Environmental Taxes in OCDE countries: recent developments

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Abstract: The measures adopted so far by Public Administration to prevent the deterioration of the environment have proved insufficient, revealing a situation that is getting worse very rapidly. In this context, "green taxes" appear to be the most interesting alternative at hand. This paper presents a summary of the general consensus, now emerging from related literature: it both provides the underlying principles for this form of taxation and explores its economic effects. At the same time, it reviews the current state-of-affairs by observing the countries of the OECD, and Spain. Finally, it introduces a series of conclusions, reflecting on the future of environmental taxation in Europe and in Spain.

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1. INTRODUCTION

It is technically very difficult to stop the deterioration of the environment at the speed at which it is taking place. To this we must add the tremendous costs implied, the slowness and possible inefficiency of the measures applied, as evidenced in the various attempts to regenerate certain green areas. This brings forth a vision of serious damage to the environment where humans naturally perform their economic activities. The recent publication of the Stern report (2006) gives proof of the accelerating speed of the damage resulting from human activity, and the extension of the deterioration is clearly of considerable concern. The studies presented by the Intergovernmental Panel on Climate Change (IPCC) at the United Nations estimate that the heavy concentration of greenhouse effect gases will produce an important increase in the average temperature of the planet over this century, and this will, ultimately, have catastrophic consequences on the population and economies.

In the given context, Public Administrations are applying some instruments in the hope that they will have an impact on the behaviour of the different agents involved in the deterioration of the environment. According to Azqueta (2002), the public sector should intervene directly, implementing public projects for the treatment of waste, and other regenerating activities such as the construction of purifiers. However, this article does not focus on corrective actions involving the State, but rather considers those public interventions which could have an impact with respect to the main economic issue: modifying the behaviour of the agents involved in the deterioration of the environment.

For this purpose, the Administration has two types of non-coercive measures: 1) providing the necessary information, both to consumers and to corporations, highlighting the technologies available, alternative resources and how to approach the substitution of consumer goods; and 2), persuasion, including suggestions for the parties involved, introducing the option of reaching a voluntary agreement in order to achieve determined levels of

environmental objectives. This would involve the invitation (publicity and advertorial suggestion, for instance) to modify the traditional style of life and some consumer options. With the failure of the previous alternatives the Administration can then utilize more restrictive measures such as: enforcement of regulations, the creation of markets for emission permits, subsidizing the least contaminating companies, and applying environmental taxes (1). This article focuses on the latter.

The structure of this study is the following: in Section 1, from the existing literature we summarise the basis for the different economic instruments proposed to confront the problems that the deterioration of the environment is generating. In Section 2, we focus on the countries of the OECD, describing a series of cases where "green tax" has been applied so far. The article then briefly analyses the impacts on fiscal revenues, listing the economic effects observed in a series of countries. In Section 3, central to this work, the current situation regards environmental taxation in Spain is described. In fact, the different administrations of some Autonomous Regions are making a strong move towards using this kind of instrument. This not only responds to the financial aspects involved, but confronts the lack of action by the Central Administration. On one hand, it shows the experience of those Autonomous Communities which have incorporated environmental taxes into their legal systems; secondly, it analyses the tax revenues by describing the elements involved. Furthermore, it highlights some of the figures as the most relevant elements. The study ends with a section of conclusions and reflections on the future of environmental taxation in Spain.

2. FOUNDATIONS FOR ENVIRONMENTAL TAXATION, AND EFFECTS

According to Buñuel (2004) "The use of economic instruments to achieve environmental objectives was proposed by economists as the most efficient solution to tackle environmental issues" (2).

The Report of the European Environment Agency (EEA) on the evolution of environmental taxes, issued on July 18, 2000, states that the application of such fiscal instruments is key, for it "enables multiple achievements of desirable aims". Following is a synthesis of the main underlying principles in the related literature.

1. These taxes respond to environmental concerns, are adequate for most principles and commitments established on an international basis, namely: "those who contaminate, pay", and the principle of the user's responsibility.

2. There is evidence that these measures are far better instruments than traditional environmental regulations. The extension of the damage, at a pace that cannot be stopped, underscores the limitations of traditional restrictions. Basically, said regulations focus on achieving a certain level of efficiency regarding environmental concerns and objectives, without focusing on results. According to Gago and Labandeira (1997), the innumerable requisites for information, the administrative costs, and the need to standardize regulations pertaining to the different contaminating agents, have undermined the static efficiency of traditional restraints and regulations (capacity to adequately discriminate and the limitations of cost-efficient solutions), as well as its dynamical efficiency (capacity to promote technological innovation).

3. These instruments are coherent with currently dominant fiscal principles. Modern fiscal systems favour indirect taxation on products and consumer goods, without distinguishing vertical equity, its enforcement being relatively simple. The enforcement of environmental taxation could be similar to an indirect tax, a fact that is associated with basic modern fiscal reform.

4. The economic effects are important, for these taxes not only internalize the external costs of contaminating in an efficient manner (3), but they also introduce some other relevant properties:

a) It provides efficiency in static terms: by having different impacts on the different agents involved, they allow a reaction that minimizes the total cost of controlling the contamination. This aggregated cost reduction capacity upon achieving the objectives of environmental policies is vital when the objectives expand, for it becomes necessary to reduce the costs involved as much as possible.

b) It promotes dynamical efficiency with technological innovation, diminishing the adoption of existing technologies. Its scope continues even when a determined level of environmental improvement is achieved: given that the tax is paid for emissions that have not yet been reduced, this creates a powerful and constant incentive to seek innovative technologies which may result in a larger reduction of emissions, at a lower cost.

c) Increased revenues for environmental concerns. Fiscal revenues are expanded in a significant way and can be oriented towards financing investments in environmental developments and infrastructure.

5. Generation of environmental and economic benefits. Indeed, the "theory of the double dividend" (4) suggests that the incorporation of environmental taxation (especially those related to energy), can also bring about the reduction of other taxes, such as those applied to labour, company benefits, family savings, contributions to social security, and so on. In this way the contribution to the economy can go hand in hand with the contribution to the environment (first dividend) by means of an increased efficiency of the fiscal system (second dividend).

6. Finally, this type of taxation usually has a broad social acceptance.

In short, environmental taxation brings forward a superior theoretical stand when compared to other traditional instruments. Not only does it bring about environmental improvement, (favouring behavioural change towards a greater degree of respect for the environment), but it also provides for increased fiscal revenues, both distributive and macroeconomic.

