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Can environmental taxation in France really become ecological?

Current situation and conditions of acceptability

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Summary

At present, France's environmental tax system does not serve an ecological purpose, but rather a more traditional objective of yield taxation. Obvious signs of this inadequacy are the very large share taken by energy taxation and the low level of most tax rates, which often only implicitly target polluting products. Reforming the French tax system would mean "greening" it as a whole, by applying tax rates in line with marginal damage. The success of the reform and its acceptance by taxpayers depend on the associated redistribution mechanism, efforts to educate and inform, transparency and, paradoxically, the boldness of the measures taken.

JEL classification: D62 - H23.

Keywords: Environmental tax - Double dividend - Tax progressivity.

1. Introduction

In September 2012, the first Environmental Conference for the Ecological Transition¹ was held in Paris, opened by President François Hollande, who set the goal of making France the nation of environmental excellence. This involves reducing pressure on exhaustible natural resources (water, raw materials, fossil fuels), reducing damage to nature, and combating polluting activities and climate change. One of the key components of the ecological transition is

¹ This conference has been held every year since, defining a new roadmap for the ecological transition. In 2014, environmental taxation was not one of the themes explicitly addressed.

the energy transition, in other words, the transition from a society based on the abundant consumption of fossil fuels to a more energy-efficient, low-carbon society, thanks in particular to the development of renewable energies.

Ecological taxation could be one of the key elements of the policies implemented to achieve these objectives. Indeed, it was one of the financing instruments highlighted in the 2012 Roadmap for Ecological Transition. In fact, a French Committee for Ecological Taxation (CFE for *Comité pour la fiscalité écologique*) was set up in December 2012², with the ambition of constituting a permanent mechanism for consultation and evaluation of ecological taxation and with the mission of formulating an opinion on ecological tax measures proposed by the Government and making proposals in this area.

Where do we stand, at the end of 2014, in this area of ecological taxation? The aim of this article is to take stock of the implementation of coherent and effective ecological taxation in France, and to shed light on the reasons for the difficulties encountered and the conditions for its acceptance by the various players in economic life. The first part of this article is devoted to defining ecological taxation, which suggests a semantic distinction between using ecological and environmental names for this type of tax. Secondly, we will show that France's current situation in terms of environmental taxation falls far short of its stated objectives. In the third part, we set out the conditions necessary for the introduction of an ecological tax system that is both effective and socially acceptable.

2. Environmental or ecological taxation?

According to a definition shared by various French and European statistical and research institutes (CGDD, Eurostat, OECD), *environmental taxation* covers, on the one hand, all taxes levied on products or assets that have an adverse impact on environmental quality, such as taxes on energy consumption, vehicle taxes, etc., and, on the other hand, tax expenditure to promote sustainable development (legislative or regulatory provisions whose implementation results in a loss of revenue for the State), taxes on pollution and waste, and taxes on water consumption; and secondly, tax expenditures promoting sustainable development (legislative or regulatory provisions whose implementation results in a loss of revenue for the State compared with what would have resulted from the application of the general principles of French tax law), such as tax exemptions or credits. The bonus-malus scheme introduced for the registration of new cars is a tax-subsidy combination that forms part of this package. Environmental taxation is therefore fundamentally defined by its tax base, and not by the way in which its revenues are used, nor by the intention behind its introduction.

² The CFE issued a progress report in July 2013 and published several opinions.

In 2012, environmental tax revenues in France amounted to 37.2 billion euros, which represents 1.83% of the GDP and 4.08% of the total revenue from taxes and social contributions (source: Eurostat).³

In fact, it is interesting to compare the amount of environmental tax revenue with the amount of environmental protection expenditure, defined as "the financial effort undertaken by the various components of society - public administrations, private companies and households - to prevent, reduce or eliminate damage caused to the environment" (CGDD, 2014a). These amounted to 47.5 billion euros in 2012, or 2.27% of GDP, all contributors combined. General government finances 31.8% of this expenditure, corresponding to 15.1 billion euros. It is therefore clear that environmental tax revenues do not finance this specific expenditure, but rather contribute to the State budget, in accordance with the public finance rule of non-allocation of tax revenues.

This definition of environmental taxation in terms of the tax base is superimposed on a definition in terms of the purpose assigned to ecological taxation by economic theory. The aim of ecological taxation is to internalize externalities, most often negative ones. According to the Pigouvian principle of taxation (Pigou, 1920), polluting emissions should be taxed at a unit rate equal to the marginal damage they cause. In this way, in line with the polluter-pays principle, the private agents at the source of the externality incur, in addition to their private cost of producing the good that causes the pollution, the external cost imposed on the victims of the pollution. This leads them to make decisions based on the total social cost of pollution, thus internalizing the external cost.⁴ This mechanism is commonly referred to as a price signal: in effect, the increase in the price of the polluting good due to the tax causes an increase in its relative price compared to other goods, particularly less polluting goods. This signal then encourages buyers, whether consumers or manufacturers, to substitute polluting products with non-polluting ones, or to adopt less polluting technologies. A stable, long-term price signal also stimulates innovation by encouraging manufacturers to seek less polluting solutions to reduce their production costs, or to offer less polluting products to take advantage of the market opportunities opened up by environmental regulation. By modifying relative prices in this way, any ecological tax is by nature distortionary - like any indirect tax - but this distortion is desirable insofar as it corrects a market failure. Ecological taxation is justified by its incentive nature (Chiroleu-Assouline, 2011).

As we can see, ecological taxation is a priori environmental and it would be natural for environmental taxation to be ecological, but an examination of the situation in France shows that this is still far from being the case, even if, in practice, the two terms are used

³ <http://ec.europa.eu/eurostat>

⁴ See Baumol and Oates (1988) or Beaumais and Chiroleu-Assouline (2002).

interchangeably. The semantic distinction introduced here is not reduced to the distinction between yield taxes and incentive taxes, nor to a difference between a definition according to the base and a definition according to the rates, but it covers a slightly more complex reality.

The Roadmap for Ecological Transition adopted in 2012 recognized the role that ecological taxation can play in encouraging virtuous behavior and dissuading harmful behavior in order to reduce greenhouse gas emissions, various forms of pollution and the use of natural resources. It also noted that "*tax instruments exist in our country, but remain incomplete or perfectible*", and that "*in fact, the implementation of environmental taxation remains largely unfinished in France*". In outlining the avenues for reform, the government's objective was "*to bring our country into line with the European Union average*", while placing the role of the price signal and the trade-offs to be made to take account of problems of competitiveness, redistribution and job insecurity at the heart of the analysis. Insisting that it should not be seen as a source of return for public finances, the document assigns only a secondary place to ecological taxation among the various possible financing instruments for the ecological transition. All the major principles are included in this roadmap: reforming ecological taxation, using its signal effect rather than its potential as a financing instrument, bringing tax rates closer into line with marginal damage, and so on. Since then, the government's stated strategy has been that of a far-reaching reform of the French system of compulsory taxation, which nevertheless, at the end of 2014, had not yet been implemented.

