

# Acid News

## New emission ceilings further delayed

The proposal for a revised NEC directive has once again been postponed by the European Commission.

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## Additional NO<sub>x</sub> reductions necessary

At least nine EU countries foresee difficulties in reducing their emissions sufficiently to meet the ceilings that are laid down in the national emission ceilings (NEC) directive.

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It is the coal industry that benefits most from interest in methods for collecting and trapping carbon dioxide (CCS).

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SHIPPING

# Global emissions must be curbed

**International shipping** now belches out more of the major air pollutant sulphur dioxide than all of the world's cars, trucks and buses combined, according to a new study<sup>1</sup> by the International Council on Clean Transportation (ICCT). Made up of transport and air quality experts from around the world, the ICCT now calls on the industry to clean up its act and also submit to tough standards as part of efforts to combat global warming.

Over the last three decades, shipping activity, as measured in tonne-kilometres, has grown on average by 5 per cent

every year. The group conclude that the International Maritime Organization (IMO) has "not kept pace with the industry's rapid growth and with technological advances in emission control".

"International ships are one of the world's largest, virtually uncontrolled sources of air pollution," said ICCT president Alan Lloyd.

**According to** the study, in 2005 ocean-going vessels accounted for 27 per cent of the global emissions of nitrogen oxides (NO<sub>x</sub>), 9 per cent of global sulphur di-

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# Acid News

A newsletter from the Swedish NGO Secretariat on Acid Rain, the primary aim of which is to provide information on air pollution and its effects on health and the environment.

Anyone interested in these matters is invited to contact the secretariat. All requests for information or material will be dealt with to the best of our ability. Acid News is available free of charge.

In order to fulfill the purpose of AcidNews, we need information from everywhere, so if you have read or heard about something that might be of general interest, please write or send a copy to:

The Swedish NGO Secretariat on Acid Rain  
Box 7005, 402 31 Göteborg, Sweden  
Tel: +46-31-711 45 15.  
Fax: +46-31-711 46 20  
E-mail: [info@acidrain.org](mailto:info@acidrain.org)  
Internet: [www.acidrain.org](http://www.acidrain.org)

Editor: Christer Ågren ([cagren@acidrain.org](mailto:cagren@acidrain.org))

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## THE Swedish NGO Secretariat on Acid rain

The Secretariat has a board consisting of one representative from each of the following organizations: Friends of the Earth Sweden, the Swedish Anglers' National Association, the Swedish Society for Nature Conservation, the Swedish Youth Association for Environmental Studies and Conservation, and the World Wide Fund for Nature Sweden.

The essential aim of the secretariat is to promote awareness of the problems associated with air pollution, and thus, in part as a result of public pressure, to bring about the needed reductions in the emissions of air pollutants. The aim is to have those emissions eventually brought down to levels – the so-called critical loads – that the environment can tolerate without suffering damage.

In furtherance of these aims, the secretariat

- Keeps up observation of political trends and scientific developments.
- Acts as an information centre, primarily for European environmentalist organizations, but also for the media, authorities, and researchers.
- Produces information material.
- Supports environmentalist bodies in other countries in their work towards common ends.
- Participates in the lobbying and campaigning activities of European environmentalist organizations concerning European policy relating to air quality and climate change, as well as in meetings of the Convention on Long-range Transboundary Air Pollution and the UN Framework Convention on Climate Change.

## Editorial

**Reducing** greenhouse gas emissions implies burning less fossil fuels, which in turn will mean less air pollution, resulting in less damage to health and the environment.

Therefore, the decision by EU Heads of State this March on a binding target to reduce greenhouse gas emissions by at least 20 per cent between 1990 and 2020 – a target that would increase to 30 per cent under an international agreement – will have major implications for EU air quality legislation.

The effects of climate policies on air pollutant emissions can mainly be seen in the energy and transport sectors. Improvements in energy efficiency and increased use of less- or non-polluting renewable sources of energy, result in significantly lower emissions of sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), and fine particles (PM), as compared to a situation without climate policy.

**In scenarios prepared** for the revision of the national emission ceilings (NEC) directive, the Commission's consultant IASA has estimated that a 20-per-cent cut in carbon dioxide emissions by 2020, could bring additional reductions in emissions of SO<sub>2</sub>, NO<sub>x</sub>, and PM<sub>2.5</sub> in the EU by approximately 30, 12, and 8 per cent, respectively.

It is clear that climate policies will have a positive effect on regional scale (Europe-wide) air pollution, but improvements will also take place in urban background air quality and urban hotspots, such as street canyons.

Recent analyses by the European Environment Agency (EEA) suggest that as a result of enhanced climate policies, exceedances of the air quality limit values for fine particles and NO<sub>2</sub> will drop considerably in cities across Europe (see AN 3/06).

Under a "climate action scenario"

(aiming at a 40-per-cent reduction in greenhouse gases by 2030), the EEA estimates the annual economic benefits to society of the resulting health improvements to amount to between 16 and 46 billion euro. Moreover, the costs for implementing current air pollution legislation are estimated to come down by some 12 billion euro per year.

Considering the damage caused by air pollution, these cost savings should be used to raise the level of ambition in EU air quality legislation.

Increased levels of fine particles alone are responsible for 350,000 premature deaths every year. That equals one premature death every one and a half minutes. Moreover, they are estimated to be responsible for around 100,000 cases of respiratory or cardiac hospital admissions, 30 million respiratory medication use days and several hundred million restricted activity days each year.

The Commission's response to this situation has been a thematic strategy on air pollution and a proposal for a new air quality directive – both presented in September 2005. Neither reflects the urgency or seriousness of the air pollution problem. The level of ambition of the thematic strategy is low, to say the least. The proposed new directive is even worse, since it contains provisions that would actually allow worsening health protection standards, rather than strengthening them.

**The good news** is that the recently agreed new EU climate policy brings additional air pollution improvements "for free". This fact must be fully accounted for – and used to markedly raise the level of ambition – in the second reading of the new air quality directive this autumn, and when developing the proposal for a new NEC directive.

Christer Ågren

*Better  
air quality  
for free!*

# Dirty power should clearly cost more



A Danish computer model makes it possible to calculate the socio-economic effects for individual power plants, for example benefits resulting from a reduction in emissions. (Photo: Elsam)

**The health damage** caused by air pollutants emitted from power plants may be valued at 17 euro per kilogram nitrogen oxides, 12 euro/kg sulphur dioxide and 46 euro/kg fine particles (PM<sub>2.5</sub>), according to a recent study by the National Environmental Research Institute (NERI).

A group of Danish scientists have used the ExternE methodology to estimate the external costs of three Danish energy supply industries. All three are CHP plants, i.e. they generate both heat and electricity, but they use different fuels – one is a waste incineration plant, the

other is coal-fired, and the third uses a mix of gas and coal. The results were presented in May in an article in the Danish magazine “Naturlig energi”.

**When expressed** as cost per kilowatt-hour (kWh) of electricity produced, the external costs were highest (3.5–6.3 eurocent) for the waste incineration plant, a bit lower (3.5–3.8 eurocent) for the coal/gas plant, and lowest of all (0.4–2.0 eurocent) for the coal-fired plant. It should be noted that the coal-fired plant is the most modern one, and is equipped

with up-to-date flue gas cleaning for removal of both SO<sub>2</sub> and NO<sub>x</sub>.

Overall for Denmark it is estimated that increased concentrations of PM<sub>2.5</sub> are responsible for some 3000 premature deaths each year. On average, the lifespan reduction in these cases is between two and nine years, depending on whether the cause of death is related to cardio-respiratory disease or to cancer.

NERI has developed its own computer model EVA (Economic Valuation of Air Pollution), which is an integrated environmental economic-atmospheric model system for assessing the health effects from air pollution.

**The model** can be used for socio-economic assessment and for individual plants, for example to evaluate the benefits resulting from a reduction in air pollution in relation to the costs of abatement measures.

The above-mentioned estimated costs per kWh could be used as a basis when discussing possible subsidies for renewable sources of energy. The article authors claim, however, that from a socio-economic perspective it would be better to internalize the (external) costs of pollution into the consumer price for electricity.

If this were done, the external costs should be based on the cost per kilogram of pollutant emitted, rather than the cost per kWh of electricity, since the latter is both more stable and better reflects the situation in both urban and rural environments.

Christer Ågren

## Danish panel calls for emission charges

A commission appointed by Denmark's finance ministry has recommended that electricity producers should pay emission charges for air pollutants to more accurately reflect the cost of damage caused by emissions from power stations. The panel

calls for emission charges to be introduced on nitrogen oxides and to be considered on a range of pollutants including particulates and heavy metals, while existing taxes on sulphur dioxide should be increased. Suppliers would have the choice of paying up, cleaning emissions more thoroughly or switching to greener energy sources.

Source: ENDS Europe Daily, 21 May 2007.

*Note:* The article *De eksterne omkostninger ved energiproduktion*, in Danish only, can be downloaded from [http://www2.dmu.dk/Pub/EVA\\_artikel%202.pdf](http://www2.dmu.dk/Pub/EVA_artikel%202.pdf). More information about NERI and the EVA computer model is available at: <http://www.dmu.dk/International/News/EVA.htm>



Over the last three decades, shipping activity, as measured in tonne-kilometres, has grown on average by 5 per cent every year. International ships are one of the world's largest, virtually uncontrolled sources of air pollution, according to the International Council on Clean Transportation, ICCT.

## Global emissions must be curbed

oxide (SO<sub>2</sub>) emissions, and 3 per cent of global carbon dioxide (CO<sub>2</sub>) emissions. Air quality impacts from shipping are especially significant in port cities and nations with extensive coastlines adjacent to shipping corridors. It has been estimated that about 70–80 per cent of all ship emissions occur within 400 kilometres of land.

**The global average** sulphur content of marine fuel oil is 27,000 parts per million (ppm), compared to maximum limits of just 10–15 ppm for road fuels in Europe, Japan and the United States. Emissions of SO<sub>2</sub> are a major cause of acid rain and contribute to the formation of fine particles (PM) that cause cardio-respiratory and other illnesses.

“We’ve found that the public health and environmental consequences are clear and compelling and the technology is available now to dramatically lower air pollution from international shipping,” said Dr. Axel Friedrich, co-author of the report and head of department at the German Environment Protection Agency. “It’s time for the IMO

to make overdue changes that will save lives, help millions of people breathe easier, and reduce global warming.”

It is stated that marine engines generally produce emissions of SO<sub>2</sub>, NO<sub>x</sub>, hydrocarbons, carbon monoxide and fine particles at a far higher rate than their stationary or mobile counterparts on land, and that this is in part due to the lack of stringent pollution control requirements imposed on these engines and in part due to the poor quality of the fuel they burn.

**Improved fuel quality**, optimized engines and exhaust after-treatment have been shown to significantly improve the environmental performance of marine vessels. Other measures such as shoreside power, improved auxiliary engines, and speed reduction can reduce ship emissions while in harbour. The feasibility and cost-effectiveness of these measures have been demonstrated, and dramatic reductions in ship emissions at sea and at berth are possible today with the use of readily available technologies.

**The ICCT calls** for widespread adoption of proven best available technologies in the short term and technology-forcing

standards for the long term. In the short term (by around 2010) the fuel sulphur limit in sulphur control areas (SECAs) should be reduced from 15,000 to 5000 ppm, and more SECAs should be designated. As a next step, the uniform global limit of the sulphur content of marine fuels should come down from the current level of 45,000 ppm to 5000 ppm in the mid-term (2012 to 2017), and in the longer term (after 2020) the sulphur content should be brought down further, in line with on-road fuels.

Regarding NO<sub>x</sub> emissions, the ICCT recommends requiring new engines to achieve emission limits that are 40 per cent lower than the current IMO standard in the near term. In the mid-term, NO<sub>x</sub> emissions should come down by 95 per cent, which is achievable with technologies already used by diesel trucks and power plants. The fuels and many of the technologies needed to meet these standards are also in use today in some ocean-going vessels, where regulations or incentives are already in place.

**It is concluded** that the IMO has so far not taken advantage of the best available technologies and fuels. Instead, its only action on ship emissions – which was adopted in 1997 and entered into

force in 2005 – at best codified the industry's existing practices.

