

INCLUSIVE GREEN GROWTH: **FOR THE FUTURE WE WANT**

OECD WORK
2012



RIO+20
United Nations
Conference on
Sustainable
Development



OECD



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Message from the OECD Secretary-General

Inclusive green growth for a fairer, cleaner, stronger economy



The first Rio Summit in 1992 was historic for arguing that development has to be sustainable, and that to be sustainable, it must integrate the environmental with the social and the economic dimensions. Twenty years on, that is still a powerful message, but sustainable development is not a reality. The Rio+20 Conference provides an opportunity to change that by setting out ways to move from a concept to practical proposals for making it happen.

There has been significant progress over the past 20 years. While the world's population has increased by a third, world GDP has tripled, helping millions of people to work their way out of poverty. The number of children in developing countries who die before the age of five dropped from 100 to 72 per 1 000 live births between 1990 and 2008, and around 90% of children in developing countries are now enrolled in primary school.

However, economic expansion has come at a price to the planet. If we do not protect the environment and its natural resources, this expansion could grind to a halt because we will have destroyed or permanently damaged the water and mineral resources, ecosystem diversity and other natural foundations on which our well-being relies.

If we do not change course, the impact on our quality of life and health will be significant, with an increasing economic burden. More and more financial and human resources will need to be spent to make enough water available and drinkable, keep the land productive, ensure that the air is breathable, and supply industry with the raw materials it needs.

Inclusive green growth offers an optimistic, realistic alternative to countries looking for new sources of growth that make economic, environmental and social sense. Green growth is not a replacement for sustainable development. Together with innovation, going green can be a long-term driver for economic growth.

The OECD Green Growth Strategy provides a clear framework for how countries can achieve economic growth and development while preventing costly environmental degradation, climate change and inefficient use of natural resources. The Strategy identifies common principles and challenges but shows that there is no one-size-fits-all prescription for implementing green growth. Each country needs to devise a strategy tailored to its own circumstances. In all cases, to be sustainable, strategies have to be inclusive and open. Growth has to reduce inequality and the tensions it generates. "Green" cannot be an excuse for protectionism, depriving citizens of choice, driving up costs and stifling innovation.

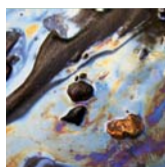
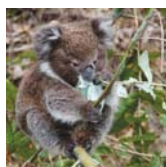
However, even the best policies are nothing without the political will to implement them. In 2011, Ministers meeting at the OECD welcomed the Green Growth Strategy as a growth strategy first and foremost, and stressed that green growth tools and indicators have the potential to unlock new growth engines and job opportunities. In 2012, the Mexican presidency of the G20 has established green growth as one of its priorities.

It is a key priority for the OECD too. We are exploring how green growth strategies can be applied in the specific context of developing countries and emerging-market economies. And we will continue to work with our members and partner countries to design cost-effective and politically implementable policy measures; robust indicators, data and mechanisms to help track progress; and dedicated platforms and innovative ways to facilitate knowledge-sharing and co-operation at the international level.

I wish Rio+20 every success in helping to make life better for us all and for future generations.

A handwritten signature in black ink, which appears to read 'Angel Gurría'.

Angel Gurría
OECD Secretary-General



An urgent call for action

Since the Rio Summit in 1992, some impressive progress has been achieved on the road to sustainable development. From 1992 to 2010, world GDP increased by almost 75% and GDP per capita by 40%, bringing with it widespread improvements in living standards while helping to lift hundreds of millions of people out of extreme poverty.

Yet the fruits of this economic growth have not been equally distributed and poverty eradication still remains a pressing concern in many parts of the world. The

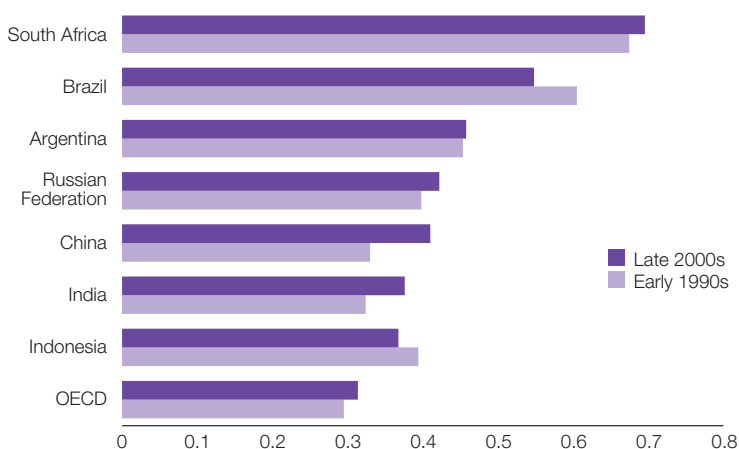
distributional patterns of that growth, as reflected in wealth accumulation and well-being, has seen income and equity gaps widen in both developing and developed countries.

Today in advanced economies, the average income of the richest 10% of the population is about nine times that of the poorest 10%. Emerging economies have achieved dramatic reductions in poverty, yet income inequality, which was already high, has worsened over the last decade. Rising inequality creates economic, social and political challenges, including affecting economic performance as a whole and fuelling protectionist sentiments.

- Even in traditionally more egalitarian countries – such as Germany, Denmark and Sweden – the income gap between rich and poor is expanding – from 5 to 1 in the 1980s to 6 to 1 today. It is 10 to 1 in Italy, Japan, Korea and the United Kingdom, has risen to 14 to 1 in Israel, Turkey and the United States and has reached more than 25 to 1 in Mexico and Chile.

DIVIDED WE STAND

CHANGE IN INEQUALITY LEVELS, EARLY 1990s VERSUS LATE 2000s
Gini coefficient of household income



Notes: Figures for the early 1990s generally refer to 1993, whereas figures for the late 2000s generally refer to 2008.

Gini coefficients are based on equivalised incomes for OECD countries and *per capita* incomes for all emerging economies except India and Indonesia for which *per capita* consumption was used.

Source: OECD-EU Database on Emerging Economies and World Bank Development Indicators Database.

The OECD study *Divided We Stand: Why Inequality Keeps Rising* (2012) reveals that the gap between rich and poor has widened in most advanced and emerging economies. It analyses the major underlying forces behind these developments and discusses the most promising policies to counter increases in inequalities and how the policy mix can be adjusted when public budgets are under strain.

www.oecd.org/els/social/inequality

- While China, India, the Russian Federation and South Africa have seen strong economic expansion over the last decade, they have also recorded steep increases in inequality levels in this time. In Indonesia and Brazil, however, strong output growth went hand-to-hand with declining income inequality. But the gap between rich and poor is still high in Brazil, at 50 to 1.

At the same time, growth patterns have incurred significant environmental costs. Natural assets have been and continue to be depleted, with the ecosystems services they deliver already compromised by environmental pollution.

Providing for a further 2 billion people by 2050 and improving living standards for all will challenge our ability to manage and restore those natural assets on which all life depends. Failure to do so will have serious consequences, especially for the poor, and ultimately undermine economic growth and human development.



Finding out more

www.oecd.org/economy/goingforgrowth/inequality

Going for Growth. Chapter on Reducing income inequality while boosting economic growth: Can it be done? (OECD, 2012)

Perspectives on Global Development 2012: Social Cohesion in a Shifting World (OECD, 2012)

The Impact of Publicly Provided Services on the Distribution of Resources: Review of New Results and Methods, OECD Social, Employment and Migration Working Papers No. 130 (OECD, 2012)

Tackling Inequalities in Brazil, China, India and South Africa - The Role of Labour Market and Social Policies (OECD, 2010)

OECD publications are available for free preview at www.oecd-ilibrary.org

SOCIO-ECONOMIC DEVELOPMENTS TO 2050

By 2050, the Earth's population is expected to increase from 7 billion to over 9 billion and the world economy is projected to nearly quadruple, with growing demand for energy and natural resources as a result. While growth will still be high, average GDP growth rates are projected to slow in China and India. Africa could see the world's highest growth rates between 2030 and 2050.

OECD countries are expected to have over a quarter of their population aged over 65 years in 2050, compared with 15% today. China and India are also likely to see significant population ageing, while more youthful populations in other parts of the world, especially Africa, are expected to grow rapidly. These demographic shifts and higher living standards imply evolving lifestyles and consumption patterns, all of which will have significant consequences for the environment. Nearly 70% of the world's population is projected to live in urban areas by 2050, exacerbating challenges such as air pollution, transport congestion, and waste management.

Without more effective policies, a world economy four times larger than today is projected to use 80% more energy in 2050. It is projected that the share of fossil-fuel based energy in the global energy mix will still remain at about 85%. The major emerging economies are projected to become major energy users. To feed a growing population with changing dietary preferences, global use of agricultural land is projected to expand in the next decade.

In the absence of new policy action, the OECD projects that pressures on the environment from population growth and rising living standards will outpace progress in pollution abatement and resource efficiency. Continued degradation and erosion of natural environmental capital is expected by 2050 as a result, with the risk of irreversible changes that could endanger centuries of rising living standards.

The OECD Environmental Outlook to 2050:

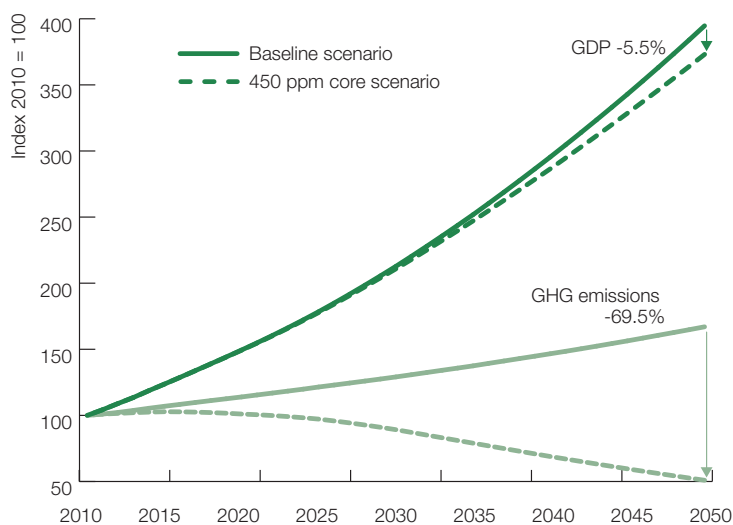
The Consequences of Inaction (2012) projects demographic and economic trends over the next four decades, using joint modelling by the OECD and the Netherlands Environmental Assessment Agency (PBL). It assesses the impacts of these trends on the environment if we do not introduce more ambitious policies to better manage natural assets, and examines some of the policies that could change that picture for the better. The Outlook focuses on four areas: climate change, biodiversity, water and the health impacts of pollution. It concludes that urgent action is needed now to avoid significant costs of inaction, both in economic and human terms.

www.oecd.org/environment/outlookto2050





WHAT WOULD IT COST TO FIGHT CLIMATE CHANGE? 450 Core scenario: global emissions and cost of mitigation



Source: OECD Environmental Outlook to 2050: The Consequences of Inaction (OECD, 2012); output from OECD ENV-Linkages model.

IT PAYS TO ACT NOW

Acting now makes environmental and economic sense. In the case of climate, if countries act now, there is still a chance – although it is receding – of global GHG emissions peaking before 2020 and limiting the world's average temperature increase to 2° C. The *OECD Environmental Outlook to 2050* suggests that a global carbon price sufficient to lower GHG emissions by nearly 70% in 2050 compared with the baseline scenario and limit GHG concentrations to 450 parts per million (ppm) would slow economic growth by only 0.2 percentage points per year on average. Global GDP would still almost quadruple. The difference pales alongside the potential cost of inaction on climate change, which some estimate could be as high as 14% of average world consumption per capita. The *Outlook* also suggests that the benefits of making further air pollution reductions in the BRIICS could outweigh the costs by 10 to 1 by 2050. Investing in safe water and sanitation in developing countries can yield benefit-to-cost ratios as high as 7 to 1.



WHAT WOULD THE ENVIRONMENT LOOK LIKE IN 2050 IF CURRENT POLICIES ARE MAINTAINED?

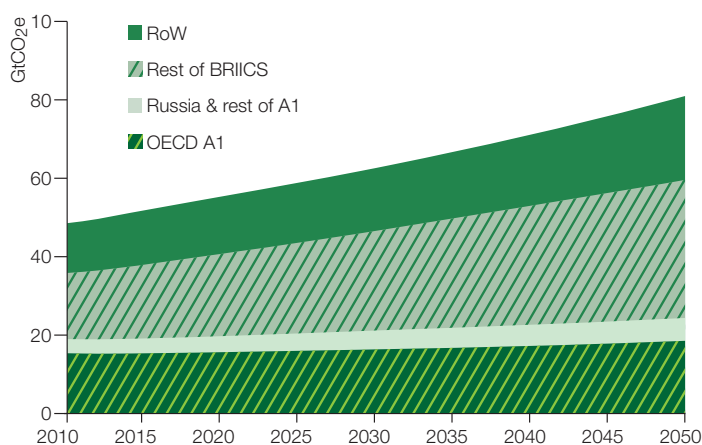
More disruptive climate change is likely to be locked in, with global greenhouse gas (GHG) emissions projected to increase by over 50%.

The global average temperature increase is projected to be 3°C to 6°C above pre-industrial levels by the end of the century. The GHG mitigation actions pledged by countries in the Cancún Agreements at the United Nations Climate Change Conference in 2010 will not be enough to prevent the global average temperature from exceeding the internationally agreed goal of 2°C, unless very rapid and costly emission reductions are realised after 2020. Surpassing the 2°C threshold would alter precipitation patterns, increase glacier and permafrost melt, drive sea-level rise, and the intensity of extreme weather events. This will hamper the ability of people and ecosystems to adapt.

Biodiversity loss is projected to continue, especially in Asia, Europe and Southern Africa.

Globally, terrestrial biodiversity (measured as mean species abundance – or MSA – an indicator of the intactness of a natural ecosystem) is projected to decrease by a further 10% by 2050. Mature forests are projected to shrink in area by 13%. Climate change is projected to become the fastest growing driver of biodiversity loss by 2050. Declining biodiversity threatens human welfare, especially for the rural poor and indigenous communities whose livelihoods often depend directly on natural resources and well-functioning ecosystems services.

GHG EMISSIONS BY REGION



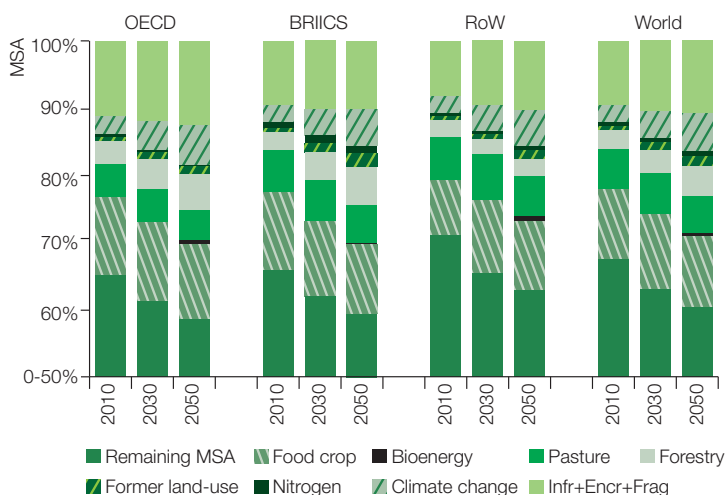
Notes: A1: Group of countries that are part of Annex 1 of the Kyoto Protocol

Rest of BRIICS: Country group including Brazil, China, India, Indonesia and South Africa

RoW: Rest of the world

GtCO₂e: Giga tonnes of CO₂ equivalent

EFFECTS OF DIFFERENT PRESSURES ON TERRESTRIAL MSA



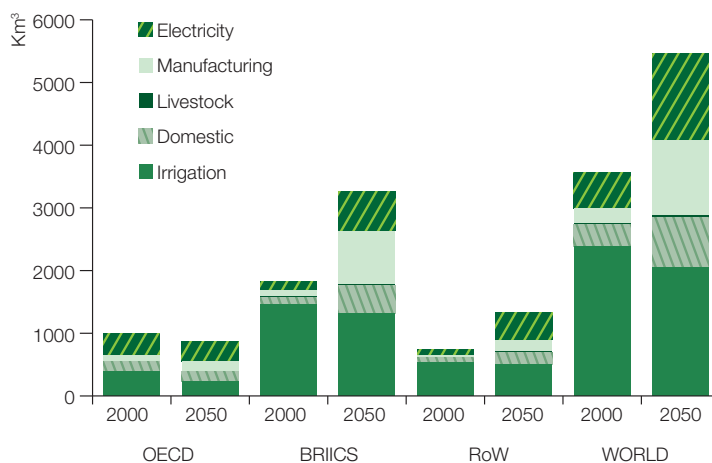
Note: MSA of 100% is equivalent to the undisturbed state

Infr+Encr+Frag stands for Infrastructure, encroachment and fragmentation



- About one-third of global freshwater biodiversity has already been lost, and further loss is projected to 2050.

