and thus they are not really obliged to modify existing schemes. The EU Emissions Trading Directive defines clearly which installations must hold CO_2-certificates. In view of the traditionally different tax structure in EU Member States, the Energy Tax Directive had to leave major details of enforcement to the Member States in order to enable them adequate harmonisation with in their national tax structure and with respect to existing taxation schemes.

In consequence, some EU countries industrial installations both have to hold CO_2-certificates and pay energy taxes on fossil fuels. In others, there are high tax rebates for energy-intensive industries. On the other hand, the EU Member States have quite different emission reduction targets for their installations. Some countries have set ambitious targets and others have only rather weak targets.

A combination of input taxes (both for fossil fuels and uranium), electricity tax for end-users and tax rebates for industrial installations taking part in emissions trading seems to be the best solution in the future.

Finland, for example, has adopted the following combination for its national system: energy tax is divided into basic tax and surtax. Basic tax is fiscal and is collected on petrol and diesel oil. Surtax is collected on oil products, other fossil fuels, and electricity. The energy tax on fossil fuels has been 18.05 euro per tonne CO_2. To favour certain sources of energy, natural gas receives a 50% reduction on the energy tax and the tax of peat is not based on the carbon content. Electricity is taxed at its consumption stage, which means that the fuels for power production are tax-free. In addition, renewable power, excluding large-scale hydro power, is eligible for subsidies. According to the described taxation, no taxes are taken into account in the simulations for market electricity. Despite the EU emissions trading system, the energy tax will also continue to apply to these facilities. This means that since 2005, energy tax will be levied on many heat producing plants, even though they are included in the emissions trading sector in Finland. In the future, adjustment to better harmonise both systems may be introduced, but there is no plan to end energy taxation.[57]

Emissions trading can be a strong instrument for the electricity sector because the energy tax directive seeks to abolish input taxes in the electricity sector. Existing input taxes shall only be maintained if they have an environmental purpose. Nuclear power generation is an exception from this general rule— it is not affected by emissions trading and thus gains competitiveness in comparison to electricity from fossil fuels which could be in breech with

[57] Tiina Koljonen*& Ilkka Savolainen, Impact of the EU emissions trading directive on the energy and steel industries in Finland, Technical Research Centre of Finland, VTT , 2004, page 2

the loyalty principle in the EC Treaty and the correct implementation of the European directive for the liberalisation of the energy market. This is seen as "counterproductive from an environmental point of view"[58]. Therefore a specific supplementary "primary energy tax on nuclear fuels" would be able to balance this different weight. United Kingdom who was first to combine energy tax and emission trading to a certain extent as shown above, puts taxes on nuclear energy as well in the form of an energy tax.

In principle, the British Climate Change Levy has introduced a flexible model where rebates on energy taxes for certain installations are justified, but only if the emission abatement targets are challenging enough. According to evaluation by M. Seiche "the installations subject to emissions trading are not identical with industrial companies as a whole"[59]. A large steam generator in the chemical industry, for example[60], participates in emissions trading, but small production processes and the administration sector in the same chemical company are not subject to emissions trading. The potential for increasing energy efficiency is especially high within these smaller production processes and in the administration sector. Therefore, it is proposed in the field of energy policy and research in Europe, that taxes should be targeted specifically towards these parts of the companies without granting high tax rebates. The criteria for differentiating between regular and reduced energy taxes would then be the energy intensity of the industrial process rather than the involvement of the company as a whole to the industrial sector or the service sector.[61]

A good overview is given by in table 5, demonstrating a benchmark based on effectiveness, accuracy, administrative costs, predictability of price effects.[62]

Table 6.

	Ecological Tax Reform	Emissions Trading
Effectiveness	High - depending on tax rates	High - depending on reduction targets
Accuracy	Weaker than with ET - high enough depending on accuracy of econo-metric estimates of price elasticity of demand	High in cap and trade regime. Relatively weak in baseline and credit system
Administrative costs	Low - higher with complicated tax rebates and exemptions	Low with auctioning - moderate with grandfathering - high with benchmark system
Predictability of price effects	Very high - but only if tax laws are fixed several years in advance	Rather low - but companies can secure themselves with derivatives

Source: Green Budget Germany

[58] See G R E E N B U D G E T G E R M A N Y, publication from 21st of September 2004, Matthias Seiche, The Relation between Emissions Trading and Ecological Tax Reform: For better Harmony in the Concert of Instruments
[59] ibid
[60] ibid
[61] Matthias Seiche, ibid
[62] Matthias Seiche , ibid

VIII. Ecological taxation impacts on different economic and societal sectors

The following seeks to briefly discuss the effects of ecological taxation. In literature and public discussion, one main argument and concern against eco-taxes on national level and in a globalised world is the danger to international competitiveness. This risk is taken seriously in all presented eco-tax schemes. The European Commission allowed these indirect subsidies to energy intensive sectors of the respective national economies after evaluation of risks for market opening and competition.

