

How to avoid critical levels of climate change

The latest science gives fresh insights into reaching a 1.5 or 2°C target, and analysis reveals a large gap between necessary action and current commitments.

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MEPs call for a binding energy efficiency target

Parliament continues its call for a binding energy efficiency target of 20 per cent by 2020, crucial for achieving a range of other EU objectives.

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New analysis of national emissions ceilings

Additional measures to achieve the interim targets of the thematic strategy on air pollution would cost less than €3 per person in 2020.

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EU consults on ship fuels

The Commission proposes to bring the EU directive on the sulphur content of marine fuels in line with the stricter IMO international standards.

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Coal in Europe: states support dying industry

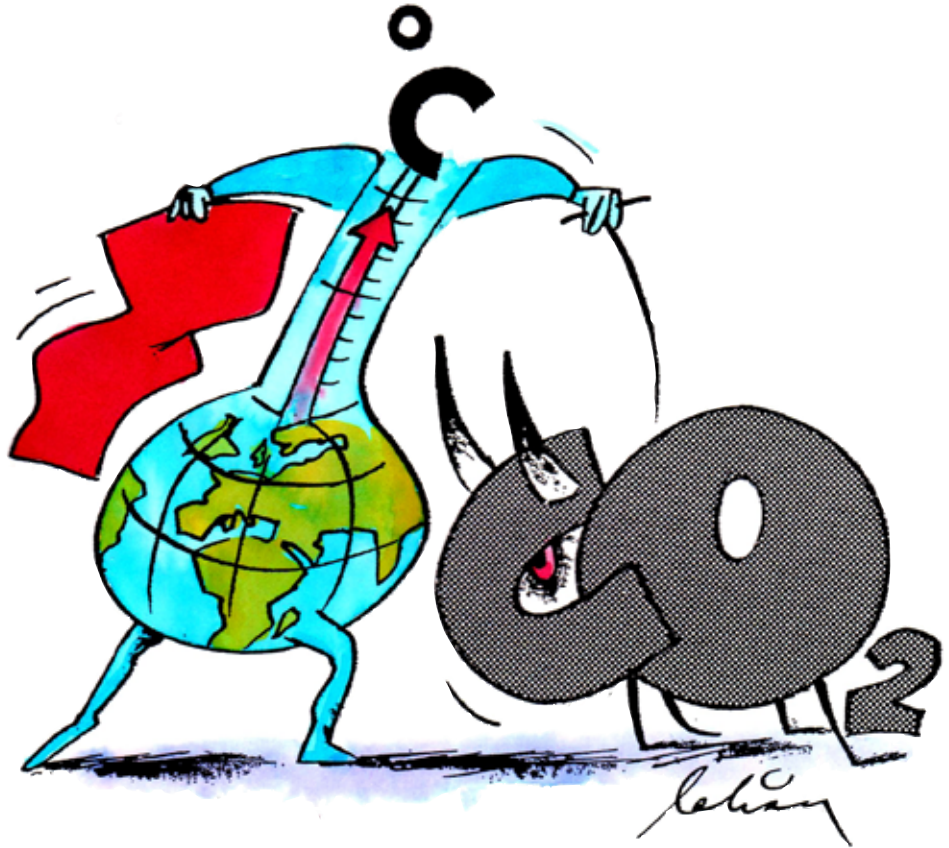
Four short articles reveal extensive state support for a crumbling industry which is damaging health, the environment, and national economies.

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Intercontinental transport of air pollutants

Intercontinental flows of important air pollutants have a significant impact on environmental quality.

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GHG emissions must peak by 2015

A new EU report highlights the urgency of reducing emissions of greenhouse gases if a 2°C target is to be met.

Global emissions of greenhouse gases must peak in three to five years and be reduced by three per cent annually thereafter, according to a report¹ recently published by the European Union Presidency, which looks at scientific perspectives on climate one year after the Copenhagen Climate Conference. The report argues that a peak in emissions by 2015 is required if we are to have a reasonable chance of limiting average global surface warming to 2°C, the ultimate objective of the United Nations Framework Convention on Climate Change. The later the peak, the higher the subsequently required reduction rates

become. Peaking after 2015 would likely require more than a three per cent reduction in emissions each year.

The Copenhagen Accord sets a goal of 2°C and calls for parties to the Convention to submit their 2020 emission reduction pledges in order to begin the work towards achieving this goal. Additionally, it allows for a review of a 1.5°C limit in 2015. The EU report does not analyse in detail the reductions needed to reach 1.5°C, a target advocated by more than 100 countries and NGOs. Instead, the report examines the chances of reaching the 2°C target with present climate commitments. **Page 3 ►**

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 fulfil 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:

Air Pollution & Climate Secretariat
Box 7005, 402 31 Göteborg, Sweden
Tel: +46 31 711 45 15
Fax: +46 31 711 46 20
E-mail: info@airclim.org
Internet: www.airclim.org

Editor: Christer Ågren
Assistant editors: Reinhold Pape and Paul Ferris
Published by The Swedish Society for Nature Conservation.

Printed by Trio Tryck AB, Örebro, Sweden.
ISSN 0281-5087.

The Air Pollution and Climate Secretariat
The Secretariat has a board consisting of one representative from each of the following organisations: Friends of the Earth Sweden, Nature and Youth Sweden, the Swedish Society for Nature Conservation, and the World Wide Fund for Nature (WWF) Sweden.

The essential aim of the Secretariat is to promote awareness of the problems associated with air pollution and climate change, and thus, in part as a result of public pressure, to bring about the needed reductions in the emissions of air pollutants and greenhouse gases. The aim is to have those emissions eventually brought down to levels that man and 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 organisations, 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 organisations 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

The Conference of the Parties to the UN Framework Convention on Climate Change will hopefully have this month adopted the 2°C target from the Copenhagen Accord in a legal text. After many years of negotiation, a target has finally been formulated which the world believes needs to be met to avoid dangerous climate change and fulfil the objective of the Convention. This is a very big step forward!

But the year's climate science suggests that dangerous anthropogenic interference with the climate system cannot be ruled out at 1.5°C, and that various tipping points initiating severe damage may be triggered with between 0.5°C and 2°C of

global warming. Examples are sea level rises threatening the existence of small island states; damage to communities and agricultural production in many countries; and threats to the survival of several global ecosystems due to climate change.

Today more than 100 countries support a 1.5°C target, and it must also be agreed to as a goal of the Climate Convention. Various scientific institutions, governments and NGOs are researching and developing new strategies on how to reach this goal. According to this research, climate policies in the next one to four years will be very important if the 1.5 or 2°C target is to be reached.

The research suggests that global greenhouse gas (GHG) emissions must peak in coming years and at the latest by 2015, and be reduced drastically thereafter at rates of at least three per cent annually, if the world is to have a chance of reaching the 2°C goal. During 2010, global GHG emissions increased by three per cent.

What probability of success or chance of failure should the world accept when setting policies designed to reach these targets? The EU's latest scientific climate report (see article page 1) is based on a 66

per cent probability of reaching the 2°C degrees target. This is an unacceptable large risk, given that it threatens any possibility of reaching a 1.5°C target. Instead, a probability of success of more than 90 per cent should be applied, given the high costs of failure.

Cumulative emissions of GHGs are the most important factor, and long-lived carbon dioxide (CO₂) emissions are responsible for 80 per cent of the greenhouse effect. Scientists have calculated what the

remaining CO₂ emissions budget is which would allow temperatures to stay below 2 degrees. The results are frightening and show a very large gap between the commitments presented in the Copenhagen Accord and the re-

ductions needed. Annually, the world is currently emitting around 30 gigatonnes (Gt) of CO₂ (2008 figures). The remaining budget of CO₂ emissions, if we are to have more than 90 per cent chance of reaching the 2°C target, is around 600 Gt of CO₂. This amount of CO₂ will be used up by the world in 20 years if the present level of emissions continues, and much faster if annual emissions continue to increase.

To address this very large gap between the necessary targets and present commitments, the science calls for much more immediate action to be taken by the world's governments. They should immediately develop a global emergency action programme for drastic reductions of all greenhouse gases over the next 20 to 30 years, and an assistance programme for developing countries of several hundred billion euros annually. This action programme should be developed by agreeing to principles of fair allocation of the available carbon space and an appropriate effort sharing formula. The time for these decisions is many years overdue, and must now be taken at the last minute before the window to reach a 1.5 or 2°C target is closed!

Reinhold Pape

How to avoid critical levels of climate change?





JENNIFER WOODARD MADERAZO

Digging ourselves a hole: greenhouse gas emissions must peak soon if we are to meet a 1.5 or 2°C target. Coal is a major source of such emissions.

GHG emissions must peak by 2015

Continued from front page

According to the report, the current emission reduction pledges associated with the Copenhagen Accord fall short of the 2020 goals required to provide a reasonable chance of limiting warming to 2°C, without requiring potentially infeasible post-2020 reduction rates. Even the most optimistic interpretation of the current pledges leaves a gap of between two and six gigatonnes of CO₂ equivalent emissions by 2020. Excluding the conditional pledges and other optimistic hypotheses, the gap in 2020 is approximately ten gigatonnes of CO₂ equivalents.

The main conclusions of the report are based on what would be required to provide at least a 66 per cent probability that the temperature increase would be limited to 2°C, and would require global emission reductions of 50 to 70 per cent relative to 1990 levels by 2050. This assumes further emission reductions after 2050. If a higher probability of staying below 2°C is required, then greater emission reductions would be needed. If a lower probability is considered acceptable (for instance, a 50 per cent chance) then emission reductions could also be lower.

However, the analysis of the current Copenhagen Accord pledges shows that,

even allowing for a lower 50 per cent chance of limiting warming to below 2°C, current commitments would require post-2020 emission reduction rates that may not be feasible.

To ensure at least a 66 per cent chance of limiting global warming to less than 2°C, the EU report suggests:

- Reductions of long-lived GHGs, such as carbon dioxide
- Complementary measures for shorter lived warming agents
- In the longer-term (post 2030), possible deployment of technologies that achieve negative CO₂ emissions.

Cumulative emissions of GHGs are most important. Given the short atmospheric lifetime of some warming agents, temperatures in the longer term will be little affected by mitigation action of these agents in this decade, although mitigation could slow the current rate of warming.

The achievement of the large reductions in anthropogenic GHGs required to meet the 2°C limit is highly dependent upon the implementation of effective policy instruments.

Recent scientific literature reinforces the evidence provided by the IPCC Fourth Assessment Report that limiting warming

to less than 2°C considerably reduces the risk of triggering accelerated or irreversible changes in the climate system, as well as large-scale adverse impacts. Nevertheless, significant risks do still remain. Impacts of climate change will, in addition, not be the same everywhere and some regions or sectors might experience a disproportionate amount of adverse impacts.

