## Assessment and recommendations

Germany has made major progress in establishing an environmental policy framework that is supportive of green growth. While strict technology-forcing regulations and standards remain at the core of German environmental policy, the use of economic instruments has been extended to improve pricing of environmental externalities. However, potential synergies among instruments have not been fully exploited. Further extending the use of environmentally related taxes (and other economic instruments) could make the tax system more growth-friendly if revenue is used to reduce more distortionary taxes such as those on labour and capital.

The ecological tax reform, implemented in 1999-2003, confirms this view. Revenue from increased energy taxation was mostly recycled to reduce social security contributions. Estimates indicate that this mechanism helped reduce energy consumption and greenhouse gas (GHG) emissions, while having positive employment and economic effects. A number of design features, however, have reduced the effectiveness of the reform. The eco-tax (*i.e.* the additional tax applied to the original excise duties) is neither based on the carbon content of fuels nor on other environmental externalities. The reform allows for several tax exemptions, in particular for coal products and export-oriented industrial sectors; this has resulted in areas of the economy not being subject to any GHG-related price signal (*i.e.* neither the eco-tax nor the $CO_2$ allowance price under the EU Emissions Trading System), as well as in some forms of double taxation or pricing. Finally, failure to adjust the tax rates for inflation has reduced their incentive effect. Since 2003, the overall increase in energy efficiency can be attributed more to higher global oil prices than to the incentive provided by the eco-tax. While total energy use has not declined, revenue from energy taxation has decreased since 2003. As a result, environmentally related taxes revenue has also declined. In 2009, it accounted for 2.3% of GDP and 6% of total tax revenue, slightly below the respective OECD Europe averages.

Germany relies less on vehicle taxation than most other OECD countries. The annual motor vehicle tax has not provided sufficient incentives to renew the car fleet towards more efficient and less polluting cars. In 2009, the tax was restructured to promote a shift towards cars with lower $CO_2$ emission levels. However, the $CO_2$-related component accounts for a relatively low share of the tax, which, in turn, represents a minor share of the total costs of vehicle ownership and use. This suggests that the incentive provided by the new tax remains relatively weak. On the other hand, the emission-based highway toll for heavy goods vehicles has helped increase the uptake of low-emission freight vehicles. However, it is not applied to light duty vehicles or to passenger cars. In addition, incentives that encourage private car ownership and use, and hence emissions of GHGs and air pollutants, remain in place. These include the preferential tax treatment of company cars and the commuting allowance.

Overall, Germany spends large amounts on support measures that have a potentially negative impact on the environment. These were estimated at EUR 48 billion (1.9% of GDP)

in 2008. Germany has made progress in cutting direct subsidies to coal production with a view to gradually phasing them out by 2018. Nevertheless, support to production and consumption of fossil fuels accounts for a large part of environmentally harmful subsidies and runs contrary to Germany's ambitious climate change policy. Much of this support goes to energy-intensive sectors, often in the form of tax exemptions. Germany's public finances, and the cost-effectiveness of its environmental policy, would greatly benefit from the reform of support measures with perverse environmental effects.

The government started to reduce some of these exemptions and introduced new environmentally related taxes (*e.g.* the air travel tax) in the framework of its fiscal consolidation programme for 2011-14. Prior to this, public finances had deteriorated, partly due to the fiscal stimulus launched to address the 2008-09 economic crisis. While Germany's stimulus package was smaller than in other G7 countries, its environment-related share was relatively large. Increased investment in energy-efficient buildings and innovative transport, and the above mentioned revision of the vehicle tax, were measures intended to promote a low-carbon economy. The package also included a car scrapping programme, which helped stabilise production and employment in Germany's large automobile industry. However, it could have been designed to provide better environmental outcomes.

Over the past decade, investment in traditional environmental domains declined while environment-related financing became more focused on climate change mitigation. In both the water and waste sectors, investment, operation and maintenance costs are mostly borne by consumers through water and waste charges, in line with the user-pays principle. This has allowed greater participation of the private sector; most providers of water and waste services now involve private operators in some form. However, there are some concerns about insufficient transparency in setting water tariffs, potential

inefficiencies of water utilities, and the related impacts on water prices. Electricity consumers have also been the primary financier of increased investment in renewable energy. The government also provided investment grants and soft loans through the development bank, KfW, to leverage private investment in energy saving and renewable energy.

Water and waste pricing, together with strict regulations, have provided incentives for reducing water consumption and municipal waste generation, and for increasing waste recycling and recovery. Water abstraction fees are in place in several, but not all, *Länder*. The existing wastewater charges could be made more effective by adjusting their scope and level. The implementation of some extended producer responsibility systems (*e.g.* waste electrical and electronic equipment) could also be improved to enhance waste prevention. The use of economic instruments could also be broadened to help reduce the environmental impacts of agriculture and to strengthen, *inter alia*, biodiversity conservation. Such measures could provide potentially large gains in cost-effectiveness compared to indirect payments or regulatory approaches.

Germany's emphasis on technology-forcing environmental policies has helped generate new domestic and export markets in the environmental goods and services (EGS) sector. The Federal Statistical Office estimated the turnover of the EGS sector at about 2% of GDP in 2009 with the development of renewable energy sources being the main growth engine. Most EGSs were sold on the domestic market, while manufacturing of renewable components was more export-oriented. As conventional industries are increasingly

implementing environmental technologies and improving energy and resource efficiency, defining the scope of the EGS sector has become more complex. Using a broader definition, the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety came up with an estimate of the EGS market size almost three times as large as that of the Federal Statistical Office. Clarification of the correspondence of these definitions would help inform the debate on the economic impacts of environment-related policies and on the economic opportunities associated with the EGS sector. Technological progress and productivity gains will be key factors in Germany maintaining its global competitive advantage in the EGS sector.

In 2010, Germany was the fourth largest provider of Official Development Assistance (ODA). Over the previous decade, ODA increased significantly from 0.27 to 0.38% of gross national income (GNI). However, Germany fell short of its 2010 target of 0.51% of GNI and further efforts are needed to attain the target of 0.7% by 2015. Bilateral aid for the environment more than tripled in the same period, reaching nearly half of the (screened) sector-allocable aid in 2008-09, a very high percentage compared to other countries participating in the OECD Development Assistance Committee. Climate protection gained further prominence. In 2008-09, Germany was the second largest donor of both bilateral and multilateral climate-related assistance. This support will continue to increase following the pledge made at Copenhagen to provide fast-start climate financing. In addition to public finance, Germany has pioneered innovative instruments for leveraging and mobilising private capital. It has also consistently supported access to water and sanitation: since 2000, bilateral aid has increased by 46% and Germany provided the largest imputed multilateral contribution to the Water and Sanitation sector in 2008-09. Nevertheless, striking a balance between the current emphasis on climate change and supporting other environment and development priorities is a challenge. As from 2011, all

ODA projects are systematically subject to a Joint Environment and Climate Assessment at both strategic and operational levels.

### Recommendations

- Consider creating an effective carbon tax in the sectors not covered by the EU Emissions Trading System and ensure that other, non-carbon related, externalities are adequately priced.
- Reduce perverse incentives for car use by revising the tax treatment of company cars and the commuting allowance; consider extending the current system of road tolls to light duty vehicles and eventually passenger cars; consider adjusting the rates of the annual motor vehicle tax and complementing it with a vehicle purchase tax.
- Introduce a mechanism to systematically screen existing and proposed subsidies against their potential environmental impact, with a view to phasing out environmentally harmful and inefficient subsidies.
- Strengthen the incentive effect of wastewater charges and promote water abstraction fees in all *Länder* and all sectors, including mining; consider introducing taxes on agricultural inputs.
- Strengthen coherence between agriculture and water policies, including by: ensuring effective cross-compliance with environmental requirements (Pillar 1 of agriculture payments); and expanding nature protection payments (Pillar 2 payments).

- Reinforce the benchmarking of water utilities to increase their efficiency, as well as the transparency of tariff setting.
- Strengthen waste prevention, for instance by: broadening and strengthening extended producer responsibility systems; expanding the use of economic instruments to promote primary resource substitution (*e.g.* incineration tax); and expanding knowledge networks and dissemination of best practices.
- Maintain a strong, balanced commitment to environment within an expanded volume of official development assistance, in line with international commitments.
- Continue to provide international leadership on climate-related development assistance including by promoting innovative instruments for leveraging and mobilising private capital.

## 1. Greening the tax system

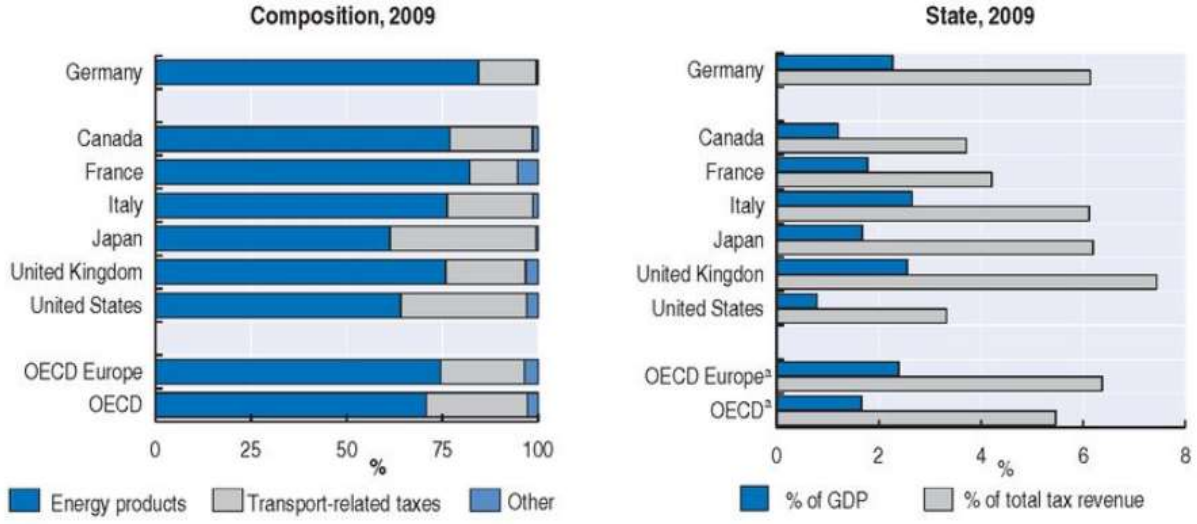
Germany has made significant steps in extending the use of taxes to improve pricing of environmental externalities. The steps include the 1999-2003 ecological tax reform and the 2009 restructuring of vehicle taxation on the basis of vehicles' $CO_2$ emission performance. These taxation measures can be seen as part of a broader package including other market incentives for environmental policy, such as participation in the EU Emissions Trading System (EU ETS), the use of emission-based road tolls for heavy goods vehicles (HGVs), the removal of some environmentally harmful subsidies and the introduction of feed-in tariffs to support electricity generated from renewable sources. Some commentators have argued that this package could be considered a "green budget

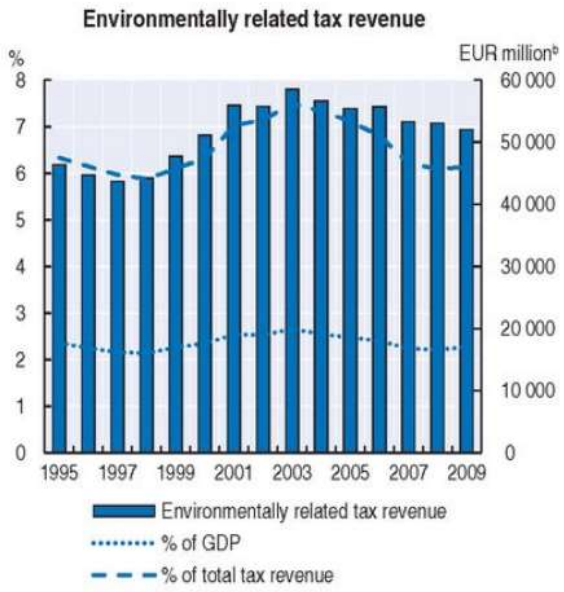
reform" (Görres, 2006; OECD, 2011a), although the measures were introduced at intervals and not in a co-ordinated manner. The lack of an overarching policy reform framework is one reason for some inconsistencies and hence inefficiencies in the policy mix. Synergy among instruments has not been fully exploited, as the following sections explain.

