



The green economy: How can growth be reconciled with reduced carbon emissions?

Ludovic Subran, Chief Economist and Director of Research

Yann Lacroix, Manager of Group Sector Studies



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Context

Why this special dossier?

- CO2 emissions have been rising with population growth and wealth
- At a time of world economic slowdown and intensified austerity measures, especially in Europe, commitment to promising sectoral dynamics is needed

Underlying incentives of a three-way economical arbitrage

- Cost constraints: already generating innovation (targeted profitability), additional costs are bearable if they are quickly recovered but hard to finance if the return on investment is slow
- New markets: building international competitiveness and capturing new outlets seem possible
- Role of incentives from the State: on the one hand, via international regulation by establishing payable carbon quotas and establishing a long-term partnership; and, on the other hand, stimuli (financing, subsidies) that are hard at a time of budget cuts but which play a part in strategic development

Two definitions

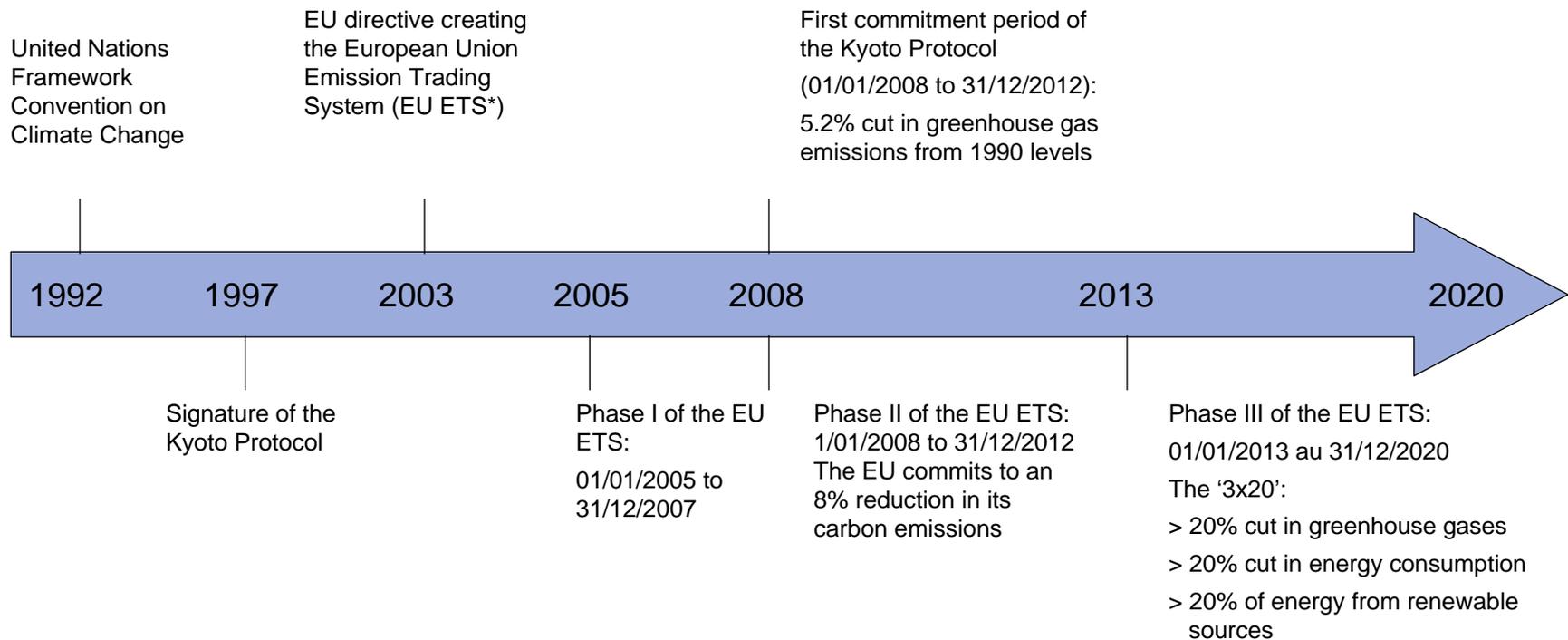
- Green growth: economic growth with lower CO2 emissions
- Green economy: investment (additional activity) to achieve green growth

The green economy: How can growth be reconciled with reduced carbon emissions?

- 1 A worrying acceleration in carbon emissions
- 2 The development in alternative energy sources remains embryonic
- 3 The green economy offers growth potential for some sectors
- 4 Conclusion: seize the opportunities

Growing international awareness: Advances and impasses

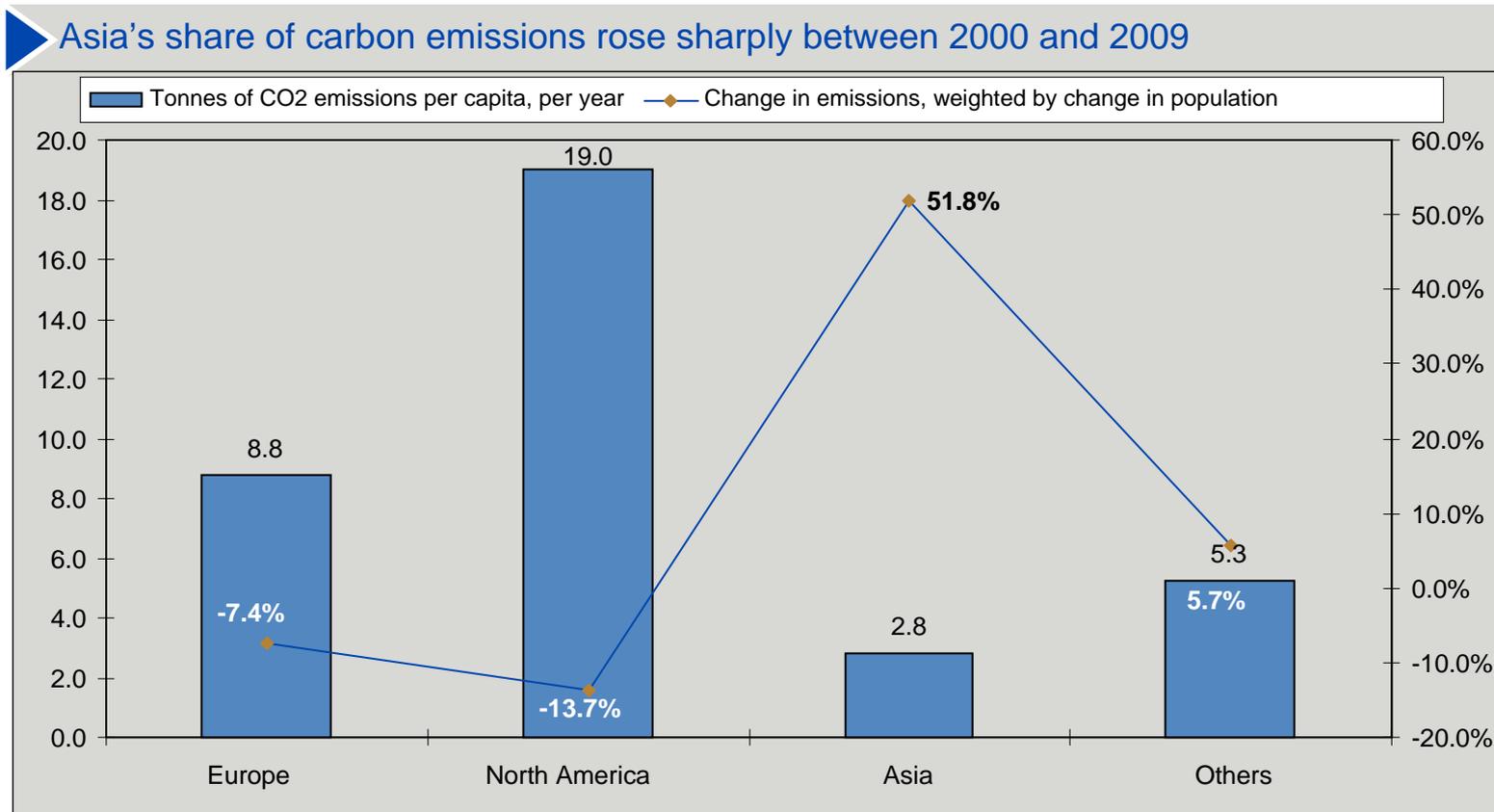
United Nations Framework Convention on Climate Change