As mentioned, the EU report also notes that the Copenhagen Accord calls for a review, in 2015, of a potential 1.5°C limit. It concludes that research in relation to this is expected to be synthesised in the upcoming IPCC Fifth Assessment Report. The few limited assessments currently available give preliminary evidence that such a goal might only be possible by allowing temperatures to initially exceed 1.5°C, followed by temperature reductions towards the end of the century or later.

Reinhold Pape

¹ **Scientific perspectives after Copenhagen.** Information reference document, October 2010. Available at: <http://tinyurl.com/euclimatestudy>



MEPs call for a binding energy efficiency target

On 9 November 2010 the European Parliament's Industry, Research and Energy (ITRE) Committee reiterated its call for a binding EU target on energy saving, a demand also made by the Environment Committee in October. Voting on a report by Danish European People's Party member Bendt Bendtsen on the EU's Energy Efficiency Action Plan, they called for the EU "to adopt a binding target on energy efficiency of at least 20 per cent by 2020, and thereby advance the transition into a sustainable and green economy."

MEPs thus underlined their support for correcting what many hail as a major shortcoming of the EU's 2008 Climate and Energy Package: that unlike the targets on renewable energy and greenhouse gas emission reductions, the target to reduce energy consumption by 20 per cent by 2020 is only voluntary.

At current rates of progress the EU will miss the 20 per cent goal by about half, and its non-binding nature is regarded as a key factor in the EU's lacklustre performance. Of course, a binding target alone

is no golden solution: tailored policies and programmes are needed to ensure that measures to reduce energy use are put in place. But the evidence to date is that without a greater degree of ownership and accountability for delivering energy savings, these measures are not being adequately adopted or implemented.

In addition to its call for a target, the ITRE Committee's report sends a strong message to EU heads of state and the European Commission, ahead of the forthcoming Extraordinary Energy Summit on 4 February, that the revised Energy Efficiency Action Plan must include all necessary measures to reach at least 20 per cent energy savings. The report contains recommendations to reduce energy wastage in buildings, transport, industry, the power sector and in the use of products and appliances. Measures include support for upfront financing, energy audits, education and training, efficiency standards and labels, market surveillance, and provisions to help catalyse the market in energy services, in which companies

make money from helping customers to reduce their energy use.

The report will go to a vote of the full European Parliament in its December plenary session, and will be taken into account by the European Commission in the preparation of the revised Energy Efficiency Action Plan, which is expected in March 2011. This plan is eagerly awaited after repeated delays, to put meat on the bones of the frequently-made claims that energy efficiency and savings are the top priority in EU energy policy – as set out in the Energy 2020 Strategy published by the European Commission in October.

Climate Action Network Europe and other NGOs and business groups have been making repeated calls to strengthen the EU energy saving target as a key to achieving the New Europe 2020 Objectives, as per a letter to the heads of state in June 2010 (see box opposite).

Erika Hope

Erika Hope is Senior Climate Policy Officer at CAN Europe.

Open letter: EU energy saving target is key to achieving the New Europe 2020 objectives

As representatives of a range of business and professional associations and civil society interests, we are firmly convinced of the multi-faceted benefits of energy saving and consider that the EU must urgently step up its action in this regard.

We regret that the European Council did not pay more attention to energy saving. Meeting the EU's target to reduce our energy consumption by 20 per cent by 2020 is a win-win-win solution, which should be acknowledged as lying at the heart of the new 2020 objectives. It could generate a million new, local jobs, greatly reduce imported energy dependency and help Europe and its businesses take the lead in the global race for innovative and sustainable products. Yet at current rates, only half of the target will be achieved. The consequence of this failure will be an unnecessary additional cost to consumers of €78 billion annually at a time of severe budgetary constraints, an increase in the need for harsh and unpopular austerity measures and undermining the achievement of Europe's strategic goals.¹

Practices and technologies to achieve the necessary savings are already available. We call on you to urgently take the steps necessary to see that these solutions are acted upon. This means taking on a higher level of commitment and accountability for delivering on the existing 20 per cent target.

Overcoming the barriers to energy saving requires a new impetus

for targeted efficiency policies and programmes, alongside strengthened price signals. We consider that binding targets would help to establish this impetus, as has been demonstrated for other priority policy areas for example in the case of renewable energy and air quality. We note that the European Parliament again called for such a target in its Resolution on the Europe 2020 Strategy, voted this week.

Even taking into account the economic recession and policies adopted since the 2006 Energy Efficiency Action Plan (EEAP), a three-fold increase in policy impact will be needed to achieve the 20 per cent target. The next twelve months represent a narrow window of opportunity: the forthcoming Energy Action Plan and review of the 2006 EEAP must set out the framework and new legislation to ensure that the savings gap is closed.

While many member states will have to reduce budget deficits in the coming years, a 20 per cent binding target for energy saving will help incentivise action in the most strategic areas, to the economic and environmental benefit of all Europeans. We hope that those benefits are at the forefront of European leaders' minds and that energy saving will be made the first order priority for Europe's economic recovery and new 'EU2020' Strategy.

¹ **Energy Savings 2020.** Ecofys and Fraunhofer, September 2010.

UNEP: Current climate pledges are insufficient

A report by the United Nations Environment Programme (UNEP) released in advance of the UN climate convention meeting in Cancun reconfirms that current pledges to reduce greenhouse gases are insufficient to prevent dangerous climate change.

The report analyses the voluntary pledges made by many countries under last year's Copenhagen Accord. It concludes that even if those commitments are fully realised, carbon dioxide equivalent (CO₂e) emissions in 2020 will be five gigatonnes higher than the amount required if global temperature rise is to be kept below 2°C. If commitments are only implemented in their weakest form, however, then emissions would exceed the limit by nine gigatonnes, and be only marginally lower than business-as-usual emissions.

Current global annual emissions of greenhouse gases amount to 49 gigatonnes of CO₂e, and are predicted to rise to 56 gigatonnes by 2020 if no action is taken. Scientists believe that emissions cannot exceed 44 gigatonnes in 2020 if the 2 degree target is to be met.

Web link: <http://tinyurl.com/UNEPpledges>

CO₂ emissions rise again

A paper published in the *Nature Geoscience* journal as part of the Global Carbon Project has found that despite the deep financial crisis last year, carbon dioxide (CO₂) emissions in 2009 dropped only 1.3 per cent on 2008 levels. This is less than half the drop that had earlier been predicted.

Drops in emissions in developed economies were offset by strong growth in many developing countries and an increasing reliance on coal. The carbon intensity of production, a measure of CO₂ emissions per unit of GDP, dropped by just 0.7 per cent in 2009, well below the long term average of 1.7 per cent per year.

The study also predicts that global CO₂ emissions have risen by 3 per cent in 2010, a return to the high growth rates of emissions between 2000 and 2008.

Web link: <http://www.globalcarbonproject.org/carbonbudget/>



BRIAN J. MATIS

New analysis of national emissions ceilings

Additional measures to achieve the interim targets of the thematic strategy on air pollution would cost less than €3 per person in 2020, or less than one eurocent per day.

The National Emission Ceilings (NEC) directive is one of the pillars of the EU's air pollution control legislation and plays a vital role in achieving the goals of the sixth environmental action programme (EAP). The long awaited revision of this directive would determine the essential new interim air quality targets for 2020, and set national caps on five pollutants: tighter limits on emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds, and ammonia, plus the first ever national caps on emissions of fine particulate matter (PM_{2.5}), to be achieved by member states by 2020.

When presenting its thematic strategy on air pollution in 2005, the European Commission failed to come up with proposals for specific action to reduce air pollutant emissions. However, it did announce its intention to revise the NEC directive and to propose in 2006 new emission ceilings for 2020, which would be based on the level of ambition set out in the strategy.

Since that date, several proposals have been presented for new or revised EU legislation that would help to reduce emissions, but so far there have been no proposals regarding the new emission ceilings.

Environmental objectives

In its 2005 thematic strategy on air pollution, the Commission established interim health and environment objectives to be achieved by 2020 in order to guide the ambition level for further emission reductions. These targets, expressed in terms of relative improvements compared to the situation in the base year 2000 (see Figure), aim to reduce:

- The number of life year lost due to PM_{2.5} by 47 per cent;
- The number of premature deaths attributable to ground-level ozone by 10 per cent;

- The total area of ecosystems exposed to excess nitrogen deposition (eutrophication) by 43 per cent;
- The total area of forest ecosystems exposed to excess acid deposition by 74 per cent.

The strategy also includes targets to reduce the total area of freshwater ecosystems exposed to excess acid deposition by 39 per cent, and the total area of forest ecosystems subject to excess ozone exposure by 15 per cent. While the achievement of these last two targets was not part of the optimisation analysis considered below, they were subsequently considered and found to be met by the resulting optimised scenarios.

Baseline scenarios

It is within this policy context that the Commission's consultant, IIASA, has released the latest analysis of further cost-effective reductions of air pollutant impacts in the EU.

As a first step, the analysis projects baseline scenarios, which model air pollutant impacts absent any additional measures to reduce emissions and meet the strategy's targets.

Policies and strategies for greenhouse gas (GHG) reductions have a big impact on energy use and thus on air pollutant emissions. In earlier analyses for the new NEC directive, various energy scenarios have been analysed, illustrating the impacts of different assumptions regarding future use of fossil fuels within the EU (see *Acid News* 3/07 and 3/08).

For its latest analysis, IIASA used energy projections that correspond to the EU's 2008 Climate & Energy Package, as well as updated assumptions on economic growth. It also takes account of recent EU legislation on emissions from industrial and mobile sources, and of the new emission and fuel standards for

international shipping that were adopted by the International Maritime Organization in October 2008.

Two energy projections developed for the Commission using the PRIMES model are investigated, one that fully incorporates the EU 2020 target for renewable energy use (P10) and another that does not (P9). The effects of the economic crises in 2008

Table 1: Emissions of air pollutants from land-based sources in EU27 in 2000 and in 2020 under the P10 energy scenario (kilotonnes).

		Emissions	Change
SO₂	2000	10,385	
	Baseline 2020	2,626	-75%
	Optimised 2020	2,324	-78%
	MRR 2020	1,779	-83%
NO_x	2000	12,251	
	Baseline 2020	5,433	-56%
	Optimised 2020	5,176	-58%
	MRR 2020	4,434	-64%
NH₃	2000	4,021	
	Baseline 2020	3,708	-8%
	Optimised 2020	3,012	-25%
	MRR 2020	2,254	-44%
VOCs	2000	11,659	
	Baseline 2020	6,018	-48%
	Optimised 2020	5,970	-49%
	MRR 2020	4,068	-65%
PM_{2.5}	2000	1,798	
	Baseline 2020	1,089	-39%
	Optimised 2020	1,032	-43%
	MRR 2020	574	-68%

Baseline: Baseline scenario reflecting current legislation and policy, in this case assuming full implementation of most existing air quality legislation.