Nevertheless, other concerns have caused there to be a delay in their enforcement: the main issues so far are the following:

1. Technical, methodological issues, lack of information and reliable data: all of this means that there is only limited knowledge as to their environmental impact. The same thing happens with regards to the value of their contribution in terms of costs and benefits, and assessing the possible economic responses of the agents involved. At the same time it is also hard to value the results simulating the application of alternative instruments.

2. Enforcing this type of taxation in practical terms brings some difficulties for the public administration: there is a need for more technical knowledge over the possible damaging effects as well as regarding the regeneration or the elimination of the damages. This can also give rise to some feasibility issues within the administration areas.

3. The need for more awareness regarding environmental concerns in today's public opinion, and the lack of political will to confront this matter.

4. "Economic problems" that may emerge: namely, lack of fiscal stability, distributive effects, and overall possible impacts on competition. The latter will be discussed separately:

- Lack of stability in fiscal collection: if an environmental tax proves to be effective, it could bring with it a certain tendency towards a decreased level of fiscal collection. This follows on from the fact that its success diminishing some contaminating behaviours would bring a decrease in the amounts collected through environmental tax.

- Distributive effects which are less equitable: fiscal reform or re-composition is not a simple matter, given the difficulties to integrate the different items conforming environmental taxation in the different fiscal systems. Altogether this re-composition may not be equitable: given its nature involving indirect taxation, the distribution of

the different environmental taxes may be regressive in most cases. The lowest incomes could be the ones with the largest amount of taxation.

-Loss of competitiveness risk: if taxation is transferred to the product's end price, this could have an impact on the sales of goods and services in the national or international markets. An excessive amount of environmental taxation targeting national companies would imply a major increase in production costs, which on the other hand would mean an important drawback in their competitiveness.

Fortunately, recent studies show that these concerns can be dealt with appropriately or that they could also fail to take place. First, as we will show on Section 2, fiscal income could be sustained, for the objective of this taxation is not to put an end to all the contaminating activities, which would result in zero environmental fiscal revenues. If that was the aim, better results would be achieved by a total prohibition of any contaminating activities, implying more radical measures and serious sanctions with the corresponding administrative controls. Environmental taxation can only take place in the context of legally accepted contaminating activities, reduced to acceptable and efficient levels from an economic perspective. The latter can only be compatible with a reasonable amount of fiscal revenue in connection to environmental taxes in the global fiscal system.

In the second place, measures to mitigate the above mentioned distributive effects can be instrumented by: modifying the internal structure of the environmental taxes (lowering the rates or allowing some exemptions), and establishing direct means for compensation in a personalized way (income transfers, tax reduction upon other forms of taxation and social security payments); this could also be applied to other more generic and indirect forms of compensation (taxing contaminating activities while subsidizing environmental safe activities).

Third, according to Gago and Labandeira (1997), environmental taxation does not produce negative effects on a given sector's competitiveness, if this sector's activities are not involved in international competition. In the same way, it will not affect sectors that are already competing in international domains, those already bearing environmental taxes. Negative impacts falling upon one particular sector can be compensated by an increase in the competitiveness of other sectors. Benefits could emerge from performing certain activities in a cleaner environment, or from profits generated by industry re-cycling trends. At the same time, it sometimes happens that certain attempts to prevent negative impacts on competitiveness may concentrate the fiscal burdens on end users instead of targeting the actual contaminating agents.

Finally, as can be seen in the next section, there is an increased amount of evidence on the positive effects and environmental efficiency of these environmental taxation instruments.

3. ENVIRONMENTAL TAXES AND THE OECD

3.1 General Overview

When you study the fiscal reform plans currently being designed or others that have already been enforced in developed countries, it is clear that environmental taxes are wielding an increasingly greater influence. Countries such as UK, Denmark, Sweden, Norway and other OECD members already have a broad experience in this field, and, therefore, other countries could take advantage of what has been learnt from this. Most of these taxes fall upon the areas and activities of transportation and energy, but many also extend into the areas of waste re-cycling and the

treatment of residual spills. Table 1 shows some of the most relevant current taxes in Europe, distinguishing those oriented to vehicle fuels, raw materials related to energy, and motor vehicles. It also shows emission rights fees in relation to air and water, water usage, and others related to biodiversity and sustainable exploitation of wild life.

Table 1

Environmental Taxes in Europe

Country	Natural Resources				Waste			Spills		Selected Products					Other	
	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p
Austria				X	X				X		X	X				
Belgium	?	?							?		X	X	X			
Denmark	X		X		X	X			X	X	X	X	X	X		
Finland	X		X		X				X		X		X			
France		X				X			X							
Germany		?				X			X							
Greece		X	X						X							
Ireland									X				X			
Italy					X			X	X				X		?	
Netherlands		X	X		X				X						?	
Norway					X	X		X	X	X	X				?	
Poland	X	X	X	X			X	X	X	X	X					X
Portugal			X													
Spain								?	X							
Sweden	X		X		X			X	?			X	X			
Switzerland								X							?	
UK	X				X											

? Only applied to emissions in excess of certain limits
? Only for air emission

a. Mining, minerals, gravel, sand
b. Surface water, non-surface water
c. Hunting, fishing
d. Deforestation, use of forests
e. Solid urban residues
f. Incinerating facilities
g. Dangerous waste
h. Air pollution
i. Water
j. Chemicals
k. Packaging/bottling/cans
l. Batteries
m. Pesticides
n. Plastic bags
o. Noise pollution
p. Modifications in the use of land

Source: OECD (1999), OECE (2001) and OECD and EEA (2007)

Certain specific tax items, for instance those applied to tax carbon dioxide emission in the northern countries, highlight the Swedish tax on nitrogen oxides and the British contributions for the use of waste dumps. There are other examples with problematic products, such as the Irish tax on plastic bags, the Austrian tax on fertilizers, the Danish tax on pesticides and the Belgium tax on certain beverage containers.

