

Acid News

NO. 1, MARCH 2010

The right to clean air

The EU has the tools needed for strict enforcement of air quality legislation – and should not hesitate to use them.

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Renewables can power the world

Renewable sources can produce all the energy the world needs already in 20 years from now, American experts claim.

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Success and failures in pollution abatement

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Billion dollar benefits from new air standards

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Supergrid paves the way for windpower

A supergrid connecting Scandinavia and large parts of western Europe may pave the way for rapid expansion of off-shore windpower.

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Methane emissions must be reduced

Rapid reductions in emissions of methane and other short-lived greenhouse gases are needed to slow down global warming, especially in the Arctic region.

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Cutting NOx emissions - the Norwegian way

Through an agreement between the Norwegian government and business organisations, a tax was transformed into a fund for investments – and emissions began to decrease rapidly.

In January 2007, Norway introduced a tax on the emissions of nitrogen oxides (NOx) amounting to NOK 15 per kg NOx (€ 1.8/kg) emitted from ships, fishing vessels, air traffic and diesel railways, as well as engines, boilers and turbines used in manufacturing industries.

The tax system applies to larger units, i.e. those with a capacity greater than 10

megawatts for boilers and 750 kilowatts for propulsion engines onboard ships.

The NOx tax is also imposed on offshore flaring and onshore oil and gas installations. At the time of introduction, the tax covered approximately 55 per cent of total Norwegian NOx emissions.

Regarding shipping, the tax applies to emissions from ships in Norwegian territo-

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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 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

Everyone has the right to breathe clean air. In 2006, the World Health Organization (WHO) released revised guidelines for four outdoor air pollutants: particulate matter (PM), ozone, nitrogen dioxide and sulphur dioxide. For some pollutants, such as PM, no threshold value for harmful effects could be determined, and WHO therefore decided to set values, which if achieved, would be expected to result in significantly reduced rates of adverse health effects.

The EU annual limit value for PM₁₀ of 40 microgrammes per cubic metre (µg/m³) is twice as high as recommended by the WHO. In addition the EU has a daily limit value of 50 µg/m³, the same as recommended by the WHO, but which is allowed to be exceeded 35 days every year.

Clearly, the EU's air quality standards are insufficient to protect people's health. Despite the weakness of these standards, legal proceedings are currently ongoing against ten member states for failing to comply with the mandatory PM₁₀ standards – limits that should have been met back in 2005.

Evidence of the health hazards posed by air pollutants is clear and unambiguous. The Commission's own analysis concluded in 2005 that because of air pollution 370,000 people die prematurely every year in the EU. Further effects of air pollution on the environment include ecosystem damage through eutrophication, acidification and ground-level ozone.

PM alone is estimated to be responsible for 350,000 premature deaths yearly. That equals one premature death every one and a half minutes. Moreover, the current levels of PM 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.

Air pollution particularly affects vulnerable groups such as infants, children, the elderly and those suffering from asthma,

allergies and other respiratory diseases. Whichever way you look at this problem, the benefits of clean air far outweigh the costs.

Over the last year or so, the Commission has been flooded by requests from member states for exemptions from meeting the air quality standards. It is obvious that many member states have plainly failed to take the necessary measures in time, and now they find themselves in a critical situation where they are at risk of being brought before the European Court of Justice.

At the same time as EU countries struggle to avoid cleaning up the air in line with binding legislation they themselves have agreed and sign up to, on the other side of the Atlantic work is ongoing to strengthen air quality standards.

Another interesting contrast is the fact that in setting primary ambient air quality standards in the United States, the responsibility under the law is to establish standards that protect public health, regardless of the costs of implementing a new standard. The US Clean Air Act requires the Environmental Protection Agency, for each criteria pollutant, to set a standard that protects public health with "an adequate margin of safety." Even if in practice this may not eventually happen, the fundamental principle is good, and certainly something for other countries to emulate.

In contrast to most international environmental treaties, the EU does actually have the tools needed for strict enforcement. Financial penalties can be imposed either as a periodic (e.g. daily) penalty payment or as a lump sum. Considering the serious and widespread damage to health and the environment caused by excessive air pollution, compliance with air quality legislation is essential, and strict enforcement action by the Commission must be a top priority. We do have the right to breathe clean air.

Christer Ågren

Clear the Air!



Cutting NOx emissions - the Norwegian way

Continued from front page

rial waters irrespective of their nationality. Specifically for Norwegian registered vessels, the tax applies to emissions in “near waters”, which are defined as those within 250 nautical miles of the Norwegian coast. Ships in international traffic are generally exempt, including vessels operating in direct traffic between Norway and foreign ports.

Shortly after the introduction of the NOx tax, in May 2008, fourteen Norwegian business organizations entered into an agreement with the Ministry of the Environment. By committing to jointly achieve a 30,000 ton emission reduction over four years (2008–2011), the enterprises participating in the Business Sector’s NOx Fund are relieved from the fiscal NOx tax – instead they pay a charge of NOK 4 (€ 0.47) per kg NOx into the Fund. (The charge is set higher for the offshore sector, at NOK 11 (€ 1.29) per kg NOx.)

More than 95 per cent of the emissions (about 100,000 tons) that were initially subject to the tax are now instead covered by the agreement. As a result, the NOx Fund is expected to allocate some NOK 1,800 million to NOx reduction projects over the four-year period.

Participants in the NOx Fund can apply for grants to finance NOx abatement measures. With assistance from Det Norske Veritas (DNV), the board of the NOx Fund selects the most cost-effective NOx reduction projects, which may receive up to 75 per cent of the investment costs. The fund will also support operational costs, such as urea that is used in selective

catalytic reduction (SCR) systems. It is estimated that approximately 80 per cent of the reduction will come from maritime projects onboard vessels.

Gas Recirculation (EGR).

Measures undertaken under the NOx Fund until the end of 2009 have been estimated to cut emissions by close to 12,000 tons. Projections for the following two years foresee additional reductions, and by the end of 2011 the programme is expected to have fulfilled its commitment – taking into account that the original commitment of a 30,000 ton reduction was lowered somewhat as a result of improvements in emission data for ships showing that earlier emission factors were somewhat exaggerated.

Introduction of the NOx tax was motivated by the need for Norway to quickly achieve additional NOx reductions in order to meet the 2010 national emission ceiling laid down in the 1999 Gothenburg

Protocol under the Convention on Long-range Transboundary Air Pollution.

Work is now in progress under the Convention to revise that protocol, and to set new, stricter emission ceilings to be attained by 2020. The new agreement is expected to be finalised within the next two years or so.

In light of these developments, the Business Sector’s NOx Fund is now preparing for an extension of their agreement with the Norwegian state. The existing agreement includes such an option, and negotiations to this effect will take place this spring.

Christer Ågren

For more information: www.nho/nox/english



Celebrating the success.

According to the NOx Fund, the grants have boosted investment in NOx abatement techniques, such as SCR and engine modification onboard ships. They have also spurred more than 25 ships to run on gas instead of marine fuel oil – a measure that not only cuts NOx emissions by 90 per cent, but also lowers emissions of carbon dioxide by about one fifth.

A closer look at the abatement measures eligible for grants, based on the 530 applications in place by January 2010, demonstrates that the fitting of SCR to ships is expected to deliver approximately half of the total NOx reduction by 2011. Engine modifications will contribute 15–20 per cent, and propulsion by gas some 10 per cent. Other measures on ships include Humid Air Motor (HAM) and Exhaust

Renewable energy can power the world by 2030

Renewable energy sources could produce all the energy the world needs in as little as 20 years from now and at a lower cost than the present energy mix, two American experts claim.

Renewable energy can supply all the energy the world needs by 2030, and it will cost less than keeping the energy mix we have, according to two US energy system researchers in *Scientific American*.

A plan for a sustainable future. How to get all energy from wind, water and solar power by 2030 read the cover story of the November 2009 issue of *Scientific American*.

The article, written by the energy researchers Mark Z Jacobson at Stanford University and Mark A. Delucchi at UCLA, claims that not only can renewables do the job: they can do it without nuclear power or carbon capture and storage, without biomass and with only technology that works now.

And it won't cost any more than sticking to the energy mix we have now.

The way they do it is very simple. They



What we need is basically 900 of these....

want us to build 3.8 million wind power stations at five megawatts (MW) each, 49,000 concentrating solar power plants of 300 MW each, 40,000 photovoltaic plants also of 300 MW, 1.7 billion rooftop photovoltaic installations, 490,000 tidal turbines, 720,000 wave power converters and 5,350 geothermal plants.

Their plan is all-electric. Electric vehicles, electric heating. This has several advantages.

- One is that it is easier to follow: in this vision all energy is equal. The energy



...and 3.8 million of those....

or rather average output is expressed as terawatts (TW), i.e. thousands of gigawatts, a gigawatt being the typical output of a nuclear or coal power unit.

- It is also inherently conservative: there may be cheaper, simpler and faster methods to heat buildings, for example by solar water heating or by energy efficiency measures, so parts of the electricity will not be needed. If so, fewer wind turbines etc will be needed.
- Electricity can save energy, especially for vehicles. The authors take the projected world energy demand in 2030 calculated by the US Department of Energy as 16.9 TW (from 12.5 TW today), which for this reason is reduced to 11.5 TW. For example, only 17 to 20 per cent of the energy in gasoline is used to move a vehicle (the rest is wasted as heat), whereas 75 to 86 per cent of the electricity delivered to an electric vehicle goes into motion.

There is no doubt that the resources of wind and solar are adequate. But there are a number of question marks.

Can so much be built so fast? To build that much new power capacity in 20 years is certainly a huge undertaking. But it can be done, according to Jacobson and Delucchi. Taking a historical parallel: "During World War II, the US retooled automobile factories to produce 300,000 aircraft, and other countries produced 486,000 more."

Will the world run out of some rare materials? The authors identify six possible hurdles: silver for solar cells, neodymium for wind power gearboxes, tellurium and indium for some solar cells, platinum for hydrogen fuel cells and lithium for car batteries, but envisage methods to either bypass or reduce the problem, such as more efficient recycling of materials, or wind power without gearboxes.

Won't it cost the earth? It will not come cheap: the authors estimate the price tag as being on "the order of 100 trillion dollars", excluding transmission. But anything else will also cost: coal



...and less than 2 billion of these.