Optimised: New optimised scenario achieving the environmental targets of the 2005 thematic strategy on air pollution.

MRR: Maximum reductions in the RAINS model, i.e. limited to include only so-called end-of-pipe technical measures.

Table 2. Air pollution effects in the EU27 in 2000 and 2020 under the P10 energy scenario.

	Human health		Natural environment	
	Million years of life lost due to PM _{2.5}	Premature deaths due to ozone	Acidification: Unprotected forests (km ²)	Eutrophication: Unprotected ecosystems (km ²)
2000	200.9	22,700	280,000	1,188,000
Baseline 2020	115.6	17,100	89,000	947,000
Optimised 2020	106.4	16,900	67,000	819,000
MRR 2020	83.2	15,300	42,000	609,000

and 2009 are taken into account in both projections. Resulting emissions of carbon dioxide (CO₂) in the EU in 2020 are two and nine per cent below their 1990 level in scenarios P9 and P10 respectively.

The baseline projection for air pollutant emissions under the NEC directive should in principle include the effects of full implementation of all existing national and EU-wide legislation and measures. But the analysis by IIASA has so far ignored the further measures that will be needed by some member states to meet their current national emission ceilings for 2010. It also failed to consider measures that may be required to comply with current EU air quality limit values for particles (PM₁₀ and PM_{2.5}) and nitrogen dioxide (NO₂).

Based on national forecasts, eleven member states will fail to achieve their emission ceilings for nitrogen oxides (NO_x) by 2010, and some will also have problems achieving their ceilings for volatile organic compounds (VOCs) and ammonia (NH₃) (see *Acid News* 3/10, p. 22-23). Even by 2020 some member states are projected to not have attained their 2010 NECs for NO_x and NH₃, unless additional measures are taken.

In addition to the baseline scenarios that show the expected emission levels in 2020 that will result from implementing current legislation (CLE), IIASA has also calculated the maximum achievable emission reductions from applying end-of-pipe measures (MRR).

Optimised scenarios

Starting from the new baseline scenarios, IIASA applied the optimisation mode in its GAINS computer model to identify the least-cost set of emission reduction measures for the EU as a whole that achieved the environmental targets of the thematic strategy. The resulting optimised emission reductions for scenario P10 are shown in Table 1.

As compared to the baseline scenario, ammonia emissions in 2020 under the P10 optimised scenario would need to come down by an additional 696 kilotonnes (kt), SO₂ by an additional 302kt, NO_x by 258 kt, PM_{2.5} by 57 kt, and VOCs by 48 kt.

Health benefits

The scenario analysis also includes estimates of some health and environmental impacts expected to result from the projected levels of future emissions (see Table 2).

In the case of PM_{2.5}, the GAINS model estimates years of life lost that can be attributed to changes in anthropogenic emissions. Using the pollution levels for the year 2000, it is estimated that increased concentrations of PM_{2.5} resulted in some 200 million life years lost in the EU that year. In the baseline scenario, this figure comes down to 116 million by 2020, and in the optimised scenarios to 106 million.

As a result of reduced emissions in the baseline scenario, the number of premature deaths from ground-level ozone is estimated to decrease by about ten per cent between 2000 and 2020, from 22,700 to 17,100. The optimised P10 scenario further reduces this figure to 16,900.

Environmental impacts

The analysis of environmental impact includes ozone damage to vegetation, as

well as acidification and eutrophication of various types of sensitive ecosystems.

In the year 2000, some 23 per cent of the forest area in the EU, nearly 300,000 square kilometres, received acid depositions above the critical loads. By 2020 this is calculated to drop to seven per cent (90,000 km²) under the baseline scenario, and to five per cent (70,000 km²) under the optimised scenario.

Regarding eutrophication, in the year 2000, about 73 per cent of sensitive ecosystem areas in the EU, nearly 1.2 million square kilometres, received nitrogen deposition above the critical loads. By 2020 this is calculated to drop to 59 per cent (950,000 km²) under the baseline scenario, and to 50 per cent (820,000 km²) under the optimised scenario.

Three euros per year

Those additional emission reduction measures that are required to meet the targets of the strategy and go beyond the existing baseline measures are estimated to cost about €1.5 billion per year in 2020, or 0.01 per cent of the EU's GDP in 2020. This equals an annual cost per person of approximately €3, or a daily cost per person of less than one eurocent.

According to the cost-effectiveness optimisation, some three quarters of the costs for additional measures should be spent by the agricultural sector to reduce ammonia emissions. This reflects the fact that this sector so far has done much less than other sectors to reduce emissions – under current policies agriculture is estimated to bear only four per cent of the total air pollution control cost in 2020.

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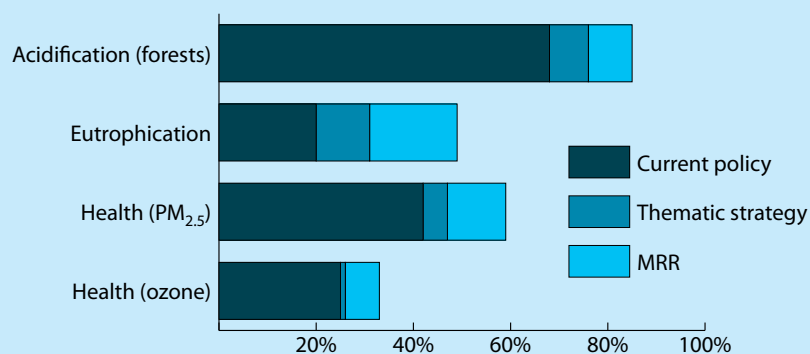


Figure: Per cent improvement (gap-closure) from 2000 to 2020. (100% = no exceedance of ecosystem critical loads due to air pollution, no life-years lost due to PM, no premature deaths due ozone)

New analysis of NECs

Continued from page 7

Climate policies can have a significant impact on costs of air pollution control – they influence the costs of additional measures beyond current legislation to meet given air quality objectives, and also affect the cost of implementing current legislation. As compared to the P9 scenario, the P10 scenario assumes lower energy consumption and less fossil fuel use in 2020, with the result that the estimated annual costs of implementing current legislation on air pollution in 2020 would be nearly €1 billion higher under the P9 scenario.

As such, changing the energy scenario from P9 to P10 reduces overall air pollution control costs by nearly €1 billion per year, in addition to the climate benefits.

This is in line with previous analysis by IIASA, which estimated an annual saving in total air pollution control costs in 2020 of about €8 billion when switching from an energy scenario without climate policy to one based on the Climate & Energy Package. Such cost savings would constitute a significant fraction of the costs of adjusting the energy system towards the needed CO₂ reductions.

Benefits much greater than costs

An updated estimate of the monetised health benefits of implementing the thematic strategy objectives has yet to be published by the Commission. When this was last investigated about two years ago, these benefits were valued at between €22 and €70 billion per year. If this estimate still holds, and there is no reason why it should not, the benefits of action exceed the costs by up to 50 times.

Note that this comparison of costs and monetised benefits does not include all the benefits that would result from improved air quality – notably it excludes benefits to ecosystems and cultural heritage, as well as some of the health benefits.

Christer Ågren

Source: Baseline emission projections and further cost-effective reductions of air pollution impacts in Europe – A 2010 perspective.

27 August 2010. By F. Wagner et al., International Institute for Applied Systems Analysis (IIASA), Austria. Access the reports and more information on the NEC directive and its revision: http://ec.europa.eu/environment/air/pollutants/iam_nec_dir.htm



Wind can provide 20% of electricity by 2030

Wind could meet twelve per cent of global power demand by 2020, and up to 22 per cent by 2030, according to a study published by the Global Wind Energy Council and Greenpeace International.

The Global Wind Energy Outlook 2010¹ finds that wind power could play a key role in satisfying the world's increasing power demand, while at the same time achieving major greenhouse gas emissions reductions. The 1,000 GW of wind power capacity projected to be installed by 2020 would save as much as 1.5 billion tonnes of CO₂ every year. These reductions would represent 50-75 per cent of the cumulative emissions reductions that industrialised countries committed to in their 2020 'Copenhagen pledges'. By 2030, a total of 34 billion tons of CO₂ would be saved by 2,300 GW of wind power capacity.

Wind power can make a massive contribution to global electricity production and to decarbonising the power sector, but we need political commitment to make this happen. Wind power technology provides governments with a viable option for truly tackling the challenges of our time and for being part of the energy revolution our planet needs.

In addition to its environmental benefits, wind energy is becoming a substantial factor in economic development, providing more than 600,000 'green collar' jobs today both in direct and indirect employment. By 2030, the number of jobs is projected to increase to over three million.

Steve Sawyer

¹ **Global Wind Energy Outlook 2010.** Available at: <http://www.gwec.net/index.php?id=168>

TOM CUSACK

More EU air quality failures

In late November the European Commission decided to take four more member states – Cyprus, Italy, Portugal and Spain – to the European Court of Justice for failing to comply with EU air quality limit values for airborne particles (PM₁₀).

According to the Commission, the PM₁₀ limit values have not been respected in several zones in the four countries since the legislation came into force in 2005.

The EU air quality directive requires member states to limit the exposure of citizens to PM₁₀, by setting limit values for exposure which were due to be met in 2005, including an annual limit value of 40 micrograms per cubic metre (µg/m³) as well as a daily limit value of 50 µg/m³ that must not be exceeded more than 35 times per year.

While member states may apply for time extensions until June 2011 to meet the PM₁₀ limit values, these can only be granted provided a number of conditions are met. It must be demonstrated that steps have been taken to achieve compliance by the extended deadline, and an air quality plan setting out the relevant abatement actions for each air quality zone must be implemented.

All four countries have applied for time extensions, but the Commission concluded that the conditions for granting them had not been met.

On 30 September the Commission sent letters to five other member states – Austria, the Czech Republic, Germany, Poland and Slovakia – urging them to comply with the PM₁₀ limit values. As from that date, these countries have two months to comply with the reasoned opinion under EU infringement procedures, and in the absence of satisfactory responses they may be referred to the Court.

These countries had also applied for time extensions, which were rejected by the Commission. Austria, Germany, Poland and Slovakia have subsequently



TOM TAYLOR

re-applied for time extensions, and the Commission is still in the process of assessing these new notifications.

Moreover, in October Belgium was approached a second time for failure to transpose the air quality directive into national legislation. In Belgium, the transposition of EU legislation on the environment is generally a competence of the three regions – Wallonia, Flanders and the Brussels-Capital Region. After having sent a letter of formal notice to Belgium in July, the Commission received notification that the legislation had been adopted in only one of the three regions. Consequently, the Commission has now sent Belgium a reasoned opinion.

