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## *The fiscalization of environmental protection*

*Environmental protection and sustainable development have become major topics on the global agenda (OECD, 2008, European Commission, 2007) partly because of the seriousness of the situation and partly because of the need for international cooperation. Global climate change has made it clear to many decision makers that climate protection should be taken into consideration as an international strategic goal. Environmental protection, which had fallen principally within national competence before, operated especially through regulations (e.g. standards, quotas, production restrictions), it was therefore these instruments initially that were attempted to be adopted at the international level. An obvious example for this was the Montreal Protocol signed on the 16<sup>th</sup> September 1987, which banned as from 1st January 1989 the use of certain greenhouse gases (freon) damaging the ozone layer. However, the application of regulatory instruments at the international level has remained limited till now, as it is extremely difficult to reach a consensus between a large number of states of various economic magnitude. Due to the lack of sanctions, certain countries have failed to cover the expenses of environmental protection and, applying free rider tactics basically, they have failed to meet their commitments or have not joined the relevant international agreements in the first place.*

In the beginning of the 1990s North-European, especially Scandinavian countries recognized that the climate policy objectives could be nicely combined with other sector policies (energy or tax policy, research and development, innovation) and in fact the positive synergy effect deriving from that policy mix could be quite remarkable. As a result of that, new industries and technical solutions have been established for the exploitation of renewable energy sources, which latter have come to play a considerable role in the energy mix at the national level. Typically European countries have encouraged the achievement of energy and climate policy goals by introducing environmental tax reforms as well.

The ambitious energy and climate policy objectives of the European Union (EU) for 2020 already denote supranational commitments to the reduction of greenhouse gas emission, the general use of renewable sources of energy and the enhancement of energy efficiency. In the scope of the tax coordination superior to Member States, Directive 2003/96/EC on energy tax came into force as of 2004 and set minimum tax levels for the EU Member States as regards particular sources of energy (coal, gas, electricity). The European Commission has placed the revision of the energy tax directive on the agenda, within the

framework of which it wishes to put explicit emphasis on the environmental element or introduce expressly a CO<sub>2</sub> tax. As an innovative market-based instrument, the European trade in the emission units of greenhouse gases (emissions rights) was also launched as of 1<sup>st</sup> January 2005.

### ECONOMIC POLICY INNOVATIONS FOR SUSTAINABLE DEVELOPMENT

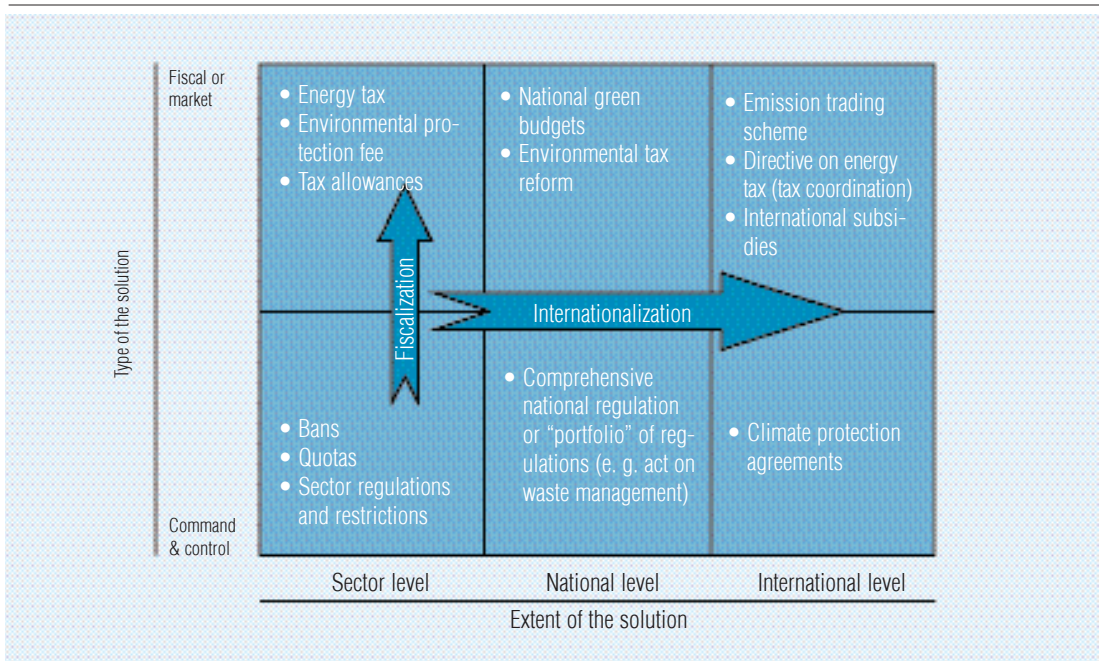
*Examining national and international economic policies in the past decades, a wave of innovations can be observed (Hansjürgens, Wätzold – 2005). In the course of the latter, solutions have shifted from command and control type legal regulations to market based and ecological methods, and within these from individual to comprehensive treatment (see Chart 1).*