According to the report, the lack of international standards and oversight has prompted local action from port cities and states where people bear the brunt of ship pollution, such as California and ports in Sweden, Los Angeles and Long Beach, to reduce the impact of ships on air quality. Without further action by the IMO, further local measures will result in an expanding patchwork of regulations by individual nations, states, and ports.

Christer Ågren

<sup>1</sup> **Air pollution and greenhouse gas emissions from ocean-going ships: Impacts, mitigation, options and opportunities for managing growth.** Published in March 2007 by the ICCT. Can be downloaded from [www.theicct.org](http://www.theicct.org)

### ICCT recommendations

ICCT's three main recommendations for IMO action for the mid-term (2012 to 2017) are to:

**Clean up marine diesel fuel.** Require approximately a 90-per-cent reduction in regulated sulphur levels, from 45,000 ppm, the current IMO standard for marine fuels, to 5,000 ppm, with harmonization with on-road diesel sulphur levels after 2020. Lower fuel sulphur levels will both reduce emissions of fine particles and SO<sub>2</sub>, and enable the use of emission control equipment that would otherwise be impaired by high sulphur levels.

**Set emission standards for new vessels based on readily available technologies.** Require approximately a 95-per-cent reduction in NO<sub>x</sub> emissions from new ocean-going vessels, which is possible using already available emission control technologies. Adopt emission standards for fine particles (PM). Low sulphur fuels are a critical first step to enable advanced technologies needed to meet PM and NO<sub>x</sub> standards.

**Set standards to address climate change impacts.** In the short term, develop a greenhouse gas emissions inventory and baseline for the climate impacts of international shipping. Set fuel economy standards for new and existing vessels.

## NATIONAL EMISSION CEILINGS

# New ceilings further delayed

The proposal for a revised directive has once again been postponed.

In early May the European Commission decided to postpone by more than half a year – from this July to February next year – its planned proposal for a new national emissions ceilings (NEC) directive.

After consultation with Member States in late March, the Commission concluded that the adoption of new climate and energy policies by the EU Heads of State on 9 March should be fully accounted for when developing the new NEC directive proposal.

This requires updating of scenarios on future energy use and resulting emission scenarios, which are key ingredients of the cost-effectiveness analysis underpinning the forthcoming proposal. Moreover, modellers may have to wait for the EU to arrive at burden-sharing agreements between member states on the 20-per-cent reduction target for greenhouse gas emissions and the target for a 20-per-cent share of renewable energy. Both targets are to be attained by 2020.

The 2001 NEC directive is the key legislation for the achievement of the EU's air pollution objectives as well as for attaining the air quality standards for a number of pollutants, including particles (PM), sulphur dioxide, nitrogen oxides and ozone.

Slower than expected progress in the EU's Clean Air For Europe (CAFE) programme has already led to some delay – the NEC directive was originally scheduled for review and revision by 2004. In September 2005, the Commission's thematic strategy on air pollution proposed significant cuts in emissions of the four pollutants covered by the NEC directive – sulphur dioxide, nitrogen oxides, vola-

tile organic compounds, and ammonia.

According to the current directive, by 2010 member states must limit their annual national emissions so that they do not exceed the emission ceilings laid down in the directive, and they must ensure that these emission ceilings are not exceeded in any year after 2010.

The new directive is to set new and stricter national emission ceilings for 2020 and is likely to include first-ever national ceilings on emissions of fine particulate matter, PM<sub>2.5</sub>. A revision of EU air quality standards currently underway will set parallel limits on ambient concentrations of PM<sub>2.5</sub>.

The proposed new emission ceilings will be elaborated with the help of integrated assessment computer modelling, which weighs the cost-effectiveness of reduction measures in each sector and country. According to preliminary estimates by the Commission's consultant IIASA (International Institute for Applied Systems Analysis), the incremental cost of meeting the thematic strategy's environmental targets varies significantly depending on what energy and climate policy is assumed for 2020.

Christer Ågren

Note: Since last summer IIASA has performed a series of analyses and produced several reports for the NEC revision process. The reports present scenarios for country-by-country emissions up to 2020 under varying assumptions regarding energy and climate policies. The resulting impacts on health and environment are also shown, as are estimates of the incremental cost for reducing emissions to the extent needed to attain the environmental targets of the 2006 thematic strategy on air pollution. The reports are available from IIASA's website: [www.iiasa.ac.at/rains/nec2007.html?sb=18](http://www.iiasa.ac.at/rains/nec2007.html?sb=18)

# Additional reductions of nitrogen oxides necessary

At least nine EU countries foresee difficulties in reducing their emissions of air pollutants sufficiently to meet the ceilings that are laid down in the national emission ceilings (NEC) directive.

**On behalf of** the European Commission's environment directorate, the UK consultancy AEA Energy & Environment has examined whether the national reports contain the information that is required according to the directive (see box). On the basis of the information submitted by each country an evaluation was also carried out on emissions trends to date, as well as expected future emissions.

Based on "business as usual" projections as reported by member states until April 2007, only nine member countries (out of the 21 that had provided the required information) are projected to comply with all of their ceilings by 2010. Even if envisaged additional measures are considered, only 13 countries will meet all their emission ceilings.

**The study shows** that there are major deficiencies in reporting. Three countries – Greece, Ireland, and Luxembourg – had by 31 March 2007 still failed to submit national programmes, inventories and projections to the Commission. Another five countries (Belgium, Germany, Latvia, Portugal, and Spain) had not submitted full national programmes – only provisional information.

The national reports that were submitted reveal that the main problems foreseen by countries relate to emissions of nitrogen oxides, and that ten countries – Austria, Belgium, Denmark, France, Germany, Italy, Malta, Netherlands, Slovenia, and Sweden – project emissions in 2010 that are higher than their ceilings. By comparison, only two

(Malta and Netherlands) predict that they may not meet their ceilings for sulphur dioxide.

**It is however** difficult to determine how great the obstacles to meeting the ceilings actually are, since most of the national programmes lack the information needed for a proper analysis, namely, quantitative estimates of the effects of the measures proposed or undertaken.

To assess whether countries are on track to achieve their emission targets, or not, the AEA used a "distance-to-target" indicator (see graphs). This is a measure of the deviation of actual emissions in 2005 from a linear path between 1990 and 2010. Since the assumption of a linear emission trend is somewhat hypothetical, the report stresses that this analysis is only indicative.

Based on these assumptions, twelve

member states were not on track to meet their emission ceilings for nitrogen oxides. Spain, Malta, Belgium, Austria, Ireland and Portugal appear to have the biggest problems in meeting their emission ceilings. (Note that due to lack of data from Greece and Luxembourg, these two countries were not included in the "distance-to-target" analysis.)

The trend appears more encouraging for sulphur dioxide – in which case only three countries (Malta, Cyprus and Spain) have emissions that lie above the target path.

**Regarding** volatile organic compounds, there are four countries – Poland, Spain, Portugal and Denmark – that look as if they may have problems meeting their emission ceilings. Again in the case of ammonia there were four countries whose emissions were "too high" in

## NEC directive reporting

The National Emission Ceilings (NEC) directive covers sulphur dioxide, nitrogen oxides, volatile organic compounds and ammonia.

Article 6 of the NEC directive says that the Member States shall, by 1 October 2006 at the latest, have updated and revised their 2002 national programmes for the progressive reduction of the four pollutants covered by the directive. These programmes should be so formulated as to make it possible to attain the NECs by 2010 at the latest. They should state what policies and measures have

been adopted or envisaged, and give quantified estimates of the effects they will have had on emissions by 2010. Article 8 says that the Member States shall have informed the Commission of their programmes by 31 December 2006.

Article 6 also says that the member countries must make their programmes available to appropriate organizations such as those dealing with environmental matters, as well as to the public. This information shall be "clear, comprehensible and easily accessible."

For more information about the NEC directive, see: <http://ec.europa.eu/environment/air/ceilings.htm>

2005, namely Spain, Germany, Denmark and Finland.

**Full and accurate** analysis and reporting by the countries is highly important not only for the implementation of the directive's 2010 ceilings, but also for its review and revision.

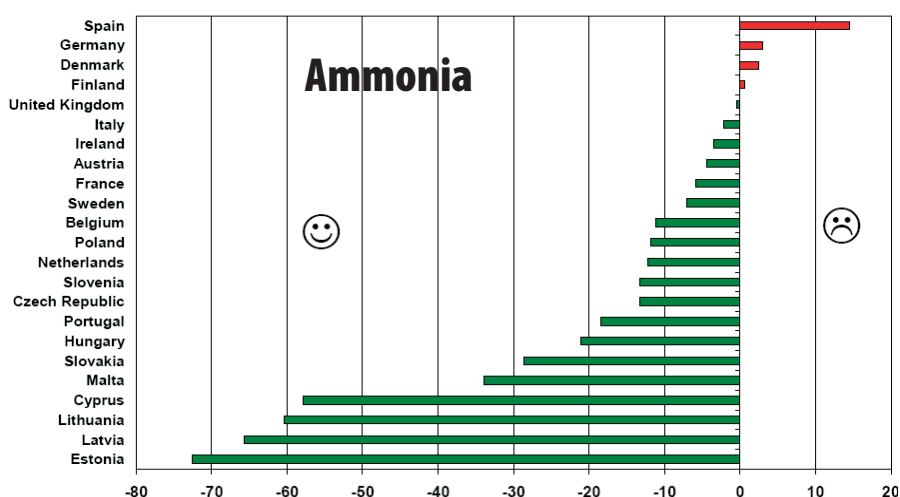
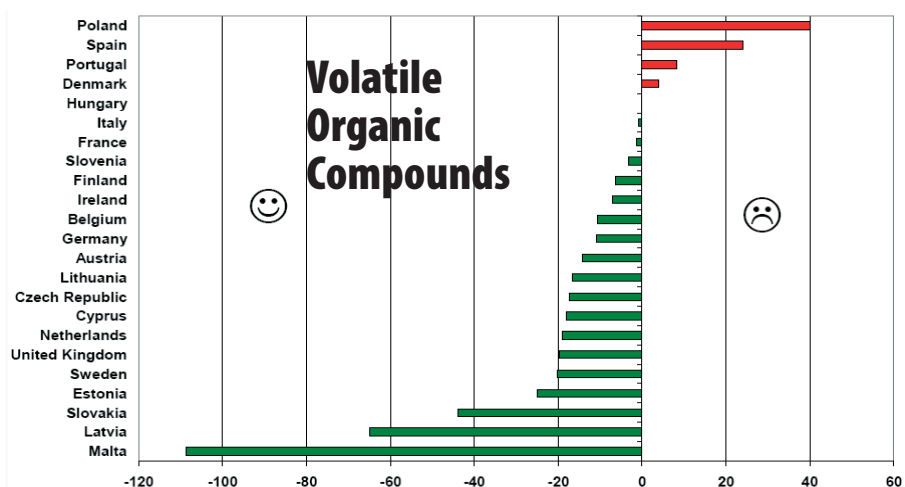
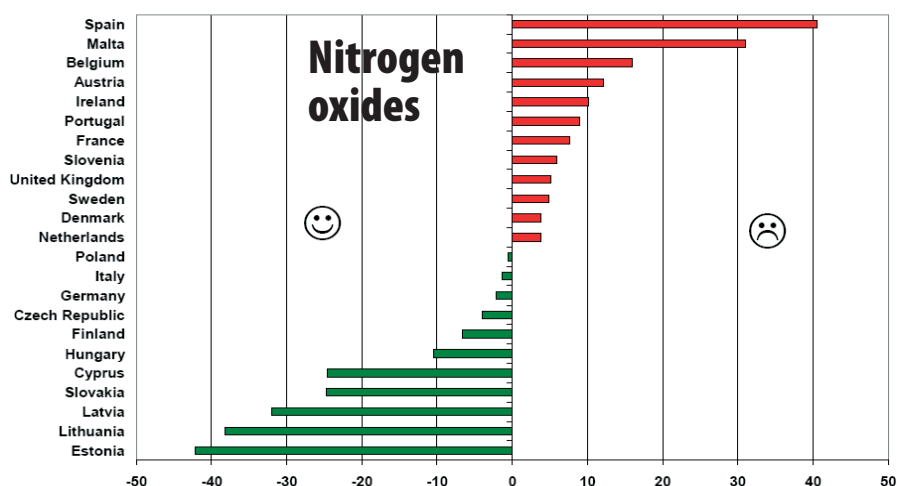
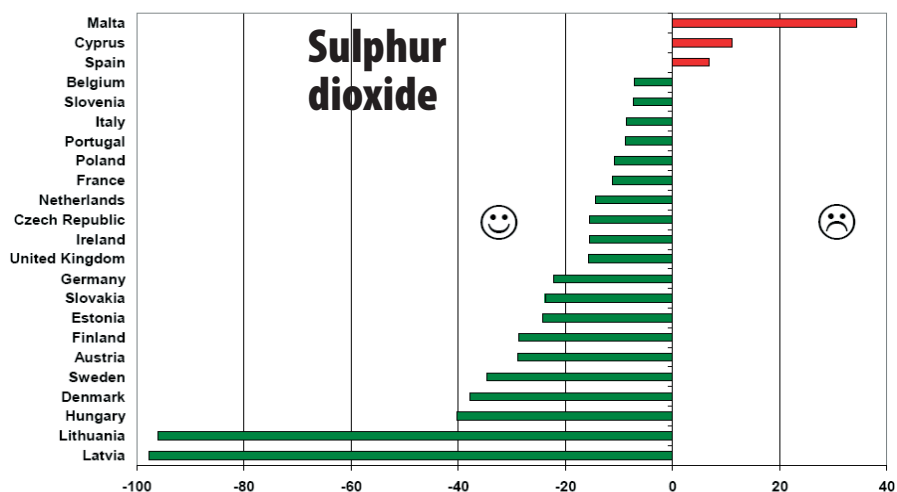
It is obvious that several EU member countries foresee difficulties in meeting their legally binding national emission ceilings by 2010. The lack of proper analysis and failure to investigate and report on possible additional emission abatement measures by many member states may help explain this disturbing situation.