Christer Ågren

Sources: Commission press releases 30 September, 28 October and 24 November. Further information is available on the Commission's website: http://ec.europa.eu/environment/air/quality/legislation/time_extensions.htm

Industrial Emissions Directive adopted

On 8 November the new Industrial Emissions Directive (IED) was formally adopted by the Council of Ministers. It updates and merges seven pieces of existing legislation on solvents, large combustion

plants (LCPs), waste incineration, titanium dioxide production and integrated pollution prevention and control (IPPC). Around 52 000 installations are covered by this act, including power plants, metal production and chemical manufacturing facilities. The new directive will strengthen the application of Best Available Techniques (BAT) in the permitting process.

Fossil fuel fired combustion plants are still a major source of air pollutant emissions. The new directive sets stricter emission limits for NO_x, SO₂ and dust from the largest plants. According to the European Commission, the resulting benefits of emission reductions run to between €7 and €28 billion per year, including the prevention of 13 000 premature deaths per annum.

New plants must apply the stricter standards from 2012, while existing plants have to comply with these standards from 2016, but there are some significant derogations. Until 30 June 2020, member states may define transitional plans with declining annual emission caps. Moreover, installations that are already scheduled to close before the end of 2023 or operate less than 17 500 hours after 2016 may be exempt from upgrading.

The directive will enter into force 20 days after its publication in the Official Journal, which is expected before the end of 2010. Member states will then have two years to transpose the directive into their legislation and to start implementing the new legislation.

Source: European Commission press release 8 November 2010. Web link: <http://tinyurl.com/IEDadopted>

EU consults on marine fuels

The European Commission is seeking stakeholder input via an internet consultation on a forthcoming proposal to update the EU directive on the sulphur content of marine fuels.¹ This would align the sulphur standards in the directive with the stricter international standards agreed to by the International Maritime Organisation (IMO) in 2008,² which came into force on 1 July 2010.

In line with the IMO requirements, the general global maximum sulphur content of marine fuels will drop from 4.5 to 3.50 per cent in 2012, and further to 0.50 per cent in 2020 (subject to a review in 2018, which may postpone the 0.50 per cent limit to 2025).

Stricter requirements apply for fuels used in designated sulphur emission control areas (SECAs). In Europe, there are currently two such SECAs: the North Sea (including the English Channel) and the Baltic Sea. Here the sulphur limit from July 2010 is set at 1.00 per cent, falling

to 0.10 per cent as from 2015.

It should be noted that IMO's international rules allow ships to use alternative methods to achieve equivalent reductions in sulphur emissions, such as exhaust gas cleaning (scrubbers) or alternative fuels like liquefied natural gas (LNG), as long as certain safety and environmental requirements are met.

In its background document, the Commission concludes that ship emissions of sulphur dioxide (SO₂), nitrogen oxides (NO_x), and fine particles (PM) significantly contribute to air pollution problems in the EU, including damage to health (premature deaths and illnesses) and the environment (acidification, eutrophication and associated losses in biodiversity).

In order to reduce air pollution damage and to achieve air quality objectives, additional measures to reduce the emissions of air pollutants are required, including from international shipping. Such emission reductions will also help member states

to attain binding air quality standards.

The Commission also notes that "projections of the business as usual scenarios for ship emissions show that these emissions in EU sea areas could be as important as emissions of SO₂ and NO_x from all land-based sources combined in the EU by 2020."

Under existing EU law, ships may use 1.5 per cent sulphur fuel in SECAs – a discrepancy which needs to be corrected. Consequently, the Commission proposes that the current EU requirement on sulphur limits in SECAs should be aligned with the new IMO standards, and that "the transposition of the global standard for the sulphur content of fuels outside of SECAs should also be considered to achieve."

To assess the impacts of introducing the new sulphur standards, a series of studies has been produced for the Commission and the European Maritime

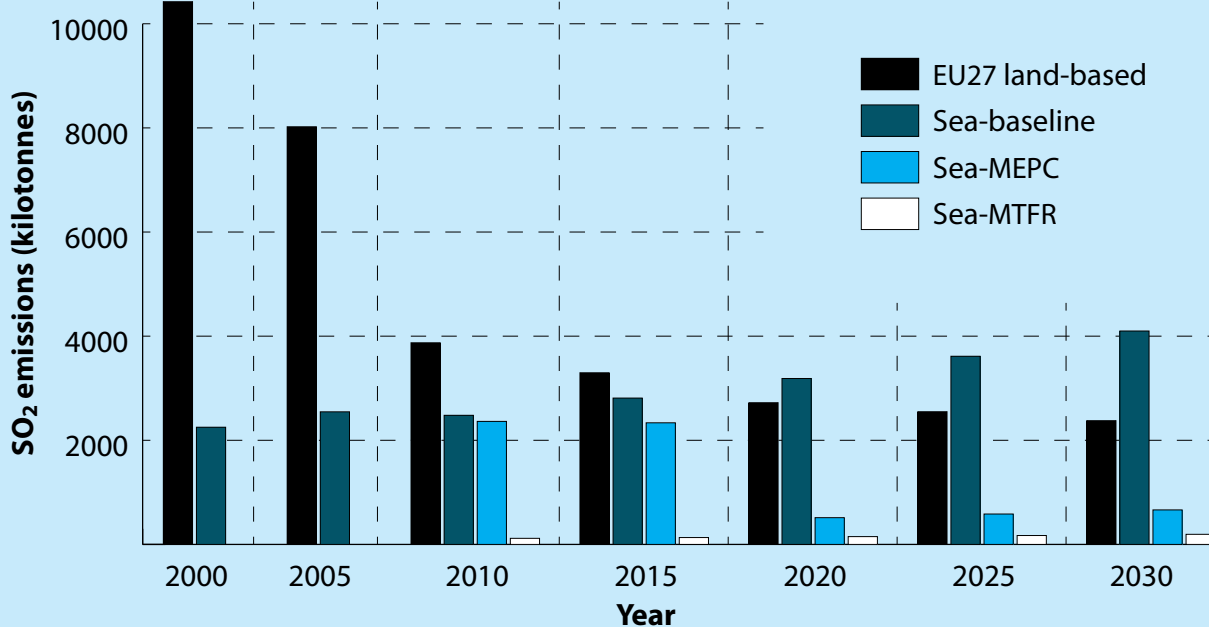


Figure One: emissions of sulphur dioxide (SO₂) in the EU27 and from international shipping in European sea areas (Baltic Sea, North Sea, North-East Atlantic, Mediterranean and Black Sea) between 2000 and 2030.

Projections of emissions from land-based sources in the EU27 are based on a "current legislation scenario" which assumes full implementation of existing legislation to control air pollutant emissions.

Projections of emissions from international shipping are shown in three scenarios:

- *Sea-baseline*: current legislation prior to the adoption by the IMO of the revised MARPOL Annex VI from October 2008
- *Sea-MEPC*: assuming full implementation of the revised MARPOL Annex VI. Sulphur Emission Control Areas (SECAs) are limited to the current ones, i.e. the Baltic Sea and the North Sea. It is assumed that the IMO's global limit of 0.5 per cent sulphur takes effect from 2020.
- *Sea-MTFR*: assuming full implementation of all technically feasible emission abatement options in the GAINS-model, i.e. limiting fuel sulphur content to 0.1 per cent in all EU sea areas.

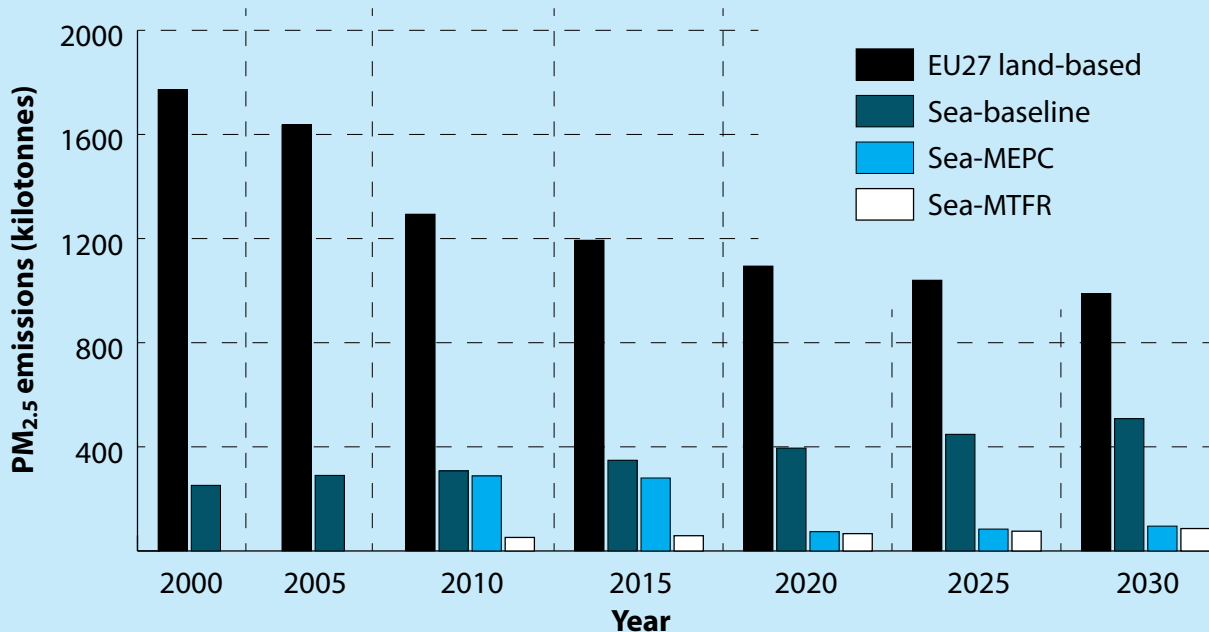


Figure Two: emissions of fine particles (PM_{2.5}) in the EU27 and from international shipping in European sea areas (Baltic Sea, North Sea, North-East Atlantic, Mediterranean and Black Sea) between 2000 and 2030. For scenario descriptions, see Figure One.

Safety Agency (EMSA), as well as by IMO and the member states. The Commission concludes the studies confirm that the benefits will largely outweigh the costs, but that they also suggest that stricter sulphur requirements will “at least in some cases lead to important increases of maritime transport costs.” In turn, this may in some cases lead to a “reduced attractiveness of short sea shipping”, which may trigger a modal shift to rail or road transport solutions (in the absence of further measures affecting the cost of the latter modes).