The dialogue serves to improve both the efficiency and equity of national economic policies and the international economic system, while it

seeks to retain the advantageous effects of competition and avoid or eliminate its harmful effects. Actors and their interests differ widely within and between states, it is therefore especially important for the dialogue to have a “common language” and a generally understandable and accepted standard. This opens up the opportunity to find common denominators, objectives and instruments like the Millennium Development Goals (MDG) at the level of the international community or the efforts of the Lisbon Strategy of the European Union for sustainability (European Council, 2000) at the supranational level. Through the global and local public dialogue, the issues of environmental protection and sustainable development have reached ever higher levels of quality; common thinking and discourse have been characterised by the use of economic terms and standards to an increasing extent. Through the fiscalization of environmental protection, the field has increasingly integrated into economic systems.

Chart 1

#### SOLUTIONS FOR ENVIRONMENT PROTECTION



The *Millennium Development Goals* are contained, in a general formulation, in the Millennium Declaration, which was adopted by 189 nations at the UN Millennium Summit in September 2000. At the next Summit in 2001 these goals were concretized in a target system. This international development initiative intends to achieve 8 broad goals by the target date of 2015, which are broken down to 21 subtargets and 60 indicators for the purposes of progress measurement and feedback. The identification of the goals was assisted by the contribution of the experts of the UN Secretariat, IMF, OECD and the World Bank. Goal 7 refers explicitly to securing environmental sustainability (UNDP).

The *Lisbon Strategy* is an originally ten-year modernization agenda set out at the meeting of the European Council in March 2000 that intends to increase prosperity in the EU by improving competitiveness. The strategy rests conceptionally on three pillars: economy, society, and the environment. The essence of the environmental pillar is that economic development should be sustainable, based on natural resources. The mechanism for integration and change management of the strategy is open coordination, which is based on jointly defined objectives and measures as well as on comparison and the exchange of best practices. In the EU there is an intention to continue the program and speed up structural reforms. Sustainability is expected to play an even bigger role in future, together with the strengthening of the external dimension (SCADPlus).

The Kyoto Protocol is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC), adopted at the third UNFCCC conference on 11 December 1997. The protocol entered into force on 16 February 2005 and determines at an international level the commitments of states in reducing greenhouse gas emissions; its first

phase expires in 2012. The follow-up with hoped for stronger commitments was meant to be secured by the Climate Conference in Copenhagen between 7 and 18 December 2009. The result of the Climate Summit was a minimum consensus, which set a 2°C limit on the increase of global average temperature as a goal without selecting instruments, recorded in an accord that participants voted to take note of and which would be included in the UN process.

### THE PROBLEM AND SOLUTIONS FROM AN ECONOMIC POINT OF VIEW

According to the first fundamental theorem of welfare economics (Léon Walras) Pareto efficient distribution will always take place at a free, competitive market where there are no transaction costs and the preferences of the stakeholders are entirely independent (i.e. there are no externalities). However, if external economic effects (externalities) exist then it is unlikely that the market *ab ovo* generates a Pareto efficient distribution.

In democracies with market economies and at international markets connecting nation states, it is a fundamental requirement for efficiency that pricing reflect the appropriate information about the actual state of economic activity at the markets. The functioning of the “invisible hand” might otherwise lead to market failures, the elimination of which, in most cases, is incumbent upon the governmental regulation, the economic policy. The private sector can in certain cases also solve the problem of external effects: *Coase*, for example, proposed voluntary private agreements if property rights were clearly defined and there were only a few actors involved (Coase theorem), but also mergers and acquisitions can help to internalize externalities. However, there are several factors limiting the management of

externalities by the private sector (e.g. public goods, transaction costs, the lack of information), the intervention of the government is therefore inevitable in most cases (Stiglitz, 2000).