Christer Ågren

Note: The report **Evaluation of national plans submitted in 2006 under the National Emission Ceilings Directive 2001/81/EC – Interim report** (dated 28 April 2007), by AEA Energy & Environment, can be downloaded from: [http://ec.europa.eu/environment/air/nationalprog\\_dir200181.htm](http://ec.europa.eu/environment/air/nationalprog_dir200181.htm). The national programmes so far submitted to the Commission are available at the same website.

**The graphs show the distance to target indicators for each of the pollutants covered by the NEC directive.**

The distance-to-target indicator measures the deviation (in per cent) of the actual emissions in 2005 from a (hypothetical) linear path between base-year emissions and the emission ceilings for 2010. A positive value suggests an under-achievement and a negative value an over-achievement by 2005.





LARGE COMBUSTION PLANTS

# Europe's dirty thirty

The Greek Agios Dimitrios power plant emits a massive 1.35 kg of CO<sub>2</sub> for every kWh of electricity it produces. This makes it the top offender in Europe's list of dirtiest coal-fired plants.

In the last issue of Acid News we presented a list of Europe's largest point emitters of carbon dioxide (CO<sub>2</sub>), based on data from EPER, the European Pollutant Emission Register.

WWF (the World Wide Fund For Nature) in collaboration with the consultancy Öko-Institut, has used the same database to pick out the thirty largest point emitters of CO<sub>2</sub>. They then compared the emissions from these thirty plants with the amount of electricity generated at each plant.

**The biggest** emitters of carbon dioxide per kilowatt-hour of electricity produced are the Greek power stations Agios Dimitrios and Kardia, followed by Niederaußem and four other German plants, see table. Most of the "Dirty Thirty" are located in Germany and the UK (10 plants each), followed by Poland (4 plants).

Europe's dirtiest power stations are all coal-fired, with the worst twelve all running on particularly CO<sub>2</sub>-intense lignite.

Just four companies account for most of Europe's dirtiest power stations. More than half of the 30 plants analyzed are run by RWE (Germany), Vattenfall (Sweden), EDF (France) and EON (Germany). RWE and Vattenfall are also the EU's largest corporate climate polluters.

**In 2006** the "Dirty Thirty" were responsible for 393 million tonnes of CO<sub>2</sub>, which is equal to 10 per cent of all EU CO<sub>2</sub> emissions.

Since many of the dirtiest plants are now nearing the end of their technical lifespan and will be decommissioned soon, the report also gives some scenarios for future electricity production.

It states that if they are replaced with new coal-fired power stations, the con-

tinued will be locked into high levels of CO<sub>2</sub> emissions for decades to come. However, if current coal-fired plants are replaced by cleaner alternatives such as the less CO<sub>2</sub>-intense natural gas or CO<sub>2</sub>-free renewable energies, Europe would lead the world towards a low-carbon economy.

**The report** contains three scenarios for future power generation, showing the potential for emission reductions as a result of fuel switching.

"The facts are clear. The power sector needs to phase out dirty coal as soon as possible," says Stephan Singer at the WWF's European Climate and Energy Unit.

"This must be done through an improved EU Emissions Trading System, helping the EU achieve its target of up to 30 per cent reduction in emissions by 2020."

However, to reduce emissions from the plants by the amount needed to meet the climate target – limiting global warming to two degrees – would require a broader strategy, for which WWF offers the following possibilities:

- ▶ A strong focus on energy savings on the demand side, rendering new power supply unnecessary.
- ▶ A better integration of heat and power demand, thereby promoting highly efficient Combined Heat and Power Plants as a replacement for traditional electricity plants.
- ▶ Carbon Capture and Storage (CCS),

both retrofitting and at new power stations.

▶ A massive expansion of new renewables baseload power probably from a new grid structure supplying offshore wind and imported concentrated solar power from Southern Europe and North Africa.

Per Elvingson

**Further reading: Dirty Thirty: Ranking the most polluting power stations in Europe.**

The report and an interactive map can be found at [www.panda.org](http://www.panda.org) (type "Dirty Thirty" in the search window).

**These 30 power plants are the biggest CO<sub>2</sub> emitting power plants in the EU25 countries in absolute terms (million tonnes of CO<sub>2</sub> per year). WWF has ranked them according to their relative emissions.**

	Power Plant	Country	Fuel	Operator	Relative emissions <sup>1</sup>	Absolute emissions <sup>2</sup>
1	Agios Dimitrios	Greece	Lignite	DEH	1.350	12.4
2	Kardia	Greece	Lignite	DEH	1.250	8.8
3	Niederaußem	Germany	Lignite	RWE	1.200	27.4
4	Jänschwalde	Germany	Lignite	Vattenfall	1.200	23.7
5	Frimmersdorf	Germany	Lignite	RWE	1.187	19.3
6	Weisweiler	Germany	Lignite	RWE	1.180	18.8
7	Neurath	Germany	Lignite	RWE	1.150	17.9
8	Turow	Poland	Lignite	BOT GiE S.A.	1.150	13.0
9	As Pontes	Spain	Lignite	ENDESA	1.150	9.1
10	Boxberg	Germany	Lignite	Vattenfall	1.100	15.5
11	Belchatow	Poland	Lignite	BOT GiE S.A.	1.090	30.1
12	Prunero	Czech Rep	Lignite	CEZ	1.070	8.9
13	Sines	Portugal	Hard coal	EDP	1.050	8.7
14	Schw. Pumpe	Germany	Lignite	Vattenfall	1.000	12.2
15	Longannet	UK	Hard coal	Scottish Power	970	10.1
16	Lippendorf	Germany	Lignite	Vattenfall	950	12.4
17	Cottam	UK	Hard coal	EDF	940	10.0
18	Rybnik	Poland	Hard coal	EDF	930	8.6
19	Kozienice	Poland	Hard coal	state owned	915	10.8
20	Scholven	Germany	Hard coal	E.ON	900	10.7
21	West Burton	UK	Hard coal	EDF	900	8.9
22	Fiddlers Ferry	UK	Hard coal & oil	Scottish & South.	900	8.4
23	Ratcliffe	UK	Hard coal	E.ON	895	7.8
24	Kingsnorth	UK	Hard coal & oil	E.ON	892	8.9
25	Brindisi Sud	Italy	Coal	ENEL	890	14.4
26	Drax	UK	Hard coal	AES	850	22.8
27	Ferrybridge	UK	Hard coal	Scottish & South.	840	8.9
28	Mannheim	Germany	Hard coal	EnBW, MVV	840	7.7
29	Eggborough	UK	Hard coal	British Energy	840	7.6
30	Didcot A & B	UK	Hard coal & gas	RWE	624	9.5

<sup>1</sup> Grams of CO<sub>2</sub> per kilowatt hour (g CO<sub>2</sub>/kWh). Where two plants have the same relative emissions, the plant with the higher absolute emissions (million tonnes CO<sub>2</sub> per year) ranks dirtier.

<sup>2</sup> Annual emissions for the year 2006 in million tonnes of CO<sub>2</sub>.

## Buildings can play a key role in climate policy

The right mix of appropriate government regulation, greater use of energy saving technologies and behavioural change can substantially reduce carbon dioxide (CO<sub>2</sub>) emissions from the building sector, which account for 30–40 per cent of global energy use, says a new report from the UN Environment Programme (UNEP) Sustainable Construction and Building Initiative (SBCI).

The report says many opportunities exist for governments, industry and consumers to take appropriate actions during the lifespan of buildings that will help mitigate the impacts of global warming.

Citing the example of Europe, the report says more than one-fifth of present energy consumption and up to 45 million tonnes of CO<sub>2</sub> per year could be saved by 2010 by applying more ambitious standards to new and existing buildings. Worldwide, the UNEP estimates an emission reduction potential of 1.8 billion tonnes of CO<sub>2</sub> per year.

Source: **Buildings and Climate Change: Status, Challenges and Opportunities**. Available at [www.unep.org](http://www.unep.org).



## Steep cut foreseen in Bulgarian emissions

At the start of April the Bulgarian government adopted emission targets that will set a ceiling on sulphur dioxide (SO<sub>2</sub>) emissions of 380,000 tonnes a year in 2012, compared with 900,000 tonnes in 2005 and two million tonnes in 1990.

A full 86 per cent of sulphur dioxide emissions in Bulgaria come from coal-fired power plants. The thermal power stations in the Maritsa Iztok coal basin generate 65 per cent of total SO<sub>2</sub> emissions (585,000 tons). The facilities are being outfitted with flue gas desulphurization installations, which should reduce SO<sub>2</sub> emissions by 94 per cent.

The other emission caps installed by the government are 247,000 tons for NO<sub>x</sub>, 175,000 tons for volatile organic compounds and 108,000 tons for ammonia.

Source: Dnevnik (<http://en.dnevnik.bg>), 10 April 2007

# More studies before action

UN shipping body drags out debate on stricter environmental standards for international shipping.

**Delegates** at a working group meeting of the International Maritime Organisation (IMO) in April failed to agree on substantive decisions to reduce air pollution from shipping, despite the near universal agreement that such reductions are acutely needed. Instead, the IMO is considering a new schedule that will not produce a final decision on any new limits until 2008 at the earliest – in fact, even further delay is possible.

According to IMO secretary general Efthimios Mitropoulos, there is a need to carry out a “broad-based and holistic review” of proposals being developed to cut air pollution from ships. Therefore, the IMO’s main environment policy decision-making body, the Marine Environment Protection Committee (MEPC), which meets in July, is to commission a study to help evaluate options to reduce emissions.

It appears as if the intention of the IMO is that the study should focus specifically on the effects of the proposed fuel options to reduce sulphur dioxide (SO<sub>2</sub>) and particulate matter (PM) emissions. It should also address possible consequential effects, such as impacts on emissions of carbon dioxide, including those that may result indirectly as a result of changes in the oil refining industry.

**Consequently** it is not intended to consider strategies for reducing emissions of nitrogen oxides (NO<sub>x</sub>), as this work should continue in the Working Group on Air Pollution under the so-called BLG Sub-Committee.

The study is to be conducted by a group of experts nominated by selected IMO member governments and non-governmental organizations (mainly industrial ones), which means an obvious risk that the so-called independent ex-



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perts will be mostly the same delegation members already involved in the MARPOL Annex VI revision process.