But major studies especially by the OECD in 1997 found that these concerns were "often exaggerated". It is especially questionable since, as shown here, the tax rates are generally too low to have a significant effect on competitiveness. The above example, especially from the United Kingdom, underlines this conclusion. And taxation via positive effect on reduction of energy consumption often leads to modernisation of the respective industry and by that, an improved effectiveness. This is probably a factor which will become more important in the coming years with ever increasing energy prices due mainly to increases of mineral oil prices.

In a major report for the Swedish Environmental Protection Agency in October 2004, Patrik Söderholm underlined that "all existing environmental taxes and charges in Sweden have not had any major adverse effect on the economy."[63]

The German eco-tax became, since 2005 and the phasing out of many rebate schemes for the energy intensive industry, a profitable source of income for the government. The revenues in 2003 rose to € 18.8 bn, thus more than 28 % from the 14.6 bn € in 2002.

The main aim of the German eco-tax is to use its income to finance cuts in worker's and employer's pension contributions. This could only help in reducing the share of these taxes in the overall tax from 20.3 % in 1999 to 19.5% in 2003. And most of the extra income generated by decreased exemption for industries and big energy consumers was taken for general spending as the government "struggles to reduce its budget deficit".[64]

Each tax scheme has to be accompanied by a monitoring exercise in order to reflect if the specific eco-tax is working for the environmental goals. The public has a right to know whether the tax they pay as an ecological tax "really works for the environment"[65].

Polluters only change behaviour patterns if the charge is high enough to invest in non-pollution or less polluting technologies. If too weak, the mechanism becomes more a "licence to pollute". And it must be avoid polluters just changing towards another process. This may happen with landfill taxes, for example, where the respective industry would then go for incineration to avoid landfill tax.

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[63] He underlines though a further need to more empirical support, see Patrik Söderholm, Extending the Environmental Tax Base –Prerequisites for increased taxation of natural resources and chemical compounds, p.78

[64] Green Budget News 2-4/2003

[65] Kai Schlegelmilch,, Environmental Fiscal Reform, Experience and present situation in Germany, speech Vienna 2002, Green Budget News 1 , p. 17

Since introduction of the 1999 Eco-Tax in Germany, petrol consumption has fallen during the first three years after introduction for the first time in fuel history, thus helping Europe to save face in view of ever increasing consumption in the overall EU 25. Purchases of three- to five-litre cars have increased. The Eco-Tax provided incentives for investment in environment-friendly technology and creates competitive advantages.

The German Government sets the following success elements:

- The upward trend in fuel consumption stopped after 50 years: petrol and diesel sales are falling since 1999.
- The numbers of passengers in public transport are rising.
- The ecological tax reform will lead to a reduction of CO2-emission by 2 - 3 % up to 2005.
- Up to 250.000 additional jobs have been created until 2003.[66]

1. Clarity and effectiveness of eco taxation

The basic idea of many eco-tax reforms introduced in the EU is that an increase in environmental taxes is accompanied by a reduction in taxes on labour, thereby trying to avoid an increase in the overall tax basket and achieving the twin benefits of reducing environmental damage when increasing the demand for labour and employment through reduced labour costs. The reduced costs might also foster work incentives leading to an increased supply of labour.[67]

As outlined, a high share of environmental tax revenues in comparison to overall taxation as such do not automatically provide a clear indication of a high priority of protecting the environment via taxation policy, an indication for achieving environmental oriented policy goals. Eurostat underlines that the ratio depends on the general tax structure, influenced by direct taxes and social contributions. If green taxes are an efficient incentive, they would reduce the use of the environmentally harmful goods and thereby erode the tax base. This could even lead to a falling tax-to-GDP ratio for environmental taxes[68].

