NO. 1, MARCH 2013

Acid News

Running out of time – the LCPD bites at last

EU SO_2 emissions have been cut by 80 per cent and NOx emissions halved between 1990 and 2010. Things are going to get even better, thanks to the LCP Directive.

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Progress too slow

Emission levels of carbon dioxide from the transport sector have levelled off, after the sharp reductions that followed the economic crisis in 2008.

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Revising EU air pollution policy

Significant additional emission reductions and accompanying environmental improvements can be achieved in the EU over the next 10-15 years.

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Nitrogen overload still harms ecosystems

Two-thirds of EU ecosystems are currently exposed to more nitrogen deposition than they can cope with and one-tenth is receiving too much acid fallout.

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Scope for reducing ammonia emissions

By applying already known techniques and agricultural practices, the EU could reduce agricultural emissions of ammonia by more than 30 per cent.

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Tailwind for wind

Wind power is coming of age. It supplies one-fortieth of the world's electricity, and has grown tenfold in 10 years. There is room for much more. China and the US now lead the world.

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Small chimneys – big emissions

The Danish Government and the European Commission have separately presented proposals for emission standards for new boilers and stoves. But to achieve noticeable near-term air pollution reductions it is essential to combine such standards with measures for existing installations.

Residential wood burning in the EU is a significant source of several air pollutants: fine particulate matter ($PM_{2.5}$), black carbon (soot), dioxins, polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs). It accounts for about one-third of the total emissions of soot and $PM_{2.5}$. These emissions contribute significantly to premature mortality and morbidity in the EU as well as to Arctic warming and thereby climate

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Acid News

A newsletter from the Air Pollution & Climate Secretariat, the primary aim of which is to provide information on air pollution and its effects on health and the environment.

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

In order to 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:

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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.

AirClim

Editorial

It is now 2013, the year declared by environment commissioner Potočnik as the year of air, and in a speech at the EEB air quality conference on 8 January, he said that poor air quality was the cause of 420,000 premature deaths in the EU in 2010 and that this is "simply not acceptable" – a view that is obviously shared by a large majority of the population, according to a Eurobarometer survey published that same day.

The survey reveals a widespread dissatisfaction among EU citizens with actions currently being taken to address air quality problems. Seven out of ten respondents said that public authorities are not doing enough to promote good air quality.

"It is equally unacceptable that we should need to wait another forty years"

Almost nine out of ten believe that health issues related to air quality are a serious problem, and eight out of ten consider acidification and eutrophication as serious problems. Four out of five EU citizens believe that the EU should propose additional measures to address air pollution.

Support for stricter air quality policy also comes from the World Health Organization (WHO), which has urged the EU to strengthen its laws on air pollution to bring them into line with the latest science. The science-based WHO's air quality guidelines are currently far stricter than the EU's standards. For fine particulate matter ($PM_{2.5}$), the EU standard is more than twice as high as the WHO guideline. The EU limit value is also twice as high as the new air quality standard in the United States.

Since the adoption of the EU's national emission ceilings (NEC) directive in 2001, scientific methodologies and understanding of the wider environmental effects of air pollution have also improved – we now know that ecosystems are more sensitive than previously thought and the resulting problems of eutrophication, acidification and ozone exposure have been worse than previously estimated.

In early March, sixty environmental, health and citizens' organisations from across the EU sent a joint letter to the Commission, listing three main priorities for which they would like legislative action in 2013.

- The adoption of ambitious emission reduction commitments in the revised NEC directive, both for existing and 'new' pollutants – new pollutants being $PM_{2.5}$ and methane.
- The adoption of sector legislation to cut emissions from all major sources – the main sectors listed include agriculture, domestic heating, shipping, small industrial combustion plants, road vehicles, non-road mobile machinery and solvent use.
- The enforcement and strengthening of ambient air quality limit values, especially for $PM_{2.5}$.

In his 8 January speech, Potočnik suggested "that for health, the vision of no significant negative impacts from air pollution means achievement of WHO health guidelines" and that "for the environment, it means no ecosystems stressed by acidification or eutrophication." He concluded that "this should be our ultimate goal, and it should be achieved by 2050."

The vision as such is fine – it is in fact largely the same as the long-term objectives already established twenty years ago in the EU's Fifth Environment Action Programme (EAP) from 1992 (and again in the Sixth EAP from 2002).

Potočnik is right in saying that the current air pollution situation is not acceptable. But it is equally unacceptable that we should need to wait another forty years to achieve the objectives agreed twenty years ago. The expectation of the sixty environmental groups – and most probably also of the vast majority of EU citizens – is for the Commission and member states to aim to achieve these fundamental objectives by 2030.

Christer Ågren

EU citizens: we want stronger air quality policy

Almost four out of five Europeans believe that the EU should propose additional measures to address air pollution.

According to a recent Eurobarometer survey among EU citizens, a majority of Europeans believe that air quality has deteriorated in the last ten years. In Italy, as many as 81 per cent hold this view, and between 70 and 75 per cent in Cyprus, France, Greece, Hungary, Romania and Spain.

The survey reveals a widespread dissatisfaction with actions currently being taken to address air quality problems, with seven out of ten Europeans considering themselves unhappy with efforts by public authorities to improve air quality. Other groups that were not seen as doing enough were energy producers (64%), households (61%), car manufacturers (53%) and farmers (50%).

There is also a general sense that the level of information about air quality is insufficient; almost six out of ten do not feel adequately informed about air quality issues, with 31 per cent of participants in Spain and 27 per cent in Luxemburg, Cyprus and Latvia of the view that they are not informed at all.

A large majority of Europeans (79%) think that the EU should propose additional measures to address problems related to air quality in Europe. Participants in the survey were specifically asked if they are aware of EU legislation on air quality standards and national emission ceilings, and out of those who know about these laws (25 per cent in both cases), more than half were of the view that they should be strengthened.