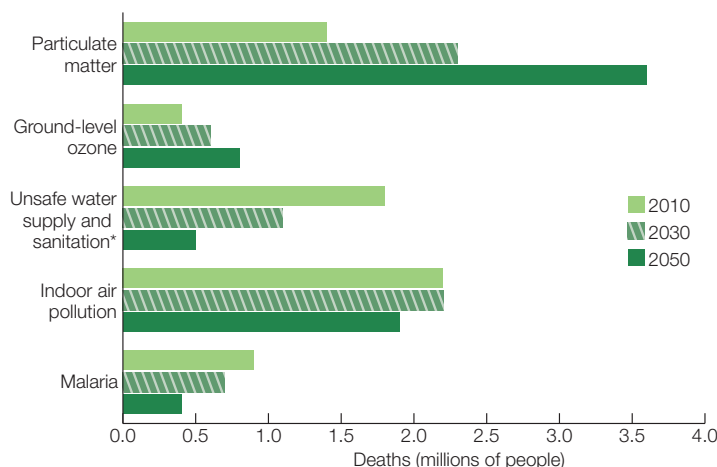
GLOBAL WATER DEMAND



Note: This graph only measures 'blue water' demand and does not consider rainfed agriculture.

Freshwater availability will be further strained in many regions, with 2.3 billion more people than today – in total over 40% of the global population – projected to be living in river basins under severe water stress, especially in North and South Africa, and South and Central Asia. Global water demand is projected to increase by 55%, intensifying competition among users. Environmental water flows will be contested, putting ecosystems at risk. Pollution from urban wastewater and agriculture is projected to worsen in most regions, increasing eutrophication and damaging aquatic biodiversity. Globally more than 240 million people are expected to be without access to an improved water source by 2050, and 1.4 billion people still without access to basic sanitation.

GLOBAL PREMATURE DEATHS FROM ENVIRONMENTAL RISKS



Note: *Child mortality only

- Sub-Saharan Africa is unlikely to meet the MDG of halving the 1990 level of the population without access to an improved water source by 2015.

Air pollution is set to become the world's top environmental cause of premature mortality. Air pollution concentrations in some cities, particularly in Asia, already far exceed World Health Organization safe levels. By 2050, the number of premature deaths from exposure to particulate matter is projected to more than double to 3.6 million a year globally, with most deaths occurring in China and India. The burden of disease related to exposure to hazardous chemicals is significant worldwide, but most severe in non-OECD countries where chemical safety measures are still insufficient.

Source: OECD Environmental Outlook to 2050: The Consequences of Inaction (OECD, 2012); outputs from IMAGE and ENV-Linkages models.



What is green growth and how can it help deliver sustainable development?

Twenty years after the first Rio Summit, the world continues to face a twin challenge: expanding economic opportunities for all in the context of a growing global population; and addressing environmental pressures that, if left unaddressed, could undermine our ability to seize these opportunities.

Green growth is where these two challenges meet and it is about exploiting the opportunities to realise the two together.

- *Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.*

To do this it must catalyse investment and innovation which will underpin sustained growth and give rise to new economic opportunities.

Green growth is not a replacement for sustainable development.

Rather, it provides a practical and flexible approach for achieving concrete, measurable progress across its economic and environmental pillars, while taking full account of the social consequences of greening the growth dynamic of economies. The focus of green growth strategies is ensuring that natural assets can deliver their full economic potential

on a sustainable basis. That potential includes the provision of critical life support services – clean air and water, and the resilient biodiversity needed to support food production and human health. Natural assets are not infinitely substitutable and green growth policies take account of that.

Green growth policies are an integral part of the structural reforms needed to foster strong, more sustainable and inclusive growth. They can unlock new growth engines by:

- **Enhancing productivity** by creating incentives for greater efficiency in the use of natural resources, reducing waste and energy consumption, unlocking opportunities for innovation and value creation, and allocating resources to the highest value use.

- **Boosting investor confidence** through greater predictability in how governments deal with major environmental issues.

- **Opening up new markets** by stimulating demand for green goods, services and technologies.

- **Contributing to fiscal consolidation** by mobilising revenues through green taxes and through the elimination of environmentally harmful subsidies. These measures can also help to generate or free up resources for anti-poverty programmes in such areas as water supply and sanitation, or other pro-poor investments.

- **Reducing risks of negative shocks to growth** due to resource bottlenecks, as well as damaging and potentially irreversible environmental impacts.

In May 2011, the OECD delivered its **Green Growth Strategy** to Heads of State and Ministers from over forty countries, who welcomed it as a useful tool for expanding economic growth and job creation through more sustainable use of natural resources, efficiencies in the use of energy, and valuation of ecosystem services.

The Strategy responds to a request from Ministers of the 34 countries who signed the Green Growth Declaration in 2009, committing to strengthen their efforts to pursue green growth strategies as part of their response to the economic crisis and beyond.

www.oecd.org/greengrowth





Strategies for greener growth need to be tailored to fit specific country circumstances.

They will need to carefully consider how to manage any potential trade-offs and best exploit the synergies between green growth and poverty reduction. The latter include, for example, bringing more efficient infrastructure to people (e.g. in energy, water and transport), tackling poor health associated with environmental degradation and introducing efficient technologies that can reduce costs and increase productivity, while easing environmental pressure. Given the centrality of natural assets in low-income countries, green growth policies can reduce vulnerability to environmental risks and increase the livelihood security of the poor.

Green growth strategies also recognise that focusing on GDP as the main measure of economic progress generally overlooks the contribution of natural assets to wealth, health and well-being. They therefore need to rely on a broader range of measures of progress, encompassing the quality and composition of growth, and how this affects people's wealth and welfare.

The OECD is working to identify the policy mixes and measurement tools

that countries in different situations can adopt to implement green growth in a way that contributes to poverty eradication, employment opportunities, and a strong and sustainable economy.

- *The starting point of OECD work is that there is no “one-size-fits-all” prescription for fostering greener growth.*

Greening the growth path of an economy depends on policy and institutional settings, level of

development, social structures, resource endowments and particular environmental pressure points. Advanced, emerging, and developing countries will face different challenges and opportunities. While national plans will differ, in all cases green growth strategies need to go hand-in-hand with the main pillars of action to promote social equity: more intensive human capital investment, inclusive employment promotion, and well-designed tax/transfer redistribution policies.

The OECD report on Green Growth and Developing Countries (forthcoming) aims to identify promising areas in which green growth objectives could be achieved and the policies, regulations, technology transfer, financing and new market and innovation opportunities that could help to deliver them. It reviews key barriers and includes options for a policy framework and a set of criteria that developing countries could consider in their efforts towards green growth policy making. Work will also commence on how progress could be assessed.

The report is being developed based on a consultative process with developing countries.

It aims to provide a platform for developing country partners to indicate their interest in collaborating with the OECD to shape a green growth agenda that is feasible and relevant for them and addresses the aspirations of their citizens.

www.oecd.org/dac/greengrowth





The elements of successful green growth strategies

The OECD Green Growth Strategy provides an analytical lens that can be applied to differing country needs and priorities. It helps to identify the most appropriate policy mix for advancing more sustainable and inclusive growth.

A number of criteria to help guide the design of policy strategies are proposed, such as: cost-effectiveness, adoption and compliance incentives, and ability to cope with uncertainty and provide a clear and credible signal to investors. Other important criteria include effectiveness in stimulating innovation and the diffusion of green technologies, and the extent to which instruments can be designed and implemented in a way that facilitates international co-ordination.

Governance issues are also an important consideration in policy design and implementation. Difficulties in monitoring environmental performance and compliance, collecting green taxes, adapting new technologies or setting up new markets may influence the choice of policy instruments in countries with large informal economies and where there is weak institutional or human capacity. Distributional effects will play an equally important role in policy development, including for the protection of poor households from any adverse effects of policy reforms. Successful strategies will likely draw on the key elements identified in this section.

VALUING NATURAL ASSETS AND ECOSYSTEM SERVICES

Valuing and properly pricing natural resources, biodiversity and the ecosystem services they provide lead to more sustainable use of these goods and services. For example, pricing can be an effective way of allocating water, particularly where it is scarce, and for encouraging more sustainable consumption. Appropriate water tariffs can generate the essential finance needed to help cover the costs of water infrastructure, essential to ensuring continued and expanded access to water supply and sanitation services for all.

Economic instruments also show promise with respect to biodiversity and other ecosystem services. Estimating the monetary value of the services provided by ecosystems and biodiversity can make their benefits more visible, and can lead to better, more cost-effective decisions. Creating markets and incentives to capture these values are an important element of the green growth toolkit, for example through payments for ecosystem services (PES) for forests and watersheds, tradable water rights, or through the use of eco-labelling certification schemes. OECD policy analysis focuses on the economic valuation of biodiversity and ecosystem services, and the use of economic incentives and market-based instruments to promote the conservation and sustainable use of biodiversity and

associated ecosystem services. This work supports the UN Convention on Biological Diversity.

- Interest in PES has been
- increasing rapidly over the past
- decade, with more than 300
- programmes being implemented
- worldwide to date. PES
- programmes in China, Costa Rica,
- Mexico, the United Kingdom and
- the United States alone are
- estimated to channel over USD
- 6.53 billion annually.

Finding out more

www.oecd.org/env/biodiversity

www.oecd.org/water

Green Growth and Biodiversity,
OECD Green Growth Papers (OECD,
forthcoming)

**Paying for Biodiversity: Enhancing
the Cost-Effectiveness of Payments
for Ecosystem Services** (OECD, 2010)

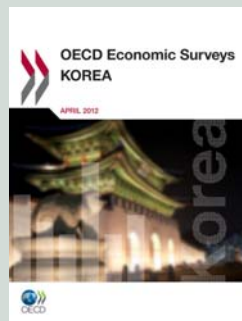
**Pricing Water Resources and Water
and Sanitation Services,** OECD
Studies on Water (OECD, 2010)



Tailoring green growth policies to individual countries

The OECD is supporting countries in their efforts to design and implement strategies for greener and more inclusive growth, including through its core advice in country-specific and multilateral surveillance. Through these, the OECD is providing guidance tailored to the needs of individual countries.

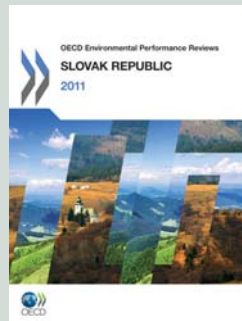
The **OECD Economic Surveys** systematically assess how environmental and growth policy recommendations interact, including in areas such as taxation, innovation, infrastructure, energy, agriculture and product market regulation. Recent surveys covering green growth include Brazil, Denmark, Germany, India, Korea, Mexico, New Zealand, Poland and the Russian Federation.



In response to country demand, the **OECD Investment Policy Reviews** now seek to help countries improve domestic conditions for investment in support of green growth objectives. The Investment Policy Review of Colombia and forthcoming Reviews of Tunisia, Jordan and Malaysia all include a green growth focus.



The **OECD Environmental Performance Reviews** examine how countries' environmental policy frameworks can support green growth, including through pricing mechanisms and transition measures. Recent reviews include Ireland, Israel, Japan, Luxembourg, Norway, Portugal, the Slovak Republic, and Greece.



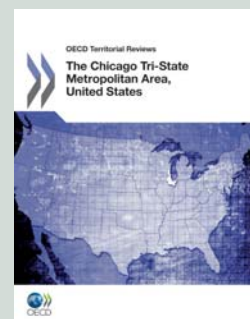
Also based on country demand, the **OECD Reviews of Innovation Policy** incorporate green growth considerations in their recommendations as well as best practice examples on how to improve policies which impact on innovation performance, including R&D policies. Recent reviews include Russia and Peru.



The OECD report **Going for Growth** identifies structural reform priorities to boost real income for each OECD country and key emerging economies. It will start to highlight policy opportunities that can strengthen growth, improve environmental outcomes and identify possible trade-offs.



The **OECD Green Cities programme** assesses the impact of urban green growth and sustainability policies on urban and national economic performance and environmental quality in different geographical, economic and national regulatory contexts. A first round of case studies included the Paris-IDF region, the Chicago/Tri-State Area and Korea. Case studies of Stockholm, Kitakyushu, Abu Dhabi and China are currently underway.





MAKING POLLUTION MORE COSTLY

Putting a price on pollution – through carbon taxes or emissions trading schemes – is a key policy for greener growth. **Pricing mechanisms tend to minimise the costs of achieving a given environmental objective and provide incentives for further efficiency gains and innovation, encouraging more sustainable production and consumption patterns.** Better pricing of

environmental ‘bads’ can contribute to improved health outcomes through a cleaner environment, with positive repercussions for human capital, labour productivity and reduced health-related expenditures. Pricing instruments can also generate additional fiscal revenues to ease tight government budgets and help finance critical priorities such as health, education, or infrastructure development.

A number of countries have embarked on green tax reforms, often using the revenues raised to reduce taxes on labour which could help boost employment and encourage green growth.

- *If advanced economies used taxes or auctioned permits to achieve the greenhouse gas emission reductions they pledged in the Cancún Agreements, they could raise USD 250 billion in revenues per year by 2020.*

Finding out more

www.oecd.org/env/taxes

Interactions Between Emission Trading Systems and Other Overlapping Policy Instruments, General Distribution Document (OECD, 2011)

Taxation, Innovation and the Environment (OECD, 2010)

The OECD **Environmental Fiscal Reform for Poverty Reduction**, *DAC Guidelines and Reference Series* (2005) identifies approaches to fiscal reform for green growth that can work well in most developing countries. The report provides insights and examples of good practice on using environmental taxation and pricing measures in country development and poverty reduction strategies. It also looks at the political economy of environmental fiscal reform and the role of donors in supporting the reform process.

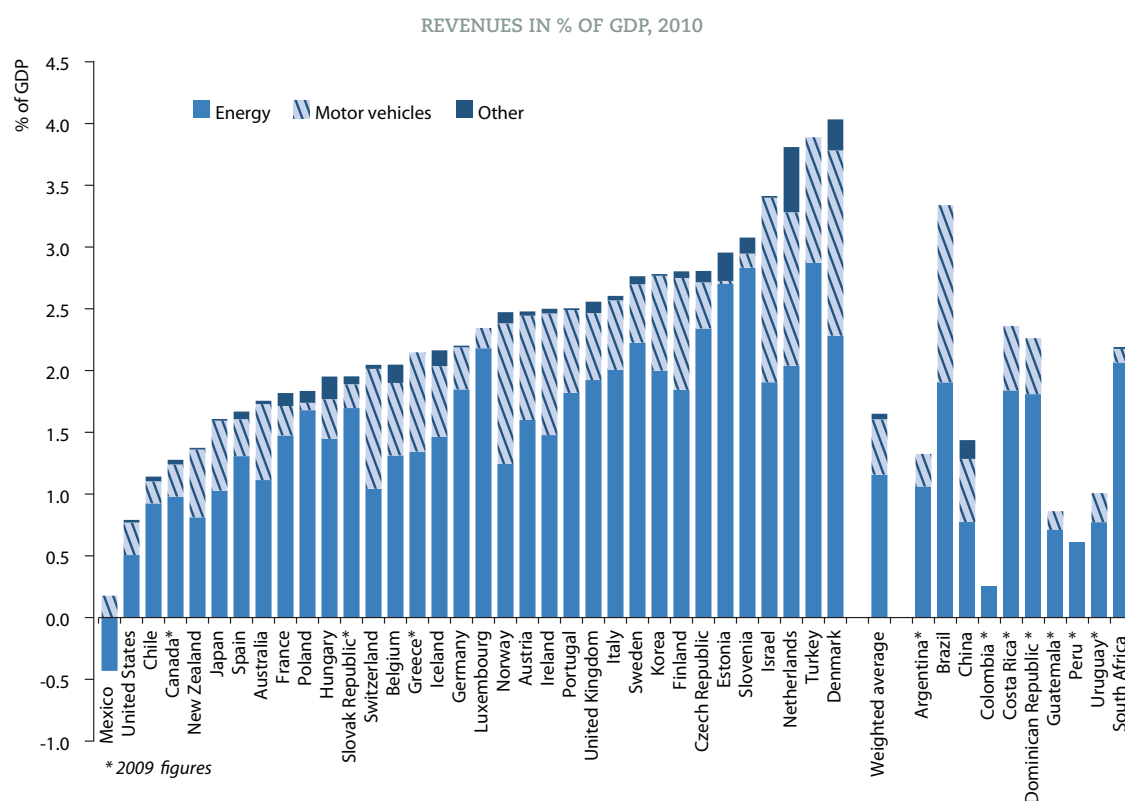
www.oecd.org/dev/poverty



ENVIRONMENTALLY RELATED TAXES IN PRACTICE

The use of environmentally related taxation (and emission trading systems) has widened in recent years, but there is still significant scope for increased use of these pricing instruments.