Overall, it maybe said that a cost-tag-approach is followed by many Member States, as shown already. But in overall evaluation they have not reached the necessary effectiveness in most cases.

First of all, the tax rate is often too low and large emission-intensive sectors such as heavy industries or transport receive reduced tax rates or complete tax exemption. The different rate schemes in the different countries unnecessarily deepen the threat of distortion of competition than to deliver a strong EU-wide approach to emission reduction by taxation.

For the OECD level, the following table underlines the variety of many EFR schemes:

[66] **Future Challenges to Global Climate Change and New Policy Instruments,** Setting the Right Incentives: The Role of Emission Trading and other Flexible Mechanisms, Parliamentary Secretary of State Margareta Wolf, speech, Conference: Emissions Trading Rights and Other Flexible Mechanisms, 13. Oktober 2004, Barcelona

[67] See Eurostat Structure of the taxation systems in the European Union, 2004, p. 12 cons.

[68] Eurostat, page 13

Table 6.

Table 3.7. Rates of CO_2 taxation in OECD countries which introduced carbon taxes

	Treatment of industry	Treatment of power generators	Electricity use		Coal	Natural gas	Fuel oil	Diesel	Petrol
	Industrial firms		Euros per MWh		Euros per tonne of CO_2			Euros per tonne of CO_2	
			Households	Industry				Cars	
Austria	Tax payments capped at 0.35 per cent of firm's net production value	Untaxed	15	0	0	19	25	110	181
Denmark	Lower rates in exchange for abatement agreements	Untaxed	97	11	Between 0.4 and 131			141	241
Finland	85 per cent refund if energy taxes exceed 3.7 per cent of value added	Untaxed	7.4	4.5	14.5	8.7	23	121	260
Germany	Carbon tax payments capped	Taxed[1]	21	12	0	17	20	179	289
Ireland	Likely to receive exemption	Undecided	0	0	Tentatively € 15 to 20			124	177
Netherlands	No tax on quantities above 10 GWh or 1 Mm^3 per year for electricity and gas respectively	Untaxed	64	0	–	80	66	136	281
New Zealand	Only emissions above negotiated targets are liable to the tax	Taxed	0	0	To be set in line with Kyoto permit prices			–	93
Norway	Special rates for:	Untaxed	12	0	20		36	156	251
	Metals processing				0				
	Domestic aviation and shipping						14		
	Fishing						0		
	Pulp and paper, fish processing						10		
	Off-shore activities					40	36		
Sweden	Reduced rates	Untaxed	11	0	78		104	132	227
	Industry				17		19		
United Kingdom[2]	Only 20 per cent of the climate levy if abatement targets are agreed to	Untaxed	0	4.8	5.5[3]	11	16	253	312

Note: All excise taxes on fuels are attributed to CO_2 unless they are adjusted to charge another pollutant in a direct fashion (e.g. sulphur in heating fuel for Norway).
1. At reduced rates.
2. The climate change levy applies only to businesses.
3. 0 for coal tailings.

Source: OECD 2004 Sustainable Development, p 98

Exemption for energy-intensive industries is used and argued in relation to competition of this industry with sectors in other EU States or outside the EU which do not have any energy tax. With the introduction of a European wide Minimum Energy Tax system this argument becomes less convincing within Europe.

2. Social discrimination and competitiveness failure as side effects of green taxation

There are side effects when introducing a shift to green taxation: Environmental taxation as indirect taxation in general can lead to adaptation problems for low-income households or for some industries.

Low-income families suffer more from increased water and energy and other resource related prices than middle class or affluent families.

There are different approaches to help and to apply environmental taxes regressively. Governments have a social responsibility to ensure that every consumer is able to afford an adequate water and energy supply. A water or energy allowance could help poorer families but would need an established energy or water metering infrastructure. Taxes can be "terraced"— the amount of drinking water to meet the basic needs is tax-free, but above that a tax is levied, rising in different stages. [69]

Some industries will also have problems at least during a transition period before modernisation measures to bring down pollution or resource use take effect. There is “an unavoidable tension between the need to make major changes and the desire to minimize the pain of adjustment”[70]. Some industry may in the end not be able to survive. This depends at the same time on the increase of other non or less polluting industries taking the place on the market. Roodman underlines, "for every declining coal industry, there will be a rising solar industry".[71]