*EU ETS: Europe Union Emission Trading System

Source: CITEPA

Carbon emissions: a disastrous combination of the effects of growth in both population and wealth



Source: BP statistics

Europe: France, Germany, Italy, Spain, UK, Poland and Russia

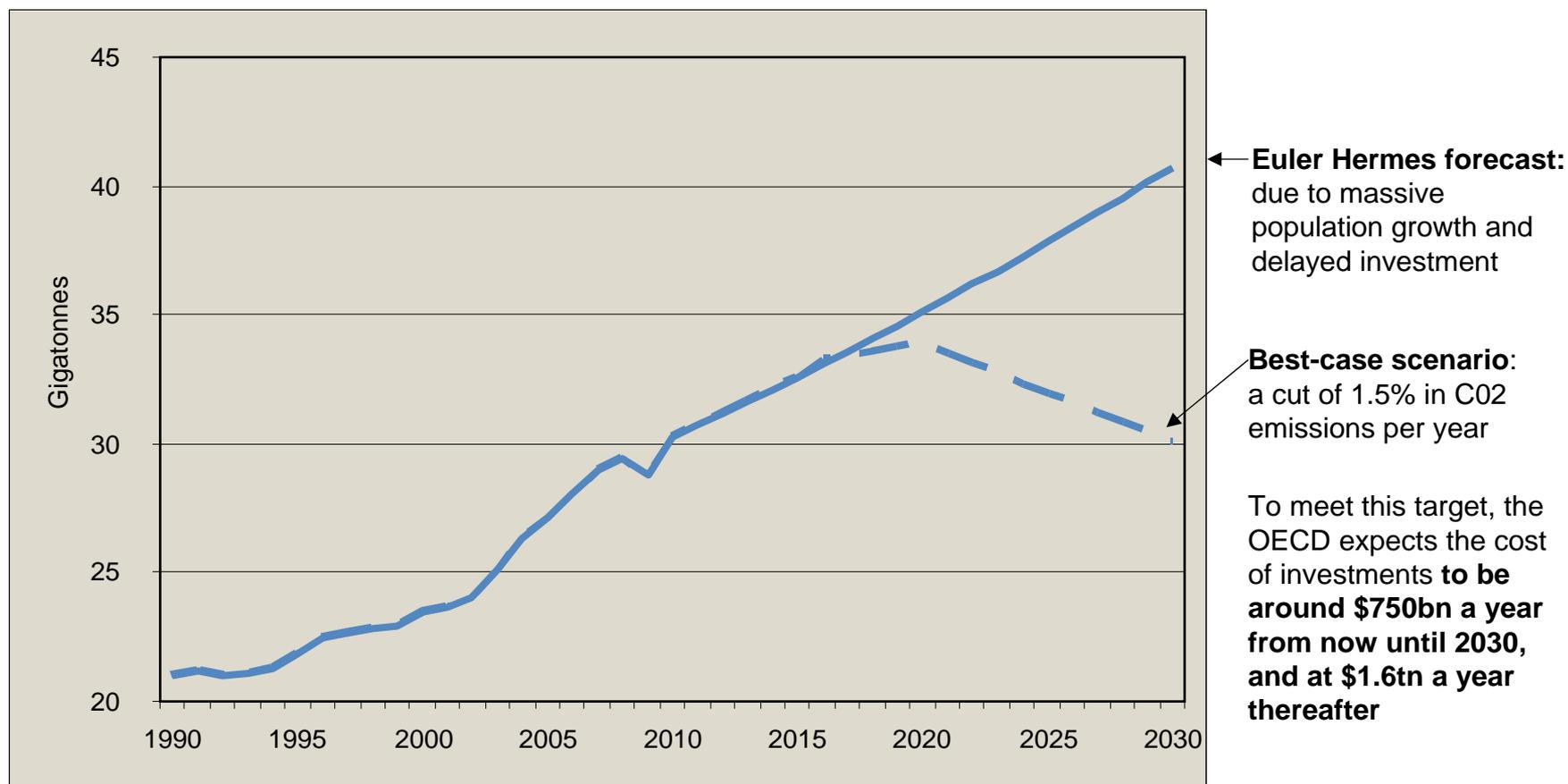
North America: US and Canada

Asia: Japan, China, Taiwan, India and Indonesia

An impossible investment effort?

To get carbon emissions back to 2010 levels by 2030, emissions will have to be cut by 1.5% a year starting in 2020 according to the Kyoto Protocol

Change in carbon emissions worldwide (in Gt)



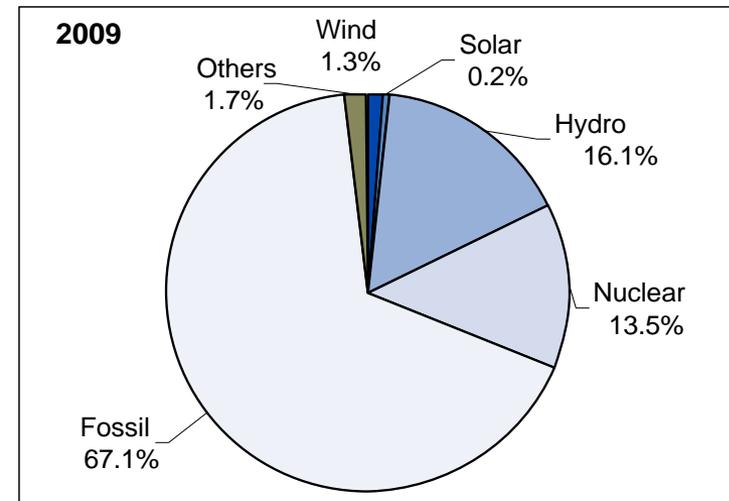
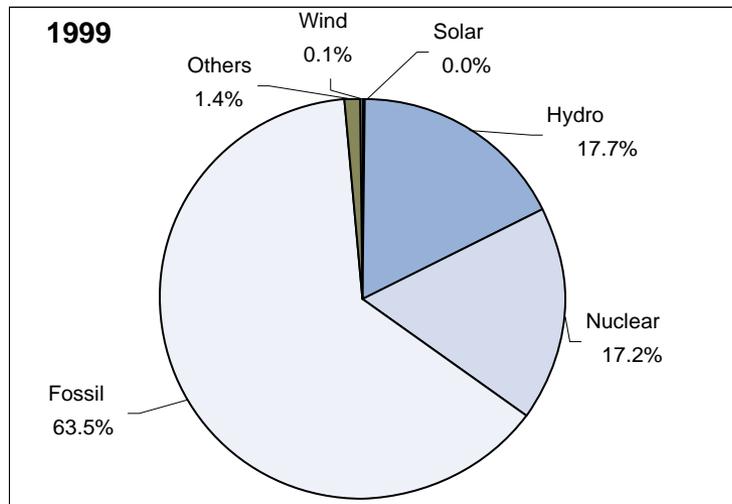
Source: IEA, OECD, Euler Hermes

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Electricity production continues to be mostly from fossil fuels, and their relative share continues to grow

Clean electricity generation has yet to be invented...



Source: Oberv'ER

Some alternative energy sources offer opportunities for green growth...

