

Acid News

NO. 2, JUNE 2009

Europe needs ECA's

To combat the ever increasing pollution from international shipping EU should designate all sea areas around Europe Emission Control Areas.

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Half as bad as cars

Globally, commercial ships emit almost half as much particulate pollution as the total amount released by cars.

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Worse than worst-case

Global greenhouse gas emissions increase at a faster rate than in the worst-case scenarios of the Intergovernmental Panel on Climate Change (IPCC).

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Small but dangerous

Fine particles cause 546,000 premature deaths each year in Europe. In Sweden alone, health damage from fine particle pollution costs € 2.4 billion annually.

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Transport emissions still increasing

Greenhouse gas emissions from the European transport sector rose 26 per cent between 1990 and 2006 while all other sectors show a declining trend.

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Will not make it

Nineteen EU member states have so far notified the Commission that they will need time extensions to comply with EU air quality standards.

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Climate package adopted

The EU's climate and energy package has been formally adopted.

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Cleaner ship fuels to save American lives

The United States and Canada want ships to burn cleaner fuel when approaching the continent to reduce smog-related deaths.

On March 27 the United States and Canada jointly submitted a proposal¹ to the International Maritime Organization (IMO) to designate most areas of the coastal waters covered by their Exclusive Economic Zones as an emissions control area (ECA) for the control of sulphur oxides, nitrogen oxides, and particulate matter emissions.

According to calculations by the US Environmental Protection Agency (EPA), the creation of an ECA would save up to 8,300 American and Canadian lives

every year by 2020 by imposing stricter environmental standards on large ships. The use of current high-sulphur residual fuel in ships leads to large emissions of smog-inducing nitrogen oxides, health-damaging fine particles, and sulphur dioxide which create acid rain.

Urban neighbourhoods that surround ports in the US, such as the hubs of Newark, New Jersey and Los Angeles, have typically suffered the worst health problems, such

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Acid News

A newsletter from the Air Pollution & Climate Secretariat, 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 Acid News, 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:

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The Air Pollution and Climate Secretariat

The Secretariat has a board consisting of one representative from each of the following organizations: Friends of the Earth Sweden, Nature and Youth Sweden, the Swedish Anglers' Association, the Swedish Society for Nature 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

Over the last twenty years, fuel and emission standards for land-based transport have been dramatically strengthened over most of the world. But international shipping has for a long time resisted similar legislation, both as regards emissions of air pollutants and greenhouse gases.

Eventually, in October last year, after some twenty years of talks but very little action, strict new limits for reducing sulphur emissions from ships were finally agreed by the International Maritime Organisation (IMO). But these important new standards are still many years away from practical implementation – the 0.5 per cent global sulphur limit will apply as from 2020 (or possibly 2025), and the 0.1 per cent sulphur limit for ships in designated Emission Control Areas (ECAs) will apply as from 2015.

More importantly, the measures agreed so far in IMO for reducing emissions of nitrogen oxides (NOx) are totally inadequate – the Tier 2 standards that will apply to new ship engines as from 2011 will only reduce NOx emissions by about 16–22 per cent, as compared to the current Tier 1 standards.

The slow turnover of the shipping fleet combined with the high growth in shipping activities mean that the Tier 2 standards are not likely to result in any real reductions in total ship emissions even within the next 15–20 years. Every effort must therefore be made to markedly strengthen the weak global NOx emission standards, both for existing and new ships.

Last year's IMO agreement also included a Tier 3 NOx emission standard, which will be introduced in 2016 and requires an 80 per cent NOx reduction from the present Tier 1 level. But the Tier 3 standards apply solely in specific designated NOx Emission Control Areas, and are limited to new ships only.

In late March, the United States and

Canada jointly submitted a proposal to the IMO to designate most of their coastal waters, an area extending 370 kilometres from the coastline, as an emissions control area (ECA) for the control of sulphur oxides, nitrogen oxides, and particulate matter emissions (*see front page*).

All ships operating in the ECA will face stricter emission standards designed to reduce the threat they pose to human health and the environment. The ECA standards will cut sulphur in fuel by 98 per cent, particulate matter (PM) emissions by 85 per cent, and NOx emissions by 80 per cent as compared to the current

global requirements.

Clearly, the EU and its member states should follow the example of the United States and Canada and designate all sea areas around Europe (the Baltic Sea, the North Sea, the North-East Atlantic, the Mediterranean and the Black Sea) as “full” Emission Control Areas, i.e. covering all the major air pollutants (sulphur, PM and NOx). Currently only the Baltic Sea and the North Sea have ECA status, and this is limited to sulphur control.

To ensure an organized gradual phase-in of low-sulphur fuel, to encourage the use of the best techniques, and to speed up the introduction of cleaner fuels and ships, IMO regulations need to be complemented by economic instruments, such as emission charges.

These should be set so as to make it financially worthwhile – at least for ships that regularly frequent the areas where they apply – to use cleaner fuels or to invest in techniques needed to ensure a distinct reduction in emissions.

Christer Ågren

Europe needs Emission Control Areas



The double benefits of climate policy

Action to cut greenhouse gas emissions could save millions of lives because of the cleaner air that would result.

There are strong links between the problems of climate change and air pollution, in particular the fact that emissions from fossil fuel combustion contribute significantly to both problems. Consequently, measures to abate emissions of greenhouse gases may show strong co-benefits in terms of less air pollution and vice versa.

Policies that result in a reduced demand for coal in the electricity sector will simultaneously lower the emissions of the major greenhouse gas, carbon dioxide, and of traditional air pollutants such as sulphur, nitrogen oxides and fine particles. Similarly, policies to limit transport demand and congestion will improve air quality and at the same time lower emissions of greenhouse gases (GHG). There are however also examples of measures that may help alleviate one problem, but exacerbate the other.

It is important to take into account these co-effects when deciding on appropriate policy actions in response to one or both of these problems. A recent study by the Netherlands Environment Agency investigated the consequences of the interrelationship between policies on climate change and policies on air pollution.

The interrelations between these two policy areas were investigated from three different perspectives (or windows):

- *Climate change window:* Policies primarily aiming at the mitigation of global climate change not only reduce emissions of GHG but also reduce emissions of air pollutants, which yields co-benefits in terms of improved air quality;
- *Air pollution window:* Policies primarily aiming at the mitigation of (local) air pollution not only reduce emissions of

air pollutants, but also reduce emissions of GHG, yielding co-benefits in terms of reduced global climate change;

- *Integrated approach:* Policies that simultaneously aim to mitigate climate change and (local) air pollution, yielding

Without climate policy....



an optimised combination of reductions in emissions of greenhouse gases and air pollutants.

One of the main messages of the report is that a stringent global climate policy will lead to considerable improvements in local air quality and consequently improve health. Measures to reduce the global emissions of greenhouse gases to 50 per cent of 2005 levels, by 2050, can reduce the number of premature deaths from air pollution by 20–40 per cent.

However, if countries continue the trend of increasing energy use as in “business-as-usual”, then population growth, ageing demographics and increased urbanisation will cause premature deaths from air pollution to increase by 30 per cent in the industrialised (OECD) countries, and 100 per cent outside the OECD.

According to the study, there is indeed a synergy between the two policy areas, and an integrated strategy tackling climate change and air pollution is likely to reduce the overall policy costs and generate a net welfare benefit at the global level.

Although the indirect benefits of climate policy – improved air quality and public health – provide an additional incentive for countries to participate in a future climate agreement, current estimates indicate that they are too small to fully outweigh the costs of climate policy.

For example, in 2050, the costs of such a climate policy in China – under which greenhouse gas emissions are 80 per cent lower than the “business-as-usual” trend without a stringent climate policy – could amount to 6.5 per cent of the country’s GDP, while the benefits were estimated to be equivalent to 4.5 per cent of

GDP. However, these benefits could also be achieved through a more targeted air quality policy. In China, such a targeted air quality policy could achieve the same air quality improvements by 2050 at a cost of 1.8 per cent of GDP.

The study also shows that a stringent air quality policy can lead to a reduction in emissions of greenhouse gases. For example, if China pursues a stringent air pollution control policy to reduce the number of premature deaths from air pollution by 70 per cent (compared with a “business-as-usual” trend without such a policy), this policy will lower GDP in 2050 by 7 per cent. The air quality benefits would be equivalent to 7.5 per cent of GDP, while greenhouse gas emissions would be 40 per cent lower.

Christer Ågren

Co-benefits of climate policy (2009). PBL report no. 500116005. 75 pp. By J. Bollen, C. Brink, H. Eerens and T. Manders. Published by and available from the Netherlands Environment Agency, <http://pbl.nl/en/index.htm>.

Cleaner ship fuels to save American lives

Continued from front page

as asthma and cancer, from the pollutants, according to EPA studies. Some 40 US ports currently fail to meet federal air pollution standards.

The Canadian area most affected by marine pollution is Vancouver and lower British Columbia, the location of the country's largest port and gateway to growing trade with Asia, but there are also sizable emissions along the St. Lawrence Seaway and the Great Lakes, and in Atlantic ports, such as Halifax and Saint John.

The two countries have a combined population in excess of 330 million, over half of whom reside along the Pacific and Atlantic coasts and in port cities. More than 100 million people in the US and Canada live in areas with air pollution at levels exceeding the national ambient air quality standards,

levels which are unhealthy according to the World Health Organisation.



Last trip to California?

ANDREW BREEDEN/PHOTO

Because ship pollution travels great distances, much of the inland population is also affected by ship emissions and will benefit from the cleaner air made possible by applying the stricter ECA standards.

It is estimated that the creation of an ECA will save between 3,700 and 8,300 American and Canadian lives every year by 2020, and avoid some 3.4 million instances of respiratory ailments, such as asthma, according to an analysis the two countries conducted for their application.