ENERGY TECHNOLOGY	RATED POWER/ PLANT (MW)	PER CENT OF ENERGY 2030	NUMBER NEEDED, WORLD
Wind turbine	5	50	3.8 million
Wave device	0.75	1	720,000
Geothermal plant	100	4	5,350
Hydroelectric plant	1300	4	900
Tidal turbine	1	1	490,000
Roof PV ¹ system	0.003	6	1.7 billion
Solar PV ¹ plant	300	14	40,000
CSP ² plant	300	20	49,000

Table: A vision of the global energy situation 2030.
1) PV=Photovoltaics, 2) CSP=Concentrating Solar Power.

power (with carbon capture and storage, CCS), nuclear, etc. And though renewable energy is more demanding for the grid than just building new plant on the same sites as the old ones, this is not always an option and huge investments in the grid are foreseen anyway. As for wind power, the cost is already about the same as for new coal or natural gas power. If external costs for pollution and climate change are included, wind power is cheaper. The other major component, solar, is expensive now, but costs are expected to fall considerably over the next ten years.

And when the wind does

not blow? The authors see several methods to deal with this, i.e. to mitigate the intermittency of most renewables. One is to have steady flow from geothermal and tidal power. One is to use hydropower (for which they envisage some expansion) for flexibility. One is to let wind power even out itself: if the wind is weak in one place, it is often stronger at some distance. "For example, interconnecting wind farms that are only 100 to 200 miles apart can compensate for hours of zero power at any one farm should the wind not be blowing there." Also, wind and solar are usually complementary, windy weather is often cloudy weather, and hot days with little wind will produce more solar power.

This may sound optimistic, but on real electric grids, the operators keep proving that even extreme intermittencies can be

handled. Just after the article was published, in the early hours of November 8, Spain for a moment got more than 50 per cent of its electricity from wind power. Three



Oh, and about half a million of these, and...

months earlier the wind power contribution was at a low of just one per cent. On neither occasion did the grid collapse.

The demand can also help to match varying supply. The scenario calls for a phase-out of fossil fuel transport to be replaced by electric cars. By use of smart meters, more cars can be charged when supply is strong. In a more detailed analysis, submitted to Energy Policy¹, Jacobson and Delucchi also point to the possibility of storing surplus energy as hydrogen or in thermal storage, for later use.

Obviously, the study is a kind of thought experiment. It shows one possible future, not an optimized future, as that demands detailed discussion far beyond the reach of the interested layman or legislator.

1) www.stanford.edu/group/efmh/jacobson/PDF%20files/JDEnPolicy24Jan2010.pdf

The realism can be contested. But it is robust in the sense that it does not depend on speculative technology. True, five-megawatt wind power turbines are not commercial yet, but three-megawatt turbines are, so the extrapolation is reasonable. Even larger turbines are clearly conceivable and will surely be more efficient and in all likelihood more economic. Electric cars have not yet established any significant market, but even the imperfect electric cars of today (with respect to range and charging difficulties) would win great acceptance if the alternative is fossil cars without fuel or with extremely expensive fuel.

As the ensuing debate (152 comments published on the Scientific American web) shows, some elements of the scenario are

contested. Some of them are however more supportive than disruptive: people have pointed to unused options, such as sustainable biomass, geothermal heat by heat pumps, innovative transit technologies and the fact that energy efficiency is not credited enough. (Many commentators also missed nuclear power.)

As for nature conservation NGOs, tidal power is controversial to say the least and more hydro is not wel-

come. But they are not decisive: tidal and additional hydro combined represent just two per cent of the Jacobson-Delucchi scenario.

Is it realistic to have four per cent from wave power? We will probably know within a few years, as testing is underway. If the wave power converters work reliably, they will need lower subsidies than solar cells to make money and less need for balancing than wind power.

Fredrik Lundberg

The *Scientific American* article can be downloaded from www.stanford.edu/group/efmh/jacobson/sad1109Jaco5p.indd.pdf

Air pollution abatement - success and failures

The convention on long range air pollution has helped to clear the skies over Europe and North America over the last three decades - but a few countries are still notorious in failing to fulfil their commitments.

Initiated at a time when the detrimental impact of acid rain was gaining increasing public attention in Europe and North America, the Convention on Long-range Transboundary Air Pollution (CLRTAP) was signed in 1979 and entered into force in 1983. As the first regional environmental treaty, the convention has been instrumental in the reduction of harmful air pollutants in Europe and North America.

With 51 parties, the convention covers most of the region of the United Nation's Economic Commission for Europe (UNECE). Over the years, the convention has been extended by eight protocols, focused upon reducing air pollutant emissions for the protection of human health and the environment. Each of these protocols targets pollutants such as sulphur dioxide (SO₂), nitrogen oxides (NO_x), persistent organic pollutants (POPs), volatile organic compounds (VOCs), ammonia (NH₃), and toxic heavy metals.

The most recent one – the 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone – came into force in 2003, and aims at reducing air pollution damage by setting binding national emission ceilings for SO₂, NO_x, VOCs and NH₃, to be achieved by 2010. The emission ceilings are complemented by technical annexes establishing mandatory emission standards for both stationary and mobile emission sources.

Negotiations to revise and strengthen

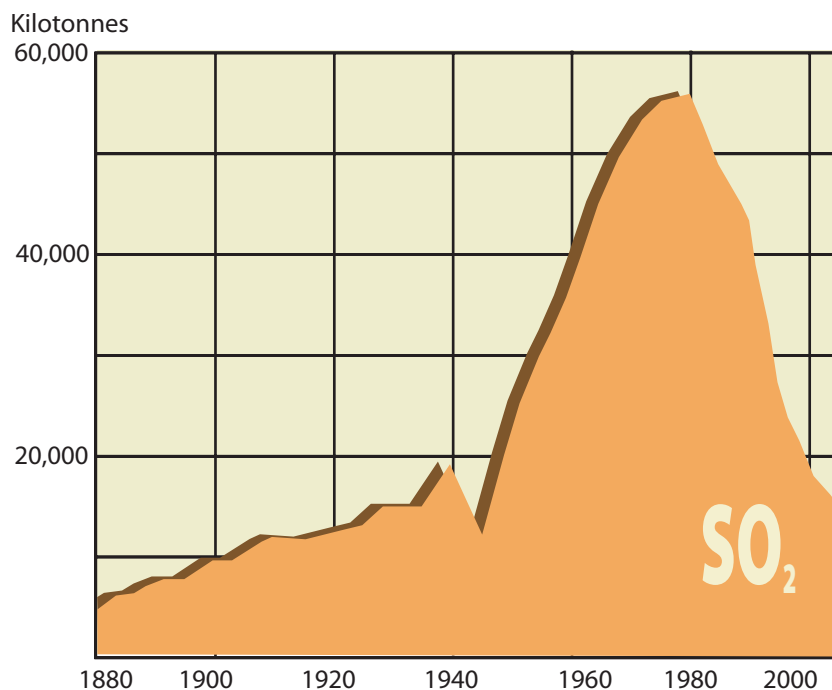


Figure: Emissions of sulphur dioxide in Europe over the period 1880-2005. Source: Vestreng et al, Atmospheric Chemistry and Physics, 2007.

the Gothenburg Protocol, including a widening to cover fine particulate matter (PM_{2.5}) as well, will start this year, and the aim is to adopt a revised protocol in December 2011. This should set new, stricter national emission ceilings for 2020.

Renegotiation of the 1998 Heavy Metals Protocol is ongoing, and amendments to the 1998 POPs Protocol were recently adopted (*see box*).

Encompassing the European continent and North America, the convention is also well known for having successfully

linked science and policy. The European Monitoring and Evaluation Programme (EMEP) and the Working Group on Effects, with its International Cooperative Programmes, are effective networks of scientists and research centres, responsible among other things for mapping critical loads/levels, computer modelling for integrated assessment and researching the levels and impacts of air pollutants.

Although much has been accomplished in the past 30 years, air pollution levels are still too high and scientific research continues to identify new risks. One example of such a risk is reactive nitrogen, which has more than doubled during the last century, resulting in a range of negative environmental impacts, including damage to ecosystem biodiversity.

Climate change is a major environmental challenge, and both greenhouse gases and air pollutants originate largely from the

Table: Emissions of sulphur dioxide, nitrogen oxides and ammonia 1990-2006 in the United States and EU27 (kilotonnes/year). Data from USEPA and EEA.

COMPOUND	US 1990	US 2006	TREND %	EU27 1990	EU27 2006	TREND %
Sulphur dioxide, SO ₂	23,077	14,714	-36	27,323	8,284	-70
Nitrogen oxides, NO _x	25,527	17,694	-23	17,136	11,294	-34
Ammonia, NH ₃	4,320	4,135	-4	5,120	4,094	-20

same emission sources and their effects can be closely linked.

Consequently, it is a challenge for the convention to exploit the benefits to be gained from policies that simultaneously address climate change and damage from air pollution. One step in this direction was taken at the meeting of the convention's executive body in December 2009, when it was agreed that the revision of the Gothenburg Protocol should include an evaluation of so-called short-lived climate forcers, primarily black carbon and tropospheric ozone as well as their precursor pollutants (e.g. NO_x, VOCs, carbon monoxide and methane).



ELMUNSTER / FOTOLIA

Headquarters of the Air Pollution Control Agency, Athens?

Over the years, the convention has gradually shifted from a single-pollutant policy (i.e. looking at one pollutant such as SO₂, and one effect, such as acidification), to a multiple-pollutants and multiple-effects policy framework, based on the critical load approach. To be able to better account for the links between air pollution and other high-profile issues such as climate

change and biodiversity loss, the convention's approach may need to be widened another step to encompass multiple-issues and multiple-effects. Clearly, as CLRTAP moves forward, the science-policy interface will continue to be crucial.

It is now clear that air pollution is not limited to the regional scale, but that it is a global – or at least a northern hemi-

spheric – problem. Some air pollutants, such as ozone and fine particles (and their precursors), can be transported thousands of kilometres. This means that pollutant emissions in one continent can cause damage in another continent, and that emissions in Europe, North America or Asia may end up in the sensitive ecosystems of the Arctic.

Scientific matters linked to the trans-continental movements of air pollutants have for the past five years or so been handled by a designated task force under the convention, but the policy implications still remain to be sorted out. To this effect, CLRTAP has initiated various “outreach” activities across the world, and this work may become more important in the coming years.