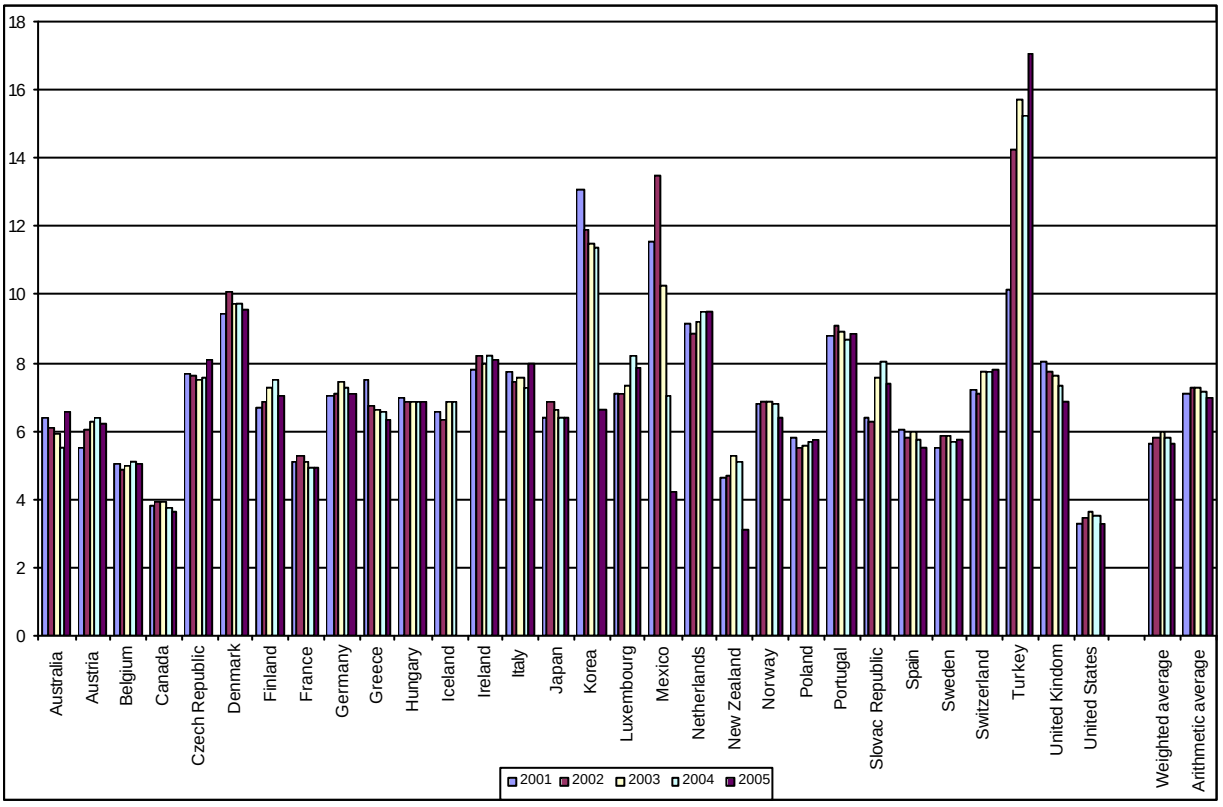
From a pragmatic point of view, the enforcement and success of environmental taxes basically depends on two main factors: fiscal revenue collection efficiency and the results in static and dynamic frames, meaning how effective they are when it comes to modifying certain behaviours regarding environmental concerns.

3.2 Fiscal Revenue Efficiency and Environmental Taxes

The collection of environmental taxes in the countries of the Organization for Economic Co-operation and Development (OECD, 1999) amounted to almost 7% of all given fiscal revenues in 1995; in 1999, this percentage had largely increased, with some variations amongst the different countries, between 2.5% and 12.3%; in 2004, the amounts totalled between 4% and 13% of the total revenues. This is reflected in Figure 1. Even when there is no evidence of generalised increase trends, the figures indicate a significant increase in some countries which is due, especially, to the broadening of taxable base.

Figure 1

Revenues from environmentally related taxes in per cent of total tax revenue



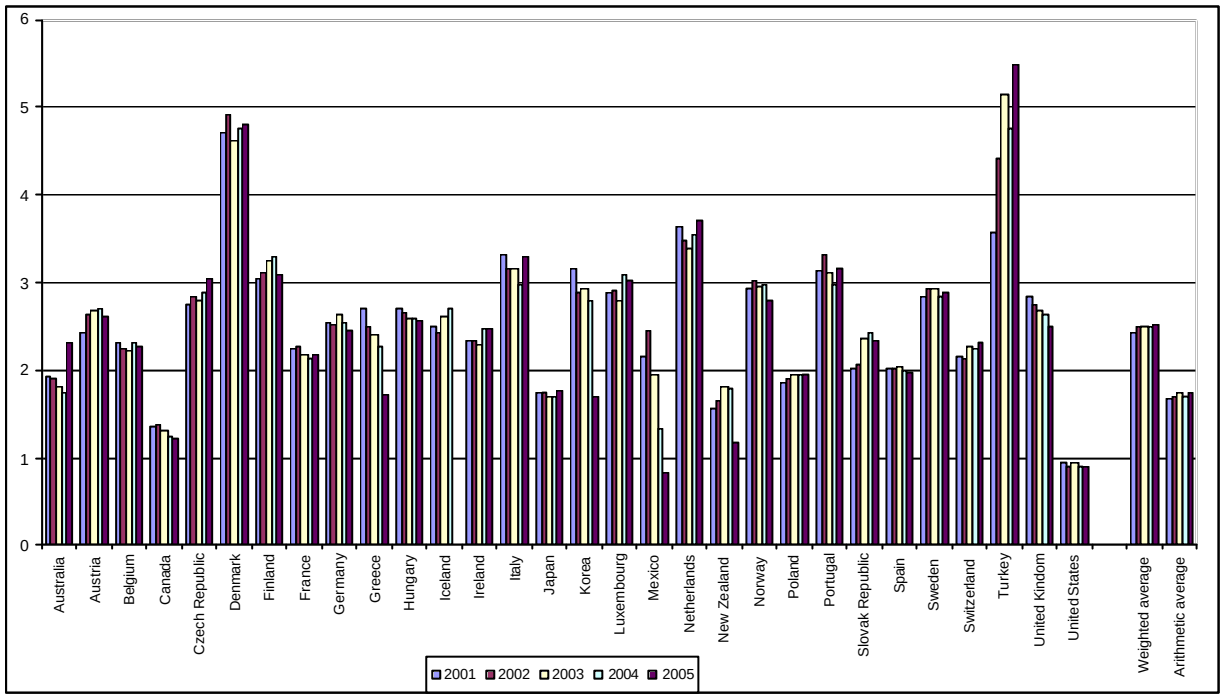
Source: OECD and EEA Database (2007)

The alternatives proposed to achieve an increase in fiscal revenues are either to generate new means of tax or, to increase the tax rate of existing ones. However, once again, the aim of environmental taxation is not so much to generate further fiscal revenue, but rather to promote patterns and behaviours that may favour the conservation and regeneration (where applicable) of green areas and certain environments.