Moreover, controlling ship emissions would help reduce air pollution related stresses, such as acidification, nitrogen nutrient loading and ground-level ozone, in a large number of sensitive ecosystems, including numerous

forests, grasslands, alpine areas, wetlands, rivers, lakes, estuaries, and coastal waters. The total sulphur and nitrogen deposition in sensitive ecosystems would be significantly reduced, which will contribute to the recovery of sensitive ecosystems in both the US and Canada.

Emission Control Areas (ECAs)

An application for ECA designation must be approved by the Parties to Annex VI of the IMO's MARPOL Convention. ECAs may be designated for sulphur oxides (SOx) and particulate matter (PM), or nitrogen oxides (NOx), or all three types of emissions, subject to a proposal from an IMO member country. The proposal would be considered for adoption by the IMO, if supported by a demonstrated need to prevent, reduce and control one or all three of those emissions from ships.

Since new ECAs are likely to become effective between 2010 and 2015, ships operating in SOx/PM-ECAs would be required to use fuel with a sulphur content not exceeding 10,000 ppm. In 2015 this would be reduced to 1,000 ppm. As an alternative to using low-sulphur fuel, ship operators may choose to equip their vessels with exhaust gas

cleaning devices ("scrubbers"), which must achieve at least the equivalent sulphur emission reduction.

In addition, engines on vessels constructed in 2016 and later would need to comply with the Annex VI Tier 3 NOx limits, when operating in a NOx-ECA. These NOx limits are expected to necessitate the use of after-treatment technology, such as selective catalytic reduction (SCR).

There are two ECAs in effect today, exclusively controlling sulphur emissions and therefore called Sulphur Emission Control Areas (SECAs). The Baltic Sea SECA entered into force in May 2005, and the North Sea (including the English Channel) SECA entered into force in November 2006. Ships operating in these areas must currently use fuel with a sulphur content that does not exceed 15,000 ppm.

The proposed emissions control area extends 200 nautical miles (370 kilometres) from the coast, and includes waters adjacent to the Pacific coast, the Atlantic/Gulf coast and the main Hawaiian Islands (*see figure*). Not included are the Pacific US territories, smaller Hawaiian Islands, the Aleutian Islands and Western Alaska, the US territories of Puerto Rico and the US Virgin Islands, and the US and Canadian Arctic, but they could be included in the future after assessments are done.

Under the new programme, large ships such as oil tankers and cargo ships that operate in ECAs will face stricter emission standards designed to reduce the threat they pose to human health and the environment. These standards will cut sulphur in fuel by 98 per cent, particulate matter (PM) emissions by 85 per cent, and nitrogen oxides (NOx) emissions by 80 per cent as compared to the current global requirements.

To achieve these reductions, ships must

use fuel with no more than 1,000 parts per million (ppm) sulphur beginning in 2015, and new ships must use advanced NOx emission control technologies beginning in 2016 (*see table*).

For ships engaged in international trade, the economic impacts of complying with the ECA standards are expected to be modest. Analysis of a ship in liner service between Singapore, Seattle, and Los Angeles/Long Beach suggests that improving from current performance to ECA standards would increase the cost of shipping a twenty-foot-equivalent container by about US\$ 18. Overall, operating costs for a ship on such a route, which includes about 1,700 nautical miles of operation in the proposed ECA, would increase by about three per cent.

Similarly, the impacts on cruise vessels are expected to be small. The passenger price of a seven-day Alaska cruise operating entirely within the ECA would increase about US\$ 7 per day.

The two governments estimate that the total annual cost of improving ship emissions from current performance to emissions control area standards will be US\$ 3.2 billion in 2020. Approximately two-thirds of this relates to operating costs (mainly switching to more expensive low-sulphur distillate fuels), and the remaining one-third to hardware costs (primarily installation of SCR).

It is expected that in the proposed ECA, less than 16 million tonnes of fuel will



The proposed North American Emission Control Area (green line).

be consumed in 2020, which would then be about three per cent of total global marine fuel use. Based on computer modelling analyses, the average increase in costs associated with switching from high-sulphur residual fuel to low-sulphur distillate fuel will be US\$ 145 per tonne. As the distillate fuel has a five per cent higher energy content, the net equivalent cost increase is estimated at US\$ 123 for each tonne of residual fuel that is replaced by distillate fuel.

The costs for each tonne of NOx, SOx, and PM avoided are estimated at US\$ 2,600,

US\$ 1,200, and US\$ 11,000, respectively. These costs per tonne are a measure of cost-effectiveness, and are comparable or favourable to the cost-effectiveness of the controls imposed on many land-based sources.

It is concluded that improving current ship emission levels to ECA standards is one of the most cost-effective measures available to obtain necessary improvements in air quality in the US and Canada.

The joint US-Canada application for ECA designation will be discussed at the 59th session of the IMO's Marine Environment Protection Committee (MEPC 59), to be held in London 13-17 July 2009.

Assuming the application is considered here, the earliest possible approval is by the MEPC 60, which is anticipated to take place in March 2010. If accepted there, the new ECA could enter into force in August 2012.

Christer Ågren

¹ **Proposal to designate an emission control area for nitrogen oxides, sulphur oxides and particulate matter submitted by the United States and Canada.** IMO MEPC 59/6/5, 2 April 2009.

More information on the US-Canada proposal is available at: www.epa.gov/otaq/oceanvessels.htm

Table: A summary of MARPOL Annex VI global and geographic-based international standards and their phase-in schedule, as adopted by IMO in October 2008.

	Date	Fuel sulphur ¹ (ppm)	NOx ²
Global	To January 2012	45,000	
	From 2012	35,000	
	From 2020 ³	5,000	
	From 2011		Tier 2
Emission Control Area	To July 2010	15,000	
	From July 2010	10,000	
	From 2015	1,000	
	From 2016		Tier 3

1) Exhaust-gas cleaning systems (e.g. scrubbers) that achieve equivalent sulphur emission reductions may be used as an alternative to low-sulphur fuels.

2) Today's Tier 1 NOx standards apply to ships built as from year 2000 and range from approximately 10 to 17 grams NOx/kWh, depending on engine speed. The Tier 2 standards represent a 15-20% NOx reduction below Tier 1, and the Tier 3 standards represent an 80% NOx reduction below Tier 1. These NOx standards apply only to newly built ships.

3) Subject to review in 2018, this standard could be postponed to 2025.

Ships pollute half as much as world's cars

Since most shipping traffic takes place close to the coastline, ship emissions are a significant health concern.

Globally, commercial ships emit almost half as much particulate pollution into the air as the total amount released by cars, according to a new study¹. Ship pollutants affect the Earth's climate, ecosystems, and the health of people.

Based on direct measurements of emissions, it is estimated that worldwide, ships emit 900,000 tonnes of particulate matter (PM) pollution each year. Shipping also contributes up to 30 per cent of smog-forming nitrogen oxides (NO_x), and 5-8 per cent of global man-made sulphur dioxide (SO₂) emissions.

"Since more than 70 percent of shipping traffic takes place within 250 miles (400 kilometres) of the coastline, this is a significant health concern," says lead author Daniel Lack, a researcher at the National Oceanic and Atmospheric Administration (NOAA) in Boulder, Colorado.

Lack and colleagues have analyzed the exhaust from over 200 commercial vessels, including cargo ships, tankers

and cruise ships. They have also examined the chemistry of particles in ship exhaust gases.

Ships emit sulphates – the same polluting particles associated with diesel-engine cars and trucks that prompted improvements in on-road vehicle fuel standards. Sulphate emissions from ships vary with the concentration of sulphur in ship fuel. Globally, ship fuel sulphur content is regulated under the International Maritime Organisation (IMO). Some ships use cleaner low-sulphur fuel oils, while most others continue to use high-sulphur heavy fuel oils.

According to the new study, sulphates make up just under half (46%) of shipping's total particle emissions. The other half is composed of organic particles (39%) and sooty, black carbon particles (15%).

Both the sulphate particles and the organic particles appear to be linearly correlated with fuel sulphur content,

and fuels with higher sulphur contents produce more small particles than fuels containing less sulphur.

An earlier study by Lack's team found that emissions of the non-sulphate particles depend on the operating speed of the engine and the amount of lubricating oil needed to deal with wear and tear from burning less-refined fuels.

One surprising result of switching to low-sulphur fuels is that, although total particle emissions diminish significantly, the time that remaining emitted particles spend in the air appears to increase. The organic and black carbon particles are less likely to form cloud droplets. As a result, these particles remain suspended for longer periods of time before being washed to the ground through precipitation.

¹ **Particulate emissions from commercial shipping: Chemical, physical, and optical properties.** By Lack, D. A., et al. (February 2009). *Journal of Geophysical Research*, 114, D00F04, doi:10.1029/2008JD011300

Ever heard of particulate matter?



JEFF CLOW/FOTOLIA

Environmental ship index underway

On request from several leading ports in northwestern Europe, including Le Havre, Antwerp, Rotterdam, Bremen and Hamburg, the Dutch research institute CE Delft has developed an environmental ship index to be implemented voluntarily from 2010 to promote greener shipping.

The index identifies vessels that perform better in terms of emissions of nitrogen oxides (NO_x) and sulphur dioxide (SO₂) than under current international regulations.



CARLOS SELLER/FOTOLIA

late matter (PM) are not reflected in the index, the reason being that PM emissions from ships are neither certified nor regulated. Including them would, according to the authors, involve measuring them and

establishing a baseline, which would make the index costly and complex. However, it should be noted that measures to cut SO₂ emissions, such as switching to low-sulphur distillate fuel, also significantly reduce PM emissions.

Since emissions of boilers and incinerators on board ships are not regulated, they are not included in the index. Similarly, engines below 130 kilowatts (kW) are not included. Also shore-side electricity is not accounted for in the proposed index.

Data on a ship's NO_x emissions should be calculated using the official certificates for the engines fitted to each ship, while data on SO₂ emissions should be established after inspection of the bunker fuel delivery notes for a ship either over the past year or over another period. It is however not clear from the report how the use of exhaust after-treatment devices such as selective catalytic reduction (SCR) or SO₂ scrubbers could be accounted for.