Implementation of the existing protocol is a matter of high priority, and was discussed by the executive body in December. The convention's implementation committee reported that a few countries are still failing to comply with the emission reduction demands of the protocols, and several countries are failing to comply with the obligation to report.

Despite repeated sharp reprimands over several years, Greece and Spain have still not reduced their emissions as required by the protocols. Greece expressed expectations to achieve compliance with its

Seven harmful chemicals added

Parties to the convention's Protocol on Persistent Organic Pollutants (POPs) agreed in December 2009 to add seven new substances to the protocol, namely: hexachlorobutadiene, octabromodiphenyl ether, pentachlorobenzene, pentabromodiphenyl ether, perfluorooctane sulphonates, polychlorinated naphthalenes, short-chain chlorinated paraffins. This brings the number of POPs regulated under the protocol to 23.

The POPs Protocol, which was signed in 1998 and entered into force in 2003, constituted the first international action to control POPs, and so far it has been ratified by 29 countries. The original protocol regulates 16 substances, banning the production and use of some, while scheduling others for elimination at a later stage or severely restricting their emissions. It also contains obli-

gations for the use of best available techniques to control emissions and for the environmentally sound disposal of waste containing POPs, as well as specific emission limit values for the incineration of waste.

Parties to the convention must now ratify the revised protocol before the new restrictions enter into force.

Note: Persistent organic pollutants (POPs) are particularly harmful chemical substances (pesticides, industrial chemicals and by-products or contaminants) which pose a serious threat to the environment and to human health. POPs are not just toxic – unlike other pollutants, they resist degradation, remaining in the environment for generations and accumulating in the bodies of humans and animals. They are transported over long distances, including to the Arctic. Health hazards from POPs include endocrine disruption, reproductive and immune dysfunction, neurobehavioural and developmental disorders, and cancer.

Continued on following page ►

Air pollution abatement - success and failures

Continued from previous page

obligations under the 1988 NO_x Protocol by 2013, which is nearly 20 years too late, but the committee was not convinced that this would actually happen, and also concluded that the country's responses remained insufficient.

Spain has now been in non-compliance with the NO_x Protocol for 15 years, i.e. every year since 1994. Spain currently expects to achieve compliance by 2010, but this was called into question by the committee due to the fact that in 2007 Spanish emissions were still 36 per cent above the target. Spain has also failed to comply with the 1991 VOC Protocol – it is still a long way from achieving the required 30-per-cent reduction. Spain has stated that it still does not expect to achieve compliance before 2020.

The executive body expressed increasing disappointment at the continuing failure of Spain and Greece to fulfil their obligations to take effective measures to attain compliance, and strongly urged both countries to implement the measures necessary to achieve compliance as soon as possible.

In addition, increased use of biomass for domestic heating has meant that emissions in Denmark of polycyclic aromatic hydrocarbons (PAH) continue to increase, which is not compliant with the emission reduction obligation in the Persistent Organic Pollutant (POP) Protocol.

The executive body was disappointed that Denmark has once again indicated it will not achieve compliance for many

years, and urged Denmark to speed up abatement measures to shorten the period of expected non-compliance.

As to the requirements to report on emission data and on strategies and policies for abating air pollution generally, the committee noted that despite a general improvement, several parties were still found to be failing to comply with their reporting obligations.

Christer Ågren

Information: www.unece.org/env/lrtap

Review of the VOC paints directive underway

An EU consultancy report published in December recommends extending the 2004 directive on volatile organic compounds (VOCs) in paints and varnishes to other products such as hairsprays, solvent-based adhesives, window cleaning products and wood coatings.

The German consultancy Ökopol also recommends a stricter VOC limit value for solid-based interior decorative paints of 130 grams per litre.

It is estimated that these measures could reduce annual VOC emissions in the EU by between 94,000 and 106,000 tons.

The consultants did not however recommend setting a VOC limit of 10 per cent for deodorants/antiperspirants, in spite of the fact that this would lead to the highest VOC reduction of all options investigated, 126,000 tons. The report states that the implementation of this option “is expected to have limited acceptance at consumers used to apply aerosol- or pump-type spray systems,” as they would then need to change to roller-type systems.

A review of the directive is being un-

dertaken in line with the provisions of its Article 9, and the European Commission will now consider the consultancy's recommendations and possibly propose legislative changes in 2011.

For more information see: ec.europa.eu/environment/air/pollutants/paints_directive.htm

Note: Directive 2004/42/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (known as the VOC Paints Directive), establishes limit values for the maximum VOC contents of various products. Those products include paints for use on buildings, their trims and fittings and structures associated with buildings and products for vehicle refinishing. For paints there are two sets of limit values, the first one applies from 1 January 2007, and the second, stricter set of limits, applies from 1 January



TRACY WHITEHEAD / FOTOLIA

- Hurry up, they are about to extend the VOC paints directive...

2010. For vehicle refinishing products there is only one set of limit values, which applies from 1 January 2007.

Tough stance on air quality derogations

European Commission objects to vast majority of requests for more time to comply with EU air quality legislation.

In December, three new decisions were taken by the European Commission concerning requests from Bulgaria, Poland and the United Kingdom for additional time to comply with EU legislation on air quality.

Temporary exemptions from the binding limit values for particulate matter (PM₁₀) – that should have been met back in 2005 – had been requested for 97 zones in the three countries, and from the nitrogen dioxide (NO₂) limit value in one zone in Poland. The Commission approved time extensions for PM₁₀ in five air quality zones in Poland but objected to all other requests.

In the remaining zones in Poland, as well as all zones in Bulgaria and the United Kingdom, the Commission considered that the conditions have not been met. In many cases, this is because insufficient data has been provided or because the measures outlined in the submitted air quality plans do not demonstrate that the standards will be met when the exemption period expires.

In some cases the Commission's assessment showed that exemptions will not be necessary since compliance with the limit values has already been achieved. This was said to be the case for the United Kingdom, where all air quality zones except the Greater London zone were in compliance in 2008. However, the air quality plan for the Greater London area did not meet the conditions for a time extension, the Commission explained.

On 1 February the Commission rejected eleven out of twelve new Italian requests for more time to meet the PM₁₀ limit values. Most of Italy's earlier request for derogations had already been rejected last year. This time, however, an extension was approved for one zone in the region of Campania.



No more timeouts, the Commission says.

EU air quality legislation sets binding limit values and/or indicative target values for the maximum permitted concentrations of certain air pollutants. Action to reduce pollution through an air quality plan is required where there is a risk of these standards being exceeded.

There are two air quality limit values for particulate matter (PM₁₀) based on daily average concentrations (50 micrograms per cubic metre (µg/m³), not to be exceeded more than 35 times in a calendar year) and annual average concentrations (40 µg/m³). These entered into force on 1 January 2005.

Two limit values for nitrogen dioxide based on hourly and annual average concentrations entered into force on 1 January 2010. The hourly limit value is 200

µg/m³, not to be exceeded more than 18 times in a calendar year, and the annual average limit is 40 µg/m³.

The 2008 air quality directive allows member states to notify time extensions for meeting the air quality standards for PM₁₀ (until 11 June 2011) and NO₂ and benzene (until 2015 at the latest). During the time extension period, limit values continue to apply plus a margin of tolerance.

So far, twenty-one decisions on time extensions concerning 18 member states have been adopted, and according to the Commission conditions for an exemption from the PM₁₀ limit values were satisfied in 49 air quality zones in Austria, Cyprus, the Czech Republic, Germany, Hungary, Italy, the Netherlands, Poland and Spain. (*See also Acid News No. 3, 2009.*) In these cases, the Commission was satisfied that compliance will be achieved at the expiry of the time extension period through comprehensive air quality plans.

The conditions for a postponement of the NO₂ limit values have also been accepted for nine zones in the Netherlands.

Legal proceedings are ongoing against ten member states for failing to comply with the PM₁₀ limit values. In those countries the PM₁₀ limit values continue to be exceeded, and either they have not submitted notifications or the Commission has already objected to requested time extensions.

Christer Ågren

For more information on time extensions:
ec.europa.eu/environment/air/quality/legislation/time_extensions.htm

For more information on limit values for pollutants:
ec.europa.eu/environment/air/quality/standards.htm

Great health benefits from new US air quality standards

New air quality standards announced by the EPA are estimated to yield health benefits in the USA of between 13 and 100 billion dollars.

On 25 January, the United States Environmental Protection Agency (EPA) announced a new national air quality standard for nitrogen dioxide, and earlier that month EPA also proposed a strengthening of the nation's standards for ground-level ozone.

Currently there are National Ambient Air Quality Standards (NAAQS) in effect in the US for six pollutants, namely: particulate matter, ozone, sulphur dioxide, nitrogen dioxide, lead, and carbon monoxide. For each of these, EPA must set standards sufficiently protective of both public health and public welfare.

The Clean Air Act requires EPA to review and, if necessary, revise the standards every five years – a requirement the agency has repeatedly failed to abide by. But this is now changing as the Obama administration is making the NAAQS programme a higher priority.

According to the EPA, the new one-hour standard for nitrogen dioxide (NO₂) will protect millions of Americans from peak short-term exposures, which primarily occur near major roads. Short-term exposures to NO₂ have been linked to impaired lung function and increased respiratory infections, especially in people with asthma.

"For the first time ever, we are working to prevent short-term exposures in high risk NO₂ zones like urban communities and areas near roadways," said EPA Administrator Lisa Jackson. "Im-

proving air quality is a top priority for this EPA."

While establishing a new one-hour standard for NO₂ at a level of 100 parts per billion (ppb), the EPA is also retaining the existing annual average standard of 53 ppb. NO₂ is formed from vehicle, power plant and other industrial emissions, and contributes to the formation of fine particle pollution and ozone smog.

The American Lung Association, welcomed the new standard, calling it a good first step, but said the EPA's original proposal last summer was more protective. "After waiting 38 years, we had frankly hoped for a stronger, more protective standard. Their decision allows areas to have NO₂ concentrations that remain hazardous to the millions of people who will have to breathe them," said Charles

Connor, president of the ALA.

Connor made reference to a recent review by the Health Effects Institute. An expert panel concluded that breathing NO₂ and other pollutants from highway traffic increased the risk that a child's asthma would get worse. Strong evidence warned that pollution from traffic may even increase the risk that children could develop asthma, or worsen their lungs' ability to function. For older adults and people with cardiovascular disease, living near a highway may increase the risk of early death, the review showed.