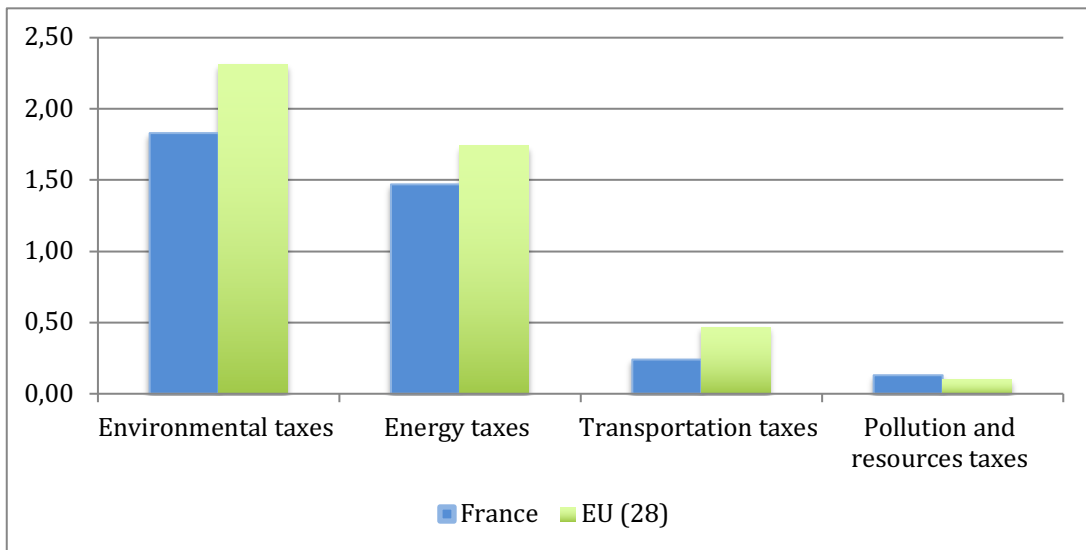
3. Environmental taxation in France today

At 1.83% of GDP in 2012, the weight of environmental tax revenues is low, and far from increasing in line with stated objectives, having even fallen slightly since 2001 (Eurostat⁵). France ranks 24th out of 28 European Union countries, both in terms of total revenues and those derived from energy taxes, which account for the largest share (80%, or 1.47% of GDP). Tax revenues from transport taxes and pollution and resource taxes account for 0.24% of GDP (23th/UE-28) and 0.13% of GDP (11th/UE-28) respectively. Figure 1 highlights the low weight of these tax revenues in relation to GDP, compared with the average for the 28-member European Union.

It is important to emphasize that in 2012, the greening of the French tax system was not underway, since on the contrary, revenues from environmental taxes have grown much more slowly than overall compulsory taxes since 1995 (Figure 2), with their share of compulsory taxes falling even further than their weight in relation to GDP, and steadily, from 5.82% in 1995 to 4.08% in 2012 (Eurostat).

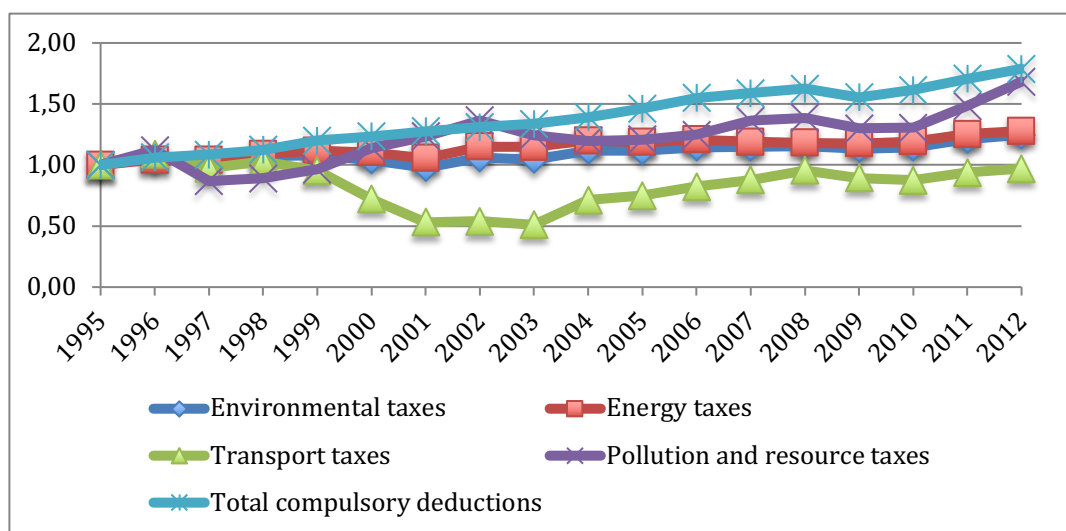
⁵ <http://ec.europa.eu/eurostat/>

Figure 1: Weight of environmental tax revenues, 2012 (as % of GDP)



Similarly, ecological taxation does not play a prominent role in financing the ecological transition, as evidenced by the follow-up to the implementation of the 2012 roadmap for the ecological transition by the Ministry of Ecology, Sustainable Development and Energy (October 2014). This document refers to the work of the French Committee for Ecological Taxation (CFE) for everything to do with taxation⁶ while the chapter devoted to financing the transition only mentions strengthening the sustainable development dimension of the AFD and public procurement rules.

Figure 2: Change in total compulsory levies and environmental tax revenues



⁶ The CFE has not met since February 2014, and its chairman, Christian de Perthuis, resigned in October 2014 due to the government's lack of interest in the committee's work. As of 05/01/2015, he has still not been replaced.

Environmental taxation also includes environmentally-friendly tax expenditures, such as the sustainable development tax credit, or other subsidies. For 2011, measures of this type numbered 29 in the French tax system for a total of around 2.6 billion euros, but with very diverse and often anecdotal amounts (CGDD, 2013), with the sustainable development tax credit accounting for 1.95 billion euros, ten times more than the exemption from domestic consumption tax on biofuels, the second-largest expense (see Table 1).

Table 1: Main environmentally-friendly tax expenditures in 2011

Tax	Measurement	Beneficiaries	Revenues (M€)	Year of creation
IR	Tax credit for expenditure on energy-saving and sustainable development equipment for the main home (CIDD)	M	1950	1999
TICPE	Capped exemption from domestic consumption tax for biofuels	E	196	1995
ISF	Partial exemptions for woodlands and forests, interests in forestry groups, rural property leased under long-term leases and shares in GFAs.	M	52	1981
TFPB	Property tax rebates for low-income housing organizations and semi-public companies for energy-related work (equal to a quarter of expenditure)	E	50	2005
IS	Eco prêt à taux zéro (Zero interest rate eco-loan, identified as an IS tax credit for credit institutions)	M	50	2008
TICPE	Reduced rate of domestic consumption tax on LPG	M+E	41	2007
IR-IS	Tax credit for farms using organic production methods	E	33	2006
VAT	5.5% rate for the supply of renewable energy by networks	E	25	2006

Source: CGDD (2013), *La fiscalité environnementale en France - Etat des lieux*.