The current directive requests the Commission to particularly consider the designation of additional SECAs, as well as alternative or complementary measures, such as the use of economic instruments, to reduce air pollution from ships. It does not, however, contain provisions to regulate ship emissions of NO_x or PM.

The Commission notes “that certain subject matters cannot be subject to amendments” at present, but it fails to provide any substantive reason for this claim. Instead, it says that its forthcoming Communication accompanying the possible proposal may indicate which options could be pursued at a later stage. According to the Commission, a key example of this is the designation of Emission Control Areas, which require a proposal from parties³ and a subsequent verification by the IMO against set criteria.

Clearly, the Commission does not currently intend to address the issue of additional ECAs or the question of regulating air pollutants from shipping other than SO₂. Instead, it says, these issues will be brought up when a more general review of the EU’s air quality policies is conducted in 2013. The Commission intends to have additional public consultations on these important matters from spring 2011 onwards.

Interested parties are invited to send their comments, suggestions and replies to the questionnaire to the Commission by 5 January 2011 at the latest. The questionnaire and the Commission’s background

document can be found at: <http://ec.europa.eu/environment/consultations/sulphur.htm>

Christer Ågren

¹ **Directive 2005/33/EC** of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC as regards the sulphur content of marine fuels, and Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels and amending Directive 93/12/EEC.

² **Revised Annex VI** of the International Convention for the Prevention of Pollution from ships (MARPOL), adopted on 10 October 2008.

³ Five of the EU’s 27 member states are not parties to MARPOL Annex VI, namely Austria, the Czech Republic, Hungary, Malta and Slovakia.

Non-compliant shipping fuel

The degree of compliance with marine fuel sulphur limits within the EU is “insufficient”, according to the European Commission.

Analyses of fuel samples undertaken by the European Maritime Safety Agency (EMSA) in 2008 found that the monthly degree of non-compliance of SECA fuels ranged from 4.1 to 9.2 per cent of samples tested. Non-compliance with the sulphur limit of 0.1 per cent for marine gas oils (MGO) was even higher – between 19.5 and 25.5 per cent of monthly samples.

The worst compliance record of all was for passenger vessels, where a majority of fuel samples for passenger ships calling at EU ports (except for France and parts of Spain) contained sulphur in excess of the 1.5 per cent limit.

This new data was presented in the background document to the Commission’s internet consultation (see main article). Moreover, the Commission noted that the sampling frequency and the number of samples taken to check for compliance with the directive are very low, and vary significantly between member states.

Feature: coal in Europe

In these four short articles, AirClim's partner organisations provide an insight into the domestic situation of the coal industry in Hungary, Slovakia, Slovenia and Ukraine.

Hungary: choosing a dirty path to development

Hungary's coal resources total 3,300 million tonnes (Mt), mainly lignite, while the annual production is between 9-10 Mt. Although the reserves could last for centuries, consumption has been declining since the mid 1970s. After the changes of 1989, the old, polluting, uneconomic and state subsidised coal sector required radical reshaping. While all but one underground coal mine has subsequently been shut down, most of the outdated and inefficient power plants continue to operate. The state-financed restructuring and the privatisation of the energy sector in the 1990s resulted in the preservation of these polluting and costly structures.

The state continues to play a determining role in the process through its scheme of administrative support and financial subsidies, financed by taxpayers and electricity consumers. The biggest lignite power plant, Mátra, which is responsible for some ten per cent of total national carbon dioxide (CO₂) emissions, is allowed to participate in the national support scheme designed for renewables due to its co-firing of wood. Other, smaller plants have also switched

to wood fuel for the same reason, and are thus rewarded for burning biomass in an unsustainable way.

The Kyoto process does not effectively force the implementation of measures to decrease CO₂ emissions due to Hungary's special base year, the average of 1985-87 emissions, and the collapse of heavy industry after 1989. In the EU-ETS mechanism, instead of the "polluter pays" principle, the "polluter profits" principle was applied: the largest emitters were given quotas for free, which can basically be regarded as an additional financial subsidy to these companies.

By ensuring the survival of these polluting structures, decision makers may have chosen the easier path. However, taking into account the fact that Hungary lies in one of the geographical regions most affected by climate change, a transition towards a sustainable energy system that seriously increases energy efficiency, energy conservation and renewables should be considered essential.

András Perger
Energiaklub, Hungary

About Energiaklub

Energiaklub Climate Policy Institute and Applied Communications is a non-profit organisation based in Hungary, which for the last twenty years has been organising communication and awareness-raising campaigns, trainings and conferences, carrying out research, and preparing proposals for decision makers.

The organisation promotes a rational use of our dwindling resources, an economy based on diverse local resources, and a change in energy-wasting consumer habits, amongst other priorities.

<http://www.energiaklub.hu>

Full report: The role of coal in the Hungarian electricity sector with special attention to the use of lignite. Available at: http://www.energiaklub.hu/sites/default/files/kiadvanyok/lignite_hungary.pdf



The world's largest bucket-wheel excavator, onsite in Bükkébrány, Hungary.



PIP ECKEN

About the Foundation for Alternative Energy

The Foundation for Alternative Energy (FAE) is a Slovak non-governmental organisation committed to environmental protection through the promotion of sustainable energy development. Established in 1991, FAE's main objectives are to promote awareness, knowledge and use of renewable energy technologies.

Since 1995, FAE has also served as the coordinator of INFORSE-Europe, a network of 80 NGOs working for sustainable energy solutions.

<http://inforse.org/europe/fae>

Full report: Brown coal in Slovakia. Available at: <http://inforse.org/europe/fae/Brown%20Coal%20Slovakia%20web.doc>

In Slovakia, coal means jobs first

Despite the fact that Slovak brown coal and lignite resources are in the final phase of their exploitation, there has been little notable activity of late to manage Slovakia's necessary energy transition.

In 2008, the government and the management of the Slovak coal company Baňa Čáry decided to re-open the lignite mine at Čáry-Kuty, 70 km north-west of Bratislava. The mine resumed production in 2009, just three years after it was closed due to the ineffectiveness and decline of the brown coal industry in Slovakia. This event brought fresh air to the dying industry that has caused so much environmental and health damage in Slovakia. The area around towns Prievidza, Novaky and Handlova were and are still considered as the most polluted region of the country. Long-term health impacts related to the inhalation of dust and gaseous effluents from power plants has been observed in the population for several decades.

The new era of this mine would not be possible without the state subsidy of €3.6 million, or 30 per cent of investment costs. As a result, the total number of jobs will increase from 122 in 2007 to between 250 and 300 at the end of 2010, with the goal of producing between 0.2 and 0.5 million tonnes of lignite annually for the next 30 to 50 years. The employment question was the driving force behind this decision.

Apart from the direct subsidy, domestic brown coal for power production would not be possible without an additional government support mechanism – the decision that the coal power plant at Novaky is obliged to buy a certain amount of domestic coal. One can of course ask questions about the impacts of such policies on sustainability, the environment and the economy – especially given the large unused renewable energy potential – but at the end of the day, it is jobs that rule politics in Slovakia today.

Emil Bedi
Foundation for Alternative Energy, Slovakia

Slovenia: propping up the lignite industry

The lignite industry plays an important role in the Slovenian energy sector, as Šoštanj thermal power plant (ŠTTP), using lignite from the nearby Velenje mine, produces one third of Slovenian electricity. Both companies are important employers in the Šaleška valley and as such are the area's development engine.

However, it is a high time for the Šaleška valley to start identifying brighter and less polluting paths for their future. The Šaleška valley is one of the most polluted areas in

Slovenia, while at the same time suffering severe damage due to ground immersion, which is a consequence of underground mining in Velenje. ŠTTP is also a major contributor to Slovenia's greenhouse gas emissions. The lignite industry imposes a high external cost which is not covered by the companies. If the full environmental and social costs were counted, neither the Velenje mine nor ŠTTP would see the construction of the planned 600 MW Block 6 as a profitable future investment.

Instead, increased use of domestic renewable sources, such as solar, biomass and geothermal, would be considered as the best development option for the Šaleška valley and Slovene energy sector, accompanied by strong measures for efficient use energy.

Lidija Zivcic

Focus Association for Sustainable
Development, Slovenia

About Focus Association for Sustainable Development

Focus Association for Sustainable Development is an independent, non-profit environmental organisation. By providing examples, they show that environmentally and socially responsible life is possible. Their values emphasise a holistic approach, living according to the principles they promote, teaching by example, active citizenship,

expertise, transparency, dialogue and cooperation. They focus on the issues of climate, energy, mobility, global responsibility and consumption. In the framework of these issues they organise various events, run campaigns and practically oriented projects, raise awareness, monitor, analyse, take part in decision-making processes, co-operate with a variety of stakeholders and

work with the media. They work at a local and national level, as well as in the EU and internationally.

<http://www.focus.si>

Full report: Status and impact of the Slovenian lignite industry. Available at: http://www.focus.si/files/Publikacije/lignite_study.pdf





Ukraine: coal is a dirty and expensive Soviet relic

The coal sector of Ukraine no longer plays the role it had in the Soviet era. Coal mining has dropped significantly, and the quality of coal has decreased due to the depletion of seams. The country has instead inherited a wholly unprofitable economic sector that requires constant investment. The coal sector is also responsible for a number of social and environmental problems, which are aggravated with time, and which the state has neither political will nor financial resources to solve.

One of the key problems of the crisis in the coal sector is that coal prices do not even cover the operational costs of mining, let alone repair and maintenance costs and capital investment. The average production cost of coal is significantly higher than its selling price, and this gap is growing. International Energy Agency analysis suggests that coal prices are distorted due to the subsidisation of the coal sector, government interventions in fuel allocation and the influence of private monopoly buyers. In 2008, each tonne of coal sold incurred losses of 152 Ukrainian hryvni or about €15, and the coal sector received state funding of around 7,500 million Ukrainian hryvni, which is approximately three per cent of Ukraine's annual budget. In 2008, approximately 60 per cent of all money provided to support the sector was used to offset losses.

Local people are highly dependent on the coal industry. This is particularly so for some small towns and villages, where most

people work for coal mining companies. The Soviet-era practice of establishing 'mono-industry' cities and villages results in significant social problems today, as companies close down and many people are left without jobs. Unfavourable social conditions, unemployment and poverty cause a high level of crime, drug addiction and HIV infection in the main coal mining regions of Ukraine.

Of course, the coal sector also causes a range of serious environmental problems, including air pollution and alteration of geological, hydrologic and hydrochemical conditions in the areas where coal mining companies are located. Ukraine is a party to the UN Framework Convention on Climate Change and the Kyoto Protocol and therefore is required to take certain steps to cut its greenhouse gas emissions. However, the country's energy policy threatens to achieve the opposite. According to the Energy Strategy, the percentage of coal in the energy balance will be increased from 22 per cent (43.5 million tonnes of equivalent fuel) in 2005 to 33 per cent (101 million tonnes) by 2030 in the base scenario. As a highly carbon-intensive fuel, increased use of coal will see greenhouse gas emissions in Ukraine almost double by 2030, to 350 million tonnes of carbon dioxide equivalent.