The Institute's report states, "Based on a synthesis of the best available evidence, the Panel identified an exposure zone within 300–500 meters from a highway or major road as the area most highly affected by traffic emissions and estimated that 30–45 per cent of people living in

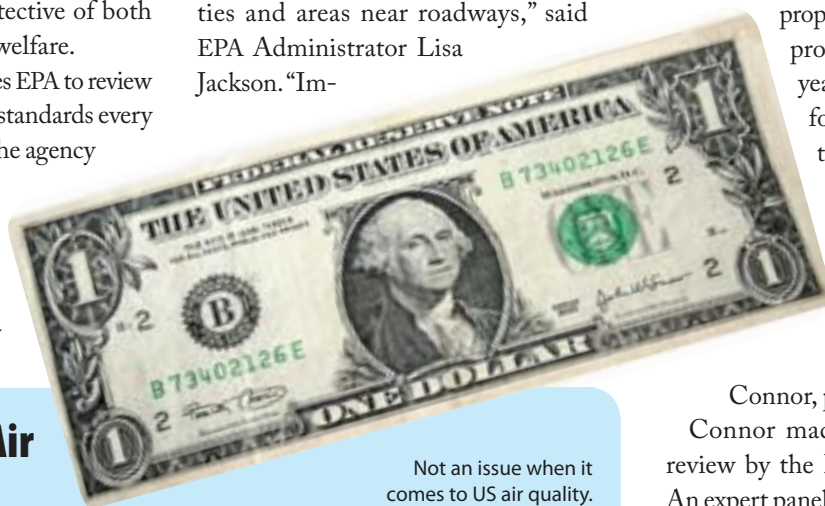
The US Clean Air Act and EPA

In setting primary ambient air quality standards, EPA's responsibility under the law is to establish standards that protect public health, regardless of the costs of implementing a new standard. The Clean Air Act requires EPA, for each criteria pollutant, to set a standard that protects public health with "an adequate margin of safety." As interpreted by the EPA and the courts, the Clean Air Act requires EPA to create standards based on health considerations alone.

According to the EPA, however, this does not mean that costs or other economic considerations should be

ignored – consideration of costs and benefits is essential to making efficient, cost-effective decisions for implementation of air quality standards.

The impacts of cost and efficiency are considered by states, as they decide what timelines, strategies, and policies are most appropriate. Therefore, the Regulatory Impact Analyses produced by the EPA are intended to inform the public about the potential costs and benefits associated with a hypothetical scenario that may result when new air quality standards are implemented, but they are not relevant to establishing the standards themselves.



large North American cities live within such zones.”

On January 7, the EPA presented its proposal for new ozone standards. A “primary” standard to protect public health, was suggested to be set at a level between 60 and 70 ppb measured over eight hours. The current standard is 75 ppb.

Ground-level ozone, also known as smog, is linked to a number of serious health problems, ranging from aggravation of asthma to increased risk of premature death in people with heart or lung disease. Ozone can even harm healthy people who work and play outdoors.

EPA is also proposing to set a separate “secondary” standard to protect the environment, especially plants and trees. This seasonal standard is designed to protect plants and trees from damage occurring from repeated ozone exposure, which can reduce tree growth, damage leaves, and increase susceptibility to disease.

Depending on the level of the final standard, the proposal would yield health benefits between US\$13 billion and 100 billion, according to the EPA. The new standard would help reduce premature deaths, aggravated asthma, bronchitis cases, hospital and emergency room visits and days when people miss work or school because of ozone-related symptoms. Estimated costs of implementing this proposal range from US\$19 billion to 90 billion.

The EPA is scheduled to issue final ozone standards in August 2010, and it expects to propose new fine particulate (PM_{2.5}) standards in July 2010 and finalize them by April 2011. A new one-hour sulphur dioxide (SO₂) standard was proposed in November 2009.

Christer Ågren

For more information: www.epa.gov/air/urban-air/

Note: For comparing air quality standards expressed in parts per billion (ppb) with those expressed in micrograms per cubic metre (µg/m³), the following conversion factors could be used: 1 ppb NO₂ = 1.91 µg/m³ NO₂ and 1 ppb O₃ = 2 µg/m³ O₃.



GALYNA ANDRESHKO / FOTOLIA

Meeting the new standards?

New air quality standards in India

For the first time in 15 years India has revised its air quality standards. The new standards were notified by the environment ministry in November, and have lowered maximum limits for health damaging pollutants such as sulphur dioxide, nitrogen dioxide and PM₁₀, and introduced new limits for pollutants left out earlier, including ozone, PM_{2.5}, arsenic, nickel, benzene and polyaromatic hydrocarbons (as benzo(a)pyrene).

Another change is that there will now be uniform standards for residential, industrial and rural areas limits, thus ending the practice of providing less stringent limits for industrial zones.

More cities are now likely to find themselves exceeding the limits. Data from the Central Pollution Control Board suggests that, even under old standards, two-thirds of 120 cities whose air quality is monitored by the board have higher than permissible levels of particulate matter. An analysis by the non-government group Centre for Science and Environment (CSE) has shown that in 80 per cent of the 120 cities the value of at least one pollutant exceeds the annual average limit imposed under the new standards.

CSE welcomed the new standards as the first uniform health-based air quality standards in India. “CSE has been demanding these norms, proposals for which have been languishing with the ministry for over three years. It has been a long and protracted battle, and we have fought very hard for them,” said Anumita Roychoudhury, associate director of CSE and head of its Right to Clean Air Campaign.

The annual mean standard for nitrogen dioxide (NO₂) has been strengthened from 60 to 40 micrograms per cubic metre (µg/m³) and a 1-hour mean limit of 200 µg/m³ has been introduced.

For ozone, the new limits are 100 and 180 µg/m³ respectively as 8-hour and 1-hour mean values, and for fine particles (PM_{2.5}) the new limits are set at 40 µg/m³ as annual mean and 60 µg/m³ as daily (24-hour) mean.

Some of the new standards are aligned with recommendations from the World Health Organization (WHO), while others – such as those for fine particles – are much less stringent.

Christer Ågren

More information: www.cseindia.org/node/329

Greenhouse gas reductions will benefit human health

Reducing greenhouse gas emissions will have major direct health benefits, especially in low-income countries.

Tackling climate change by reducing carbon dioxide and other greenhouse emissions will have major direct health benefits in addition to reducing the risk of climate change, especially in low-income countries, according to a series of papers on “Health and Climate Change” published recently in the British medical journal *The Lancet*.

According to the authors, many measures to reduce greenhouse gas emissions will themselves have additional and independent positive impacts for health. These co-benefits will offset at least some of the costs of climate change mitigation, and should be taken into account in international negotiations.

The *Lancet* studies were undertaken by an international team of scientists. Each study focuses on one sector in which greenhouse-gas emissions need to be reduced, including household energy use, transport, electricity generation, and food and agriculture. A fifth study reviews the effect on health of short-lived greenhouse pollutants, which are produced in several sectors.

In rich countries, energy use in buildings for heating, lighting, and other needs is responsible for a large part of energy demand. In the poorest parts of the world,

energy for cooking and heating relies on solid-fuel household stoves. Either way, household energy use is responsible for a significant amount of greenhouse gases.



Good for you, and for the climate.

The simple stoves used by the poorest half of the world's households operate at low combustion efficiency and produce airborne particles, including black carbon, in addition to various greenhouse gases and other health-damaging pollutants.

National programmes offering low-emission stove technology for burning local biomass fuels in poor countries could, over time, avert millions of premature deaths, and constitute one of the strongest and most cost-effective climate-health linkages.

Transport accounts for almost a quarter of all fossil fuel greenhouse-gas emissions. Reduction of motor vehicle use through

more walking and cycling will not only diminish transport emissions but should also reduce obesity, lower the rate of chronic diseases caused by physical in-

activity, lessen the health-damaging effects of air pollution, and make the roads safer for pedestrians and cyclists.

Electricity production is a major contributor to greenhouse-gas emissions. The review concentrates on only one of the health effects of power generation – the emission of airborne particles causing damage to the respiratory and cardiovascular systems.

Changing methods of electricity generation to reduce CO₂ emissions would reduce particulate air pollution and deaths. The biggest gains would be in cardiopulmonary disease, followed by lung cancer. The effect would be greatest in India and China and lowest in the EU. (The more modest improvement to be expected in Europe arises from the relatively clean methods of burning fossil fuels already in use.) The cost of these changes would be significantly offset by reduced costs of death from pollution, especially in China and India.

Agriculture and food production account for 10–12 per cent of greenhouse-gas emissions, and livestock farming is responsible

WILLI/FOTOLIA



DOUGLAS FREER/FOTOLIA

Bad for you, and for the climate.

for four-fifths of these emissions, which include methane emitted by ruminant animals. Land-use changes, including deforestation for livestock production, add substantial further emissions.

Changes in farming practices to reduce emissions include greater efficiency in livestock farming, more carbon capture through changes in land use, better manure management, and less dependence on fossil fuels. These four changes are necessary but unlikely to be sufficient to meet the target for greenhouse-gas emission reductions, and the study assesses the consequences for health of a fifth approach – a 30-per-cent reduction in livestock production.

A fall in the adult consumption of saturated fat from animal sources would reduce heart disease, and provide additional health benefits from less obesity and diet-related cancers.

Short-lived greenhouse pollutants account, directly or indirectly, for a substantial proportion of global warming, and are also responsible for the bulk of the direct damage to human health from global energy use. The pollutants include sulphate, organic and black carbon, carbon monoxide, non-methane volatile organic compounds, and other gases that are responsible for ozone creation, such as

methane and nitrogen oxides.

Whether they are warming or cooling, all short-lived greenhouse pollutants – or, in the case of methane, its atmospheric by-product, ozone – affect human health. Atmospheric ozone and sulphate, for example, are both associated with cardiopulmonary toxicity. Breathing air laden with fine particles is associated with increased morbidity and mortality. WHO has estimated that in 2000 this caused well over two million premature deaths.

Reductions in atmospheric concentrations of sulphate, black carbon and ozone will benefit health. According to the study, there is little evidence that sulphate particles, which are climate cooling, are less harmful to health than are undifferentiated particles, and some evidence that they are more harmful. Because of their short lifetimes in the atmosphere, a reduction in the emissions of black carbon and ozone precursors will offer almost immediate benefits.