If finalized as scheduled, the study will be presented to the MEPC next spring.

**The proposal** for the new study was presented during the meeting of the Working Group on Air Pollution, held in London on 16–20 April, at which the

revision of MARPOL Annex VI was also discussed.

Several options to cut emissions of SO<sub>2</sub> are on the table, ranging from tightening the maximum sulphur content of fuels used in existing special protection areas or along coastlines, to lowering the sulphur cap worldwide or promoting a mandatory switch to more highly-refined distillate fuels.

## IMO MARPOL Convention

Following its ratification by 15 countries, Annex VI to the International Convention on the Prevention of Pollution from Ships (MARPOL) came into force on 19 May 2005. It was originally signed in 1997.

Annex VI sets limits on the sulphur content of marine heavy fuel oils (with a global cap of 4.5 per cent) and on the emissions of NO<sub>x</sub> from new ship engines. These standards are however so weak as to be hardly likely to have any

appreciable effect.

On the other hand, the annex also sets a limit of 1.5 per cent sulphur for heavy fuel oil used by ships sailing in Sulphur Emission Control Areas (SECAs), which should lead to reductions in the two designated areas, the Baltic Sea and the North Sea.

At its first meeting after the entry into force of the Annex VI, in July 2005, the IMO’s Marine Environment Protection Committee (MEPC) agreed on the need to undertake a review aiming at a possible strengthening of the Annex.

Delegates also discussed a proposed three-tier system to bring down NO<sub>x</sub> emissions from new engines. The next tier could mean NO<sub>x</sub> emissions being cut by just 10–20 per cent by 2010–2012, relative to year 2000 levels. There are several proposals regarding what would happen thereafter, with cuts of 40 to 80 per cent proposed to be introduced by 2015–2016. (See AN 1/07, p. 16.)

**The working group** is scheduled to meet once more – either before the end of this year or early next year – to finalize their recommendations in time for the MEPC meeting by March 2008.

Environmental groups allied with Friends of the Earth International expressed alarm at the lack of action by the international community to reduce harmful air pollution from ships. Two years ago, the IMO decided to review the MARPOL Annex VI and create tougher international standards for air pollution from international shipping. The revision was to be finalized and adopted before the end of 2007.

“Air pollution from ships is a large and growing human health and environmental threat of global proportions,” stated David Marshall of the Clean Air Task Force. “It is irresponsible for governments to allow this pollution threat to continue when there is ample technology today capable of reducing this toxic pollution substantially.”

Eelco Leemans of the North Sea Foundation added: “The IMO must pick up the pace and act soon. If IMO cannot – or will not – take prompt action to reduce shipping emissions, then the EU, the US and other countries that care about the health of their citizens and environment will need to move ahead with their own requirements.”

**According to** the environmental groups, many countries and progressive elements of the shipping industry are supporting prompt IMO action to reduce shipping pollution, but the oil industry, much of the shipping industry, and “flags of convenience” countries are dragging their feet, using every opportunity to slow down or block any real progress.

Christer Ågren

## UK scientists assess impacts of shipping sulphur controls

If shipping emissions in the North Sea are assumed to increase at a rate of 2.5 per cent per year, their relative contribution to sulphur deposition in the United Kingdom is expected to increase from nine to 28 per cent between 2002 and 2020 in the absence of ship emission controls.

As a result of EU legislation and MARPOL Annex VI, from autumn 2007 the sulphur content in fuels used by ships in the North Sea will be limited to a maximum of 1.5 per cent. This will limit the contribution of shipping to sulphur deposition to 23 per cent.

A further tightening of the sulphur limit (i.e. lower than 1.5 per cent) would result in significant reductions in the total sulphur deposition in the UK, as well as a reduction in the area of sensitive habitats where critical loads for acidity are exceeded in the UK.

*Source: Modelling the atmospheric transport and deposition of sulphur and nitrogen over the United Kingdom and assessment of the influence of SO<sub>2</sub> emissions from international shipping. Atmospheric Environment, Volume 41, Issue 11, April 2007, pp. 2355–2367.*

## Postponed ship emissions control

On 24 April the US Environmental Protection Agency (EPA) decided to postpone proposals for new exhaust emission standards for large marine engines. The deadline will move from 27 April 2007 to 17 December 2009.

EPA established in 2003 the first US emission standards for new compression-ignition Category 3 marine engines, i.e. those with a displacement at or above 30 litres per cylinder. At the same time, a deadline of April 2007 was set for EPA to promulgate a new tier of emission standards for these engines.

The schedule was intended to allow EPA time to consider the state of technology that may permit greater emission reductions and the status of international action for more stringent standards.

Now the EPA claims that due to the long lead times associated with the installation and assessment of advanced emission control technologies and to the delayed start of IMO negotiations for a new tier of international standards, much of the information that will be required to develop new Category 3 marine diesel engine standards is only now becoming available. Therefore, EPA is setting

a new regulatory deadline for the next tier of Category 3 marine diesel engine standards, with a final rule to be adopted no later than December 2009.

*Source: [www.epa.gov/otaq/regs/nonroad/marine/ci/420f07024.htm](http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f07024.htm)*

## Vancouver introduces ship emission fees

In a bid to stem growing air pollution, the Port of Vancouver, Canada's largest, will start charging international cargo ships fees that are based partly on a vessel's air pollutant emissions.

The new harbour dues system (introduced in April) rewards ships that take steps to reduce pollution, such as burning lower-sulphur fuel, by charging them lower dues than it does to ships with higher emission levels.

A report in 2004 by US and Canadian regulators warned that by 2010 growing marine traffic in the Vancouver area will contribute more air pollution to the region than is produced by cars and trucks.

*Source: Reuters News Service, 2 April 2007.*



## Shipping main source of nitrogen deposition

A recent report from Helcom has investigated various scenarios for expected levels of nitrogen deposition in the Baltic Sea in 2010. According to the study, the total nitrogen deposition in the Baltic will be about the same in 2010 as it was in 2003. For all three scenarios investigated, there are three major emission sources that contribute to deposition, namely Poland, Germany, and ship emissions. In the Baltic Sea region, shipping, road transportation and energy combustion are the main sources of NO<sub>x</sub> emissions, while agriculture is the main source of ammonia emissions.

*Source: Estimation of atmospheric nitrogen deposition to the Baltic Sea in 2010. Available from: [http://www.helcom.fi/publications/en\\_GB/publications/](http://www.helcom.fi/publications/en_GB/publications/)*

# Cost-effective to reduce emissions from ships

The measures in force to address emissions from international shipping are clearly inadequate.

**In the absence** of new abatement action, air pollutant emissions from international shipping in European sea areas are expected to increase by about 50 per cent between 2000 and 2020. This would counteract the envisaged benefits of costly efforts to control the remaining emissions from land-based sources in Europe.

However, if already available technical control measures are applied, emissions of sulphur and nitrogen oxides from international shipping could instead be reduced by up to 85 per cent in that same time period.

These are some of the conclusions of a new report<sup>1</sup> prepared for the European Commission by a consortium of consultants, and released in May. The study was carried out as a follow-up to the 2005 thematic strategy on air pollution, and to provide input to the ongoing revision of the directive on national emission ceilings (NEC). The outcome will also be used in negotiations under the International Maritime Organisation on the revision of its MARPOL Annex VI (see separate article on p. 10).

**Analysis for** the EU's Clean Air For Europe programme indicated that human exposure to fine particles (PM<sub>2.5</sub>) from anthropogenic emission sources in the year 2000 caused some 348,000 premature deaths, which is equivalent to an average shortening of statistical life expectancy of about eight months. A large fraction of the PM<sub>2.5</sub> consists of secondary sulphate and nitrate aerosols, formed in the air from emissions of sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>).

Shipping already contributes significantly to the health and environmental

damage caused by air pollution in Europe – a significant fraction of sulphur and nitrogen compounds deposited on land originates from ship emissions. Currently ships are responsible for 10–20 per cent of sulphur deposition in coastal areas.

**Land-based emissions** in the EU are expected to decline in coming years. The baseline projections prepared for the ongoing revision of the National Emission Ceilings (NEC) directive indicates that by 2020, current EU legislation for land-based sources would lead to a reduction of SO<sub>2</sub> emissions by more than 60 per cent, and of NO<sub>x</sub> emissions by about 40 per cent, compared to the year 2000. To fulfil the objectives of the thematic strategy on air pollution, more far-reaching reductions of about 82 per cent for SO<sub>2</sub> and 60 per cent for NO<sub>x</sub>, by 2020 are needed.

There are some measures in force to address emissions from international shipping, such as the 1997 MARPOL Annex VI and the 2005 EU directive on the sulphur content of marine fuels. But these are clearly inadequate, and the expected increase in the volume of ship movements will far outweigh the limited positive environmental effects of these measures.

Based on fairly modest annual growth rate assumptions of 2.5 per cent for cargo vessels and 3.9 per cent for passenger vessels, it is estimated that by 2020 ship emissions would grow by 42, 47 and 56 per cent respectively, for SO<sub>2</sub>, NO<sub>x</sub> and PM<sub>2.5</sub>. (See box for more information about ship emissions.)

**According to** these baseline projections, by 2020 the contribution of ship-

ping to sulphur and nitrogen deposition is expected to increase to more than 30 per cent in large areas of Europe, especially in the UK, Ireland, Sweden, Denmark, France, Germany, Netherlands, Belgium, Spain, Italy, and Greece. In many coastal areas, ships will be responsible for more than half of the sulphur deposition.

The application of technically feasible emission reduction measures for ships (see below) could reduce health damage by nine per cent on average for the EU27, as compared to the 2020 baseline situation. Improvements of more than ten per cent would be seen in Malta, Denmark, Spain, Ireland, Cyprus, Portugal, UK, Sweden, Italy, Greece, Netherlands, and France. Improvements of between 20 and 50 per cent are expected for people living along coastal areas.

**A set of** “best available” technical emission control measures was identified by the consultants. This could – if fully applied – reduce by 2020 the SO<sub>2</sub> and NO<sub>x</sub> emissions from international shipping by nearly 80 and 90 per cent, respectively, compared to the baseline case.

The costs of these measures, which include the use of low-sulphur (0.5 per cent) fuels and catalytic exhaust cleaning (SCR), are estimated at 5.1 billion euro per year in 2020. By comparison, the costs of the measures proposed under the thematic strategy for further reductions by land-based sources were estimated at 7.1 billion euro per year in 2020.

In addition, four selected specific packages of measures that could deliver emission reductions at lower costs were explored.

► **Level 1:** Internal engine modifications for all ships built after 2010 and

retrofitting the low-speed engines of existing (pre-2000) vessels with slide valves. If applied to all ships, NO<sub>x</sub> emissions would still increase by 33 per cent by 2020, as compared to a 47-per-cent increase in the baseline case. If applied only to EU-flagged ships, NO<sub>x</sub> emissions would increase by 42 per cent. The costs for these measures on all ships are estimated at 26 million euro per year.

► **Level 2:** The use of fuel with a maximum sulphur content of 0.5 per cent (or seawater scrubbing resulting in equivalent emissions) in the North Sea and Baltic, slide valve retrofits for existing low-speed engines and humid air motors for all newly built vessels (post-2010). If applied to all ships, by 2020 this would result in increases in SO<sub>2</sub> and NO<sub>x</sub> emissions of 23 per cent and 7 per cent respectively, compared to emission levels in 2000. If limited to EU ships, SO<sub>2</sub> and NO<sub>x</sub> emissions would go up by 32 and 29 per cent respectively. Implementation on all ships would cost some 773 million euro per year.

► **Level 3:** Using fuel with a maximum sulphur content of 0.5 per cent (or seawater scrubbing resulting in equivalent emissions) for all ships in all sea areas (after a stepwise phasing-in period 2010–2020). A 15-per-cent reduction from the IMO baseline level for all pre-2010 vessels, and a 50-per-cent reduction from the IMO baseline level for all post-2010 vessels. By 2020 this package would reduce SO<sub>2</sub> and NO<sub>x</sub> emissions by

66 per cent and 3 per cent respectively, compared to emission levels in 2000, at an estimated cost of 2.5 billion euro per year.