Janez Potočnik, European Commissioner for the Environment, said "Citizens want us to act and we will respond by reviewing our air policy in 2013. They are asking for more measures in key sectors, and better information on policy effectiveness. To meet these challenges we need to work together at all policy levels – and follow up with action on the ground."

Impacts of air pollution on health and nature are clearly a cause for great concern. Almost nine out of ten believe that health issues related to air quality, such as respiratory and cardiovascular diseases, are a serious problem, and around eight out of ten consider acidification and eutrophication as serious problems.

When asked about the sources of air pollution, more than three-quarters say that emissions from cars and trucks have a large impact on air quality. Just over two-thirds point to emissions from industrial production and from fossil fuel power stations, while 54 per cent say international transport. Fewer than half think that agricultural emissions from farms, fertilisers and burning of agricultural waste (41%) and residential energy use (34%) have a large influence on air quality.

Electric cars and hybrid electric/gasoline cars are considered the best car fuel systems in terms of air quality, and electricity the best household heating system, followed by wood biomass, gas, and biomass pellets. Seven out of ten believe that renewable energy should be prioritised as the main energy option in future. Some 85 per cent of Europeans agree with the "polluter pays" principle, whereby those who pollute should also pay for the costs for negative impacts on health and the environment.

Actions most commonly taken by individuals in the last two years to reduce emissions were to use public transport more frequently, cycle or walk instead of using a car (63%), replace old, inefficient equipment with newer equipment with better energy efficiency ratings (54%), replace their domestic heating system with a lower-emission system, and buying a low-emission car (22%).

Just under half of Europeans (49%) think that the challenges of air pollution can best be addressed at the European level, while 23% think these challenges are better addressed at the national level and 24% at the local level.

Carried out in autumn 2012, the Eurobarometer survey asked more than 25,000 EU citizens in the 27 member states a number of questions on the topic of air quality. The findings show strong support for further action at EU level and will feed into the European Commission's ongoing review on EU air pollution policy, which is scheduled to come up with specific proposals for measures in the second half of 2013.

Christer Ågren

Information: European Commission press release, 8 January 2013: *http://europa.eu/rapid/press-release_IP-13-6_en.htm*

The full Eurobarometer results: *http://ec.europa.eu/public_opinion/archives/flash_arch_360_345_en.htm#360*

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Walking, cycling and using public transport were the most popular form of action taken by individual citizens to improve air quality.

Small chimneys – big emissions

Continued from front page

change. The share of emissions from residential wood burning is expected to increase as other key emission sources gradually become more efficiently regulated and because increasing costs of conventional home heating will continue to stimulate cheap wood burning.

Emission levels per unit of energy from residential wood burning are so high that emission levels from other heat sources are overshadowed (figure). In addition, detailed Danish and Swiss measurements from chimneys show that emissions of $PM_{2.5}$ may increase up to 30 times if a stove isn't operated properly and up to 250 times if it is misused, which underlines the fact that emission levels can be much higher under real-life conditions.

The key challenges related to residential wood burning are the high pollution levels combined with a long lifetime of each unit (usually more than 30 years) and the intensive use of wood burning because it is a cheap or sometimes even free way of heating in many parts of Europe.

The Danish Centre for Environmental Research has conducted very detailed studies on pollution from residential wood burning, and found that it is responsible for about 80 per cent of Danish PAH emissions, 70 per cent of $PM_{2.5}$, 60 per cent of black carbon, 50 per cent of dioxin and contributes significantly to emissions of VOCs and CO (ozone precursors). In comparison, all Danish power plants emit about 2 per cent of the total $PM_{2.5}$ emissions but produce more than 60 per cent of the energy.

Detailed measurements in residential areas in Denmark show that wood burning can increase local $PM_{2.5}$ and PAH concentrations to levels similar to those in rush hour traffic in central Copenhagen.

The Danish Centre for Energy, Environment and Health estimates that pollution from Danish residential wood burning causes about 250 premature deaths yearly in Denmark and about 650 premature deaths in the EU (due to pollution spread to the rest of Europe). This mortality is related to chronic exposure to increased PM concentrations and not to acute exposure to wood smoke. On top of this, tens of thousands of cases of serious diseases (heart, airways and cancer) can be related to the pollution. This estimate does not take into account secondary particles from VOC emissions. The yearly socio-economic health costs related to pollution from Danish wood burning are estimated to be around €500 million per year.

If residential wood burning remains practically unregulated, the sector will by 2025 be responsible for more than 90 per cent of the total Danish $PM_{2.5}$ emissions.

In the light of this situation, the Danish government put forward a proposal to regulate stoves and boilers that has just been out for public consultation. The key point is to introduce emission standards for new stoves and boilers. The limit values are aimed at both sale and resale and must be fulfilled to sell stoves and boilers in Denmark and will only come into force if allowed as national standards by the EU. The Commission has also published a working document with possible EU-wide emission limit values for new stoves in the form of the Ecodesign Directive.

The Danish and EU proposals for PM limit values for stoves are shown in the table and compared to the best stoves on the market today and emissions from other heat sources in Denmark as well as the European Environmental Bureau's proposal for limit values(see figure). The Danish limit value for 2016 is twice as high as the best stove was in 2010 and the EU limit value for 2015 is almost ten times higher. The proposed limit values are high compared to emission levels for other heat sources and trucks as well. However, a key problem is that the regulation does not focus on replacement of existing stoves with new models or other heat sources. Since stoves and boilers often have a long lifetime (more than 30 years) the Danish Environment Protection Agency estimates that the proposed regulation will only reduce particle pollution by 2 per cent.