The solution preferred by economic theory is an economic policy that incorporates negative externalities into the potential cost structure, and thus also the decision making, of individual market participants. These costs would otherwise be borne by society only and not by the individuals causing the pollution. The solution requires the evaluation of ecological goods as public goods, which, in the absence of market prices, can most likely be accomplished by cost-benefit analysis. This can happen directly through a so-called contingent valuation or indirectly by using substitution or complementary market goods. Apart from valuation it is necessary to establish incentive mechanisms that make environmental protection possible at minimal costs. These incentives have differentiated impacts leaving a free choice from among the different technologies and economic policy solutions to avoid environmental pollution. The goal is to reach a socially optimal level of environmental pollution.

In the case of environmental protection, the use of common resources and the lack of pricing are the most evident problems among externalities. It is hardly possible to exclude individual market actors from the use of common resources and due to the lack of an efficient market, it is difficult to price pollution. As a result of that, the allocation of environmental resources is typically inefficient. Microeconomics describes problems related to the environment as externalities (Pigou, 1920) that fall outside the spatial and temporal cost differentiation of individual decision makers (business administration). In the case of externalities, the decisions of individual market actors can have positive or negative effects that

translate into subsequent benefits or costs for other actors, without actual market transactions involved. Since environmental pollution, as a negative externality, decreases social prosperity, reducing pollution to a socially optimal level with adequate methods leads to an improvement of prosperity.

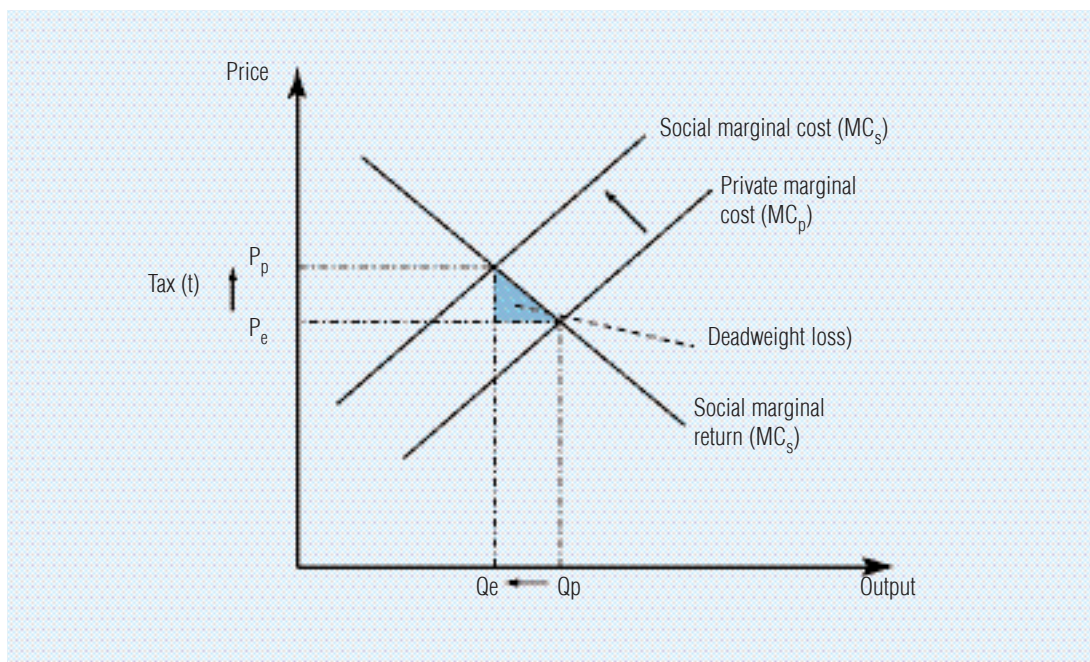
There are two major forms of governmental intervention: legal restrictions based on direct command and control as well as market-based regulations. The spread of market-based instruments in environmental protection shows that their assessment and incentive techniques have become more and more sophisticated. These instruments are actually cost effective, they are suitable for fiscal coordination and for internalizing externalities, just as they are fair complements to other sector policies. In contrast to these, *command & control-type* legal regulations, which, some say, serve rather the economic order, operate with orders, restraints and sanctions. Regarding environmental pollution, two sorts of regulations can be distinguished, namely output- and input-side regulations (Stiglitz, 2000). Certainly these, too, can be regarded as sanctioning (operating with prohibitive costs) economic instruments based on elementary (sometimes only implicit) assessment.