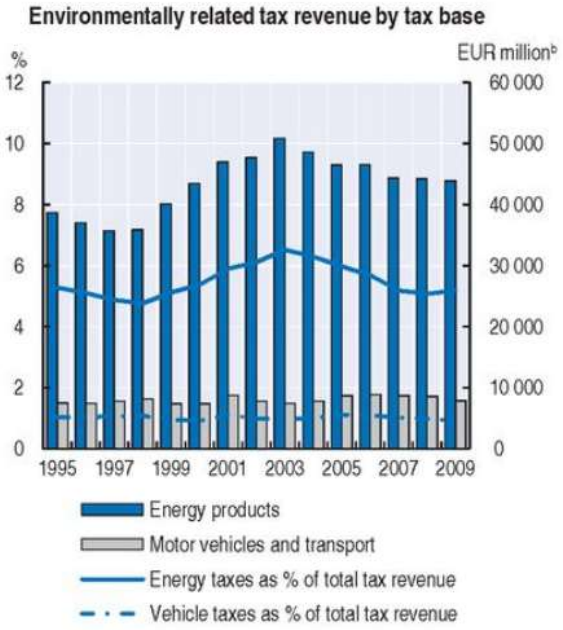
As in all other OECD countries, environmentally related taxes largely coincide with taxes on energy products and vehicles. In Germany, in 2009 most environmentally related tax revenue (84.5%) came from energy taxation, including transport fuels and electricity; 15% was generated by the motor vehicle tax and about 0.5% by other taxes, such as hunting and fishing taxes. Energy taxes accounted for a larger share of environmentally related tax revenue than the average in the OECD (Figure 3.1). Revenue (in real terms) rose sharply between 1999 and 2003 as a consequence of the progressive increase in energy taxation. However, real revenue has since decreased by about 11%: the slight increase in revenue from vehicle taxes has only partly compensated for the strong decline in revenue from energy taxes (Section 1.1). Environmentally related taxes have declined as a share of GDP and total tax revenue. In 2009, environmentally related tax revenue accounted for 2.3% of GDP and 6% of total tax revenue, slightly below the respective OECD Europe averages (Figure 3.1).

Germany should consider further extending the use of environmentally related taxes. Such taxes should be introduced in clearly defined stages so the economy can adapt to changes in relative prices. Distributional impacts (*e.g.* on low-income households) should be addressed by means of targeted social support. The country's experience with the

Figure 3.1. **Environmentally related taxes**






*a)* Weighted average.
*b)* At constant 2005 prices.
*Source:* OECD/EEA Database on instruments used for environmental policy; OECD (2010), *OECD Economic Outlook No. 88.*

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eco-tax reform, while to a certain extent incomplete, shows that environmentally related taxes can make the tax system more growth-friendly if revenue is used to reduce more distortionary taxes such as those on labour and capital (Section 1.1). Germany's tax system remains skewed towards labour, notably because of the still high social security contributions (OECD, 2012). In addition, increased revenue from such taxes could contribute to the government's fiscal consolidation efforts (Section 5.1).

Steps have been taken in this direction with the introduction of taxes on nuclear fuel and air travel as part of the 2011-14 fiscal consolidation package. Germany's unique nuclear fuel tax is an excise duty on nuclear fuel used for power generation.[1] The air travel tax is applied to tickets for passenger flights departing from German airports, with rates depending on the flight distance.[2] The interaction of this tax with the EU ETS, which includes the aviation sector as from 2012, needs to be considered.

### 1.1. *Energy taxation and the eco-tax reform*

The ecological tax reform (*Ökologische Steuerreform*) was introduced in 1999 with the objectives of mitigating $CO_2$ emissions, providing incentives for job creation and boosting innovation. It introduced a tax on electricity consumption and gradually increased the excise duties on fossil fuels between 1999 and 2003 (Table 3.1). The tax rates have remained virtually unchanged since then. A key feature of the eco-tax reform was the use of about 90% of energy tax revenue to lower payroll contributions by employers and employees. A small share of tax revenue was recycled to support renewable energy.[3] A second feature was the provision of generous eco-tax exemptions for energy-intensive manufacturing sectors exposed to international competition (see below for further discussion). This meant that small manufacturing businesses and the residential, commercial, public services and road transport sectors mainly bore the cost of the eco-tax.

As a result of the reform, revenue from energy taxation rose by 27% in real terms between 1999 and 2003, and from 5.1% to 6.5% as a share of total tax receipts (Figure 3.1). The deflated implicit tax rate (ITR) on energy,[4] which measures taxation per unit of fuel used, also increased sharply, in line with the increases in tax rates and in revenue (Figure 3.2). While the taxation burden on energy increased, that on labour income, measured by the ITR on labour,[5] decreased (although to a much lesser extent), which partly offset the impact on businesses and households. Overall, despite the increase in energy tax revenue (and overall environmentally related tax revenue) until 2003, the tax-to-GDP ratio declined (Figure 3.2).

Estimates indicated that the decrease in social contributions by employers and employees had positive employment and economic effects, of the order of 250 000 jobs and +0.5% of GDP by 2003, compared to a reference scenario without the eco-tax reform

(Görres, 2006; Knigge and Görlach, 2005). Overall, the net cost of the reform to the economy was estimated at EUR 0.3 billion in 2002 and EUR 12 billion in 2003, well below the additional energy tax revenue (EUR 18.7 billion in 2003). The work-intensive service sector benefited from a lower tax burden (Knigge and Görlach, 2005). The net burden, taking into account the value of the revenue recycling of social security contributions and the tax-induced energy efficiency measures, was estimated at below 2% of gross operating

Table 3.1. **Eco-tax reform schedule**

| Tax base | Original tax | Stages of reform | | | | |
|---|---|---|---|---|---|---|
| | | 1999 | 2000 | 2001 | 2002 | 2003 |
| **Electricity** (EUR cents/kWh) | – | 1.02 | 1.28 | 1.54 | 1.8 | 2.05 |
| **Transport fuels** (EUR cents/litre) | | | | | | |
| Diesel | 31.7 | 34.77 | 37.84 | 40.91 | 43.98 | 47.04 |
| Petrol | 50.11 | 53.18 | 56.25 | 59.32 | 62.39 | 65.45 |
| Natural gas | 6 | 7 | 7 | 8 | 8 | 8 |
| Liquid gas | 6 | 7 | 7 | 7 | 8 | 8 |
| **Heating fuels** | | | | | | |
| Light heating oil (EUR cents/litre) | 4.09 | 6.14 | 6.14 | 6.14 | 6.14 | 6.14 |
| Heavy heating oil (EUR cents/kg) | 1.53 | 1.53 | 1.79 | 1.79 | 1.79 | 2.5 |
| Natural gas (EUR cents/kWh) | 0.18 | 0.344 | 0.344 | 0.344 | 0.344 | 0.55 |

*Source:* BMU (2004).

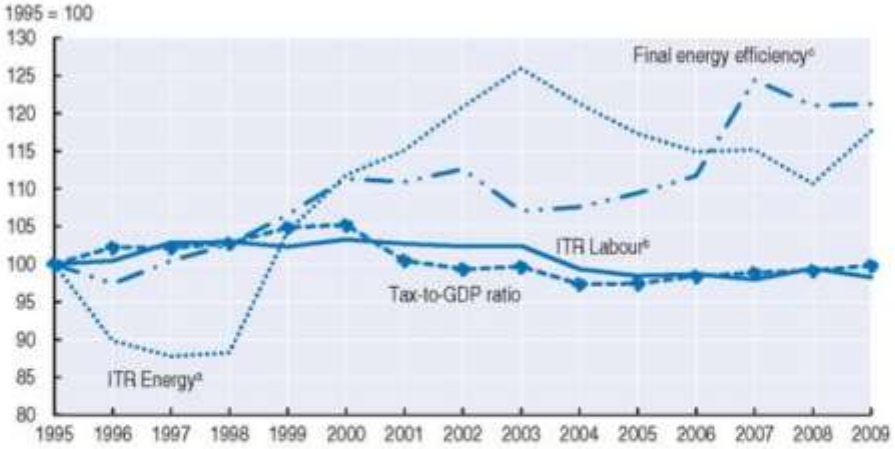
surplus for the most negatively affected sectors (ferrous and non-ferrous metals). Estimates indicated a burden of about 1% of gross operating surplus for other energy-intensive industries such as glass and cement (Andersen *et al.*, 2007).

Between 1999 and 2003, final energy use fell by 8.6% in transport and by 3.5% in the residential sector, possibly due to the incentive provided by the eco-tax reform. On the other hand, energy use in industries, many of which were shielded from the energy tax rise, continued to increase. An analysis by Ecologic and the German Institute for Economic Research (DIW) indicated that the reform helped decrease Germany's $CO_2$ emissions (Chapter 5) and improve the market penetration of energy-saving technologies (Ludewig *et al.*, 2010). Air emissions from transport also decreased partly as a consequence of the reform.

Final energy efficiency (or GDP generated per unit of energy used) improved in the first years of the eco-tax reform implementation, but less than in previous years (Figure 3.2). It returned to the 1999 level in 2003, when tax rate adjustments ended, and rose at a higher rate between 2003 and 2007. The decrease in consumption of the taxed energy products, especially transport fuels, was mainly due to soaring world market oil prices rather than to the energy-saving incentive provided by the eco-tax. Other factors underlying increased energy efficiency include the introduction of HGV road tolls and participation in the EU ETS (Section 3; Chapter 5). The consumption share of diesel, which is taxed at a lower rate than petrol, also grew (see below). All this resulted in a decline of revenue from energy taxation; by 2009, the share of energy taxes in total tax receipts had returned to 1999 levels (Figure 3.1). Overall, the taxation burden on energy use has declined since 2003: the decline of the deflated ITR on energy indicates that revenue from energy taxation decreased faster than final energy consumption, mainly due to the lack of adjustment of tax rates to

inflation and the introduction of further tax exemptions (Figure 3.2).