Meanwhile, the revenue from taxes on energy, the most widespread form of environmentally related tax, has tended to decline as a share of GDP, partly because growing global energy demand has pushed up pre-tax prices and encouraged increased fuel efficiency – showing the impact of economic incentives.



Note: Revenues from motor fuel taxes are included in 'Energy', not in 'Motor vehicles'. Royalties and tax revenues from oil and gas extraction are not included.

Source: OECD/EEA database on instruments for environmental policy: www.oecd.org/env/policies/database





REFORMING ENVIRONMENTALLY HARMFUL SUBSIDIES

Reforming policy-induced distortions that are damaging both for growth and the environment is a key priority within the green growth policy mix. Subsidies to fossil fuels, for example, encourage pollution and constrain the ability of governments to engage in programmes that help improve long term growth prospects such as improved health and education. There is significant scope for reducing the heavy burden that these subsidies place on government budgets, while also better targeting support to those who most need it.

Governments and taxpayers spent about half a trillion USD in 2010 supporting the production and consumption of fossil fuels. For the first time ever, the OECD has compiled an inventory of over 250 measures that support fossil-fuel production or use in 24 industrialised countries, which together account for 95% of the OECD's total primary energy supply. Those measures had an overall value of about USD 45-75 billion a year between 2005 and 2010. In emerging and developing countries, the International Energy Agency (IEA) estimated that subsidies to fossil fuel consumption amounted to some USD 409 billion in 2010.

Fossil fuel subsidies encourage the wasteful use of energy, contribute to price volatility by blurring market signals and act to lower the cost-competitiveness of renewable energy sources and energy-efficient technologies. Moreover, they often fail to meet their stated objectives of alleviating poverty or promoting

economic development. **The IEA found that only 8% of the USD 409 billion spent on fossil fuel subsidies in 2010 was distributed to the poorest 20% of the population;** other direct forms of welfare support would cost much less and reach the people who need them most.

OECD analysis suggests that most countries or regions would record real income gains following unilateral removal of their subsidies to fossil fuel consumption, as a result of a more efficient allocation of resources across sectors. Scarce government resources would be freed up for other priorities, such as protecting vulnerable households, stimulating employment creation,

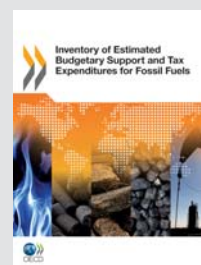
or helping to address climate change at home or in developing countries.

- Real income gains from the
- unilateral removal of fossil fuel
- consumption subsidies could be
- as much as 4% in some countries.
- At the same time, global GHG
- emissions would be reduced 6%
- by 2050 compared with business-
- as-usual.

Considerable momentum is building to cut fossil fuel subsidies, notably in the G20 forum as well as among Asia-Pacific Economic Cooperation (APEC) economies. Many countries are now pursuing reforms, though formidable economic, political and social hurdles will need to be overcome to realise lasting gains.

To assist governments' understanding of the nature and scale of their policies supporting fossil fuels, the OECD *Inventory of Estimated Budgetary Support and Tax Expenditures For Fossil Fuels* (2012) contains detailed information of over 250 mechanisms that support fossil fuel production and use in OECD countries. The Inventory will be updated regularly and expanded over time to cover more countries and more support mechanisms.

www.oecd.org/iea-oecd-ffss



Finding out more

www.oecd.org/g20/fossilfuelsubsidies

An update of the G20 Pittsburgh and Toronto Commitments, joint report by IEA, OPEC, OECD and World Bank on fossil-fuel and other energy subsidies (2011)

Mitigation Potential of Removing Fossil Fuel Subsidies: A General Equilibrium Assessment, OECD Economics Department Working Papers no. 853 (OECD, 2011)

The OECD and the IEA have established an online database to increase the availability and transparency of data on energy consumer subsidies and measures that support the production or use of fossil fuels in OECD countries.

The OECD's Economic Surveys also provide targeted analysis and advice to countries implementing fossil fuel subsidy reforms, for example in Mexico, India and Indonesia.

In the case of agriculture and fisheries, some support measures to these sectors may hamper the allocation of scarce resources to more productive activities, and increase the pressures on the environment, for instance through elevated GHG emissions, nutrient loading, rates of resource depletion and pressures on land and water resources. Not all forms of

agricultural support are environmentally harmful, however, and some support measures are linked to the achievement of specific environmental objectives. OECD work shows that the share of agricultural support that is linked to commodity production has decreased (e.g. market price support and associated trade barriers, direct production support, or input subsidies) and support measures conditional upon meeting environmental, food safety and animal welfare requirements or support based on the generation of ecosystem services have increased. Targeting policies to specific objectives is likely to achieve greater economic efficiency and better environmental performance. Further work is underway in the OECD to deepen understanding of the linkages between agricultural policies, support and green growth.



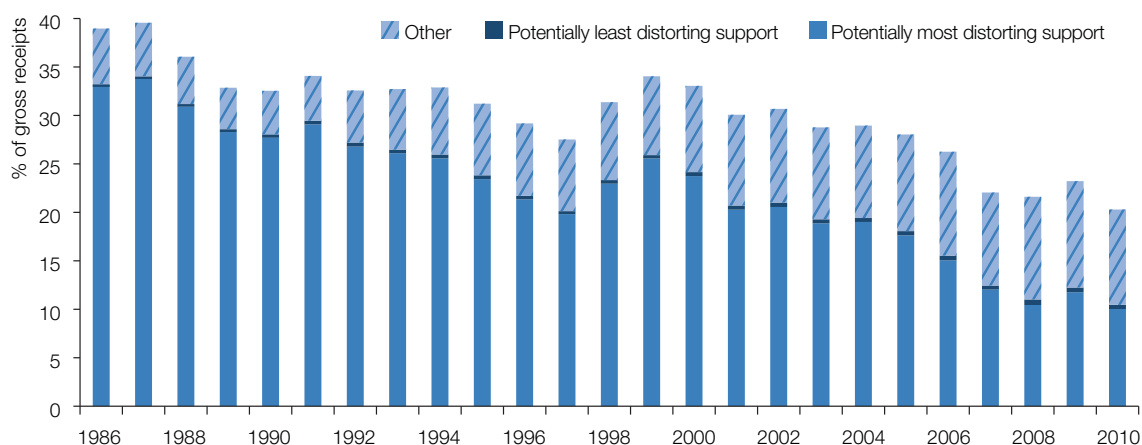
Finding out more

Decoupling agricultural support:
www.oecd.org/agriculture/decoupling

Producer and Consumer Support
Estimates database:
www.oecd.org/agriculture/pse

**Agricultural Policy Monitoring
and Evaluation 2011: OECD
Countries and Emerging
Economies (OECD, 2011)**

TRANSFERS FROM CONSUMERS AND TAXPAYERS TO AGRICULTURAL PRODUCERS
1986-2010



Notes: Potentially most distorting = support based on commodity production and inputs with no constraints attached to their use.
Potentially least distorting = support not based on production.
Data for 2010 are provisional.
Source: OECD PSE/CSE database, 2011.



INNOVATION AND GREEN TECHNOLOGY DEVELOPMENT AND DIFFUSION

Innovation, involving the creation, diffusion and application of new products, processes and technologies, can help to achieve the decoupling of growth from environmental pressures, at the lowest possible cost. Innovation also leads to new ideas, new entrepreneurs and business models, contributing to the establishment of new markets and eventually to the creation of new jobs.

The drivers of green innovation differ across countries. Advanced and emerging economies can often mobilise foreign direct investment, trade and human capital to build their technological and innovation capacity. However, in many developing countries, innovation takes place in small firms or in the informal economy, with less capacity to seek and absorb knowledge. Policy frameworks to foster green innovation should be adjusted to national circumstances, including the economic structure, existing capabilities to innovate, and the institutions in place.

Green innovation thrives under the same conditions as overall innovation, as the fundamental drivers and barriers are similar. Therefore a sound framework for innovation is important, including competitive markets, openness to foreign trade and investment, and

well-functioning financial markets. Removing barriers to new and young firms is particularly important, as these firms tend to be more responsive to new technological or commercial opportunities. Providing effective protection and enforcement of intellectual property rights (IPR) is essential to encourage the development and diffusion of technologies and to facilitate foreign direct investment and licensing.

But the rate and pattern of ‘green’ innovation is also affected by other factors, such as the environmental policy framework. Emission taxes and tradable permit systems provide price signals that indicate governments’ commitment to greener growth, giving innovators an incentive to invest in green innovation and the flexibility to identify the best means of meeting environmental objectives. Price signals enhance efficiency in allocating resources by strengthening markets for green innovation, and will lower the costs of addressing environmental challenges.

But price signals are not sufficient, particularly if breakthrough technologies are to be developed and diffused throughout the economy. Temporary support for the development and commercialisation of green technologies will be needed in certain cases as well as public and private investment in relevant

research, including in emerging and developing economies that will need to adapt existing technologies to their own local context. Strengthening markets for green innovation is also important, for example through well-designed public procurement standards and regulation.

- Investing only in energy and environmental R&D is not enough to spur green innovation. R&D in fields such as chemistry, material sciences and engineering are equally important sources of scientific research for green inventions.

Recent OECD work suggests that there are significant differences between the effects of different policy measures depending on the level of technological development, so having the appropriate mix of policy instruments is important. For example, when a technology is still far from being competitive, relative prices are less important than ambitious performance standards, or significant public support for research.

More generally, characteristics of the policy framework for green growth like stringency, predictability and flexibility are key for encouraging innovation and technology transfer. **An “unpredictable” policy regime can slow down technology invention and adoption.** For instance, the increased volatility of public R&D spending has a negative impact on innovation.

GREEN INNOVATION IN TOURISM

Tourism, as a transversal sector interacting with many other industries and services, can contribute significantly to the shift towards more sustainable, cleaner and low-carbon economic growth. Entrepreneurs and policy-makers are increasingly looking at innovation as key to improving environmental performance and achieving sustainable targets. Innovation is also essential to improve existing products and to develop more sustainable tourism products and experiences.

www.oecd.org/cfe/tourism

Although energy and environmental R&D still account for a small share of GDP, in recent years governments have been promoting increased investment in green technologies, notably in the area of renewable energy. As competition between alternative technological trajectories is key, there is a risk that governments will attempt to pick winners. One way to avoid this is to support general infrastructure or basic conditions for a wide range of alternative technologies, *e.g.* advanced grid management systems that are needed for a number of generating technologies, or general-purpose technologies such as ICT, industrial biotechnology or nanotechnologies. Good policy design is essential for any support, *e.g.* in ensuring competitive selection

processes, focusing on performance rather than specific technologies, avoiding favouring incumbents or providing opportunities for lobbying, ensuring a rigorous evaluation of

policy impact, and containing costs. Support for commercialisation should be temporary and accompanied by clear sunset clauses and transparent phase-out schedules.

Finding out more

www.oecd.org/environment/innovation

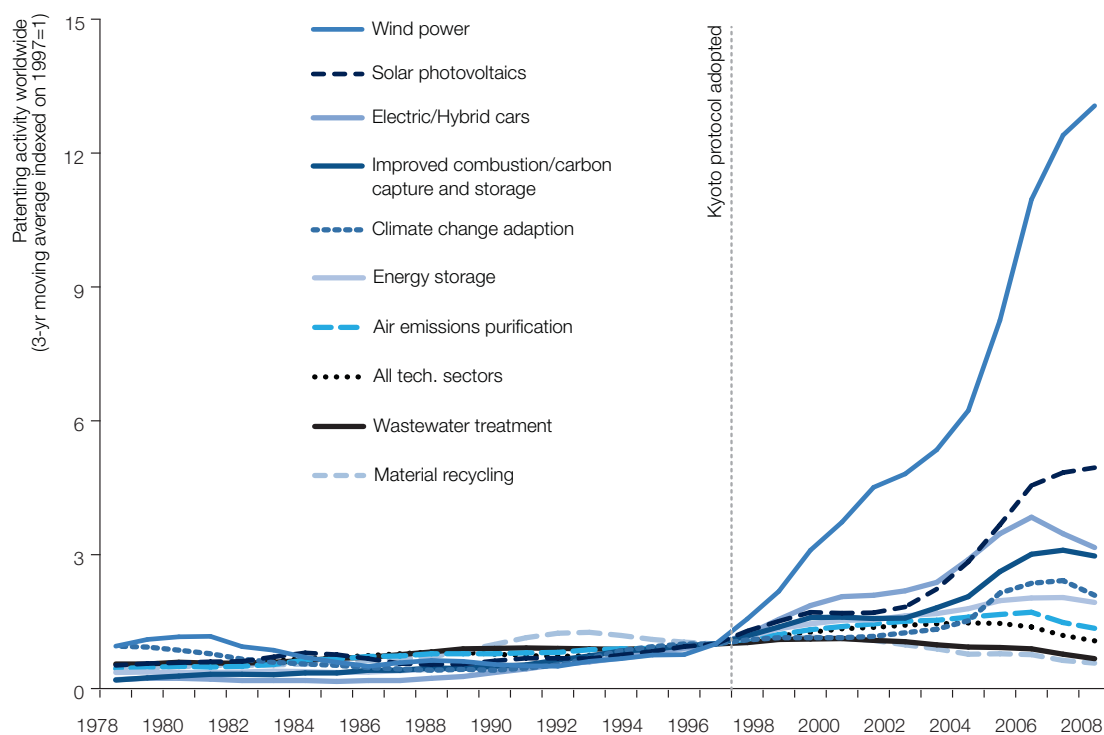
www.oecd.org/sti/innovation/green

Energy and Climate Policy and Innovation: Bending the Trajectory, OECD Studies on Environmental Innovation (OECD, 2012)

Invention and Transfer of Environmental Technologies, OECD Studies on Environmental Innovation (OECD, 2011)

Fostering Innovation for Green Growth, OECD Green Growth Studies (OECD, 2011)

THE IMPORTANCE OF CLEAR POLICY SIGNALS Trends in patenting activity worldwide



Note: Patent counts refer to the number of "claimed priorities", by the first filing date worldwide, shown as 3-year moving averages and indexed on the year 1997.

Source: OECD calculations based on data extracted from the EPO Worldwide Patent Statistical Database (PATSTAT, October 2011) using algorithms developed at the OECD and the EPO. See *Energy and Climate Policy and Innovation: Bending the Trajectory* (OECD, 2012).



SKILLS DEVELOPMENT AND LABOUR MARKET POLICIES

A successful transition towards a greener economy will create new opportunities for workers, but also new risks. The challenge for labour market and skill policies is to maximise the benefits for workers and help assure a fair sharing of adjustment costs, while also supporting broader green growth policies (e.g. by minimising skill bottlenecks). The **three main policy priorities** are:

- support a smooth reallocation of workers from declining to growing firms, while reducing the adjustment costs borne by displaced workers
- support eco-innovation and the diffusion of green technologies by strengthening initial education and vocational training, and ensuring that overly-strict product market regulations are not blunting the incentive to innovate
- reform tax and benefit systems for workers to make sure that cost pressures generated by environmental policies do not become a barrier to employment.