Figure 2 offers a complementary perspective of the relative importance of this type of taxation. As it appears, the so called “green tax collection”, expressed as a proportion of the GDP, increased from 2.5 % in 1995, to 5% in 1999, a level which is maintained in 2003 and 2004.

Figure 2

Revenues from environmentally related taxes in per cent of GDP



Source: OECD and EEA Database (2007)

Following Gago *et alt*. (2004), the increase in fiscal revenues in some countries such as Norway, Sweden or the United Kingdom, has been sufficient enough both to bring about “Green Fiscal Reforms” and to compensate the distributive effects that could have compromised the application of said reforms. The so called “Green Fiscal Reform”, incorporated new environmental taxes focusing mostly on energy areas, as well as on the potential reduction of social security fees(4). This is based on the referenced “theory of the double dividend”, and states that the utilization of the environmental taxes in order to reduce other taxes on labour, profits or savings, can pave the way for an improvement that is twofold, both for the economy and for the environment (5).

3.3. Economic Effects

It is not possible to make generalized claims as to the benefits achieved by the so called “green taxes”. Therefore this section will describe a brief list of successful cases (6).

1. Different taxes on fuel with and without lead have been applied in many countries, and we can see that the first option has almost disappeared from the market.

2. The tax on gasoline increases automatically every month in the United Kingdom. There is evidence of the strong impact this had on improvements to the efficiency of big pick up vehicles, namely 13% between 1993 and 1998.

3. In Sweden there is a special tax for emissions of NOx. In 1995 the records for such combustion emissions amounted to 25% less than expected. Furthermore, this tax has proved to be a very powerful revenue collection instrument, with such a strong impact that it has considerably extended the chances for fiscal reform in the country.

4. In Denmark there is a tax for the generation of waste, as a result of which the volumes of waste processed by the Danish local administrations have decreased around 26% between 1987 and 1996.

5. There is another tax in Denmark for the usage of water. Water consumption diminished by 13% between 1993 and 1998, and spills were reduced 23 percent.

6. Following the European Environmental Agency (2005), the model used in the Netherlands applies very high taxes to water contamination, and it forces those who pollute to pay for the damage control costs with respect to the sewage system. This is an exemplary case given the legislation involved, and it shows that confronting the problem at its origin can also be very profitable. It prevents water contamination rather than having to pay the costs for purifying it later.

On the other hand, Belgium provides an example of the issues that may arise when environmental taxes are applied. In this country, the administrative costs of ecological taxes represent an amount twenty times larger than the amount collected. Administrative costs incurred in the application of these taxes can vary largely, so there is a limit to the valid conclusions that can be drawn from all the cases, given the fiscal and legal peculiarities of each country. Nevertheless, these are factors that all countries should take into account, if they wish to include environmental taxes in their fiscal and legal organization.

4. ENVIRONMENTAL TAXATION IN SPAIN

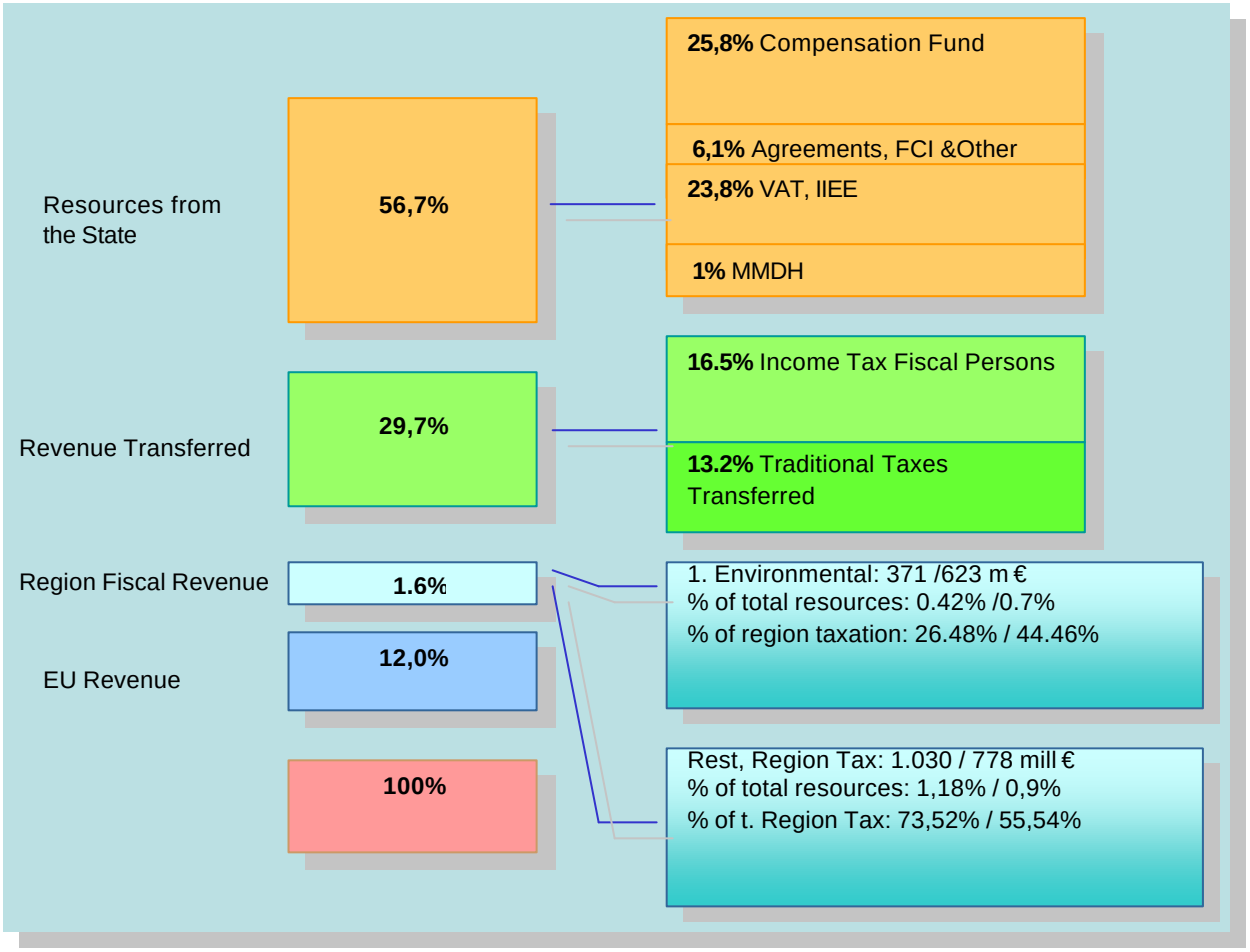
In Spain there are no environmental taxes applied at State level, this actually being an exception within the European Union. Indeed, the Spanish Central Administration has so far not shown any signs of favouring any such taxes (6). The case is different in some of the regional "Autonomous Communities", for these have chosen to establish decisive measures in a series of fiscal areas, having legislative and control capacity although they are subject to certain restrictions (7). Furthermore, as Figure 2 indicates, the fiscal revenue collection from environmental taxes in Spain is less than 2% of the GDP, a percentage significantly less than the amount reported by many European countries, such as, Denmark, the Netherlands, and Finland.