Figure 3.2. **Implicit tax rates on energy and labour**




*a)* The implicit tax rate (ITR) on energy is the ratio between the revenue from energy taxes (2000 prices) and final energy consumption.

*b)* The ITR on labour is the ratio between the revenue from taxes on labour income and social contributions and overall compensation of employees.

*c)* Final energy efficiency is the ratio between GDP (2000 prices) and total final energy consumption; it is the inverse of final energy intensity.

*Source:* EC (2011), *Taxation trends in the European Union*; OECD-IEA (2011), *Energy Balances of OECD Countries*; OECD (2010), *OECD Economic Outlook No. 88*.

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Some design issues of the eco-tax reform have undermined its cost-effectiveness. First, tax rates do not adequately reflect environmental externalities. They vary by energy source and user group, reflecting concerns about competitiveness and distributive impact rather than cost-effectiveness (Kohlhaas, 2000). For example, when expressed per tonne of carbon, variations of tax rates are often difficult to justify from an environmental perspective (Chapter 5). The eco-tax rates (*i.e.* the additional tax applied to the original excise duties) on fuel oils for heating have usually been lower than the average emission allowance price under the EU ETS, which had hovered around EUR 15-20 per tonne of $CO_2$ for most of the second trading period (since 2008), before plummeting to below EUR 10 in late 2011. Hence, they have not reflected the value of $CO_2$ emissions, let alone that of other environmental externalities such as air pollution generated by fossil fuel combustion.

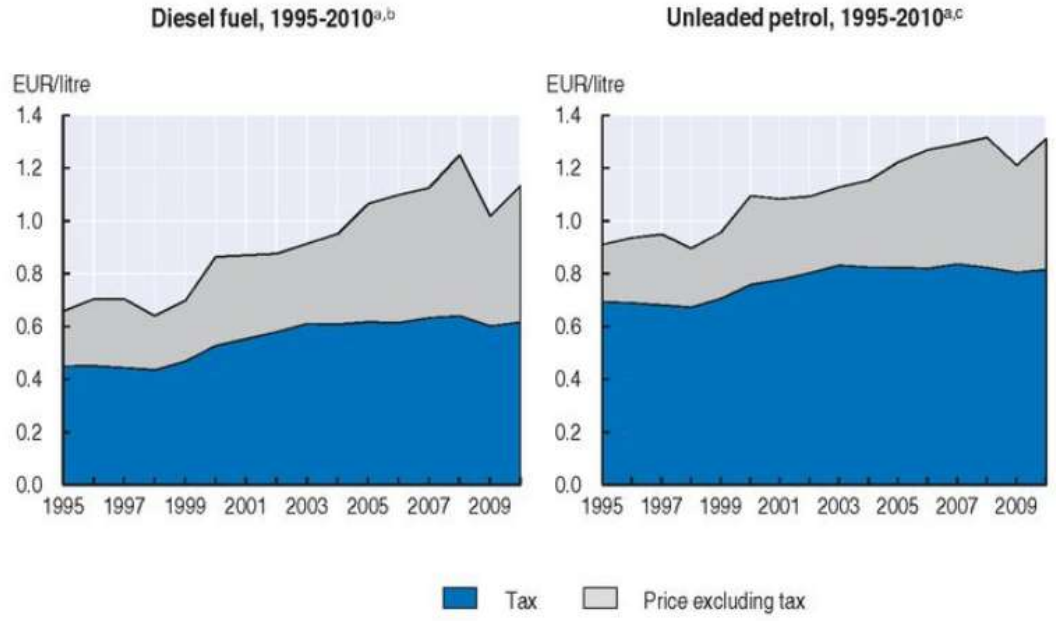
On the other hand, as everywhere in the OECD, fuels for transport are taxed at a much higher level than fuels for stationary combustion. Additional negative externalities related to the transport sector, such as noise, accident and congestion, could justify the higher rates, although excise duties are not well designed to address such externalities. In particular, diesel is taxed less than petrol (Table 3.1), but it has a higher carbon content than petrol, and diesel-powered vehicles generate higher levels of nitrogen oxides and fine particles than comparable petrol-fuelled vehicles. The higher vehicle tax applied to diesel passenger cars is an inadequate substitute for the reduced fuel tax, as shown by the increasing share of diesel cars in the fleet (Section 1.2; Chapter 5). Revenue losses resulting from the favourable tax treatment of diesel are considerable: the Federal Environment Agency (UBA) quantified such losses at EUR 6.6 billion in 2008, or about 13% of the sum of environmentally harmful subsidies as calculated by the agency (UBA, 2011). All this argues in favour of bringing the diesel tax rate at least to the same level as that of petrol, although

concerns about fuel tourism could make this difficult in practice. If diesel-petrol tax parity is achieved, the vehicle tax for diesel cars could be set at the same level as for petrol cars, as suggested by the UBA (Section 1.2). Overall, eco-tax rates should be based at least in part on the $CO_2$ content of the fuel taxed, with the $CO_2$ component made explicit so as to provide a clear price signal.

Another problem with the eco-tax is that its rates have remained virtually unchanged since 2003, undermining its incentive function. Combined with the increase in world market oil prices, this has resulted in a declining share of taxation in fuel prices. For example, after having increased in the early 2000s, the share of taxes in prices decreased from 74% in 2003 to 62% in 2010 for petrol and from 67% to 54% for diesel (Figure 3.3). Nevertheless, the share of taxes in transport fuel prices remains among the highest in the OECD. While the eco-tax rates were initially set at levels too low to induce substantial energy savings, their scheduled increases in the first years of the reform allowed the economy to adjust gradually to the change in relative prices (Kohlhaas, 2000). Continued adjustments would have sent clear price signals and helped maintain the energy tax as a stable revenue source. However, as in many countries, world oil price increases made such adjustments politically difficult. Some form of tax indexing, therefore, merits consideration.

Finally, a number of exemptions and partial derogations were granted to some fuels (notably coal) and economic sectors, mostly agriculture and energy-intensive manufacturing. While some tax exemptions have recently been made less generous, most of them are still in place (Section 2). They have distorted the price signal given by the eco-tax. As a result, existing low-cost abatement options have not been sufficiently

## Figure 3.3. **Road fuel prices and taxes**




*a)* At constant 2005 prices.
*b)* Automotive diesel for non-commercial use.
*c)* Unleaded premium (RON 95)
*Source:* OECD-IEA (2011), *Energy Prices and Taxes.*

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exploited (OECD, 2012). Exempted sectors have tended to postpone the necessary adjustments and investments despite their substantial potential for energy savings. For instance, the energy intensity of industrial production (ratio of industrial energy consumption to industrial production), which decreased moderately during the first years of the eco-tax reform, has declined much more significantly since 2003 with the increase in pre-tax market energy prices. Also, energy use in the agriculture and forestry sectors has increased: in 2009 it was 6% above the 2000 level, while agricultural production increased by 4% in the same period.

Exemptions and tax relief were intended to mitigate the impact of the eco-tax on energy- and capital-intensive sectors (such as chemicals and iron and steel), which could have been hit harder by energy taxation than other sectors and benefited less from cuts in social contributions (Kohlhaas, 2000). While concerns about international competitiveness are legitimate, the risk of reduced competitiveness in some exempted enterprises is likely to have been overstated (OECD, 2012). As the 2012 OECD Economic Survey of Germany suggests, competitiveness concerns need to be addressed by means of payments or refunds that are not proportional to the level of energy consumption, so that incentives for energy savings and emission reductions are maintained (see also Section 2).

### *1.2. Vehicle taxes*

Germany relies less on vehicle taxation than most other OECD countries. Vehicle taxes accounted for about 0.35% of GDP and 1% of total tax revenue in 2009, and have hovered around these levels since 2000. Germany is one of the few European countries that do not apply a tax on vehicle purchase or registration. Instead, an annual motor vehicle tax has long been in place.

Until 2009, the motor vehicle tax was based on vehicles' cylinder capacity and emissions according to Euro standards, with higher rates for diesel-powered vehicles and

those without particle filters. However, the average engine size of newly registered passenger cars continued to increase. Cars in Germany tend to be bigger and more powerful than in many other European countries. There has been only a marginal shift of the fleet towards smaller vehicles. This phenomenon is linked to the relatively low level of taxation and tax differentiation across car types, as well as to the large number of company cars, which tend to be larger and to have above-average fuel consumption (Kalinowska *et al.*, 2009; UBA, 2011; see also Section 2). Also, the share of diesel cars in sales has steadily increased, from 30% in 2000 to 44% in 2008 (ACEA, n.d.). It is therefore likely that fuel taxes and prices influenced vehicle purchase decisions more than vehicle taxes. Still, the shift to diesel cars, along with technology advances, helped improve the fuel efficiency of the fleet and reduce greenhouse gas (GHG) emissions from road transport, even if the vehicles were bigger (Chapter 5). The Euro vehicle standards helped reduce new cars' average emissions of local air pollutants and overall transport-related emissions (Chapter 1). In addition, a subsidy for retrofitting in-use diesel cars with particulate filters has been granted since 2006 and contributed to the retrofitting of about 500 000 cars in 2007-09 (BMU, 2010).[6] This incentive was extended to light commercial vehicles in 2010 and relaunched in 2012.

In July 2009, the annual motor vehicle tax was restructured to include a $CO_2$ component in addition to cylinder capacity, with the aim of reducing per-vehicle $CO_2$ emissions. The $CO_2$ tax is proportional to emissions (above a certain threshold).[7] In line with recommended practice, the $CO_2$ component of the tax is not differentiated according to fuel type, but the cylinder capacity part is nearly five times higher for diesel vehicles than for petrol vehicles because the former have a greater impact on local air pollution.[8]

The $CO_2$-based differentiation of vehicle taxation can provide car owners with an incentive to choose low $CO_2$ emission vehicles, thereby affecting fleet composition. In addition, recurrent taxes, such as the German annual vehicle tax, can, in principle, provide stronger incentives to change cars, since they must be paid annually rather than only at the moment of purchase (OECD, 2009a). While evidence to this effect is limited,[9] Vance and Mehlin (2009) found that German car owners take into account the lifetime costs of car ownership and use in their car purchasing decisions, implying that annual vehicle taxes, and even more so fuel costs (and taxes), significantly affect the composition of the car fleet. However, taxes on vehicle ownership are theoretically less efficient than fuel taxes and road charges in reducing GHG and air pollutant emissions since they are more removed from actual vehicle use.

OECD analysis suggests that in many countries the incentive to abate $CO_2$ emissions that is implicit in vehicle taxation is disproportionally strong compared to incentives provided in other sectors of the economy (*e.g.* those covered by the EU ETS). In this respect, the implicit incentive provided by Germany's vehicle taxation appears to be more balanced than those in many other OECD countries (OECD, 2009b).[10] However, it also appears to be

relatively weak. For instance, the motor vehicle tax decreased on average through the reform (Ludewig *et al.*, 2010). The absolute amount of the vehicle tax remains small compared to the total cost of vehicle ownership and use, ranging from 1% to 5%. Furthermore, the $CO_2$-related component accounts for a relatively low share of the tax and, while the tax differential across vehicle categories is higher under the new system, it remains among the lowest applied in European countries (Kalinowska *et al.*, 2009). Vehicles registered before the tax reform remain subject to the old annual tax until 2013, which may also undermine the incentive to change cars.