By replacing old wood stoves with Swan labelled[1] stoves and replacing old wood boilers with new boilers the pollution from private wood burning can be halved. This would reduce the total Danish and EU emission of $PM_{2.5}$ by 35 and 16 per cent, respectively. And if all wood stoves and wood boilers were replaced with wood pellet equivalents the pollution from residential wood burning could be shrunk to less than a tenth of present emissions. Total Danish and EU emission of $PM_{2.5}$ would be reduced by about 65 and 30 per cent, respectively, and other key pollutants would also be reduced significantly.

Several flue gas cleaning technologies have been tested in Denmark without success. Consequently, the most cost-efficient PM reduction measures for this sector are to replace existing wood stoves and wood boilers with the best ones on the market, or even better, with pellet stoves and pellet boilers or other heating sources.

Table: Suggested Danish, EU and EEB emission limit values for stoves. All limit values include condensates (Norwegian standard NS 3058-2).

Stoves	2013	2016	
Danish suggestion (in g $PM_{2.5}$/GJ) (original units: g PM / kg wood)	320 (5 g PM/kg wood)	250 (4 g PM/kg wood)	
	2015	2017	2019
Commission suggestion (in g $PM_{2.5}$/ GJ) (original units: mg/Nm^3, 13% O_2)	1,150 (150 mg/Nm^3)	580 (75 mg/Nm^3)	310 (40 mg/Nm^3)
	2015	2018	2020
EEB suggestion (in g $PM_{2.5}$ /GJ)	200	100	50

Danish wood burning

Stoves emit about 70% of the $PM_{2.5}$ from residential wood burning and boilers emit about 30%. About 25% of the wood is used in wood pellet boilers but these only cause about 1% of the emissions. About 20% of the Danish stoves are old (before 1990) and 80% are newer. About 15% of the Danish stoves have the Swan label. About 20-30% of the Danish boilers are old (before 1980) and 70-80% are newer.

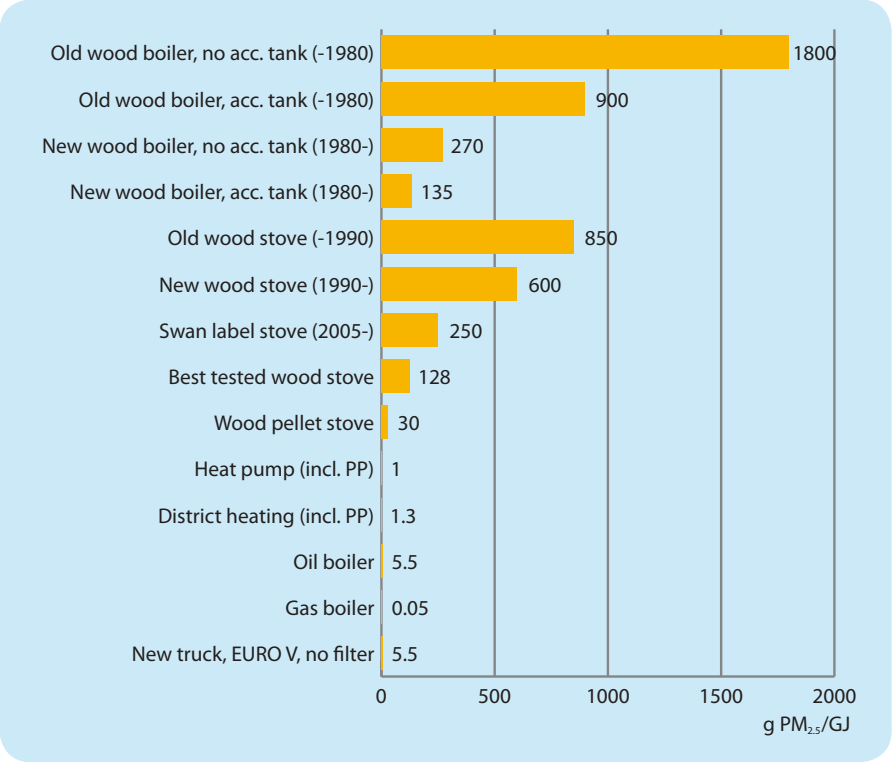

Figure: $PM_{2.5}$ emission levels including condensates (Norwegian standard NS 3058-2) from boilers and stoves compared to other heat sources. In comparison, the emission level of a truck without filter (EURO V) is included.

Note: The emission level for boilers may be expressed as mg/Nm³ and 10 per cent oxygen. This emission does not include condensates. Usually, 1 mg/Nm³ ≈ 5.5 g/GJ including condensates. Newer estimates suggest that emission factors from boilers may be reduced up to 40 per cent. Emission from stoves may be expressed as mg/Nm³ and 13 per cent oxygen. This emission does not include condensates. Usually, 1 mg/Nm³ ≈ 7.7 g/GJ including condensates.

Economic incentives (taxes or charges) combined with strict emission limit values are efficient instruments to promote replacement (shorten the lifetime) or phasing out of heavily polluting stoves and boilers, thereby promoting the best stoves and boilers and encouraging better home insulation, heat pumps or, in cities, gas and district heating. The Danish Ecological Council has designed a tax proposal concerning stoves in Denmark. The tax is based on the type of installation, varies with emission levels and is differentiated for urban and rural areas. For an old wood stove within an urban area the tax would be 1,000 euros a year, but for an equivalent stove in a rural area the tax would only be half as much. A modern eco-labelled wood stove in an urban home would cost 500 euros a year, while an equivalent stove in a country home would be free from tax. Pellet stoves would be exempted from tax everywhere.

The proposal means fairer taxation of heat sources by increasing the fee on the most polluting types. It has been estimated that this tax model would reduce the pollution from wood burning by more than 50 per cent through the replacement of units, increase Danish tax revenues by €200-300 million per year and result in annual health gains worth €200-300 million in Denmark and almost €1 billion in Europe due to Danish PM reductions. Furthermore, incentives to insulate houses would be enhanced, as well as the promotion, sales and development of better stoves.