► **Level 4:** For SO<sub>2</sub>, the same measures as for Level 3. A 15-per-cent reduction from the IMO baseline level for all pre-2010 vessels, and selective catalytic reduction (SCR) on all post-2010 vessels. SO<sub>2</sub> and NO<sub>x</sub> emissions would come down by 66 and 17 per cent respectively, compared to emission levels in 2000. Costs are estimated to amount to 3.2 billion euro per year.

A comparison of the emission reduction options for ships with those outlined in the thematic strategy for land-based stationary sources, shows that the technical measures for marine sources could yield significant reductions at relatively low costs.

**However**, an analysis of the cost-effectiveness of measures for ships relative to land-based measures cannot be based solely on marginal abatement costs, but also needs to consider the damage to health and the environment caused by emissions, i.e. it also has to take into account the resulting damage to sensitive receptors (people and ecosystems).

This was done using an integrated assessment model, which brings together information on abatement costs and atmospheric dispersion characteristics, thus enabling comprehensive cost-effectiveness analyses to be undertaken.

The scenario analysis demonstrated that introducing ship emission reduction measures can substantially lower the cost of additional controls for land-based sources for attaining the health and environmental objectives of the thematic strategy. Countries with a high proportion of their area located close to the sea benefit more from stricter controls on shipping.

**For three out of the four** emission reduction packages investigated, net cost savings were achieved, i.e. the total costs of land-based and shipping measures combined were lower than when measures were only taken for land-based sources.

The study only shows to what extent emission abatement measures on ships could offset costs for measures aimed at land-based sources, in order to attain the thematic strategy objectives. Consequently, no analysis was made of the cost-effectiveness of “stand-alone” emission abatement measures on ships.

Christer Ågren

<sup>1</sup> **Analysis of Policy Measures to Reduce Ship Emissions in the Context of the Revision of the National Emissions Ceilings Directive** (Final report, March 2007). Consultancy report to the European Commission's DG Environment by the International Institute of Applied Systems Analysis, Entec UK Limited and the Norwegian Meteorological Institute. Available at: <http://ec.europa.eu/environment/air/transport.htm>

## Air pollution from ships

According to the report, the vast majority – approximately 95 per cent – of emissions from international shipping in Europe are produced by larger vessels, i.e. bigger than 500 gross registered tonnes (GRT). For these larger vessels, roughly 95 per cent of SO<sub>2</sub> and NO<sub>x</sub> emissions are estimated to emanate from cargo ships. Nearly half of the emissions in the region originate from ships with EU flags, and approximately 5 per cent are emitted from ships while at berth.

For the year 2000, the total emissions from international shipping by larger vessels in European sea areas were estimated at 2.3 million tonnes SO<sub>2</sub>, 3.3 million tonnes

NO<sub>x</sub> and 250,000 tonnes PM<sub>2.5</sub>. Under business-as-usual assumptions, SO<sub>2</sub> emissions from international shipping in European waters are projected to increase by 42 per cent between 2000 and 2020, NO<sub>x</sub> emissions by 47 per cent and PM<sub>2.5</sub> emissions by 56 per cent.

Without additional measures, by 2020 the emissions from international shipping would then come close to the projected baseline emission levels for land-based sources, and even surpass the target levels established in the thematic strategy on air pollution for land-based sources, in particular for SO<sub>2</sub> by a factor of two.

Emissions from larger vessels taking place in the so-called territorial waters were estimated at 577,000 tons of SO<sub>2</sub> and

761,000 tonnes of NO<sub>x</sub> in the year 2000. This is nearly one quarter of the total shipping emissions in Europe. The territorial waters encompass a zone stretching 12 nautical miles (22 km) from the shore.

The inventory also included an estimation of emissions from national sea traffic, which comprises ship movements between ports of the same country. These were calculated to be around 260,000 tons SO<sub>2</sub>, 340,000 tons NO<sub>x</sub>, and 25,000 tons PM<sub>2.5</sub>. Emissions from national shipping would thus constitute a relatively small portion – around ten per cent – of total maritime emissions. It should be noted that there are considerable differences between this estimate, and the figures reported by member states.

# The poorest people will be hardest hit

The effects of human-induced climate change pose an increasing threat to the natural world and human society, according to the UN's Intergovernmental Panel on Climate Change, IPCC.

**The IPCC report**, published in April, summarizes published scientific research up to 2005. It describes how climate change is affecting people and the environment. It predicts future impacts, by region and sector, and estimates how far mitigation and adaptation measures can help reduce them.

The report concludes that climate change is already having major impacts. Future climate change will make dry areas drier and increase the risk of flooding in others. More than a billion people may face fresh-water shortages by 2050. In some countries, crop yields could halve by 2020. Health problems will increase.

There are also likely to be widespread biodiversity losses: 20 to 30 per cent of

plant and animal species will face an increased risk of extinction if the average global temperature increases by more than 1.5 to 2.5 degrees Celsius. The IPCC forecasts a three-degree rise this century under business as usual.

**The four areas** of the world thought to be the most vulnerable to climate change are:

- ▶ the Arctic, where temperatures are rising fast and ice is melting;
- ▶ sub-Saharan Africa, where dry areas are forecast to get drier;
- ▶ small islands, because of their inherent lack of capacity to adapt, and
- ▶ Asian mega-deltas, where billions of people will be at increased risk of flooding.

The summary for policy makers was adopted by delegates from 113 countries after a week of negotiations. Some delegates tried to play down the message of human impact on the climate in order to avoid taking strong measures to reduce emissions. China, the US, Russia, and Saudi Arabia were the main culprits at the meeting, according to several independent sources.

**The IPCC** brings together 2,500 scientists and is the top authority on climate change. This is the second in a series of reports to be published this year, together making up its fourth global climate assessment.

The first part, on the science of climate change, released in February, concluded

## Impacts, Adaptation and Vulnerability: IPCC conclusions

In the IPCC's previous assessment (2001) it was reported that the effects of global warming could be detected in some systems. In the latest report there is a much larger body of evidence to support this claim.

### Better understanding of future effects

In general the number and severity of climate effects will increase as climate change progresses. The impact of these effects will vary.

The availability of water will increase in regions where it is already good, but decline in many areas that are already dry. Glacial retreat will reduce access to water in areas that are dependent on meltwater from the mountain chains around the world.

Continuing climate effects, combined with other environmental effects and over-exploitation of natural resources, are depleting the world's ecosystems. Carbon will be fixed less effectively by terrestrial ecosystems, which could eventually turn into sources of carbon dioxide.

If global warming progresses more than a couple of degrees there is increasing likelihood of extinction of 20–30 per cent of plant and animal species on the planet. The mountainous areas of Europe will face much greater species losses, in some areas up to 60 per cent under high emission scenarios by 2080. Major changes may also take place in the functioning of ecosystems, having negative effects on biodiversity and ecosystem services.

Initially, as local temperatures continue to rise by 1–3 degrees, it will favour agriculture in some regions and cause problems in others. The negative consequences will be felt first in certain tropical areas.

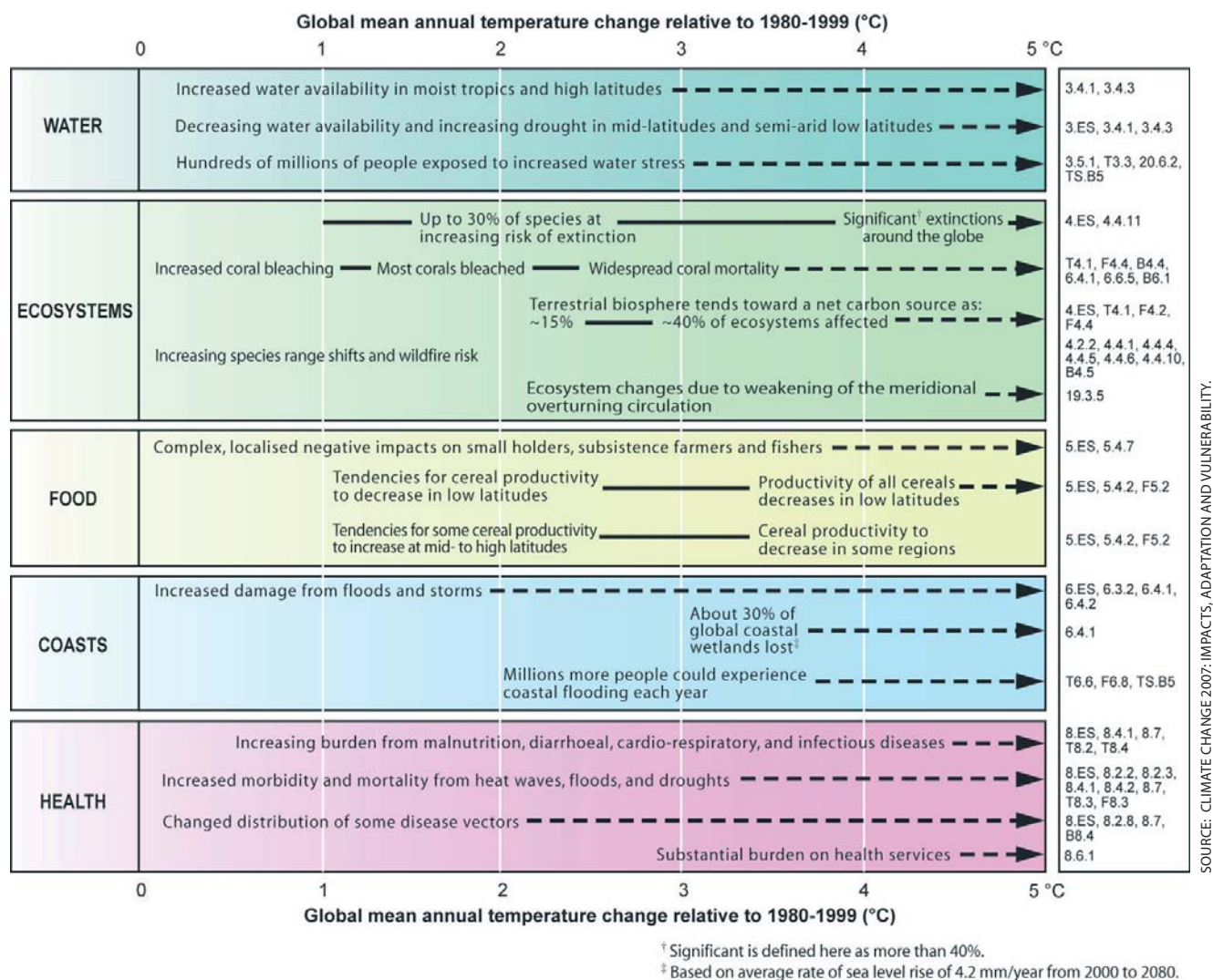
The effects on population centres show large regional variations. The most exposed are densely populated coastal areas and communities and businesses that are sensitive to extremes or dependent on climate-sensitive resources.

Climate-related health effects will also vary from region to region. Globally, it is expected that more people will lose out than will gain.

### Better understanding of regional effects

**Africa:** Food production could fall by up to 50 per cent as early as 2020. Reduced water resources may affect 75–250 million people. This will be compounded by the effects of rising sea levels.

**Asia:** Reductions in meltwater runoff from mountain glaciers may mean reduced access to water in large areas, with negative effects on more than a billion people by the year 2050. Rising sea levels will cause severe flooding along coastlines, especially in the densely populated mega-deltas.



it is at least 90 per cent likely that human activities are principally responsible for the warming observed since 1950 (see AN 1/07). The third part, published on 4 May, focuses on ways of curbing the rise

in greenhouse gas concentrations and temperature (see next spread). A fourth report in November will sum up all the findings.

Per Elvingson

**Further reading: Climate Change 2007: Impacts, Adaptation and Vulnerability. Summary for policymakers.** Available at [www.ipcc.ch](http://www.ipcc.ch).

See also **Earth Negotiations Bulletin** summary, [www.iisd.ca/download/pdf/enb12320e.pdf](http://www.iisd.ca/download/pdf/enb12320e.pdf)

**Australia - New Zealand:** Restricted availability of water, reduced harvest from farming and forestry, and reduced biodiversity are expected here.

**Latin America:** Harvests are expected to decline. Gradual changes in ecosystems are expected, which will have consequences on biodiversity.