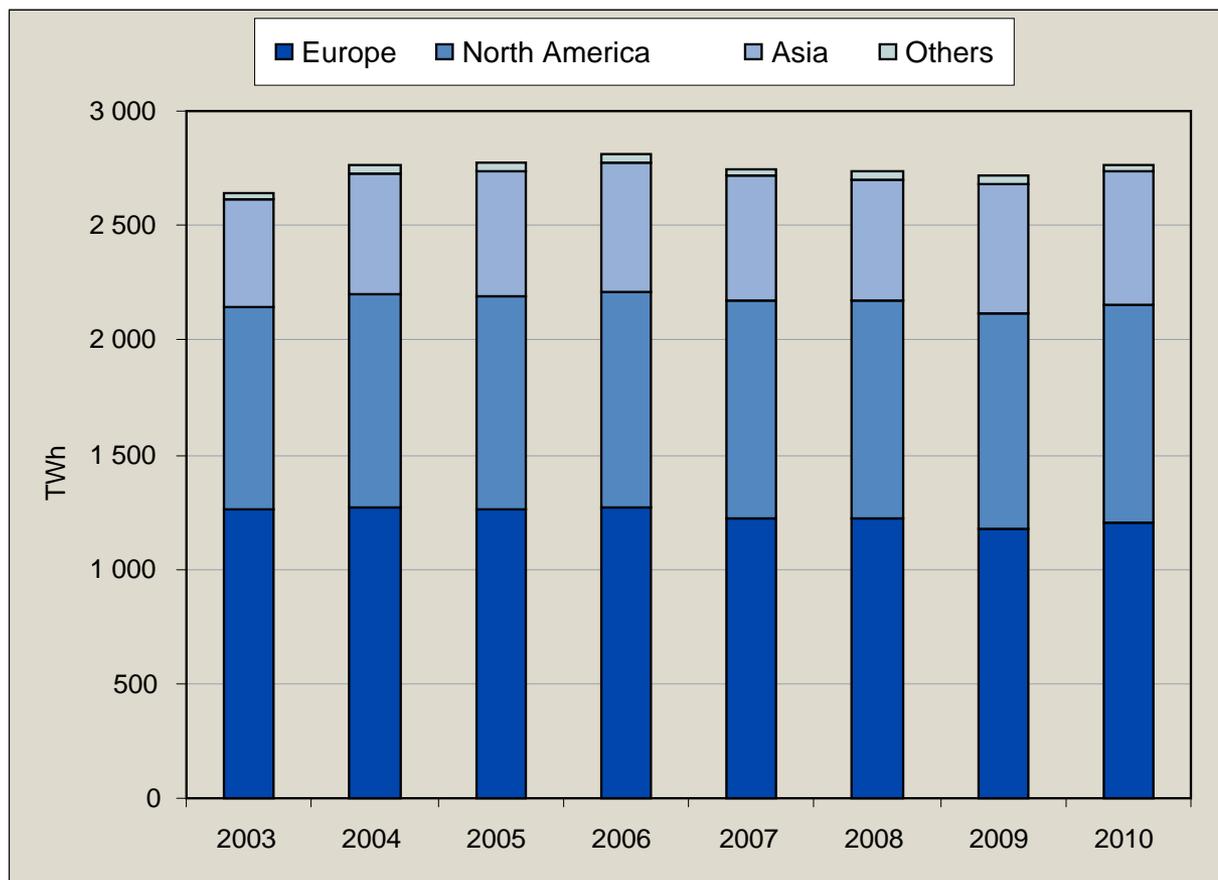
Pertinence: emissions from energy production account for 22% of total CO2 emissions

...however, the transformation of the productive apparatus seems to have stalled

The relative share of hydro in world electricity generation has fallen in recent years. What about the others?

Nuclear power: a source of electricity that has not risen for five years

World electricity output (in TWh) from nuclear power



Source: BP statistics

In 2010, nuclear power accounted for 14% of world electricity production.

In 2003, it accounted for 16%

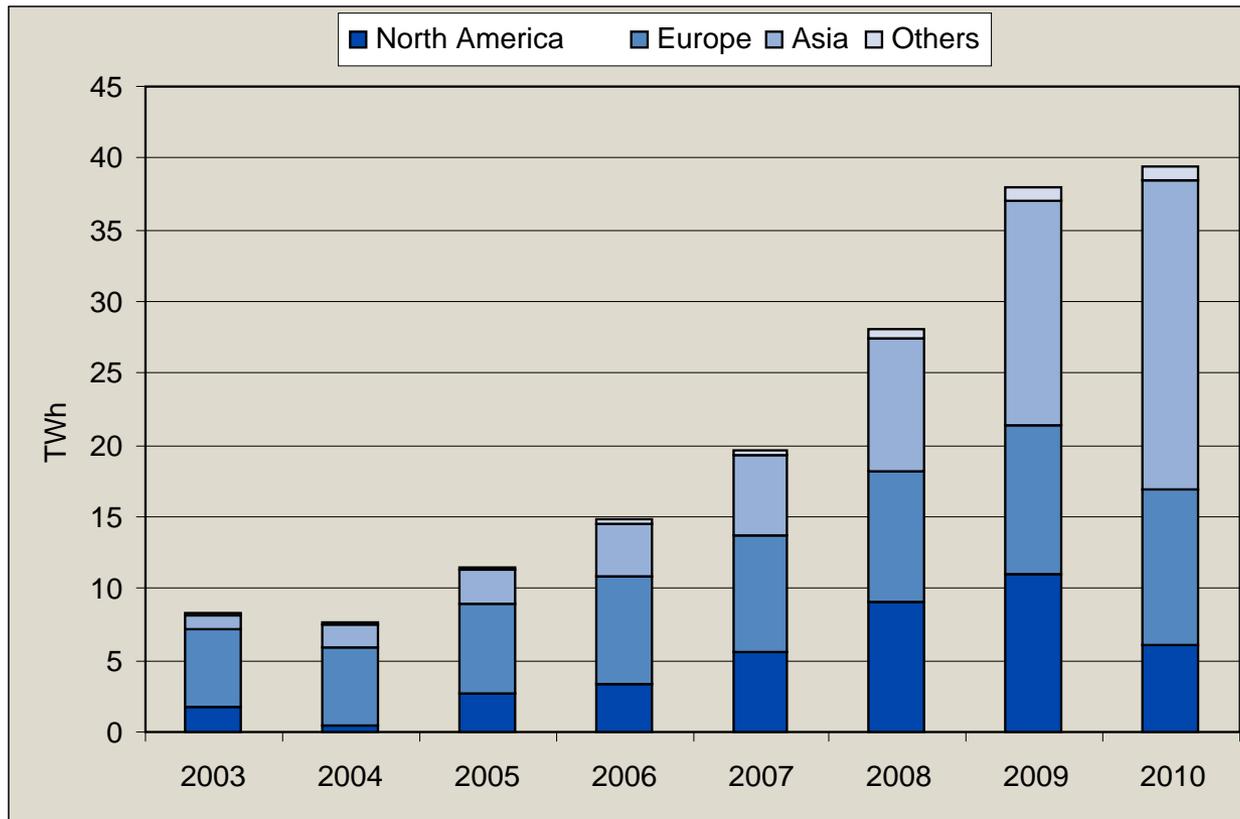
Use of **nuclear power avoids carbon emissions totalling 2.5 Gt a year** (or around 9% of global emissions); however it creates collateral radioactive waste that needs to be stored over a very long timeframe

The nuclear meltdown at **Fukushima** in Japan in March 2011 might threaten the potential of nuclear power generation in Asia

Wind power: a halt in investments in 2010

A marked fall in new installations: -5% in Europe, -50% in North America

▶ Yearly capacity installation (in TWh)