There is also need for green-specific labour market and skill policies, including top-up training for mid-career workers who need to adapt to greener ways of working. An OECD questionnaire

sent to labour and employment ministries reveals that about 60% of the responding countries have implemented at least one green growth labour market measure, with training being the most common. The challenges that emerge are: detecting how green growth is changing labour demand and jobs skill requirements, co-ordinating labour market and skill policies with environmental policy, and ensuring that both men and women are equally well-prepared for the shift to a greener economy and that they both benefit from new jobs and entrepreneurial opportunities.

Women's under-representation in science, technology, engineering and mathematics fields in tertiary education directly limits women's opportunities to participate in a growing green labour market. In the majority of OECD countries, fewer than 30% of tertiary qualifications in the fields of engineering, manufacturing and construction and about 40% of tertiary qualifications in science degrees were awarded to women.

Gender differences in these subject choices are even more distinct in vocational training programmes. If green content is introduced only in science and engineering oriented vocational programmes, a large proportion of women will not benefit from the training and miss the opportunity to acquire the necessary skills for new green jobs.

- In OECD countries, women have a smaller carbon footprint than men. Moreover, women are more likely to recycle, buy organic food and eco-labelled products and they place a higher value on energy-efficient transport than men.

From the demand side, an OECD survey of small and medium-sized enterprises indicates that firms are often not sufficiently aware of the need for green skills for the future, and their investment in green training or green knowledge-intensive activities is often limited, as is their awareness of the impact of regulations on their industry.

- By 2030 employment in the solar and wind electricity sector in the OECD area as a whole could be 40% higher than without climate mitigation policies. By contrast, the fossil fuel and coal mining sectors could lose more than 35% of their jobs in the OECD area.

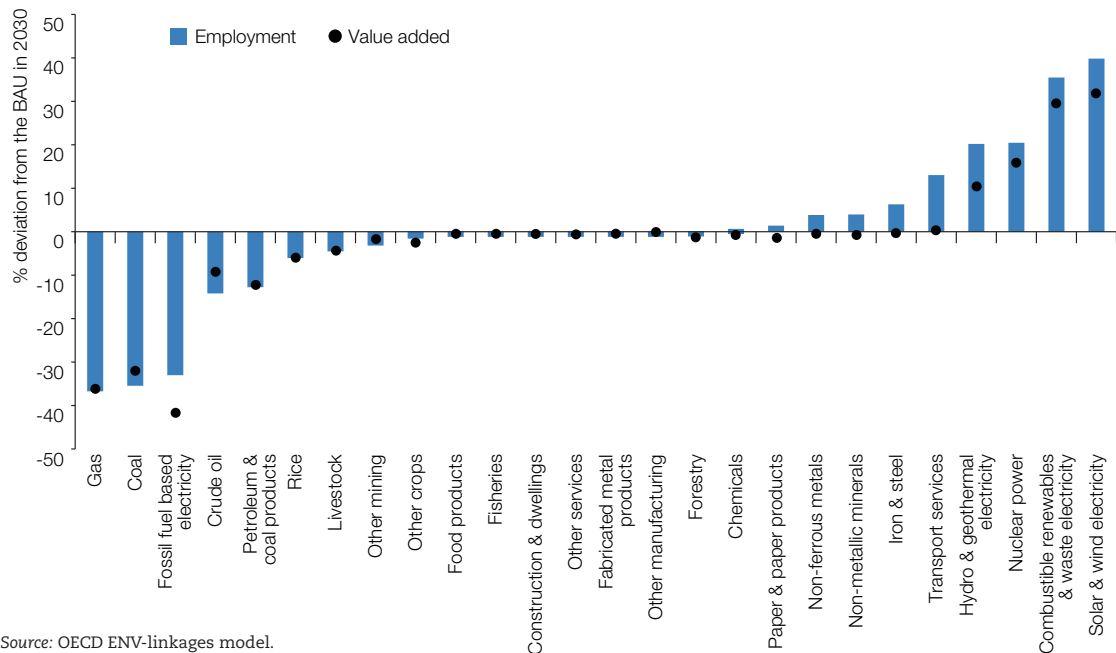


WHAT WOULD CLIMATE CHANGE POLICIES MEAN FOR JOBS?

A study using the OECD's ENV-Linkages model shows that a well-designed emissions trading system could sharply reduce GHG emissions while allowing GDP to keep growing (although at a slightly lower rate). These modelling results also indicate small net impacts on total employment, but other studies suggest bigger gains if the right policies are in place. These studies also show that green growth could be a powerful weapon to help developing economies in their fight against underemployment. The key is mobility, with workers able to move easily from sectors where employment would drop, notably fossil-fuel industries, to sectors such as renewable energy industries where job opportunities rise rapidly. Countries exporting fossil-based energies would be most affected.

The OECD model demonstrates that the impact of GHG mitigation policy on GDP growth is small when the labour market adjusts smoothly to employment opportunities and losses, but that the costs rise significantly when workers in declining sectors become unemployable elsewhere due to an incapacity to change and lack of flexibility in labour markets. One way to combine environmental policy with measures to help workers take advantage of new opportunities would be use revenues from carbon taxes to reduce taxes on labour income. This can generate a "double-dividend" by delivering both lower GHG emissions and higher employment.

SECTORAL CHANGES IN EMPLOYMENT WITH AMBITIOUS CLIMATE CHANGE MITIGATION POLICIES, OECD COUNTRIES
In % deviation from the business-as-usual (BAU) scenario in 2030



Source: OECD ENV-linkages model.

Finding out more

Greening jobs and skills: www.oecd.org/greengrowth/skills

OECD Employment Outlook 2012, chapter on green jobs (OECD, forthcoming)

Employment Impacts of Climate Change Mitigation Policies in OECD: A General-Equilibrium Perspective, OECD Environment Working Papers no. 32 (OECD, 2011)

Enabling Local Green Growth: Addressing Climate Change Effects on Employment and Local Development, OECD LEED Working Papers no. 2012/01 (OECD, 2012)

Greening Jobs and Skills: Labour Market Implications of Addressing Climate Change, OECD LEED Working Papers no. 2010/02 (OECD, 2010)





LEVERAGING PRIVATE INVESTMENT FOR GREEN INFRASTRUCTURE AND TECHNOLOGIES

Investing in greener infrastructure is critical for more sustainable growth because the choice of infrastructure can lock-in polluting and climate vulnerable development patterns, and because it accounts for the bulk of investment needed to address pressing environmental challenges. In addition, infrastructure projects are particularly vulnerable to climate change, due to long operational life times.

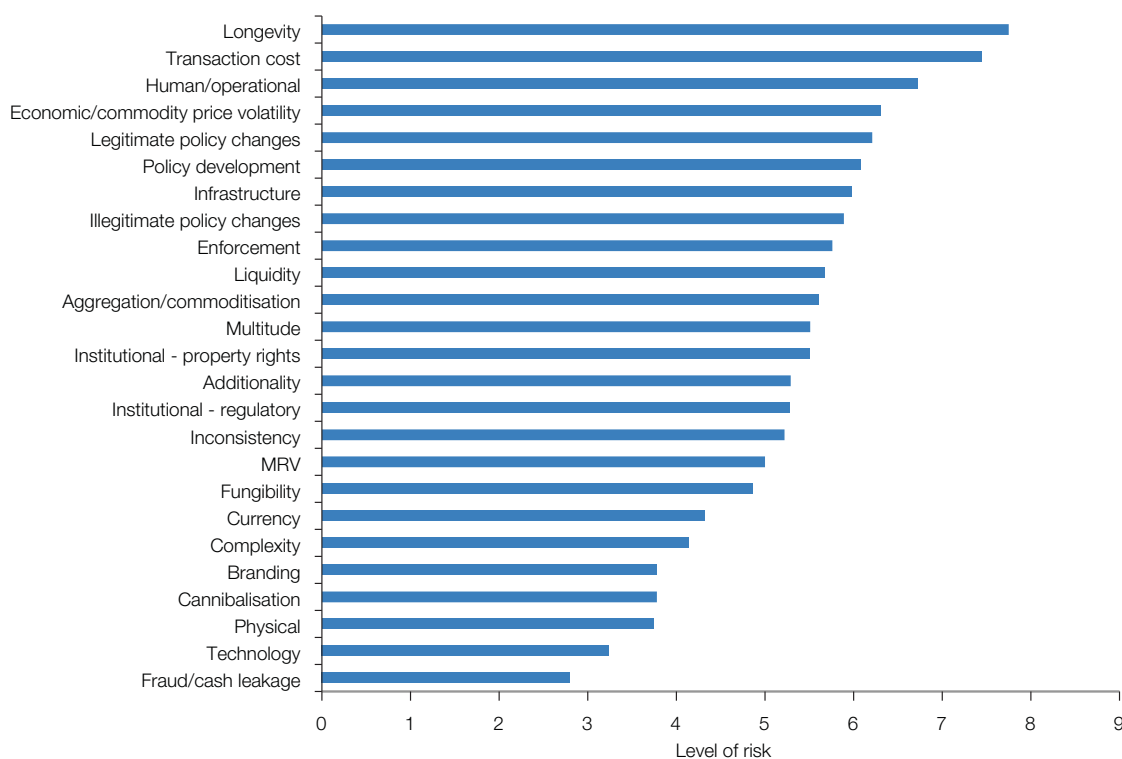
In developing countries, where a major part of the infrastructure required for development is still to be built, there is an opportunity to leap-frog by introducing greener and more efficient infrastructure. In developed countries, the challenge is more about renovation and upgrading outdated infrastructure.

Major shifts in long-term investments will be required to transform energy, transport, water and building infrastructure to become resource- and energy-efficient and increase the use of

renewable energy. The IEA and others estimate the investment required is USD 1 trillion per year globally, in addition to the OECD's estimates of global infrastructure requirements of USD 50 trillion to 2030, almost half of which is required by 2020.

While private investment in clean energy is rising quickly, domestic and international private investment in green infrastructure is still seriously constrained by market failures and by activity- and sector-specific investment barriers.

RANKING OF RISKS IN GREEN FINANCE



Source: Mobilising Private Investment in Green Infrastructure (OECD, forthcoming working paper) (based on data from Standard & Poor's / Parhelion)

Moreover, country-specific barriers often limit the attractiveness of such investments, either in terms of the adequacy of returns or unmanageable risk.

Institutional investors – such as pension funds and insurance companies– can play an important role in financing such green growth initiatives, which represent a potentially “win-win” long-term investment opportunity with steady income streams. However, less than 1% of pension funds’ assets globally are allocated to infrastructure investment, let alone to green growth projects. This may be due to an unsupportive environmental policy backdrop, including regulatory risk and uncertainty, a lack of information, knowledge and expertise about the type of investment required to finance green projects, or a lack of appropriately structured financing vehicles providing the risk/return profile required.

- *Almost 10% of the global burden of disease could be avoided through investment in better water and sanitation infrastructure and could result in several million lives being saved.*

How can governments encourage private investments?

Governments can aid the transition by using public funds to mitigate financial risk, unlock private investment, promote learning, and build institutional and human capacity to bring about transformative change, while developing a coherent green investment policy framework for long term financial viability.



The OECD is working to develop an integrated policy framework that can help achieve the common goal of low-carbon, climate resilient (LCR) development and greener growth. This includes goal setting across levels of government; reforming policies to enable investment and strengthen market incentives for LCR infrastructure; and specific financial policies that provide transitional support for new green technologies, as well as increasing the social returns through, for example, training and R&D and institutional capacity building; along with promoting green business and consumer behaviour through information and education policies.

Other OECD work aims to establish what policy signals are required to give institutional investors the confidence to invest in this space, and to determine the most efficient financing tools for leveraging private sector financing, as well as how to track both public and private sector climate change finance.

Finding out more

www.oecd.org/greengrowth/investment

Defining and Measuring Institutional Investors’ Allocations to Green Investments (OECD, forthcoming working paper)

Toward a Policy Framework for Green Infrastructure Investment (OECD, forthcoming working paper)

Role of Institutional Investors in Financing Clean Energy (OECD, forthcoming working paper)

The Role of Pension Funds in Financing Green Growth Initiatives, *OECD Working Papers on Finance, Insurance and Private Pensions*, no. 10 (OECD, 2011)

Transition to a Low Carbon Economy: Public Goals and Corporate Practices (OECD, 2010)

GREENING CONSUMER BEHAVIOUR

Household consumption patterns and behaviour are having an increasing impact on stocks of natural resources, environmental quality and climate change. In response, governments are introducing measures to encourage people to consider the environmental effects of their purchasing decisions and practices. These include environmentally-related taxes, energy efficiency standards for homes, CO₂ emissions labels for cars, and financial support to invest in solar panels.

Better understanding what influences people's behaviour towards the environment can help governments choose the most effective policy instruments. OECD surveys of more than 10 000 households across a number of

countries, in the areas of energy, food, transport, waste and water, show that economic incentives encourage energy savings and investment in water-efficient equipment as well as waste generation and recycling levels.

- Households charged for their water on a volume basis consume approximately 20% less than those who are not charged.

But "soft" policy measures such as labelling, public information campaigns and education can play a significant complementary role. Initiatives to raise environmental awareness are crucial, as attitudes towards the environment drive water-saving behaviours, demand for energy-efficient appliances, and decisions to recycle and to consume organic food. However, few households are prepared to pay

Finding out more

www.oecd.org/environment/households

Greening Household Behaviour: The Role of Public Policy (OECD, 2011)

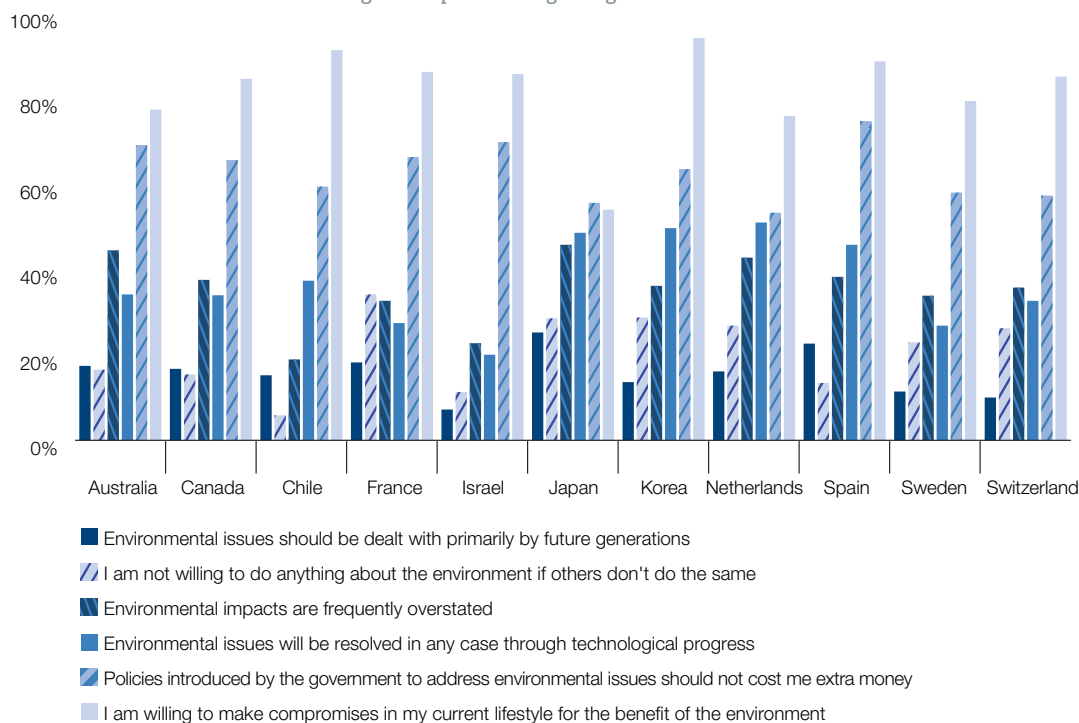
Consumer Policy Toolkit (OECD, 2010)

Environmental Claims: Findings and Conclusions of the Committee of the OECD Committee on Consumer Policy (OECD, 2010)

much to use green energy, drive alternative fuel vehicles or consume organic food, so using a mix of instruments will be key to spur behavioural change.