These tax expenditures are subject to more rapid and often less conflicting changes than revenues. For example, the text of the law "on energy transition for green growth", announced since 2012, adopted on first reading on October 14, 2014 and scheduled for final vote in early 2015, adds a new 30% tax break for energy renovation work undertaken between September 1, 2014 and December 31, 2015, in an attempt to reach the target of one million thermally insulated homes per year set during the 2012 presidential campaign. An energy voucher will

also be introduced for low-income households, to eventually replace the existing social tariffs for gas and electricity.

The ecological bonus-malus scheme introduced in 2008 in the wake of the Grenelle Environment Round Table has a special status: the bonus scale paid to purchasers of new vehicles with low CO₂ emissions is governed by regulations, while the malus scale is governed by the Finance Act, since it takes the form of an additional tax on registration certificates (*carte grise*) for the purchase of vehicles with high CO₂ emissions. The scheme was intended to be financially balanced, but given that the tax scale has a strong influence on both demand and supply in the new vehicle market, it is difficult to forecast income and expenditure with sufficient accuracy. Structurally in deficit since 2008, when the difference between bonuses paid and malus collected was +617 million euros, the scheme turned positive in 2012, following a tightening of the scale, to reach -102 million euros, then +100 million euros again in 2013. If the scheme is in deficit, this appears in the air quality protection expenditure account from a monetary point of view (CGDD, 2014a).

a. A tax system misguided by the search for yield rather than incentives

Aside from the fact that France's tax system is so small, it must be noted that, as highlighted in the Progress Report of the French Committee for Ecological Taxation (CFE, 2013), its structure reflects the logic of tax yield rather than ecological incentives. Indeed, it has been built up through successive additions and modifications of taxes initially set up as yield taxes, even though they are now considered to support ecological taxation.

The first sign that the current environmental tax system has gone astray is that four-fifths of the tax revenues concerned come from energy taxes, with TICPE (*Taxe intérieure sur la consommation de produits énergétiques*, formerly TIPP) alone accounting for two-thirds of all ecological tax revenues.

On the other hand, explicitly ecological taxes such as the TGAP (*Taxe Générale sur les Activités Polluantes* - General Tax on Polluting Activities) or taxes on pollution and water abstraction only generate 6% of total environmental tax revenues, or 0.1% of GDP! Yet the TGAP has a very broad scope of application, since it is the result of the 1999 merger of five pre-existing taxes on special industrial waste, household and similar waste storage, atmospheric pollution, base oils and the attenuation of noise pollution in the vicinity of airfields. It is now payable by all companies whose activities or products are considered polluting: waste, polluting emissions, lubricating oils and preparations, detergents, solvents, extraction materials, pesticides, chemicals... Similarly, the weight of taxes on transport (0.24% of GDP) is half that of the European average (0.47%).

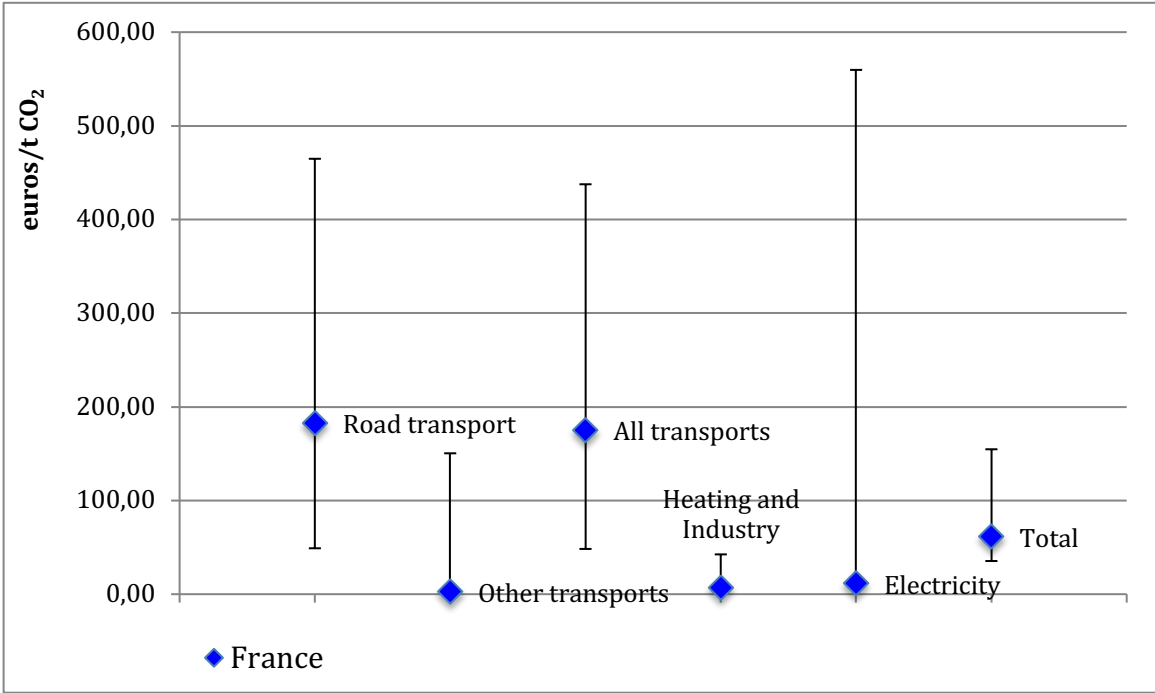
The original reason for the creation of these energy taxes was more to do with their yield than their potential incentive to reduce energy consumption. Energy is an essential commodity, and its demand is relatively inelastic: energy products therefore constitute a base that erodes only slightly, ensuring stable tax revenues.

The strength of a yield tax is the weakness of an incentive tax: in the first case, a low rate applied to a broad base is enough to guarantee high revenues, while in the other, only significant rate increases can significantly reduce consumption.

The second sign that current environmental taxation is not very ecological, because it offers little incentive, is precisely the low level of most tax rates. Indeed, with the exception of fuel tax rates, which are at a significant level (OECD, 2013), the apparent effective tax rates on the various energy products according to their use or on the most common air or water pollutants are low, not very consistent with each other and very different from those practiced in other European countries. There is therefore a strong presumption of lack of economic efficiency and non-internalisation of marginal damage.

Figure 3 below shows the apparent effective tax rates on carbon dioxide emitted by energy sources according to their use. These are implicit carbon tax rates, because even though their base is not explicitly the carbon content of each energy, emission rates can be used to calculate average tax rates on CO₂ emissions.