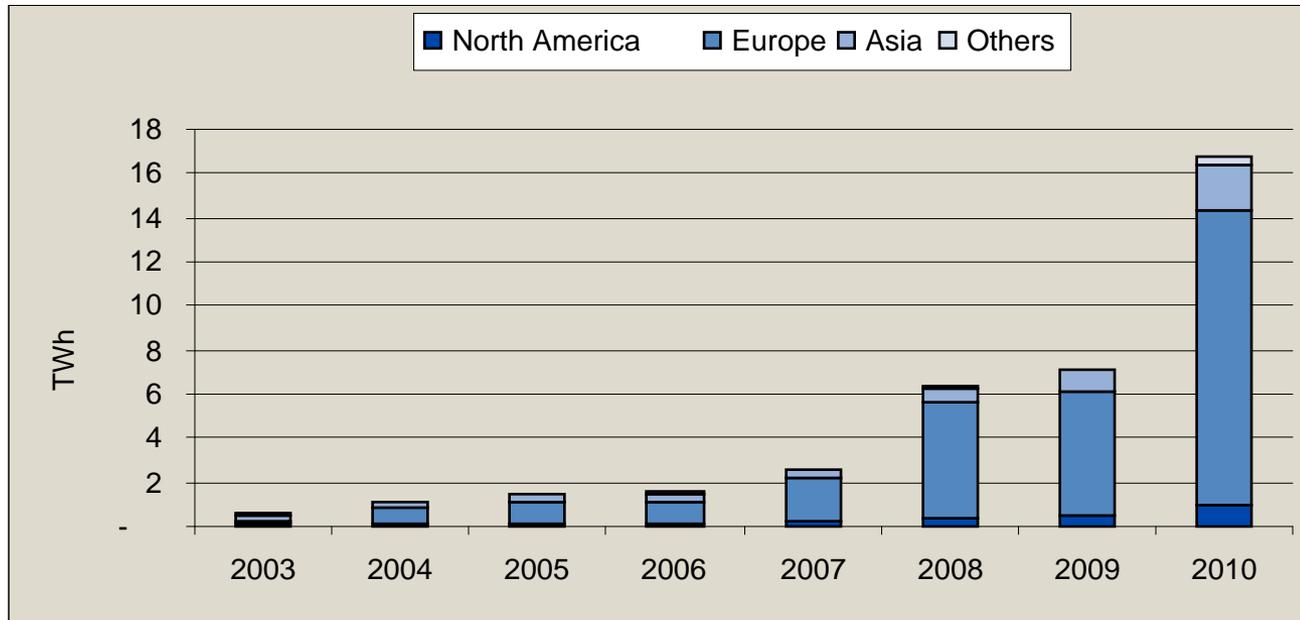
In 2010 wind power accounted for less than 1% of world electricity production, with an installed capacity of 200,000 MW

In 2010, China accounted for more than 46% of new wind power installation, and had a total capacity of 42 GW, or 23% of the world total, the equivalent of two-thirds of France's nuclear-generated capacity

Source: BP statistics

Solar power: strong growth led by Europe, and notably Germany

▶ New capacity installation (in TWh)



Despite rapid growth, **solar power in 2010 accounted for only 0.2% of world electricity generation**, with an installed capacity of 17 terawatts

Europe accounted for 75% of installed capacity in 2010, two-thirds of this being in Germany, the leader in the field

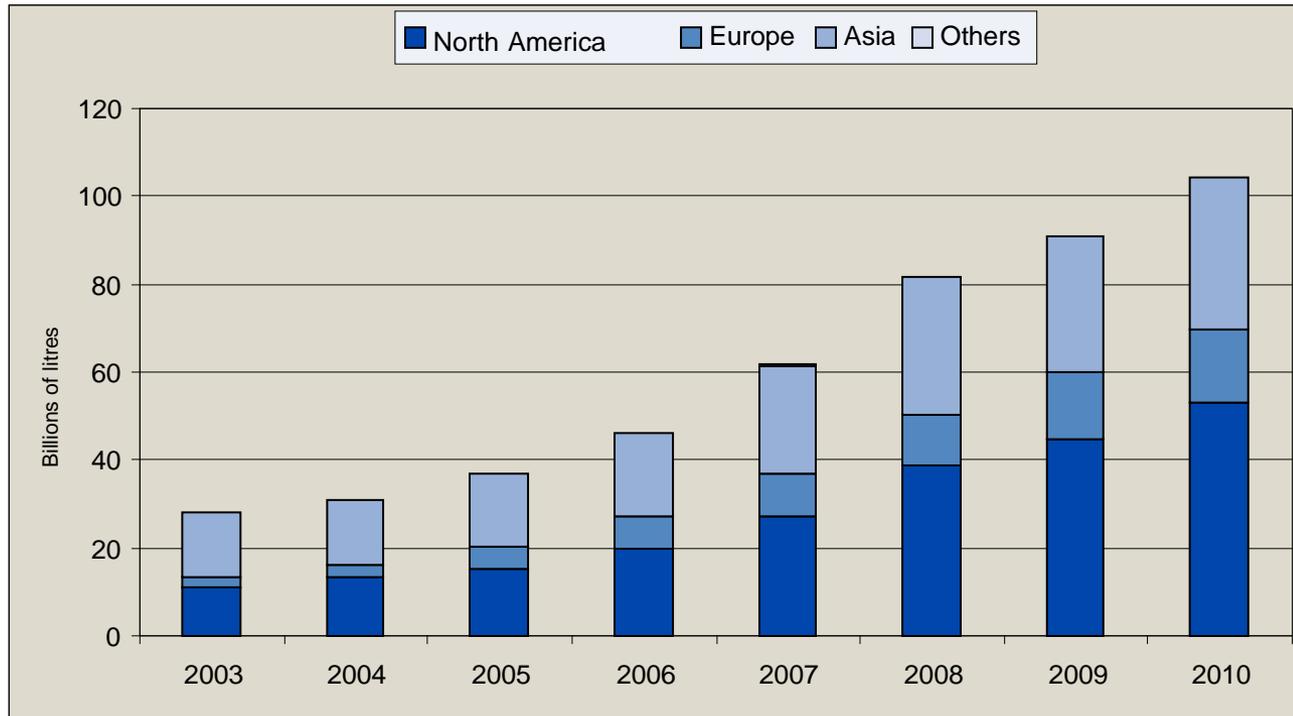
Source: BP statistics

The repurchase price of solar-generated electricity is critical to the growth of solar power

Zone	Share of electricity
North America	0.1%
Europe	0.6%
Germany	2.8%
Asia	0.1%
World	0.2%

Biofuels: sensitive to fluctuations in supplies of agricultural commodities

▶ Annual biofuel production (in billions of litres)



Source: BP statistics

Despite continued growth in production over recent years, biofuels (ethanol and biodiesel) provided only **3% of world road transport requirements 2010** (in terms of energy contribution)

The ethanol segment has two major players, the **US (47% of world production in 2010)** and **Brazil (28%)**, while the **European Union** is the leader in biodiesel (52%)

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First, the three sectors with the highest intensity of carbon-generating energy usage