4.1. Revenue Collection and its Relevance

Figure 3 shows the importance of environmental taxation as a fiscal revenue instrument with respect to the total resources available in the different "Autonomous Communities". Observing the amounts for 2002, such tax collections represented 26.5 and 45.5 percent of the total amounts in local fiscal revenues; however, these latter only represent, on average, 1.6% of the total revenues from the regional administrations.

Figure 3

Fiscal Revenue Collection Relevance of Environmental Taxes in Spain



Source: Ministerio de Economía y Hacienda (2007). Data: 2002

On the other hand, Table 2 shows the amounts of fiscal revenue corresponding to the environmental tax revenues of the communities in relation to: i) aggregated GDP, ii) traditional taxes transferred, iii) compensation fund, and iv) general tax revenue managed by the State.

Table 2

Autonomous Communities Fiscal Revenue Relations

	371 Mill. €	623 Mill.€
% of GDP (total CCAA)	0,049%	0,08%
% of Traditional Taxes Transferred (ITP y AJD, ISD, IP, Bets)	2,62%	4,40&
% of Regional Compensation Funds	1,68%	2,83%
% of State Managed Taxes (IRPF, IVA, I.I.E.E.)	1,04%	1,75%

Source: Ministerio de Economía y Hacienda (2007). Data: 2002

This shows that their relative weights are not very significant, representing between 0,05% y el 0,08% of the GDP of the Autonomous Communities: namely, up to 4,4% of the amount of revenue obtained by the regions through traditional transferred tax amounts, and between 1,04% and 1,75% of the general taxes managed by the State.

4.2 Performance in the Different Areas

Table 3 shows the environmental taxes created in the different autonomous communities, during the last twenty years, listed according to their relative influence.

Table 3

Environmental Taxes in the Different Autonomous Communities

	Sewage and Drinking Water Fees	Waste Collection Fees	Emission Tax (air)	Spills and Damages Fees	Dangerous Waste Disposal Taxes	Large Facilities and Installations	Non-renewable Energies	Tourism
Andalucía			2003	1994 (r) 2003	2003			
Aragón	1997 (d) 2001		2005			2005		2005
Asturias	1994					2002		
Baleares	1991					1991 (u)		2001(r) 2005
Canarias	1990			1987(*) 1990			1986	
Cantabria	2002							
Castilla -L								
Castilla- M	2002 (*)		2000(r) 2005		2000 (r) 2005		2000 (r) 2005	
Cataluña	1981(r) 2003 y 2005	2003			1997	2000	1997	
C Valenciana	1992							
Extremadura						1997		
Galicia	1993		1995					
La Rioja	1994 (r) 2000							
Madrid	1984 (r) 1993	2003						
Murcia	2000	1995(*) 2005	1995(*) 2005	1995(*) 2005				
Navarra	1989					2001		
País Vasco	2006							

(r) Repealed
(u) Declared Unconstitutional
(*) Approved, not enforced
Source: Own making following Gago et all. (2005) and Magadán and Rivas (2006)

As inferred from Table 3, practically all Autonomous Communities have adopted the enforcement of fees on the use of water and the corresponding purifying treatments. Furthermore, some have extended this by applying taxation on certain forms of contamination, as well as on some uses of natural resources. Galicia was the first community to do this by generating a tax on the emission of sulphur oxide and nitrogen oxide into the air in 1995. In 1997, Extremadura started taxing the ownership of electric power supplies that may result in contamination. In 2001, Castilla La Mancha created a tax instrument similar to the Galician one, for the same type of contaminating substances, and they then extended this fee to the generation of electricity with nuclear centres, as well as to the storage of the radioactive waste from the latter. In 2003, Madrid introduced a tax for the acceptance of industrial and

construction waste in the community's official dump sites. Andalucía applied a new tax on nitrogen and sulphur oxides in 2004, as well as on carbon dioxide. They also applied taxation to deposits of radioactive waste in nuclear dumps, as on other dangerous waste that was stored or disposed in the community's dump sites. Cataluña has designed special fees on activities that may carry environmental damage risks, and a tax fee (so far exceptional in Spain although very much utilized in other European countries) on all the waste processing activities within City Council limits. Aragón and Murcia have also adopted, recently, similar environmental fiscal measures (9).

Table 4 indicates the different percentages of fiscal revenues of the main instruments applied for environmental taxation in the different Autonomous Communities in Spain. It shows that water and water treatment related fees x represent almost the entire amount of the revenues.

Table 4

Proportion of Fiscal Revenues for the Different Environmental Taxation Items

	Mill. €	%
Water	310,89	83,75%
Gases	15,44	4,15%
Solid Waste	3,49	0,94%
Facilities & Installations with Environmental Impact	41,35	11,13%
Total	371,2	100%

Source: Ministerio de Economía y Hacienda (2007). Data: 2003

4.3. Selected Case Studies and Experiences

The following selection of case studies highlights the environmental taxes recently enforced by some Autonomous Communities in Spain, with details of some core elements to be distinguished: taxable element, tax base, liable individual and type of tax applied. At the same time, the study distinguishes, for each region, the revenue data records for the following taxable items: water, waste, damaging gas emissions -air, together with other environmental fees and taxes according following the OECD criteria (10).

a) Sewage and water treatments:

Almost all the Autonomous Communities have currently enforced or are in the process of applying this kind of taxation based on water consumption.

a.1) Revenues

Table 5

Revenues from Water Treatment and Sewage Tax and Fees

Autonomous Community	Environmental Fees	Mill € (2002)	Mill € (2003)	Mill € (2004)	Mill € (2005)
Andalucía	Spillage permit fee (cancelled by law 18/2003)	3,1	3,68	0	0
	Coastal spillage tax (created by law 18/2003)	0	0	1,787	1,65
Aragón	Sewage fee	0,64	4,63	7,1	12,027
Asturias	Sewage fee	19	5,43	16,92	20,4
Baleares	Sewage fee	35,48	39,35	42,85	44,88
Cataluña	Water fee	188,87	212,85	242,62	311,45
Galicia	Sewage fee	8,8	9,754	15,961	30,501

Madrid	Waste water purifying fee	0	0,832	2,92	3,22
Murcia	Sewage fee	0,59	24,3	29,86	33,37
La Rioja	Sewage fee	4,9	4,06	7,5	6,7
Valencia	Sewage fee	0	107,56	115,95	129,84
Total		261,38	412,446	483,468	594,038

Source: Ministerio de Economía y Hacienda (2007).