Figure 3: Apparent effective tax rates in the EU-28 (euros/t CO₂)



It is striking to note that only the tax affecting fuels used for road transport is very high: 182 euros on average, according to OECD calculations (2013) with very marked differences between fuel types that have hardly changed since the ADEME study (2009) estimating the 2007 apparent tax rate for premium unleaded fuel at €265/t CO₂ and that for diesel at €158/t CO₂. These high levels no doubt owe less to Pigou than to Ramsey (1927), whose theory of optimal indirect taxation shows that it is more efficient, in order to raise a given tax revenue, to differentiate tax rates on goods in inverse relation to the price elasticity of demand.

Nevertheless, France's apparent carbon dioxide tax rates are all at the lower end of the range for other European countries, and in any case well below those in Germany (Cour des Comptes, 2011). Coal is the fossil fuel that emits the most CO₂ yet is the least taxed. Other fuels (kerosene, LPG) are taxed at even lower rates than unleaded petrol and diesel, or even exempted (natural gas).

All sources agree that the weight of energy taxation in France is lower than the European average, mainly because fossil fuels are under-taxed (unlike motor fuels), the gap having widened since the adoption of a carbon tax by Sweden, Denmark, the UK and Finland. But this is not the only reason. In fact, despite its rate being significantly higher than for other energies, the tax rate on unleaded petrol has been adjusted only minimally in nominal terms since 2004, and its amount in value has been eroded by inflation (Cour des Comptes, 2011). The absence of indexation has resulted in an estimated annual loss of revenue of around 1.3 billion euros for gasoline and 1.6 billion euros for diesel, compared with what could have been achieved if these taxes had been maintained at the same level in real terms. From the point of view of the Cour des Comptes, it is likely that the problem is denounced more for the loss of yield than for the loss of ecological efficiency.

TGAP rates for atmospheric pollutants (NO₂, NO_x, VOCs, SO_x, PM_{2.5}) are themselves very low, with a maximum of €167/tonne for nitrogen oxides. They are thus considerably lower than the external costs of air pollution, on the order of several thousand euros per tonne of pollutant, according to estimates for France available from various studies such as RICARDO-AEA (2014) or EEA (2013) based on assessments in the *Handbook on estimation of external costs in the transport sector* (2008).

Other rates have been arbitrarily reduced, such as the axle tax on vehicles over 12 tonnes, which was lowered in 2009 in preparation for the introduction of the ecotax for heavy goods vehicles, initially scheduled for January 2014. Despite the latter's indefinite postponement and subsequent withdrawal, this tax rate has not been restored to its previous level.

The White Paper on Ecological Transition (2013) bluntly acknowledged the obvious inadequacy of these rates. Even allowing for the difficulty of accurately assessing the external costs associated with air pollution or road infrastructure use, the presumption here is equally strong that the tax rates applied are far lower than the external costs they are supposed to internalize.

It was on the basis of a similar diagnosis that the OECD, in its latest report on the state of France's environment, recommended increasing the rates of environmental taxes and charges (OECD, 2005).

b. Numerous environmentally harmful tax niches

The French tax system includes numerous tax expenditures or niches that are directly or indirectly harmful to the environment. Foremost among these are the numerous exemptions granted in relation to the fossil fuel tax scale for reasons of support for certain sectors (agriculture, construction, road haulage, cabs, fishing) whose difficulties are not necessarily linked to fuel prices, as noted by Guillaume (2011). The amount involved was nearly 6.6 billion euros in 2011, representing a shortfall of 16.5% of environmental tax revenues for that year... Such tax expenditures attenuate, or even blur, the price signal sent to fossil fuel consumers, and thwart the desired reorientation of behavior. It is in this sense that they are qualified as environmentally damaging and counted as such by the OECD in its recently updated *Inventory* (OECD, 2012).

The social tariffs for electricity and gas, which date back to 2005 for electricity and 2008 for gas, also fall into this category of support for energy use, contrary to the desire to promote energy sobriety: their aim is clearly to combat fuel poverty. As part of the "energy transition for green growth" law passed in October 2014, an energy voucher should be introduced for low-income households, to eventually replace the existing social tariffs. This dissociates the amount of aid from actual consumption, effectively encouraging consumers to save electricity and gas.

The difference in tax treatment between diesel and gasoline is not usually considered a tax expenditure, as it does not result from an exemption or rate reduction, but from the separate setting of different tax rates on different products, albeit providing the same service. In France, the tax differential in favor of diesel is one of the highest among European countries (Andersen et al., 2014). Thus, in 2012, the implicit tax rate on unleaded petrol, taking energy content as the basis, was 18.97€/GJ versus 11.90€/GJ on diesel. This tax advantage has had a major impact on the composition of the vehicle fleet, and therefore on the industrial and competitive aspects of the sector, as well as on the environmental impact of motor traffic.

Diesel's share of passenger car registrations was thus still 67% in 2013, down 6 points since 2012, with the peak of 77.3% dating back to 2008 (ADEME, 2014). Overall in the French private car fleet, diesel accounted for 75.2% in 2013. (CGDD, 2014b).

Table 2: Environmentally damaging tax expenditures related to fossil fuel consumption

Tax expenditure	2011 figures (M€)
<i>Total</i>	6562
<i>Transport</i>	3991
TIC exemptions on fuels	
- commercial air transport (international flights)	2448
- commercial air transport (domestic flights)	552
Refund of a fraction of the TIC on diesel fuel (road haulage)	320
TIC exemption on petroleum products used by boats	278
ICT exemption for agrofuels (*)	270
<i>other</i>	123
<i>Sector-specific uses</i>	2219
Reduced rate of TIC on non-road diesel (public works, agriculture)	2080
Refund of a fraction of the TIC on energy products (agriculture)	130
<i>other</i>	9
<i>Households and Territories</i>	259
TIC exemption on natural gas for households and heating networks	253
<i>other</i>	6
(*): phasing out by 2016	

Source: CGDD (2013), *La fiscalité environnementale en France - Etat des lieux*.

Contrary to popular opinion, the difference in average CO₂ emission rates for motor vehicles according to engine type is only very slightly in favor of diesel, at around 5g CO₂/km in 2013 (ADEME, 2014), under ideal new vehicle test conditions. Indeed, the combustion of a liter of diesel produces 30% more CO₂ than a liter of gasoline (2.6kg vs. 2.2kg). But the fuel consumption of a diesel vehicle is only really lower than that of a petrol engine in conditions of optimum efficiency, reached only after 10 to 15 minutes of city driving. Finally, diesel is clearly the source of atmospheric pollutant emissions, since the average diesel-powered personal

vehicle emits around 2 times more nitrogen oxides and more than 30 times more particulates per kilometer driven than a gasoline-powered personal vehicle.⁷ In 2012, diesel produced 89.2% of PM₁₀, and 91.6% of NO_x due to road traffic (CGDD, 2014b).