- 60% of people are willing to pay extra for the use of renewable energy in their electricity, but 45% of people who would choose a differentiated rate for renewable energy do not have the option to do so.

DO CONSUMERS CARE ABOUT ENVIRONMENTAL ISSUES?
Percentage of respondents agreeing with the statements



Source: OECD *Greening Household Behaviour: Results of the 2011 Survey* (OECD, forthcoming)



Integrating green growth into government policies

MAINSTREAMING GREEN GROWTH INTO CORE ECONOMIC POLICIES

Having the institutional and governance capacity to implement wide-ranging policy reform is an essential condition for greening growth and achieving sustainable development. **Governments need to be able to integrate green growth objectives into broader economic policymaking and development planning.** Developing such capacity is a key structural issue and applies as much to many OECD countries as it does to developing countries. This issue is not restricted to formal national level planning processes, such as national plans or poverty reduction strategies, but extends to public financial management

(especially the budget process), developing strategies for key economic sectors as well as how these feed through into sub-national development.

Capacity development for green growth policies should take a “country system approach” across government. Finance and core economic ministries should take a leading role on core economic policies for green growth that engage central planning, finance and sectoral ministries as well as environment agencies in their formulation. The role and capacity of non-governmental actors in the private sector and civil society will also be important.

Finding out more

Environmental Action Programme Task Force: Greening Development in Eastern Europe, Caucasus and Central Asia: www.oecd.org/env/eap

Green Growth and Developing Countries (OECD, forthcoming)

Greening Development: Enhancing Capacity for Environmental Management and Governance (OECD, 2012)

Green Growth and Environmental Governance in Eastern Europe, Caucasus, and Central Asia, OECD Green Growth Papers (OECD, 2012)

Greening national processes: distinctive features of developing countries

Natural resources are central to developing countries. Valuing environmental assets and services in national and corporate accounts can encourage the development of policies to safeguard their value.

The low level of infrastructure in most developing countries provides an opportunity to **leapfrog** to modern, efficient technologies, but it also requires sufficient technical capacity and a supportive policy environment.

High levels of employment in **informal sectors** poses challenges for successfully implementing environmental standards, and requires stakeholders to have the capacity to develop and implement appropriate measures.

Effective, inclusive and equitable **governance** is essential. Governance processes and mechanisms for greening development should respond to the needs and interests of marginalised groups.



WIKIGENDER is a project initiated by the OECD Development Centre to improve knowledge of and exchange on gender equality-related issues around the world, with a focus on empirical evidence measuring gender equality. Based on the work of the Social Institutions and Gender Index, Wikigender also aims to highlight the importance of social institutions such as informal and formal laws, social norms and practices that impact on women's empowerment.

www.wikigender.org



MAINSTREAMING GENDER

Mainstreaming gender in green growth strategies will be particularly important to tackle malnutrition and food security in developing countries. Women play a fundamental role in poverty reduction, decreasing child malnutrition and increasing agricultural production. Discriminatory attitudes and practices regarding the role of women in society are significant barriers to their control over resources and thus food production. For example, OECD work using the Social Institutions and Gender Index shows that in countries where women have few or no rights to access land, the levels of child malnutrition are also higher. Recent OECD work also shows that discriminatory social institutions can negatively affect rural women's empowerment, agricultural production and food security.

- Countries where women lack rights to own land have on average 60% more malnourished children.

THE IMPORTANCE OF CITIES, REGIONS AND COMMUNITIES

Central government policy alone cannot ensure a green transition – cities, regions and communities can also be catalysts for green growth policy solutions. Experimentation and learning at the local level can provide essential experience and lead to bottom-up diffusion of approaches between cities and regions as well as influence national and even international levels of actions. Co-ordinating governance issues can help achieve the most cost-effective option in attaining green growth, including in the areas of green investment and innovation.

Cities are essential to making growth stronger, greener and more inclusive

Over 50% of the world's population is now living in cities, and 70% of the population is expected to be urban by 2050. Cities are critical drivers of national growth: just 2% of OECD regions, mainly the largest OECD urban areas, produce one-third of all growth in the OECD. In both India and China, the five largest cities' economies contribute approximately 15% of national GDP – roughly three times their share of the population.

But growing urbanisation increases pressures on the environment. Cities account for an estimated 67% of global energy use and 71% of global energy-related CO₂ emissions. The expansion of cities without sufficient spatial planning or adequate investment in housing and other

essential infrastructure can create substandard living conditions, through severe air and water pollution as well as the accumulation and inappropriate disposal of household and industrial waste.

- Without new policies, the health impacts of urban air pollution will continue to worsen by 2050, and it is expected to become the top environmental cause of premature mortality worldwide.

OECD work on cities and green growth shows that urban policies, such as increasing density, congestion charges and property tax reforms, can contribute to reducing environmental pressures while supporting economic growth in the long term. There are clear instances where green growth initiatives at the city level can also provide social co-benefits, such as reducing social exclusion through public transit enhancements or reducing households' energy costs through energy-efficiency retrofits. But developing green growth strategies at the city scale is not an easy task. Key challenges include how to ensure integration and co-ordination between local and national initiatives and making these efforts broader, more systematic and long-term. Now more than ever, funding is another key issue as cities face demands of employment generation and service provision with fewer resources.

www.oecd.org/greencities





RENEWABLE ENERGY AND THE OPPORTUNITIES FOR RURAL DEVELOPMENT

Recent years have seen a rapid increase in the quantity of energy produced from renewable sources, such as wind, solar, geothermal and small hydropower.

Between 2002 and 2010, overall investment in renewable technologies has been estimated at approximately USD 1 trillion. Due to the availability of both space and renewable sources of energy, rural regions attract a large share of this investment.

- In Germany around 25% of overall renewable energy investments goes to rural areas, and above 60% in countries like the United States, Canada and Australia.

OECD case studies suggest that renewable energy deployment can positively affect the development path of rural areas. For instance, royalties and taxes paid by developers to local communities help them to improve the delivery of key services. New resources can be used to build schools, senior residences, or increase broadband access in sparsely populated areas. Renewable energy installations can also create employment opportunities in maintenance and operation activities and can spur self-employment and entrepreneurship.

However, national and regional renewable energy policies with very ambitious targets and high incentives for renewable energy production have often caused distortions, triggering rent-seeking behaviours, and creating competition between installations and agriculture and tourism for land use or landscape amenities. As a result, many local communities have started opposing further deployment.

Potential links with rural industries such as forestry or manufacturing are not developed due to the lack of an integrated approach to renewable energy deployment. Reducing the use of spatially blind incentives set at the central level, and taking into account the characteristics and specific needs of hosting economies could help to transform the large investment in an opportunity for economic development.



Finding out more

www.oecd.org/greengrowth/citiesandregions

Cities and Green Growth (OECD, forthcoming)

Compact City Policies: A Comparative Assessment, OECD Green Growth Studies (OECD, 2012)

The Production of Renewable Energy as a Regional Development Policy in Rural Areas, OECD Green Growth Papers (OECD, 2012)

OECD Regional Outlook 2011: Building Resilient Regions for Stronger Economies, Special Focus: Innovation and Green Growth in Regions, (OECD, 2011)



International co-operation for green growth

TECHNOLOGY TRANSFER AND INTERNATIONAL RESEARCH CO- OPERATION

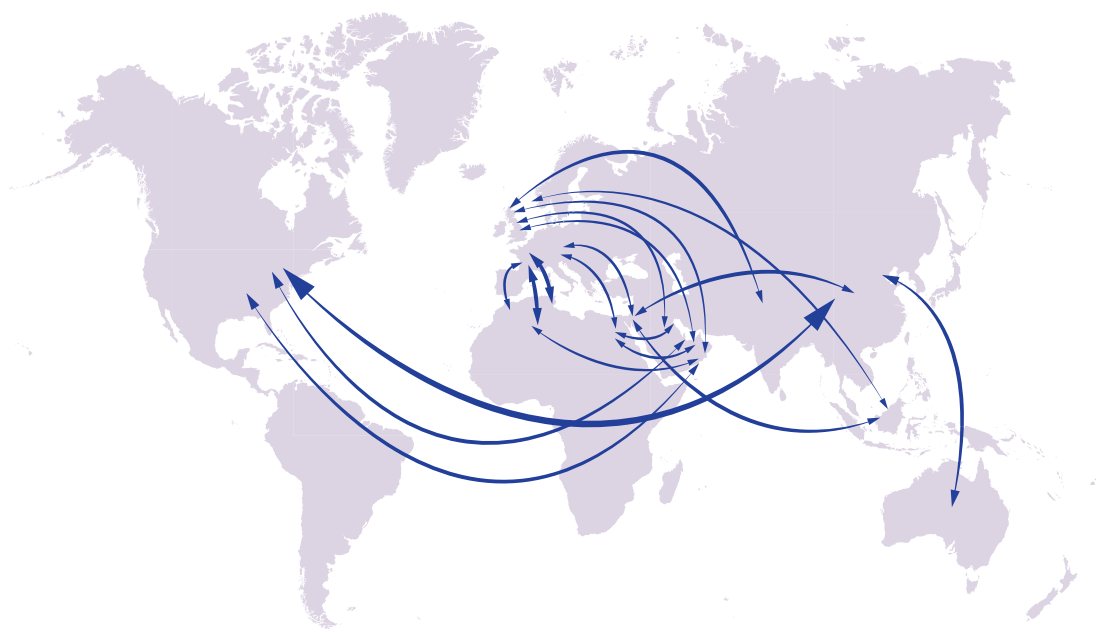
Ensuring a wide diffusion of green technologies in areas such as energy, transport and waste disposal will be as important as their development. Environmental issues of international or global concern can benefit from international policy co-ordination which extends beyond joint commitment to emission reductions.

OECD work shows that not all international green technology transfer and knowledge diffusion takes place within advanced economies. In recent years, emerging and developing economies have become important destinations and sources for international transfer of environmental and climate change mitigation technologies. Increasingly, inventors in non-OECD countries have joined forces with OECD inventors in the

development of specific technologies. However, there is significant potential for further expansion in North-South and South-South diffusion of environmental technologies and knowledge.

Actions by developing countries to put in place policies that constrain emissions will be critical for encouraging greater international diffusion of green technologies.

INTERNATIONAL RESEARCH CO-OPERATION IN DESALINATION TECHNOLOGIES Most important co-authorship relationships between OECD and non-OECD countries



Note: Country of authorship is defined in terms of country of primary affiliation.

Source: OECD calculations based on data from the SCOPUS database. See *International Cooperation for Climate Change: A Problem Shared is a Problem Halved* (OECD, forthcoming).

However, the lack of stringent environmental policy signals in developing countries is not the only explanation for the low rates. More general factors such as lack of financial resources, openness to trade and foreign direct investment, the rule of law and the quality of the IPR system also help to explain why technology diffusion tends to be concentrated in developed countries. However, the most important factor is unquestionably domestic innovative (or absorptive) capacity. **The higher the level of domestic human capital, the greater the diffusion and adoption of technologies available on international markets.** This

illustrates the importance of long-term capacity building and education in technical and scientific areas underpinning 'green' innovation.

One important way to increase domestic innovation capacity is through international research collaboration. Indeed, it is interesting to see that while much of the international research co-operation is amongst OECD economies, some developing countries have become significant research partners. The map shows how frequently researchers based in OECD and non-OECD countries co-author scientific papers in the area of desalination.

International technology-oriented agreements can play an important role in encouraging collaboration, and the evidence indicates that emerging economies are relatively more likely to collaborate in the development of climate mitigation technologies than in other areas. The IEA's "Implementing Agreements" have played an important role in encouraging inventors from different countries to collaborate in the development of technologies such as solar and wind power, carbon capture and storage, and energy storage, and many of the emerging economies are playing an increasingly prominent role in such agreements.



Finding out more

www.oecd.org/environment/innovation

www.oecd.org/sti/innovation/green

International Cooperation for Climate Change: A Problem Shared is a Problem Halved (OECD, forthcoming working paper)

Energy and Climate Policy and Innovation: Bending the Technological Trajectory, OECD Studies on Environmental Innovation (OECD, 2012)

International Technology Agreements for Climate Change: Analysis Based on Co-Invention Data, OECD Environment Working Papers, No. 42 (OECD, 2012)

Invention and Transfer of Environmental Technologies, OECD Studies on Environmental Innovation (OECD, 2011)

REDUCING BARRIERS TO TRADE IN ENVIRONMENTAL GOODS AND SERVICES

Achieving greener growth will require numerous goods and services to enable factories and buildings to use energy more efficiently, to reduce air and water pollution, to make the transition to more sustainable uses of energy, and to provide sanitation and clean drinking water. Many of these goods and services will be procured locally, but some will only be available, or available more cheaply, from foreign suppliers.

Trade in both environmental goods and services (EG&S) often goes hand in hand. For example, there is a fast-growing trade in services monitoring, repairing and even remotely operating renewable-energy facilities such as wind turbines and bio-gas plants.

- At one point in the negotiations on liberalising trade in environmental goods at the WTO, the number of products proposed by member economies for including on a list of such goods numbered more than 400.

Trade can help the environment both through achieving a more efficient use of resources and by serving as a conduit for the transfer of green technologies. Willingness within the international community to reduce barriers to trade in EG&S appears to be growing. The OECD has been active in providing input to such efforts by the WTO, APEC and NGO coalitions. But, currently, trade barriers still reduce the quality of the needed inputs and make their supply more expensive, rendering progress along the path of green growth more difficult.

Reducing or eliminating import tariffs on environmental goods is relatively easy to implement with the appropriate political support. But many of the barriers to trade in EG&S are of a non-tariff nature and

require more frequent consultation and co-ordination among the countries concerned. Local-content obligations, for example, are conditions imposed on producers or investors — often in the context of subsidies, tax breaks, or government procurement — that specify a minimum share of goods or services associated with a project that have to be procured locally. Such obligations have arisen in several countries, or their provinces, notably in connection with renewable energy. The OECD is currently working to document the incidences of these and other domestic incentive measures and to explain their effects on production, consumption and trade in the affected goods.

Finding out more

www.oecd.org/trade/env

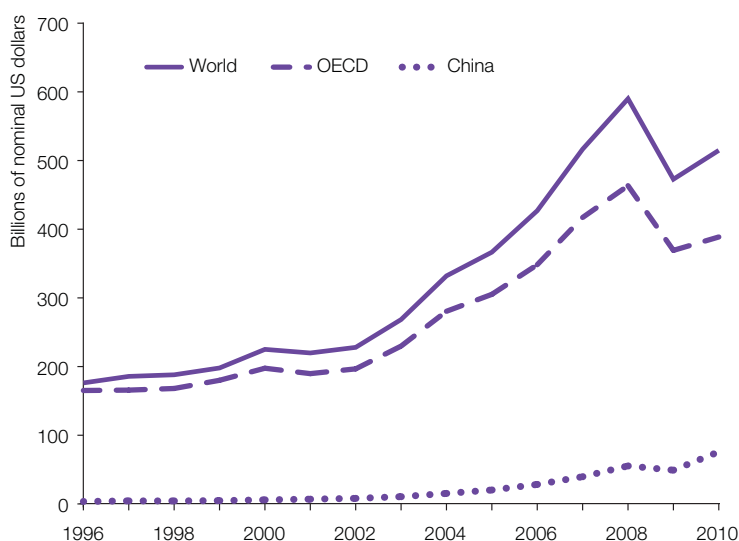
Trade-Related Measures Based on Processes and Production Methods in the Context of Climate-Change Mitigation, *OECD Trade and Environment Working Papers*, no. 2011/04 (OECD, 2011)

Trade in Services Related to Climate Change: An Exploratory Analysis, *OECD Trade and Environment Working Papers*, no. 2011/03 (OECD, 2011)

Facilitating Trade in Selected Climate Change Mitigation Technologies in the Energy Supply, Buildings, and Industry Sectors, *OECD Trade and Environment Working Papers*, no. 2009/02 (OECD, 2009)

From 1996 through 2010, world trade in environmental goods – as defined by a list drawn up by the OECD in the late 1990s – tripled in nominal value terms. Over the same period, the share accounted for by non-OECD countries grew fourfold, from 6% to 24%.