It is too early to assess the impact of the new tax, especially because car sales in 2009-11 were heavily influenced by the economic crisis and the car scrapping incentive launched in 2009 as part of the stimulus package (Section 5.1). The car scrapping programme led to a shift towards smaller and less powerful cars, although this trend was quickly reversed as soon as the subsidy was removed. While these effects are typical of such incentive programmes, the shift back to bigger and more powerful cars in 2010 (ACEA, n.d.) was swifter than in other countries with similar programmes (Box 3.1). This fact suggests that the new $CO_2$-based vehicle tax rates are too low to provide an incentive

towards smaller, more fuel-efficient vehicles. This could be addressed by adjusting the rates of the annual tax and complementing it with a moderate registration or purchase tax also based on $CO_2$ emission performance.

### Box 3.1. **The 2009 car scrapping programme**

The automobile industry plays a very significant role in the German economy. In 2010, it accounted for more than 20% of the total turnover, and 14% of the employment, of German industry (VDA, 2011). The industry was expected to suffer heavily from the global economic crisis in relation to both domestic and external demand. In the last quarter of 2008, sales of passenger cars dropped by 11% on a year-to-year basis (IHS, 2010). As part of its fiscal stimulus package, in 2009 the government launched a car scrapping programme with the objective of stabilising the German automobile industry's production and employment. The programme granted a fixed payment of EUR 2 500 to any private consumer who purchased a new or used car (up to 14 months old) to replace a car over nine years old. The only environmental requirement was that the purchased vehicles should at least comply with the Euro 4 emission standard; however, this requirement had been mandatory for all new car registrations in the EU since 2005. Nevertheless, the programme was named *Umweltprämie* (eco-premium) to emphasise the expected positive side-effects of fleet renewal on GHG and air pollutant emissions (IHS, 2010). The programme budget was EUR 5 billion, enough to support the purchase of 2 million cars. In addition, a vehicle tax rebate was granted for new vehicles meeting Euro 5 or Euro 6 standards.

The programme was effective in supporting short-term demand for new cars: new registrations from January to November 2009 were 25% higher than in the same period of the previous year, boosting GDP by 0.15% (IHS, 2010). The programme spurred renewal of the car fleet: vehicles scrapped were more than 14 years old, on average. There was also a shift towards smaller cars, although sales of middle-size cars also increased. For the first time in 15 years, the average engine size and power output of cars sold in Germany sharply decreased, as did the share of newly registered diesel cars. Due to the fixed payment, the scrapping incentive favoured demand for small, cheaper cars; in addition, sales of company cars (which tend to be larger and diesel-powered) dropped because they did not benefit from the subsidy. These trends were reversed in 2010 with the phase-out of the subsidy, as had been expected, but the reversal was swifter than in other countries that implemented similar programmes, such as France and Italy (ACEA, n.d.).

About 98% of the scrapped cars were in compliance with the Euro 2 emission standard or below. Average carbon efficiency of new registered cars also improved, reaching 155 g $CO_2$/km, compared to 160 g $CO_2$/km in a business-as-usual scenario (IHS, 2010). Hence, the

programme helped reduce $CO_2$ and air pollutant emissions on a per-vehicle basis. Estimates of total $CO_2$ emission savings vary widely. IHS (2010) estimates 540 kt $CO_2$ saved in 2009 (equivalent to 0.35% of $CO_2$ emissions from transport in 2009 or to 88% of the emission reduction in the transport sector in 2009) and 351 kt $CO_2$ in 2010. ITF (2011) estimates a lower impact in 2010 (66 kt $CO_2$ saved or 0.04% of 2009 transport emissions) and a cumulative impact of a 200 kt $CO_2$ emission reduction to 2030. According to the latter analysis, more lighter and smaller vehicles were scrapped and traded in for medium-sized vehicles than *vice versa*, even though the number of new small cars purchased was above the average of previous years. This reduced the total positive impact. The cost-effectiveness of the programme in achieving the quantified $CO_2$, $NO_x$ and safety benefits is modest: the benefits represent only around 25% of the estimated cost. The introduction of a $CO_2$ emission or fuel efficiency requirement, as in the French and US programmes, would have helped increase cost-effectiveness.

Overall, the scrapping programme had some positive stimulus and spillover effects. However, as in other countries with similar programmes, from a medium- and long-term perspective, the economic and environmental benefits were limited (Pollit, 2011). The main effect of scrapping incentives is to advance car purchases, which often results in lower than average sales in future years, once the programme is phased out. Such programmes create market distortions that can prevent necessary structural adjustments and discriminate among manufacturing sectors and consumers, for instance to the disadvantage of low-income households that cannot afford new cars. From an environmental perspective, such programmes are not a cost-effective way to reduce GHG and air pollutant emissions; in addition, the environmental impact over the whole lifecycle of a vehicle should be considered, including, for example, increased demand for steel and disposal of end-of-life vehicles (OECD, 2010a).

## 2. Removing environmentally perverse incentives

Germany spends large amounts on support measures that have a potentially negative impact on the environment. The UBA, which regularly reviews federal subsidies, estimates that in 2008, EUR 48 billion (1.9% of GDP) in subsidies had negative primary or secondary effects on the environment (Table 3.2).[11] This is comparable to the revenue from energy taxes. Many long-time subsidies are no longer justified on economic or social grounds (UBA, 2011). In general, they contravene the polluter-pays and user-pays principles, distort competition, lock in inefficient technology and lead to inefficient allocation of resources. As direct transfers or various forms of tax breaks, subsidies weigh on current public finances, and can entail additional future expenditure to remediate the potential environmental and health damage. Germany's public finances, and the cost-effectiveness of its environmental policy, would greatly benefit from the reform of support measures with perverse effects. A systematic screening of existing and proposed subsidies against their potential environmental impact could facilitate such reform.

Table 3.2. **Environmentally harmful subsidies in Germany, 2008**

| Sector | Environmental asset | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | EUR million | Climate | Air | Water | Soil | Biodiversity and landscape | Health | Resources |
| **1. Energy supply and use** | | | | | | | | |
| Reductions in electricity and energy taxes for manufacturing, agriculture and forestry | 2 415 | * | * | ** | ** | ** | * | * |
| Peak equalisation regime for eco-tax in the manufacturing sector | 1 962 | * | * | ** | ** | ** | * | * |
| Tax reduction for certain energy-intensive processes and techniques | 886 | * | * | ** | ** | ** | * | * |
| Coal subsidies | 2 454 | * | * | * | * | ** | * | * |
| Privileges for the lignite industry | min. 195 | * | * | * | * | * | * | * |
| Energy tax reductions for coal | 154 | * | * | ** | ** | ** | * | * |
| Manufacturer privilege for producers of energy products | 270 | * | * | ** | ** | ** | * | * |
| Energy tax exemption for non-energy uses of fossil fuels | min. 1 600 | ** | ** | ** | ** | ** | ** | * |
| Free allocation of $CO_2$ emission trading allowances | 7 783 | * | * | ** | ** | ** | * | * |
| Subsidies for nuclear power | n.q. | ** | ** | ** | ** | ** | * | * |
| **2. Transport** | | | | | | | | |
| Energy tax reduction for diesel fuel | 6 633 | * | * | ** | ** | ** | * | * |
| Distance-based income tax deduction for commuters | 4 350 | * | * | ** | * | * | * | * |
| Exemption of kerosene from energy tax | 7 232 | * | * | ** | ** | ** | * | * |
| Energy tax exemption for inland waterway transport | 118 | * | * | ** | ** | ** | * | * |
| VAT exemption for international flights | 4 237 | * | * | ** | ** | ** | * | * |
| Flat-rate taxation of privately used company cars | 500 | * | * | ** | * | * | * | * |
| Tax exemption for biofuels | n.q. | * | ** | * | * | * | ** | ** |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **3. Construction and housing** | | | | | | | | |
| Home ownership grant | 6 223 | ** | ** | * | * | * | ** | * |
| Promotion of saving for building purposes | 467 | ** | ** | * | * | * | ** | * |
| Promotion of social housing | 518 | ** | ** | * | * | * | ** | * |
| Joint agreement for the improvement of regional economic structures | n.q. | ** | ** | * | * | * | ** | * |
| **4. Agriculture, forestry, fisheries** | | | | | | | | |
| EU agricultural subsidies | n.q. | * | ** | * | * | * | ** | ** |
| Joint agreement for the improvement of agricultural structures and coastal protection | n.q. | * | ** | * | * | * | ** | ** |
| Tax rebate for agricultural diesel | 135 | * | * | ** | ** | ** | * | * |
| Exemption of agricultural vehicles from vehicle road tax | 55 | ** | ** | ** | * | ** | ** | ** |
| Subsidies for production of spirits | 80 | * | ** | * | * | * | ** | ** |
| EU fishery subsidies | n.q. | * | ** | * | * | * | ** | ** |
| **Total** | **48 267** | | | | | | | |

n.q.: not quantifiable; *: Primary effects; **: Secondary effects.
*Source:* UBA (2011).

## 2.1. *Energy subsidies*

Support to production and consumption of fossil fuels accounts for a large part of environmentally harmful subsidies. For 2008, estimates vary between EUR 7.5 billion and EUR 24 billion, depending on the methodology used and the kind of subsidies included (OECD, 2011b; UBA, 2011).[12] Much of this support goes to energy-intensive sectors and coal, often in the form of tax exemptions, such as the exemptions from the eco-tax (Section 1.1).

In particular, coal is virtually tax-free, and tax rates are reduced for heating fuels. As in many other countries, aviation fuel is also exempt, though the government introduced an air travel tax in 2011 (Section 1.1). Under the so-called peak equalisation regime, many energy-intensive manufacturing sectors and those exposed to international competition benefit from a 90% refund of the eco-tax payment that exceeds the relief on social contributions. Exemptions were further extended in 2006 so that specific energy-intensive processes in the steel and chemical sectors are totally exempt from energy taxation (OECD, 2011b). In addition, the manufacturing, agriculture and forestry sectors pay reduced rates on electricity and heating fuels. In many cases, these exemptions are granted to businesses that are not exposed to strong international competition (UBA, 2011). Such tax benefits reduce energy prices, thereby encouraging energy use and reducing incentives to adopt energy-efficient technology, with negative implications for GHG emissions. Also, they distort competition among energy sources and can favour the use of dirtier fuels.

Some tax exemptions have recently been made less generous (OECD, 2012). For example, the German fiscal consolidation package for 2011-14 includes the reduction of some eco-tax and energy tax exemptions.[13] Relief for energy-intensive firms will be conditioned on investments in energy savings from 2013 onwards. However, many of these exemptions remain unjustifiable on economic grounds and should be phased out. Tax breaks should only be used to avoid double taxation/pricing. For example, companies participating in the EU ETS face a carbon price and should not be subject to the part of the eco-tax or energy tax that is clearly referable to $CO_2$ emissions (Chapter 5). If needed to preserve industry competitiveness, the tax benefits could be replaced by better targeted public support, ideally linked to energy savings (OECD, 2012).