Paradoxically, the ecological bonus-malus scheme has had a mixed ecological impact. Admittedly, it has proved effective in reducing the average emission rate of all vehicles on the road in France, since the average emission rate of new vehicles fell from 162g CO₂/km in 2000 to 117g in 2012, with an acceleration in the fall (-32g) from the introduction of the bonus-malus mechanism in 2008. By 2010, France had already achieved the European compromise target of reducing average emissions from new vehicles to 130g CO₂/km by 2015. The next target is for 95% of the vehicle fleet to emit less than 95g CO₂/km by 2021.

But under the guise of environmental efficiency, this mechanism is the source of a number of perverse effects. In fact, the reduction in CO₂ emissions achieved by new vehicles on the market is essentially the result of lower fuel consumption. This also means a lower cost per kilometer driven, at a given fuel price. D'Haultfœuille et al (2014) have shown that over the 2008-2009 period, this drop in the cost of use added to the cost advantage provided by the bonus caused a "rebound effect" on total emissions due to the increase in vehicle purchases (emissions increasing both with the number of kilometers traveled and with the production of new vehicles, which itself emits CO₂). They suggest reducing the pivotal emission rate of the bonus-malus mechanism, but also calibrating the mechanism so that the "greening" of the vehicle fleet is achieved without any change in fleet size. In 2014, the thresholds for triggering the bonus and malus were changed more radically than in previous years: the bonus is now only awarded to vehicles emitting less than 95g CO₂/km, while the malus applies to all those emitting more than 130g CO₂/km (which was the threshold for triggering the bonus in 2008). Meurisse and Le Roy (2014) show that it is possible to accompany the bonus-malus mechanism with a fuel tax to neutralize this rebound effect, without destroying the incentive effect of purchasing a lower-emission vehicle.

What's more, the bonus-malus only takes into account the level of CO₂ emissions from vehicles, and not other pollutants such as particulate emissions. For the same level of CO₂ emissions, a diesel vehicle will therefore be considered as "clean" as a regular vehicle. The incentive nature of the bonus/malus is therefore insufficient, and too exclusively geared towards combating climate change.

Revising the bonus/malus principle to make it more incentive-based and even more effective would mean differentiating it according to the type of fuel used and, above all, favoring non-

⁷ <http://www.airparif.asso.fr/etat-air/air-et-climat-quelques-chiffres#sources> (accessed 12/21/2014).

emitting vehicles (such as electric or hydrogen-powered vehicles) much more, in relative terms, which has been the case since 2014.

Finally, as far as biodiversity is concerned, many tax measures instituted as part of certain public policies indirectly result in negative externalities (Pelosse et al., 2011), which justifies the objective of reducing these measures set by the Ecological Transition Roadmap (2012): this is the case for tax expenditures contributing to urban sprawl, measures taken in favor of new housing construction (new PTZ, Scellier scheme), the construction of hangars and warehouses (abatement on development tax), the creation of offices in the Île-de-France region, or the absence of payment for the cost of public facilities and externalities by peripheral urbanization (Sainteny, 2011).

4. The difficulties currently facing ecological taxation in France

The White Paper on Ecological Transition (2013) called for a reorientation of ecological taxation, going even further than the CFE's interim report published in mid-2013 and placing among the priorities the strengthening of ecological taxation and making ecological subsidies more effective in order to "*put in place ecological price signals reflecting the long-term stakes*". Attempts have been made, in particular to introduce a carbon tax, but these have either ended in failure, as in 2009-2010, or more recently in very relative and still fragile success.

a. Ecological taxation that has not been taken on board

To limit France's contribution to greenhouse gas emissions, the draft *climate-energy contribution* (CCE for *contribution climat-énergie*), voted by a large majority in Parliament in 2009 as part of the PLF 2010, provided for a tax on carbon dioxide emissions, at an initial rate of 17 euros/t CO₂ in 2010 on all fossil fuel uses not covered by the European market for tradable emission permits. The Rocard report, submitted during the preparatory phase of the project, recommended a ramp-up from 32 euros/t CO₂ to 100 euros in 2030, stressing the importance of not undermining the price signal in the medium term by adopting a starting level of too low an order of magnitude. However, the exemption of almost all industrial companies (93% of all companies, as they are subject to the European Union Emissions Trading Scheme, or EU ETS) led to censure by the French Constitutional Council and the withdrawal of the project.

The name " climate-energy contribution" emphasized the fact that paying a tax on carbon emissions was tantamount to making a contribution to financing the public good that is the climate. In this way, the CCE asserted its nature as a tax to internalize an externality, as opposed to any notion of yield tax. However, immediately renamed the "carbon tax" by all political and

economic players, the CCE lost its clarity and acceptability, and was perceived by public opinion as nothing more than an additional levy.

Four years after this withdrawal, and on the CFE's proposal, a new climate-energy contribution came into force on April 1, 2014 at a rate of 7 euros/t CO₂ in 2014, then 14.50 euros in 2015 and due to rise to 22 euros in 2016. Its key feature is undoubtedly that it is not a new tax on a new base, but a new way of calculating part of an existing tax: it is a "carbon component" that raises the rates of domestic taxes on the consumption of fossil fuels (TIC for *taxe intérieure sur la consommation d'énergie*) via a carbon excise. Unlike VAT, which is an ad valorem tax whose yield rises with the pre-tax price of fuels, the CCE, like the TIC as a whole, is insensitive to variations in the price of the products taxed: at unchanged consumption volumes, its yield remains the same, and its relative weight weakens in the event of a rise in the price of petroleum products. This is an important property that helps to mitigate the effects of volatility in the price of a barrel of crude oil, thanks to the inertia of consumer fuel prices, which are already very high due to the very high weight of taxes (including VAT) in the final price, representing, at the end of 2014, 60% of the price of gasoline and 52% of the price of diesel. For example, while diesel and gasoline prices in France were back to their December 2010 levels by the end of 2014 due to the spectacular drop in oil prices, the drop was much steeper (due to a rise in the dollar against the euro) in the United States, where car sales immediately picked up again. This phenomenon provides a superb illustration of the existence of price elasticity in the demand for fuel: fuel consumption is thus sufficiently elastic for purchasing behaviour to be very different between France and the United States, given their very high tax differential, but not so elastic as to be able to serve as the tax base for a yield tax...

Like the TIC itself, its carbon component still admits numerous exemptions and rate reductions, for example for overseas departments (exclusion from TIC scope), farmers (partial reimbursement) or natural gas in its gaseous state intended for use as fuel (100% tax reduction). The air and sea transport sectors remain "outside the scope" of the TIC, and the road transport sector still benefits from TIC reimbursement, which corresponds to a de facto exemption from the carbon component for vehicles over 7.5 tons. Finally, electro-intensive companies subject to quotas (EU-ETS market) are exempted in the name of preserving business competitiveness (option offered by Article 17 of Directive 2003/96/EC, which authorizes Member States to apply a level of taxation down to zero to energy products and electricity when used by energy-intensive companies). Nevertheless, certain previous exemptions have been cancelled, such as those concerning household consumption, and the reduction in TICPE for biofuels is scheduled to disappear by 2016. According to El Beze (2014), "*the base of the carbon component is broader than that of the 2009 carbon tax*".