Sectors studied

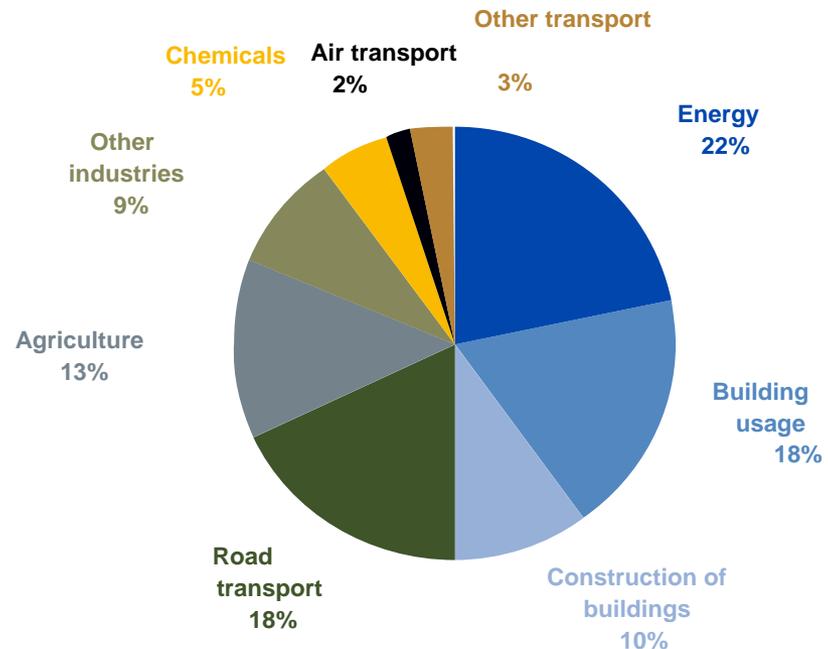
A. Construction: growing carbon-intense urbanisation

B. Industry: cement and chemical manufacturers have long been cutting emissions, but this has proved to be a slow process

Transport:

C. By road: Europe aims to lead, with regulation and with costly advanced technology but the growth in sales is occurring in emerging countries with still much lower purchasing power.

D. By air: little major technological advance in the short term, due to the strong growth in world air transport



What about agriculture?

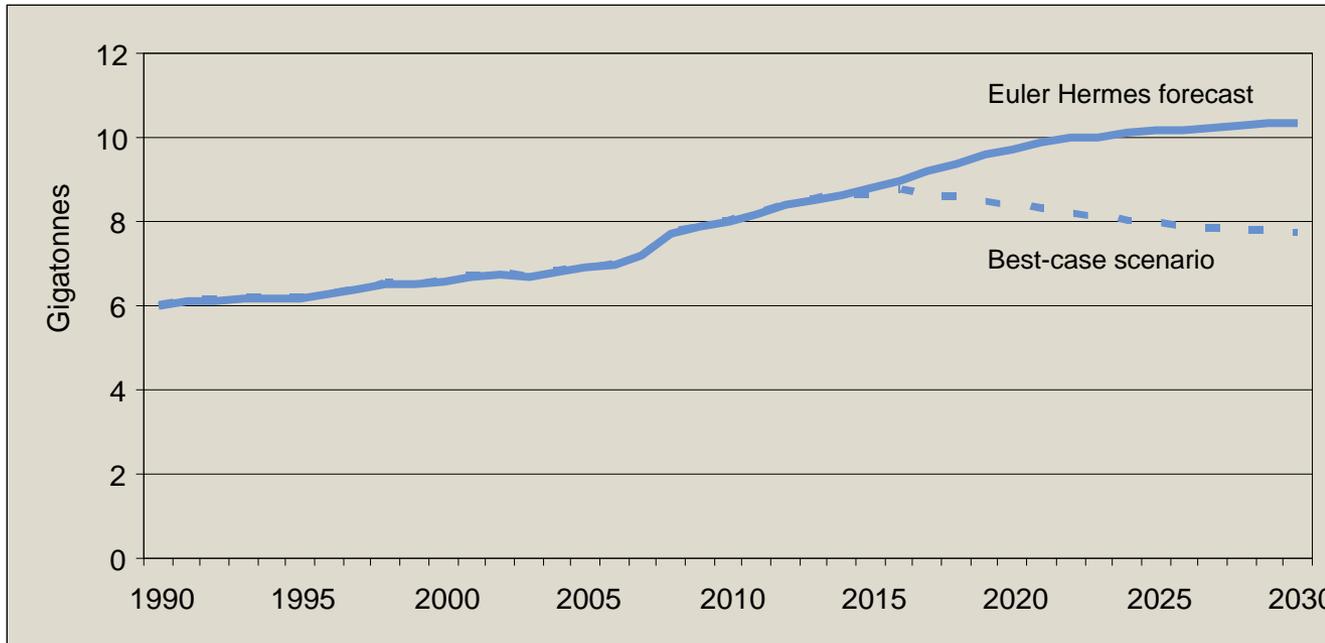
Emissions from this sector account for 13% of all greenhouse gas emission, and are led by nitrous oxide (use of nitrogen fertilisers and management of livestock wastes) and methane (from ruminant livestock).

Consumption habit developments?

Source: Euler Hermes

Construction accounts for 28% of carbon emissions; this should stabilise from 2020 on

World carbon emissions from construction of buildings (in Gt)



Carbon emissions by sector

Construction: Raw materials including cement	10%
Usage: Heating, hot water, lighting	18%

Sources: UNEP, Euler Hermes

Major determinants

- **Growth in urbanisation rates and equipment ownership** (x2 in the emerging countries up to 2050)
- **Strong dependence on the economic environment and subsidies:** lacklustre demand (unemployment rate, incomes, interest rates) and economic incentives (tax advantages, subsidies) are determinant – at the expense of the genuine dynamics
- **Technical constraints:** constant developments in building materials, lack of knowledge over their long-term performance, training requirements in the profession

A major sector that needs to master its own profession

Cutting emissions: a windfall in terms of the volume of activity

- Nearly all buildings need to be adapted; current construction does not always meet the desired standards (20% of them at least)
- Different needs in different zones: renovation in high-income countries, new buildings in the emerging countries
- An existing potential for the sector: traditional rate of renovation for existing buildings is slow, at around 2% a year

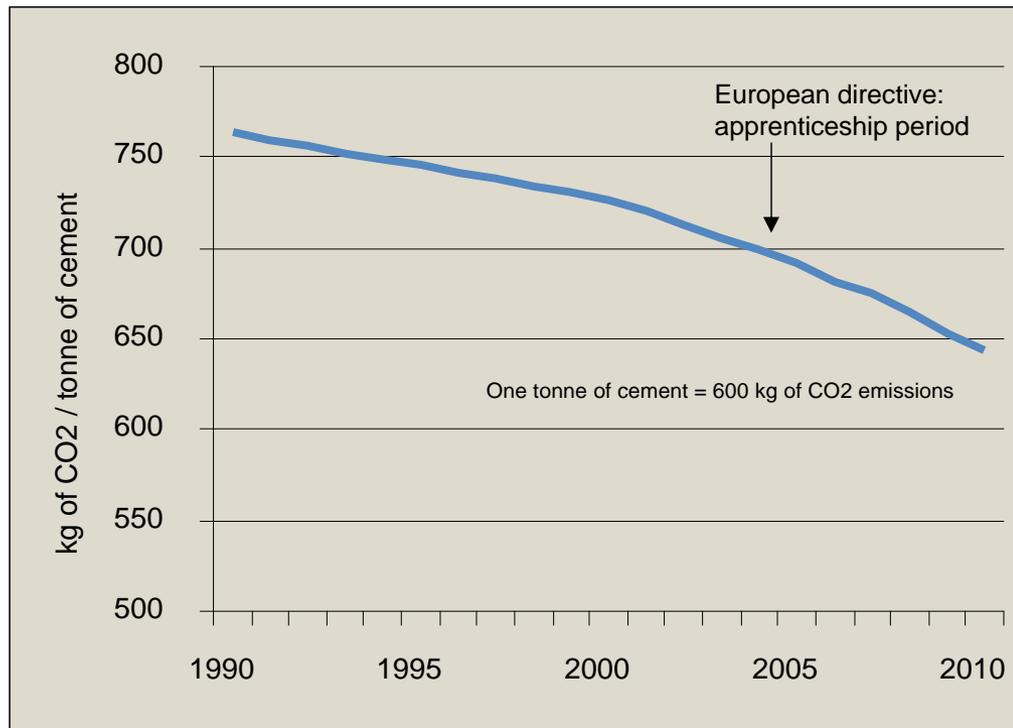
The additional building costs are estimated at \$510bn, or the equivalent of 0.8% of growth; these could be amortized over 10 years

- A rise in construction expenditure in the short term; in relation to what they would have been without environmental constraints, given that this market has not yet reached its maturity

Example: in Europe, a 'high environmental quality' (HQE) building costs basically 10% more than a traditionally constructed building, or 15% more in France for a low energy consumption building. Allowing for the energy savings of running a better insulated building, or even its energy self-sufficiency, ten years would be required to break even.