As far as the *market-based instruments* of the government are concerned, these include emission trading schemes on the one hand and *fiscal instruments* like indirect taxes, charges, fines and subsidies on the other hand. In the case of emission trading schemes, a politically determined output limit (*cap*) is broken down to single polluters, which in fact means a quantitative regulation (*rationing*). However, under the given circumstances, polluters can deal in the emission permits with one another, thus it is the market pricing mechanism that prevails here already. *Taxes, charges and fines* are also designed to represent the environment polluting aspect of production or consumption as



Chart 2

**MARKET EQUILIBRIUM IN CASE OF ENVIRONMENTAL TAX ASSESSMENT**



negative externalities in prices (European Environmental Agency, 2006) (see Chart 2). According to British economist *Arthur Pigou*, the amount of the tax levied on the output should ideally equal the marginal cost of the externalities (Pigou, 1920).

Through the introduction of taxes, charges and fines, the rise in prices provides negative incentive for the stakeholders, while the application of these instruments and, what is more, even of the trade of emission permits, raises revenue for the state budget. In contrast with that, *subsidies*, including, beyond direct subsidies, tax exemptions, tax credits and tax allowances as well, provide incentives for the production and consumption of goods more preferable from an environmental point of view. Consequently, also in this case, the positive incentive is implemented through the change (decrease) of prices or costs, while, at the same time, the subsidies entail a fall in the revenues or a rise in the expenditures of the state budget (Kosonen – Nicodeme, 2009).

**FISCAL INSTRUMENTS AND THEIR IMPACTS**

One of the main advantages of taxes and other fiscal instruments as opposed to regulations is *efficiency*. On the one hand, this is manifested in the fact that, through the price mechanism, consumers or producers moderate their environmentally harmful activities in line with the “polluter pays” principle up to the point where the marginal cost of the pollution cutback equals the amount of the tax. Consequently, the cost of hitting the environmental target is minimized and, on the other hand, market actors can flexibly choose the method and extent of pollution reduction. Imposing taxes and charges generally entails lower administrative costs than introducing a regulation, in the case of which latter it is up to the actors to explore the details. In contrast with that, fiscal instruments affect consumers' behaviour through the price mechanism, while in production they provide incentives for technology exchange and innovation. (Hamilton et al, 2001).

Nonetheless this efficiency gain is moderated by the social cost of tax increase (deadweight loss) and the interaction of environmental tax with the markets of other production factors (especially labour). Indeed, the introduction of environmental tax also causes a welfare loss due to the fact that it reduces real wages by increasing consumer prices and thus it entails a fall in the labour supply. Another important factor affecting efficiency is the fact that taxes (and auctioned tradable emission permits) typically generate revenues for the budget, which makes it possible to cut other distorting (principally labour) taxes and social security contributions. This “revenue recycling” is the basic idea of environmental fiscal reforms and its favourable impact is referred to as the *second dividend of environmental taxes*, being the number two positive effect after the primary environmental effect. It is worthwhile to draw attention here to the fact, however, that economic literature is rather divided regarding the existence and magnitude of the second dividend of environmental taxes. The reason for this is chiefly that although the positive effects (e.g. those of improving employment and investments) can be demonstrated ex ante with the help of various models, the ex post experiences are quite miscellaneous in this regard. It seems that the negative effect of tax interaction is generally greater than the positive effect accruing from revenue recycling; therefore, the introduction of an environmental tax always entails some social costs. This is mainly due to the fact that if a tax with a broader base (such as labour taxes) is replaced by a(n) (environmental) tax with a narrower base, this usually gives rise to substitution, which increases the excess burden. As a result of that, the strong form of the double dividend principle is not tenable in all cases, as the second dividend of the environmental fiscal reform is not positive for certain in net terms (Seung-Joon, 2007).