Coal production is supported through direct subsidies covering the difference between production costs and the world market price of coal exports. Germany has made progress in cutting these subsidies with a view to gradually phasing them out by 2018. Subsidies to hard-coal mining fell from EUR 4.9 billion in 1999 to EUR 2.1 billion in 2009 (OECD, 2011b). Yet coal subsidies, including the support for coal use, remain substantial and run contrary to Germany's ambitious climate change policy (Chapter 5). As the OECD (2012) suggests, Germany should consider accelerating the phase-out of coal subsidies and use active labour market policies to facilitate labour mobility and promote employment in traditional mining regions.

Since 2007, Germany has promoted the use of biofuels through mandatory blending quotas and with partial tax exemptions for first-generation biofuels and total exemptions for second-generation ones. This kind of support is common to many other European countries. It has led to dramatic growth in biofuel consumption and helped reduce GHG emissions from road transport. However, the cost of abating a tonne of $CO_2$ by using biofuels is considerably higher than that of other abatement measures (Chapter 5). The tax revenue loss alone cost the budget EUR 580 million in 2008 (UBA, 2011). Nor does this take account of the cost associated with potential environmental damage to land and water linked to biofuel production (Table 3.2). Biofuel sustainability criteria have been in force in Germany since 2011, but it is too early to assess their impact.

### *2.2. Vehicle use*

The tax treatment of personal road transport tends to encourage car use over public transport, as does the lack of tolls for passenger cars on German highways (Section 3). Company cars used for private purposes are taxed at a flat, low rate (1%), encouraging

employers to pay their employees partly in the form of a car. As a result, in 2008 30% of new car registrations in Germany were company cars, which tend to be bigger, more powerful and more polluting (UBA, 2011). This tax treatment should be made less advantageous and possibly differentiated on the basis of vehicles' $CO_2$ emission levels. Distance-based income tax deductions for commuters also promote use of cars and encourage workers to live further away from their place of work. Germany is one of the few European countries to have such a system in place. In addition to its cost for the public budget (Table 3.2), it is estimated that this system will account for 2 million tonnes of $CO_2$ emissions by 2015 (UBA, 2011). This concession should be revised by making the allowance not conditional on distance driven and/or linking it to environmental criteria (*e.g.* car fuel efficiency).

### *2.3. Housing and construction*

Germany has traditionally supported the housing sector and home ownership through various subsidies (Table 3.2). Progress has been made in reducing these. In particular, the home ownership grant, a direct transfer to new homeowners, will be completely phased out by 2013. The subsidies have contributed to urban sprawl and to increasing land-take for settlement and transport infrastructure, with negative consequences for resource and energy use as well as traffic flows. Substantially reducing the conversion of undeveloped land for housing and transport is an objective in the National Sustainable Development Strategy. Germany should consider making any remaining support to home ownership and social housing conditional on environmental parameters, such as energy efficiency or use of existing buildings and built-up areas. The property tax could also be restructured to reflect environment-related criteria.

### 2.4. Agriculture and fisheries

Support to agriculture in Germany follows the rules of the EU Common Agricultural Policy. Support to EU farmers, as measured by the OECD Producer Support Estimate, declined from 33% of farm receipts in 2000-02 to 23% in 2007-09, broadly in line with the OECD average. Direct aid to farmers has been progressively untied from agricultural production and input use by shifting from production- to area-based subsidies (Single Farm Payment under Pillar 1): 44% of EU support to farmers in 2007-09 was based on output and input quantities, the forms of support that most encourage production, compared to about 65% in 2000-02. In particular, Germany adopted "compulsory modulation", *i.e.* cutting direct payments by 3% (2005), 4% (2006) and 5% from 2007 to 2012 and channelling the funds into subsidy programmes for the development of rural areas (including the agro-environmental programmes). Direct aid to farmers is also conditional on meeting environmental standards (cross-compliance) and adopting good farming practices (defined as levels of environmental quality to be achieved at farmers' own expense). Yet there are cases where support to farmers is linked to production and thus can negatively affect the environment. For example, in 2008 German companies received about EUR 100 million from the EU to export surplus agricultural products (UBA, 2011).[14] These subsidies are to be phased out by 2013. German farmers also benefit from reductions in input costs, with implications for the environment. These include tax concessions on diesel used in agriculture and vehicle tax exemptions for farm vehicles (Table 3.2). These benefits should be reviewed in the framework of a broader review of energy subsidies (Section 2.1).

The EU Common Fisheries Policy provides the framework for German support to fisheries. Government financial transfers to the fishing industry continued to decline in

recent years. They averaged about EUR 9 million per year in 2005-07, or about 3.5% of the value of the total catch from capture fisheries, well below the EU average. Direct aid to fishermen represented a minor part of total support to fisheries (OECD, 2010b). Like other EU countries, Germany provides subsidies to fishermen for fleet reduction (scrapping of vessels) and renewal of existing vessels, *e.g.* to improve safety and working conditions, promote use of more selective and environment-friendly gear and increase fuel efficiency. Aid is not linked to production or to investment in new vessels, which have the greatest potential to reduce fish stocks. Nevertheless, as in other EU countries, productivity gains due to renewal and modernisation of the fleet are likely to have offset measures to limit fishing efforts (OECD, 2011c).

## 3. Extending the use of pricing mechanisms

Germany has made progress in using non-tax pricing mechanisms to encourage more environmentally friendly behaviour and to recover the cost of water, waste and transport infrastructure (Section 5).

A significant change in Germany's approach to climate change mitigation, traditionally based on regulatory and voluntary instruments and financial assistance, was the launch of the EU ETS in 2005. It covers about 60% of total $CO_2$ emissions. A number of issues linked to the design of the EU ETS have been identified and will be addressed, to some extent, in the trading period starting in 2013. A key challenge for Germany is combining energy taxation (Section 1.1) and the EU ETS to provide a clear price signal across the economy. Currently, there are areas of the economy that do not face a price signal and others that are subject to double regulation. The interaction between the EU ETS and the feed-in tariffs for electricity generation from renewables should also be taken into

account. When a carbon price exists, applying other policy tools can lead to overlap and undermine cost-effectiveness. These issues are analysed in more detail in Chapter 5.

In 2005, Germany launched an electronic toll system for heavy goods vehicles (HGVs) on the national highway network. Proceeds are used to finance road infrastructure. However, light-duty vehicles and passenger cars are not subject to the system; in practice, they are exempted from paying the costs of using road infrastructure, including the environmental costs. The toll is based on driving distance, number of axles and the vehicle's emission category. In 2009, the toll was raised and made more dependent on vehicle emission levels. This emission- and distance-based toll has provided incentives to renew the vehicle fleet towards less polluting HGVs and to improve efficiency of freight transport (*e.g.* better load factors) (Gustaffson *et al.*, 2007). Just in the first year after its introduction, the share of freight mileage accounted for by low-emission HGVs rose from 1% to 6%, with a corresponding reduction in distance driven by high-emission HGVs (Erdmenger *et al.*, 2010). A shift from road to rail has also been observed, although it was mainly triggered by fuel price rises (Gustaffson *et al.*, 2007; see also Figure 5.7). As some traffic diverted to toll-free roads, the system was extended to a few national roads. All this has helped reduce GHG and air pollutant emissions from transport (Chapters 1 and 5). Given the results achieved, extending the toll to roads other than highways and to all freight and passenger vehicles should be considered.

The polluter-pays principle is well anchored in municipal waste management. Waste charging systems have been used throughout the country for about two decades. They have helped reduce waste generation and increase recycling rates (Chapter 1). The systems

vary among municipalities, many of which apply fixed waste fees. There is room to further develop weight-based charging systems to promote waste minimisation. Hybrid systems, composed of a small fixed fee for the service provided and a variable fee depending on the amount collected, have proved the most effective in ensuring both environmental (waste reduction) and economic (revenue stability) benefits (Schlegelmilch *et al.*, 2010). Deposit-refund systems are also in place for some beverage containers. While the use of economic instruments is well established for municipal waste management, it is much less so for the management of other waste streams. Such instruments could help German waste management move up the waste hierarchy and provide better incentives for preventing and reducing waste generation. For example, a tax on primary construction materials, as applied in the UK, could strengthen incentives for recovery of secondary materials.

Germany's long-standing water pricing policy has been effective in reducing water demand (Chapter 1). While unit water tariffs paid by German households are relatively high, annual domestic water bills are comparable with those in other OECD countries (Box 3.2). However, there has been criticism that tariffs have been set in a non-transparent manner, which may have led to overcharging of consumers and inefficiency in utility operations. Household water use (including water used in small enterprises) declined from 129 litres per capita per day in 2000 to 122 litres per capita per day in 2009. This is one of the lowest per capita water consumption rates among OECD countries, though there are sizable differences between western and eastern *Länder*. Paradoxically, the lower water consumption, also due to demographic changes, has negatively affected water supply infrastructure, which was built on the basis of forecasts of higher water use.[15]

Wastewater charges are imposed on all direct discharges by local authorities (as operators of public wastewater treatment facilities) and by industrial and domestic wastewater treatment installations. Levies are based on effluent pollution level, expressed

in units of toxicity. They are collected at *Land* level and proceeds are used to finance the preservation and improvement of water quality. The existing wastewater charges could be made more effective by adjusting their scope and level, however. Final customers' water bills also include wastewater fees to cover the cost of operating and maintaining wastewater treatment facilities. About 10% of utilities charge a fixed annual amount. In other cases, the wastewater fee is based on freshwater consumption and quality. A distinction between freshwater and precipitation water may also be made. On average, in 2010, consumers paid EUR 116 for wastewater treatment (BDEW, 2010). These charges, already in place for several decades, together with modernisation and construction of municipal and industrial wastewater treatment plants, have contributed to significantly reducing water pollution (Chapter 1).

Other than charges in the water sector, Germany has made little progress in using economic instruments for biodiversity conservation and sustainable use. Experience with payments for ecosystem services (PES) has been essentially limited to the so-called Natura 2000 payments provided for by the EU Common Agricultural Policy.[16] In line with the 2004 OECD Council Recommendation on the Use of Economic Instruments in Promoting the Conservation and Sustainable Use of Biodiversity, further consideration should be given to expanding the use of PES and other market-based instruments, as they can provide potentially large gains in cost-effectiveness compared to indirect payments or regulatory approaches (OECD, 2010c).

### Box 3.2. **Water pricing**

The majority of households (97%) pay a two-component tariff for drinking water supply: a basic monthly charge (EUR 5.13 on average) designed to cover the fixed costs of maintaining the infrastructure, and a consumption-based charge (EUR 1.6 per cubic metre, excluding taxes), which is relatively high by OECD standards. Tariff levels vary by municipality. After substantial increases in the early 1990s (*e.g.* 11.7% in 1992-93), the rate of tariff increase was much slower between 2000 and 2010, at around 1.2% per year, and generally below the inflation rate. On average, in 2010, consumers paid EUR 82 per year for drinking water supply. Taxes and levies account for about 21% of drinking water prices, which is high compared, for example, to France and the United Kingdom.