Cement: a very gradual cut in carbon emissions but a long-term job due to financial considerations

CO2 emissions per tonne of cement (in kg)



Sources: cementbureau, Euler Hermes

Cement production is a significant source of carbon emissions during the process of calcination, in which limestone is heated at high temperatures and breaks down into calcium oxide (quicklime) and carbon dioxide

There has been a constant reduction in CO2 emissions from cement production (1% a year) since 1990. This reduction continues to be slow, despite accelerating to 1.5% a year since 2005. Cement still accounts for 7% of global carbon emissions.

Asia accounts for 75% of production

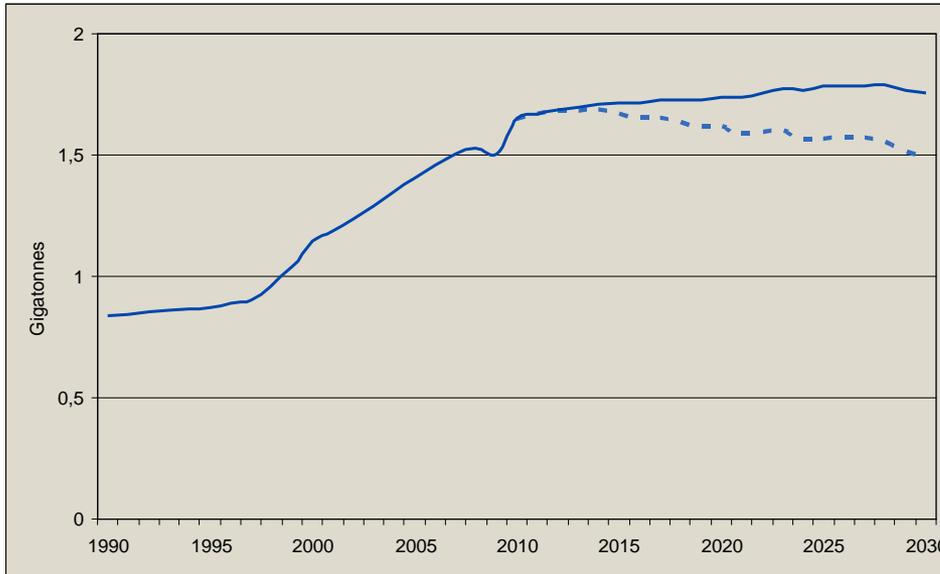
World cement production accounts for 2 Gt of CO2 emissions annually. At current rates of progress, one tonne of cement will generate less than 500 kg of CO2 by 2030.

The reduction in emissions of CO2 per tonne results from genuine sectoral dynamics in production costs

Although accounting for 5% of world carbon emissions, chemicals measures the pulse of green growth

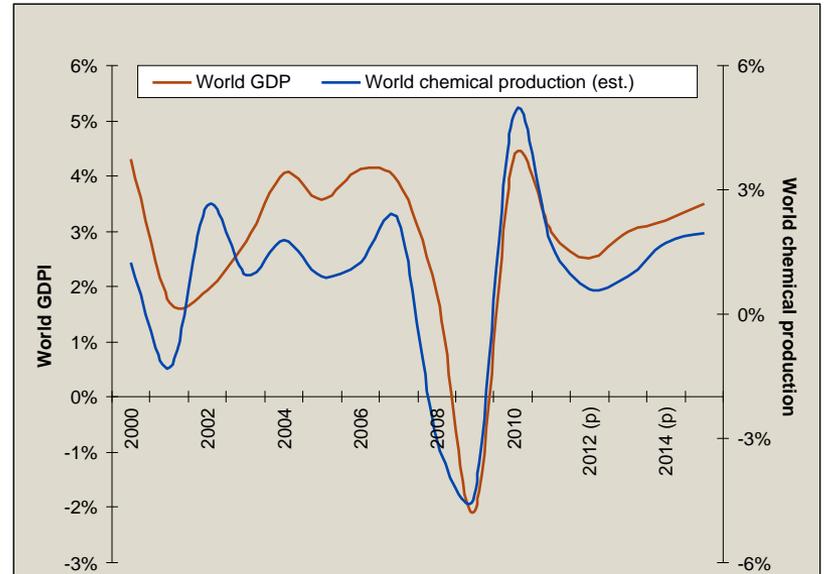
The best-case scenario: a return to 2010 levels of emissions from 2030

World carbon emissions from the chemical industry



Sources: IEA and OECD data, Euler Hermes forecasts

World GDP growth and chemical production move in tandem



Sources: Global Insight, IMF, Euler Hermes forecasts

Scenarios

- Euler Hermes: world chemical sector carbon emissions to increase by 0.3% per annum between 2010 and 2030
- Best-case scenario: chemical sector carbon emissions fall by 0.5% per annum between 2010 and 2030

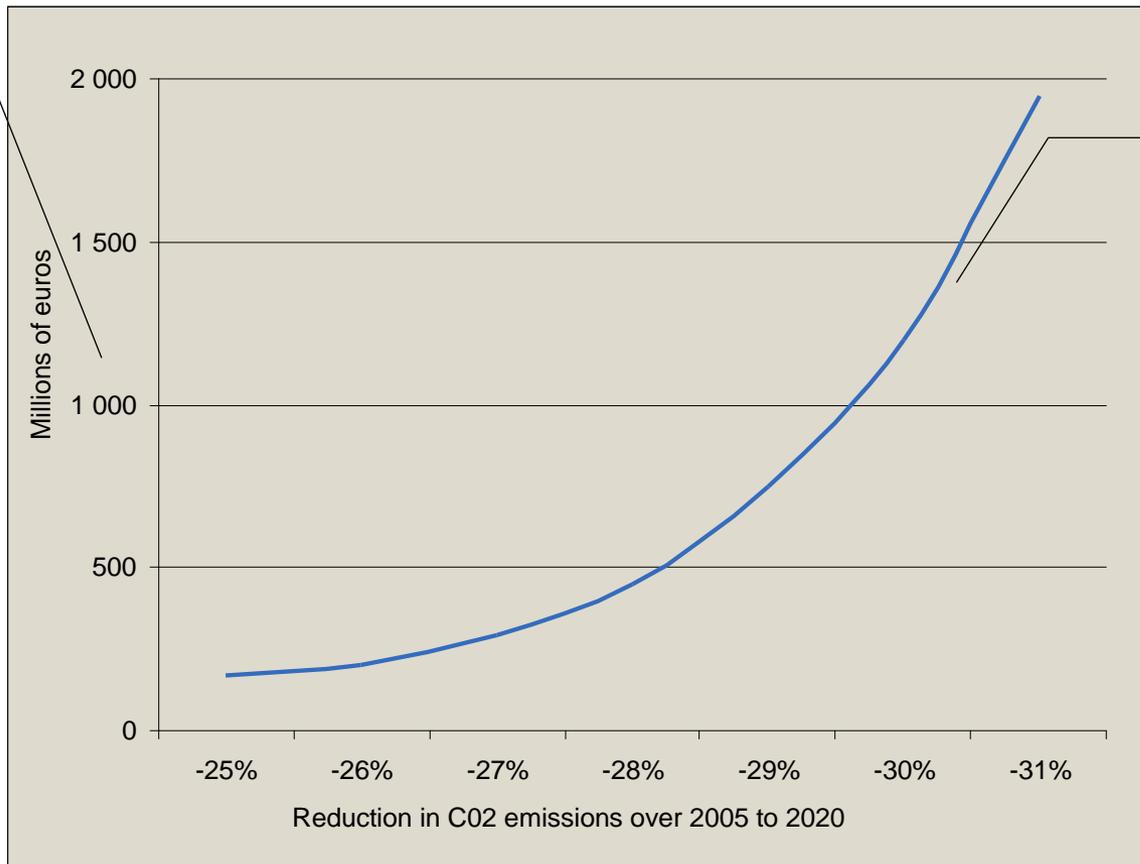
Stylised fact: chemical production, emissions and world GDP move in sync

At the limit of its capacities?