In order to solve the current problems in the coal sector, it is essential to do a number of things: to improve its profit-

ability by shutting down unprofitable mines and privatising commercially promising ones, and to set a market price on coal and reduce its production cost, a precondition for the reduction of energy subsidies and their burden on the national budget.

Khrystyna Rudnytska

National Ecological Centre of Ukraine

About the National Ecological Centre of Ukraine

The National Ecological Centre of Ukraine (NECU) is a non-governmental not-for-profit organisation created in 1991. NECU works to bring environmental considerations into the core of any decision. The organisation has branches in a dozen Ukrainian cities. NECU works on issues such as biodiversity, energy, global climate change, transport, multilateral development banks, Russia, Caucasus and Central Asia.

<http://www.necu.org.ua>

Full report: Problems of Ukraine's coal sector and greenhouse gas emissions from coal mining and consumption. Available at: http://climategroup.org.ua/wp-content/uploads/2010/06/Ukraine_coal-sector_web201011.pdf

Tougher emissions standards for motorcycles

European motorcycles should come

with advanced anti-lock braking systems, cleaner engines and daytime headlights in order to reduce road deaths and pollution, according to new emissions and safety requirements for motorcycles and all other L-category vehicles proposed on 4 October by the European Commission.

The L-category covers a wide range of vehicles such as two- or three-wheel powered cycles, mopeds, motorcycles, tricycles, on-road quads and mini-cars. The largest L-category comprises powered two-wheelers (PTW), with about 30 million vehicles currently in use in the EU.

Regarding air pollutants, the Commission concludes that the introduction of stricter emission standards for passenger cars and heavy duty vehicles means that the contribution of L-category vehicles will become increasingly important over the next decade. In the case of hydrocarbons, L-category vehicles' contribution to total road transport emissions is estimated at 38 per cent today, but is projected to rise to 62 per cent by 2020 if no action is taken. Mopeds alone are expected to account for 38 per cent of total road transport hydrocarbon emissions in 2020.

For carbon monoxide (CO), this share is 20 per cent today and is anticipated to rise to 38 per cent by 2020. The L-category vehicle fleet is also a high contributor to



PHILIPPE GEENEN

volatile particle (PM) emissions in urban areas, leading to smog and adverse effects on people's health.

As L-category vehicles are responsible for only three per cent of total road transport mileage, it is clear that their pollutant emissions are disproportionately high.

To improve air quality, the Commission therefore proposes three new emissions steps – Euro 3, 4 and 5 – for all L-category vehicles, plus a Euro 6 step for motorcycles (which are already at Euro 3). Compliance with these three new steps will be required in 2014, 2017 and 2020 respectively. This

three-step staged approach will, according to the Commission, provide sufficient lead-time to vehicle manufacturers to introduce the necessary pollutant abatement technology.

Introduction of durability requirements, together with on-board diagnostics (OBD) requirements, will help to maintain low emission levels over vehicle life.

The Commission does not currently foresee a limit to emissions of the main greenhouse gas, carbon dioxide (CO₂). Instead, mandatory reporting of the

Category and year	Euro level	Carbon monoxide (CO)	Total hydrocarbons (THC)	Nitrogen oxides (NOx)	Particulate matter (PM)	Non-methane hydrocarbon (NMHC)
Motorcycle 2014	Euro 4	1970	250	170	-	-
Motorcycle 2017	Euro 5	1140	170	90	-	-
Motorcycle 2020	Euro 6	1000	100	60	4.5 ¹	68
Moped 2014	Euro 3	1000	1200 ²		-	-
Moped 2017	Euro 4	1000	630	170	-	-
Moped 2020	Euro 5	1000	100	60	4.5 ¹	68

Table: Emission standards (milligrams per kilometre) for motorcycles with a design vehicle speed of more than 130 km/h. (1) Applicable only to gasoline direct injection engines. (2) Sum mass of total hydrocarbons and nitrogen oxides (THC + NOx).

actual CO₂ emission measurements and fuel consumption determination carried out in the global test cycle by the manufacturer at type-approval will, according to the Commission, pave the way for an energy efficiency labelling system, which might be introduced at a later stage. Such a system will then assist the consumer in comparing vehicles while making a purchase decision based on additional important aspects like energy efficiency and greenhouse gas emissions.

Suggestions to cap the power of motorcycles were not taken up by the Commission, saying there was insufficient evidence that high powered motorbikes were more dangerous. For that reason and in order to remove internal barriers to trade, the option for member states to mandate a maximum power for motorcycles of 74 kW will no longer be available.

According to Article 21 of the draft directive, by 1 January 2016 at the latest, the Commission shall carry out a comprehensive environmental effect study. The study shall evaluate air quality and the share of pollutants contributed by L-category vehicles. It shall also collate and evaluate the latest scientific data, modelling and cost efficiency information with a view to establishing definitive policy measures by confirmation of the Euro 5 (Euro 6 for motorcycles) environmental requirements and enforcement dates laid down in the annexes.

The Commission proposes to simplify the current legislative set of 15 directives by replacing them with five regulations. This first draft regulation, spelling out the scope of the new legislation, categories of vehicles concerned and emission limit values, will be followed over the next two years by another four regulations laying down rules on test procedures.

In line with the EU's co-decision procedure, the proposal now goes to the European Parliament and the Council, and is expected to come into force on 1 January 2013.

Christer Ågren

For more information, see: http://ec.europa.eu/enterprise/sectors/automotive/documents/proposals/index_en.htm



JOÃO PAULO CORRÊA DE CARVALHO

CO₂ can drop faster than carmakers claimed

A new study has shown that average CO₂ emissions from cars dropped a record 5.1 per cent last year. Over half of this was due to improvements in technology, rather than simply being the result of the purchase of smaller cars. The environmental group Transport & Environment, who authored the report, argues that this drop discredits the lobbying of carmakers, who earlier successfully pushed to have a new target on car CO₂ emissions delayed to 2015.

If current rates of improvement continue, the car industry will likely meet the CO₂ target of 130g/km by 2012, the date originally proposed by the Commission and which carmakers claimed was unrealistic. Some carmakers have already almost met the 2015 target, with Toyota cars averaging 132g/km.

Carmakers are currently lobbying to delay and weaken CO₂ targets for vans. "Three years ago the car industry said it could not deliver car CO₂ targets on time but is now set to achieve them years ahead of schedule. Now the same industry is saying van CO₂ limits cannot be met; it is time the credibility of these claims was questioned," said Joe Dings, director of Transport & Environment.

Source: T&E press release 4 November 2010. Web link: <http://tinyurl.com/CO2cars>

Member states still not compliant with IPPC

Many member states are still not fully compliant with the IPPC directive on industrial pollution, according to a recent European Commission report. The report assesses implementation during the period 2006 to 2008. The IPPC directive requires that existing installations be covered by

Best Available Techniques (BAT) compliant permits as of 30 October 2007.

The Commission has opened infringement cases against Belgium, Denmark, Greece, Spain, Italy, Malta, Portugal, Slovenia, Austria, France, Ireland and Sweden. So far, all but four of these cases have been referred to the European Court of Justice, which ruled on the first case against Belgium in 2010 for failing to meet the Directive's deadline. Further proceedings are ongoing against Estonia and Lithuania for failure to properly transpose the law.

Regarding the quality of the permits issued, the main problem identified by the report is the low proportion of permits reflecting the implementation of BAT, as set out in the relevant BAT Reference documents (BREFs). In particular, no justification could be found for the significant differences between the BREFs and permit conditions set for more than 50 per cent of the installations examined.

Source: European Commission's report COM (2010) 593 final, 25 October 2010. Web link: <http://tinyurl.com/IPPCcompliance>

79 per cent of Spaniards breathe polluted air

Spain's air quality improved for the second year running in 2009, thanks more to the economic crisis rather than to action taken by public authorities, environmental group Ecologistas en Acción said.

Collating data from regional authorities, Ecologistas found that emissions of fine particles (PM₁₀) and nitrogen dioxide (NO₂) were down by about five per cent on 2008. Despite the improvement, 2.8 million and 5.2 million people were exposed to levels of PM₁₀ and NO₂ respectively that were in excess of the binding EU air quality standards. As compared to the World Health Organization's air quality guidelines, it is estimated that some four out of five Spanish citizens are exposed to excessive air pollution levels.

According to Ecologistas, air quality is improving despite a lack of adequate action by Spanish public authorities. Few air quality plans are in place, as required by the 2008 EU air quality directive, and those that exist are ineffective because they lack measures to reduce road traffic.

Source: ENDS Europe, 11 November 2010. Web link: <http://tinyurl.com/Spainshair>



Intercontinental transport of air pollutants

Throughout the northern hemisphere, intercontinental flows of important air pollutants, such as ozone and fine particles, have a significant impact on environmental quality.

A recent report by the Task Force on Hemispheric Transport of Air Pollution says that coordinated international actions to mitigate the intercontinental flows of certain air pollutants would yield significant environmental and public health benefits. The task force has studied ground level ozone (O_3), fine particles (PM), mercury (Hg) and persistent organic pollutants (POPs).

The task force was created in 2004 by the Convention on Long-range Transboundary Air Pollution (LRTAP Convention), and will present its findings and recommendations to the Convention's Executive Body in Geneva on 13-17 December.

The task force concludes that for each of these pollutants, observed concentrations or deposition at any given location is made up of several different fractions, one of which is related to the intercontinental transport of anthropogenic emissions. Other fractions may originate from natural sources or local and regional man-made sources.

In most cases, abating the man-made local or regional emission sources of these pollutants is the most efficient approach to reduce their impacts. However, without further international cooperation to mitigate their intercontinental flows, many countries will not be able to adequately protect public health and environmental quality. Moreover, cooperation to decrease emissions that contribute to intercontinental transport of air pollution has significant benefits for both source and receptor countries.

Model experiments of hemispheric transport of air pollution have been carried out to derive intercontinental source-receptor relationships for four regions - North America, Europe, South Asia, and East Asia. These regions are responsible for more than three quarters of the anthropogenic emission in the Northern Hemisphere. Specific analyses were also made to quantify the impact in the Arctic of emission changes in these four regions.

Regarding ozone, current annual average surface concentrations in the northern mid-latitudes are about 37 parts per billion (ppb). About 20-25 per cent of this is estimated to originate from the stratosphere, and a similar proportion is formed from natural precursor sources. Man-made sources contribute more than 50 per cent, and over the four continental regions investigated about half of this fraction originates from sources in the region itself and about half is transported from other regions. In heavily polluted environments, the fraction attributable to local and regional emissions sources may be much larger.

