

TO COMBAT ENVIRONMENTAL PRESSURES NORWAY HAS DEVELOPED SOME OF THE WORLD'S MOST AMBITIOUS ENVIRONMENTAL POLICIES...

Norway has developed some of the world's most ambitious environmental policies...

... and a unique Sustainable Development Strategy.

More could be done to better integrate environmental and sectoral policies...

...and to promote eco-innovation.

Norway has established an effective environmental management system...

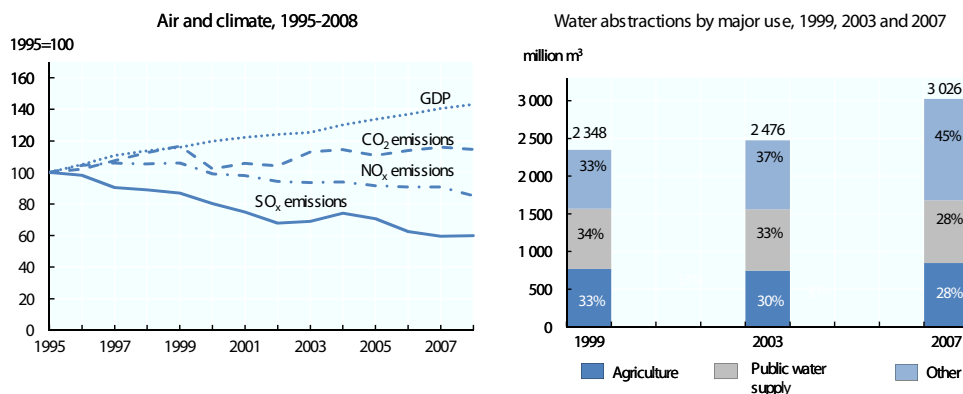
... and has adopted ambitious policies for biodiversity but faces implementation challenges.

Norway faces difficult dilemmas in achieving its ambitious climate mitigation targets...

...but continues to be a pioneer in international environmental co-operation.

Since the discovery of oil in 1969, Norway's economy has grown on average by 3% per annum in real terms. In 2009, this sector accounted for 20% of GDP and 46% of export revenues. Before oil, Norway's economic development was driven by cheap electricity from hydropower which fostered the development of an energy-intensive manufacturing sector, particularly metals, chemicals, shipbuilding and wood processing. To combat the environmental pressures from these and other sectors, Norway has pioneered some of the world's most ambitious environmental policies. They are embedded in a policy for sustainable development that aims to maintain the national capital stock over generations, and to support poverty reduction and sustainable development internationally.

Figure 1. **Air pollution and water use**



As the country with the second highest GDP per capita in OECD countries, Norway has been willing and able to commit substantial financial resources to achieve these policy goals. While Norway has been a front-runner in many areas of environmental policy, and other countries can learn much from this experience, important challenges remain, particularly reducing greenhouse gas emissions, protecting biodiversity, managing waste, and curbing urban air pollution. As the economy rebounds quickly from the global economic and financial crisis, continued efforts are needed to ensure that environmental policies are efficient and effective enough to curb the environmental pressures that renewed growth will generate.

Key environmental trends

Waste management: Municipal waste generation has increased faster than the rate of economic growth. Some sectors, such as food processing and services have experienced particularly rapid growth. Municipal waste generation is higher than the OECD or EU-15 average. Reported generation of hazardous waste increased by 64% over the review period and now accounts for 10% of all waste generated. Over 70% of combustible waste is exported to neighbouring countries. Norway imports significant quantities of hazardous waste for final disposal.

Air pollution: Emissions of SO₂ have continued to decrease: they are well below the OECD average per unit of GDP and meet the Gothenburg target. Emissions of non-methane volatile organic compounds have been reduced since 2000 and Norway reached its NMVOC ceiling under the Gothenburg Protocol in 2008. Good progress has also been achieved in reducing NO_x, but further efforts are required to meet the Gothenburg commitment. Emissions of ammonia have been constant, just below the Gothenburg target. These trends, together with lower levels of these pollutants generated in other countries, have reduced acid deposition. Nevertheless, large areas of southern Norway are still exposed to acid deposition.