The most significant amounts in revenue correspond to taxes related to water treatments. These also appear to be the most extended throughout the different regions, followed by waste related fees. In the majority of the autonomous communities, water treatment fees correspond to financing of water treatment and purifying systems. The following table provides interesting details from observing a typical water treatment tax, such as the one in Cantabria.

a.2) Case Study: Water Treatment Fees in Cantabria

Taxable Element	Waste water, and spills evidenced from levels of water consumption, in general
Fiscal Subject	Those incurring in water consumption, thus generating the taxable element. This includes fiscal persons, entities and legal entities, communities and owners as well as entities with no legal standing which may nevertheless constitute an economic unit or a separate ownership entity. Utility providers are fiscally liable upon contributor substitution.
Taxable Base	General regulation: the volume of water used or estimated during the given fiscal period, expressed in cubic meters and taking into account its contaminating levels in accordance with the following differentiated types of established use: industrial and residential.
Fees	- Residential use: 4.4 € fixed sum plus variable component in terms of consumption. - Industrial use: 4.4 € fixed sum plus variable component in terms of contamination.

Source: Law 2/2002, enforced April 29, waste water treatment and purification in the Community of Cantabria

b) Taxable Waste

In recent years, communities such as Andalucía, Cataluña, Castilla la Mancha, Madrid, Murcia and Extremadura have decided to establish some form of fiscal tariff on waste products, in relation to the risk and damages implied, as well as to their origin.

b.1) Revenues

Table 6

Revenues from Waste related Taxes

Autonomous Community	Environmental Tax	Mill € 2002	Mill € 2003	Mill € 2004	Mill € 2005
Andalucía	I. Radioactive waste deposits	0	0	1	4,16
	II. Dangerous substances deposits	0	0	1,17	0,56
Cataluña	Tariff on the controlled disposal of municipal waste	0	0	23,29	32,086
Castilla la Mancha	I. Storage of radioactive waste	0	15,53	15,06	15,66
Madrid	I. Storage of waste	0	3,4	11,58	9,008
Murcia	Tariff on spills/ sewage	0,59	24,32	29,86	33,37
Extremadura	I. Facilities & Installations with an impact on the environment	25,53	26,02	27,12	26,3
Total		26,12	69,27	109,08	121,144

Source: Ministerio de Economía y Hacienda (2007).

Cataluña is the Autonomous Community that collects by far the highest amount of revenue under this concept, namely 34 million euros, followed by Extremadura, Murcia, Madrid and Andalucía. The following table lists the main elements compounding the environmental taxes recently enforced in the region of Murcia

b.2) Case Study: Waste storage in Murcia

Taxable Element	The disposal of waste in temporary or permanent storage.
Fiscal Subject	Fiscal and legal subjects and entities with no legal standing which may nevertheless own the waste facilities involved or are responsible for the dumping or abandonment of the related waste products or spillages.
Taxable Base	Constituted by the corresponding weight or volume of the waste residue and or spills implied, stored, dumped or abandoned.
Tax Tariff	- Dangerous waste 30 € - Non dangerous waste and urban residential 7 € - Waste from dead matter 3€
Taxation Period	Taxed annually, payable on December 31. It involves the total waste admitted during the past year in the facilities where the waste matter constituting the taxable element is generated.

Source: Law 9/ 2005, December 29, Fiscal Measures in relation to transfer tax and local tax in the region of Murcia

c) Tax on air emissions

In 1995, Galicia was a pioneer in the creation of the first tax for contamination of the air environment in Spain. Other communities such as Andalucía, Castilla La Mancha, Aragón and Murcia currently also apply and participate with fiscal measures of this kind.

c.1) Revenues

Table 7 shows the results in terms of tax revenue related to air emissions in the different Autonomous Communities.

Table 7

Taxes for the Emission of Contaminating Gases in the Environment

Autonomous Community	Environmental Tax	Mill € 2002	Mill € 2003	Mill € 2004	Mill € 2005
Andalucía	Tax on Emission of gasses to air	0	0	10,54	13,084
Castilla la Mancha	Tax on Emission of contaminating gasses	0	15,33	15,06	15,6
Galicia	Atmospheric contamination tax	15,58	15,44	17,26	15,117
Total		15,58	30,77	42,86	43,801

Source: Ministerio de Economía y Hacienda (2007)

The Autonomous Community of Galicia, namely the region with greater experience with this sort of tax, happens to be the one that collects the largest amount of revenue. This is so even when it applies taxes only to nitrogen and sulphur dioxide emissions. The rest of the communities also tax carbon dioxide. This is the case of Aragon, an example of the application of said taxes that are studied with further detail in the following table.

c.2) Case Study: Tax on damages to the environment as a result of contaminating agents in the region of Aragon

Taxable Element	Environmental damage caused by contaminating agents.
Fiscal Subject	Those performing activities resulting in environmental damage, or those who run the facilities where said activities cause contaminating emission to the air, taxed by law
Taxable Base	Quantities of contaminating substances implied in the emission to air, for a given facility or emission site, during the corresponding fiscal period.
Tax Components	The tax entails applying the following tariffs to the contaminating units of the given taxable base: a. If sulphur oxide (SOX) and nitrogen oxide (NOX) are involved: 50 €/metric ton b. If carbon dioxide is involved (CO2): 200 €/kiloton

Source: Law 13/2005, of December 30, Fiscal and Administration Measures for Transfer Taxes, and Local Taxes

d) Non-Renewable Energies and related Taxes

As a matter of fact, this sort of taxation was not generated with the purpose of improving the environmental conditions or preventing possible damage. The only purpose was to increase fiscal revenues. In Spain there are traditional tax instruments applied to fuels, electricity and vehicles; according to the OECD criteria previously referred to, these kinds of taxes are, nevertheless, environmental. This follows the reasoning that even though their origin was not related to preventing environmental damages, they do involve elements which tend to modify related behaviour in a favourable way. Table 8 provides details of the fiscal revenue amounts corresponding to these taxes, in all, representing almost 2% of GDP.