In order to further promote the best new stoves and boilers an EU labelling system could be introduced. Another option is to introduce low-emission zones prohibiting or restricting domestic wood burning in residential areas where district heating or gas are – or can be made – available.

Kåre Press-Kristensen

Kåre Press-Kristensen is senior advisor on air quality at The Danish Ecological Council (*www.ecocouncil.dk*).

[1]The swan is an ecolabel established by the Nordic Council of Ministers.

No extension for the 2015 sulphur deadline

The European Commission on 25 January told France it will not authorise any EU country to seek an extension of the deadline for the 2015 sulphur limit of 0.10 per cent for marine fuels used in the European Sulphur Emission Control Areas (SECA) covering the Baltic Sea and the North Sea including the English Channel.

The statement from the Commission came in response to a proposal from the French shipowners interest group Armateurs de France (AdF) to seek a three-year extension of the deadline for ships already in service in the Channel and North Sea.

In a so-called non-paper, the Commission concludes that raising the general issue of deadlines for implementation "may be wrongly perceived as an attempt to overturn the agreement reached [in IMO in 2008]." It also argues that such a move could create additional hurdles for those in the process of implementing the new provisions, thus jeopardising orders for scrubbers and refinery investments. Furthermore, plans could be postponed for a much-needed LNG infrastructure to make the industry resilient for the longer term.

The Commission continues to say that the implementation of the new directive is also a key measure to help member states resolve lingering non-compliance cases related to EU air quality standards, notably related to particulate matter which cause the most significant human health impacts. Several impact assessments demonstrated that reducing emissions from maritime transport featured amongst the most cost-effective measures. Failing to tap that potential would require action in other sectors, including the public sector, or else member states would risk penalties in the range of several of millions of euros.

Directive 2012/33/EU on the sulphur content of marine fuels (amending directive 1999/32/EC) was published in the EU's Official Journal on 27 November 2012 and entered into force on 17 December 2012. Member states have until 18 June 2014 to transpose the directive into their national law.

Running out of time – the LCPD bites at last

EU SO_2 emissions have been cut by 80 per cent and NOx emissions halved between 1990 and 2010. Things are going to get even better, thanks to the Large Combustion Plant Directive (LCPD), introduced in 1988.

In March 2013, the Didcot A power plant, near Oxford in southern England will be shut down. It used to emit 41,000 tons of SO_2 (equivalent to 128,000 tons of concentrated sulphuric acid), 16,000 tons of NOx and six million tons of CO_2. It was ranked 24th of the worst point sources of SO_2 among the then 25 members of the EU .

Didcot was commissioned in 1964, long before acid rain entered the political agenda, let alone climate change. It is now on its deathbed, as a result of the 1988 LCP directive.

The original LCPD targeted the "new" plants, those in operation from July 1987 or later. The "existing plants", such as Didcot were only indirectly addressed. The governments were obliged to cut the national SO_2 emissions from such existing plants by about 30 per cent by 1993, and about 65 per cent by 2003.

This forced many, but not all, plants to improve their act by retrofitting flue gas desulphurisation. Some could survive because other plants took measures, and by using low-sulphur coal.

The LCPD was amended in 2001. Now old plants such as Didcot A (from before 1987) had to either conform to roughly the same emission standards as the post-1987 plants, or "opt out".

Didcot A opted out, together with 219 other power plants or other combustion plants, more or less Europe's dirtiest. Most of them are in Eastern Europe and the UK, but also a quite a few in France, Spain and Portugal, according to European Commission reports .

The 220 plants, with a total thermal capacity of about 90 GW in operation in 2006, will be retired at the latest by the end of 2015. 90 GW corresponds to about 30 GW of electric power, if all the plants were power plants (which most of them are).

The opt-out plants were given a maximum of 20,000 hours of operation between 2008 and 2015. Those 20,000 hours could be used for a little more than two years of constant operation and then had to shut down. Alternatively, a plant could operate for fewer hours per year (for example to cover winter peaks) but more years.

There are about 3,300 large combustion plants, of which 220 chose to opt out.

Most of the opt-out plants use coal to generate power, including lignite and peat.

Many have used up all or almost all of their hours. By 2012, 52 of them had less than one year (8,760 hours) to go, some not a single hour. They are essentially out of service.

Sixty-six of them have operated for less than 1,000 hours and quite a few not even one hour. Most of those are unlikely to ever operate. They are a last-resource reserve, and also essentially out of service.

Table: Opt-out plants as of 1 January 2012

	No	MWth
Belgium	2	670
Bulgaria	3	3,111
Cyprus	6	768
Denmark	1	104
Estonia	1	1,146
Finland	19	2,634
France	36	5,141
Greece	4	946
Italy	20	2,977
Malta	4	941
Poland	40	8,146
Portugal	5	4,411
Romania	41	11,680
Slovakia	9	3,057
Slovenia	2	419
Spain	10	5,011
United Kingdom	17	39,239
Total	**220**	**90,401**

So what will come in their place?

Despite having over 25 years' notice, there is an element of panic in some countries. This is because the shutdown of the coal power plants coincides with a crisis in nuclear power and new doubts about increased dependence on natural gas.

Germany has been planning to phase out nuclear since 1998, while also cutting CO_2 and other emissions. Renewables are gradually replacing both nuclear and coal. Germany has no opt-outs, but wind and solar are intermittent, and have to be balanced with cross-border trade or by load-following other power plants. Load-following means less money for the plant operator, in Germany or outside.

Belgium has two opt-outs. It plans to phase out two (smallish) nuclear power reactors by 2015. According to some people this meant a risk of blackouts in Belgium. Last summer, however, two (larger) nuclear reactors were found to have thousands of defects in the core vessels, and are have since been shut down. It is not clear when, or even if, they can restart, but Belgium made it through a full winter with an acceptable capacity margin at all times. This margin will shrink somewhat when the opt-outs cannot be used.