Investing in cutting carbon emissions in the chemical sector in a high-income country seems to become too costly beyond a certain threshold

Additional investment of €1.1bn to cut carbon emissions by 5 points

Cumulative investment (y-axis) that is needed over the period to reach the targeted reduction in carbon emissions (x-axis)



A **cost-effect** opposing the feasibility of the **best-case scenario**:

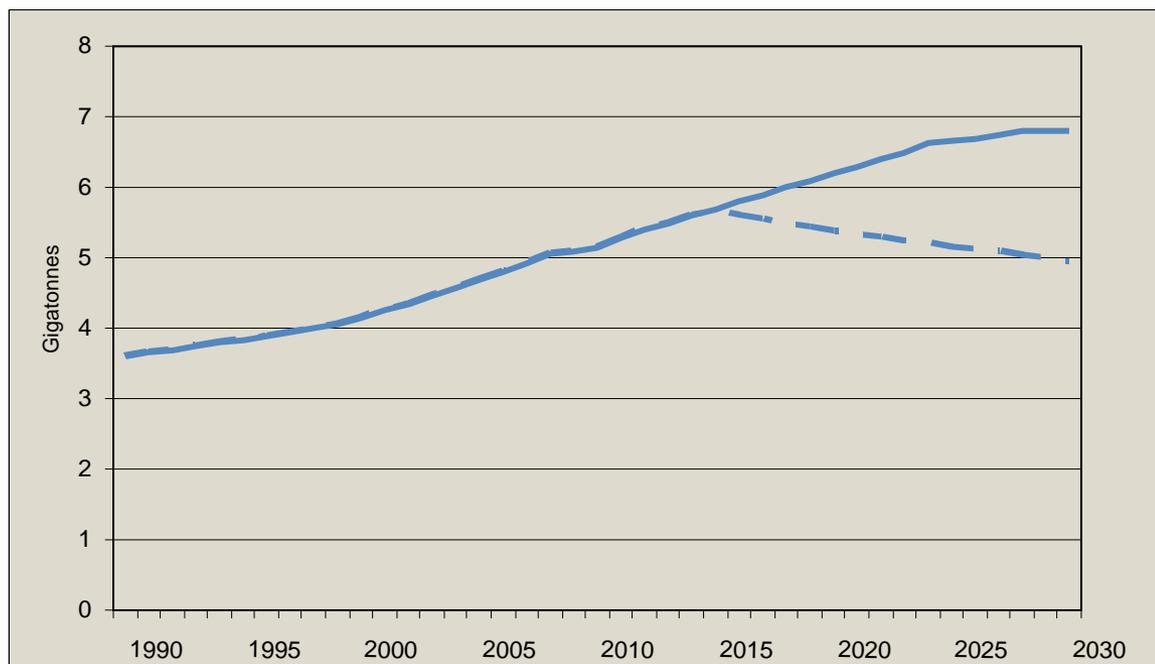
It would require an investment of **€1.3bn over 10 years** to slash sector carbon emissions by **30%** between 2010 and 2020

or **€200m** to cut them by only **25%** over the same period

Sources: UIC, data from 2008 study by AT Kearney

Road transport: 18% of world carbon emissions in 2010 – The growth in the number of vehicles

World carbon emissions from road transport (in gigatonnes)



Euler Hermes forecast: the growth in the automotive market, thanks to increasing sales in the emerging countries, and barring any change in US consumer habits (still wedded to large vehicles) will prevent any rapid reversal in increasing carbon emissions

Best-case scenario: a return to 2010 emission levels in 2030

Sources: sources IEA, Euler Hermes

Growth in the automotive sector is due to the emerging countries, but purchasing power out there is still very low

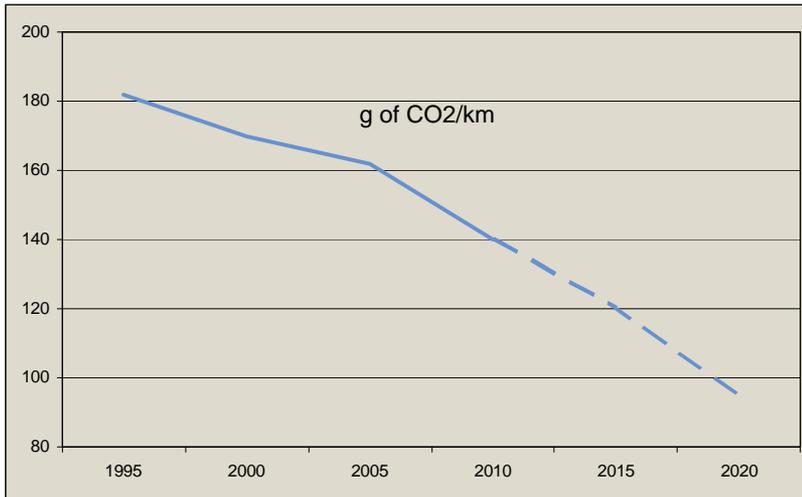
At purchasing power parity, GDP per capita is \$15,800 in Russia, \$11,200 in Brazil, \$7,500 in China, and \$3,300 in India – compared to \$47,000 in the US and \$36,000 in Western Europe.

Sales in the industrial countries are down by 9 million units, a fall of 20%.

In the emerging countries, sales rose by 12 million units between 2009 and 2011, an increase of 150%.

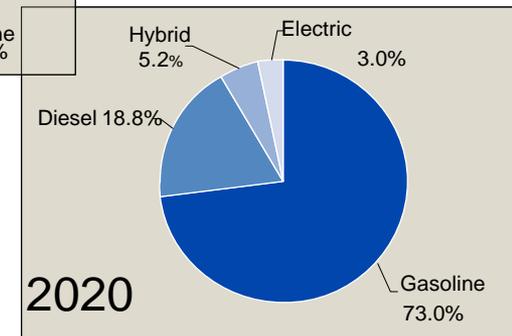
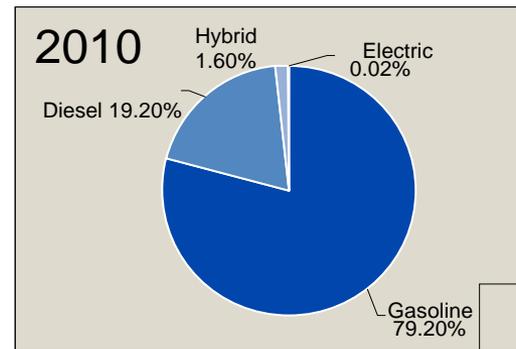
Regulation, development and technology transfer, changes in consumer behaviour: what kinds of actions are there for seizing the green opportunities in road transport?