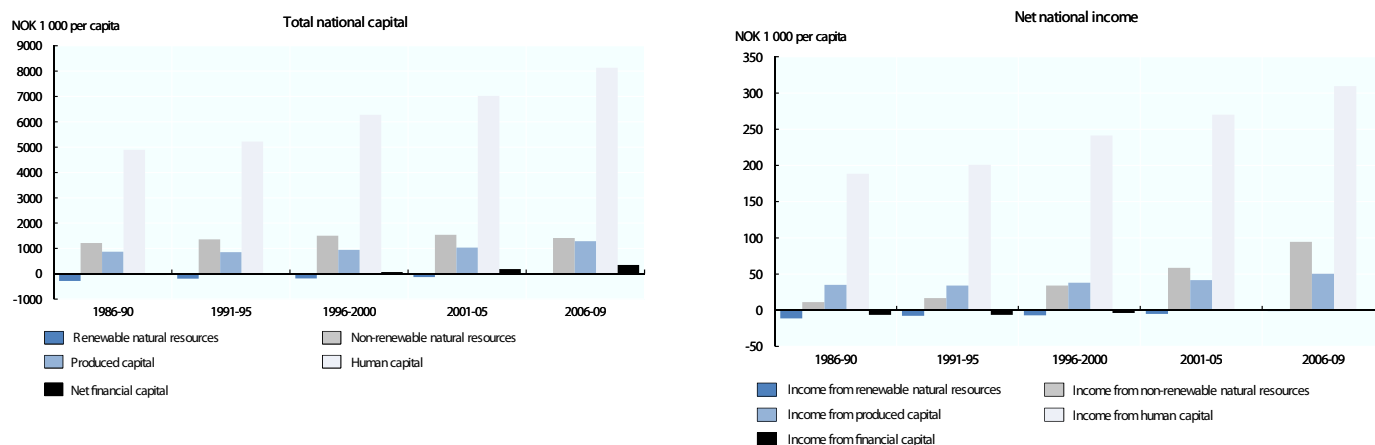
Water quality: In 2008, the Ministry of the Environment (MoE) determined that at least one-quarter of Norway's water bodies did not meet the ecological and chemical standards of the EU Water Framework Directive. Eutrophication is expected to be a continuing challenge, with municipal wastewater, agriculture, aquaculture and manufacturing the main sources. Norway began implementing the EU Water Framework Directive ahead of schedule.

Pollution from off-shore sources: The main pressures on the marine environment from oil and gas activities include operational and accidental discharges of chemicals, crude oil and produced water, which contains residues of oil, other organic and inorganic components, and added chemicals. Targets for reducing discharges of chemical additives have been achieved. However, the volume of produced water has increased, and there has been no net reduction in total discharges of oil and other naturally occurring chemicals. Most serious oil spills in Norway have originated from ship traffic near the coast. In 2007, an accident in the Statfjord field in the North Sea resulted in the second largest oil spill on the Norwegian continental shelf. As oil exploration and shipping extend to more fragile environments, the risks from these sectors are likely to increase.

... AND A UNIQUE SUSTAINABLE DEVELOPMENT STRATEGY HAS BEEN ESTABLISHED.

Norway has put in place an advanced strategy to promote sustainable development that is increasingly shaping practical policy formulation. Sustainable development provides a long-term policy framework for co-ordinating and integrating economic, environmental and social policies. The main goal of Norway's Sustainable Development Strategy is to increase national capital over time. In view of Norway's natural resource wealth, the Sustainable Development Strategy calls for decreases in natural capital (such as oil and gas) to be off-set by increases in other forms of capital: human, produced or financial.

Figure 2. **Total national capital and net national income**



The National Sustainable Development Strategy sets out five key principles against which policy action should be judged: i) equitable distribution; ii) international solidarity; iii) the precautionary principle; iv) the polluter pays principle; and v) joint efforts (i.e. by the whole population). Once these principles have been applied, the Strategy requires policy options to be subject to a test of cost-effectiveness. Implementation of the Strategy is overseen by the Ministry of Finance, and progress is monitored by Statistics Norway using a core set of indicators. The most recent assessments suggest that the total capital stock has been increasing. Statistics Norway estimates that human capital represents 73% of total national capital, compared with 12% for oil and gas reserves.