The UK has a bigger problem. The policy has been to replace phased-out coal power with new coal power, nuclear power, wind power and gas power.

In the real world however, the UK is phasing out nuclear. It has shut down 29 reactors, two of them during 2012, and several more to follow before possible nuclear new-builds could add capacity, at the very earliest by 2019.

New coal is going nowhere. E.ON gave

Didicot A on its last legs.

JOE DUNCKLEY/FLICKR.COM/CC BY-NC-SA

up on building two 800 MW coal power units at Kingsnorth, citing lack of an economic case. Another factor, though, was the strong opposition for climate reasons. The project did not agree well with the strong UK climate commitment. A long-standing effort to reconcile coal with climate policy has been carbon capture and storage. Efforts to make coal clean with CCS have failed so far – despite government offers of at least a billion pounds, on top of similar EU offers.

Gas power provides the UK with more electricity than coal and nuclear combined, and is not used at full capacity. But gas is expensive, and many worry that still more gas will mean higher electricity bills.

In short, the equation is: less coal, less nuclear, not much more gas. Wind power contributes 20 TWh/year, which could become 40 TWh by 2015. Regulator Ofgem has warned of blackouts by 2015, largely because of shutdowns of opt-outs.

So can more renewables really meet demand?

They will have to. In the short term, the only games in town are renewables, efficiency and demand side. It is really the same story as in Germany, Belgium and France (with many opt-outs and a bleaker future for nuclear) … and almost everywhere else. Less "base-load" means a more variable supply.

The high prices argument is not relevant. The public has to pay for investments in new power and grid capacity, either as taxpayers or as consumers.

With somewhat higher prices, and much more variable prices, there will be strong incentives to shift some consumption from peak to off-peak hours, or even minutes and seconds. With various market mechanisms and gadgets it is much cheaper to adjust demand than to build new power lines and power stations.

This has always been the case, but demand-side management has usually lost out everywhere because of strong vested interests for more supply.

The crunch caused by the fallout of the LCP, among other things, could be a double blessing. The air will be cleaner and the energy system more sustainable.

Poland and Romania will have to shut a lot of plants, but both have surplus capacity and many power lines for cross-border trade. Both also have significant wind power programmes, and an overwhelming potential to save electricity. They have also overestimated power consumption in previous forecasts.

In 1988, when the LCPD was adopted, climate change was high on the agenda, but this is nowhere to be seen in the directive. It missed a good chance by giving much less stringent emission limit values for coal than for natural gas. Natural gas power emits no SO_2, much less NOx, less than half as much CO_2 per kWh, and is outperformed only by efficiency improvements and renewables.

In this respect, and by allowing coal subsidies, the EU has been a force for preserving coal rather than doing something about carbon emissions, all at the expense of air quality.

Now, 25 years later, the directive will actually lead to less coal, less CO_2, more renewables and greater efficiency.

Fredrik Lundberg

[1] Mark Barrett 2004 *http://128.40.58.147/markbarrett/Environment/LPS/APC17web.PDF* p 31

[2] *http://ec.europa.eu/environment/air/pollutants/stationary/lcp/implementation.htm*

[3] IEA Medium term renewable energy market report 2012

New US clean air standards for $PM_{2.5}$

The United States Environmental Protection Agency (EPA) in December finalised an update to its national air quality standards for harmful fine particle pollution ($PM_{2.5}$), setting the annual health standard at 12 micrograms per cubic metre to be met by 2020.

The standard was proposed in June (see AN 4/12) and is consistent with the advice from the agency's independent science advisors. EPA estimates the health benefits of the revised standard to range from US$4 to 9 billion per year, with estimated costs of implementation ranging from US$53 to 350 million.

By 2030, it is expected that all standards that cut $PM_{2.5}$ from diesel vehicles and equipment alone will prevent up to 40,000 premature deaths, 32,000 hospital admissions and 4.7 million days of work lost due to illness.

Source: EPA press release, 14 December 2012
More information: *http://www.epa.gov/pm*

EU launches alternative fuels strategy

On 24 January the European Commission announced a package of measures to ensure the build-up of alternative fuel stations for transport across the EU with common standards for their design and use. Alternative fuels are, according to the Commission, being held back by three main barriers that together form a vicious circle: the high cost of vehicles, a low level of consumer acceptance, and the lack of recharging and refuelling stations.

It is therefore proposing a package of binding targets on member states for a minimum level of infrastructure for alternative transport fuels such as electricity, hydrogen and natural gas, as well as common EU-wide standards for equipment needed. The Clean Power for Transport Package consists of a Communication on a European alternative fuels strategy, a Directive focusing on infrastructure and standards and an accompanying document describing an action plan for the development of Liquefied Natural Gas (LNG) in shipping.

Source: European Commission press release, 24 January 2013 *http://europa.eu/rapid/press-release_IP-13-40_en.htm*

Progress too slow

Emission levels of carbon dioxide from the transport sector have levelled off, after the sharp reductions that followed the economic crisis in 2008. However there is still a notable absence of structural changes, such as modal shifts.

Energy use in the transport sector fell from a record high level by almost 5 per cent between 2007 and 2009, and over the following two years energy usage has remained at a relatively constant level (figure), increasing according to preliminary data by 0.1 per cent between 2010 and 2011, writes the European Environment Agency in its annual report on transport and the environment[1], which was published just before Christmas.

The large fall in energy use occurred primarily in domestic shipping, aviation and rail. While the decrease for road transport, which accounts for 72 per cent of all transport energy, was much less.