Falling CO2 emissions from vehicles in the European Union (g of CO2/km)



Source: ACEA

Growth in world market share of low-emission vehicles



Sources: PwC, Euler Hermes forecasts

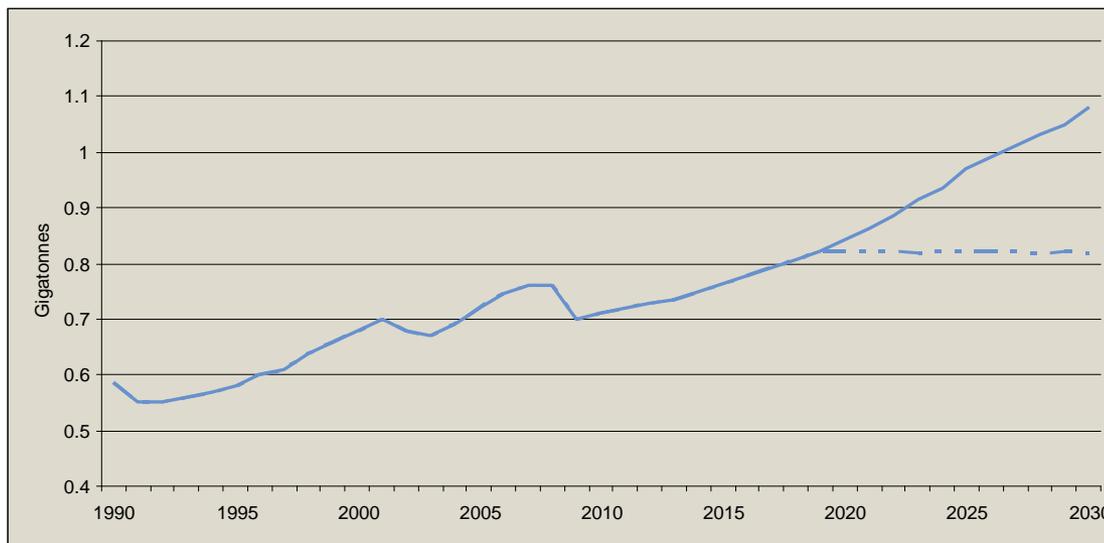
If the 2020 target is matched, then the EU could meet the objectives for cutting CO2 emissions. From 2012, a system will be established for **financial penalties on vehicle constructors.**

Developing new technologies will take a long time due to **the development costs, the unit cost per consumer, and the cost of creating the necessary infrastructure.**

Air transport: 2% of CO2 emissions currently but facing the challenge of growing air traffic

The sector's contribution to the greenhouse effect should increase over the next two decades

► Growth in air transport carbon emissions



Euler Hermes: the environmental measures taken will not offset the sharp rise in CO2 emissions arising from the air traffic growth

Best-case scenario: stabilization in emissions from the sector from 2020 on

Sources: ICAO, IATA, Euler Hermes estimates

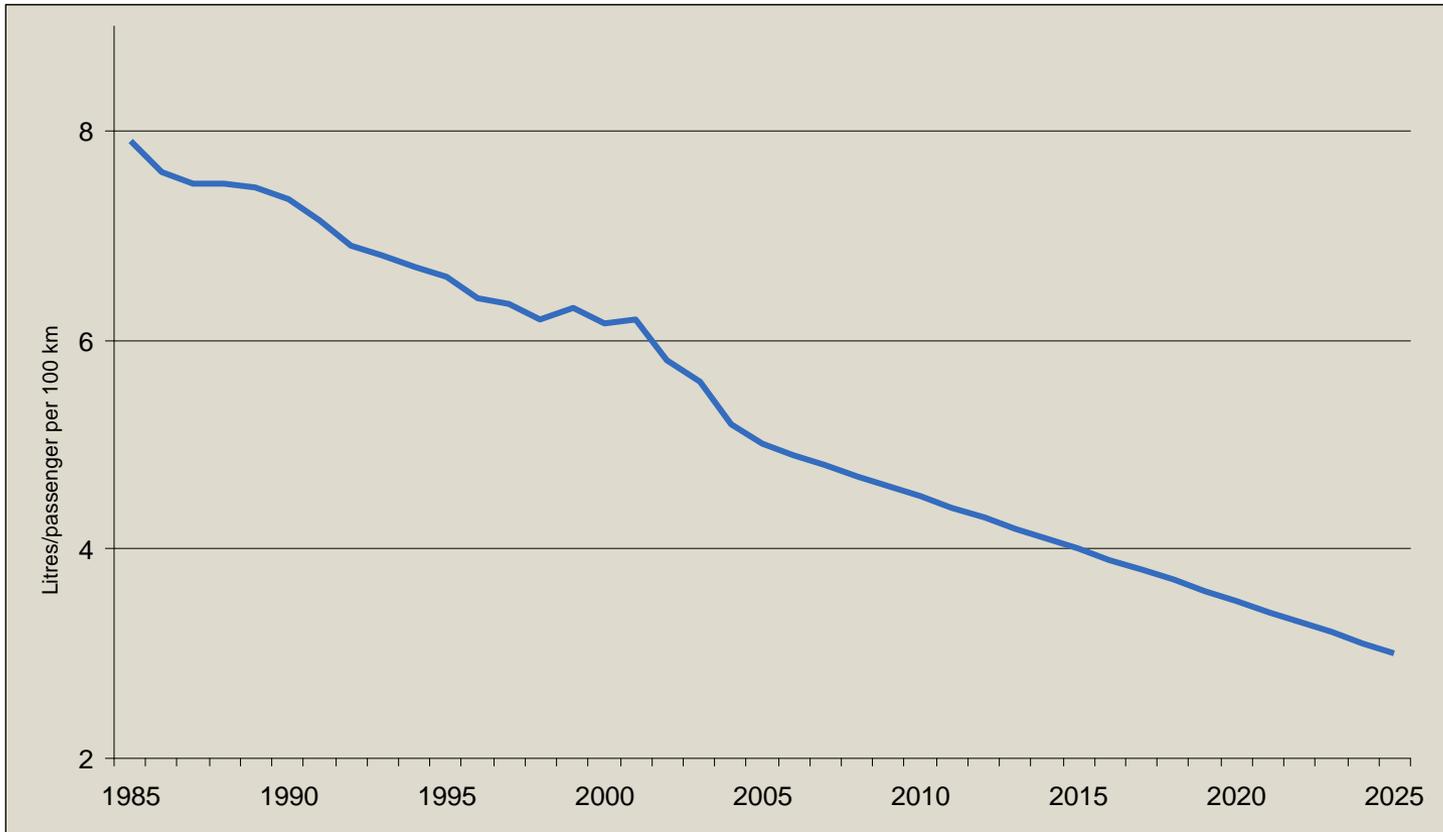
International air traffic is slated to double over 2010-2025, with annual growth of 4.5%-5%

Note: Fleet estimated at nearly 50,000 aircraft in 2030, with renewals and the increase in air traffic

Many factors are spurring the sector forward: population growth, growing middle classes in emerging countries, regular price decreases, increased supply (low cost carriers in Europe, Asia, etc.)...but there could be possible impediments to this growth such as deterioration in the economic environment

The many efforts made by the sector will only bring advances after two decades

The fall in fuel consumption in world passenger air transport (litres per passenger/100 km travelled)



Actors in the sector are concentrating on **4 major areas:**

- **technology**
- **operations**
- **organisation**
- **finance**

Convergence of economic, strategic and environmental interests

Source: ICAO

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The challenge of the triple arbitrage: The economy will be green if it is profitable

- The lack of a framework agreement and the difficult budgetary decisions to come threaten to further brake the already reduced prospects of low-carbon economic growth
- Beyond social responsibility, there are underlying sectoral dynamics (the search for profitability), which, when sustained in a targeted strategic fashion, can contribute strongly to growth in the short term and long term, given the potential value added to be achieved in the sectors
- This potential for the green economy is concentrated often (construction and automotive sectors) in the increased demand from the emerging countries; at times in the necessary reduction in energy dependence in manufacturing (chemicals, cement), or in looking to intensify a certain counter-cyclical behaviour (air transport)

Thank you
for your attention

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