Even before the Sustainable Development Strategy, Norway placed strong emphasis on integrating economic and environmental policies. Norway was one of the first countries to apply environmental taxes, and they continue to be important instruments of environmental policy. An impressive analytical capacity has been developed to underpin policy development. However, like in many countries, the interplay of policy analysis and the political process has not always led to the selection of the most cost-effective environmental policies. Further efforts should be made to reconcile environmental policy objectives with those of the sectors that exert the greatest pressures on the environment.

Opportunities exist to achieve environmental objectives more cost-effectively by removing exemptions that undermine the effectiveness of environmentally related taxes, and by phasing out environmentally harmful subsidies. For example:

» 40% of total net electricity consumption is tax exempt, including 95% of electricity consumption in the pulp and paper industry. These exemptions increase environmental pressures from this pollution-intensive sector.

» Direct payments to Norwegian farmers as a share of farm receipts remain among the highest in the OECD. Shifting from production-related subsidies to less distorting forms of support, such as income support and payments targeting specific environmental outcomes, would reduce the negative environmental impacts of the agricultural sector.

» Diesel is taxed less than unleaded petrol, even though there is no environmental justification for this. Opportunities exist to reduce CO₂ emissions more cost effectively by shifting the burden of taxation from car registration to fuels. A broad-based road charging system could also help to reduce air pollution and congestion caused by road transport.



...AND TO PROMOTE ECO-INNOVATION.

Norway's good economic performance contrasts with a relatively poor performance on conventional innovation indicators, such as patents per capita. The share of research and development (R&D) in GDP is below the OECD average, reflecting the relatively low share of manufacturing in the economy. There is broad political agreement that efforts should be made to foster more R&D intensive, "knowledge based" industries so as to maintain high, sustainable growth, particularly when oil and gas production decreases. These efforts should include designing environmental policies in a way that stimulates cleaner technological development. The development of technologies for carbon capture and storage (CCS) remains a priority in Norway's R&D strategy and receives substantial funding. 🌱

Box 1. Carbon capture and storage (CCS)

Carbon capture and storage aims to prevent CO₂ escaping into the atmosphere by capturing it from power plants or other large emitters and storing it in geological formations. Given the large contribution that fossil fuels will continue make to energy production, particularly in emerging economies like China and India, the development of viable CCS technology is considered to be a potentially crucial element in efforts to mitigate climate change.

Norway has extensive experience in storing CO₂. Since 1996, more than 10 million tonnes of CO₂ have been separated in gas production at the Sleipner West field in the North Sea and stored in a geological formation 1 000 meters below the seabed. Sleipner was the world's first facility to store large quantities of CO₂ under the seabed. Monitoring of the storage reservoir shows no sign of seepage. The Snøhvit field in the Barents Sea provides gas to the world's first liquefied natural gas plant with CCS, located in Melkøya. Since 2008, CO₂ has been separated at Melkøya (onshore) and piped back to Snøhvit (off-shore), where it is stored 2 600 meters below the seabed. At full production, 700 000 tonnes of CO₂ will be stored annually.

Box 1. Carbon capture and storage (Ctd.)

Building on these two projects, Norway aims to develop CCS in two stages at the Mongstad industrial site on the west coast. The first step is the Technology Centre Mongstad. In 2009, the investment decision was made and construction began in the same year. The technology centre will start operating in early 2012 and will capture CO₂ from two different flue gases with two different capture technologies. Step two is full-scale CCS from the combined heat and power plant at the Mongstad refinery. In 2007, the first gas-fired plant in Norway (with installed capacity of 450 MW) started operating at Kårstø, but CCS is not installed.

It has become clear that it will take longer than previously expected to develop the necessary CCS technology. In May 2010, the government announced a decision to extend the planning phase for large-scale carbon capture at Mongstad, and an investment decision was postponed until 2014.