WORLD TRADE IN ENVIRONMENTAL GOODS
1996 – 2010



Note: "Environmental goods" refer to those included in the OECD's illustrative list in *Environmental Goods and Services: the Benefits of Further Trade Liberalisation* (OECD, 2001)
Source: OECD based on WTO trade data.



ENSURING FREEDOM OF INVESTMENT AND PREVENTING PROTECTIONISM

International investment is a vital source of finance and a powerful vector of innovation and technology transfer as countries address the effects of climate change and seek to promote green growth.

The OECD-hosted Freedom of Investment (FOI) Roundtable, bringing together some 50 governments from around the globe, has issued a statement, *Harnessing Freedom of Investment for Green Growth*, which underscores the importance of continued monitoring by governments of their investment treaty practices regarding environmental goals.

New environmental measures should also observe key international law principles such as non-discrimination (creating a level playing field for domestic and international investors). International investment arbitration is assuming a growing role in resolving disputes involving environmental issues, placing special responsibility on the investment policy community to ensure the integrity and competence of arbitral tribunals and to improve their transparency.

The FOI Roundtable also addresses concerns expressed by some countries that investment could be affected if the green growth policy agenda were captured by protectionist interests. However, **to date, none of the 42 OECD and emerging economies that report regularly to the Roundtable about investment measures have**

reported overt discrimination against non-resident or foreign investors in relation to environmental policy. Nonetheless, vigilance is encouraged.

Environmental policy measures that appear to be neutral may potentially involve de facto discrimination or create barriers to trade which constrain development. Some environment-related state aids (such as grants, loan guarantees or capital injections for individual firms), may

potentially pose risks to competition.

The FOI Roundtable will continue to monitor investment measures to ensure that they are not used as disguised protectionism. As part of its general monitoring of investment measures, the Roundtable invites States to report on whether their investment treaty arbitration cases have any impact on environmental policy.

Finding out more

www.oecd.org/daf/investment/foi

Harnessing Freedom of Investment for Green Growth, Freedom of Investment Roundtable (OECD, 2011)

Defining and Measuring Green FDI: An Exploratory Review of Existing Work and Evidence, *OECD Working Papers on International Investment*, No. 2011/02 (OECD, 2011)

Stocktaking of Domestic Greenhouse Gas Emission Reporting Schemes (OECD, forthcoming working paper)



The OECD Guidelines for Multinational Enterprises are recommendations addressed by governments to multinational enterprises. They provide voluntary principles and standards for responsible business conduct.

The Guidelines encourage communication practices in areas where reporting standards are still evolving, such as social, environmental and risk reporting. This is particularly the case with GHG emissions. In line with an increased demand for disclosure of non-financial information by companies, the OECD is currently taking stock of government schemes promoting corporate GHG emissions disclosure with a view to identify related benefits and challenges for governments, companies and investors.

www.oecd.org/daf/investment/guidelines



DEVELOPMENT ASSISTANCE FOR GREEN GROWTH AND SUSTAINABLE DEVELOPMENT

Official development assistance (ODA) plays an important role in areas where private sector flows are scarce – such as human and institutional capacity development – to create enabling conditions for greener growth.

OECD countries make up the main donor countries, and have been working with developing country partners to identify how ODA can best support their sustainable development.

Sustainable natural resource management is now a priority focus of many bilateral aid programmes and Environmental Impact Assessments are a standard requirement of all significant aid-funded infrastructure projects in developing countries. Moreover, **aid can play an instrumental role to avoid lock-in to carbon-intensive infrastructures and in many cases to mobilise private investment in these areas.**

- In 2010 OECD donors allocated about USD 3 billion to railway transport which could potentially reduce private transport demand and the associated GHG emissions.

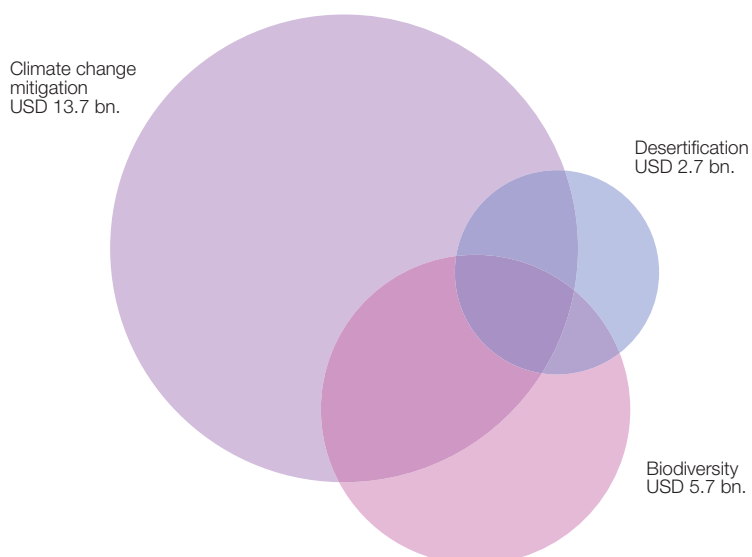
ODA's contribution to green growth in developing countries can be further strengthened by ensuring that climate proofing and disaster risk reduction approaches are mainstreamed in aid-funded public investments. Similarly aid for poverty reduction needs to promote livelihoods that are more secure and resilient to climate

change and environmental degradation. It should aim to assist with major developmental shifts, such as urbanisation, where the scale of investment needed is large and the sustainability of its planning is particularly important for advancing green growth.

- ODA for renewable energies
- recently surpassed that of ODA
- for non-renewable energies.

The OECD has recently accelerated its efforts in applying lessons learned from enhancing development effectiveness to climate change finance, which is set to increase substantially to USD 100 billion annually by 2020. This work includes ensuring the effectiveness of its delivery and using the finance critically not only for the impact of mitigation and adaptation measures but also for development outcomes and poverty reduction.

AID ACTIVITIES TARGETING THE THREE RIO CONVENTIONS
2009-10 average commitments by Development Assistance Committee (DAC) members, constant 2010 prices



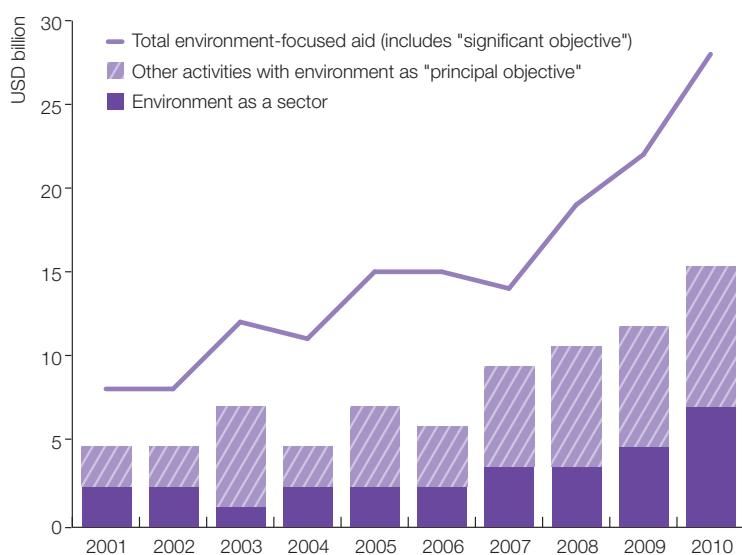
Source: OECD DAC Creditor Reporting System (CRS)

The OECD collects data on aid flows to key sectors related to green growth and sustainable development such as energy, water, agriculture and forestry. It has also been tracking aid for environmental purposes for over two decades and aid targeted to the three Rio Conventions on biodiversity, desertification, and climate change since 2000.

www.oecd.org/dac/stats/rioconventions

Bilateral ODA for general environmental protection from DAC members grew from USD 1.9 billion in 2001-02 to USD 5.1 billion in 2010. Support for other activities addressing environmental sustainability rose from USD 5.8 billion to USD 20.3 billion in 2009-10.

ENVIRONMENT AID
2001-2010, commitments by DAC members, constant 2009 prices



Source: OECD DAC Creditor Reporting System (CRS)

PROMOTING KNOWLEDGE-SHARING

The OECD has joined forces with the Global Green Growth Institute, UNEP and the World Bank to establish the Green Growth Knowledge Platform (GGKP). Launched in January 2012, the GGKP is an international knowledge-sharing platform that identifies and addresses major knowledge gaps in green growth/green economy theory and practice. It aims to provide practitioners and policymakers with better tools to foster economic growth and implement sustainable development, including any commitments that emerge from Rio+20.

All GGKP research and knowledge-sharing activities operate with an understanding that the green growth and green economy policy mix will vary according to country-specific circumstances, thereby necessitating a

menu of policy options and toolkits. These will seek to improve local, national, and global economic policymaking around the world by providing rigorous and relevant analysis of the various synergies and tradeoffs between the economy and the environment. The GGKP will complement other efforts by emphasizing policy instruments that yield local environmental co-benefits while stimulating growth, providing a compelling set of incentives for governments.



GREEN GROWTH
knowledge platform

www.greengrowthknowledge.org



Finding out more

www.oecd.org/dac/greengrowth

Development Co-operation Report 2012 (OECD, forthcoming)

Strategic Environmental Assessment in Development Practice: A Review of Recent Experience (OECD, 2012)

The Mutual Review of Development Effectiveness in Africa 2010: Promise and Performance, OECD/United Nations Economic Commission for Africa (OECD, 2011)



Measuring well-being and progress towards greener growth

For almost 10 years, the OECD has been looking beyond the functioning of the economic system to the diverse experiences and living conditions of people and households. The OECD agenda on measuring well-being and progress calls for improved and new statistical measures, aimed at filling the gap between standard economic statistics (which are mainly focused on measuring the volume of market activity and related macro-economic statistics) and indicators that have a

more direct bearing on people's lives. Work on the latter aspect can be grouped under the following three pillars of the OECD Measuring Progress framework:

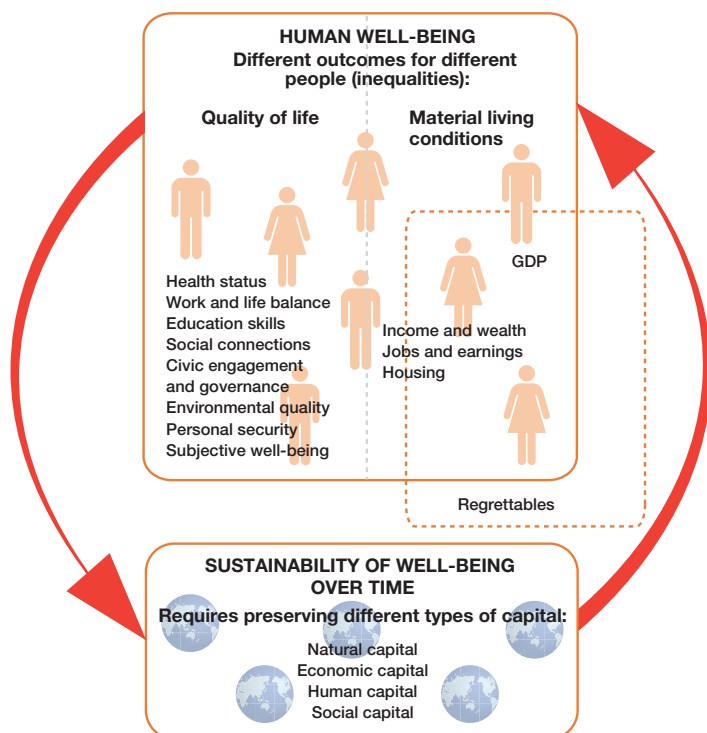
- **Material well-being** includes the commodities and resources available to individuals and households. To improve measurement in this area, the OECD is working in different directions such as: measuring

disparities in National Accounts; measurement of services produced by households for their own use; analysing and explaining the difference between volume growth in real GDP per capita and real household income per capita; and developing an integrated framework on income, expenditures and wealth.

- **Quality of life** gathers non-monetary aspects that shape people's 'doings and beings'. This work mainly focuses on developing guidelines on the measurement of subjective well-being, improved measures of environmental quality of life and measures of resilience and vulnerability.

- **Sustainability** can be assessed by looking at the set of key economic, social and environmental assets transmitted from current to future generations, and whether these assets will allow people to meet their own needs in the future. To capture the broad notion of economic, social and environmental sustainability, the OECD is monitoring key natural resources, estimating carbon-emissions embedded in consumption, and measuring human capital.

OECD FRAMEWORK FOR MEASURING WELL-BEING AND PROGRESS



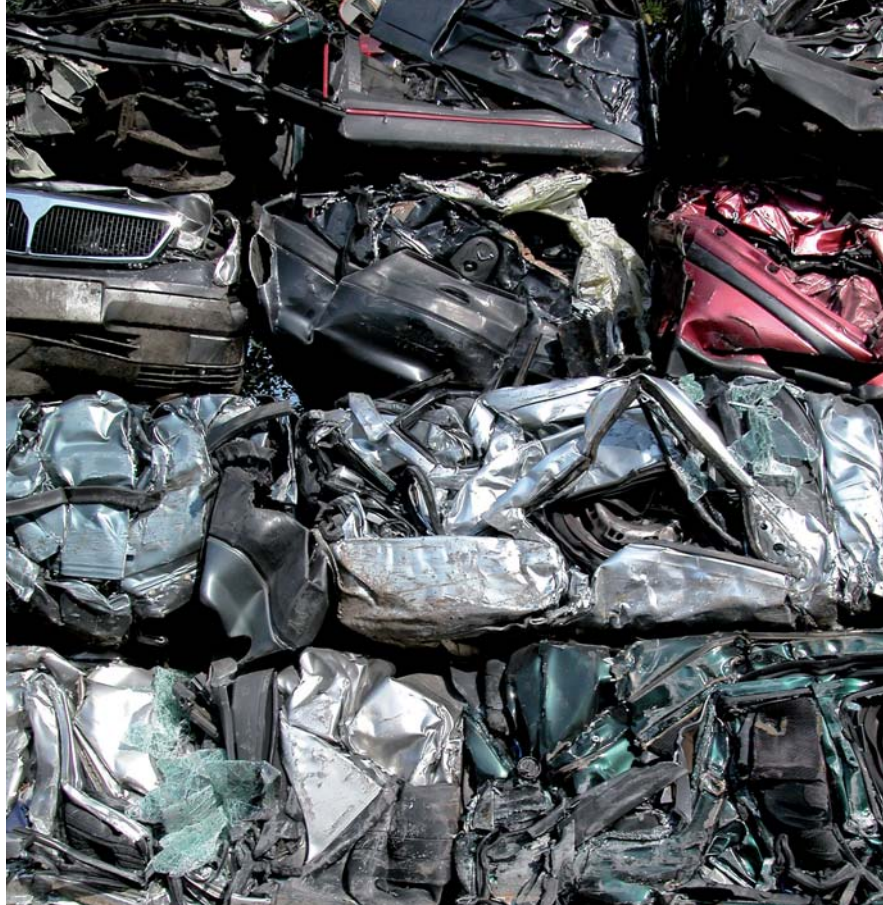
Finding out more

www.oecd.org/measuringprogress
oecdbetterlifeindex.org

The OECD's work on green growth indicators is a key part of its broader agenda on measuring progress and well-being. It can complement GDP by measuring and communicating progress on the decoupling of pollution and resource consumption from growth, as well as the impact of economic activity on natural assets and human well-being. For developing countries, these indicators can be also used to provide valuable feedback for international donors, financial institutions and corporate partners.

The OECD works closely with other relevant organisations to develop a common framework that can be easily used by all countries, taking into account their national circumstances and capacities. Given the complexity of green growth that cuts across economic, environmental and social dimensions, progress towards policy objectives cannot be easily captured by a single measure but rather by a set of markers that identify necessary conditions for green growth. To this end, the OECD Green Growth Measurement Framework is a powerful tool for providing a body of evidence to support the policy dialogue on whether:

- economic growth is becoming greener;
- there is risk of future shocks to growth linked to deterioration of natural resources;
- people benefit from greener growth; and
- greening the economy is opening new sources of growth.