Christer Ågren

For further information see: www.thelancet.com/series/health-and-climate-change

Ship fuel tax will bring down the speed

A US\$60 per tonne fuel tax could lead to a decrease in carbon dioxide (CO₂) emissions of up to 20 per cent, according to a new study led by James Corbett of the University of Delaware. A higher fuel tax of around US\$150 per tonne could lead to an average speed-related CO₂ reduction of up to 30 per cent.

A speed reduction mandate targeted to achieve 20-per-cent CO₂ reduction in the container fleet is shown to cost between US\$30 and 200 per tonne of CO₂ abated, depending on how the fleet responds to a speed reduction mandate.

Source: **The effectiveness and costs of speed reductions on emissions from international shipping.** By James Corbett et al. Published in *Transportation Research Part D: Transport and Environment*, Volume 14, Issue 8, December 2009,

Baltic Sea NOx emissions on the rise

The Baltic Sea is one of the busiest seas in the world, accounting for 15 per cent of the world's cargo. Cargo and container traffic is expected to triple and oil transportation is estimated to increase by 40 per cent by 2017.

A study by the research programme ShipNoDeff has calculated that with the projected annual 5.2-per-cent growth in maritime traffic in the Baltic Sea, the rise in emissions of nitrogen oxides (NOx) from ships in the Baltic Sea would not be reversed until after 2030, even if this sea area were designated as a NOx emission control area, which would imply an 80-per-cent reduction in emissions from all new marine diesel engines installed on ships on or after 1 January 2016.

The nine coastal HELCOM countries and the EU have devised a strategic Baltic Sea Action Plan that sets forth a commitment to radically reduce pollution to the sea and restore its good ecological status by 2021. A HELCOM ministerial meeting will be held in Moscow on 20 May to review the progress the countries have made in reducing pollution of the Baltic Sea.

Source: Sustainable Shipping News, 10 February 2010.

Copenhagen failure on aviation and shipping

The outcome of the Copenhagen summit proved extremely disappointing as regards international aviation and shipping emissions.

The outcome of the

Copenhagen summit proved extremely disappointing as regards international aviation and shipping emissions, according to an analysis by the European Federation for Transport and Environment (T&E). Despite intensive discussion on bunker fuels in the months leading up to the December Climate Summit, it proved impossible to bridge the continuing differences.

The final draft text of the bunkers working group of the United Nations Framework Convention on Climate



From Copenhagen with relief.

Change (FCCC) secured no consensus and no mention was made concerning bunkers in the Copenhagen Agreement – save a single reference to innovative sources of finance which could be construed as including bunkers.

The conference failed to act on the question of setting global sectoral targets for international aviation and maritime emissions because there was neither agreement on whether the UN FCCC or the International Civil Aviation Organisation (ICAO)/International Maritime Organisation (IMO) should set them, nor the level of cuts required. (The EU had proposed a 10-per-cent cut for aviation and a 20-per-cent for shipping over 2005 levels.)

The major expectation on bunkers at Copenhagen was to resolve the competing principles of equal treatment of aircraft and ships (ICAO and IMO) and the UN FCCC principle of common but

differentiated responsibilities (CBDR) governing climate negotiations. China, India, Saudi Arabia and a number of other key developing countries had made it very clear in prior ICAO and IMO meetings that discussion of potential market based measures – including their global scope and application – could not be progressed pending the outcome of the Copenhagen negotiations.

So what are we left with after Copenhagen?

Firstly, a heightened profile for the international bunkers issue and the potential for revenues from global measures to play a major role in climate finance at some stage in the future. But set against this is a sense of renewed unclarity and uncertainty regarding bunker fuels. They were not even mentioned in the Copenhagen Agreement save indirectly in the reference to alternative sources of finance.

ICAO and IMO will proceed to discuss

further the issues at their upcoming meetings in 2010 but without any formal guidance or timelines on the key issues from Copenhagen that they claimed was needed to enable them to progress bunker issues. Bunkers also remain in the so-called LCA track of the UN FCCC, presumably to be discussed further in Bonn in May 2010.

Will ICAO and IMO seriously address the question of targets? Target setting is not on the IMO agenda. ICAO made clear at its Copenhagen side event that it believes the two-per-cent fleet efficiency improvement aspirational goal is a

target in itself.

Meanwhile, aviation emissions continue to grow and the industry's reputation continues to decline.

The shipping industry's call for global measures and even target setting at Copenhagen was more genuine. But even though there are clear proposals before the IMO for a global levy or emissions trading, the chances of early progress do not look promising. The new European Commission and Parliament must be looking seriously now at introducing unilateral legislation to control emissions from ships calling at EU ports.

Note: This text is a summary of an analysis, dated 4 January 2010, made by T&E after the Climate Summit in Copenhagen in December 2009. The full text can be read or downloaded at: www.transportenvironment.org/News/2009/12/Analysis-Aviation-and-Shipping-Emissions-after-Copenhagen/

ANDREW BREIDEN / FOTOLIA

IMO urged to take action on black carbon emissions

Three countries – Norway, Sweden and the United States – are asking the International Maritime Organisation (IMO) to take action to reduce shipping emissions of black carbon (BC).

In a joint submission to the next meeting of the IMO's Marine Environment Protection Committee (MEPC), to be held in London on 22–26 March, the three countries conclude that:

- The Arctic climate is warming much faster than the rest of the planet;
- Rapid melting of Arctic land- and sea-ice is accelerating that warming;
- Black carbon emissions, especially when deposited on land- and sea-ice, are a significant contributor to that warming and melting;
- Reductions of black carbon now, can provide short-term climate responses that are absolutely necessary to forestall a climate tipping point, and
- Reductions of black carbon will have positive effects on human health.

According to their paper, international shipping annually emits 71–160 thousands tonnes of BC, equivalent to about two per cent of total global emissions. An esti-

mated 85 per cent of shipping emissions occur in the northern hemisphere, and the release of BC emissions in northern



STEVE MANN / FOTOLIA

Going slower - part of the solution.

shipping routes affecting the Arctic is particularly damaging. Black carbon is believed to constitute 5–15 per cent of ships' emissions of particulate matter.

One main option for cutting BC emissions is to reduce fuel consumption from the world's shipping fleet, and reduc-

ing vessel speed is particularly effective. Reducing speed by 10 per cent results in approximately 23 per cent lower fuel consumption, and accompanying reductions in pollutant emissions. A 34-per-cent speed reduction – even assuming a 40-per-cent increase in the number of vessels – can reduce emissions by some 57 per cent.

Moreover, BC emissions can be further reduced by the use of specific pollution control measures, such as:

- In-engine measures;
- Installation of diesel particulate filters (DPF);
- Use of water-in-fuel emulsification; and,
- Replacement of conventional fuel valves with slide valves.

Action is becoming increasingly urgent as shipping traffic in the Arctic is expected to grow substantially as the ongoing melting process opens up sea lanes in the region.

Source: **Reduction of emissions of black carbon from shipping in the Arctic**. Submission by Norway, Sweden and the United States. IMO document MEPC 60/4/24, 15 January 2010.

New EU sulphur regulations in ports

From 1 January 2010, ships using ports within the EU are not allowed to use marine fuels with a sulphur content exceeding 0.1% while at berth. Moreover, marine gas oils with a sulphur content higher than 0.1% are not allowed to be marketed in any EU member state.

Each country is obliged to ensure that these rules are implemented in practise. Member states shall check by sampling that the sulphur content of marine fuels complies with these provisions, which are laid down in directive 2005/33/EC (amending directive 1999/32/EC relating to a reduction in the sulphur content of certain liquid fuels).

In spite of the fact that nearly five years have now passed since this legislation was adopted, claims have been raised that shipowners should be given more time to adapt, e.g. to carry out technical modifications that may be needed when switching from heavy fuel oil to low-sulphur distillate fuel.

A Commission decision from 29 December 2009 concludes that technical solutions are available and sufficient time for technical adaptation has been given. A document on "Questions and Answers" relating to implementation and enforcement of this part of the directive published on the Commission's website,

makes it clear that the directive "does not allow for any delay, nor for exemptions other than those already included and therefore [the implementation date] cannot be postponed."

Several countries, including Sweden, Denmark and Norway, have announced that they will be strictly enforcing the sulphur regulation.

For more information, and to download the "Questions and Answers" document: ec.europa.eu/environment/air/transport/ships.htm

Supergrid paves the way for wind power expansion

A supergrid connecting Scandinavia and large parts of western Europe may pave the way for an even faster expansion of off-shore windpower.

Northwest Europe may pave the way for very large amounts of wind power by means of a supergrid connecting Germany, Ireland, the UK, Scandinavia, France and Benelux.

The cost for all the undersea cables is estimated at 30 billion euro.

A political declaration was signed by officials from nine countries in December 2009 and aims at a binding agreement late 2010.

Wind power is growing very fast, at around 29 per cent per year globally. Offshore wind power is growing even faster. In Europe, installed capacity of onshore wind power grew 21 per cent to 64 gigawatts, but offshore wind power grew 39 per cent to 2.1 gigawatts. Some 3.5 gigawatts of capacity is under construction and another 16 has received all permits. (Data from ewea.org.)

The technical potential for wind power, especially offshore, is massively abundant. In Norway alone, a study for the government estimated this potential at 14,000 TWh/year, or some 70 per cent of global electricity consumption in 2007!

But to achieve even a small percentage of this potential a lot of infrastructure is needed.

Obviously every large wind power station has to be connected to a high-voltage grid. But that is not enough. Whereas wind power production is predictable within a small margin for say 25 years of operation, it is very variable over hours,

days and weeks. When the wind is weak, there has to be backup power, and when the wind is strong some other power source has to decrease power.

Some of the variability can be evened out by wind power itself. Winds in the

Baltic can be strong when they are faint in the Irish Sea. But to make use of that the sites have to be connected, which is hardly the case today.

A "supergrid" in the North Sea would make way for a large wind component for north-western Europe both for the above reason, and because Norway and Sweden (and also Finland) already have a large share of hydropower, a very cheap and fast way to counter the variability of wind power. When the wind turbines produce a lot of electricity, the water can stay and rise in the hydro dams. When wind is low, hydro can increase production.

Wave power also has a huge potential, though it is far less developed than wind power. It shares many of the characteristics with offshore wind power: it is expensive to build, has to face very harsh conditions and it is variable. Though it is not exactly in phase with wind power, and somewhat more predictable, it still needs backup.