In 11 out of 16 *Länder,* a resource fee is applied for groundwater abstraction for various purposes, such as drinking water, irrigation, mine draining, cooling and industrial use. The fee for abstraction for public water supply ranges from EUR 0.02 per cubic metre in Saxony to EUR 0.31 per cubic metre in Berlin. Utilities pass on this fee to consumers. The fee generates revenue of EUR 200 million to EUR 400 million per year, which is earmarked in some *Länder* for water management measures. In eight *Länder,* a fee is also applied for withdrawal of surface water.

About 99% of the capital and operational costs for drinking water, and 96% for wastewater treatment, are directly borne by consumers. The cost of water supply, including the fixed cost of the capital-intensive, high-quality infrastructure, has to be covered by fewer cubic metres of water sold than in many countries. This means German households pay relatively high unit tariffs, though annual domestic water bills are lower than in neighbouring countries.

*Source:* BDEW (2010).

## 5. Investing in the environment to promote economic growth

### 5.1. *Environment-related components of the stimulus and consolidation packages*

Responding to the global economic and financial crisis, Germany introduced discretionary measures in November 2008 and February 2009. The combined fiscal package amounted to EUR 80 billion or 3% of 2008 GDP, less than the G7 average of 3.6%. Equal priority was given to tax cuts (equivalent to 1.6% of GDP, concentrated on personal income taxes) and spending measures (about 1.4% of GDP, mostly investment programmes) (OECD, 2009c). Environment-related measures were estimated at 13% of the total recovery package (Table 3.3).

Table 3.3. **Environment-related components of the recovery package**

| Measure | Description | Budget |
|---|---|---|
| Housing refurbishment | Funding for energy efficiency measures in buildings | EUR 3.3 billion |
| Green tax reduction | R&D targeting alternative mobility concepts (especially electro-mobility) | EUR 500 million |
| Car scrapping | Car scrapping programme | EUR 5 billion |
| Green tax reduction II | Revision of the tax on passenger cars (from 1 July 2009): new calculation based on $CO_2$ emissions | EUR 1.8 billion |
| Total | | EUR 10.6 billion |

Source: Pollitt (2011).

Overall, the green part of the German stimulus package was relatively large, averaging EUR 129 per capita. It clearly targeted sectors that were particularly affected by the recession, including vehicles, engineering and construction. Assessments indicate that the measures likely saved or created a significant number of jobs (Pollitt, 2011). The increase in GDP was assessed as much larger than the stimulus package due to the co-financing involved in the car scrapping programme, which effectively converted savings to spending. However, the impact was short term and private consumption contracted at the end of the programme. The development and diffusion of efficient vehicles had a longer-term objective. The investment in energy efficiency in public buildings will have taken slightly longer to implement but still had an impact on rates of economic activity.

Environmental outcomes of the car scrapping programme are unclear as the fleet would have been renewed anyway (Box 3.1). Changes in vehicle taxation could have more lasting effects and R&D is expected to provide efficiency gains after 2020. The improvements to efficiency in public buildings should provide steady and permanent reductions in energy consumption.

Crisis-related revenue shortfalls and recovery measures have resulted in serious deterioration of the fiscal position: the general government budget shifted from being in balance in 2008 to showing a deficit of more than 3% of GDP in 2009. However, the fiscal situation improved rapidly due to both structural and cyclical factors. In 2011, the government started implementing a consolidation package of around EUR 80 billion

to 2014. On the expenditure side, the bulk of the retrenchment effort will concentrate on social and family benefits and cost savings in the public sector. Importantly, the additional expenditure on education and R&D investment (around 0.5% of GDP from 2010 to 2013) is exempt from cuts (EC, 2011b). Tax measures include the reduction of energy tax relief and the introduction of an air travel tax (Section 1).

### 5.2. *Pollution abatement and control and environment-related expenditure and financing*

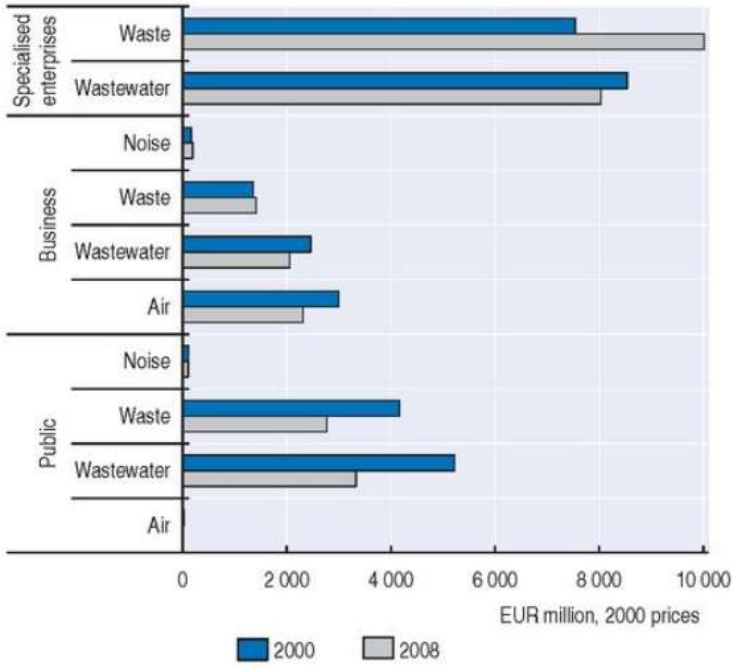
Since 2000, pollution abatement and control expenditure[21] has slightly decreased in constant prices, implying a sharper decline in its share of GDP, which indeed went from 1.6% to 1.3% over 2000-08. The decrease was observed in both the public and business sectors, and in all environmental domains except waste and noise. In contrast, operating expenditure of specialised enterprises has risen significantly, in particular for provision of waste services. This reflects increasing use of subcontractors to provide environmental services as well as rising spending to maintain the infrastructure installed over the past two decades. Overall, wastewater treatment and waste management remain the biggest items of expenditure, although the business sector continues to have relatively high spending on air protection (Figure 3.4).

Investment in public water supply decreased by more than 20% over 2000-10 because the need for network improvement declined once water infrastructure in the eastern *Länder* converged with that in their western counterparts. Over the decade, the German water sector underwent important reform, leading to increased efficiency and enhanced private sector participation: in 2008, about 60% of services were provided by private companies. Almost the full cost of water supply and wastewater treatment services is directly borne by consumers, as required by the EU Water Framework Directive (ATT *et al.*, 2011; see also Box 3.2).

The waste management sector is generally governed by the polluter-pays principle. Implementation of producer responsibility programmes shifted the financial responsibility for waste management from local governments to industry, then consumers (Section 3). Despite differentiated VAT treatment between the public and private sectors in the provision of environmental services, private sector participation in waste management services has expanded over the past decade. It now represents about 65% of municipal waste management companies. Some waste management facilities have been built by private companies or in public-private partnerships.

As German environmental policy was shifting from traditional domains to more global issues like climate change, the government amended the Environmental Statistics Act to

Figure 3.4. **Pollution abatement and control expenditure by sector and domain, 2000 and 2008**



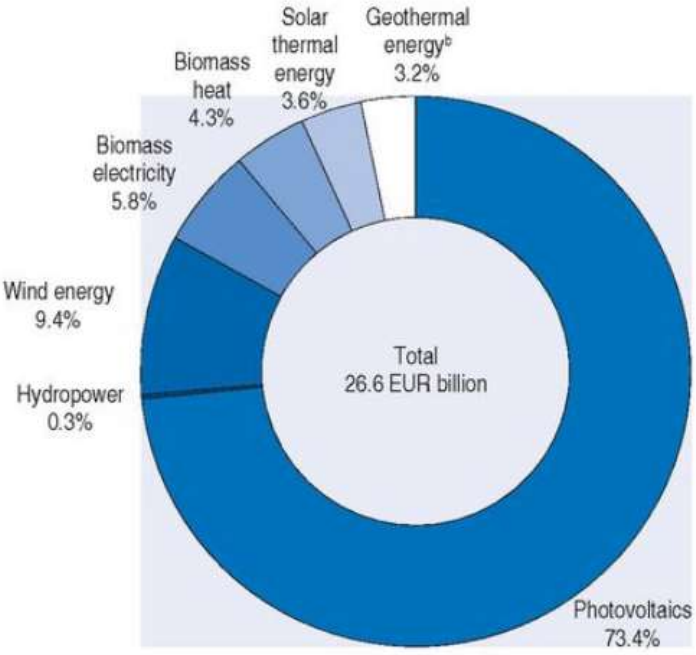

*Source:* Federal Statistical Office.

StatLink http://dx.doi.org/10.1787/888932591805

monitor related expenditure. This change was also motivated by the need to capture integrated technologies in addition to end-of-pipe investment. According to the Federal Statistical Office, industries, mostly in the energy sector, invested EUR 1.6 billion in climate protection in 2009, of which 39% was in GHG emission prevention and reduction, 36% in energy efficiency improvement and 25% in renewable energy sources (Federal Statistical Office, 2011a). However, this figure excludes investment by the construction sector for building renewables facilities and renovating buildings. When these activities are considered together with trade, commerce and household spending, investment in the construction of renewables installations totalled nearly EUR 27 billion in 2010 (Figure 3.5), almost three times the 2000 level (BMU, 2011a).

The most important mechanism for financing renewables development is the programme of feed-in tariffs, in use for 20 years (Kalamova *et al.*, 2011) (Chapters 4 and 5). The cost of the system is passed on to end-users through the so-called EEG surcharge on the electricity price. Between 2000 and 2010, the cost of the feed-in tariff programme amounted to EUR 46 billion (in 2010 prices).[22] In addition, the government has made extensive use of direct financial transfers in the form of investment grants and soft loans to finance environmental and climate protection (Boxes 5.4 and 5.5). KfW, the state-owned bank, has played an important role in this effort. In 2010, the volume of its activity for domestic environmental and climate protection reached nearly EUR 21 billion. Of this total, EUR 9 billion was spent on renewables and another EUR 9 billion on energy-efficient construction and modernisation (KfW, 2010).