Christer Ågren

Proposal for an Environmental Ship Index – Air pollutants and CO₂ (2009). 42 pages. Publication number: 09.7848.05. By E. den Boer, J. Faber, and D. Nelissen. Published by CE Delft, The Netherlands. Available from www.ce.nl

California demands cleaner ship fuels

According to the low-sulphur fuel regulation adopted by the California Air Resources Board (ARB), ocean-going vessels operating within 24 nautical miles (45 kilometres) of California's coastline will be required to use either marine gas oil (MGO), with a maximum of 1.5 per cent sulphur, or marine diesel oil (MDO), with a maximum of 0.5 per cent sulphur, in their main engines or auxiliary boilers, effective 1 July 2009.

As from 1 January 2012, vessel operators will be required to use MGO or MDO with a maximum of 0.10 per cent sulphur in their main and auxiliary engines.

The regulation is seen as a bridge to the proposed North American Emission Control Area (ECA) which will introduce low-sulphur fuel requirements out to 200 nautical miles.

Similarly, the voluntary fuel incentive programme by the ports of Los Angeles and Long Beach acts as a bridge to the ARB regulation. Since 1 July 2008, ships using the ports have been compensated if they voluntarily switch to low-sulphur distillate fuel within 20–40 nautical miles of the ports.

Participation in the programme has increased from 13 per cent of all calls in July 2008 to 18 per cent of all calls in January 2009. Of the 204 vessels participating in the programme by January 2009, 164 were container vessels, 29 were auto carriers, and 11 were cruise vessels.

The programme is currently scheduled to end on 30 June 2009, after which date the ARB low-sulphur fuel regulation is expected to enter into force.

Information: <http://www.arb.ca.gov>

Emissions of the greenhouse gas carbon dioxide (CO₂) are not directly reflected in the index. The reason stated is that there is no established baseline for the CO₂ efficiency of ships. However, in order to encourage ships to report CO₂ so that a baseline could be established in the future, ships can earn a reporting award for CO₂.

Emissions of health-damaging particu-



Shore power.

Tax exemption for shore power in Sweden

Three major shipping organisations – The Swedish Maritime Administration, Ports of Sweden and the Swedish Shipowner's Association – have come together to sign an agreement to promote shore power in Sweden in a bid to reduce vessel emissions.

Currently around ten vessels are supplied with shore-side power in the Port of Göteborg. The Port is planning to extend the power supply to more berths in line with increased demand. Göteborg was the first port in world to use a high-voltage shore power supply.

The three organisations are pushing for a national tax exemption for shore-side electricity, and expect the Swedish government to abolish the current tax shortly.

Information: www.portgot.se/prod/hamnen/ghab/dalis2b.nsf

Tokyo to encourage shore power for ships

If all ships calling on Japanese ports stop engine idling and instead use electricity from land, CO₂ emissions can be reduced by one million tonnes, or to less than half of current emissions from ships. Tokyo port has announced that it will encourage ships anchoring at the port to use on-shore power instead of running engines for power. This practice will also reduce emissions of NO_x, SO₂, and other noxious components of ship exhausts.

An electricity supply for ships will be offered at Hinode Pier in downtown Tokyo starting in April, initially for inland and coastal ships such as ferries, large pleasure cruisers, and freighters totalling an estimated 4,000 vessels in the first year.

Source: Car Lines, February 2009

Shipping would profit by cutting CO₂ emissions

Greenhouse gas emissions from the global shipping industry could be cut by at least one fifth without any cost or even at a profit.

Shipping activity could double or even triple by 2050 under business-as-usual scenarios according to a new report from the International Maritime Organisation (IMO). Consequently, greenhouse gas emissions from ships could increase by up to 250 per cent by 2050 if no further action is taken in this area.

New emission data for 2007 shows that shipping emitted 1,046 million tonnes of carbon dioxide (CO₂), corresponding to 3.3 per cent of global emissions. By comparison, international aviation's share was 1.9 per cent. Of the total emissions from shipping, 870 million tonnes came from international shipping while the remaining 176 million tonnes came from domestic shipping and fishing vessels.

However the report also reveals the major potential that exists for shipping to cut its emissions through new technologies and practices. Many of these measures would actually save the industry money because of the fuel savings incurred.

Together, if implemented, these measures could increase efficiency and reduce the emissions rate by 25–75 per cent below the current levels, according to the report.

A whole range of measures, including towing kites, speed reductions, and upgrades to hulls, engines and propellers, were considered by the report's authors. They also found that economic instruments, such as emissions trading or a bunker fuel levy, are efficient and cost-effective policies to tackle shipping emissions

"The shipping industry, currently responsible for more greenhouse emissions than the UK or Canada, now has no excuses for remaining outside international emissions reductions frameworks," said Peter Lockley, head of transport policy at WWF UK.

The IMO has been under pressure from the European Union and the UN Framework Convention on Climate Change (FCCC) to come forward with concrete proposals to reduce the sector's greenhouse gas emissions. The issue will be discussed further at an IMO meeting in July, which is expected to finalise the IMO's position ahead of the UN FCCC conference in Copenhagen in December.

"It is vital that shipping emissions come within an overall cap under the post-2012 climate regime, as they are projected to rise even if gains in efficiency are taken into consideration," Lockley said.

Should the Copenhagen agreement fail to include global maritime emissions and if no international reduction targets are agreed through the IMO, the EU plans to include the sector in its emission trading scheme.

Christer Ågren

Second IMO GHG Study 2009. Document MEPC 59/INF.10. International Maritime Organisation, www.imo.org. See also press release from WWF UK at www.wwf.org.uk.

Vancouver to offer shore power to cruise ships

Vancouver will become Canada's first port to provide shore power for visiting cruise ships. In 2009, this initiative is expected to cut consumption of marine diesel fuel by 1,000–1,500 tonnes, thus

reducing CO₂ emissions by 3,200–3,700 tonnes, and emissions of air contaminants, including PM, NO_x, and SO₂ by 110–130 tonnes per year,

Source: Car Lines, February 2009

Greenhouse gas emissions from rich countries still increasing

Almost half of the signatory states to the Kyoto protocol have reached their emission targets. Still overall greenhouse gas emissions is increasing. The USA alone was responsible for over two thirds of the increase in 2007.

Emissions of the main greenhouse gas carbon dioxide (CO₂) from industrialized countries grew by 145 million tonnes in 2007, with the United States accounting for over 100 million tonnes. In total, the US emitted 7.1 billion tonnes of CO₂ in 2007.

The 27-nation European Union cut its emissions by 1.4 percent to five billion tonnes in 2007, 12.3 per cent below 1990 levels.

Germany saw the largest net decrease, cutting CO₂ by 23.9 million tonnes or 2.4 per cent.

There were huge differences in greenhouse gas emission trends between the various EU member states since 1990. In the biggest fall, Latvia's emissions were 54.7 per cent below 1990 in 2007, while Spain had the biggest rise, 53.5 per cent above 1990.

Under the 1997 Kyoto Protocol to the UN Framework Convention on Climate Change, around 40 industrialized countries have committed to cut their greenhouse gas emissions by an average of 5.2 per cent below 1990 levels by 2008–2012.

Close to half of the signatories have already reached their Kyoto targets, though largely due to economic restructuring and the closure of industry in eastern Europe following the collapse of the Soviet Union, rather than through investment in cleaner energy or energy efficiency.

Overall, greenhouse gas emissions from industrialized nations rose by nearly one percent in 2007, much of this was due to increases in the US, one of the few industrialized countries that has not signed up to the Kyoto Protocol.

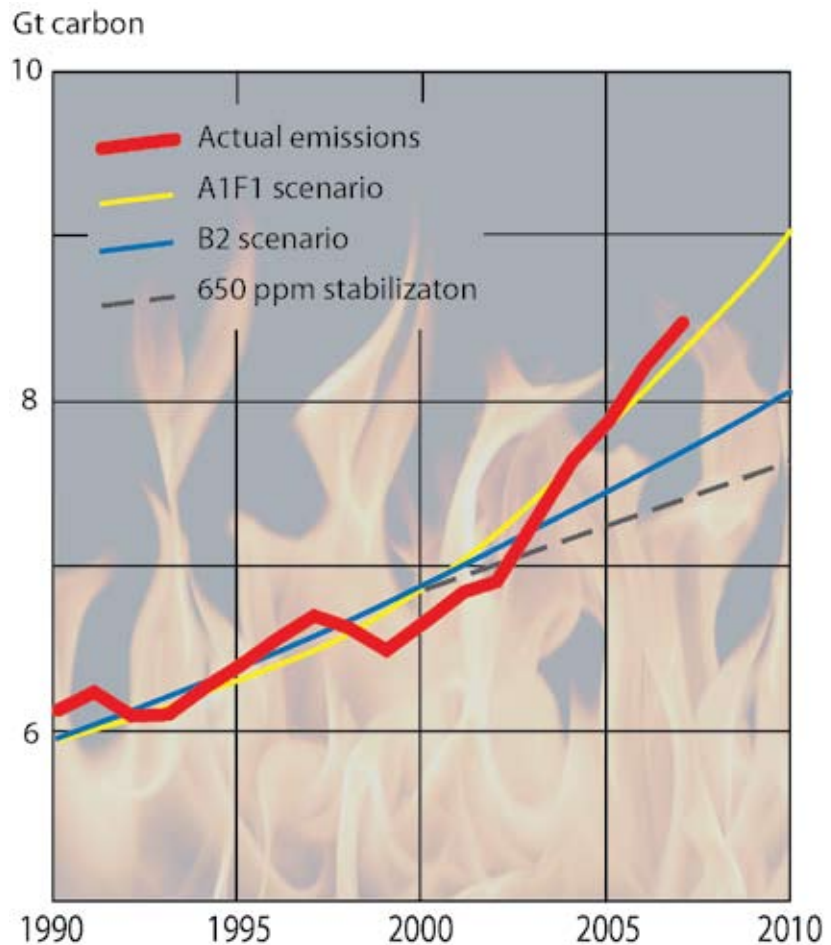
Carbon emissions from countries that have signed up to the Kyoto Protocol increased by 0.1 percent in 2007, mainly due to rises in Japan and Canada.