For ozone, the largest relationship is the impact of North American emissions on European ozone levels, followed by the impact of European emissions on South Asia and East Asia. East Asian emissions have a similar impact on ozone in North America as North American emissions have on East Asia. Arctic ozone levels are mostly influenced by European emissions, followed by North American emissions.

Within a region, the precursor pollutants most strongly influencing annual average ozone levels are nitrogen oxides (NO_x), volatile organic compounds (VOCs), methane (CH₄), and carbon monoxide (CO), in decreasing order of importance.

In contrast, the intercontinental contributions to annual ozone concentrations are most strongly influenced by changes in methane, followed by NO_x, VOCs, and CO. It was shown that cutting methane emissions in a given region produces roughly the same decrease in intercontinental transport of ozone to other regions as a similar percentage decrease in NO_x, VOCs and CO emissions combined.

It is worthwhile noting that apart from damaging human health and vegetation, ozone contributes significantly to climate forcing, both directly as a greenhouse gas and indirectly by damaging plants and inhibiting their uptake of carbon dioxide. Consequently, reducing emissions of methane, which itself is an important greenhouse gas, will result in lower direct forcing from methane as well as lower direct and indirect climate forcing from ozone.

Both primary and secondary PM play a role in intercontinental transport. While

the transcontinental contribution to PM concentrations is smaller in relative terms as compared to ozone, its impacts on human health are estimated to be comparable to that of ozone, because the relationship between PM and mortality is stronger. The contributions of the three foreign regions to the mortality in a given home region are estimated to range from three to five per cent. Of the total mortalities associated with emissions from North America and Europe, 15 per cent and 12 per cent, respectively, are estimated to be realised outside of these source regions.

Intercontinental transport of newly released man-made mercury emissions is estimated to account for about 10-30 per cent of total mercury deposition, on an annual globally averaged basis, while natural and re-emitted mercury make up some 35-70 per cent of total mercury deposition, depending on the region. East Asia, which accounted for almost 40 per cent of total global newly released mercury in 2000, is the most dominant source among the four regions, accounting for 10-14 per cent of the mercury deposition found in other regions, followed by contributions from Europe, South Asia, and North America. However, where deposition is

highest, the dominant sources are local and regional emissions.

The task force notes that international forums for pursuing further international cooperation to mitigate sources of intercontinental transport exist for POPs and mercury (the Stockholm Convention on POPs and the UNEP's mercury program).

For ozone and PM, however, there are currently no such global arrangements. But there are several regional agreements that address at least some of the sources of ozone and PM. The task force argues that "a global confederation of regional cooperative programmes on air pollution could help develop a better and globally shared understanding of air pollution problems and their solutions at the local, regional and global scale while maintaining autonomy and flexibility for regions to develop policies and programmes appropriate for their circumstances."

Christer Ågren

Source: Hemispheric Transport of Air Pollution 2010: Executive Summary. ECE/EB.AIR/2010/10, October 2010. Available at: <http://www.unece.org/env/lrtap>

Air pollution and health in Asia

The World Health Organisation (WHO) estimated in 2002 that over 500,000 deaths in Asia in the year 2000 were caused by outdoor air pollution exposure, accounting for approximately two thirds of the total global burden of deaths attributed to ambient air pollution. In addition, indoor air pollution from the burning of solid fuel in both rural areas and urban slums contributed an additional 1.1 million deaths.

In 2002, the Health Effects Institute (HEI) initiated the Public Health and Air Pollution in Asia (PAPA) programme to reduce uncertainties about the health effects of exposure to air pollution in Asian cities, and a new report¹ from HEI provides a comprehensive literature review to come out of the PAPA programme.

The review describes the current scope of the Asian literature on the health effects of outdoor air pollution. It also includes an assessment of a large number of studies

of daily mortality and hospital admissions for cardiovascular and respiratory disease, as well as an analysis of Asian studies of long-term exposure to air pollution and chronic respiratory disease, lung cancer, and adverse reproductive outcomes.

A broad overview of the status of and trends in air pollution sources, emissions, and exposures in Asian countries is included. The Asian health effects studies are compared with those from other regions, such as North America and Europe, and the report identifies gaps in knowledge, and gives recommendations to how these could be addressed.

It is concluded among others that, in broad terms, the effects of short-term exposure in Asian cities are on a par with those observed in hundreds of studies worldwide. The same pollutants — fine particles (PM), ozone (O₃), sulphur dioxide (SO₂), and nitrogen oxides (NO_x) — affect

in particular older people with chronic cardiovascular or respiratory diseases.

The results of the chronic-effects studies reviewed are said to be broadly consistent with those of studies in other regions, which suggests that long-term exposure to air pollution promotes chronic pulmonary disease and other adverse effects that result in reduced life expectancy.

Incremental improvements in air quality are expected to improve health, even in areas with relatively high ambient concentrations, and health benefits are expected to also result from further reductions in exposure to pollution concentrations below those specified in the WHO guidelines.

Christer Ågren

¹ Outdoor Air Pollution and Health in the Developing Countries of Asia: A Comprehensive Review. Special Report 18. Health Effects Institute, November 2010. Available at: <http://www.healtheffects.org/>

Extra time for non-road vehicles to meet limits

Manufacturers of tractors and engines used in non-road mobile machinery will need more time to meet already adopted stricter emission limits, according to the European Commission.

EU legislation sets limits on emissions of carbon monoxide, hydrocarbons, nitrogen oxides and fine particles (PM) from these engines. The current emission standards, known as stage IIIA, will from 1 January 2011 be replaced with stage IIIB that set significantly stricter limits for PM emissions. In addition, stage IV standards with stricter NOx-limits are to apply for some types of engines from 2013.

But the recent economic recession has led to a slump in sales, which in turn has

resulted in a situation where some manufacturers have not yet developed engines and accompanying technology to meet the more demanding limits of stage IIIB.

The Commission's proposed solution is to extend the so-called "flexibility scheme", which was introduced to facilitate the transition between the different emission stages and allows manufacturers to place on the market a limited number of vehicles fitted with engines that comply with the less stringent emission limits of the previous stage.

The Commission proposes that the percentage of older engines permitted to be placed on the market under the flexibility scheme should be increased to 50

per cent of each manufacturer's annual number of sales (calculated as the average sales in the EU over the last five years). These engines would only be required to comply with the stage IIIA limits until the end of 2013. The current quota is 20 per cent of sales before 2012.

On 7 July, the Commission published its proposal to amend the 2004 directive regulating air pollutant emissions from non-road mobile machinery (NRMM) so as to increase the flexibility provisions. More recently on 8 November, a similar proposal was published for agricultural and forestry tractors.

Sources: ENDS Europe Daily, 15 November 2010, AECC Newsletter, July-August 2010.



NOx controls in Baltic

The Baltic Marine Environment Protection Commission (HELCOM) is seeking to designate the region as a NOx Emission Control Area (NECA) under Annex VI of the International Maritime Organization's (IMO) MARPOL Convention.

At a meeting in November, HELCOM's maritime group decided to further study the economic impact of the proposal, which is to be finalised at a meeting in March 2011 and then submitted to the IMO.

Work on the NECA proposal began a few years ago and studies on economic impacts and the effects of shipping emissions on eutrophication and human health have been carried out. The Baltic Sea is already designated as a Sulphur Emission Control Area (SECA).

"The Baltic Sea NECA would lead, in the long term, to the reduction of NOx emissions from ships in the Baltic by approximately 80 per cent compared to the current level, estimated at 357 kilotons in 2009," says Anne Christine Brusendorff, HELCOM's Executive Secretary. "This will contribute to curbing eutrophication which is the Baltic's biggest environmental problem."

Source: HELCOM press release 8 November 2010. Web link: <http://tinyurl.com/BalticNECA>

Japan preparing for ECA application

Japan is planning to submit an application to the International Maritime Organization (IMO) for an emission control area (ECA). Currently three different options are being considered, ranging from localised "micro-ECAs" to a comprehensive ECA similar to that adopted for North America.

The "micro-ECAs" would introduce strict emission limits in waters around some of the most densely populated areas with a high volume of shipping traffic, such as Tokyo and Osaka Bay. The two other options are a 200 nautical mile (nm) or a 50 nm ECA zone in the coastal waters around Japan. An assessment of costs and benefits is currently underway for the different options.

Source: Sustainable Shipping News, 22 November 2010

Criticism of ECA sulphur limit unfounded

The IMO has hit back at industry claims that there was no proper impact assessment done for a 0.10 per cent sulphur limit in emission control areas (ECAs).

"We reject the view that there was no impact assessment of the 0.10 per cent limit," Dr. Edmund Hughes from the IMO's Marine Environment Division told Bunkerworld in November. He pointed out that one of the proposals being considered during the negotiations leading up to the MARPOL Annex VI revision had suggested a 0.10 per cent ECA sulphur limit, and it was therefore among the scenarios being considered by an IMO expert group.



In December 2007, a paper was submitted to MEPC, reporting on the outcome of an "Informal Cross Government/Industry Scientific Group of Experts" that had been established to evaluate the effects of the different fuel options proposed, and the 0.10 per cent sulphur limit was one of the options evaluated.

The broad scope of the expert group was "to review the impact on the environment, on human health and on the shipping and petroleum industries, of applying any of the options identified as possible amendments to MARPOL Annex VI to introduce measures aiming at reducing emissions from ships into the atmosphere."

Dr. Hughes stressed that the revision process was by consensus, and that it was approved, and later adopted, by consensus at the MEPC in October 2008.

Source: Sustainable Shipping News, 23 November 2010

Steamships exempted

Older steamships in the United States are likely to be exempted from the 2015 sulphur limits in the North American Emission Control Areas (ECAs). Due to their age, there is a lack of technical and design support with regard to both fuel switching procedures and actually operating the boiler on marine distillate fuel, according to the US proposal to the 61st session of the IMO's Marine Environment Protection Committee (MEPC). The exemption will be time limited to five years (expiring in 2020) and apply only to the North American ECA, as well as to the proposed Caribbean ECA if it is approved. The US proposal will now go forward to MEPC 62 with a view to formal adoption in July 2011.

Source: Sustainable Shipping News, 4 October 2010

Reduced port fees for reduced pollution

An agreement between a group of European ports will see them reduce fees for ships that are less polluting from next year. Reductions will be based upon a ship's performance under a new voluntary assessment scheme, the Environmental Ship Index (ESI).