The effect of the climate-energy contribution on fuel prices is very slight. Indeed, in 2014, the introduction of the carbon base was offset by a reduction in the conventional component of the TIC, except for gas, which has been taxed very little until now. Then, from 2015 onwards, the increase will be proportional to the CO₂ content of products, and will be highest for coal, then heating oil and finally gas. For motor fuels, the effect will be very cushioned, as fuels are subject to numerous taxes: the TIC on diesel should rise from 42.84 eurocents per liter in 2013 to 46.81 eurocents in 2016 (+9.3%), and that on gasoline from 60.69 eurocents per liter in 2013 to 64.11 eurocents per liter in 2016 (+5.7%).

Nor does it allow for the correction of the existing tax differential between diesel and premium fuels, since a reduction in the differential of 0.55 centimes in 3 years would require 210 years to correct the tax differential between diesel and premium fuels! One of the CFE's first opinions, in April 2013, nevertheless concerned the denunciation of this tax differential "*in the opposite way to what would be recommended by the consideration of environmental externalities*". It pointed out that diesel tax exemption is used as a sectoral support instrument, despite its environmentally unfavorable incentive effects (CFE, progress report, 2013).

The 2014 version of the CCE has once again been renamed the "carbon tax", but so far it has gone relatively unnoticed due to low media coverage and, above all, the fact that its impact was neutralized in 2014 by the equivalent reduction in the "classic" component of the TIC (not calculated on carbon content). Its main flaw is undoubtedly that it was introduced surreptitiously, without any real explanation, and not as part of an overall reform.

b. Contested taxation

It has to be said that ecological taxation is not accepted in France, neither by public opinion, nor by the majority of the political class, nor, curiously, by the current Minister for the Environment. It was only the lack of media coverage (helped by the fact that its effect on prices was fully offset in the first year) that enabled the CCE to be introduced in the first place. The minister at the time, Philippe Martin, was careful to point out that this measure was "*not just another tax, but a tax reform*", and that it would have "*no impact in terms of tax pressure on the French in 2014*"⁸. Similarly, the government spokeswoman stated, "*It's not about creating a new tax. It's simply a question of greening existing taxes on energy*"⁹. The only point emphasized is the absence of any negative impact on purchasing power, rather than the measure's usefulness in bringing about changes in behavior.

⁸ Philippe Martin, Université d'été du PS, La Rochelle, August 23, 2013.

⁹ Najat Vallaud-Belkacem, Europe 1, August 23, 2013.

On the other hand, the fuss over the ecotax for heavy goods vehicles, which was supposed to enable the road haulage sector to internalize the externalities it causes, has demonstrated above all a lack of political will in the face of opposition mainly from a sector of activity (road haulage) which until now has benefited from tax advantages (reimbursement of a fraction of the TIC for road haulage). Although the principle of the ecotax had been voted by Parliament with near unanimity, the procrastination that led to successive postponements and then withdrawal of the measure reflects the weakness of the government (and the political class as a whole) in the face of social movements and lobbying. In this case at least, giving in on the means is tantamount to giving in on the objective.

Generally speaking, ecological taxation is criticized for two main reasons: its potential recessionary effect and its impact on inequalities.

- **Loss of competitiveness and recessionary effect**

By increasing corporate production costs, ecological taxes would lead to a loss of competitiveness, encourage relocation and increase unemployment. This is the main criticism in a context of weak growth and very high unemployment.

However, the risk of loss of competitiveness needs to be put into perspective. Admittedly, cost increases can be significant for energy-intensive companies, but they often have considerable scope for substitution, enabling them to avoid higher taxation. This is the purpose of this type of taxation. And when it comes to competitiveness and relocation, it's the overall cost of production that matters, of which ecological taxation is only a small part. Added to this is the fear that a single-country tax would be ineffective on a global scale, both because of France's low contribution to global emissions (1% in 2011, but 11.3% for the EU27) and because of potential carbon leakage. The latter is a fact: as France has reduced its emissions since ratifying the Kyoto Protocol, the carbon footprint of its domestic demand is unchanged at 11.6 teq CO₂/inhabitant, while its territorial emissions have dropped from 9.5 to 7.7teq CO₂/inhabitant. This "delocalization" of emissions can be explained by the tertiarization of the economy and technical progress, which lowers unit production costs and triggers a rebound effect in consumption and therefore imports. Fears of activity relocation are also strong, even if the empirical evidence is hardly conclusive in this sense (Grether et al, 2012; Marconi, 2012; Erdogan, 2013). It is these fears that motivate thinking about border tax adjustment (BTA) mechanisms, which are nevertheless difficult to implement, and which would make it possible to tax CO₂ emissions wherever they are emitted.

- **Loss of purchasing power, regression and widening inequalities**

Like any indirect tax, an ecological tax leads to a loss of purchasing power for consumers (income effect), mitigated however by the substitution effect which leads them to modify the

composition of their purchases. This substitution effect is all the greater the higher the price elasticity of demand for the polluting good. Consequently, the more effective ecological taxation is on the environment, the less purchasing power is affected *ex post*.

All in all, however, if such a tax is introduced without any redistribution of tax revenues, the direct drop in purchasing power contributes to a reduction in activity. A further indirect decline results from job losses.

Ecological taxation has a relatively greater impact on poorer households, whose consumption of taxed products represents a larger proportion of their expenditure the lower their income. In this sense, ecological taxation is said to be regressive (Poterba, 1991; Metcalf, 1999; Wier et al., 2005; Ruiz and Trannoy, 2008). The carbon tax raises the price of fuel, and therefore the cost of running a car, as well as that of fuels used for heating and cooking. Given that these are mainly restricted expenses, and that the poorest households often lack the budgetary leeway to invest in a less polluting vehicle or heating system, they have little scope for substitution. These households have less scope to escape the loss of purchasing power, or to reduce its impact.¹⁰ Their ability to reduce emissions is therefore also limited. This is what Ségolène Royal, Minister of Ecology since April 2014, regularly denounces as a manifestation of *punitive ecology*.

5. Paths to acceptability

How do we get taxpayers to accept the principle and implementation of ecological taxation? In the light of the foregoing, a few key principles emerge: redistribute to overcome fears of job losses and loss of purchasing power; do it skilfully to limit its impact on the poorest and demonstrate that ecology can be non-punitive; explain the incentive purpose of ecological taxation as opposed to the logic of yield; clearly display the objectives and means implemented to overcome public opinion's prejudice against taxation. All these elements are linked.

a. Pedagogy

Three points must be emphasized if ecological taxes are to be accepted.

The first is that the objective must be understood and shared: the need to contribute to the fight against climate change must be explained, as must France's determination to respect the commitments made to the international community with its European Union partners, in line with its past responsibility, which is greater than its current contribution to global emissions.