Canada's emissions rose by four per-

cent in 2007, putting the country's CO₂ emissions at 29 per cent over 1990 levels. With a rise of 2.3 per cent in 2007, Japan

is also significantly above its own six per cent reduction target.

Source: Reuters, 20 and 23 April 2009.



Actual global greenhouse gas emissions compared to two IPCC scenarios and to the development needed to stabilize atmospheric greenhouse gas concentration at 650 ppm.

Worse than worst case...

Carbon dioxide emissions from fossil-fuel burning and industrial processes is accelerating not only in industrialized countries, but at a global scale. The emissions growth rate has been over 3 per cent for the present decade, compared to 1.1 per cent during the 1990s. Since 2000 the emissions have exceeded the projections in the most fossil-fuel intensive scenario of the IPCC, the A1F1 scenario, projecting a global mean temperature increase of 2.4–

6.4 °C by the end of this century.

The graph is from a scientific article by Michael Raupach and others, published 2007. Emission data has been updated for 2006 and 2007. All emission data is from CDIAC, a body under the US Department of Energy.

Source: Raupach, M R et al 2007: Global and regional drivers of accelerating CO₂ emissions. PNAS, vol. 104:24, p.10288-10293.



Small particles - big business for the pharmaceutical industry.

Small but dangerous - new facts on particles

Fine particles cause 546,000 premature deaths each year in Europe, of which 39,000 are due to emissions from international shipping.

A large number of studies carried out in both the US and in Europe have shown that when the concentration of particulate matter (PM) in air rises, even from low levels, there is a rise in mortality from respiratory, cardiac and circulatory diseases, and more people seek hospital care for bronchitis and asthma.

It is the very smallest particles that are believed to be the most harmful, because when they are inhaled they can penetrate deep into the lungs. The focus of debate is turning to $PM_{2.5}$ (*see box*). However, many researchers point out that coarse particles ($PM_{2.5}$ – PM_{10}) also have considerable health effects and their levels also need to be reduced.

The shape and chemical composition

of the particles as well as their size are thought to influence their harmfulness, as do the substances that adhere to their surfaces.

So far it has not been possible to distinguish clearly between the health effects of particles with different origins, so particles in the same size range are usually regarded as equally harmful. Toxicology studies indicate, however, that so-called primary particles from combustion have a higher toxic potential than secondary particles (*see box*). These primary particles are often rich in metals and organic compounds, and also have a relatively high surface area.

In a new Swedish study¹, an advanced

computer model was used to estimate the population exposure to regional background concentrations of fine particles ($PM_{2.5}$). The particles were split into two main categories – primary and secondary.

Most earlier studies have not differentiated between differences in relative risk between primary and secondary PM. In this study premature deaths due to secondary PM were estimated using the relative risk factor of a six-per-cent increase in mortality per 10 microgrammes per cubic metre ($\mu g/m^3$) of $PM_{2.5}$. For primary PM, a risk factor of 17 per cent per 10 $\mu g/m^3$ of $PM_{2.5}$ was used.

Based on emission data for the years 2001–2003, population exposure to PM was estimated by multiplying concentra-

tions with the population density in the various parts of Europe.

Secondary PM was found to contribute more to the population-weighted exposure than primary PM, but as a result of the larger relative risk factor assumed for the latter, primary PM was calculated to be responsible for a larger number of premature deaths.

The number of annual premature deaths in the EU27 due to regional background concentrations of PM_{2.5} was estimated at 316,000, of which 177,000 (56%) were linked to primary PM. For the whole of Europe, emissions of primary particles were responsible for more than half (55%) of a total of 546,000 PM-related premature deaths annually.

For comparison, the EU Clean Air For Europe (CAFE) programme estimated the number of premature deaths caused by PM_{2.5} in the year 2000 at 348,000 for EU25. It should be noted that the CAFE study included an “urban enhancement effect” to at least somewhat account for the local peaks in pollution and exposure in cities.

The contribution of international shipping to the total European emissions was about eight per cent for primary PM_{2.5}, 11 per cent for sulphur dioxide, and 17 per cent for nitrogen oxides. These ship emissions resulted in about 39,000 PM-related premature deaths each year.

Due to the prevailing westerly wind directions, countries in western Europe contribute more than those in eastern Europe to overall European population exposure and PM-related premature deaths.

Christer Ågren

¹ **Population exposure and mortality due to regional background PM in Europe – long-term simulations of source-region and shipping contributions.** By C. Andersson, R. Bergström and C. Johansson. Atmospheric Environment, March 2009.

What are particles?



Particulate matter (PM) is an air pollutant consisting of a mixture of particles that can be solid, liquid or both, are suspended in the air and represent a complex mixture of organic and inorganic substances. These particles vary in size, composition and origin.

Their properties are summarized according to their aerodynamic diameter, called particle size, which is measured in microns. A micron equals one thousandth of a millimetre and is written: μm . The measurements used at present are the weights of two particular fractions:

- PM₁₀, particles with an aerodynamic diameter smaller than 10 μm , which may reach the upper part of the airways and lung.
- PM_{2.5}, with an aerodynamic diameter smaller than 2.5 μm . These are regarded as more dangerous because they penetrate more deeply into the lungs and may reach the alveolar region.

Usually particles are divided into three groups: *coarse*, diameter 2.5–10 μm ; *fine*, 0.1–2.5 μm ; and *ultrafine*, less than 0.1 μm . The fine and ultrafine fractions are more strongly associated with anthropogenic activities than the coarse fraction, which may contain for example wind-blown dust.

The size of the particles determines the time they spend in the atmosphere. While sedimentation and precipitation

remove PM₁₀ from the atmosphere within a few hours of emission, PM_{2.5} may remain there for days or even a few weeks.

Consequently, PM_{2.5} can be transported over long distances. In most places only a small proportion of the background concentration is traceable to local emissions, and a large percentage, particularly of the finest fractions, consists of particles that were emitted in other locations or formed as secondary particles in the atmosphere. In urban environments, along major roads for example, the local contribution can be considerable, however.

Particles are classed as either primary or secondary:

Primary particles are those that are formed during combustion, but may also consist of dust, small soot flakes, pollen, etc. Major sources of anthropogenic emissions are combustion processes (often small-scale appliances, e.g. domestic stoves or boilers) and internal combustion engines (primarily diesel engines).

Secondary particles consist mainly of sulphate and nitrate salts that are formed in the air from sulphur dioxide and nitrogen oxides. Ammonia and volatile organic compounds (VOCs) are also of interest. Any source that emits these substances therefore contributes to their formation. Most fine particles in air are of secondary origin.

Particles cost billions

Health damage in Sweden from fine particle pollution costs SEK 26 billion (€ 2.4 billion) every year, according to a recent study prepared for the Swedish Environmental Protection Agency.

Results from urban air quality modelling show that in 2005 most of the country had rather low urban background concentrations of PM_{10} , compared to the annual mean EU air quality limit of 40 micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

But in some parts of Sweden, mainly in the south, the concentrations were close to the national Swedish environmental objective for 2010 of $20 \mu\text{g}/\text{m}^3$ as an annual mean. About one in ten of the Swedish population were exposed to annual mean concentrations of PM_{10} above $20 \mu\text{g}/\text{m}^3$, and less than one per cent of Swedes experienced exposure levels of PM_{10} above $25 \mu\text{g}/\text{m}^3$.

Regarding $PM_{2.5}$, air quality modelling indicates that annual mean urban background concentrations in 2005 were of the same order of magnitude as the national Swedish environmental objective for 2010 of $12 \mu\text{g}/\text{m}^3$ in quite large areas of the country. About half of the population was exposed to $PM_{2.5}$ annual mean concentrations above $10 \mu\text{g}/\text{m}^3$,

Not so expensive Swedish particles.



VIKTOR/FOTOLIA

Expensive Swedish particles.

while less than two per cent experienced levels above $15 \mu\text{g}/\text{m}^3$.

The authors estimate that approximately 3,400 premature deaths per year result from exposure to ambient annual mean PM_{10} concentrations. Together with some 1,300 – 1,400 new cases of chronic bronchitis, around 1,400 hospital admissions and some 4.5–5 million days of

restricted activity (RADs), the societal cost for health impacts was estimated at approximately SEK 26 billion per year (1 SEK = 0.095 euro). The finer $PM_{2.5}$ particles make up a significant fraction of PM_{10} , and are estimated to be responsible for approximately 90 per cent – or 3,100 – of the total number of annual premature deaths from particles.

Based on the exposure data and dose-response functions, the socio-economic benefits of introducing and complying with maximum limit values for $PM_{2.5}$ were calculated. The annual socio-economic benefits of complying with a $20 \mu\text{g}/\text{m}^3$ $PM_{2.5}$ limit value are estimated at a little more than SEK 7 billion, and would avoid approximately 1000 fatalities. Introducing lower limit values would result in correspondingly higher socio-economic benefits. A limit of $15 \mu\text{g}/\text{m}^3$ would equate to about SEK 15 billion (2,000 avoided fatalities), and a limit of $10 \mu\text{g}/\text{m}^3$ would equate to SEK 21 billion (~3,000 avoided fatalities).

Christer Ågren

Quantification of population exposure to $PM_{2.5}$ and PM_{10} in Sweden 2005. IVL Report B1792. Produced by the Swedish Environmental Research Institute and Umeå University on behalf of the Swedish Environmental Protection Agency. See: www.swedishepa.se/en/In-English/Menu/



EVENING/FOTOLIA

Transport emissions still on the increase

Greenhouse gas emissions from the European transport sector rose 26 per cent between 1990 and 2006, while all other sectors show a declining trend.