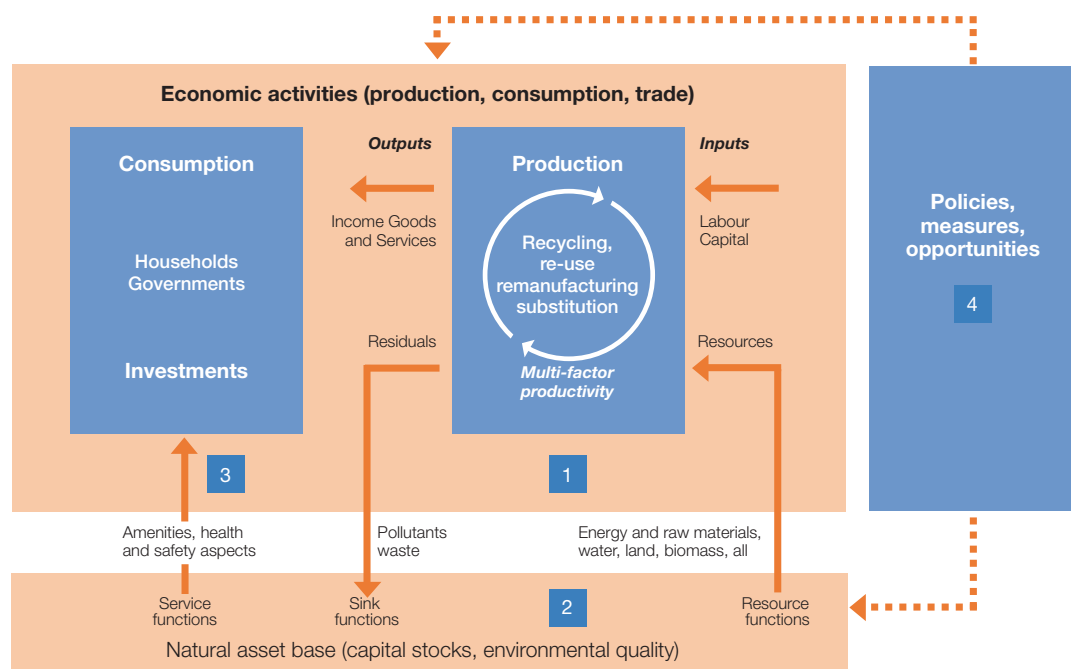
The 2011 report *Towards Green Growth: Monitoring Progress - OECD Indicators* proposes a set of twenty-five indicators on the basis of existing work in international

organisations, and in OECD and partner countries. The framework divides indicators into four inter-linked groups reflecting the main features of green growth.

PROPOSED GREEN GROWTH INDICATOR GROUPS AND TOPICS COVERED

1	The environmental and resource productivity of the economy	<ul style="list-style-type: none"> Carbon and energy productivity Resource productivity: materials, nutrients, water Multi-factor productivity
2	The natural asset base	<ul style="list-style-type: none"> Renewable stocks: water, forest, fish resources Non-renewable stocks: mineral resources Biodiversity and ecosystems
3	The environmental dimension of quality of life	<ul style="list-style-type: none"> Environmental health and risks Environmental services and amenities
4	Economic opportunities and policy responses	<ul style="list-style-type: none"> Technology and innovation Environmental goods and services International financial flows Prices and transfers Skills and training Regulations and management approaches
	Socio-economic context and characteristics of growth	<ul style="list-style-type: none"> Economic growth and structure Productivity and trade Labour markets, education and income Socio-demographic patterns

OECD GREEN GROWTH MEASUREMENT FRAMEWORK



The OECD will continue working with countries to advance the green growth measurement agenda, fill some of the most important information gaps, and contribute to the implementation of the System of Environmental and Economic Accounting in areas relevant to green growth. The aim is to:

- Fill gaps in environmental-economic data at the industry level.
- Develop and improve the physical data for key stocks and flows of natural assets, including information on land resources and non-energy mineral resources that often constitute critical inputs into production.
- Further develop physical data to help improve material flow analyses.
- Improve information on biodiversity.

■ Develop monetary values to reflect prices and quantities for (changes in) key stocks and flows of natural assets. Such valuations, even if incomplete and imperfect are required for extended growth accounting models, more comprehensive balance sheets and for adjusted measures of real income.

- Produce information on how environmental concerns trigger innovation in companies.
- Develop indicators on environmental regulation to complement indicators on economic instruments.
- Improve measures on both the objective and the subjective dimensions of quality of life, in particular measures of environmentally induced health problems and related costs; and public perceptions.

At the same time, the OECD, UNEP and the World Bank are working closely together, and also with other organisations, including the UN Statistics Division, other UN agencies, EUROSTAT, and the European Environment Agency, to develop a common set of core indicators for the green economy.

INDICATORS DATABASE

The OECD has recently launched an online database containing selected indicators for monitoring progress towards green growth to support policy making and inform the public at large. The indicators draw upon the OECD's expertise with statistics, indicators and measures of progress.

The dataset covers OECD countries as well as the BRIICS economies (Brazil, Russian Federation, India, Indonesia, China and South Africa), Argentina and Saudi Arabia from 1990 onwards.

stats.oecd.org

Towards headline indicators for green growth

As part of the next steps of its Green Growth Strategy, Ministers have asked the OECD to define a small set of headline indicators that can support national economic policies by tracking central elements of green growth, while at the same time conveying a clear message to the public and policy makers.

Based on a preliminary reflection and in co-ordination with other international initiatives, notably the UNEP's framework for Green Economy indicators, the following six indicators are under consideration and development and will be augmented with an indicator reflecting economic opportunities and policy responses:

- CO₂ productivity (demand-based and production-based)
- Non-energy material productivity by material group (demand-based and production-based)
- Multifactor productivity adjusted for environmental services
- Index of natural resource stocks
- Change in land cover
- Population exposure to fine particles (PM 2.5)

OECD green growth indicators in practice

Countries like the **Czech Republic, Korea and the Netherlands** have already applied the OECD green growth measurement framework and indicators to their specific national contexts to assess their state of green growth. With the support of OECD, the Latin America Development Bank, the Latin American and the Caribbean Economic System and the United Nations Industrial Development Organization, work is underway in **Mexico, Colombia, Costa Rica, Ecuador, Guatemala, and Paraguay** to apply the OECD indicators as a way to identify key areas of national concern and the scope for improving the design, choice and performance of policy instruments.



Finding out more

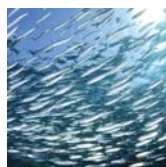
www.oecd.org/greengrowth/indicators

Towards Green Growth: Monitoring Progress – OECD Indicators (OECD, 2011)

Sustainable Manufacturing Toolkit: www.oecd.org/innovation/green/toolkit

Material Resources, Productivity and the Environment (OECD, forthcoming)

Mortality Risk Valuation in Environment, Health and Transport Policies (OECD, 2012)



- An increase of 3° - 5° C in global mean temperatures would likely result in a fall in maize and wheat yields, high production losses of pigs and confined cattle, and increased heat stress and mortality in livestock.

Transforming sectors

FOOD, AGRICULTURE AND FISHERIES

Agriculture has usually responded successfully to the need to produce more, initially by expanding the land it occupied and then by producing more intensively on that land. But world population is projected to grow by a third by 2050 and demand for food will double. Farmers will be in competition with urbanisation and infrastructure projects for land and other resources such as water, and the negative impacts of further intensification on the environment may limit improvements to yields.

- To meet the needs of an expected 9 billion people by 2050, food production will need to increase by 70% - 100% compared with current levels.
- Agriculture uses on average over 40% of water and land resources in OECD countries.

Farming and fishing have significant impacts on the environment. Climate change will also have an effect on agriculture and food production. The challenge for policy makers is to meet increasing demands for food and resources while minimising environmental and social pressure.

- Developing countries will need an estimated investment of USD 209 billion per year to meet the food needs of their growing populations.

The **OECD Green Growth Study: Food and Agriculture** (2011) argues that a greener and more effective food chain can contribute substantially to sustainable growth and food security, and pave the way for less pressure on marine and land resources. It identifies three priority areas where coherent action is required:

- Increase productivity in a sustainable way: Increasing resource use efficiency throughout the supply chain will not only ensure more production relative to inputs used, but also conserve scarce natural resources and deal with waste.
- Ensure that well functioning markets provide the right signals: Prices that reflect the scarcity value of natural resources as well as the positive and negative environmental impacts of the food and agriculture system will contribute to resource use efficiency.
- Establish and enforce well-defined property rights: Property rights help ensure optimal resource use, in particular for marine resources, land and forests, greenhouse gas emissions, and air and water quality.

www.oecd.org/agriculture/greengrowth



FISHERIES AND AQUACULTURE

As natural capital is used up, it becomes more expensive to replace it with technology and other resources.

About half of the fish stock groups monitored by the FAO are fully exploited and a third overexploited, depleted or recovering from depletion.

Poorly managed fisheries leave the environment and profitability at risk.

Allowing fish stocks to be drawn down below the point where they offer maximum returns hurts the profitability of fishers and the potential contribution of the sector to the economy and food supply, as well as ocean ecosystems.

Change can be sudden, unpredictable and irreversible.

Some stocks can recover from catastrophic collapse, as did the Peruvian anchovetta, while others fail to do so, like the cod stocks in the Northwest Atlantic.

- Approximately 30% of the world's fish stocks are overexploited, depleted, or recovering from depletion and 50% are fully exploited.

Policies have to be coherent with activities outside the fish sector.

For example, fertilizer and pesticides from agriculture can cause dead zones such as the 6 000 - 7 000 square mile zone in the Gulf of Mexico. Tourism and commerce may compete with fish production for access to infrastructure.

Principles and guidelines for rebuilding fisheries recommended by the OECD in 2012 address these issues. The key message is that if fisheries are managed in a sustainable and responsible way, rebuilding won't be necessary. OECD work calls for a comprehensive assessment that recognises the interplay between the economics of fishing activity, the biological state of the stocks, management and governance.

www.oecd.org/fisheries

Finding out more

OECD-FAO Agricultural Outlook (OECD, FAO, 2012)

Agricultural Policies for Poverty Reduction (OECD, 2012)

Food and Agriculture, OECD Green Growth Studies (OECD, 2011)

The Economics of Rebuilding Fisheries (OECD, 2012)

Fisheries: While Stocks Last? OECD Insights (OECD, 2010)





ENERGY

Rising energy demand and the need to drastically cut CO₂ emissions require a transformation in the way we produce, deliver and consume energy. The current energy system is highly dependent on fossil fuels, whose combustion accounted for 84% of global greenhouse gas emissions in 2009, according to the IEA. Global demand for energy is rapidly increasing, because of population and economic growth, especially in large emerging market economies, which will account for 90% of energy demand growth to 2035. At the same

time, 1.3 billion people worldwide still lack access to electricity.

As developed countries renew their energy infrastructure and developing countries build new power plants to meet growing demand, there is a window of opportunity to achieve greener energy production. **IEA analysis shows that worldwide energy-related emissions of CO₂ could be halved by 2050, using existing and emerging technologies, at an additional new investment of USD 46 trillion.**

Promoting innovation and creating new markets and industries can reduce the sector's carbon-intensity and improve energy efficiency, as well as create opportunities for economic growth and employment. It is vital for governments to create the enabling policy framework to catalyze private sector investment. **By acting now, long-term costs can be reduced:** every US dollar

that is not spent on investment in the energy sector before 2020 will require an additional USD 4.3 to be spent after 2020 to compensate for increased greenhouse gas emissions by building zero-carbon plants and infrastructure by 2035 (IEA, 2011).

Finding out more

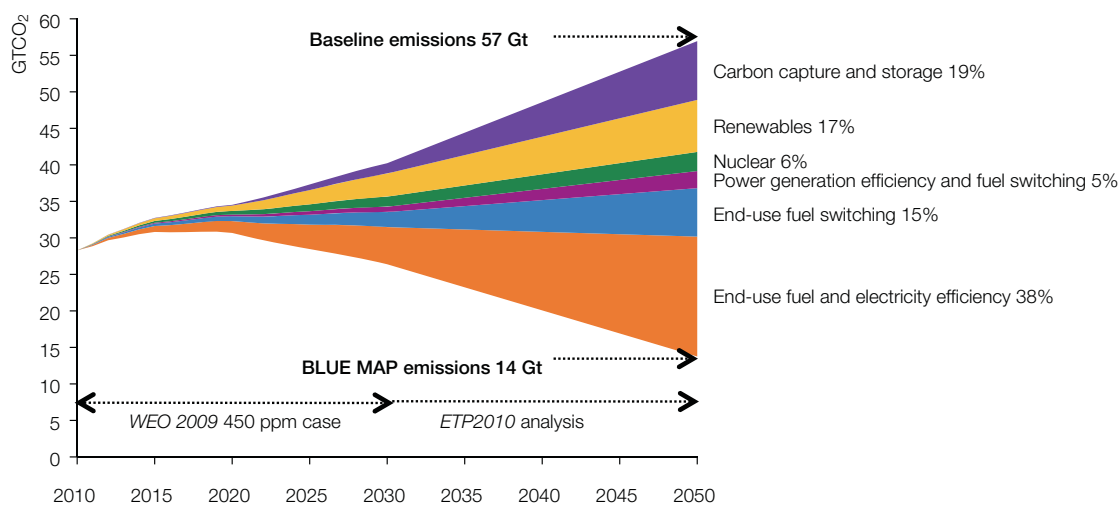
www.iea.org

World Energy Outlook 2011 (IEA, 2011)

The joint report by the OECD and IEA, **Green Growth Studies: Energy (2011)** highlights the challenges facing energy producers and users, how they can be addressed using green growth policies, and how to reshape the political economy of reform.



KEY TECHNOLOGIES FOR A LOW-CARBON ENERGY SYSTEM IN 2050



Source: Energy Technology Perspectives 2010, IEA



WATER

According to the OECD *Environmental Outlook to 2050*, global water demand is projected to increase by 55% between 2000 and 2050, and tensions could increase as domestic users, manufacturing, electricity generation and other economic sectors compete with agriculture for access to resources. By 2050, over 40% of the global population are likely to be living in river basins under severe water stress.

Despite progress in increasing access to improved water sources and sanitation, **more than 240 million people are expected to remain without access to “improved” –but not necessarily safe – water sources by 2050.** Almost 1.4 billion people are projected to still be without access to basic sanitation in 2050, mostly in developing countries.

- According to the World Health
- Organization, investments to meet
- the water and sanitation MDGs
- could have a benefit-to-cost ratio
- of 7 to 1.

Green growth policies in the water sector need to address both quantity and quality issues, encourage water-related innovation and investment in green infrastructures, and they need to be integrated with policies in sectors that have an impact on water availability and use - especially agriculture, energy, and land use. Sustainable financing, effective governance and policy coherence are key.

Sustainable pricing of water and water related services can signal the scarcity of the resource, promote efficiency and manage demand. Targeted social support is more effective than low tariffs (or the absence of tariffs) to combine investment in water supply

and sanitation systems and affordability for poor households.

Restoring environmental flows and allocating more water to watershed services will help maintain the valuable ecosystem services they provide. Removing incentives which encourage people to settle or invest in flood-prone areas can reduce the impact of water-related disasters.

Health and other dividends

Investing in water supply and sanitation infrastructure brings important dividends, in particular in urban slums where unsafe water and lack of sanitation generates huge health costs and lost economic opportunities. Innovative techniques and business models with private sector involvement will be needed.

Public support for water-related R&D and building the capacity of users is justified to improve and increase the use of appropriate wastewater treatment equipment and techniques, and the efficient management of nutrients and agricultural run-off. Experience shows that building the capacity of users (essentially that of farmers) in target economies through training and education can be even more relevant and effective than transferring technologies.

Additional benefits can include saving energy and cutting investment requirements and operation and maintenance costs. However, there are also risks, notably pollution of agricultural land or health risks. OECD work on eco-innovation for water explores economic and policy issues associated with the use of alternative water resources and innovative technologies, such as smart water systems.