Still another renewable option is tidal power. There is no doubt that it can work, and supply large amounts of

electricity; the proposed Severn Barrage in the UK could produce 8,600 megawatts. Tidal power in that form – damming a river mouth against the sea – is not popular with environmentalists. But a different technology – direct use of the



DMITRIY MELNIKOV / FOTOLIA

Time for Europe to plug in?

kinetic energy in the ingoing and outgoing current – would be much less disruptive for ecosystems. It is also more modular, unlike the enormous, one-off, investment in a barrage. Tidal power is not intermittent in the same sense as wind, wave and solar power, but it still varies. The locations are unevenly spread, often far from where electricity is consumed.

Solar power is another intermittent source of energy which produced more than 6 TWh of electricity in Germany¹ alone in 2009, equivalent to one big nuclear or coal power plant. The integration of solar power is not a problem anytime soon, but solar is growing very fast, some 40 per cent per year globally. It may well benefit from a supergrid's capacity for balancing by the time it is operating.

Nuclear power may, inadvertently, also be a beneficiary of the supergrid. Nuclear power production fell to a record low in Sweden in 2009 (after falling four years on end) and the first months of 2010, and 2009 also saw many long stops at German, French and UK reactors. The combination of low nuclear production and a cold

1) www.ag-energiebilanzen.de/viewpage.php?idpage=118

winter in Scandinavia led sometimes to extremely high market prices for electricity, and left hardly any capacity margin on some days. By convention, nuclear is not classified as an intermittent source of power, but in fact, whatever the reasons, it presently is so.

A supergrid connecting the Scandinavian, Irish, British, Benelux and French grids could thus solve many problems.

This fact was recognized in a political declaration by ministers² from Germany, France, the UK, Ireland, Belgium, the Netherlands, Luxemburg, Sweden and Denmark on 7 December, just before the Copenhagen climate COP meeting. Norway added its name later. A first meeting of officials took place in early February, followed by one at a slightly higher level in March. A secretariat is in place in Brussels, and the aim is to have a binding agreement before the end of 2010.

The cost for a full package is estimated at 30 billion euro, according to der Spiegel³,

2) The ministerial declaration can be found at www.ewea.org/fileadmin/ewea_documents/documents/policy/Offshore_Wind/Political_declaration_on_the_North_Seas_Countries_Offshore_Grid_Initiative.pdf

3) www.spiegel.de/international/europe/0,1518,670429,00.html

so it is likely that the agreement, if the deadline is met, will initially cover only a tranche of that.

The declaration nevertheless calls for fast action, as it points to the “*crucial role which offshore wind energy is bound to play in order for Europe to meet the EU's 20-20-20 targets*”.

Nine years from conception to operation is a very short time for a large infrastructure project, and some observers, such as the conservative Die Welt, have expressed doubt whether it can be done.

Nevertheless, the political declaration is more specific about the problems that have to be faced: “*The costs, associated with the development of electricity (inter)connector infrastructure are enormous and various barriers still exist (technical, market, regulatory, and policy). These are shared challenges for all the countries concerned.*”

One reason to believe that the North Sea supergrid will happen is that it has strong corporate backing. The big power companies all invest big money into wind power, and equipment manufacturers such as ABB have been lobbying for similar projects for years.

Fredrik Lundberg

Ozone pollution could kill millions

Ozone pollution could cause hundreds of billions of dollars' worth of damage to human health and result in millions of premature deaths around the world by 2050.

Ozone is not directly emitted, but formed in the atmosphere by reactions involving precursor pollutants, as nitrogen oxides (NO_x) and volatile organic compounds (VOCs) from vehicles and power plants. Ozone pollution can lead to acute respiratory problems, for example asthma and chest infections, particularly in children and the elderly.

“We estimate that health costs due to global ozone pollution by 2050 will be US\$580 billion, and that more than two million premature deaths will result from acute exposure,” said researcher Noelle Selin of Massachusetts Institute of Technology (MIT).

The research team used a computer model to assess how ozone pollution contributes to human illness and death, quantifying the economic impacts of this damage in 16 regions around the world. They calculated how much ozone pollution will cost in real monetary terms with respect to working and leisure time lost – also known as “economic welfare”. They did this by using year 2000 and projected 2050 levels of ozone, and simulating how increasing levels of ozone directly influence economic welfare.

Increased temperatures due to global warming can directly influence the chemistry of the reactions that form ozone. The projected increases in the amount of ozone precursors are very large – especially in developing countries, and the ozone-related economic effects of these

emission increases will be far higher than those expected from climate change impacts on ozone.

The total health costs of ozone pollution above pre-industrial background levels are estimated to amount to US\$580 billion, or 0.4 per cent of the world's GDP, by 2050.

Source: [environmentalresearchweb](http://environmentalresearchweb.org/cws/article/research/41253). Study: **Global health and economic impacts of future ozone pollution**. By N. Selin et. al. Published in *Environmental Research Letters* 4, 2009. See: environmentalresearchweb.org/cws/article/research/41253



But deserts can be useful too...

Solar power from Sahara for fossil-free Europe

Solar electricity from the Sahara could supply Europe with 15 per cent of its electricity by 2050, at a price tag of 400 billion euros.

Solar power from the North African desert could help Europe to phase out fossil fuel and nuclear power at a lower cost than anything else, and also help North Africa and the Middle East to earn export income without oil, as well as obtaining a large contribution to their own electricity production and a large supply of freshwater from desalinated seawater.

That is the grand vision behind Desertec, a visionary project, backed by ABB, Siemens, and the Club of Rome. ABB's interest is understandable, as the cost for the high-voltage direct current cables – of which ABB is the world's leading producer – to Europe is estimated at €50 billion. Other companies behind the Desertec Industrial Initiative are Siemens and the German energy giants Eon and RWE, Deutsche Bank and the insurer's insurance company Munich Re and other companies.

There is as yet no firm financial commitment to anything, and the scale and timescale of the project has been questioned for very different reasons.

It should not be dismissed too easily, though.

Concentrating thermal solar power (CSP) is a simpler and possibly cheaper technology than its more well-known cousin solar cells.

CSP uses mirrors or lenses to concentrate solar rays, which heat a liquid to high pressure vapour. The vapor drives a turbine and generator, just as in a coal or nuclear power plant, except that the liquid is oil instead of water.

CSP works. It has been tried on a fairly large scale (some 300 megawatts) for more than 20 years in the Californian desert and later also in Spain.

Whereas solar cells or photovoltaics are now much bigger (several thousand

megawatts are installed each year) than CSP, some people believe CSP can reach "grid parity" faster i.e. become competitive with other power sources. IIASA¹ has recently presented a favourable review, in which it claims that with supportive policy CSP could reach parity by 2020, and without policy by 2035. The US Department of Energy² has targeted 2020 for CSP grid parity in baseload and in the intermediate power market by 2015, which is also its target for photovoltaics grid parity.

One advantage of CSP – compared to photovoltaics – is that the heat can be stored, so some power can be produced at night. A drawback is that water is the best coolant, though air-cooling with little

1) www.iiasa.ac.at/Admin/PUB/policy-briefs/pb07.html

2) www1.eere.energy.gov/solar/csp_program.html

water use is an option. And if seawater is used, reasonably near the sea, “a 250 MW collector field may be used to operate a 200 MW turbine and 100,000 m³ of drinking water may be produced a day” according to the Desertec website FAQ³.

Area is not a problem. According to a study by the German Aerospace Center DLR, Europe could get 17 per cent of its electricity from 2,500 square kilometres of solar plants out of a total area of 12 million square kilometres in the Middle East and North African nations, much of which is desert.

Costs appear surmountable, though the DLR figures – making the case for Desertec – are open to criticism in some respects.

Wind power, photovoltaics, biomass, energy efficiency, smart grids and possibly wave power may develop faster than CSP and thus erode the economic rationale of the project. It is at least not sure that the cost of photovoltaics will fall slowly from 2020 to 2050 or that all progress on biomass electricity will cease by 2020, or that wind power in Europe will grow to less than 700 TWh by 2030, and then grow very little or that wind power will have a capacity factor of only 20 per cent. But that is what the DLR figures presume.

Social Democratic German MP and long-term solar champion, Hermann Scheer, has criticized Desertec for relying too much on unknown figures, but also for being too long term.

“It is hardly possible to calculate the total cost of this project. There are just too many unknowns,” he told der Spiegel⁴. He has also claimed that “businesses are trying to delay the required changes in energy production for another 30 or 40 years,” and finally that “Desertec can really only be implemented by a handful of large companies, and it could also allow them to determine the price of electricity.”

This may potentially be a problem, and it is much less of a problem with photovoltaics and wind power where there is more of an in-built competition between manufacturers and where the manufacturer and power producers are usually separate companies.

3) www.desertec.org/en/concept/faq/

4) www.spiegel.de/international/germany/0,1518,664842,00.html

For the foreseeable future, however, it does not look likely that wind power and photovoltaic developers are being deterred by the prospect of big CSP.

Unlike RWE and Eon, the third German big power company Vattenfall wants no part of Desertec, both for pragmatic reasons and because its outgoing CEO (and Eurelectric CEO) Lars Josefsson is wary of both “European dependence” and danger of terrorist attacks.

That is indeed taking a long-term look, given Europe’s present oil dependence and more near-term dangers from terrorist attacks on existing nuclear power stations.

But with all the confusing arguments for and against Desertec, it should be kept in mind that it does enjoy support not only from what the average NGOs perceive as the bad guys (RWE and Eon), and neutrals (such as ABB) but also from a fair number of clearly good guys such as Munich Re and former MEP Anders Wijkman, now vice president of the Club of Rome, as well as the former UNEP head, Klaus Töpfer. Greenpeace⁵ has also issued a very positive report on CSP.

The grand scale of Desertec, for better or worse, has a strong political appeal. In the confirmation hearings of the incoming European Commission in the European Parliament last January, the Energy Commissioner Oettinger called Desertec a “a great opportunity” for Africa and the EU, and it fits well with EU, especially French, ambitions to forge a strong and constructive alliance around the Mediterranean.

Nuclear power and oil have proven divisive in relations between the north and south Mediterranean. Solar power could be a uniting factor, creating some peaceful prosperity in all directions, maybe not exactly to the tune of 400 billion euro, but then on the other hand maybe a lot faster than 2050.

Fredrik Lundberg

5) www.greenpeace.org/international/press/releases/concentrating-solar-power-250509

Fuel monitoring system could cut emissions

Danish shipowner J. Lauritzen announced in December that they have successfully tested a fuel analysis system onboard two bulk carriers for the past few years.