**North America:** Water resources will be reduced in some parts of the continent. Damage and disruption are also expected as a result of extremes in weather.

**Arctic regions:** Natural habitats and local communities will be affected by melting snow, ice, sea ice and permafrost.

**Small island nations:** These are threatened by rising sea levels, as well as reduced availability of fresh water.

**Europe:** Coastal erosion, tangible effects on the natural environment and more climate-related natural catastrophes are expected here. Some events will increase across almost the whole of

Europe (such as flooding due to extreme rainfall), while others will vary within Europe (such as winter floods and forest fires). Harvests and water resources are expected to decrease in the south, but increase in the north. The potential for hydroelectric generation will fall in the south. In alpine areas the glaciers will shrink. Soil stability will decrease in the north.

There will be some positive effects for northern Europe, but even here the negative effects are likely to outweigh the positive as climate change progresses.

#### Adaptations and vulnerability

Vulnerability to climate effects may be aggravated by other stress factors, such as pollution, poverty, conflicts, epidemics and shortage of food, all of which pose obstacles to sustainable development. Conversely, the sustainable development of communities can reduce their vulnerability by increasing their ability to adapt.

Climate effects and their resulting costs will vary from region to region.

From a global perspective, relatively small temperature variations are predicted to have both benefits and costs. In some areas close to the equator and in Arctic regions even small temperature rises will lead to net costs.

Negative effects are expected in all regions if the global temperature rises more than two to three degrees above that in the twentieth century, and the costs will increasingly exceed any benefits of climate change, both regionally and globally.

Beyond the next few decades many effects can be delayed or reduced by reducing greenhouse gas emissions. A combination of emission reductions and adaptation measures can reduce the risks associated with climate change.

**Source: Climate Change 2007: Impacts, Adaptation and Vulnerability. Summary for policymakers.**



## MITIGATION

# It is possible to stop global warming

We must make sweeping cuts in greenhouse gas emissions in the next 50 years to keep global warming in check, but it need cost only a tiny fraction of world economic output, according to the third report this year by the UN's Intergovernmental Panel on Climate Change.

**The IPCC shows** that stabilizing atmospheric greenhouse gas levels at 450 ppm CO<sub>2</sub>-equivalents is possible if global emissions reach a maximum in 2015 and then fall sharply. To meet the maximum warming target of two degrees above the pre-industrial level with a reasonable degree of confidence, emissions in 2050 must be 50–85 per cent below the 1990 level, according to the report's summary for policy makers.

Looking back, it can be seen that global emissions of greenhouse gases have increased by 70 per cent between 1970 and 2004. They are set to grow by between 25 and 90 per cent between 2000 and 2030 under the business as usual scenario, with fossil fuels set to continue

as the world's dominant energy source.

Developing countries are expected to account for a large share of this rise. However, emissions per person are still considerably higher in the industrialized nations. Developed countries accounted for 46 per cent of all emissions in 2000, but just a fifth of the world population.

**The fastest growth** in emissions is due to the road transport and electricity generation. A new trend seen in recent years is a slight rise in the global share of energy generated from coal.

A variety of measures have led to reductions in emissions in many countries and sectors, but these have not offset the global increases.

**The report demonstrates** that we can easily afford to stop climate change. The economic impact is spread over many years. The strictest goal, limiting concentrations of greenhouse gases to 445 parts per million in the atmosphere, would brake annual GDP growth rates by less than 0.12 per cent a year.

"This small loss should be compared to projections that the global economy will likely expand dramatically over the next several decades," the report says. Furthermore, benefits to health from less air pollution, caused by a shift from fossil fuels, "may offset a substantial fraction of mitigation costs".

The IPCC states that a global carbon price is needed to provide incentives to

invest in low-carbon technologies. This could be done through emissions trading, carbon charging and taxes, or financial incentives for technology switching.

**Governments can** play a major role in motivating the private sector to invest in innovative technologies by providing companies with “incentives that are clear, predictable, long term and robust,” the IPCC says.

Energy efficiency is vital for all sectors in most regions, according to the panel. In the buildings sector, efficiency improvements could reduce emissions of carbon dioxide by around 30 per cent “with net economic benefit”, especially in the developed world.

The IPCC also points to other opportunities, from using established technology to increase renewable energy production, to more controversial solutions such as nuclear power and the storing of carbon dioxide underground instead of releasing it into the atmosphere. For the

first time the IPCC identifies changes in human lifestyle as a way of reducing emissions.

“It’s all there already, existing clean technologies only need to be elevated from niche to mainstream,” comments Dr Stephan Singer, head of WWF’s European Climate and Energy Programme.

“Too much time has been wasted already. This report shows nothing needs to hold us back from taking the simple steps to safeguard the world’s economy and environment from climate chaos.”

**“We have a window** of opportunity, but it won’t stay open forever,” said Steve Cochran, national climate campaign director for the American non-profit group Environmental Defense. “Anyone pushing for delay is pushing for higher costs and longer odds.”

Per Elvingson

**Climate Change 2007: Mitigation of Climate Change, Summary for Policymakers.** Available online at [www.ipcc.ch/SPM040507.pdf](http://www.ipcc.ch/SPM040507.pdf)

## Less expensive to cut emissions in Germany

Germany can cut its carbon dioxide emissions at a cost far lower than the world average projected by IPCC, according to a study by Umweltbundesamt, the German environment agency. The study shows that German emissions can be reduced by 40 per cent to 2020 over 1990 levels at a cost of just 0.5 per cent of German GDP. This compares with a UN estimate of two per cent of GDP to make equivalent cuts worldwide.

Source: **ENDS Europe Daily**, 8 May 2007.



## Ban the bulb

On 20 February 2007, Australia announced it would phase out the sale of inefficient incandescent light bulbs by 2010, replacing them with highly efficient compact fluorescent bulbs that use one fourth as much electricity.

There is currently a growing trend for countries to follow Australia’s example. Similar signals have been heard from Canada, New Zealand and several US states. Replacing incandescent bulbs with compact fluorescent light sources was also mentioned by the European Council in March when new climate targets were agreed for the Union. Lighting manufacturers in Europe are supporting a rise in EU lighting efficiency standards that would lead to a phase-out of incandescent bulbs.

Each standard (13 watt) compact fluorescent light source will over its lifetime reduce coal use by more than 100 kg, according to Earth Policy Institute. Such a shift also substantially reduces air pollution, making it obviously attractive for fast-growing economies plagued with air problems, such as China and India.

If the rest of the world joins Australia, the worldwide drop in electricity use would permit the closing of more than 270 coal-fired (500 MW) power plants. Shifting to more-efficient street lighting and replacing older fluorescent tubes with newer, more-efficient ones could double this reduction in power use.

Read more: **Earth Policy Institute**, [www.earthpolicy.org](http://www.earthpolicy.org)

## How much do emissions have to be reduced?

Several studies identify a temperature rise of two degrees above the pre-industrial level as being the critical threshold. Above this level there will be increasingly severe changes that will affect humans and biodiversity – although some changes will take place even earlier, see figure on previous spread. A two-degree maximum increase is also the EU climate target.

The next question is what limit do we need to set on the concentration of greenhouse gases in the atmosphere to meet this target. Here the IPCC shows that the current level (around 380 ppm carbon dioxide) will mean an increase of around two degrees when equilibrium is reached.

To prevent levels rising significantly above the current figure it will require emission reductions of up to 85 per cent by the year 2050. See table below.

Source: Climate Change 2007: Mitigation of Climate Change, Summary for Policymakers.

CO <sub>2</sub> conc.	CO <sub>2</sub> eq conc.	Temp. increase <sup>1</sup>	Change in CO <sub>2</sub> emissions in 2050 <sup>2</sup>	Peaking year for emissions
ppm	ppm	degrees C	per cent	year
350-400	445-490	2.0-2.4	-85 to -50	2000-2015
400-440	490-535	2.4-2.8	-60 to -30	2000-2020
440-485	535-590	2.8-3.2	-30 to +5	2010-2030
485-570	590-710	3.2-4.0	+10 to +60	2020-2060
570-660	710-855	4.0-4.9	+25 to +85	2050-2080
660-790	855-1130	4.9-6.1	+90 to +140	2060-2090

<sup>1</sup> Global mean temperature increase above preindustrial level at equilibrium, using “best estimate” climate sensitivity.

<sup>2</sup> In per cent of 2000 emissions.

## Five years the key to planet's future

The world has more than enough sustainable energy and technology to curb climate change, but only if key decisions are made within the next five years, according to research by the World Wide Fund For Nature, WWF.

The WWF study shows that known energy sources and proven technologies could be harnessed between now and 2050 to meet a projected doubling in global demand for energy while at the same time achieving the necessary significant drop (about 60–80 per cent) in carbon dioxide emissions to prevent dangerous climate change.

The model shows that this is technically and industrially feasible. It also shows that measures must be taken within five years to bring about a reduction in global carbon dioxide emissions within the next ten years.

“Climate Solutions” is the report of WWF’s Energy Taskforce, which was set up in December 2005. More than 100 scientists and experts contributed their knowledge.

Further information: WWFPressrelease, [www.panda.org/news\\_facts/newsroom/index.cfm?uNewsID=102400](http://www.panda.org/news_facts/newsroom/index.cfm?uNewsID=102400)

## Natural wonders feel the heat

From the Amazon to the Himalayas, ten of the world’s greatest natural wonders face destruction if the climate continues to warm at the current rate, warns WWF.

Released ahead of the IPCC’s Second Working Group Report, a WWF briefing, *Saving the world’s natural wonders from climate change*, reports on how the devastating impacts of global warming are damaging some of the world’s greatest natural wonders.

They include: the Amazon; Great Barrier Reef and other coral reefs; Chihuahuan Desert in Mexico and the US; hawksbill turtles in the Caribbean; Valdivian temperate rainforests in Chile; tigers and people in the Indian Sundarbans; Upper Yangtze River in China; wild salmon in the Bering Sea; melting glaciers in the Himalayas; and East African coastal forests.

“While we continue to pressure governments to make meaningful cuts in heat-trapping greenhouse gas emissions, we are also working on adaptation strategies,” said Dr Lara Hansen, Chief Scientist of WWF’s Global Climate Change Programme.

Further information: [www.panda.org](http://www.panda.org).



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The German climate protection plans are jeopardized by plans to build about 30 new coal power plants, according to the environmental organization BUND.

GERMANY

## Action plan to curb greenhouse-gas emissions

**The German** government has presented an action plan to cut greenhouse gas emissions by 40 per cent by 2020 compared with 1990 levels.

The plan foresees “massive” increases in energy efficiency to bring about an 11-per-cent cut in energy use. It envisages an increase in the share of renewables in power supply to 27 per cent and a hike in the share of biofuels in the transport sector to 17 per cent. It would also involve the construction of more efficient power plants and measures to reduce methane emissions.

**The 40-per-cent** reduction target was fixed by Germany’s governing coalition when it entered power in 2005. It is dependent on the EU as a whole agreeing a 30-per-cent reduction target by the same 2020 deadline. EU heads of government agreed to this in principle last month on condition that major coun-

tries around the world do the same as part of a global climate policy.

According to German environment minister Sigmar Gabriel the measures would cost Germany 3 billion euro by 2010 to implement, compared with potential damage to the Germany economy of 137 billion euro by 2050 from uncontrolled climate change.

**Environment** protection groups, including Germany’s BUND, welcomed the plans, which they described as ambitious, but cautioned that words had to be turned into deeds.

“The climate protection plans are jeopardized by plans to build about 30 new coal power plants. If the government does not stop this, the progress signalled by Gabriel will mean nothing,” said Angelika Zahrnitz, head of BUND.

Further information: [www.bmu.de](http://www.bmu.de) (press release, in German only, 26 April 2007).

# EU seeks push for environmental taxation

**The European** Commission wants to promote greater use of market-based instruments to achieve environmental and other policy objectives, both at EU and national levels.

A green paper on market-based instruments published in March could result in proposals for revised EU legislation. Policy areas targeted include energy taxation and local air pollution. In particular it focuses on possible ways forward to make the energy taxation directive more directly supportive of the EU's energy and environmental objectives.

The green paper is a joint initiative between EU environment and tax commissioners Stavros Dimas and László Kovács.