Table 8

Revenues from Other Environmental Taxes (following OECD criteria)

Tax	Mill € 2002	Mill € 2003	Mill € 2004	Mill € 2005
Special Tax on Fuels	9.505,00	9.790,00	10.123,00	10.212,01
Tax on Retail Sales of Certain Fuels	752,97	851,47	1.000,62	1.112,46
Electricity Power Supply	692,00	759,00	809,00	854,88
Certain Transportation means	1.188,91	1.300,17	1.471,00	1.706,09
Motor vehicles	1.450,61	1.548,95	1.924,80	1.294,80
Total	13.589,49	14.249,59	15.328,42	15.180,24
Relation to GDP (%)	1,86	1,82	1,82	1,68

Source: Ministerio de Economía y Hacienda (2007) and INE (2007)

e) Brief study of surcharges on retail sales taxes, for certain fuels and regions

This kind of surcharge, commonly known as the “healthy cent”, was enforced together with Law of the General National Budget at the end of 2001. The aim was for the regional Autonomous Communities to be able to finance improvements in social security, basically in health, and to a lesser degree, environmental concerns. This law is currently enforced in Madrid, Galicia, Asturias, Cataluña and Castilla-La Mancha; after the first four regions enforced the autonomic statutes, they collected 450 million euros in fiscal revenue, from 2000 through 2005, 19 per cent of the total resources provided by this tax. Other regions such as Valencia, Baleares, Andalucía and Castilla-León, are currently studying the application of this kind of law.

In order to summarize the general results of the enforcement, differences and efficiency of the environmental taxes in the Spanish Autonomous Communities, we quote Gago *et alt.* (2006, page 119): "with a very interesting and at the same time infrequent development, with plenty of ups and downs, environmental taxes have been applied in some cases with good results in areas of the economy and the environment. Nevertheless, there has been a series of institutional conflicts in other cases, together with some mistakes with the design, and with unfortunate jurisdictional provisions in others".

Finally, as previously stated at the beginning of this section, revenue collection by means of this type of instrument, in its various forms, is still limited in Spain. However, there are expectations of improvement in their evolving environmental and economic efficiency. This will also extend the results in terms of fiscal revenue, improve certain aspects related to design, the application, and evaluation of the effects of given measures.

5. CONCLUSIONS AND REFLECTIONS ON THE FUTURE OF ENVIRONMENTAL TAXES IN SPAIN

The rapid deterioration of the environment highlights the inadequacy of those measures adopted so far by many different governments to palliate it. In this context, environmental economic instruments, and in particular, "green" taxes constitute one of the most interesting alternatives, and have been proposed in the economic literature as one of the most appropriate solutions. These latter instruments fit the principle "those who contaminate, pay"; there is evidence that these measures are far better instruments than traditional environmental regulations; their economic effects (cost minimization, the creation of incentives for environmentally positive behaviour and an increase in revenues for environmental purposes) are important; following the double dividend theory, they generate environmental and economic benefits; and they have a broad social acceptance. However, some concerns about their enforcement have arisen, and in particular, the technical, methodological and practical difficulties, the non desirable economic effects that they can cause, such as the lack of revenue stability, less equitable distributive effects, and loss of competitive risk. Nevertheless, as is shown in section 2, there are also counter-arguments that confront these pessimistic reasons stated about the negative effects of environmental taxes. Therefore, the literature on environmental taxes offers an overwhelming series of arguments that lead us to expect positive environmental and economic effects as a result of the enforcement of these types of instruments, but also warns and shows us that we have to measure, for every single case, the positive and negative effects on efficiency and equity that these kind of fiscal initiatives can cause.

In the OECD countries, the enforcement of this sort of instrument is enjoying an ever increasing greater influence and an expansion of the taxable base on issues related to biodiversity and sustainable exploitation of wildlife can be observed. Indeed, the collection of environmental taxes in these countries amounted to between 4 and 13 per cent of the total revenues in 2004. In 1999, the amounts totalled between 2.5 and 12.3 per cent of the total revenues. The increase in fiscal revenues in some countries has been sufficient enough both to bring about "Green Fiscal Reforms" and to compensate the distributive effects that could have compromised the application of said reforms. Although it is not possible to generalize the benefits achieved by the green taxes applied, there is empirical evidence in some OECD countries as to the success of these instruments in incentivating behavioural change towards a greater degree of respect for the environment.

In Spain, given the State's traditional passive attitude in this area, it is the regional Governments that have taken advantage of this fiscal span in the last twenty years. Their increased financial commitment, within the framework of budgetary restrictions emerging from the Stability and Growth Pact of the European Union, has had an impact on their creativity regards looking for other resources. Even though the results obtained so far with the related fiscal revenues are not very impressive (between 0.05 per cent and 0.08 per cent of total autonomous communities GDP), they are relatively significant. Spanish regions have lately been especially active in this field, with new environmental taxes being enforced and the existing ones reformed: This is the case, for example, of Aragón, Murcia, Castilla La Mancha and Cataluña. Sewage and drinking water is the most important field, it also being the one that provides the largest amount of revenue. Waste, spills, emissions, non-renewable energies and installations that may carry environmental damage risks are increasing their importance.

As a consequence, it is foreseen that the fiscal revenue figures from new environmental taxes may increase in the coming years, following events in other European countries. Furthermore, if we look to the future, taking into account the progressive loss of European funds given the expansion of the EU, we should expect the Spanish Autonomous Communities to continue to be the drivers in the implementation of the new "green" taxes.