Norway's support for CCS could achieve several objectives, and priorities could be more clearly established. Options, which are not all mutually exclusive, include focusing on reducing domestic emissions reduction, commercialisation of CCS, or promoting the reduction of greenhouse gas emissions in major emerging economies.

NORWAY HAS ESTABLISHED AN EFFECTIVE ENVIRONMENTAL MANAGEMENT SYSTEM.

Norway is not a member of the European Union. However, as part of the European Economic Area (EEA), it has agreed to transpose EU directives into national law, except in agriculture and fisheries. The environment is covered by this agreement, with the exception of nature protection and some aspects of water management. As a result, Norwegian environmental policy has been strongly influenced by the EU. At the same time, Norway has been proactive in its relations with the EU, and influenced EU environmental policy in areas such as chemicals and the marine environment.

With a few exceptions, Norway's environmental policies are now fully compliant with the requirements of EU legislation covered by the EEA Agreement. In some areas, such as environmental impact assessment (EIA) and the provision of information about health impacts of pollution and products, Norwegian requirements are more stringent. Regulatory procedures have been simplified, including those for environmental permitting, and administrative burdens on the regulated community have been reduced. Policy development has been underpinned by solid analysis and broad public participation.

Box 2. Strengthening the effectiveness of policy instruments to reduce air pollution in Norway

Following the adoption of a NOx tax in 2006, the Norwegian government negotiated an agreement with the main emitters of NOx (oil and gas industry, shipping, fishing, aviation and district heating). The agreement exempted them from the tax if they committed to reduce emissions by 30 000 tonnes to an annual level of 98 000 tonnes by 2010. As of February 2010 more than 580 businesses, representing more than 90% of the target NOx emissions, had joined the agreement. To help them meet their obligations, business organisations set up a fund that all participating enterprises had to join. The fund collects emission payments from enterprises, and offers financial support (NOK 1.8 billion over 2008-10) to enterprises for implementing NOx emission abatement measures. Since the adoption of these measures, NOx emissions have decreased by 10%. In December 2010 the Ministry of the Environment signed a new agreement with 15 business organisations to ensure that Norway reduced its yearly NOx emissions by another 16 000 tonnes by the end of 2017.

Since 2003 a tax on waste incineration was differentiated on the basis of the potential health and environmental impacts of air pollutant emissions. The tax was calculated on actual emissions from the incinerator, based on direct reporting of 24-hour average concentrations, or independent third party verification every six months. The average incineration tax amounted to about NOK 100 per tonne of treated waste. Since the tax was applied, important reductions have been achieved. Most notably emissions of dioxins have practically been eliminated. Despite the results achieved, the incineration tax was revoked in 2010 due to the growing volume of exports of Norwegian waste to Sweden (where the tax on waste incineration is lower) which led to a shortage of waste supplied to Norwegian incinerators.

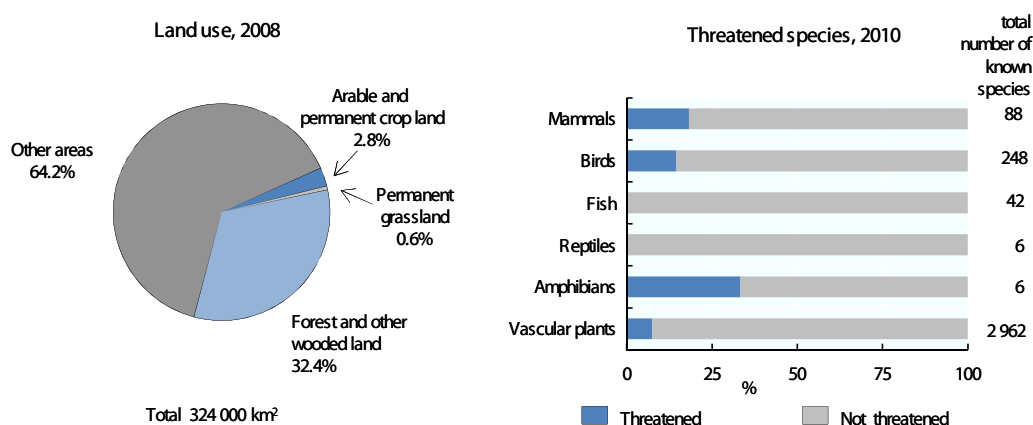
Responding to pressures to meet international environmental commitments, Norwegian oil companies, which accounted for over 60% of total NMVOCs in 2000, developed a technology to capture NMVOC emissions from storage vessels and shuttle tankers. In 2002, the government signed a joint venture agreement with the industry to coordinate the phase-in of the technology to capture NMVOC emissions, and, in 2003, adopted strict regulations requiring all vessels to use it. Ships without such equipment were not granted access to ports. Introduction of this technology helped reduce NMVOC emissions in the oil sector from 250 000 tonnes in 2001, to 40 000 in 2009 with no reduction in the amount of oil loaded. As a result, Norway reached its NMVOC emission ceiling under the Gothenburg Protocol in 2008.