While details of the scheme have yet to be finalised, the International Association of Ports and Harbours expects that savings of up to five per cent will be offered for the best performing ships. The scheme will initially apply at four Dutch ports, Rotterdam, Amsterdam, Moerdijk and Dordrecht, from 1 January 2011. Later next year it is expected to be expanded to more European ports, including Bremen, Hamburg and Antwerp.

Through the ESI individual ships will be graded for achieved reductions in sulphur dioxide and nitrogen oxides pollution that go beyond legally required levels. Improvements in energy efficiency reduce carbon dioxide emissions and will also influence a ship's ESI score.

Web link: http://www.wpci.nl/projects/environmental_ship_index.php

Climate change impacts future air quality

Climate change is likely to significantly affect future air quality over Europe. In particular, unchecked it will lead to increasing levels of ground-level ozone, an air pollutant that damages human health and ecosystems.

A recent study simulated the impact of climate change on air quality at the regional level in the year 2100 (as compared to 1990). A worst-case climate scenario was assumed, where human-induced air pollution emissions remained at the same levels as in the year 2003, thus revealing changes in air quality solely caused by climate change.

Modelling results suggest monthly average levels of ozone could reach around 110 $\mu\text{g}/\text{m}^3$ (micrograms per cubic metre) over central France in July 2100, an increase of 50 $\mu\text{g}/\text{m}^3$ from the year 1990. Large areas of south-west Europe could experience average ozone levels of around 110-125 $\mu\text{g}/\text{m}^3$ in July 2100, up from 95-105 $\mu\text{g}/\text{m}^3$ in July 1990.

Source: DG Environment, Science for Environment Policy, 4 November 2010. Web link: <http://tinyurl.com/climateair>

UN panel calls for stronger carbon, transportation taxes

The United Nations' High Level Advisory Group on Climate Change Finance has called for a strengthening of taxes on carbon and international transportation in order to raise 100 billion dollars to help poor countries address climate change.

The report proposed a series of measures that the UN Secretary General Ban Ki Moon called "financially feasible and politically viable." Specifically, it proposed a carbon price of between \$20-25 per tonne, raising up to \$30 billion, a tax on international transportation raising \$10 billion, removal of fossil fuel subsidies generating \$10 billion, with tens of

billions also flowing from private capital and international financial institutions.

The group's report was designed to feed into discussion on financing at the UNFCCC meeting in Cancun. Chaired by the Prime Ministers of Norway and Ethiopia, the group includes high level representation from national governments, intergovernmental organisations, development banks and other experts including Lord Nicholas Stern and American financier George Soros.

"Unless developed country governments keep their promise to provide long-term finance, a global agreement on climate action would be nearly impossible to reach," said Greenpeace International in a statement.

Web link: <http://tinyurl.com/UNclimatepanel>

CO₂ principal climate 'control knob', study confirms

Carbon dioxide (CO₂) is the principal 'control knob' that governs Earth's climate, a new climate modelling study by Andrew Lacis of the NASA Goddard Institute for Space Studies confirms. The study sought to resolve misunderstands around the relative role of water vapour and CO₂ as important greenhouse gasses.

The study showed that while water vapour provides the strongest feedback of the greenhouse gases (GHGs), it is not the cause (forcing) of global climate change. Without the radiative forcing provided by noncondensing GHGs, the most important of which is CO₂, levels

of water vapour would also decline and atmospheric temperatures would rapidly drop. A companion study led by one of the co-authors quantifies that CO₂ is responsible for 80 per cent of the radiative forcing that sustains the greenhouse effect.

"The bottom line is that atmospheric carbon dioxide acts as a thermostat in regulating the temperature of Earth," said Andres Lacis. "It is not surprising then that global warming can be linked directly to the observed increase in atmospheric carbon dioxide and to human industrial activity in general."

Web link: <http://tinyurl.com/CO2study>

California announces details of new ETS

The California Air Resources Board (ARB) has released the details of the greenhouse gas emissions trading scheme which is due to begin operating in California from 2012 onwards, aimed at reducing emissions to 1990 levels by 2020. The cap and trade program will apply to the state's 500 largest emissions.

However, citing the poor state of the Californian economy, the ARB announced that almost all permits will initially be provided to companies for free, rather than being sold at auction. Certain industries will be provided with all of their permits for free until 2020, including the oil and cement industries.

Despite claiming the economic situation as a justification for weakening the scheme, the ARB has argued that the law will drive innovation and green

job growth. The plan is estimated to cost just 0.1 per cent of annual GDP growth. In addition, the relatively poor economic situation in California means that the goal of reducing emissions to 1990 levels by 2020 is less ambitious than when originally proposed.

At time of press, the scheme was due to be adopted in final form by the ARB on December 16.

Web link: <http://www.arb.ca.gov>



STEVE CALCOTT

Turn up the CO₂, and up goes the temperature.

Climate change increases drought risk, severity

Large parts of the Americas, Eurasia, Africa and Australia will face an increasing risk of severe and prolonged drought this century as a result of climate change, a new study has confirmed. Authored by Aiguo Dai of the National Center for Atmospheric Research (NCAR) in the US, the study modelled how climate change will affect the various causes of droughts, including amount of precipitation and rate of evaporation.

"We are facing the possibility of widespread drought in the coming decades, but this has yet to be fully recognised by both the public and the climate change research community," Dai says. "If the projections in this study come even close to being realised, the consequences for society worldwide will be enormous."

Web link: <http://tinyurl.com/NCRstudy>

No IMO deal on fuel efficiency for ships

A decision by the IMO to implement an Energy Efficient Design Index (EEDI) for ships was blocked by several developing countries at a meeting of the IMO's Marine Environment Protection Committee (MEPC) in London in September. The standard has been under development for four years, and would have represented the first global measure to limit carbon emissions from shipping.

However, key developing countries led by China, India, Brazil, South Africa and Saudi Arabia, who had been involved in the negotiation process from the beginning, voted to reject the measure. It is now unlikely that any progress will be made until mid 2011 at the earliest.

Bill Hemmings of Transport & Environment said, "It's extremely disappointing to see such an obvious win-win policy blocked by a handful of short-sighted countries. Some developing countries appear to be worried about setting a precedent whereby a climate-related policy affects all countries equally. But that's a missed opportunity because developing countries will benefit just as much as developed countries from ships that use less fuel."

Source: T&E press release 4 October 2010.

New publications

An NGO Introduction to Mercury Pollution (2010).
By Jack Weinberg. 156 pages. Published by International POPs Elimination Network (IPEN).

This new book, freely available online, deals with mercury pollution and its harm to human health and the environment. Mercury is a global pollutant. When released, it evaporates, travels on air currents, and then falls back to earth, sometimes near the original source and sometimes far away. When mercury enters the aquatic environment, microorganisms can transform it into methylmercury, a compound that is more toxic at low doses than elemental mercury.

In the environment, methylmercury becomes part of the food chain. Small aquatic organisms ingest it from their surrounding environment. They, in turn, are eaten by fish and other larger aquatic organisms. As a result, the methylmercury bio-magnifies, becoming increasingly concentrated as the pollutant works its way up the food chain.

Marine mammals, birds, and other animals that consume fish can become highly polluted with methylmercury. Generally, higher concentrations are found in larger and older animals. People who regularly eat fish or fish-eating animals can also become sufficiently polluted with methylmercury that it harms their health. A mother passes on the mercury that has accumulated in her body to the developing foetus. Foetuses, as well as infants and children, are particularly susceptible to harm from mercury exposure.

Scientific knowledge about the harms to human health and the

environment caused by mercury exposure has grown over the years, and many governments have already taken some steps to control - within their jurisdictions - industrial and other human activities that release mercury into the environment.

However, because mercury is a global pollutant, no national government acting alone can protect its people and its environment. Recognising this, governments agreed in 2009 to start intergovernmental treaty negotiations with the aim of preparing a global, legally binding mercury-control treaty. The objective of the negotiations is to reach agreement on final treaty text in time to adopt a global mercury treaty in 2013.

The book aims to help encourage and enable organisations of global civil society to engage in local, national, and international activities aimed at controlling mercury pollution. It identifies sources of mercury pollution and suggests what can be done to control them, including also an outline of the kinds of provisions a global mercury-control treaty must contain if it is to be successful in sufficiently minimising mercury pollution to protect human health and the environment.

Download the book: <http://www.ipen.org>



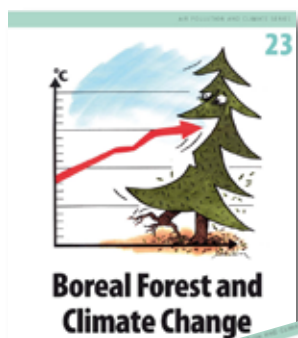
Recent publications from the Secretariat



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.

Additional, regional perspectives on the topic is given in *"Boreal Forest and Climate Change - regional perspectives"* (by the same author, April 2010). The expected rate of warming varies considerably within the Arctic region, as does the state of the forest. This means that the possible climate effects - and the possibilities to mitigate them - will be different.



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Coming events

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

EU Environment Council. Brussels, 20 December 2010.

EU Environment Council. Brussels, 3 March 2011.

Green Ship Technology Conference and Exhibition. Oslo, Norway, 21-22 March 2011. Information: www.greenshipstechnology.com

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 11-15 April 2011. Information: www.unece.org/env/lrtap/

Southeast European Congress on Energy Efficiency and Renewable Energy. Sofia, Bulgaria, 13-15 April 2011. Information: <http://tinyurl.com/SofiaCongress>

The Arctic as a messenger for Global Processes – Climate Change and Pollution. Copenhagen, Denmark, 4-6 May 2011. Information: www.amap.no

World Renewable Energy Congress 2011. Linköping, Sweden, 8-13 May 2011. Information: www.wrec2011.com

ECOMM 2011. European Platform on Mobility Management. Toulouse, France, 18-20 May 2011. Information: www.ecomm2011.eu

International Transport Forum. Leipzig, Germany, 25-27 May 2011. Information: www.internationaltransportforum.org

International EFCA-symposium on Ultrafine Particles. Brussels, Belgium, 26-27 May 2011. Information: www.efca.net

Acid Rain Conference 2011. Beijing, China, 6-9 June 2011. Information: www.acidrain-2010.org

European Biomass Conference and Exhibition. Berlin, Germany, 6-10 June 2011. Information: www.conference-biomass.com

EU Environment Council. Luxembourg, 10 June 2011.

IMO Marine Environment Protection Committee. London, UK, 11-15 July 2011. Information: www.imo.org

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 29 August - 2 September 2011. Information: www.unece.org/env/lrtap/

European Photovoltaic Solar Energy Conference and Exhibition. Hamburg, Germany, 5-8 September 2011. Information: www.photovoltaic-conference.com

CLRTAP Executive Body. Geneva, Switzerland, 12-16 December 2011. Information: www.unece.org/env/lrtap/