Transport continues to contribute disproportionately to Europe's greenhouse gas emissions, poor air quality and noise – and still uses the least efficient modes to move people and goods, according to a report by the European Environment Agency (EEA).

Greenhouse gas emissions from the transport sector rose 26 per cent or 180 million tonnes, between 1990 and 2006, excluding international aviation and marine transport. Air pollutants from road vehicles are declining, but air quality is still a problem across Europe.

"We know the technology exists to tackle impacts of the transport sector on Europe's environment. However, many vehicles rolling off production lines are anything but green, the freight sector still favours the least efficient transport modes and railways across the EU still do not have a unified system," said professor Jacqueline McGlade, EEA Executive Director.

Between 1996 and 2006 the total freight volume measured in tonne-kilometres for EU member states increased by 35 per cent. Rail freight and inland waterways saw a decline in market share. Between 1995 and 2006, car ownership levels in the EU27 increased by 22 per cent, or 52 million cars.

"At a time when we need to tackle our economic and environmental problems through sustainable and green solutions, trends in transport are pointing in the wrong direction; and will continue to contribute to air pollution, rising emissions of greenhouse gas and many negative environmental impacts," said Professor McGlade.

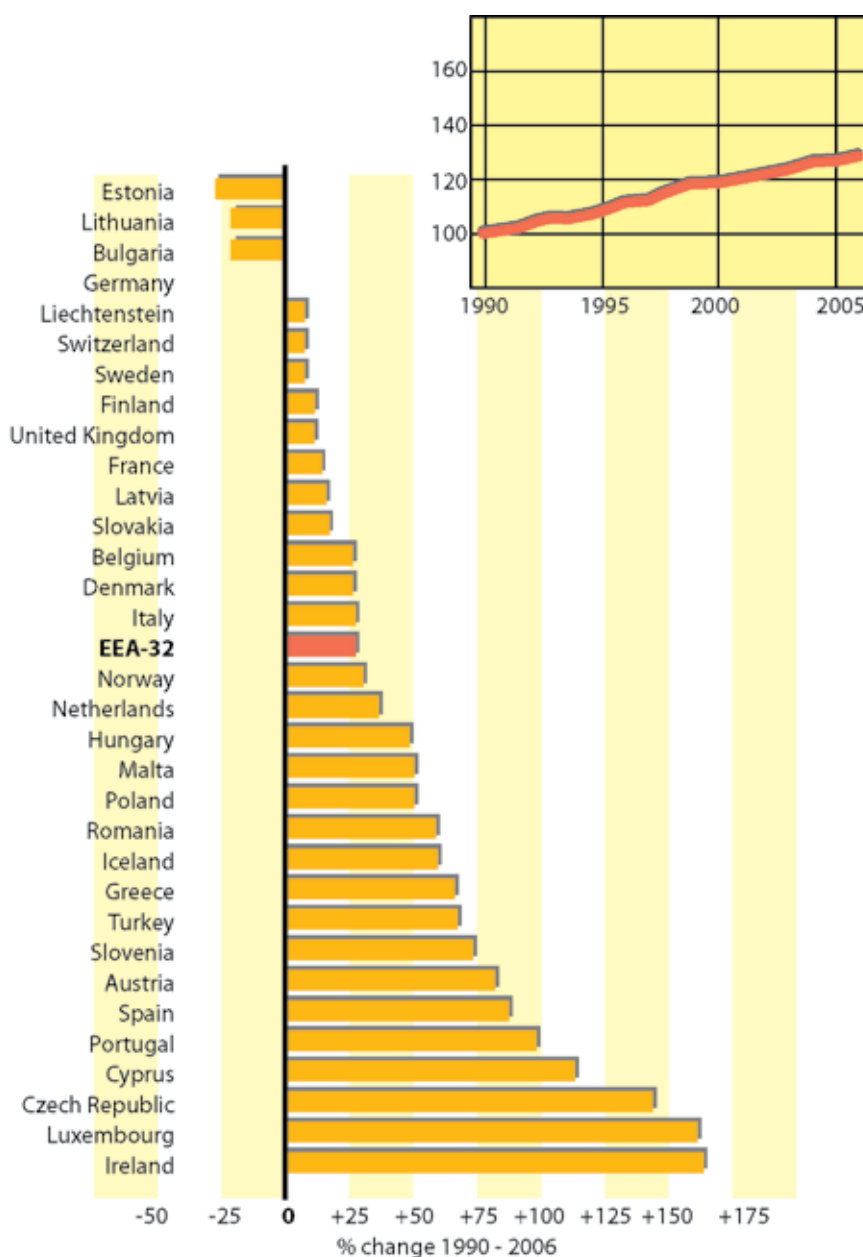
Well designed policies to manage demand for transport can reduce transport volumes, according to the EEA. This would improve the transport efficiency of the economy and decouple transport growth

from economic growth. The report also confirms that price signals play a major role in the choices made by consumers, signalling that fuel and road pricing clearly has a role to play in tackling transport

demand.

Transport at a crossroads. TERM 2008: indicators tracking transport and environment in the European Union. EEA Report No 3/2009. Available at: www.eea.europa.eu/

Transport sector greenhouse gas emissions in the EEA 32 countries increased by 28 per cent over the period 1990–2006 (small graph, index 1990=100). This compares with a reduction of 3 per cent in emissions across all sectors. The bigger graph shows the trend in transport sector greenhouse gas emissions for the same period by country.





And the winner is...

A push for cleaner industry

The new Industrial Emissions directive received its first reading in the European Parliament in March, and the Council position is expected at the end of June.

The Industrial Emissions (IE) directive revises the existing directive on Integrated Pollution Prevention and Control (IPPC), and integrates it with six sector directives – the Large Combustion Plant (LCP), Waste Incineration and Solvent Emissions directives together with three Titanium Dioxide directives.

IPPC is the key instrument of EU industrial policy relating to the environment, and it covers a wide range of industrial and agricultural activities. The IPPC directive itself is basically a framework directive in that it sets out the principles for applying IPPC but does not set any controls. Instead, these are set at the very local level of each individual installation, where account can

be taken of local technical, environmental and geographical factors.

These local controls are set as Best Available Techniques (BAT) conditions which, put very simply, means that the operator has to use the best way of protecting the environment that can be economically justified. These BAT conditions are set out in legally binding permits for each individual installation. International guidance is provided by BAT Reference Documents (BREFs), which set benchmark BAT standards for each industrial sector and some cross-sectoral issues, eg. energy efficiency. However, the BREFs are not legally binding.

IPPC therefore represents a combination of EU controls and local flexibility, underpinned for some industrial sectors by legally binding emission limit values (ELVs) set out in the sector directives. These sector directive ELVs provide minimum standards below which the determination of site-specific BAT may not fall, and the inclusion of the LCP directive in the revision ensures intense political interest at EU level.

Large combustion plants have been identified as key to the EU meeting its 2020 targets for the Thematic Strategy on Air Pollution – emissions of SO₂ and NO_x need to be cut by 50 per cent to meet

this target, and LCPs contribute over 90 per cent of these emissions¹. The existing LCP directive ELVs are particularly lenient compared to the benchmark standards judged to be reasonable by the technical working group that produced the LCP BREF. The IE(IPPC) directive therefore proposes tightening them up, generally to the level of the least strict end of the BREF BAT standard range.

This has prompted intense support from some parties for derogations from these legally binding minimum standards for LCPs eg. for plants with an agreed limited remaining life. There are also intense negotiations for a continued National Emission Reduction Plan (NERP) facility, whereby compliance is assessed across a whole sector or part sector within a member state, rather than on a plant-by-plant basis. Neither of these derogations is included in the Commission's proposal, and they were narrowly defeated in the first plenary vote in the Parliament. However, they form a key part of the evolving Council position. Similarly, a defeated derogation for high-sulphur fuels, aimed particularly at lignite, is re-emerging in the Council position.

The Commission proposed to additionally clean up the combustion sector by including plants in the 20–50 megawatts thermal (MWth) capacity range, a move which would align the Industrial Emissions directive with the Greenhouse Gas Trading directive. The Parliament supported this.

The Parliament also supported the extension of the safety net provided by the existing sector directives to other industrial sectors. This was proposed by the Parliament's rapporteur, Holger Krahmer, but opposed by the Commission on the grounds that it would be impractical to produce sector directives for all industrial sectors. A scoping study by NGOs suggested that it was possible to identify additional sectors for which the time and expense of providing a safety net of minimum legally binding standards could be justified in terms of environmental impact. They therefore welcomed the Parliament's

Contd on following page ►

Oldest and dirtiest power plants must close

More than 200 power plants across the EU must cease operations before 2016 to comply with EU air quality legislation, European Commission data shows.

The UK, Poland, Spain, France and Romania top the list of countries that will have to close coal-fired power stations. The UK will have to retire 13 plants totalling around 34 thermal gigawatts (GWth) of capacity, the highest in the EU, and Poland is set to close 37 plants totalling 29 GWth of capacity.

When revising the Large Combustion Plant (LCP) directive in 2001, member states were given the choice of "opting out" some of their oldest and dirtiest power plants from complying with the new emission limit values. This exemption was accepted largely as a result of intensive lobbying by coal-burning countries, such as the UK.

Those older power plants that chose to opt out of fitting modern emissions control systems, must close within 20,000 operating hours from 1 January 2008 or before 2016, whichever is the sooner.

All in all, seventeen of the EU's 27 member states have opted out a total of 205 plants, with a combined thermal capacity of about 130 GW. Countries that have not opted out any plants include Austria, the Czech Republic, Germany, Hungary, Italy, the Netherlands, and Sweden.

In the ongoing discussions on the revision of the IPPC directive (which also includes revising the LCP directive), several governments are pushing strongly to postpone the 2016 closing deadline for plants until 2020, or even until 2025.

2016 close-up of power plant gate.