The pioneering use of economic instruments has been extended, e.g. through taxes on NOx emissions, landfilling and emissions from incineration. Negotiated agreements with industry have also played a useful role. The application of some environmental policy instruments has contributed to environmentally favourable innovations, e.g. in reducing non-methane volatile organic compounds (NMVOCs) and hazardous emissions from waste incineration. Enforcement is better targeted, risk-based and deterrence-oriented. As a result, the quality of Norway's air and water is high, and the number of species threatened by extinction is low by OECD standards. 🌿

NORWAY HAS ADOPTED AMBITIOUS POLICIES FOR BIODIVERSITY BUT FACES IMPLEMENTATION CHALLENGES.

The 2009 Nature Diversity Act consolidated a new and innovative framework for biodiversity management in Norway that goes beyond the requirements in equivalent EU Directives. In particular, it introduces two new concepts - priority species and selected habitat types - that are intended to shape the future of Norway's biodiversity policy. Nature and biodiversity management objectives are also included in sector strategies - notably for agriculture, aquaculture, fisheries and forestry - as well as in land and sea management plans. The area of land under protection has increased significantly. More broadly, policies for biodiversity have been reinforced by a significant increase in budget, and by a substantial investment in expanding the knowledge base, including the establishment of the Biodiversity Information Centre.

Figure 3. Land use and threatened species



Nevertheless, Norway still faces major challenges in the conservation and sustainable use of biological diversity. Conservation of biodiversity within protected areas is not sufficiently secured, and some nature types, notably forests, merit further protection. Increasing aquaculture continues to pose a threat to biodiversity, especially through disease and genetic effects on wild populations. Aquaculture of cod, which is a recent development, is of particular concern. The origins of food used in aquaculture are insufficiently traceable. Although Norway's four large carnivore species (brown bear, lynx, wolf, wolverine) showed a slight upward trend during the review period, all are listed as threatened on the 2010 Red List. Moreover, targets for the large carnivores are set politically and at levels too low to maintain viable populations.

Spatial planning has not been effective in halting the loss of large “wilderness” areas, nor in preventing building in coastal zones and along rivers. Sea management plans do not provide opportunities for long-term protection of marine areas. Possible measures and strategies for adaptation to climate change have been identified, but a full analysis of their effect on nature and biodiversity should be undertaken. 🌿



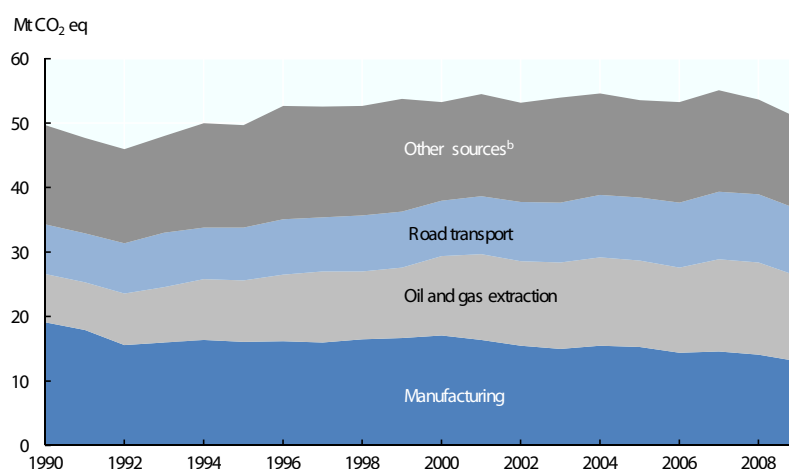
NORWAY FACES DIFFICULT DILEMMAS IN ACHIEVING ITS AMBITIOUS CLIMATE MITIGATION TARGETS.