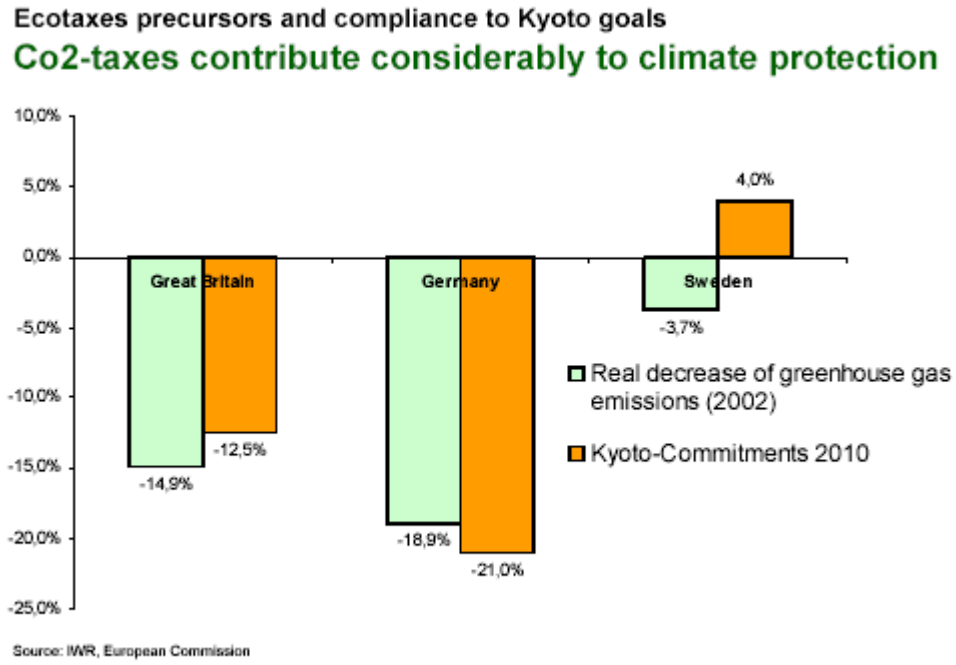
Harmonisation of tax schemes can ease competition stress, as shown above with the example of the European Union energy tax schemes.

[69] Roodman, David Malin: Getting the Signals Right: Tax Reform to Protect the Environment and the Economy, Worldwatch Paper 134 (1997)
[70] Roodman, ibid
[71] Roodman, ibid

3. Energy taxation and CO_2 goals

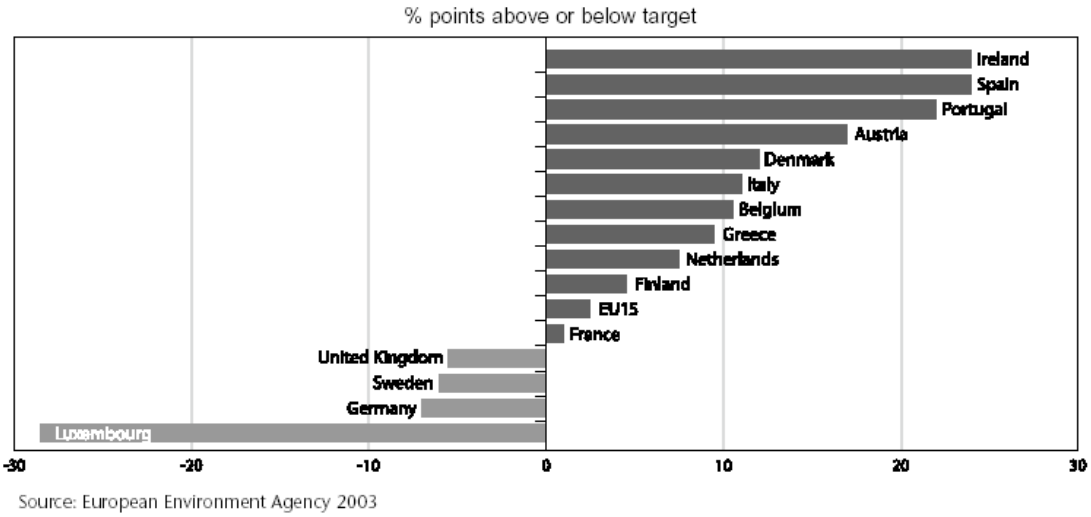
Analysis exist which shows the success of Eco-taxes concerning CO_2 reduction goals.