The second is that an ecological tax is defined by its base and rate, but not by the use to which its revenues are put: it taxes polluting products at a rate equal (as far as possible, given the uncertainties involved in estimating it) to the marginal damage caused by this pollution, in order

¹⁰ Recent works put this regressive aspect of ecological taxation into perspective, taking into account the entire life cycle of agents (Sternier, 2012) or general equilibrium effects (Dissou and Siddiqui, 2014).

to redirect purchasing behavior towards less polluting products or technologies. The effectiveness of this behavioral shift depends on the price-sensitivity of demand, and may therefore require the introduction of a high rate. In addition, the idea must be accepted that the use of the funds obtained, for example to finance public expenditure unrelated to the environment, has no impact on the ecological virtues of the taxes in question.

The third point, and probably the most important, is that the purpose of ecological taxation is not to generate a tax yield for the State. This yield is merely a *by-product* of the policy pursued. This opens the door to all possible ways of redistributing the revenue thus obtained. Ecological taxes are still too often presented as a means of financing expenditure. This was the case for the CCE, presented at the end of 2013 as a means of partially financing the competitiveness-employment tax credit from 2015. Similarly, the tax on diesel fuel was raised by 2 cents per liter on January 1^{er} 2015 to compensate for the loss of revenue from the ecotax (PLF 2014), even though the government had refused during 2013 to gradually realign the taxation of diesel fuel with that of petrol, as proposed by the CFE for ecological reasons... Such a presentation is a sure way to create or maintain doubt about the usefulness of ecological taxes for the environment.

b. Redistribution

Terkla (1984), Poterba (1993) and Parry (1995) have shown that redistributing the tax revenues generated by ecological taxes reduces their overall macroeconomic cost by reducing the loss of purchasing power for households and/or the increase in unit production costs for businesses. The type of redistribution depends on the primary objective.

- **Flat-rate compensation**

If the aim is to limit the loss of purchasing power for households and offset the relatively greater negative effect on the poorest, the simplest solution is to redistribute all or part of the tax revenue obtained to households in the form of flat-rate compensation: a "green cheque" (as in Switzerland). Such redistribution is progressive by nature, providing a relatively greater income supplement to the lowest incomes. Its progressiveness can be accentuated if only the poorest households receive the green cheque.

This was one of the scenarios discussed by the CFE for transferring part of the revenue from the carbon component of the TIC¹¹ to households. By redistributing this sum only to households in the lowest deciles in terms of income, i.e. 3 to 4 million households, this would represent around 200 euros per year per household in 2016. But decisions on this redistribution have not yet been taken.

¹¹ That's 700 million euros. The CCE should bring in 4 billion euros for the State in 2016, including 2.6 billion paid by households.

To take account of family composition, flat-rate compensation can be paid to individuals rather than households: this is the spirit of the *Citizens' Climate Lobby* proposal for a carbon tax in the United States, which suggests paying each adult a green check for the same amount (and half that amount to each child).

Carbon Fee and Dividend¹²
The *Citizens' Climate Lobby* proposal

The *Citizens' Climate Lobby* is an American environmental lobby group whose *Advisory Board* includes James Hansen, Associate Professor at the Earth Institute of Columbia University in New York, well known for his positions in favor of the fight against climate change and the carbon tax.

It proposes a mechanism based on a combination of four essential elements: a carbon tax that increases over time to high levels, a tax adjustment at the borders, an original method of redistributing the tax revenue thus obtained, and a name designed not only to remind taxpayers of the meaning of the whole scheme, but also to make it independent of the federal budget.

The initial carbon price would be \$10/t CO₂ in 2016, rising by \$10 each year to reach \$200/t CO₂ in order to enable a 90% reduction in carbon dioxide emissions by 2050 compared with 1990. This price would have to be paid by all CO₂ emitting end-uses: households, businesses and government services.

Border tax adjustment would allow imports from countries that have not adopted carbon pricing to be taxed, while exports to such countries would be zero-rated.

All the revenue thus generated would go into a *Carbon Fees Trust Fund*, which would be redistributed directly to households in the form of a monthly cheque. Each adult would receive one share, and each child half a share. The creation of the fund would ensure that carbon revenues would be kept separate from the rest of the budget, and that they would be fully redistributed. The total redistributed yield would thus be greater than the tax paid by all households, resulting in a very significant gain in purchasing power and a boost to the economy.

The main originality of the proposal undoubtedly lies in its semantic precision: the mechanism setting a price on carbon is not a *carbon tax* but a *carbon fee*, the difference being that a tax is paid into the national budget, suggesting that it is a yield tax, whereas a fee is a contribution to the financing of a good or service from which the taxpayer benefits. Symmetrically, the term "*dividend*" paid out by an "investment" fund (even if there is no question of the CCL placing this income on the financial markets) suggests the return today of an investment in the future.

In the same spirit, a project for carbon taxation accompanied by redistribution in the form of a "*carbon dividend*" was put forward in the summer of 2014 by a Democratic representative in

¹² <http://citizensclimatelobby.org/carbon-fee-and-dividend/>

the US Congress, Chris Van Hallen, with the slogan "*protecting the income of average Americans by protecting the planet for their grandchildren*".

To preserve the incentive nature of the tax, it is essential to dissociate the compensation paid to households from their actual consumption of taxed products. Of course, it is possible to redistribute to the nearest euro on an aggregate basis, without everyone receiving to the nearest euro what they pay!

- **Greening the tax system**

Following the example of the Swedish tax reform of the early 1990s, it is possible to "green" taxation rather than make it more burdensome, i.e. to redistribute ecological tax revenues by reducing the rates of other taxes or levies. The aim is to increase economic efficiency by reducing the distortions introduced by certain compulsory levies, as argued initially by Baumol and Oates (1988), Pearce (1991) and Poterba (1993). Pearce (1991) was the first to suggest that the redistribution of ecological tax revenues in the form of reduced rates of other distorting taxes could lead to a double dividend: a first, environmental dividend, due to the reduction of environmental externalities, and a second, improving economic well-being (Goulder, 1995). This second dividend can take the complementary forms of stimulating economic growth, improving purchasing power, reducing unemployment, etc. (Ekins, 1997).

Parry (1995) sets out the general condition for the existence of the economic dividend: the *revenue-recycling* effect, which reduces existing tax distortions, must outweigh the *tax-interaction* effect, which, through the mutual erosion of tax bases, can on the contrary raise the gross welfare cost of the environmental tax. But the very existence of the second dividend generally reduces the first one (improvement in environmental quality), as growth is accompanied in particular by energy consumption. Since Bovenberg and De Mooij (1994a) and (1994b), an abundance of theoretical and empirical literature has been devoted to analyzing the circumstances and conditions for obtaining a double dividend.¹³

Insofar as the double dividend represents a return to the optimum, the more sub-optimal the situation, the greater the chances that a budget-neutral environmental tax reform will lead to a double-dividend situation. This is all the more likely if the economy is affected by market imperfections, such as imperfect competition or unemployment (Bovenberg and van der Ploeg, 1996; Bovenberg, 1999).