ARTSEM MARTYSIUK/PHOTOLIA

1) Commission, 2007, "Impact Assessment of the Proposal for a Directive of the European Parliament and of the Council on industrial emissions," Commission Staff Working Document, SEC(2007) 1679



Skyrocketing.

Global warming could be twice as bad as expected

Global warming's effects could be twice as extreme as estimated just six years ago, according to scientists at the Massachusetts Institute of Technology. Earth's surface temperature could rise 5.2 degrees Celsius by 2100, compared to a 2003 study that projected a median temperature increase of 2.4 degrees C.

The new projections include improved economic modelling and newer economic data showing less chance of low emissions than had been projected in earlier scenarios. Other factors in the new model include the cooling effect induced by 20th century volcanoes, emissions of soot and measurements of deep ocean temperature.

These projections indicate that "without rapid and massive action," this dramatic warming will take place this century, the statement said.

Source: Reuters, 19 May 2009

A push for cleaner industry

Continued from from previous page

support for extending this.

The revision of IPPC also seeks to strengthen the role of the BREFs and limit the granting of derogations from those BREFs. The Commission proposes that the BREFs should be *the* reference point for determining site-specific BAT; that there should be a public justification for any derogations from the BREFs; and that the Commission may set guidance criteria as to what constitutes proper grounds for derogations. The Parliamentary vote supported all three proposals, as well as moving to maintain the quality of the BREFs by requiring that they should be reviewed at least every eight years.

This requirement to update the BREFs is translated into action at the very local level by introducing a legal time limit for the updating of permits. Both the Commission and the Parliament require this to take place within four years, but the Parliament voted to set the clock ticking after publication of the new or revised BREF, whereas the Commission does so after its adoption.

The Parliament also supported the Commission in their official inclusion of environmental Non-Governmental Organisations (NGOs) in the Sevilla BREF process, thereby formalising what has been the practice to date. However, it went beyond the Commission's proposal in other aspects of public involvement in permitting eg. by defining an explicit role for national environmental NGOs and by requiring report data etc to be placed on the internet.

Environmental NGOs were relieved that the Parliamentary process did not allow the potential dilution of *'the emission levels associated with the best available techniques as described in the BAT reference documents'*. There had been moves to provide *'equivalent parameters or technical measures'* as an alternative to this, and whilst there could be a valid role for these in some situations, NGOs feared that in practice this would be exploited to downgrade the BREF BAT standards if they were allowed to replace

ELVs. They therefore welcome the fact that *'equivalent parameters or technical measures'* have been given a supplementary role, not a replacement one.

A number of amendments were also defeated by the Parliament that would have diluted the Commission's proposal to protect soil quality. The Commission's proposal requires full remediation upon the cessation of industrial activity on the site, whilst the defeated amendments would have only required remediation to an ill-defined 'satisfactory' standard, which would have obviated the need for a baseline report.

With regard to inspections, the Parliament strengthened the Commission's inspection proposals by placing a legal requirement for random, unannounced inspections. It also tightened up on the frequency of inspections for plants that breach their permits (once every six months), whilst placing a less frequent requirement upon those plants that are subject to a systematic appraisal of risk based on objective and specified criteria (minimum once every 24 months).

Overall, environmentalists welcomed the results of the first parliamentary vote, whilst deploring the adoption of an amendment that will exempt process combustion plants burning non-conventional fuels that are not covered by the LCP BREF.

Intense negotiations in the Council are moving towards a final Council position, to be agreed on 25th June. Early hopes of a first reading agreement by the Czech Presidency have long since been abandoned and it is expected that final agreement on the new Industrial Emissions directive will be achieved in 2010.

Lesley James

Friends of the Earth Campaigner on Acid Rain (England, Wales & N.Ireland)



Number one.

Top of the dirty thirty list

Having spewn out 31 million tonnes of carbon dioxide (CO₂) in 2008, the Polish Belchatow plant is listed as EU's most polluting power station in terms of its greenhouse gas emissions. The German Niederaussem power plant was the second dirtiest and emitted nearly 25 million tonnes.

Overall, German utilities still owned 11 of the 30 most polluting facilities in the EU in 2008. Britain's top five polluters, including the fourth-ranked Drax power station, saw their total emissions rise by 2.6 percent to 60.1 million tonnes.

According to preliminary data for 2008 from the European Commission, the thirty biggest CO₂ emitters in the EU together belched out some 387 million tonnes, down 2.2 percent from 2007. (The term "dirty thirty" was first coined by the environmentalist organisation WWF in 2005.)

Source: Reuters, 3 April 2009.

PLANT	COUNTRY	2008	2007
1. Belchatow	Poland	30.9	28.3
2. Niederaussem	Germany	24.9	31.3
3. Jänschwalde	Germany	23.5	24.2
4. Drax	UK	22.3	22.2
5. Weisweiler	Germany	21.4	19.7
6. Frimmersdorf	Germany	18.6	19.6
7. Neurath	Germany	18.0	16.8
8. Brindisi Sud	Italy	14.9	14.2
9. Turow	Poland	12.9	12.3
10. Schwarze Pumpe	Germany	12.5	12.4
11.			
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16.			

Table: The top ten of the EU's dirty thirty CO₂ emitters in 2008 (emissions in million tonnes of CO₂).

Arctic nations will cut soot emissions

The eight-member Arctic Council, meeting in Norway in late April, agreed to set up a task force to examine ways to cut down on soot arising from sources such as diesel fumes, forest fires or by grass burnt by farmers – along with two other short-lived greenhouse gases.

The task force would recommend further immediate action that can be taken, and would report back on progress at the next meeting in 2011, according to a final statement by the United States, Russia, Canada, Denmark, Finland, Sweden, Iceland and Norway.

Information: <http://www.arctic-council.org/>

European birds feeling the heat

Climate change is having an observable impact on birds across Europe, according to a scientific team that has created the world's first indicator of the impacts of climate change on wildlife at a continental scale. Of the 122 common species included in the analysis, 75 per cent are predicted to experience declines, while the remaining 25 per cent of species are projected to increase.

Source: Environmental News Service, 9 March 2009

Feeling the heat.



RTIMAGES/FOTOLIA

EU states postpone air quality compliance



SUPRI/ONO SUHAROTO/FOTOLIA

Most member states will not meet the deadline.

Nineteen member states have so far notified the Commission that they will need time extensions to comply with EU air quality standards.

A Dutch request to delay compliance with EU air quality standards for fine particles (PM_{10}) to 10 June 2011 and for nitrogen dioxide (NO_2) until the end of 2014, was approved by the European Commission on 7 April.

According to the new EU air quality directive that was adopted last year, member states can under certain conditions be given time extensions for compliance in speci-

fied zones with the air quality standards for PM_{10} , NO_2 and benzene.

In order to get such exemptions, it is up to the member states to demonstrate that for NO_2 and benzene the limit values cannot be achieved by 1 January 2010, and for PM_{10} , that all appropriate measures have been taken at national, regional and local level to meet the original deadline of 1 January 2005, but that limit values

EU air quality limits for PM_{10} and ozone

EU air quality legislation sets two legally binding limit values for PM_{10} mass concentrations: An annual mean maximum level of $40 \mu\text{g}/\text{m}^3$ that must not be exceeded at all, and a daily mean value of $50 \mu\text{g}/\text{m}^3$ that must not be exceeded on more than 35 days per year.

Regarding ground-level ozone, EU legislation sets a target value, which is not legally binding, but strongly recommended. The target is that by

2010 the eight-hour average ozone concentrations shall not exceed $120 \mu\text{g}/\text{m}^3$ on more than 25 days per calendar year. The EU's long-term objective for ozone is zero exceedance of the $120 \mu\text{g}/\text{m}^3$ value.

A new air quality directive was adopted in April 2008. For the first time, it sets legally binding limit values for maximum allowed concentrations of the finer particles ($PM_{2.5}$), to be attained in 2015.

could not be achieved because of “site-specific dispersion characteristics, adverse climatic conditions or transboundary contributions.”

If the Commission does not raise objections within nine months of receipt of an official and complete member state notification, the limit values for NO₂ and benzene will be postponed from January 2010 to January 2015 at the latest. For PM₁₀, an exemption from the binding standards will in that case apply for a three-year period ending in June 2011.

During the postponement or exemption period the limit values will continue to apply, with an added margin of tolerance. Outside the zones covered by the postponement or exemption decision, limit values must be complied with in full.

So far, nineteen countries have notified the Commission with requests for exemptions from EU air quality standards, and it is expected that the Commission will rule on ten of these before the summer.

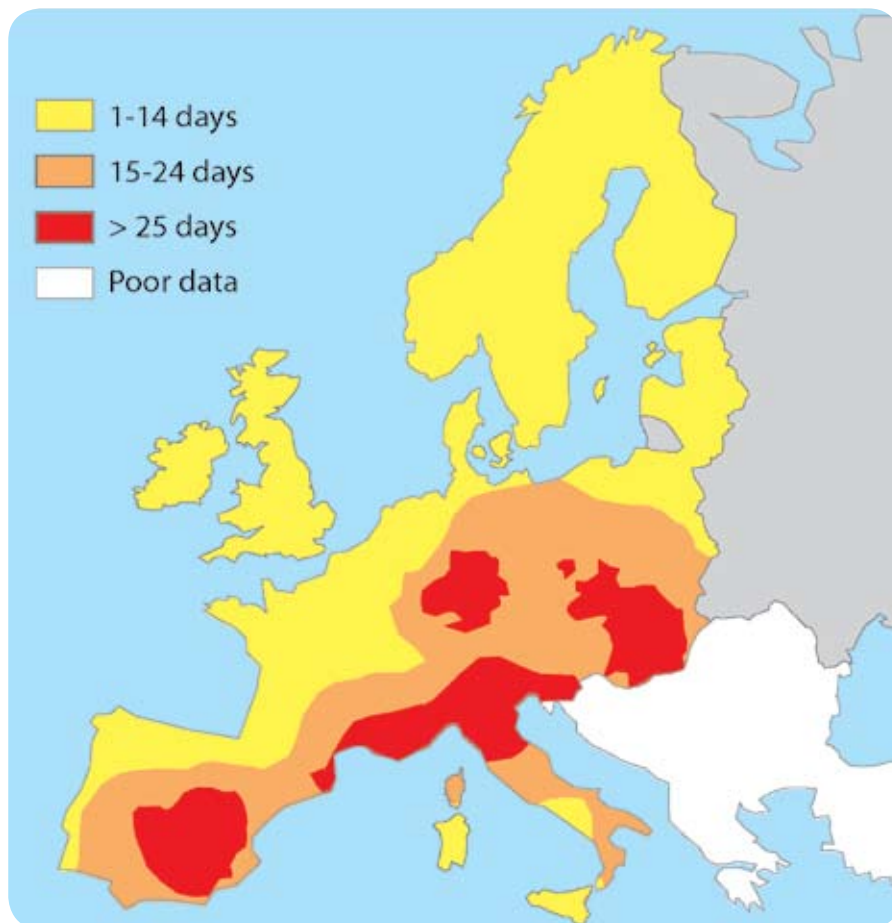
Decisions on requests from Austria, Belgium, Denmark, France, Germany, Greece, Hungary Slovakia and Spain are probably due before July, while decisions on derogation requests from Bulgaria, the Czech Republic, Cyprus, Italy, Latvia, Malta, Poland, Portugal, and the UK will come later, during autumn.