Norway has been a leader in the international effort to address climate change and has adopted some of the most ambitious emission mitigation targets of any developed country. In addition to the Kyoto target of +1% relative to 1990 levels in the period 2008-12, Norway has made a unilateral commitment to reduce greenhouse gas emissions by 10% below this target. In the period up to 2008, emissions were considerably higher than in 1990. In 2009, following the global economic and financial crisis, emissions fell to less than 2% above the 1990 level. These emissions are likely to rebound with renewed economic growth.

In the context of the Copenhagen Accord, Norway established an intermediate target to reduce “net” GHG emissions by 30-40% from 1990 levels by 2020. However, the 40% target will only be triggered, “as part of a global and comprehensive agreement for the period beyond 2012 where major emitting parties agree on emissions reductions in line with the 2 degree Celsius target.” Otherwise the target will be 30%, which would still be the most ambitious among OECD countries. The Norwegian government has further specified that domestic emission reductions should amount to about two-thirds of total reductions; the other third being purchased on international carbon markets. However, unlike Norway’s international commitments, which use a 1990 base-line, the level of domestic mitigation ambition is defined against reference emission projections for 2020. This creates uncertainty about the precise level of the domestic target.

Given the difficulties that Norway has encountered in achieving the less ambitious Kyoto target, achieving the 2020 domestic target will be a major challenge. Supporters of the ambitious target consider that Norway’s wealth, which largely relies on fossil fuels, obliges it to pursue a leadership role in the climate debate. Critics have argued that the “net” target could be achieved more cost-effectively by allowing greater use of international carbon markets.

Figure 4. Trends in GHG emissions per sector , 1990-2009



The challenge of meeting an ambitious domestic target is further complicated by Norway’s linkage to the EU Emissions Trading System (ETS). If, in order to achieve the domestic target, a common carbon price were applied to all sectors, the major share of the emission reductions would take place in sectors covered by the EU ETS.

However, this would result in increased emissions in countries covered by the ETS, causing little or no change in global GHG emissions. It could also entail downscaling of production and employment in the emission-intensive sectors in Norway, which are often located in areas with few alternative employment possibilities. Alternatively, if the sectors covered by the EU ETS were not subject to additional measures, very high carbon prices would have to be applied in the non-trading sectors. Some calculations suggest that such a policy might entail, for example, a doubling of motor fuel prices by 2020.

Confronting this challenge will require targeted, cost-effective policies. Some of the steps that could be taken include: clarifying the domestic mitigation target for 2020; strengthening the mechanism for making policy adjustments to stay on-track to meet the target; buying and retiring emission allowances within the EU ETS; establishing a more consistent price for energy across the economy; and developing an economy-wide energy efficiency strategy that does not result in emissions being shifted to other countries within the EU ETS. 🌿

...BUT CONTINUES TO BE A PIONEER IN INTERNATIONAL ENVIRONMENTAL CO-OPERATION.