Greenhouse gas emissions from transport, which in 2010 accounted for 24 per cent of all greenhouse gas emissions within the EU, have followed a very similar trend to that of energy use, i.e. a sharp decrease between 2007 and 2009, after which emissions stayed more or less level. This decline can mainly be attributed to lower volumes of freight transport, which in turn is a result of the economic recession and high fuel prices. This development means that the EU right now is on track for its target of reducing greenhouse gas emissions from transport by 60 per cent by 2050 compared to 1990 levels. However, as the EEA points out in its report, it is difficult to predict if this trend will last if and when the economy picks up.

To get a better understanding of how fluctuations in the economy affect transport, the report's authors also examined in more detail how the volume of passenger transport and freight transport have changed in comparison to GDP. Freight was found to be very sensitive to economic development. In 2008 freight transport volumes fell much more than GDP, and while the economy has slowly recovered, a much stronger rebound has been observed in the freight sector. Passenger transport was found to be much more resilient to fluctuations in the economy. Between 2007 and 2009 passenger traffic continued to rise, despite the economic downturn.

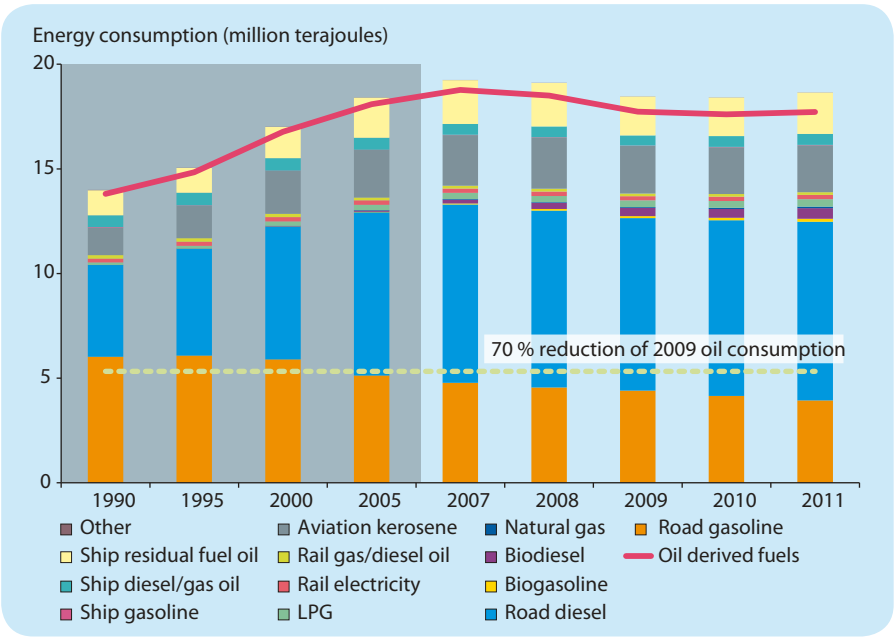

Figure: Transport energy consumption in all EEA member countries except Iceland and Liechtenstein.

High-time to put fossil-fuelled cars on the shelf.

It is only when the economy recovered somewhat, between 2009 and 2010 that passenger traffic decreased slightly. The volume of passenger traffic fell by one per cent between 2009 and 2010, in fact the first decline in many years. There has been growth in passenger transport volume every year since 1995. The explanation is thought to be less commuting, due to high fuel prices and more unemployment.

Modal shifts from fossil-fuelled road traffic and aviation to less polluting alternatives are crucial for a sustainable transport system. Unfortunately, we cannot see any positive development in this area. In Western Europe (EU-15) road traffic has continuously accounted for approximately 85 per cent of all passenger kilometres since 1995. The remaining percentage is divided roughly equally between bus and rail. In the new member states (EU-12), where bus and rail had significantly higher shares in the mid-1990s, the modal shares have steadily approached the situation in the rest of the European Union, and in 2010 the differences were only marginal. For freight the development is very similar. In the past decades road freight has dominated in the EU-15 and there is no hint of the situation changing. In the EU-12 more than half of freight went by rail in 1995, and today that share has shrunk to roughly a quarter.

In the White paper on Transport from 2011 the European Commission has set a target to reduce the sector's dependence on oil by 70 per cent by 2050 compared to 2009. A similar target is stated in the Directive for Renewable Energy, where the share of renewables in the energy mix should increase to 10 per cent by 2020. Despite a reduction in oil use and an increase in the proportion of renewable energy between 2009 and 2010, the changes are too small to be on track to meet the final targets. The situation for renewable fuels differs considerably in different member states. Slovakia and Sweden had the highest share of renewable energy in the transport sector in 2010, nearly 8 per cent, while the share of renewable energy in Denmark, Estonia and Malta did not even account for half a per cent.

The weak development of renewable fuels is also confirmed in the sale of vehicles designed for fuels other than petrol and diesel. The share of alternatively fuelled cars only accounted for four per cent of the entire fleet in 2011. And out of this share vehicles that run on liquid petroleum gas (also a fossil fuel) was the most common type. Sales of these, particularly in France and Italy, have fallen sharply since 2009 because of changing economic incentives. Electric vehicles represent only 0.03 per cent of the entire fleet.

The prospect of curbing traditional air pollutants is slightly brighter than other areas covered by the report. The two ozone precursors – non-methane volatile organic compounds (NMVOC) and carbon monoxide (CO) – have over a twenty-year period decreased to less than a quarter of previous emissions and so have sulphur (SO_2) emissions from other sources than international shipping. The trend in the short term, between 2009 and 2010, has also been declining. But this area also has some dark clouds; emissions of fine particulate matter ($PM_{2.5}$) and nitrogen oxides (NOx) have not fallen to the same extent and are today still about three-quarters of the 1990 emission levels. An increase in freight volumes between 2009 and 2010 has even resulted in a short-term increase in NOx emissions. The total reduction in SO_2 emissions is even smaller than for NOx and $PM_{2.5}$, since the increase in emissions from international shipping has more or less offset all the reductions that have occurred on land.