"Since market-based instruments have proven to be cost-effective means of achieving policy goals, the paper aims to stimulate a broad public debate on how taxes, tradable emissions rights and other market-based instruments can be

used more widely and effectively for environmental and energy policy purposes at Community and national level," they comment in a joint press release.

László Kovács, the Commissioner responsible for Taxation said: "Taxation should in the first place discourage what is undesirable, rewarding at the same time all sorts of positive behaviour, being it energy savings or environment-friendly activities. Tax revenues can then be used to favour economy-friendly activities, such as innovation or jobs."

The Commission is inviting reactions to the green paper before 31 July and will decide on appropriate follow-up in the light of the responses received. In particular, the Commission intends to consider the reactions to the green paper during its upcoming review of the Energy Taxation Directive.

Further information on the green paper and the questionnaire can be found at: [http://ec.europa.eu/environment/enveco/green\\_paper.htm](http://ec.europa.eu/environment/enveco/green_paper.htm)

reached the conclusion that they total 270–290 billion euro per year.

The report estimates that road transport receives almost half of total subsidies at 125 billion euro. Aviation, as the mode with the highest specific climate impact, gets significant subsidies in the form of preferential tax treatment, in particular exemptions from fuel tax and VAT, which add up to 27 to 35 billion euro per year. Rail is subsidised to the tune of 73 billion euro per year. For water-borne transport, 14 to 30 billion euro in subsidies have been identified.

The report is a first attempt by the EEA to quantify these subsidies, and is intended to fuel the discussion on the actual subsidy level within the sector.

**Further reading:** *Size, structure and distribution of transport subsidies in Europe*. EEA Technical Report No. 3/2007. Available at [eea.europa.eu](http://eea.europa.eu).

## EU house bank fuelling climate change

The multi-million euro loans of the European Investment Bank (EIB) in the transport sector are helping to fuel climate change and have made little or no contribution to the more progressive goals of the EU White Paper on transport, especially those on modal shift and decoupling transport from economic growth.

This is one of the main conclusions in a report from the CEE Bankwatch Network. It analyzes the 112 billion euro that the EIB provided to transport projects in the period 1996–2005. Over half of the EIB's total transport investments in the ten-year period have gone to roads and air transport; in central and eastern Europe this figure stands at 68 per cent.

**Further information:** *Lost in transportation: the European Investment Bank's bias towards road and air transport*. Available at [www.bankwatch.org](http://www.bankwatch.org).



## Rapid increase in world carbon emissions

Carbon dioxide emissions from fossil-fuel burning and industrial processes have been accelerating on a global scale, with their growth rate increasing from 1.1 per cent per year for 1990–1999 to more than three per cent a year for 2000–2004. The growth rate since 2000 was greater than for the "worst" of the emissions scenarios developed by the Intergovernmental Panel on Climate Change.

The growth rate in emissions is strongest in rapidly developing economies, particularly China. Overall, however, developing and least-developed economies (forming 80 per cent of the world's population) account for only 41 per cent of global emissions and only 23 per cent of global cumulative emissions since the mid-18th century.

By contrast, the study said the world's richest countries contributed about 60 per cent of total emissions in 2004 and account for 77 per cent of cumulative emissions since the start of the Industrial Revolution.

**The study:** *Global and regional drivers of accelerating CO<sub>2</sub> emissions*. Michael R. Raupach et al. *Proc. Natl. Acad. Sci. USA*, 10.1073/pnas.0700609104. Published online before printed version 22 May 2007. Website: [www.pnas.org](http://www.pnas.org)

## Transport subsidies quantified

Transport users tend to be unaware of the full cost of using transport. This is due to two factors. Firstly, transport systems are partly financed via public budgets. Secondly, external costs (e.g. environmental damage, congestion, etc.) are not fully internalized in the transport charges levied on users.

When consumers cannot see the full price of a product this often leads to over-consumption, and this also applies in the transport sector. The European Environment Agency (EEA) has attempted to summarize the extent of direct and indirect subsidies in the EU today, and



# Last gasp of the coal industry?

Methods for collecting and trapping carbon dioxide produced by burning fossil fuels are often put forward as an important part of the solution to climate change. In fact, it is the coal industry that benefits most from interest in such carbon capture and storage (CCS) schemes.

**Several studies** show that global emissions of carbon dioxide must begin to fall within ten years to prevent human influence on the climate from becoming excessive.

The proponents of carbon capture and storage (CCS) assert that this method could provide a bridge to a sustainable society, since it would allow the continued use of fossil fuels over a transition period. In the meantime, other forms of energy can be harnessed that are more sustainable in the long term.

**There are flaws** in this reasoning however:

► CCS would take a long time to implement, if it ever is implemented, and

it would require massive economic resources.

► CCS would not have any significant effect on reducing global emissions before 2030, and would not reach peak effect until after 2050.

A long list of other solutions for reducing emissions are technically and economically mature for large-scale use before 2015, including wind power, solar heating, heat and power generation from biofuel, all of which can be combined with a wide variety of energy-saving measures.

Solar cells require further development before they can become a major alternative to coal power, but they have a 30-year history of good technical per-

formance, and with concerted investment large-scale arrays could be profitable in many parts of the world by 2030.

If we choose to invest in CCS – or similarly fusion or new fission plants – it means withholding resources from solutions that we know to be sustainable, economically viable and technically achievable, for the benefit of solutions that are unsustainable, distant in time and pose economic, technical and environmental risks.

The argument that CCS should be used during a transition period to “win time” while we switch to a renewable energy system is therefore misleading. In effect it is a method of delaying the phasing out of coal.

## Carbon Capture...

In technical terms it is perfectly feasible to capture carbon dioxide before and after fossil fuels are burned. Between 80 and 95 per cent of the carbon dioxide can be removed. The higher the percentage required, the greater the cost. Fuel consumption compared with a plant without CCS is estimated to be around 25 per cent higher.

Retrofitting carbon dioxide capture in existing power plants is not economically viable, and even for new power plants, CCS represents a considerable additional cost.

CCS can be used for large point sources of carbon dioxide emissions, particularly coal power plants. Steelworks, cement plants and some other large industries could in principle use CCS. Cars and other small emission sources cannot, however, be fitted with CCS.

One truly visionary idea is to install CCS in a biofuel power plant. A plant of this type would have negative emissions! This sounds almost too good to be true, and it probably is, mainly for economic reasons.

## ... and Storage

There are several proposed methods for storing carbon dioxide, but the most common is geological storage, i.e. forcing the gas into salt strata, old gas boreholes and porous coal seams.

The potential for storing carbon dioxide in salt formations alone is estimated at between 1,000 and 10,000 billion tonnes of carbon dioxide. This compares with a current figure of around 30 billion tonnes for annual global emissions.

The big question is naturally whether a significant amount of the carbon dioxide will leak out into the atmosphere again and contribute to warming. Carbon dioxide has the same greenhouse effect whenever it escapes, and we know nothing about nature's ability to restore some form of stable balance.

In this respect it is clear that both the empirical data and the theoretical basis are weak. It is possible that the great majority of the carbon dioxide could be safely locked away forever, but if that is the case it cannot be proved.

Current experience is limited to storing around a million tonnes in sandstone 1,000 metres below the seabed, in the Norwegian Sleipner gas field in the North Sea. A million tonnes per year may sound like a lot, but it is negligible compared with the vast figures involved, especially if it all leaks out again. It becomes a different matter entirely when you add on five zeros.

Even if only one per cent of the remaining carbon dioxide were to leak out every thousand years, it could still pose a threat. That would mean the loss of 87 per cent in 200,000 years, with the result that more car-

bon dioxide was released into the atmosphere and the seas than if CCS had not been implemented, since the energy consumed in capturing and storing carbon dioxide means that more coal has to be burned.

## Economics

CCS is a collective name for a number of proposed methods for capturing, transporting and storing carbon dioxide, most of which are untested. Since it will be 20–30 years before the technology is ready for large-scale use it is possible to set almost any price on it.

The International Energy Agency, IEA, has estimated the current cost at 50–100 dollars per tonne of carbon dioxide captured, which is unreasonably expensive. However, it is expected that the cost could be reduced to 25–50 dollars per tonne by 2030. This would require further investment in research and development.

The EU Commission's proposal to build twelve large facilities by the year 2015 must be funded either through additional taxation or by somehow compelling the power industry to do so.

In the medium term, by 2020 or 2030 it is fairly certain that wind power, biomass, solar heating, solar cooling and energy savings can reduce emissions at a lower cost per kWh or per tonne of reduction in carbon dioxide emissions.

**An analysis** of the stakeholders behind CCS makes it easier to see the true motive.

It is clear that a strong climate policy will affect the coal industry and coal-dominated power industry very hard, since coal power is the worst method of producing electricity from the climate point of view.

It is therefore unsurprising that the strongest proponents of CCS are to be found in the coal industry and the governments of countries that have large shares of coal and coal power, as well as some oil- and gas-rich countries, such as Norway and Canada.

The US coal industry, for example, denied for a long time that there was a climate problem and funded opinion-makers and lobbyists to question the science behind it.

As time went on this position became

more untenable, so the industry has now pinned its hopes on CCS instead. Perhaps more precisely, its hopes are pinned on the belief that support for CCS will win time for the continued mining and burning of coal.

Renewable energy and energy-saving measures are supported by other groups in industry that are less well organized than the influential coal industry. They often content themselves with a supporting role, rather than promoting themselves as the strategic alternatives that they actually are.

**In many respects**, CCS would not, as often portrayed, complement renewable energy, energy-saving measures and changes in lifestyle, but would in fact be an alternative to them – admittedly not forever, but for as long as today's politicians can be held accountable, in other

words for a few terms in office. Promises that extend over a longer period than this are only credible as far as they are backed up by short-term targets and initiatives.

**Either we invest** a few thousand billion euro in wind power, solar cells, biofuel and energy efficiency, and make the lifestyle changes that are needed to meet emission targets and limit the temperature rise to two degrees above the pre-industrial level.

Or we make unchanged lifestyle our top priority and invest the same amount in CCS and nuclear power.

It's either or. The same money cannot be used twice.

Fredrik Lundberg

The author of the article is a freelance journalist and energy consultant. A more detailed analysis of CCS can be found in a report by the Swedish NGO Secretariat on Acid Rain later this year.

## Recent publications

### Could Try Harder – A mid-term report on the European Commission's environmental record

Ahead of the European Commission's own performance assessment, environmental groups have issued a critical verdict on the Commission's record for protecting and improving Europe's environment during the first half of its term in office, and laid out a series of recommendations for its remaining two and a half years.

Available at [www.green10.org](http://www.green10.org).

### Air quality and climate change: a UK perspective

More consideration must be given to the links between climate change and air quality pollutants, according to this report by the UK Air Quality Expert Group. It examines the scientific background to these interactions and identifies synergies, where measures to improve air quality can help to tackle climate change, and trade-offs where policy measures in the two areas act in opposition.

The experts conclude that regional and local governments have an important role to play in reducing the emissions, but they need appropriate direction, support and guidance. A global European framework could therefore be highly beneficial.

Available at [www.defra.gov.uk/environment/airquality/publications/airqual-climatechange/](http://www.defra.gov.uk/environment/airquality/publications/airqual-climatechange/)

### Sustainable Energy: A Framework for Decision Makers

A report from UN Energy, an inter-agency body established to coordinate the United Nations work in the realm of energy. The study examines the issue of bioenergy through the lens of nine issues, including poverty, health, food security, agriculture, climate change, finance and trade.

The report underscores the many benefits that bioenergy provides in reducing poverty, improving access to energy and promoting rural development. However, it warns that "unless new policies are enacted to protect threatened lands, secure socially acceptable land use, and steer bioenergy development in a sustainable direction overall, the environmental and social damage could in some cases outweigh the benefits". In the realm of food security, for example, price increases in major biofuel sources could drive up the prices of basic foods.

Available in pdf format from UN Energy, <http://esa.un.org/un-energy>.

# USA set for cleaner cars

**On 14 May** US President George Bush issued an executive order directing the Environmental Protection Agency and the Departments of Agriculture, Energy and Transportation to work together to begin developing regulations that will reduce petrol consumption and greenhouse gas emissions from motor vehicles, using the President's 20-in-10 plan as a starting point.