Experiences show (Kosonen – Nicodeme, 2009), that the net economic effect of the *environmental fiscal reforms* could be either modestly positive or slightly negative. It depends on numerous unique factors such as the structure of the particular national economy concerned and its current state in the business cycle, the elasticity of certain macroeconomic indicators, the extent of various distortions, exemptions and compensations as well as the success of phasing the environmental fiscal reform with other policies. Nevertheless, while in the case of the environmental fiscal reform the recycling of excess revenue reduces the costs involved in the consumer price rise, in the case of other policy instruments (regulation, emission trading with the free allocation of permits) the welfare loss accruing from the distortion effect is higher due to the lack of a revenue generating potential. In other words: revenue recycling in order to reduce other distorting (labour) taxes and contributions may not offset the total welfare loss involved in the introduction of environmental tax, however, it mitigates it by all means. Accordingly, it can be asserted on the basis of both the theory and the experience that the environmental fiscal reform implemented by shifting tax burden is more favourable than the application of single instruments.

Reviewing the results of several studies and simulations (Hoerner – Bosquet, 2001) one can state that the vast majority of environmental fiscal reforms has had a positive impact on *employment*. The improvement in employment is especially remarkable if the excess tax revenue is recycled in form reducing the employer's social security contributions, since this directly influences the price of labour. However, if the revenue recycling is implemented through the cut of personal or company income taxes, the positive effect on employment is far from being obvious. Job creation can be enhanced if the decrease in the employ-

er's social security contributions is targeted at low-income workers, as their labour supply has higher elasticity and from the production factors labour substitutes nicely for capital or energy. Reducing social security contributions therefore encourages the labour intensity of the economy, an important condition for which is the existence of a flexible labour market, however.

The impact of the environmental tax reforms on *GDP* is fairly limited; most of the analyses show a shift of  $GDP \pm 0.5\%$  per cent. Economic growth is chiefly generated by an environmental fiscal reform that recycles revenue into reducing employers' social security contributions or into improving energy efficiency, while reforms cutting personal income tax typically reduce *GDP*. Environmental fiscal reforms combined with investments into the improvement of energy efficiency or with the protection of the competitiveness of energy intensive industries, provide incentives both for increasing *GDP* and for extending employment. Therefore the so-called hybrid solutions that are combined with other sector policies are more favourable considering their economic impact than environmental tax reforms that remain within the framework of tax policy (Hoerner – Bosquet, 2001).

As far as their *sectoral* impacts are concerned, environmental fiscal reforms hit energy-intensive sectors primarily, since their main objective is the reduction of pollution emission. However, as has been shown above, the state of labour-intensive sectors may be improved as a result of the revenue recycling. Currently, the economic impact of energy taxation in Europe is modest as it has a relatively little share within production costs. Employment in energy-intensive sectors is low within production as a whole and generally there is an opportunity to switch to other energy sources or more efficient technologies. Under unfavourable conditions, however, the relocation of production to

another country would have an adverse impact on the given country, moreover, in that case the environmental damage would not decrease at the global level, either (Kosonen – Nicodeme, 2009).

The *distributional effects* of environmental fiscal reforms have influence mainly on two segments, namely households with low income and the international competitiveness of the industry. Energy taxes (on electricity, heating) have characteristically a regressive impact, because of which the increase of these taxes is detrimental for low-income people, since they spend a larger share of their income on these services. In contrast with that, transport taxes have a degressive impact, while the distributional effect of pollution taxes and charges is found to be rather neutral (European Environmental Agency, 2006). In the course of the implementation of environmental fiscal reforms, with the help of revenue recycling, households are in most cases compensated for the negative impacts from the state budget. Targeted tax allowances, energy efficiency subsidies and an increase in employment can effectively offset the rise of tax burden for low-income households. If the environmental fiscal reform raises the costs of production (e.g. energy) primarily, which effect cannot be implemented through the price of the product by the company as a result of a strong international competition, either competitiveness will decline or the firm will relocate its production to another country. In order to avoid that, almost all countries provide compensation for their most vulnerable industries in the form of tax allowances or investment subsidies (Viard, 2009).

It is also apparent from the above specified complex impacts that the economically optimal and the politically, realistically feasible measures are often different since the individual interest groups concerned certainly launch intensive lobbying. However, a well-

designed, coordinated and comprehensive environmental fiscal reform combined with other sector policy measures can, coupled with a moderated economic and distributive impact, also increase employment beyond decreasing environmentally harmful emission. This requires that an appropriate proportion of the excess revenue should be recycled for cutting labour taxes and social security contributions, preserving the competitiveness of energy-intensive industries, promoting energy efficiency and investments into technologies utilizing renewable energy, as well as for compensating low-income households unable to take advantage of the increase of employment. Choosing a right mix and implementing a transformation of the tax structure of considerable size can, together, ensure the second (economic) dividend of the environmental fiscal reform as well. Furthermore, the gradual and calculable implementation of the reform is indispensable in order to reduce information asymmetry and adaptation costs (Hoerner – Bosquet, 2001).