The Lab-on-a-Ship (LOAS) system, produced by the Danish company Nano-Nord, analyses the fuel during bunkering to the ship, and provides real-time analysis of the cleansed/treated fuel when it is pumped from the day tank. In addition it can offer online measurements of exhaust gas emissions of NOx and SOx.

The system is said to offer huge potential to ensure vessels are compliant with relevant sulphur limits, and to optimise ship operations, thereby reducing both their environmental impact and operating costs.

Sources: Sustainable Shipping News, 3 December 2009, and www.greenship.org

On-shore power increasing in Europe

Ships connecting to on-shore power at berth (thus avoiding the burning of marine fuel oil) in Europe will likely increase over the next 10 years, according to a recent survey by the World Ports Climate Initiative that examined the current situation and future plans in 53 ports. Around one-third of them are currently offering shoreside power, and 85 per cent said they are considering either introducing or expanding the technology to more quays within the next 5–10 years.

The main reasons given for ports introducing or planning to introduce the technology were the environmental benefits, reputation/goodwill and benefits for society. Shoreside power reduces key emissions including carbon dioxide, nitrogen oxides, and particulate matter. It also helps eliminate noise pollution and reduces the fuel consumption.

The goal of the survey is to stimulate the further use of shore power. The results will be used in a new web-based application that will be available through the Port of Gothenburg, Sweden.

Source: Sustainable Shipping News, 26 February 2010.

US cracks down on ship emissions

On 22 December 2009, the United States Environmental Protection Agency (EPA) finalized a rule setting tough engine and fuel standards for large US-flagged ships. The new regulation harmonizes with international standards and will lead to significant air quality improvements throughout the country (see *Acid News* 4/09, p. 19).

Annual health benefits in 2030 are estimated to be worth between US\$110 billion and 270 billion, compared to compliance costs of only about US\$3.1 billion, the EPA said.

“EPA’s rule, coupled with a successful international initiative, will provide a critical regulatory foundation. But important gaps in the framework remain, and the EPA must work in the near future to reduce black carbon emissions from all vessels as well as smog-forming emissions from existing ships,” said John Kaltenstein at Friends of the Earth. “Additional measures will be needed to better protect human health and also avert dangerous climate impacts,” he added.

More information: www.epa.gov/otaq/oceanvessels.htm.

EU expects to meet renewable target

The EU will meet its 20-per-cent renewable energy target for 2020, or slightly exceed it, according to an analysis by the European Wind Energy Association (EWEA).

The analysis shows that 13 member states predict they will meet their target, while eight forecast they will exceed their target. Only six forecast they will not manage to reach their target through domestic action alone. None of them expect to be more than one percentage point below their target.

Top achievers are Spain, Germany, Estonia, Greece, Ireland, Poland, Slovakia and Sweden, which all expect to exceed their targets.

Source: EWEA, 16 February 2010

Rapid action to abate methane needed

Rapid reductions in emissions of methane and other short-lived greenhouse gases are needed to slow down global warming, especially in the Arctic region.

Methane emissions are the second largest cause of global warming, after carbon dioxide (CO₂). Like CO₂, methane emissions anywhere create warming everywhere.

While less abundant in the atmosphere than CO₂, ton-for-ton, methane traps 25 times more heat than CO₂ over a 100-year period. Measured over 20 years, methane’s warming impact is 72 times greater than an equivalent weight of CO₂. Because methane survives in the atmosphere for only 8–12 years (compared to more than a century for CO₂), substantial emission cuts today will diminish concentration levels within one to two decades – an important time frame for slowing warming in regions that may reach critical thresholds or “tipping points” that affect the global climate system or large human populations, such as those in the Arctic and the Himalayan region.

Over the past 100 years, the Arctic has warmed at over twice the rate of the rest of the globe, and rapid loss of Arctic sea ice has already occurred. Seabed and Methane abatement can save them.

permafrost release of methane and CO₂ from such ice and tundra melting could further accelerate warming of the entire globe. Sea level rise from increased melting of the Greenland ice sheet and Arctic glaciers, even of only a few decimetres, would endanger millions throughout the world with additional flooding.

So the rapid warming of these sensitive regions will have global effects, making the long-term battle against global warming that much harder.

Reductions in CO₂ and other long-lived gases clearly must serve as the backbone of any meaningful effort to reduce global climate change. More than anything else, global warming drives Arctic warming. But preservation of the Arctic and land glaciers will in addition require means that act more rapidly.

Shorter-lived climate pollutants may provide one such means. Some research indicates that three short-lived pollutants – black carbon, ozone, and methane – have had nearly the same temperature impact on the Arctic as CO₂ over the past century. Since they have such short lifetimes – from



MELISSA SCHALKE / FOTOLIA

a few days for black carbon, to a decade for methane – reductions in these pollutants would show a more rapid Arctic climate response than could occur from CO₂ reductions alone.

Methane abatement is readily available. As a well-mixed greenhouse gas, methane reductions anywhere will slow Arctic warming, and relatively quickly.

Also of great importance, not least to developing countries, is the fact that methane reductions significantly reduce air pollution and smog by reducing ground-level (tropospheric) ozone. Such ozone-related smog already causes tens of thousands of deaths annually, and millions of respiratory disease symptoms, as well as significant crop damage that decreases food production. These figures are forecast to grow exponentially as countries industrialize.

Measures that address methane also make good sense from a development perspective. Landfills and wastewater treatment plants set up to capture methane from the beginning result in significant health, energy and economic co-benefits. Even small-scale methane projects, such as those that capture methane for biogas from just a few livestock, can bring significant development benefits to rural areas.

Methane reductions provide additional climate benefits in the Arctic by also reducing ozone there, which otherwise blankets the Arctic with smog in the springtime, hastening Arctic spring ice melt.

In addition, many measures that reduce methane also reduce other climate forcers, not only long-lived gases such as CO₂ but short-lived forcers not covered by any current climate agreements, such as ozone and black carbon. For example, a methane project that produces biogas locally for cooking, heating or transport would also reduce CO₂ and black carbon emissions that would otherwise result from the burning of wood, dung or coal for these purposes.

More than half of the earth's methane output comes from human-related sources – primarily in the areas of agriculture (livestock and rice cultivation), waste management (landfills, sewage treatment, and manure), and energy (coal and oil/gas production).

According to the US Environmental Protection Agency (EPA), global methane emissions from human-related sources could rise 23 per cent from 2005 to 2020 – totalling 7.9 billion tons of CO₂-equivalents.

Studies by the International Institute for Applied Systems Analysis (IIASA) and the US EPA have shown that global methane reductions of up to 40 per cent, or 2.7 billion tons CO₂-equivalents, of the projected global emissions in 2020 are available at costs of under 40 euros/ton, with up to 15 per cent at negative cost (i.e. self-paying). The low-cost abatement options include measures at sources such as coal mines, oil and gas pipelines, landfills, wastewater facilities, and animal waste.

Regulation eventually may serve as the main path for future methane abatement, particularly as regards common public sector sources of methane such as landfills and wastewater treatment facilities. Today however, few non-OECD countries – and not even all OECD members – ban the venting of methane.

In the absence of regulation, the Clean Development Mechanism (CDM) has so far been the primary market-based incentive to capture and utilize methane. Methane abatement represents around 15 per cent of all CDM projects under development, or 600 projects globally, which together could reduce up to 100 million tonnes of CO₂-equivalents per annum, or about four per cent of the reduction potential identified by IIASA.

The creation of a stand-alone global methane fund dedicated to moving forward global methane projects as rapidly as possible is being proposed. It is foreseen that such a fund would work in concert with the CDM, the US EPA's Methane to Markets programme, and multilateral institutions.

Sources: A fast-action plan for methane abatement (December 2009). Published by the Clean Air Task Force, Climate Policy Center-Europe and Clean Air-Cool Planet. **Methane: Tapping the untapped potential** (December 2009). By A. Pettus. Published by the Clean Air Task Force. Available at: www.globamethanefund.org or www.catf.us



IVONNE WIERINK/FOTOLIA

More efficient equipment now available.

Multi-pollutant scrubber does the job

On 8 February the American Bureau of Shipping (ABS) issued a Statement of Fact on the performance of the CSNOx system showing reductions in emissions of sulphur dioxide (SO₂) by nearly 99 per cent, reducing nitrogen oxides (NO_x) by around 65 per cent, and carbon dioxide (CO₂) by about 77 per cent. The system is installed on a 100,000 dwt Aframax tanker burning heavy fuel oil (380 cSt) with a sulphur content of 3.64 per cent.

According to its producer, the Singapore-based company Ecospec, in the CSNOx system freshwater or seawater is first fed into an ultra-low frequency electrolysis system to make it alkaline and ready for scrubbing. The alkaline water is then pumped through the exhaust stack to scrub the flue gas. The treated water is highly reactive and removes SO₂, NO_x and CO₂ through absorption. The removed pollutants are said to be converted into harmless substances found naturally in the water. After scrubbing, the scrubbed water may pass through a solid-liquid separator to remove solid particles. The water recovered will then undergo treatment to meet the discharge water standard. If the water supply is limited, the scrubbed water can be further treated and recycled back to the scrubbing process, reducing the amount used.

Source: www.marinelog.com, 25 February 2010.

The Meatless



Six days a week is enough...

In a drive to halt climate change and improve public health, ex-Beatle Paul McCartney urges Europeans to abstain from eating meat at least once a week. Agriculture contributes 18 per cent of global greenhouse gas emissions – 60 per cent of which come from livestock.

In a joint statement with the chairman of the Intergovernmental Panel on Climate Change, Rajendra Pachauri, Paul McCartney in December called on governments and individuals to opt for at least one meat-free day a week to do their bit to fight climate change.

More information: www.supportmfm.org/



Last decade warmest on record

A new analysis of global surface temperatures by NASA scientists finds the past year was tied for the second warmest since 1880. In the southern hemisphere, 2009 was the warmest year on record.

January 2000 to December 2009 was the warmest decade on record. Looking back to 1880, when modern scientific instrumentation became available to monitor temperatures precisely, a clear warming trend is present, although there was a levelling off between the 1940s and 1970s.

Source: NASA, 21 January 2010

Air quality benefits from climate policy

Reducing greenhouse gas emissions will help to avert dangerous climate change, but it will also bring other benefits, such as cuts in health-damaging air pollutants, including particulate matter, nitrogen oxides and sulphur dioxide.