Finding out more

www.oecd.org/water

Meeting the Water Reform Challenge (OECD, 2012)

Water Quality and Agriculture: Meeting the Policy Challenge (OECD, 2012)

OECD Environmental Outlook to 2050: The Consequences of Inaction (OECD, 2012)



TRANSPORT

Transport has major environmental impacts in terms of GHG emissions, air pollution and noise. Maritime and air transport represent smaller shares of total emissions than road.

- Total CO₂ emissions from freight and passenger transport combined worldwide are expected to grow 1.5 to 2.4 times their 2010 levels by 2050.

Automobiles

A large part of public expenditure to stimulate green growth has been directed at alternative vehicles, and electric cars in particular. Some governments are also making long-term investments in high speed rail, to reduce the use of car and short-haul aviation traffic.

Priority should be given to improving the fuel efficiency of conventional engines, through fuel economy and CO₂ emissions standards and economic incentives such as feebates, before gradually introducing alternative technologies. Managing congestion is central to sustainable transport.

- The congestion charge scheme in London has seen a 6% increase in bus passengers during charging hours, and raised GBP 148 million in 2009/10 to be invested in improving transport.

Rail

High speed rail can compete effectively with passenger cars and air transport over distances up to 1 000 kilometres where traffic is dense. Investment in high speed rail is likely to reduce GHGs from traffic, but the reduction is small and may take decades to compensate for the emissions from construction. The economic benefits of high speed rail, including stimulating local employment, can be significant, but should be closely assessed.

Maritime transport

Regulations and advocacy through both international and territorial policy action, and continued development of environmental performance metrics in global supply-chain networks can create market-based incentives for less-polluting maritime transport.

Aviation

Investment in fuel efficient technologies and fleet renewal will largely determine the environmental impact of aviation. Fuel prices, tax and regulatory policies will influence the composition of the fleet. An internationally agreed emissions trading system would be more effective than taxes on passenger ticket sales. Better management of air space will also contribute to reducing both emissions and noise.

Tradeoffs

Governments should consider tradeoffs among various policy objectives, for example in aero engine design between noise and emissions, or when improvements in passenger car fuel efficiency reduce fuel tax revenues. As green growth policies spread, it is necessary to review the way the transport sector is taxed. It is also

necessary to consider the political economy of congestion charges based on experience with existing systems, and conduct comprehensive socio-economic appraisal of countries' transport investments and policies.

Finding out more

www.internationaltransportforum.org

2012 Transport Outlook (ITF, 2012)

Environmental Impacts of International Shipping: The Role of Ports (OECD, 2011)

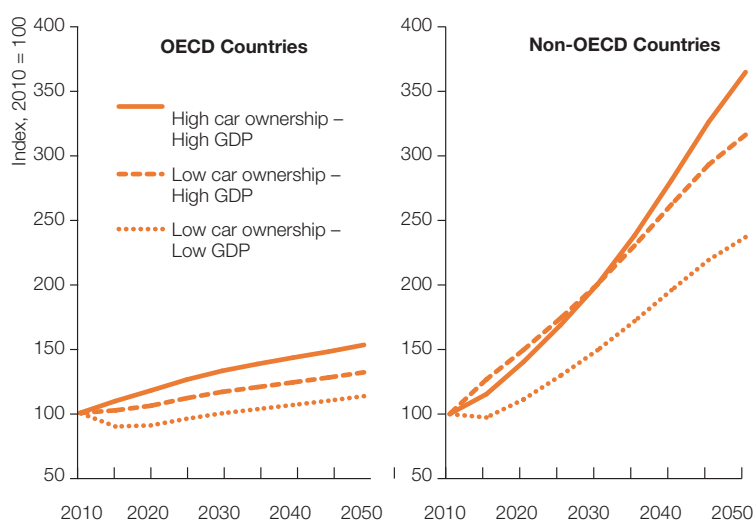
Globalisation, Transport and the Environment (OECD, 2010)

Green Growth and Transport, ITF Discussion Paper no. 2 (ITF, 2011)

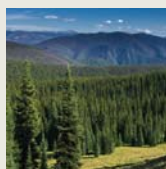
Reducing Transport Greenhouse Gas Emissions: Trends and Data, (ITF, 2011)

Strategic Transport Infrastructure Needs to 2030, (ITF, 2011)

CAR OWNERSHIP IN RELATION TO GDP
2010–2050



Source: 2012 Transport Outlook, International Transport Forum (ITF).



Policy Statement to the Rio+20 Conference

From the OECD Environment Policy Committee Ministerial Meeting on 29-30 March 2012

We, ministers¹ assembled at the OECD Headquarters on 29-30 March 2012;

We recall that sustainable development is an overarching goal of OECD governments and the OECD, as was noted in the Communiqué of the May 2001 OECD Meeting of Council at Ministerial level (MCM) [PAC/COM NEWS(2001)48]. We emphasise the importance of continuing work on sustainable development at the OECD.

We further recall that the 2009 MCM adopted the "Declaration on Green Growth" [C/MIN(2009)5/ADD1/FINAL] while the 2011 MCM welcomed the OECD's Green Growth Strategy [C/MIN(2011)4 and its ANN1&2; C/MIN(2011)5 and C/MIN(2011)5/FINAL]. We consider green growth a practical means of achieving many of the goals of sustainable development, not a replacement for it. We note that the aim of green growth is closely aligned with one of the two major themes of the Rio+20 Conference, namely green economy in the context of sustainable development and poverty eradication. We support the ongoing work of the OECD on green growth, and welcome the contribution that it makes to discussions at the Rio+20 Conference.

We welcome the OECD's *Environmental Outlook to 2050* (the *Outlook*) which we called for at our meeting in 2008. We consider that it contains important findings in the fields of climate, water, biodiversity and human health that should usefully inform deliberations at the forthcoming Rio+20 Conference. We also recognise the need for further attention by the OECD to other environmental issues, including resource and energy efficiency, sustainable agriculture and food security, chemical risk reduction and waste management, and environment-related spatial planning.

The *Outlook* demonstrates the need for urgent policy action to address key environmental challenges, change the course of development, and avoid potentially significant consequences and costs of inaction. We confirm the *Outlook* findings that a business-as-usual approach to growth and development would place grave pressures on the earth's biosphere. Although uncertainties remain about environmental thresholds, crossing them would entail real reductions in well-being and welfare.

We further note that strong governance and well-designed policies can significantly relieve these pressures while still meeting the legitimate development aspirations of everyone. We recognise the importance of establishing the right conditions to ensure a smooth transition to an inclusive and equitable green growth.

We consider that the OECD's Green Growth Strategy, released in May 2011 and augmented by subsequent analyses, provides an important policy toolkit with which to address many of the developmental challenges facing the global community. We look forward to the OECD's forthcoming report on green growth and developing countries including emerging economies, and welcome the contribution of these emerging economies to the report in order to maximise its policy relevance and usefulness.

We ask the OECD to broaden its green growth analysis both thematically and sectorally, recognising that green growth should be encouraged across all sectors and take into account the linkages between different sectors. We stress that the idea of green growth is not a replacement for the broader paradigm of sustainable development. Green growth aims to foster economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on

which our well-being relies. Green growth is not a one-size-fits-all prescription, but is instead an approach that aims to take account of different levels of development, resource endowments and environmental pressures.

We support efforts to mainstream green growth into economic policy, and recognise the important role of finance and economy ministries, working together with our own ministries as well as those responsible for innovation, skills development, natural resource management, agriculture and energy amongst others. The private sector will play a major role in delivering green growth. We emphasise the need for governments to establish enabling frameworks that leverage private investment, and to work effectively in partnership with the private sector and civil society in achieving green growth. The success of green growth policies depends on the awareness of consumers and enterprises of the need and possibilities for change, and the willingness of governments to promote policies to alter incentives for these groups. This underlines the importance of access to environmental information, public awareness and participation, and effective access to judicial and administrative review of decisions that may affect the environment. We look to the OECD to work with countries to explore implementation paths and governance approaches that are adapted to different country settings.

We underline that if countries are to effectively monitor their implementation of national green growth strategies and their progress towards any goals that may be agreed at the Rio+20 Conference, practical measurement tools will need to be developed. We commend the OECD's ongoing work on green growth indicators [C/MIN(2011)5/FINAL] as a useful complement to GDP by providing a means to measure and communicate progress on the decoupling of pollution and resource consumption from growth, as well as the impact of economic activity on natural assets and human well-being, including protection of public health. We urge the OECD to work with other relevant organisations to develop a common framework that can be easily and practically used by all countries, taking into account their national circumstances and capacities. We seek wider support for such indicators at the Rio+20 Conference. We commit to ensuring that the green growth policy agenda, open trade and investment for sustainable development, and the spread of green technologies and innovation are mutually supportive. We stress that green growth should

not constitute a means of discrimination or provide a pretext for economic protectionism; at the same time, trade and investment policy must not be a barrier to green growth or sustainable development. We note that the OECD has so far found no evidence of green investment protectionism. International co-operation, including capacity building, should be strengthened to support clean production in all countries and to avoid a shift of polluting production to countries with less stringent regulations. We ask the OECD to continue to estimate and assess fossil fuel and other subsidies, with a view to supporting countries in their efforts to rationalise or phase out environmentally-harmful and inefficient subsidies, such as fossil fuel subsidies, that encourage wasteful consumption, while providing targeted support for the poorest.

We consider that work on sustainable development and environment should be a priority in OECD cooperation with enhanced engagement countries (Brazil, China, India, Indonesia and South Africa), Russia and other emerging and developing countries. We recognise the importance for all of sharing policy experiences, including through the Organisation's improved and streamlined peer review processes so that green growth can be grounded in country-specific policy advice. We support efforts to accelerate and broaden the world-wide transition towards an inclusive green economy that promotes sustainable development and poverty eradication, and to drive international action and increase co-operation in key areas for environmental and social development such as agriculture, water, energy, employment and education. We are committed to strengthen governance structures at all levels (local, sub-national, national, regional, global) that underpin the delivery of sustainable development and the achievement of internationally agreed goals. We look forward to making progress in these areas at the Rio+20 Conference. We offer our support to the Rio+20 Conference and stand ready to contribute to the outcomes of the Conference.

1. Ministers and Representatives of Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Russian Federation, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, the United States and the European Union.



OECD DAC Policy Statement for the Rio+20 Conference

This statement was endorsed by the DAC at its Senior Level Meeting on 3-4 April 2012.

Rio+20 is an important opportunity to assess progress, identify gaps and renew commitments to sustainable development. We, the members of the OECD Development Assistance Committee (DAC), pledge to strengthen our collaboration to address new and emerging challenges and promote economic and social transformation for sustainable development. We are fully committed to the three pillars of sustainable development, through our support for social development, economic growth and environment protection and we will contribute to the delivery of clear and significant outcomes from the Rio+20 Conference by building a post-2015 global development framework on the successful example of and lessons learned from the Millennium Development Goals (MDGs).

We will continue our support for developing countries' pursuit of greener and more inclusive growth in their nationally owned development objectives and poverty reduction strategies, in line with the principles adopted in the Busan Partnership for Effective Development Co-operation. We stand by our commitments to integrate biodiversity, ecosystem services and climate change adaptation into our development co-operation practices¹ and to enhance the quality and effectiveness of development assistance, particularly regarding pro-poor economic growth and poverty reduction². We welcome the Ministerial Policy Statement of the OECD Environment Policy Committee, agreed on 29-30 March 2012.

We are building on our past efforts. Our ODA, which is supporting all MDGs, traditionally with a focus on social and economic development, has steadily increased and in 2010 amounted to almost USD 130 billion. This represents an increase of 63% since 2000. We have also made efforts to better take into account the increasing concerns of developing countries regarding environment

challenges they are facing and, during recent years, ODA allocated to environmental development (the third pillar of sustainable development) has also increased. Between 2001-02 and 2009-10, bilateral ODA for general environmental protection grew from USD 1.9 billion to USD 5.1 billion and support for other activities addressing environmental sustainability rose from USD 5.8 billion to USD 20.3 billion.

We share developing country concerns about environmental sustainability and recognise that many of them have taken the lead in the responsible use of natural resources and are learning the lessons from the shortcomings of conventional development models. We also recognise the particularities of green growth in developing countries, where it must deliver on national development, poverty reduction and job creation objectives in the context of sustainable development. We believe that green growth can deliver on these objectives, but this is only possible if context-specific strategies are defined through national policy and planning processes, led by Governments.

We will support our developing country partners' efforts to:

- Develop and implement country-specific, nationally-owned, cost-effective and inclusive strategies aiming at ensuring green growth, that take into account trade-offs and political economy barriers, support local, sectoral and national policy frameworks for equity, poverty reduction and development, and are implemented through national planning and budget processes.
- Build trust, partnership and capacities among all stakeholders, and strengthen inclusive governance of public policy and expenditure, economic governance and natural resource management, so that the

interests of poor women and men are reflected in green growth policies and their rights to sustainable livelihood assets and social protection programmes are secured.

- Identify and nurture opportunities for affordable green innovation and investment that increases employment and creates jobs, such as climate-resilient livelihoods and low-carbon and resource-efficient technologies, inter alia by supporting local initiatives, indigenous knowledge and technology transfer on voluntary and mutually agreed terms and conditions to, and between, developing countries.
- Support and scrutinise public-private partnerships to foster innovation, mitigate investment risks and facilitate multi-stakeholder initiatives to promote more equitable and environmentally sustainable investments and commodity chains.
- Increase the value and welfare derived from natural capital by managing natural resources sustainably; developing mechanisms for the payment of ecosystem services; increasing domestic revenue and income distribution from natural resource use and extraction; developing more comprehensive national accounts; and adopting relevant well-being measures.

We will also:

- Assess and promote the coherence of our domestic green growth policies with development objectives, use Strategic Environmental Assessments and Poverty Impact Assessments to raise awareness in our country offices of environmental issues and climate change, and their links to poverty reduction, and ensure that our programmes coherently support green growth and poverty reduction.
- Support systems to allow countries to choose growth paths and technological trajectories that are socially and environmentally sustainable, and to adequately manage global public goods by: creating incentives for foreign investment in sustainable sectors; promoting trade flows of environmentally sustainable goods and services; supporting developing countries' active participation in international standardisation processes; and developing capacity for innovation.

- Encourage countries to work collaboratively at all levels to promote knowledge sharing and effective capacity and institutional development, including by making use of the Green Growth Knowledge Platform (GGKP).

We intend to track our progress by:

- Supporting developing country partners' own systems for monitoring, evaluating and reporting on public programmes to develop and use their own indicators of green growth and sustainable development, including by drawing upon OECD work on measuring well-being and green growth.
- Continuing to monitor and report on external resource flows targeting relevant social and environmental objectives through the OECD DAC.
- Reporting through the OECD DAC on our progress to integrate green growth into development co operation, implement key actions from this Statement, and share good practices and lessons learned.

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1. Policy Statement on Integrating Biodiversity and Associated Ecosystems Services into Development Co operation adopted in April 2010 and Policy Statement on Integrating Climate Change Adaptation into Development Co-operation adopted in May 2009.
 2. "The overarching objective of the DAC is to promote development co-operation and other policies so as to contribute to sustainable development, including pro-poor economic growth, poverty reduction, and to this effect to enhance the quality and effectiveness of development assistance." Based on DAC Mandate from Council Resolution C(2010)123 and CORR1.

www.oecd.org/dac/environment



GREENING THE OECD

The OECD is taking action to increase its environmental performance:

Waste management

Between 2007 and 2011 the total amount of waste produced by the OECD halved.

The number of printed copies of official documents has more than halved over the past 15 years.

Paper, cans, bottles, metal, batteries, and used electronic equipment are all recycled.

Water consumption

Modifications to faucets have reduced the water volume used by 20-22%.

Energy consumption

Energy-saving light bulbs are in use throughout the Organisation's buildings.

The heating and cooling of the buildings is partly provided from the vapour produced by household waste combustion.

Re-circulated heat produced by the main computer room is used to warm the buildings

Buildings and plant

In 2011 one of OECD's main office buildings, the Marshall Building, was granted the French environmental certificate for buildings, Haute Qualité Environnementale (HQE® E certification).

The majority of the products used in the organisation are eco-labeled, from cleaning supplies to materials such as paint, glue and carpets.

Since 2002, the OECD has been equipped with furniture that uses environmentally sound production techniques, transport, recycling and re-use.



www.oecd.org/greengrowth