Nonetheless, it should be also borne in mind that, for the time being, *the implementation of environmental tax reforms provides a solution solely at the national level, while climate change is a global problem*. Therefore, a more extensive use of supranational as well as international instruments (emission trading schemes, legally binding international agreements, tax coordination) would be essential. A comprehensive approach and fiscal coordination are, however, indispensable also at the national level.

## FINAL THOUGHTS

It is not surprising that economic language and mindset have spread as a kind of “lingua franca” considering that *the main fracture line runs between environmental protection and the cur-*

*rent unsustainable economic systems*. These systems have come under immense and intensifying pressure to adapt and national economic models and international markets have executed the necessary changes typically through competition and innovation (Schumpeter, 1912). Market participants, economic systems and regions likewise aim to promote their interests, improve their competitive positions and competitiveness. Thus, different economic development strategies striving for environmental protection and sustainability can have advantageous or harmful effects on all competitors as well as the competition itself (“systems competition”: Sinn, 2003).

So as to achieve mutually acceptable results it is necessary to coordinate and harmonize the different interests and instruments (for example of tax policies: Fujiwara – Ferrer – Egenhofer, 2006), which requires a financial way of thinking and thus the opportunities of evaluation and modelling. At the national level, fiscal coordination has been increasingly a trend, balancing the different interests and effects through a cyclical (mostly annual) budget. At the international or supranational level, it is typically long term common strategies that are employed, granting participating states the due time and flexibility for action. At the micro level, it is market based instruments that provide flexibility with respect to the heterogeneity of corporations. In this case, quantity based systems help to achieve the set target, while price based systems optimize the costs of reaching that target.

At the national level, fiscal coordination does not only require the choice of the adequate instrument for a given problem, but also the parallel utilisation of multiple instruments. At this level, instruments and interests can be matched with an ecologically-oriented budget that simultaneously considers revenue and expense aspects, while at the same time investment and financing decisions can be separated



**FISCAL COORDINATION THROUGH THE BUDGET**

REVENUES	EXPENDITURES
<ul style="list-style-type: none"> <li>■ Structural reform of the tax system: <i>reducing harmful burdens, increasing useful ones</i></li> <li>■ Environmental tax</li> <li>■ Emission rights trade</li> </ul>	<ul style="list-style-type: none"> <li>■ Public investments: <i>reducing harmful ones, increasing useful ones</i></li> <li>■ Subsidies: <i>reducing harmful ones, increasing useful ones</i></li> <li>■ Compensations, grants: <i>preserving competitiveness, moderating regressive impact of environmental taxes</i></li> </ul>

according to the separation theorems known from finance (Fisher, 1930 – Tobin, 1958) (see Chart 3).

Several international organizations recommend an environmental fiscal reform to developing states for fighting poverty (OECD, 2005; IBRD – World Bank, 2005), which can, however, not so much be justified by tying specific national budgetary revenues to expenditure objectives but by the advantageous effects of structural redesign. Reforming national tax systems by decreasing disadvantageous tax burdens and increasing advantageous ones can, for example, not only benefit environmental protection but also enhance higher employment. This is especially apparent in the case of low-skilled workforce. A similar correlation applies to most public expenditures and incomes, and, in their coordination efforts, it is important for governments to strike a bal-

ance between restraints and fiscal neutrality as well as between stimulating and preventive instruments.

The international financial and economic crisis prompts governments to significant intervention; they are, however, most likely to employ the instruments of traditional business cycle policy, like enhancing demand or the government's taking over the financial risks. This demand-oriented economic policy neglects structural reforms and ecological modernization (Wuppertal Institute for Climate, Environment and Energy, 2009), because of which an increasing number of experts advocate the integration of specialized policies and the simultaneous treatment of challenges. *As a consequence, the crisis-generated obligation to act also leads to the fiscalization of environmental protection and to its integration into competitiveness considerations.*

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