Figure 3.5. **Investment in domestic construction of renewable energy installations,[a] 2010**



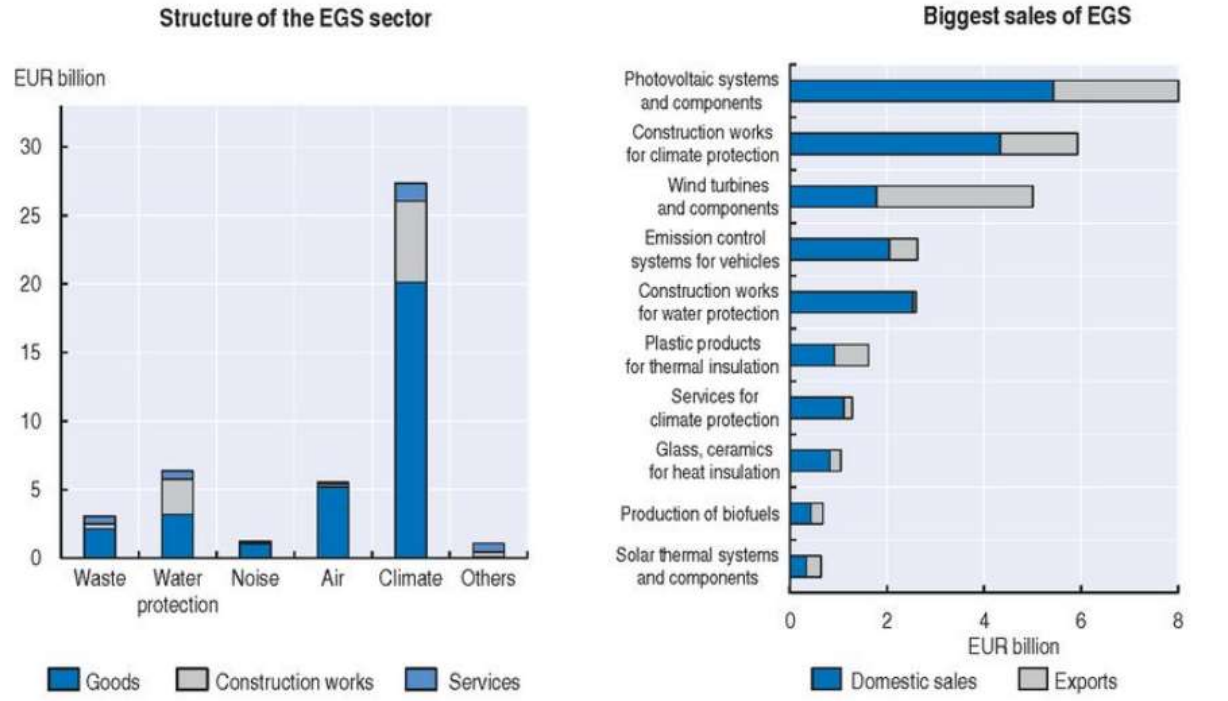

a) Includes construction of new installations and, to a smaller extent, expansion or refurbishment of installations, such as the reactivation of hydropower plants; includes investments by energy supply companies, industry, trade, commerce and private households.
b) Large installations and heat pumps.
*Source:* BMU (2011), *Renewable Energy Sources in Figures*.

## 6. Environmental goods and services

The Federal Statistical Office has collected information on the environmental goods and services (EGS) sector since 1997 (Federal Statistical Office, 2011b). Originally, the definition covered goods, construction operations and services aiming at avoiding, reducing or remediating damage to the environment caused by production and consumption. The environmental domains involved were waste management, water protection, noise abatement, air quality control, nature and landscape conservation, and soil decontamination. In 2006, a climate protection category was introduced in the survey and the definition of "environmental protection" was broadened to include resource conservation and renewables.

The Federal Statistical Office reported that turnover in the EGS sector totalled EUR 44.6 billion in 2009 (about 1.9% of GDP), nearly twice the 2006 level. Two-thirds of products and services in the sector were sold in Germany and one-third was exported. Goods accounted for 71% of the sector's sales, followed by construction (21%) and environmental services (7%) (Figure 3.6). Climate protection turnover far exceeded that in other categories, driven by a boom related to renewables. Manufacturing industries were the dominant producers of environmental goods for climate protection, including photovoltaic systems, wind turbines, control systems for vehicles and insulation products. Renewables facilities generated the major part of revenue from construction work for environmental protection, followed by installations for wastewater treatment. Waste management and water protection each accounted for slightly less than 20% of sales of environmental services, compared with 40% for climate protection services.

Figure 3.6. **Turnover in the environmental goods and services sector, 2009**




*Source:* Federal Statistical Office.

StatLink http://dx.doi.org/10.1787/888932591824

The cross-cutting nature of the industry and related statistical problems has resulted in significant differences among estimates of the impact of the EGS sector on the economy (OECD, 2011d). The question is particularly relevant as the growth of this sector is an important factor in discussions about support for development of renewables. While the Federal Statistical Office collects information on the EGS sector as described above, the BMU investigates how to assess the market size of a more broadly defined industry. Although there are good reasons to measure activities with environmental benefits outside the internationally defined EGS sector (such as water supply, ecotourism, energy and resource savings from information technology, and goods and services which have not been produced for environmental purposes but have a favourable impact on the environment), improving the methodological link between the various national sources would help improve the credibility of the information. The BMU reported that turnover of a broadly defined environmental technology services sector amounted to EUR 123 billion in 2008, or 5% of GDP (compared with the Federal Statistical Office estimates of EUR 44.6 billion in 2009, and about 1.9% of GDP). The BMU analysis suggests that the market volume could grow by an average of around 7.7% annually to reach EUR 300 billion by 2020. Similarly, estimates on employment range from 180 000 people to 1.8 million people, depending on whether the narrow or broad definition of the EGS sector is used and whether indirect employment is considered.

Development of renewables is considered the growth engine of the sector. Evaluations generally conclude that renewables development in Germany has had a positive impact on growth and employment. Support to renewables stimulates the economy by boosting investment and creating demand for green technology, particularly in the electricity sector. Gross employment in renewables sectors has increased sharply over the past two decades, with around 370 000 people employed in 2010, more than twice the 2004 level (BMU, 2011a). However, the cost of renewables development can have impacts on other sectors of the economy. Indeed, the development of the renewables industry may be associated with declines in conventional energy sectors. Technological progress and productivity gains will be key factors in determining the extent to which renewables are a source of growth for Germany (OECD, 2012).

The growth of green sectors is projected to continue, with global markets for solar thermal energy, photovoltaics and wind power expected to rise by 20% per year until 2020 (BMU, 2009). Being among the largest producers of EGS and having a more than 5% share in global trade in renewables-related products, Germany would benefit substantially from this growth (BMU, 2011b). Germany is a leader in the wind and photovoltaic sectors, with two firms among the world's ten main producers of wind turbines and three of the top ten solar panel producers. However, competition is developing quickly in these markets, and Germany has lost export market share, particularly in photovoltaics. Still, three-quarters of wind power equipment bought in Germany is produced by German manufacturers.

## 7. Environment, trade and development

### *7.1. Official development assistance*

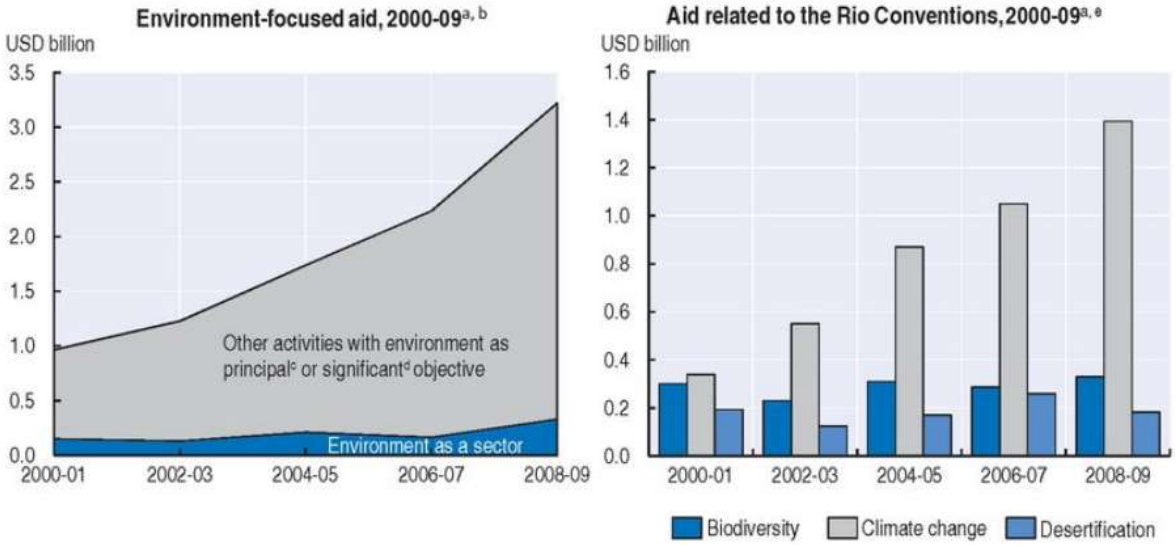
Since 2000, Germany's net official development assistance (ODA) has increased by nearly 60% in real terms to reach USD 12.7 billion in 2010, equivalent to 0.38% of gross national income (GNI). As a result, Germany was the fourth largest donor of the OECD Development Assistance Committee (DAC), providing 10% of DAC members' total ODA. Germany met the National Sustainable Development Strategy target of allocating 0.33% of GNI to ODA in 2006, but fell short of its 2010 target of 0.51%, and further efforts are needed to attain the target of 0.7% by 2015.

Germany has a strong track record in mainstreaming climate and environment in development programmes (OECD-DAC, 2010). Over the past decade, bilateral aid for the environment[23] more than tripled, reaching USD 3.3 billion in 2008-09. Although this figure is an upper-bound estimate, it represents nearly half of the sector-allocable aid,[24] a very high percentage compared to other donors (OECD-DAC, 2011a). Environment has been increasingly reported as an objective in the energy sector, reflecting the growing emphasis on climate change in Germany's development co-operation, particularly since adoption of the 2007 Bali Action Plan[25] (Figure 3.7). This scaling up of funding has been matched by increased capacity: in 2008 the Federal Ministry for Economic Co-operation and Development (BMZ) created a division for climate policy and climate financing, doubling the number of staff responsible for environment and climate.[26]

Addressing climate change in developing countries is an integral part of Germany's climate policy framework. Germany actively promoted this issue during its EU and G8 presidency and during preparations for the 2009 Copenhagen summit. In 2008-09, Germany was the second largest donor of climate-related finance, after Japan (OECD-DAC, 2011b). Germany is also the second biggest bilateral donor in the water sector. From 2000-01 to 2008-09, bilateral aid to water supply and sanitation (which partly overlaps with environment-focused aid) increased by 46% to reach USD 854 million.

Germany is a major contributor to multilateral funds for the environment. It is the third largest donor to the Global Environment Facility (GEF), which allocates about one-third of its funding to climate change.[27] German commitments for the 2010-14 programming period total EUR 347 million, significantly higher than in previous phases. The German government also supports the GEF's Least Developed Countries Fund and Special Climate

## Figure 3.7. **Bilateral aid in support of the environment**




a) Average commitments of bilateral ODA expressed at 2009 prices and exchange rates.
b) The coverage ratio for activities screened against the environment policy marker is 83% of total sector allocable aid. Excludes activities on water and sanitation not targeting environment as a principal or significant objective.
c) Activities where environment is an explicit objective of the activity and fundamental in its design.
d) Activities where environment is an important, but secondary, objective of the activity.
e) Most activities targeting the objectives of the Rio Conventions fall under the definition of "environment-focused aid" but there is no exact match of the respective coverage. An activity can target the objectives of more than one of the conventions, thus respective ODA flows should not be added.

*Source:* OECD-DAC (2011), *Creditor Reporting System: Aid Activities Database.*

StatLink http://dx.doi.org/10.1787/888932591843

Change Fund, having pledged EUR 40 million to the former and EUR 20 million to the latter by 2011. Between 2000 and 2009, Germany recorded the largest imputed multilateral contributions to the water and sanitation sector, the bulk of it channelled through the EU.