Following an information request sent to member states in June 2008, the Commission in late January sent first warning letters to ten member states that had not yet achieved compliance with the PM₁₀ limit values in force since 1 January 2005. Those were Cyprus, Estonia, Germany, Italy, Poland, Portugal, Slovenia, Spain, Sweden and the UK. These infringement actions remain open until the Commission has ruled on the relevant derogations.

Only four member states have reported compliance with air quality standards, namely Finland, Ireland, Lithuania and Luxembourg. Finland and Lithuania demonstrated that where concentration limits were exceeded this was due to winter sanding of roads, which is explicitly allowed by the air quality directive.

Christer Ågren

More information is available at the European Commission's air quality pages: http://ec.europa.eu/environment/air/quality/legislation/time_extensions.htm



Number of days in summer 2008 on which ozone concentrations exceeded the long-term objective for the protection of human health.

One in four Europeans breathe unhealthy air

Particulate matter and ground-level ozone remain significant air pollutants in Europe, according to two new reports by the European Environment Agency (EEA). Despite some improvements due to emission reductions, these pollutants continue to have a heavy toll on human health especially in southern and eastern Europe. Overall, fine particle pollution is estimated to have caused approximately 373,000 premature deaths in the EU25 in the year 2005.

One in four Europeans suffered many days of frequent and high concentrations of fine particles (PM₁₀) in 2005, according to a recent EEA technical report. In addition to these daily peak concentrations above EU thresholds, one in ten Europeans was exposed throughout the year to persistent PM₁₀ levels higher than the EU's limit for annual mean concentration. The report records similar findings for ground-level ozone, with more than a third of the European population exposed to ozone levels higher than the EU's target value.

The second technical report asserts that, according to several indicators, ozone levels last summer were the lowest since Europe-wide reporting began in 1997. Nevertheless, all EU member states and eight other European countries exceeded the long-term objectives set by EU legislation.

The highest one-hour ozone concentrations were recorded in the Lazio region in Italy. Several measuring stations in Belgium, Greece, Italy, Spain and Switzerland also reported high concentrations of between 240 and 300 micrograms per cubic metre (µg/m³).

The two reports are:

Spatial assessment of PM10 and ozone concentrations in Europe (2005). EEA Technical report No 1, 2009, and **Air pollution by ozone across Europe during summer 2008.** EEA Technical report No 2, 2009. They are available at: www.eea.europa.eu



Reduced pollution from petrol stations

New legislation will require service stations in the EU to be equipped with petrol vapour recovery, resulting in improved protection of the environment and public health.

On 5 May the European Parliament confirmed a first-reading agreement with the Council on new EU legislation demanding that as of 1 January 2012 petrol vapour recovery devices will become compulsory at all new or renovated service stations with a throughput of more than 500 cubic metres of petrol per year.

All existing large service stations (i.e. with a throughput of more than 3000 cubic metres) will be obliged to install this technology by 2018, two years earlier than proposed by the Commission, but three years later than proposed by the Parliament's rapporteur, Dimitrios Papadimoulis (*see AN 1/09, p. 3*).

Under the deal, vapour recovery systems would require a capture efficiency of at least 85 per cent. By comparison, Mr Papadimoulis wanted a minimum capture efficiency of 95 per cent, and the Parliament's Environment Committee at a vote on 31 March agreed to try to raise the level of ambition by increasing the minimum capture efficiency to 90 per cent. However, in order to find a first-reading compromise, the Parliament accepted the original proposal by the Commission for a capture efficiency of 85 per cent.

By 31 December 2014 the Commission has to review the implementation of this new directive and report the results of the review to the Parliament and to the Council, accompanied if appropriate by a legislative proposal.

Christer Ågren

Fuel-efficient cars lead to lower oil prices

Fuel efficiency standards for new vehicles will lead to a lower global oil price according to a study by Enerdata energy consulting, commissioned by environmental group Transport and Environment (T&E).

The report found that for every one per cent reduction in global oil consumption, the price of oil drops by up to two per cent. Furthermore it found that the economic benefits of fuel efficiency measures in Europe are typically underestimated by up to 17 per cent because of the failure to account for a drop in oil prices.

Economic assessments of energy efficiency measures normally use fixed oil prices when accounting for economic benefits. But the Enerdata study, for the first time, examined the future effect on the oil price itself when carmakers are

forced to comply with EU fuel efficiency standards from 2012.

"This study shows that the economic benefits of energy efficiency measures in transport have been seriously underestimated in the past because nobody ever looked at what happens to oil prices as a result," Jos Dings, director of T&E said.

"The EU needs to send a strong message that fuel tax increases at national level will have to go hand-in-hand with fuel efficiency standards if we are going to seriously tackle spiralling transport CO₂ emissions."

The study, "**The impact of lower oil consumption in Europe on world oil prices**" by Enerdata, as well as a two-page briefing on its key findings can be downloaded from the T&E website: <http://www.transportenvironment.org/publications>

California adopts low-carbon fuel standard

On 23 April the California Air Resources Board (CARB) adopted a regulation that will implement a new and unique low-carbon fuel standard.

Proposed by Governor Schwarzenegger in early 1997, this new legislation is designed to reduce carbon emissions from California's transportation by requiring refineries, producers and importers of motor fuels sold in California to reduce the carbon footprint of their products by 10 per cent by 2020, with greater cuts thereafter.

"California's first-in-the world low-carbon fuel standard will not only reduce global warming pollution, it will reward innovation, expand consumer choice and encourage the private investment we need to transform our energy infrastructure," Governor Schwarzenegger said in a statement.

The rule is supposed to lower California's carbon emissions by 16 million tonnes over the next decade, and replace 20 per cent of the state's fossil fuels used

by road transport with cleaner options, such as electricity, hydrogen, natural gas and biofuels.

To produce the more than 1.5 billion gallons of biofuels needed, more than 25 new biofuel facilities will have to be built which will create more than 3,000 new jobs, mostly in the state's rural areas.

The regulation requires providers, refiners, importers and blenders to ensure that the fuels they provide for the California market meet an average declining standard of carbon intensity, which is determined by the sum of greenhouse gas emissions associated with the production, transportation and consumption of a fuel.

The standard is also expected to drive the availability of plug-in hybrid, battery electric and fuel-cell powered cars while promoting investment in electric charging stations and hydrogen fuelling stations.

Sources: Environmental News Service and Reuters, 23 April 2009

Obama sets limits on car CO₂ emissions

A compromise to set new US-wide fuel consumption standards for new cars and trucks in return for California backing off its push for more stringent rules on automakers, was announced on 20 May by President Barack Obama.

The proposal was said to result from months of negotiations between the White House, struggling vehicle makers and the state of California. America's auto makers – with some support from the Bush administration – have spent years resisting efforts by California and 13 other states to set more stringent rules on car emissions.

Under the new standards, US passenger vehicles and light trucks must average

35.5 miles per gallon (6.62 litres/100km) by 2016. The proposal is aimed at cutting climate-warming carbon emissions, which would fall by 900 million metric tonnes, or more than 30 per cent over the life of the programme.

The US Congress does not have to approve the standards, which will be implemented through rules developed by the Department of Transportation and the Environmental Protection Agency, which could take more than a year to complete.



SOPHIA WINTERS/FOTOLIA

The biggest global health threat of the 21st century

A major report on managing the health effects of climate change, launched jointly by The Lancet and University College London (UCL), says that climate change is the biggest global health threat of the 21st century.

"Managing the Health Effects of Climate Change" is the work of UCL academics from many disciplines across the university – including health, anthropology, geography, engineering, economics, law and philosophy.

Information: www.ucl.ac.uk/news/news-articles/0905/09051501/

Air pollution endangers lives of 6 in 10 Americans

Sixty per cent of Americans – 186.1 million people – live in areas where air pollution endangers lives, according to the 10th State of the Air report by the American Lung Association.

Air pollution aggravates asthma and is a direct cause of heart attacks, which makes people living with lung and heart disease especially vulnerable. Some of the biggest sources of air pollution – dirty power plants, dirty diesel engines and ocean-going vessels – also accelerate global warming, the Lung Association concludes.

Information: www.stateoftheair.org

Court overturns US air quality standards

A federal appeals court has ruled that Bush-era clean air standards for fine particles ($PM_{2.5}$) were insufficient, sending them back to the US Environmental Protection Agency (EPA) to be rewritten in a way that will better protect public health. The court decided that the EPA under the Bush administration had acted illegally in issuing weak air pollution standards for fine soot.