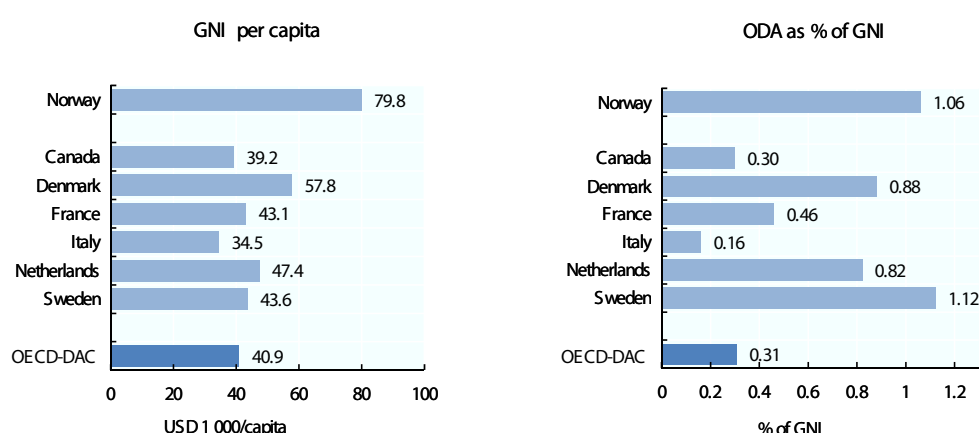
Norway has continued to play an active and innovative role in promoting international environmental co-operation, bilaterally (especially with Russia), regionally and globally. Particular emphasis has been given to the development of a sound scientific basis to support international environmental co-operation, e.g. in the development of a global convention on mercury, in setting more ambitious global targets for persistent organic pollutants, and in preparing joint assessments of the marine environment in the Barents Sea and North-East Atlantic.

Norway initiated a binding regional agreement, and subsequently a 2009 agreement in the Food and Agriculture Organization (FAO), on port state measures concerning illegal, unreported and unregulated fishing. It has also continued to play a leading role in developing international conventions to reduce environmental impacts of shipping, for example those on ballast water and ship recycling. However, Norway should take further steps to accede to, and implement, agreements on preparedness for pollution incidents by hazardous and noxious substances and on ship recycling.



Since 2000, Norway's net official development assistance (ODA) has risen by 67% to reach USD 4 billion in 2009, or 1.06% of gross national income. This is the second highest percentage among OECD Development Assistance Committee (DAC) donors. Following the adoption of an action plan for the environment in 2006, environment-focused aid doubled to USD 677 million, equivalent to a quarter of bilateral ODA, a high share compared to other donors. However, there is a question whether sufficient expertise exists in the relevant agencies to manage these resources cost-effectively.

Figure 5. **Official development assistance, 2009**



Climate change, reduction of deforestation (REDD), and clean energy are the main priorities. There is some risk of climate-related issues crowding out other important environment and development issues, though coordination of efforts with other major donors can help to off-set this risk. Further efforts are needed to ensure that adequate environmental assessments are made of development co-operation programmes and projects, particularly in the energy and oil and gas sectors. 🌿



These Highlights present key facts, figures and policy recommendations of the 2011 OECD Environmental Performance Review of Norway. The Review examines Norway's progress since the previous OECD Environmental Performance Review in 2001.

The Highlights are based on the report prepared by the OECD Environment Directorate, with the contribution of reviewers from four examining countries: Ireland, Japan, New Zealand and Sweden. The OECD Working Party on Environmental Performance discussed the report at its meeting on 30 November 2010, and approved the Assessment and Recommendations.

The policy recommendations aim to provide further support to Norway's initiatives on:

- implementing environmental policies;
- international co-operation;
- climate change;
- nature and biodiversity;
- waste management.

This review is part of the OECD Environmental Performance Review Programme, which provides independent assessments of countries' progress in achieving their domestic and international environmental policy commitments, together with policy relevant recommendations. They are conducted to promote peer learning, to enhance countries' accountability to each other and to the public, and to improve governments' environmental performance, individually and collectively. The Reviews are supported by a broad range of economic and environmental data.

Each cycle of the Environmental Performance Reviews covers all OECD member countries and selected partner countries.

The most recent reviews include: Portugal (2011), Japan (2010), Luxembourg (2010), Ireland (2010), Greece (2009), Finland (2009) and Turkey (2008).

Further information:

OECD Environmental Performance Review of Norway:
www.oecd.org/env/countryreviews/norway

OECD Programme of Environmental Performance Reviews:
www.oecd.org/env/countryreviews

Environmental Data and Indicators:
www.oecd.org/env/indicators

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