Support to climate change mitigation and adaptation is expected to continue to increase in the next few years following the pledge to provide EUR 1.26 billion for climate fast-start financing over 2010-12.[28] At least one-third of total funding will be allocated to adaptation and about 30% to reducing emissions from deforestation and forest degradation (REDD). The German government says it has exceeded the 2010 target for fulfilling this pledge, with EUR 361.5 million disbursed (Table 3.4).

Table 3.4. **Germany's contribution to fast-start financing, disbursements 2010**[a]

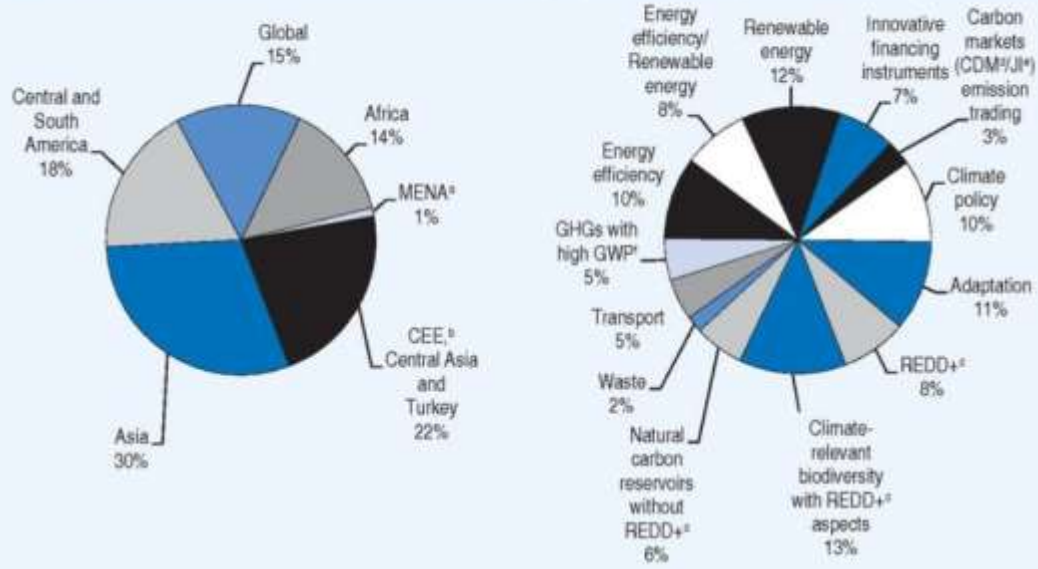
| | Mitigation | Adaptation | REDD+[b] |
|---|---|---|---|
| Multilateral | Clean Technology Fund: EUR 125 million | Pilot Programme for Climate Resilience: EUR 8 million | Forest Carbon Partnership Facility: EUR 34 million |
| | EU-UNDP Capacity Building Programme on Climate Change: EUR 5 million | Adaptation Fund: EUR 10 million | |
| | | UNEP/UNDP Ecosystem-based Adaptation Flagship: EUR 10 million | |
| Bilateral | EUR 87.4 million | EUR 47.7 million | EUR 34.4 million |
| Total: EUR 361.5 million | EUR 217.4 million (60%) | EUR 75.7 million (21%) | EUR 68.4 million (19%) |

a) As of 31 December 2010.
b) Includes conservation, sustainable management of forests and enhancement of forest carbon stocks.
*Source:* BMU and BMZ (2011).

### Box 3.6. **Innovative instruments for international climate financing**

Since 2008, the German government has made a portion of the revenue generated by auctioning the EU $CO_2$ emission trading allowances available for international climate protection. Through the International Climate Initiative (ICI), the BMU supports climate protection measures in developing countries, emerging economies and countries in transition in eastern Europe. In 2009, the BMU and BMZ signed an agreement governing the use of funding from the ICI that provides for close and early consultation on programmes and projects. ICI funding is provided for mitigation and adaptation measures, and for preservation and sustainable use of natural carbon sinks as part of the REDD+ programme. Between 2008 and July 2011, the ICI supported 242 projects in over 60 countries with funding totalling around EUR 518 million. The ICI is a significant innovation in climate finance and a model of inter-ministerial co-operation that could be useful for other countries. The German Advisory Council on Global Change has called for scaling up climate funding using revenue from the new air travel tax. It has also advocated a tax on international financial transactions for this purpose.

Figure 3.8. **International Climate Initiative, projects by region and subject, 2008-10**




a) Middle East and North Africa.
b) Central and Eastern Europe.
c) Reducing Emissions from Deforestation and Forest Degradation.
d) Clean Development Mechanism.
e) Joint Implementation.
f) Global Warming Potential.
*Source:* BMU and BMZ (2010), *Climate Challenges, Germany's International Approach.*

The Global Climate Partnership Fund, facilitated by the ICI, is an instrument to mobilise public and private capital for investment in climate change mitigation in developing and emerging countries. The fund primarily supports commercial banks and non-bank financial institutions such as leasing companies in the target countries. It aims to support provision of funding for investment by small and medium-sized enterprises and households for energy efficiency, renewables and GHG reduction. Unlike conventional loan facilities, the fund is revolving, its capital replenished by repaid loans. At the same time, the publicly provided capital acts as a risk buffer to mobilise additional, especially private, capital. The Global Climate Partnership Fund was set up in December 2009 by KfW Entwicklungsbank on behalf of the federal government. Its professional fund manager, Deutsche Bank, was selected through international tender. The fund has secured pledges from investors of over USD 100 million and is set to exceed USD 500 million by 2014 (BMU and BMZ, 2010).

Germany is one of the few countries to have provided a definition for "additional" funds in its Copenhagen pledge: they should be additional to 2009 climate funding and/or derive from innovative financing mechanisms such as the International Climate Initiative (Box 3.6). However, as is the case for other major donors, this financing is also counted as a contribution towards achieving the 2015 Millennium Development Goals, and includes amounts that were committed or pledged before the Copenhagen agreement (Oxfam, 2010). Striking a balance between the current emphasis on advancing the climate agenda and supporting other environment and development priorities is a challenge. Germany could further support the international effort on climate change by continuing to promote better monitoring and reporting of climate-related assistance (for example through its participation in the task team on tracking aid financing for the environment using the Rio markers).

Since 1988, all development projects have been subject to environmental impact assessment (EIA). In addition, a climate check was introduced in 2009 to assess projects' GHG emission saving potential and to address the impact of climate change. In 2011, these two instruments were merged in a Joint Environment and Climate Assessment, together with elements of strategic environmental assessment. Guidelines have been developed to support the systematic consideration of environmental and climate aspects at both the strategic and operational levels in the new instrument.

Recently, Germany has investigated opportunities to develop incentive programmes, build capacity, provide investment funding and encourage mainstreaming of the green economy in developing countries. Key criteria for project selection were defined, including: *i)* steering effect and inclusiveness; *ii)* focus on German comparative advantage (*e.g.* in renewables and energy efficiency); *iii)* innovative methods; and *iv)* active private sector participation. Examples include support for disseminating efficient stove technologies in Ethiopia, introducing

sustainability standards along the value chain of the coffee industry in Kenya and instituting eco-taxes in Vietnam (BMZ, 2011). Germany has funded African Development Bank work on green growth in Africa. It has supported private sector initiatives in the Donor Committee on Enterprise Development and hosted the conference on the Water, Energy and Food Security Nexus: Solutions for a Green Economy in November 2011.

### *7.2. Corporate social responsibility*

Germany promotes the OECD Guidelines for Multinational Enterprises.[29] It is among the OECD countries with the largest number of specific instances reported to the national contact point (NCP) (OECD, 2010d). The NCP is a department in the Federal Ministry of Economics and Technology (BMWi) which works in close co-operation with other federal ministries,[30] the social partners and NGOs. In specific instances, procedures, NCP decisions and recommendations are agreed by all ministries represented in the Ministerial Group on the OECD Guidelines, with the particular involvement of the federal ministry or ministries primarily concerned. In addition, participating ministries meet regularly to discuss issues relating to the OECD Guidelines, how to improve dissemination of the Guidelines and NCP working methods.

Since the establishment of a complaints procedure in 2001, the NCP has accepted five complaints[31] out of seventeen and had concluded four of them by June 2011. Among the rejected inquiries were two cases related to the environment. In 2007, a complaint was filed against a German car company accused of not giving sufficient consideration to the impact of its products on climate change. In 2009, a complaint against a Swedish electricity company alleged that it had undermined German environmental law by constructing coal

and nuclear power plants in Hamburg. More recently, a complaint alleged that the rights of indigenous people in Sweden were affected by a large windmill project financed by a German institution. The case was referred to the Swedish NCP.

A broad range of initiatives in corporate social responsibility (CSR) have been taken and networks established, the majority organised by the private sector and civil society. Recently, greater attention has been paid to promoting synergy between the promotional activities of the *OECD Guidelines for Multinational Enterprises* and other CSR instruments, including the International Labour Organization's Tripartite Declaration on Multinational Enterprises and Social Policy and the United Nations Global Compact. In 2010, responding to a recommendation of the German Council for Sustainable Development, and building on the work of the National CSR Forum, the German government adopted a national CSR strategy. It seeks to: *i)* promote CSR in small and medium-sized enterprises; *ii)* increase the visibility and credibility of CSR; *iii)* optimise the political framework for CSR; and *iv)* make a contribution towards shaping the social and environmental dimensions of globalisation.

The OECD Guidelines are also promoted in investment guarantee programmes. Companies applying for investment guarantees are referred to the Guidelines directly on the application form. They have to confirm their awareness of this by signature.

### *7.3. Export credits*

Germany has implemented the revised 2007 OECD Recommendation on Common Approaches on the Environment and Officially Supported Export Credits to minimise the adverse impacts of German investments abroad. Euler Hermes,[32] which manages the German export credit programme, has established a special sustainability unit to assess environmental issues. It publishes information on all covered projects above

EUR 15 million and discloses information on all category A projects with EIA description at least 30 days prior to final commitment. Between 2004 and 2010, Germany reported the highest number of projects with high and medium potential environmental impacts. Category A and B projects reported by Germany represented about one-fifth of the total volume reported to the OECD in 2010 (OECD, 2010e). Category A projects were concentrated in the energy (43%) and infrastructure (38%) sectors, while Category B projects were concentrated in other industries (36%) and infrastructure (29%).

In 2010, 14 projects for the promotion of renewables and water supply were covered, totalling about EUR 600 million. According to the revised OECD arrangements for these sectors adopted in 2009, the projects can be insured with more flexible repayment conditions and credit periods for up to 18 years. Guarantees were granted for projects on biomass power stations, solar cell projects and wind turbine plants. The biggest project (involving a EUR 462 million guarantee) concerned a wind farm installed off the Belgian coast (Euler Hermes, 2010).

The effects on the competitiveness of German companies produced by the 2007 OECD Council Recommendation on Common Approaches on the Environment and Officially Supported Export Credits were analysed in 2009. It was shown that disadvantages of the environmental assessment procedure, in particular in terms of time for approval, were compensated by the reduction of reputational risks and the positive impact on competitiveness (Schaltegger *et al.*, 2009). Germany supports OECD efforts to establish global standards on export credits and the environment that would avoid competitive disadvantages for OECD exporters.