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NOTES

1. Fernández y Sánchez (2002) and Azqueta (2002), offer a very complete description of the diverse instruments for environmental policy, both regulatory and economic.
2. It is well known that the first was Pigou (1920)
3. See Pigou (1920) and Baumol and Oates (1982)
4. This reform was recommended by the European Union (1994) in its White Paper on Growth, Competitiveness, and Employment.
5. The theory of the double dividend argues that the revenues generated by environmental taxes should be used to reduce other existing taxes. The aim is to reduce taxes that have an impact on labour, profits and savings, as well as social security contributions. All these sources of public revenues reduce the efficiency and delay growth ("excess of burden of taxation" effect). Double dividend is constituted by an improvement in the environment, as a first dividend, together with improvements of the fiscal system, as the second dividend. There are few arguments against the first dividend, although this, of course, depends on the elasticity of prices in both the long and short term. The second dividend is the most controversial one.
6. Other examples can be found in Braathen, (2002), OECD (2003) and Gago *et alt*. (2004)
7. Quoting Gago et alt. (2006, page 120), "The experience so far in Spain with environmental taxes and green fiscal reform, has been very limited. The figures provided are scarce and irrelevant in some cases, while showing some

peculiarities in comparative studies". This is a surprising fact when taking into account not only the common trends in European more developed countries, but also, regarding the environmental concerns in Spain (with such impending issues as are the urban expansion, the increase in the amount of waste, water shortages, and the fact that Spain is the country with the worst records of commitment regarding environmental issues in relation to climate change). Thus, the fact that the Spanish Central Administration is not willing to apply one of the most powerful instruments of environmental policy (together with the markets of emission permits) is somewhat paradoxical. On the other hand, recent empirical evidence supports the expectations of achieving good results from fiscal initiatives of this sort in Spain. A series of articles using this type of analysis is introduced in Labanderia et alt (2006)

8. Articles 6 and 9 of LOFCA impose the following limitations to the regulatory capacity of the Autonomous Communities regarding local taxation: 1) prevention of double taxation with those elements already taxed by the State; 2) not acting in areas reserved for local corporations, the exceptions being legal authorization of activities or compensation; 3) prevention of fiscal exports by taxing profit or goods located outside the Autonomous Community; y 4) prevention of hampering free circulation of goods and productive factors.

9. See ANNEX for detailed data of the diverse tax laws approved by the Spanish Autonomous Communities in areas of environmental taxation.

10. As explained by Braathen (2002) the taxes included in the data base of the OECD are mainly those that apply to fuels for motor vehicles, energy related products, air emissions, use of water and spills, biodiversity and control of wild life and natural environments. In close co-operation with the European Commission Statistics Office (Eurostat), the European Agency for the Environment and the International Energy Agency and the OECD have combined efforts and data records in order to integrate all the information related to environmental taxes, in the member countries of the OECD. The database is complemented with the information on permits that can be commercialized, deposits and reimbursements, environmental subsidies and other voluntary instruments. The Database can be consulted on http://www2.oecd.org/ecoinst/queries/index.htm.

ANNEX

Environmental Tax Laws approved by the Spanish Autonomous Communities

ANDALUCÍA	Dangerous substances deposits tax. Law 18/2003, December 29th, Fiscal and Administration Measures.
	Emission of gases to air tax. Law 18/2003, December 29th, Fiscal and Administration Measures.
	Coastal spillage tax. Law 18/2003, December 29th, Fiscal and Administration Measures.
	Radioactive waste deposits tax. Law 18/2003, December 29th, Fiscal and Administration Measures.
ARAGÓN	Sewage fee. Law 6/2001, May 17th, Ordering and Participating in water Management in Aragon.
	Tax on damages to the environment as a result of cableway installations. Law 13/2005, December 30, Fiscal and Administration Measures for Transfer Taxes and Local Taxes in Aragon.
	Tax on damages to the environment as a result of contaminating agents. Law 13/2005, December 30, Fiscal and Administration Measures for Transfer Taxes and Local Taxes in Aragon.

	Tax on damages to the environment as a result of Big Commercial Installations (Malls). Law 13/2005, December 30, Fiscal and Administration Measures for Transfer Taxes and Local Taxes in Aragon.
PRINCIPADO DE ASTURIAS	Sewage Fee. Law 1/1994, February 21st, Supply and Sewage of water in Principado de Asturias.
	Tax on Big Commercial Installations (Malls). Law 15/2002, December 27th, Budgetary, Administrative and Fiscal Measures.
ISLAS BALEARES	Sewage fee. Law 9/1991, November 27th, regulating the water sewage fee.
	Vehicle rental tax. Law 13/2005, December 27th, Fiscal and Administrative Measures.
CANARIAS	Water fee. Law 12/1990, July 26th, of water treatment.
CANTABRIA	Sewage fee. Law 2/2002, April 29th, Waste Water Treatment and Purification in the Autonomous Community of Cantabria.
CASTILA -LA MANCHA	Tax on facilities and installations with an impact on the environment. Law 16/2005, December 29th, Tax on Facilities and Installations with an impact on the environment and Autonomous Surcharge on Retail Sales Taxes for Certain Fuels.
CATALUÑA	Sewage fee and substitution for levies on sewage fee. Law 6/1999, July 12th, Ordering, Managing and Taxing water.
	Tariff on the controlled disposal of municipal waste. Law 16/2003, June 13th, Financing the infrastructures for the treatment of waste and tariff on waste deposits.
	Tax on big commercial installations (Malls). Law 16/2000, December 29th, Big Commercial Installations (Malls) tax.
EXTREMADURA	Tax on facilities and installations with an impact on the environment. Law 7/1997, May 29th, Fiscal measures on Energy Production and Transportation with an Impact on the Environment.
GALICIA	Sewage fee. Law 8/1993, June 23rd, Regulating the Hydraulic Administration in Galicia.
	Atmospheric contamination tax. Law 12/1995, December 29th, Atmospheric Contamination Tax.
COMUNIDAD DE MADRID	Waste water purifying fee. Law 10/1993, October 26th, Liquid Industrial Spills on the Sewage System.
	Storage of waste tax. Law 6/2003, March 20th, tax on storage of waste.
REGIÓN DE MURCIA	Sewage fee. Law 3/2000, July 12th, Sewage and Water Purifying in Murcia and Enforcement of the Sewage Fee.
	Storage and deposits of waste fee in Murcia. Law 9/2005, December 29th, Fiscal Measures for Transfer Taxes and Local Taxes in 2006.
	Maritime spillage fee. Law 9/2005, December 29th, Fiscal Measures for Transfer Taxes and Local Taxes in 2006.
	Emission of contaminating gasses to the atmosphere. Law 9/2005, December 29th, Fiscal Measures for Transfer Taxes and Local Taxes in 2006
LA RIOJA	Sewage fee. Law 5/2000, October 25th, Waste Water Treatment and Purification in La Rioja.
COMUNIDAD VALENCIANA	Sewage fee (Law 2/1992, March 26th, Waste Water Treatment and Purification in Comunidad Valenciana.
NAVARRA	Sewage fee. Law 10/1988, December 29th, Waste Water Treatment and Purification in Navarra.
	Tax on Big Commercial installations (Malls). Law 23/2001, November 27th, Creation of a Tax on Big commercial installations.
PAIS VASCO	Ecological sewage fee. Law on Water of Basque Country, June 23rd 2006.