Until now too little attention has been paid to these co-benefits when estimating the cost of climate change mitigation, but new research shows that they could be substantial.

A recent study shows that air quality co-benefits are worth between US\$2 and 196 (US\$49 on average) for every tonne of carbon dioxide reduced. These values are similar to the estimated cost of climate change mitigation measures.

“Co-benefits have the potential to offset all of the near-term costs of climate policy,” said Gregory Nemet, from the University of Wisconsin, one of the co-authors of the study.

Air pollution damage to health and the environment results in costs to society, when people are unable to work, their life expectancy is reduced and they have a lower quality of life due to illness. In addition healthcare costs can be high. One way to avoid these problems is through expensive pollution control – but avoiding

air pollution in the first place is a smarter and cheaper option.

Many developed countries have already learned this lesson the hard way and have stringent air pollution controls in place. But in developing countries air pollution is still a big issue, so they could see major ben-

efits from the air quality improvements associated with greenhouse gas mitigation measures. Developed countries still stand to gain too, with reduced pollution control costs.

Nemet and colleagues argue that it is vital that air

quality co-benefits are included in policy debates, and added to the costing of climate change policies, since this will reduce the societal cost of climate policy – alternatively, co-benefits may justify a more stringent climate policy.

Inclusion of air quality co-benefits would help ensure that the problem is tackled at source, placing more emphasis on reducing fossil-fuel emissions, and less on other approaches such as geo-engineering.

Source: environmentalresearchweb, 22 January 2010. <http://environmentalresearchweb.org/cws/article/futures/41491>. Study: **Implications of incorporating air quality co-benefits into climate change policymaking.** By G. F. Nemet, et al. Environmental Research Letters 5 (January-March 2010) 014007.



Health group calls for 40 per cent CO₂ target

Health Care Without Harm Europe (HCWHE) and Health and Environment Alliance (HEAL) are calling on EU heads of state to increase the EU target on climate change. They are seeking a 40-per-cent unconditional emissions reduction target by 2020, compared to

1990 levels. The reductions should be made through domestic action, which they say could bring substantial benefits in improving people's health and reducing healthcare costs.

Source: HCWHE/HEAL press release, 1 February 2010

Parliament debate on IPPC revision

The second reading debate on the proposed revision of the industrial pollution directive (IPPC) is about to take place.

The European Parliament's second reading debate on the proposed revision of the industrial pollution directive (IPPC) will begin in mid-March. Discussions will be based on proposals to be made by German rapporteur Holger Krahmer early next month. Mr Krahmer began to draft his proposals after the Council of Ministers published member states' first reading position on 15 February, based on an agreement reached in June 2009.

A vote on the proposals in the parliament's environment committee will take place on 27–28 April, and talks between the Parliament, the Council (member states) and the European Commission are likely to begin shortly after. Plenary vote in the Parliament is scheduled for 5–8 July.

The Commission's proposal aims to tighten controls on air pollutant emis-

sions from large industrial plants (*see Acid News 2/09, pp. 14–15*). The first reading positions revealed that the Parliament and the Council are in disagreement over whether national governments should be allowed to delay the introduction of tougher emissions standards for Europe's biggest industrial plants (*see Acid News 3/09, pp. 20–21*). Here, the position of the Council would allow countries, such as the big coal-burning states Poland and the UK, to delay implementing the law on large combustion plants until 2020 – four years later than the Commission had proposed.

Parliament and the Council could reach an agreement in June, but if the Parliament and member states are too far apart, the discussions may go to conciliation – an extra round of negotiations between Council and Parliament.

Christer Ågren

Asian emissions increase ozone over North America

Increases in tropospheric ozone levels above western North America during springtime are due to eastward air flows across the Pacific Ocean, with the largest increases associated with air that comes from South and East Asia, according to a recent study.

In the troposphere, the lowest layer of the atmosphere, increased levels of ozone are considered to negatively affect human health and vegetation, including crop production. Ozone also contributes to the greenhouse effect, ranking behind carbon dioxide and methane in importance.

While emissions in Europe and the United States of the main ozone precursor, nitrogen oxides (NO_x), have decreased over the last 10–20 years, they have increased in China and other parts of Asia.

Springtime ozone values above western North America were found to have increased by 14 per cent during 1995–2008, and evidence suggests a similar rate of increase has occurred since 1984. The study determined that, as average ozone values increased, the origin of the transported air moved even further to the west, with the largest increases in ozone values associated with dominant airflows from south and east Asia.

Source: Science for environmental policy, European Commission, DG Environment, 25 February 2010. Study: **Increasing springtime ozone mixing ratios in the free troposphere over western North America.** By O. R. Cooper, D. D. Parrish, A. Stohl, et al. (2010). *Nature*. 463: 344–348.

RECENT PUBLICATIONS

Reducing Transport GHG Emissions – Opportunities and Costs (2009)

Tough long-term fuel economy standards are the key to cutting greenhouse gas (GHG) emissions from road vehicles – the largest source in the transport sector.

Published by the International Transport Forum (ITF), Paris, France. See: www.internationaltransportforum.org

Scientific Synthesis of the Impacts of Ocean Acidification on Marine Biological Diversity (2009)

An update on the impact of acidification on marine ecosystems, saying that ocean acidity could increase by 150 per cent by 2050 as seas absorb about one quarter of the carbon dioxide emitted to the atmosphere by human activities.

Published in December 2009 by the Secretariat of the Convention on Biological Diversity of the UN's environment programme (UNEP). See: www.unep.org/Documents/Multilingual/Default.asp?DocumentID=606&ArticleID=6417&l=en

Green Ship Magazine

Released in December 2009, the magazine provides an easy-to-read overview of the Danish Green Ship of the Future projects as well as an in-depth description of each project.

Available at: www.greenship.org

AMBIO: Special issue on ozone exposure and impacts on vegetation in the Nordic and Baltic countries.

AMBIO Number 8, December 2009. 65 pp. Available at: <http://ambio.allenpress.com/perlerv/?request=get-toc&issn=0044-7447>

Progress in the modelling of critical thresholds, impacts to plant species diversity and ecosystem services in Europe (2010)

The CCE Status Report 2009 (130 pp.) shows the links between air pollution, climate change and biodiversity, with special focus on nitrogen deposition and eutrophication.

Published by the Coordination Centre for Effects, the Netherlands. Available at: www.pbl.nl/cce

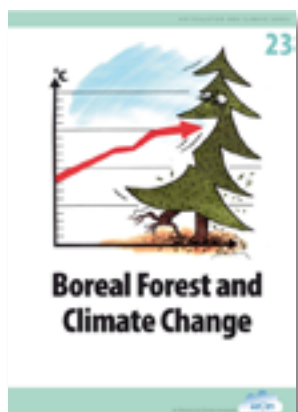
Recent publications from the Secretariat



Market-based instruments for NOx abatement in the Baltic Sea

By Per Kågeson, November 2009. This report assesses potential market-based instruments for reducing emissions from existing vessels and an early introduction of efficient NOx abatement technologies for newly built ships.

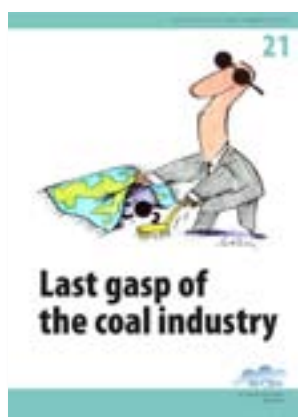
A rough calculation of the emission reduction potential indicates that application of an emissions charge, as outlined in the report, could cut NOx emissions from ships in the Baltic Sea by around 60 per cent.



Boreal Forest and Climate Change

By Roger Olsson, November 2009. Reviews recent scientific findings on the fate of the world's boreal forests under climate change. The effects of climate change are already evident in all parts of the boreal forest, and change will be far more dramatic as temperature continues to increase.

Two degrees of warming may trigger the creation of new, hitherto unseen ecosystems. Three to five degrees warming may be the critical limit for massive forest die-back in the boreal region.



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.

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 (AirClim)**

Please note our new web address, www.airclim.org, and new mail addresses: *info*, *christer.agren*, *reinhold.pape*, *acidnews*; all followed by *@airclim.org*

Coming events

IMO MEPC 60. London, UK, 22-26 March, 2010. Information: www.imo.org

EU Sustainable Energy Week. Brussels, Belgium, 22-26 March 2010. Information: www.eusew.eu

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 12-16 April 2010. Information: www.unece.org/env/lrtap

Fifth Global Conference on Oceans, Coasts and Islands. Paris, France, 3-7 May 2010. Information: www.globaloceans.org

ECOMM 2010 - European Conference on Mobility Management. Graz, Austria, 5-7 May 2010. Information: www.ecomm2010.eu

Leapfrogging Opportunities for Air Quality Improvement. Xian, China, 10-14 May 2010. Information: www.dri.edu

Transport and Air Pollution - 18th International Symposium. Dübendorf, Switzerland, 18-19 May 2010. Information: www.empa.ch/plugin/template/empa/22/90711/---/l=1

UN FCCC 32nd meeting of subsidiary bodies. Bonn, Germany, 31 May-11 June 2010. Information: unfccc.int/

EU Environment Council. 21 June, 2010. Information: www.consilium.europa.eu/

CITEAIR II Air Quality Workshop. Ljubljana, Slovenia, 1-2 June 2010. Information: www.citeair.eu

Air Pollution 2010: 18th International Conference on Modelling, Monitoring and Management of Air Pollution. Kos, Greece 21-23 June 2010. Information: www.wessex.ac.uk

Cities for Mobility World Congress 2010. Stuttgart, Germany, 4-6 July 2010. Information: www.cities-for-mobility.net

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 30 August-3 September 2010. Information: www.unece.org/env/lrtap

15th IUAPPA World Congress. Vancouver, Canada. 11-16 September 2010. Information: www.IUAPPA2010.com

IMO MEPC 61. London, UK, 27 September-1 October, 2010. Information: www.imo.org

UN FCCC COP 16 and CMP 6. Cancun, Mexico, 29 November-10 December 2010. Information: unfccc.int/

Fourth International Conference on Plants & Environmental Pollution. Lucknow, India, 8-11 December 2010. Information: <http://isebindia.com>

CLRTAP Executive Body. Geneva, Switzerland, 13-17 December 2010. Information: <http://www.unece.org/env/lrtap>