In the report it is noted that several of the targets that were set in the White Paper on transport have so far not been possible to follow up, due to a lack of data or methodology to obtain and analyse data. This includes the target to reduce the use of conventionally fuelled cars in urban traffic by 50 per cent by 2030 and the target that the majority of medium distance (>30 km) passenger traffic should go by rail by 2050.

Kajsa Lindqvist

[1] The contribution of transport to air quality, TERM 2012: transport indicators tracking progress towards environmental targets in Europe. *http://www.eea.europa.eu/publications/transport-and-air-quality-term-2012/at_download/file*

Revising EU air pollution policy

KELSEY_LOVEFUSIONPHOTO/FLICKR.COM/CC BY

Significant additional emission reductions and accompanying environmental improvements can be achieved in the EU over the next 10-15 years. Health benefits alone far outweigh the extra costs for emission control.

According to a recent report[1] by the International Institute for Applied Systems Analysis (IIASA), expected emission changes from implementing current legislation will lead to significant improvements in EU air quality. But despite these improvements, remaining levels of air pollutants will still cause significant damage to human health and ecosystems.

The production and analysis by IIASA of emission scenarios and their environmental impacts is done on behalf of the European Commission as part of the ongoing process to review and revise EU air pollution policy (see AN 3/2012).

Projections of future EU air pollutant emissions up to 2030 show that under business-as-usual (i.e. no additional measures on top of current legislation) sulphur dioxide (SO_2) emissions would decline by about 70 per cent, nitrogen oxides (NOx) by 65 per cent, and particulate matter ($PM_{2.5}$) and volatile organic compounds (VOCs) by about 40 per cent, compared to 2005. No significant changes are foreseen for emissions of ammonia (NH_3).

IIASA has also investigated the potential to take additional measures to reduce emissions beyond the current legislation, and found that full application of readily available technical measures – known as the Maximum Technically Feasible Reductions (MTFR) – would offer a significant potential for further improvements, which would bring the EU closer to achieving the objectives of its Environment Action Programme (see Table).

For instance, under current legislation the loss of average statistical life expectancy from exposure to $PM_{2.5}$ is expected to come down from 9.6 months in 2000 to 5.5 months in 2020 and 5.0 months in 2030. Full application of additional and readily available emission reduction measures could reduce these health impacts by another 30 per cent.

Elevated levels of ground-level ozone caused about 30,000 cases of premature deaths in the EU in 2000. By 2020, this number is expected to decline to 21,000 cases per year and by 2030 to some 19,000 cases. Full implementation of MTFR in the EU could avoid another 3,000 premature deaths per year. Changes in the impact of ozone to different types of vegetation, including crops and forests, have not yet been analysed.

Eutrophication constitutes a serious threat to the biodiversity of European ecosystems, and the continuing failure to reduce agricultural ammonia emissions enhances the urgency of this problem. In the year 2000, excess nitrogen deposition threatened biodiversity in 1.2 million km^2 of sensitive ecosystems, and by 2010 slow progress reduced this area to 1.05 million km^2. By 2030, the anticipated NOx reductions could shrink the affected area to 912,000 km^2, which is still more than half of the total area of sensitive ecosystems. Further measures, mainly for ammonia emissions, could protect another 200,000 km^2.

Of particular importance are areas that receive specific protection under the Birds and Habitat Directives or under national law. While not all countries have supplied

critical loads data for such protected areas, IIASA concludes that progress in these zones is slow, and by 2030, biodiversity in nearly two-thirds of the protected areas may still be threatened by excess nitrogen deposition, in addition to pressures from fragmentation and climate change.

In contrast, the situation looks brighter for acidification. The sharp fall in SO_2 emissions in particular is expected to shrink the unprotected forest area in the EU between 2000 and 2030 by three-quarters, from 205,000 km^2 to less than 50,000 km^2. In addition, there is significant scope for further improvements, both from more stringent technical emission controls and through tougher climate policy.

A new methodology has been developed that enables the assessment of compliance with PM_{10} and NO_2 air quality limit values under future emission scenarios. This has been implemented for all AirBase stations in the EU for which sufficient monitoring data are available, i.e. 1,483 stations for PM_{10} and 1,174 stations for NO_2. (AirBase is the public air quality database system of the European Environment Agency, which contains monitoring data and information submitted by the participating countries throughout Europe.)

For the PM_{10} limit values – which should already have been met by 2005 – emission cuts under current legislation are expected to largely eliminate current non-compliance in most of the member states by 2020. However, due primarily to the persistence of solid fuel use in small stoves for home heating, exceedances of the PM_{10} limit values are expected to prevail in urban areas in Poland, Bulgaria, Slovakia and the Czech Republic. Full application of MTFR could eliminate almost all likely remaining exceedances by 2020, but problems would still persist in urban areas in these four countries. Here, dedicated action to substitute solid fuels in the household sector with cleaner forms of energy will be needed.

For NO_2 limit values – which should have been met by 2010 – the foreseen drop in NOx emissions from the transport sector will reduce the share of stations that are in clear non-compliance with the annual NO_2 limit value from about 25 per cent in 2000 to four per cent in 2020 and further to one per cent in 2030. Implementation of the MTFR could eliminate all non-compliance with the exception of three stations. It should be noted that MTFR does not include or consider local measures such as traffic restrictions or low-emission zones.

In a second report[2], IIASA presents preliminary results of applying the optimisation mode of its GAINS computer model to identify the least-cost set of emission reduction measures for the EU as a whole that will achieve given environmental targets at differing levels of ambition. Together with an analysis of the associated costs and monetised benefits, this type of scenario analysis will be used to establish the level of ambition for the EU air quality policy for future target years (see Box).