Figure 4



Europe at the end of 2002 displays the following modest progress in meeting the Kyoto Greenhouse Gas Emission Targets[72]:

Figure 5.



[72] The positive outcome for Luxemburg has not so much to do with active climate protection policy but with the closure of major steel work production

In 2003, EU-15 emissions were only 1.7% below 1990 levels, while Kyoto requires for minus 8%. Almost half of the emission savings achieved until 2002 were lost again in 2003.

According to the European Environment Agency (EEA) the following main points could be observed:

An overall 53 million tonne increase in EU-15 emissions between 2002 and 2003 reflected higher greenhouse gas emissions from energy industries (+24 million tonnes or 2.1%), mainly due to a 5% growth of thermal power production and a 5% increase of coal consumption in thermal power stations. The increase in thermal power production was driven by higher electricity consumption (+3%). The largest emission increases from electricity and heat production were in the UK (+10 million tonnes), Finland (+7 million tonnes), and Germany (almost +6 million tonnes). Substantial increases of coal consumption were the main reason. Greenhouse gas emissions from households and the services sector increased considerably (+18 million tonnes or +2.8%), partly due to colder weather in the first quarter of 2003.

Emissions from industry increased by 17 million tonnes (+2.1%) which was mainly due to higher emissions from iron and steel production as well as refrigeration and air conditioning. Transport emissions increased by 6 million tonnes (0.7%) between 2002 and 2003. Germany reduced emissions from road transport for the fourth consecutive year which partly helped to make good for substantial emission increases from the transport sector in other EU-15 Member States. Emissions in the agriculture sector decreased mainly due to declining number of cattle and lower emissions from agricultural soils. Other reductions were achieved for fugitive emissions from coal mining and from natural gas. Emission from the waste sector decreased due to increased methane recovery and less waste land filled.

While some reason for this sharp increase can be seen in two consecutive bad hydropower years in Europe, it also shows the fragility of efforts and the need to do much more.

Carbon or energy taxes in Europe:

- are usually only one instrument in a variety of measures aimed at reducing emissions or curbing energy consumption in general.
- are often part of a general fiscal reform; replacing other taxes on energy and reducing the distortion impacts of traditional taxes (e.g. on labour and capital).
- are usually gradually phased-in and adjusted over time to account for inflation.
- include exemptions and exceptions have been granted to energy-intensive industries or to industries facing international competition.

4. Ecological Finance Reform – as a tool for the future

No taxation schemes, even complex reforms such as in Germany to date have so far opened to an eco-finance reform.

Financial reform, in contrast to the sole introduction of energy or general green taxation, would aim to tackle the whole finance structure of a state in relation to priorities of consequences of state policy and financing linked to the environment, resource protection, and sustainability. This would lead to a reliable phasing out of direct or indirect support mechanisms for polluting industries. This would specifically aim at ending all support to traditional resource-depleting and/or emitting energy sources such as oil, coal, and nuclear.

Without having had empirical analysis accompanying these upcoming national and international policies they must be seen from the beginning as pilot applications for "sustainable governance."

IX. Green taxation as part of a sustainable governance approach

As shown above, there are a multitude of instruments available and used to reach environmental and especially climate protection and GHG emission reduction targets.

In order to efficiently use and monitor the use of those set of instruments, States need well-trained and well prepared administrations and structures, on all levels, from local to supranational.

Governments must set the framework, define clear targets, and install an administrative mechanism capable to respond, to encourage, to monitor and, if needed, to sanction industry in their effort to come to terms with energy consumption and climate responsibilities.

From an ecological and resource-oriented approach, markets do need "reigning in" by responsive governmental policies and administrative structures. In Europe, the expression of sustainable governance attempts to reflect the need for such an internalising approach in administrative behaviour and procedure and it developed in parallel to the above recognition of market failures in environmental matters.

Sustainable governance is based on analysis of the state of the environment and industry. It follows the idea of clear and open programming of state measure for the improvement of the environment. Local, regional, and state governments introduced master planning in various areas of policies. Major examples are the Environmental Impact Assessment procedures for all types of planning and programming, not only spatial planning. Inventories of inherited hazardous soil pollution, dangerous waste sites, hazardous production, and ground water pollution were established with important analytical effort. These inventories were the bases for waste management and site cleaning programmes with, in the optimal situation, clear time scales prioritising efforts, measures and financial needs. Financial needs often were accompanied by negotiations with industry and former polluters to create funds for burden-sharing in the clean up.