A necessary condition for achieving the double dividend is, of course, the existence of significant tax distortions, which is the case in France and other European countries, where levies on labor are very distortionary (EC, 1998; or Fiorito and Padrini, 2001), around twice as

¹³ Chiroleu-Assouline (2001) provides a review of this literature, updated since those of Goulder (1996) and Bovenberg (1999).

high as in the United States, Canada or Japan, where taxes on capital are the most distortionary (Scott, 2007). Chiroleu-Assouline and Fodha (2011) show the scope for European countries to green their tax systems.

In the context of the 2009 carbon tax project, Combet et al. (2009) assessed the potential double dividend of recycling revenues in the form of payroll tax reductions, focusing on the potential for stimulating growth and employment, in line with previous empirical studies (Carraro et al., 1996).

Thus, the double dividend is only achievable if, at the same time, there is significant room for manoeuvre in terms of fiscal distortions and market imperfections to be corrected, and if tax incentives enable a significant decoupling of economic growth and pollution (particularly fossil fuel consumption).

The economic efficiency of the reform is based on the replacement of a tax levied on salaried employees by a tax affecting all consumers, but on a narrower base than that of VAT, which is levied on all consumer products. The distortions affecting the labor market are therefore corrected by transferring the tax burden to certain categories of households: the unemployed, pensioners and capitalists. The double dividend can thus be obtained to the detriment of these categories, economic efficiency being independent of equity. For example, all studies confirm that employment can increase if the tax burden is shifted from workers to the unemployed, the results depending crucially on the characteristics of the unemployment benefit system (Koskela and Schöb, 1999). Nevertheless, no reform can be socially satisfactory, and politically acceptable, if it accentuates inequalities. A "green cheque", even one targeted at the poorest, only addresses the issue of equity and does not provide a second dividend. On the other hand, adding the question of equity to that of economic efficiency means looking for specific redistribution methods.

This is the main motivation of Chiroleu-Assouline and Fodha (2011 and 2014), who demonstrated the possibility of offsetting the ecological tax through a progressive reduction in payroll levies, i.e. a uniform reduction in the lowest rate of the progressive scale (a "green cheque" then being paid to non-taxable households) accompanied by an increase in progressivity. Increasing the progressivity of levies on labor would in fact increase the revenue to be redistributed, providing leverage to reinforce the acceptability of introducing the ecological tax.

c. Audacity and transparency

The level of the tax rate undoubtedly plays a paradoxical role in taxpayers' understanding and acceptance of ecological taxation. Indeed, if the ecological tax is to internalize the significant

external costs (or at least move in that direction) caused by pollution and greenhouse gas emissions, it can only be effective if its rate is of a similar order of magnitude to the damage caused. High rates ensure both the visibility of the price signal and its effectiveness on an inelastic taxable base. This is an argument that should be understood by public opinion: if the problem is important, how can we expect to deal with it with infinitesimal cost increases? On the contrary, the introduction of taxes in homeopathic doses suggests that the issue is less ecological than the acceptability of an additional levy. The ecological argument is then perceived as purely a marketing ploy for a yield tax, especially in a context of strained public finances.

A high rate would also guarantee the visibility of the redistribution of the tax revenues thus obtained. The significant compensation obtained by each household, in relation to its income, added to other existing aids, could contribute to the more rapid adoption of new, less polluting technologies (vehicle or boiler replacement).

Sweden's experience with the massive, albeit gradual, introduction of a CO₂ tax in the early 1990s is a good example of both the economic efficiency and acceptability of an ambitious overall tax reform. In fact, the CO₂ tax replaced 6% of all compulsory levies as part of a bold greening of the Swedish tax system, with a tax rate that now stands at over 100 euros per tonne on household energy consumption. Similar boldness would be far more convincing than continuing to move forward in measured, if not concealed, steps. What we need is a real revolution in our tax system.

The boldness required must be accompanied by total transparency: on objectives, on the long-term trajectory envisaged for tax rates, and above all on the use of revenues and the overall logic of tax reform. In British Columbia (Canada), for example, the revenues raised by the carbon tax introduced in 2008 are not ring-fenced as in the CCL proposal mentioned above, but their redistribution, voted each year like any other tax provision, can be freely consulted on a website¹⁴ (which includes frequently asked questions and enables taxpayers to find out about the purpose and operation of the tax and, above all, the methods adopted to ensure budget neutrality). In an age of mistrust of politics and conspiracy beliefs, transparency is a necessary condition for the acceptability of any large-scale reform.

6. Conclusion

This article has shown that environmental taxation has not taken its rightful place in the French tax system. The way in which it has been progressively built up over time reflects a logic of seeking tax yields far more than incentives to modify behavior in order to reduce pollution or greenhouse gas emissions. In this respect, it is not at all environmentally friendly. Various

¹⁴ http://www.fin.gov.bc.ca/tbs/tp/climate/carbon_tax.htm

attempts have been made in the past to correct, at least partially, these shortcomings, in line with the polluter-pays principle. They have all failed in the face of strong resistance from public opinion and various lobbies. The latest ecological tax is the CCE, which came into force surreptitiously in April 2014, while the ecotax for heavy goods vehicles was stillborn...

An analysis of the difficulties encountered, and a comparison with successful experiences abroad, offers some prospects for the success of an ecological tax reform in France. The affirmation of the polluter-pays principle, the setting of tax rates in line with the level of environmental damage, and the full redistribution of the tax revenues thus obtained, independently of expenditure on the taxed products, constitute together, but in this order, the keystone of success. The choice of redistribution methods depends on the weighting given to the objectives of economic efficiency (stimulating growth and employment) and equity (offsetting the regressive nature of energy taxation). But transparency on objectives, as well as clear commitments on a medium-to-long-term rate growth trajectory, are just as necessary.

The introduction of the climate-energy contribution in 2014 is a very first step, albeit too timid and poorly motivated, in the direction of making the French tax system more environmentally friendly. It is not just a question of greening an existing energy tax, but rather of greening the tax system as a whole. The justification for the introduction of the CCE cannot be the financing of the competitiveness-employment tax credit, but rather its incentive properties for the adoption of technologies or products that emit less carbon dioxide. Financing the CICE is just one of the ways in which the tax revenues thus obtained can be recycled, possibly creating a double dividend, while the imperatives of social equity mean that part of the revenues should be redistributed to households to offset the loss of purchasing power of the poorest households. Finally, setting higher tax rates now, to reinforce the ecological credibility of the CCE by taking advantage of the fall in oil prices, and combining its introduction with an intensification of the progressivity of income taxes would have an even more significant leverage effect on the amounts to be redistributed.

Finally, words are just as important as deeds: following the example of British Columbia, where carbon tax revenues are redistributed in the form of Climate Action Dividends, or of the CCL's proposal, which emphasizes the contributory nature of the carbon price, it would be extremely useful for educational purposes to avoid the name carbon tax in France and stick to the name climate-energy contribution, or even to promote the name "carbon dividend" for the compensation paid to households.

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