The 20-in-10 proposal, which was announced in January, calls for a 20-per cent reduction in petrol usage over the next 10 years, with 15 per cent of the reduction to come from the use of renewable and alternative fuels, and 5 per cent to come from mandated increases in fuel efficiency.

The month before, the Supreme Court ruled that the EPA must take action under the Clean Air Act regarding greenhouse gas emissions from motor vehicles. It was a case brought by 12 states and 13 environmental organizations that has lasted four years.

Bush has sent Congress a proposal that would meet this goal in two steps. First, a mandatory fuel standard that requires 35 billion gallons of renewable and other alternative fuels by 2017, which is nearly five times the current target. The second step is an increase in fuel efficiency standards for light trucks and cars.

**The initiative was** criticized by several organizations as being too weak and too late. Friends of the Earth said the President's new policy does little to address the Supreme Court's ruling.

Friends of the Earth President, Brent Blackwelder, said: "the President's proposal focuses primarily on replacing oil with renewable energy sources such as corn ethanol, and the facts are clear – substituting most formulations of corn

ethanol for oil does almost nothing to reduce greenhouse emissions".

"Additionally, by directing his administration to do nothing but study this issue until the end of 2008, when a new president is coming into office, President Bush passed the buck on global warming at a time when we cannot afford delay," Blackwelder said.

Frank O'Donnell, of the non-profit Clean Air Trust, interpreted the Executive Order as "an attempt to sideswipe the greenhouse gas standards developed by the state of California and adopted by 11 other states. The Bush administration apparently wants to knock those standards off the road."

**"While this order** does not directly affect the outcome for California and other states which have adopted the California regulations mandating reduction in greenhouse gas emissions from future new vehicles, the overall argument has now changed from whether or not there should be regulation of carbon dioxide as a pollutant under the Clean Air Act to what type of regulation it should be," commented Steve Johnson, Administrator of the EPA.

Source: ENS, 14 May 2007 ([www.ens-newswire.com](http://www.ens-newswire.com))

## Have your say!

The European Commission is currently evaluating different options for the design of a legislative framework to reduce the emissions of carbon dioxide from new cars. Interested citizens and other stakeholders can give their view at a new "Reducing CO<sub>2</sub> emissions from cars" website. Deadline 30 June.

[http://ec.europa.eu/reducing\\_co2\\_emissions\\_from\\_cars/consultation\\_en.htm](http://ec.europa.eu/reducing_co2_emissions_from_cars/consultation_en.htm)

# Will become world's largest low emission zone



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**From February 2008** London will become a Low Emission Zone, to cut harmful emissions from the most polluting lorries, coaches and buses. The scheme is the first in the UK and the largest in the world. The plan submitted by Transport for London was approved by Mayor Ken Livingstone in early May.

From February 2008 the Low Emission Zone will apply to lorries over 12 tonnes. From July the same year lorries, buses, coaches, motor caravans, ambulances and hearses between 3.5 tonnes and 12 tonnes will also be affected.

**Operators of affected** lorries, buses and coaches that do not meet the Low Emission Zone standards (unless exempt or entitled to a 100-per-cent discount) will need to pay a charge of £200 (nearly 300 euro) for each charging day they are driven in the zone. Compliance will be monitored by cameras that read vehicle registration numbers and compare them with a database.

Transport for London estimates that two thirds of all lorries and half of all buses and coaches driving in London would be compliant with the 2008 Low Emission Zone standards without any

changes to current fleet management programmes. The Zone is intended to encourage the remaining high emission vehicles to clean up their act.

The baseline emission standards for the Low Emission Zone are Euro standards for all four regulated pollutants. From February 2008 the base standard for lorries over 12 tonnes would be Euro III, which would allow them to drive within the Low Emission Zone at no charge. The Euro III standard became mandatory for all new lorries, buses and coaches sold in the EU from October 2001 and for all new vans and minibuses sold in the EU from January 2002.

**London currently** suffers the worst air pollution in the UK and some of the poorest in Europe. It is estimated that by 2012 the Low Emission Zone will deliver reductions of around 16 per cent in the area of London where the air quality exceeds EU pollution objectives, and will deliver over £250 million (370 million euro) in health benefits.

*Further information:* **Transport for London**, [www.tfl.gov.uk/lezlondon](http://www.tfl.gov.uk/lezlondon).

## Further publications

### **An analysis of options for including international aviation and marine emissions in a post-2012 climate mitigation regime**

Including international aviation and marine emissions in national/regional reduction targets is more cost-effective than excluding them, or regulating them via sector-specific policies. This is one of the main conclusions of a study by the Dutch environmental assessment agency (MNP) that analyzes national/regional allocation options for including these so-called bunker emissions in a post-2012 climate mitigation regime.

27 pp. MNP Report 500114007/2007. Available at [www.mnp.nl/en](http://www.mnp.nl/en).

### **Ammonia: the case of the Netherlands**

Edited by Dick A.J. Starmans and Klaas W. van der Hoek. This book aims to provide a full overview of all ammonia-related emission aspects of animal husbandry in the Netherlands. Besides background information, it includes a technical and practical inventory of emission sources, followed by a listing of government approved housing systems and manure application techniques to quantify emissions.

204 pp. (hardback). US\$ 59. ISBN-13: 978-90-8686-028-9. Can be ordered from Wageningen Academic Publishers, [www.wageningenacademic.com](http://www.wageningenacademic.com).

### **ZEV Technology Review**

A Panel of Independent Experts have produced a status report on the California Air Resources Board's Zero Emission Vehicle programme. It reflects the experts' best assessment of the current status of battery electric, fuel cell, hybrid and other advanced zero emission technologies for light duty vehicles.

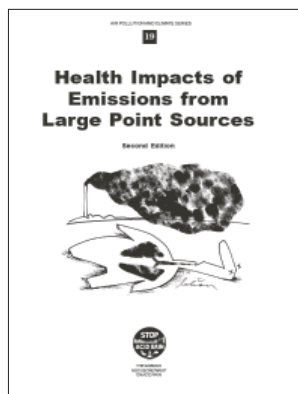
Available in pdf format at [www.arb.ca.gov/msprog/zevprog/zevreview/zevreview.htm](http://www.arb.ca.gov/msprog/zevprog/zevreview/zevreview.htm)

### **Case Studies on Climate Change and World Heritage**

Divided into five chapters, the report deals with the impact of global warming on glaciers, marine biodiversity, terrestrial biodiversity, archaeological sites, and historic cities and settlements. It is intended to raise awareness and mobilize support for preservation of the 830 natural and cultural sites included on the UNESCO World Heritage List.

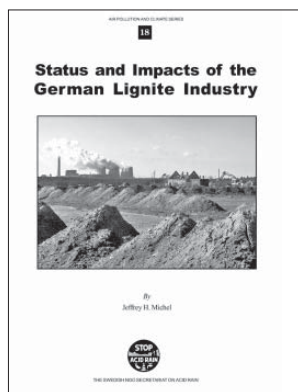
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# Recent publications from the Secretariat



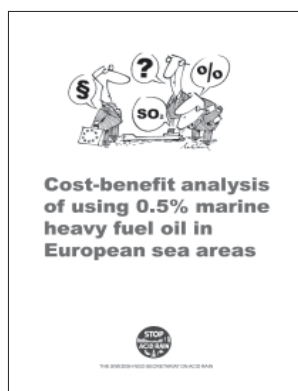
## Health Impacts of Emissions from Large Point Sources

This study combines the health impact assessment methodology used by EU's CAFE programme with an emissions database for European large point sources, to assess health damage linked to emissions of nitrogen oxides and sulphur dioxide on a plant by plant basis. It finds that the emissions from large point sources in Europe could be responsible for more than one million life years lost in Europe every year. Some of the worst polluting plants may each be responsible for the annual loss of between 10,000 and 20,000 life years. By Mike Holland, EMRC. Second Edition, March 2006.



## Status and Impacts of the German Lignite Industry

This report includes a historical treatment of German lignite use and discusses many of the hidden costs involved: excessive greenhouse gas emissions, depletion of groundwater resources, and destruction of hundreds of villages. Special consideration is paid to eastern Germany, where lignite accounts for up to 85 per cent of electrical power consumption in some regions. By Jeffrey H. Michel, April 2005.



## Cost-benefit analysis of using

### 0.5% marine heavy fuel oil in European sea areas

A lowering of the sulphur content of marine heavy fuel oil to 0.5 per cent would reduce SO<sub>2</sub> emissions from international shipping around Europe by more than three quarters by 2010. The benefits of such a measure clearly outweigh the costs, according to this study. By Christer Ågren, January 2005.

## How to order

Single copies of the above mentioned material can be obtained from the Secretariat (free of charge within Europe). Please call for quotation if more copies are required. Reports can also be downloaded in pdf format from [www.acidrain.org](http://www.acidrain.org)

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## Coming events

### Velo-city 2007 – from vision to reality.

Munich, Germany, 12-15 June 2007. *Information:* [www.velo-city2007.com](http://www.velo-city2007.com).

**Local Renewables – conference on how local governments can make the most of renewable energy.** Freiburg, Germany, 13-15 June. *Information:* [www.local-renewables2007.org](http://www.local-renewables2007.org)

**Clean Fuels 2007: Optimising fuels for the future.** Barcelona, Spain, 19-20 June 2007. *Information:* [www.cleanfuelsummit.com](http://www.cleanfuelsummit.com)

**How to Make the Sea Green.** Brussels, 26 June. *Information:* T&E, [www.transportenvironment.org](http://www.transportenvironment.org).

**Fighting Climate Change – the Potential of Rail Transport.** Brussels, Belgium, 26 June 2007. *Information:* CER, [www.cer.be](http://www.cer.be).

**EU Council of Environment Ministers.** 28 June. *Info:* [www.consilium.europa.eu/cms3\\_fo](http://www.consilium.europa.eu/cms3_fo)

**9th Conference on Energy for a Clean Environment.** Povo do Varzim, Portugal, 2-5 July 2007. *Information:* <http://rgesd.ist.utl.pt/cleanair>

**IMO MEPC 56 – Revision of MARPOL Annex VI.** London, 9-13 July 2007. *Info:* [www.imo.org](http://www.imo.org)

**EU-G8 Energy Efficiency Conference.** Berlin, Germany, 15 July 2007.

**Bioenergy 2007.** International Conference and Exhibition. Jyväskylä, Finland, 3-6 September. *Info:* <http://seminaarit.ohi.fi/default.asp?seminarID=6>

**22nd European Photovoltaic Solar Energy Conference and Exhibition.** Milan, Italy, 3-7 September. *Info:* [www.photovoltaic-conference.com](http://www.photovoltaic-conference.com)

**14th IUAPPA World Congress.** Clean air partnerships. Brisbane, Australia, 9-13 September 2007. *Information:* [www.iuappa2007.com](http://www.iuappa2007.com)

**European Mobility Week.** 16-22 September. *Information:* [www.mobilityweek-europe.org](http://www.mobilityweek-europe.org)

**CLRTAP Working Group on Strategies and Review.** 17-21 September 2007. *Information:* [www.unece.org/env/lrtap/](http://www.unece.org/env/lrtap/)

**3rd Annual European Energy Policy Conference.** Brussels, Belgium, 9-10 October 2007. *Information:* [www.euenergypolicy.com](http://www.euenergypolicy.com).

**Sixth Environment for Europe Ministerial Conference.** Belgrad, Serbia, 10-12 October. *Information:* [www.environmentforeurope.org](http://www.environmentforeurope.org).

**The 8th Annual Global Conference on Environmental Taxation.** Munich, Germany, 18-20 October. *Information:* [www.worldcotax.org](http://www.worldcotax.org)

**Clean Vehicles and Fuels – European Symposium and Exhibition.** Stockholm, Sweden, 8-9 November 2007. *Information:* [www1.stocon.se/cleanvehicles/9/10620.asp](http://www1.stocon.se/cleanvehicles/9/10620.asp)

**UN Climate Convention COP13 and COP/MOP3.** Bali, Indonesia, 3-14 December 2007. *Information:* [www.unfccc.int](http://www.unfccc.int).