Since the late 1980s, 140 countries in the world have adopted official national "green plans" or sustainable development strategies with different attitudes and characteristics but all adding to a global effort to structure protection planning, sanitation, and enforcement.[73]

Good sustainable governance needs clear environmental planning and legislation with strict limitations on pollution, interdiction of pollution excess and hazardous poisoning, and legally effective encouragement to change behaviour by industries, agriculture, and consumers.
Environmental policy planning and sustainable development strategies should be based on the following key elements[74]:

- Long-term goals for environmentally sustainable development

[73] Helge Jörgens, Governance by Diffusion – Implementing Global Norms Through Cross-National Imitation and Learning, FFU report 07/2003, Freie Universität Berlin, Forschungsstelle für Umweltpolitik
[74] Helge Jörgens ibid

- Foundation of these goals in a detailed analysis of the whole range of national environmental and sustainable development problems (problem-orientation)
- Cooperative development of goals and actions among the relevant national ministries and agencies (policy integration)
- Involvement of polluters and target groups, as well as concerned societal groups in the process of decision-making (target-group policy and participation),
- Regular reporting and policy-evaluation (monitoring), and continuous development of the strategy process (process-orientation).

The OECD research on sustainable development and governance tables the following main priorities:

The main elements of the Programme of action are as follows:
(1) Concentration on the core functions of the administration,
(2) Initiating and intensifying an ongoing process of improving the structural and procedural organisation,
(3) Promoting staff motivation by means of a co-operative management style,
(4) Promoting personnel development which is orientated in terms of the future tasks of the administration,
(5) Combining specialist and ministry responsibilities,
(6) Developing and improving information systems from which it is possible to continually gain the ideas and benchmarks needed for specific and economic administrative activities (controlling and cost accounting),
(7) Consistent simplification or elimination of rules and procedures which entail a great deal of administration,
(8) Creating the necessary framework for economic activities,
(9) Improving co-ordination within and between the ministries

X. Lessons learned from eco-tax schemes in Europe

Lessons learned from existing national eco tax schemes point to the following:

- Ecological taxation needs clear programming including clear environmental targets and programmes, such as GHG reduction targets over a specific period of time with monitoring.

- The first step towards introduction of ecological taxation is a clear design of the overall tax scheme. Planning for eco-taxation needs to be integrated into the overall fiscal development plan of a government and into ecological measures and instruments. National Sustainable Development Strategies are important to help define which level of administration each type of taxation could be appropriate and on enforcement and monitoring. Often, concerning plans to decrease pollution and minimise waste, the local level would be best suited to execute such programmes, to be the issuer of regulations in order to generate income for the local communities to pay for cleaning up and maintaining a sustainable level in their community, and to encourage that polluters assume responsibility for these charges. The role of central governmental levels in this respect is to monitor the beneficial execution and enforcement of the tax income and to control expenditure for this specific tax revenue.

- Clear emission limits have to be defined legally with clear consequences for failure to comply. Ecological state governance is to be introduced, meaning an administration

which cares for sustainable governance capability in combining corporate and political governance under well defined sustainability priorities.

- All exemptions from taxation to any part of society normally subject to such schemes must be notified to an independent agency for approval. The exemption can only be given with a review clause and should be limited and decreasing over time.

- The structure and level of the tax scheme is important; and its compatibility with other environmental measures is crucial. Too generous of exemptions undermine achievement of the objectives and become counterproductive to the very environmental aim the tax was designed for.

- The tax system must, as all tax systems in democratic structures, avoid undue burdens on the individual citizen. The law must be transparent and easy to understand, meaning that the basic principles of clear tax schemes such as generality, equivalence and ability must be met.

- Harmonisation of energy taxation helps to avert competition issues regarding distortion in the marketplace. The introduction of a harmonised energy tax in Europe will increasingly phase out concern on competitive ground. More challenging reduction targets for GHG emissions attached to the EU tax level will certainly increase effectiveness and efficiency of the tax scheme.

- The use of revenues can play an important role in reinforcing the incentive signals which the levy is intended to convey.

- A careful negotiation with main stakeholders before introduction of the tax scheme and a persistent information campaign to the public is crucial to success.