Source: Environmental News Service, 25 February 2009

Ship pollution costs billions



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Air pollutant emissions from ships operating in the North Sea and the Baltic Sea are responsible for health damage in Europe valued at 182 billion Danish kroner (DKK) (24 billion Euro) per year, of which DKK 6.1 billion (0.8) occurs in Denmark.

These are preliminary results from an ongoing study by the Danish Centre of Energy, Environment and Health (CEEH), using the EVA (Economic Value of Air pollution) computer model. The research aims at mapping the true costs of damage caused by emissions from the energy and transport sectors.

Economic valuations of air pollution damage currently focus on health impacts, but this study also aims to cover impacts on the general environment, including ecosystems and climate.

It is estimated that the total national emissions of air pollution in Denmark

cause health damage in Europe valued at DKK 31 billion each year, of which DKK 3.9 billion occurs within Denmark. By comparison, air pollutant emissions from ships operating in the sea areas surrounding Denmark and in Danish inland waters are responsible for health damage in Denmark valued at DKK 6.1 billion per year.

"Emissions from international shipping are responsible for a surprisingly large share of air pollution damage in Denmark, primarily because ships still use high-sulphur residual fuels. The increased levels of fine particulate matter (PM) that result from burning these fuels are strongly linked to serious health damage," explains professor Mikael Skou Andersen at the National Environment Research Institute (NERI).

Source: Jyllands-Posten, 23 and 24 March 2009.

New tool to evaluate local air quality

A new computer-based tool has been developed in Sweden to help local authorities evaluate air pollution at street level. It allows the results to be compared easily with EU air quality standards.

SIMAIR is a user-friendly, Internet-based tool, designed for the road network throughout Sweden. It can assess concentration levels for four pollutants: fine particles (PM_{10}), nitrogen dioxide (NO_2), carbon monoxide (CO) and benzene. Local

authorities can calculate total pollution levels for local street sites and, within ten seconds, receive a report which compares the simulated concentrations at that location with EU standards. In addition, SIMAIR identifies long range, urban and local (street) contributions to total pollution levels.

For more information: www.luftkvalitet.se

EU energy and climate package adopted

On 6 April the Council of the European Union formally adopted the six legislative texts that make up the energy and climate package that was tentatively agreed between the Council and the Parliament last December.

The package consists of:

- A directive establishing a revised **European emission trading scheme (ETS)**. Emissions from larger stationary sources are to be reduced by 21% from 2005 to 2020.
- A decision on **effort sharing**, which sets out how much each member state shall reduce its emissions of GHG in sectors not covered by the ETS directive. An overall reduction of 10% should be achieved between 2005 and 2020.
- A directive on **renewable energy**, with a target of a 20% share of renewables in total energy consumption by 2020.
- A directive on **carbon capture and storage**.



It's for us.

- A directive on **fuel quality** setting a target of a 10% reduction in GHG emissions from the production cycle of transport fuels by 2020, of which only 6% is binding.
- A regulation **limiting CO₂ emissions from new passenger cars**. Average emissions should come down to 130 grams of CO₂ per kilometre by 2015. There is also a non-binding long-term objective of 95 g/km, to be attained by 2020.

Information: http://ec.europa.eu/environment/climat/climate_action.htm

RECENT PUBLICATIONS

Environmental effects of the proposal for the directive on industrial emissions (IED)

An evaluation from the perspective of Dutch experience with IPPC (2009). 55 pages.

Published by Stichting Natuur en Milieu, Utrecht, the Netherlands: www.naturenmilieu.nl

A push for cleaner industrial production

A discussion of the issues surrounding the Commission's proposal for a directive on industrial emissions (2009). 36 pages.

Published by the European Environmental Bureau, Brussels, Belgium: www.eeb.org

Protecting American health from global shipping pollution

Establishing an emission control area in US waters (2009). 17 pages.

Published by the Environmental Defense Fund, the American Lung Association, the Puget Sound Clean Air Agency and the National Association of Clean Air Agencies: www.edf.org/documents/9466_ECA_report_March2009.pdf

Off track – Inflated claims of the car industry (2008).

Report showing that the car industry has repeatedly overestimated compliance costs when lobbying against environmental laws. 12 pages.

Published by Greenpeace International: www.greenpeace.org

Air pollution dependency on climate variability and source region

Past, current and future air pollution scenarios over Europe (2009).

By C. Andersson, Department of Applied Environmental Science (ITM), Stockholm University.

20 years with monitoring effects of long-range transboundary air pollution on surface waters in Europe and North America (2008).

56 pages. NIVA report SNO: 5684-2008. Ed. B.L. Skjelvale and H. de Wit.

Published by the Norwegian Institute for Water Research (NIVA) for the International programme on assessment and monitoring of acidification of rivers and lakes (ICP Waters): www.icp-waters.no

Speed limits can reduce air pollution

Levels of air pollution can be significantly reduced in urban areas by introducing traffic speed limits, according to a new study. Air quality was studied along a section of the Amsterdam ring road, where the speed limit was lowered from 100 to 80 km/h. It was found that particulate matter (PM) was significantly reduced, by up to 15 per cent, during the period of the speed restriction, although no significant effect on nitrogen oxides was observed. The study also found that congestion levels did not increase, contrary to concerns expressed before the restriction was put in place. The study claims to be the first to clearly demonstrate that reduced speed limits can improve air quality.

Source: Science for Environment Policy, DG ENV, 29 January 2009

Swedish air quality not improving

Air quality in Sweden has indeed improved in the past 20–30 years, but lately there has been no improvement and there are no indications that it will improve further in the next few years, according to a report by Swedish National Board of Health. Air pollution increases the risk of dying from cardiovascular diseases and lung cancer. It is estimated that air pollution decreases the average lifespan by at least six months, which equals around 3,000 premature deaths in Sweden every year due to fine particle air pollution.

Source: Environmental Health Report 2009 – extended summary. Download from: www.socialstyrelsen.se/Publicerat/2009/10391/2009-126-116.htm

Recent publications from the Secretariat



Last Gasp of the Coal Industry

By Gabriela von Goerne and Fredrik Lundberg, October 2008.

By employing carbon capture and storage (CCS) we can continue to use fossil fuels and at the same time greatly reduce carbon dioxide emissions. This frequently painted picture sounds almost too good to be true, and that is probably the case.

This report takes a look behind the bright vision of CCS given by proponents of this technology. It is not intended to damn CCS but is an appeal for wise decision-making.



Carbon Capture and Storage in Norway

By Tore Braend, October 2008. Strong economic and political motives, combined with a partly positive and partly silent NGO community, has contributed strongly to the present powerful commitment towards the use of CCS in Norway.

The overall effect of this commitment has been a negative impact on efforts to reduce emissions of greenhouse gases in other sectors, especially the transport sector, where emissions are growing fastest.



The Costs and Health Benefits of Reducing Emissions from Power Stations in Europe

By Mark Barrett, UCL, and Mike Holland, EMRC, April 2008.

According to this study, application of advanced emission control technologies to the 100 most polluting plants in the EU27 would cut total EU27 emissions of SO₂ by approximately 40 per cent and emissions of NO_x by 10 per cent. The average benefit-to-cost ratio for measures at the 100 most polluting plants in Europe is 3.4, i.e. the estimated health benefits are 3.4 times bigger than the estimated emission control costs.

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.airclim.org

Same, same but different...

Since 1 October 2008 the Swedish NGO Secretariat on Acid Rain has a new name.

From now on we are the **Air Pollution & Climate Secretariat**.

Please note our new web address, www.airclim.org, and new mail addresses: [info](mailto:info@airclim.org), [christer.agren](mailto:christer.agren@airclim.org), [reinhold.pape](mailto:reinhold.pape@airclim.org), [acidnews](mailto:acidnews@airclim.org); all followed by [@airclim.org](http://www.airclim.org)

Coming events

For the latest news and direct links, please visit www.airclim.org

Green Week 2009. Climate change: act and adapt. Brussels, Belgium, 23-26 June. Info: ec.europa.eu/environment/greenweek/

EU Environment Council. Luxembourg, 25 June. Info: www.consilium.europa.eu

17th European Biomass Conference & Exhibition. Hamburg, Germany, 29 June - 3 July. Info: www.conference-biomass.com

Fifth International Symposium on Non-CO₂ Greenhouse Gases. Wageningen, The Netherlands, 30 June - 3 July 2009. Info: www.ncgg5.org

IMO Marine Environment Protection Committee 59. London, UK, 13-17 July. Info: www.imo.org

Air Pollution 2009. 17th International Conference on Modelling, Monitoring and Management of Air Pollution. Tallinn, Estonia, 20-22 July. Information: WessexInstituteofTechnology.com

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 31 Aug - 4 Sept. Info: www.unece.org/env/lrtap

Biogasmax: European Biomethane Fuel Final Conference. Göteborg, Sweden. 7-9 Sept. Info: www.biogasmax.eu

Offshore Wind 2009. Stockholm, Sweden, 14-16 Sept. Info: www.offshorewind2009.info

European Mobility Week. 16-22 Sept. Info: www.mobilityweek-europe.org

World Bioenergy - Clean Vehicles & Fuels 2009. Stockholm, Sweden, 16-18 Sept. Info: www.wbvcf2009.se

24th European Photovoltaic Solar Energy Conference and Exhibition. Hamburg, Germany 21-25 Sept. Info: www.photovoltic-conference.com

Annual global conference on environmental taxation. Lisbon, Portugal, 23-24 Sept. Info: gcet2009.com/alternativa/index.php/x/gcet

UN FCCC Third preparatory session for Copenhagen. Bangkok, Thailand, 28 Sept - 9 Oct. Info: www.unfccc.int

Intermediate Climate Policies - The contribution of air pollution policies in terms of climate stabilisation and co-control. Göteborg, Sweden, 19-21 Oct. Info: www.naturvardsverket.se/en/

UN FCCC COP 15 and COP/MOP 5. Copenhagen, Denmark, 7-18 Dec. Info: www.unfccc.int