Results presented in these two reports are still preliminary because the calculations were performed using an energy scenario from 2010, while the final analysis – to be presented in April – will instead use the most recent EU-wide energy scenario, known as PRIMES-2012.

The optimised scenarios are constructed for what is known as a gap closure ap-

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Billions in benefits

A preliminary cost-benefit analysis[1] (CBA) was presented at the SEG meeting in December. Here the estimated cost for additional emission abatement measures beyond the baseline was compared to estimated health benefits.

Moving from the baseline to the low ambition level (25% gap closure) would reduce annual health damage costs in 2030 by €15-51 billion in the EU. Going to the mid (50%) and high (75%) ambition levels would result in annual benefits of €29-102 billion and €44-154 billion, and implementing MTFR would provide health benefits valued at €59-204 billion.

The costs for the additional emission abatement measures range from €0.4 billion per year in 2030 for the lowest ambition case, €2.3 billion/yr for the mid case and up to €10 billion/yr. If for the high ambition case. The MTFR is estimated to cost €53 billion/yr If expressed as a percentage of GDP in 2030, for the mid case this is equivalent to 0.014 per cent, and for the high case 0.06 per cent as an average for the whole EU.

To put these figures in perspective, 0.01 per cent of GDP corresponds to 10 minutes of work per year for each person, assuming 250 eight-hour workdays per year, according to the analysis for last year's revision of the Gothenburg Protocol.

For all scenarios, including the MTFR, the monetised health benefits exceed the costs. Some examples: for the mid ambition scenario the benefits exceed the costs by between 13 times (lowest valuation) and 44 times (highest valuation), and for the high ambition scenario the benefits-to-cost ratio is between 5 and 16.

It should be noted that these monetised benefits do not include impacts to ecosystems, agricultural crops or materials. Nor do they include for example chronic effects of ozone on health.

[1] Cost-benefit analysis of scenarios for cost-effective emission controls after 2020 (November 2012). Report to the European Commission by Mike Holland, EMRC.

Table : Annual impact on health and ecosystems in EU27 in the year 2000, 2010 and in 2030 under the baseline and MTFR scenarios.

	Million years of life lost due to $PM_{2.5}$	Cases of premature deaths due to O_3	Ecosystem area with excess nitrogen deposition (1000 km^2)	Forest area with excess acid deposition (1000 km^2)	Freshwater catchment area with excess acid deposition (1000 km^2)
Year 2000	399	29,300	1151	203	20
Year 2010	287	25,500	1019	96	15
Baseline 2030	208	18,600	888	47	12
MTFR 2030	150	15,600	679	21	11

Source: IIASA TSAP Reports 6 and 7 (November 2012)

Revising EU air pollution policy

Continued from previuos page

proach, aiming at step-wise health and environmental improvements. In effect this means closing the gap between the impacts of the baseline and the MTFR scenarios. For this report, IIASA has calculated three gap-closure scenarios, investigating varying levels of ambition, 25, 50 and 75 per cent gap closure for four different health and environmental targets.

The review and revision of EU air pollution policy started in March 2011 and is expected to result in a clean air strategy package to be presented by the Commission in autumn 2013. One of the main components of the package will be a revised Thematic Strategy on Air Pollution (TSAP), updating the previous one from 2005, establishing new targets for reducing damage to health and the environment as well as associated ambition levels for future cuts in air pollutant emissions.

The TSAP will be accompanied by a proposal to revise the 2001 National Emission Ceilings (NEC) directive, setting binding emission reduction targets for each member state for five air pollutants. The target year for achieving the reductions is yet to be decided, but it is likely to be 2020, 2025 or 2030, or possibly there could be more than one target year.

On 5 December, the Commission's Stakeholder Expert Group (SEG) held its fourth meeting, where it was updated on progress and discussed the information developed so far. A fifth SEG meeting is scheduled to take place in early April.

Christer Ågren

[1] TSAP-2012 Baseline: Health and environmental impacts. TSAP Report #6 (November 2012).

[2] Scenarios of cost-effective emission controls after 2020. TSAP Report #7 (November 2012).

The IIASA reports prepared for the EU air pollution policy review can be downloaded from: *http://gains.iiasa.ac.at/index.php/policyapplications/tsap*

The presentations held at the 5 December SEG meeting are available at a dedicated CIRCA library website that can be reached from: *http://ec.europa.eu/environment/air/review_air_policy.htm*

Stricter standards for motorcycles

On 11 December, the Council adopted a regulation laying down new safety and environmental requirements for motorcycles and other L-category motor vehicles (mopeds, quads and small vehicles with three or four wheels).

New motorcycles will have to comply with Euro 4 emission standards as from 2016 and mopeds as from 2017. Before the end of 2016, the Commission will evaluate the air quality and the share of pollutants produced by L-category vehicles, and consider enforcement of Euro 5 emission standards as from 2020.

The new regulation also lays down requirements for the progressive installation of onboard diagnostics systems, which can detect failures and monitor the emission control system.

Source: European Council press release, 11 December 2012

THE-ICING-ON-THE-CAKE/FLICKR.COM/CC BY-NC

New legal approach to improve EU air quality

Ambient air quality is poor in many EU countries – despite an obligation for governments to ensure good air quality for citizens. Excessive levels of particulate matter (PM_{10}) have led the Commission to take action against 17 member states.

Over the last few years, the Commission has taken Italy, Portugal, Slovenia and Sweden to Court for failing to ensure good air quality for citizens. But the Court rulings that resulted only covered the failure to comply with air quality limit values in the past, providing little incentive for member states to act on future exceedances.

This early legal action against member states failing to comply with air quality requirements was based on a breach of Article 13 of the air quality directive, which says limit values for air pollutants such as PM_{10} must not be exceeded.

The Commission will now also invoke article 23, which says that member states should adopt air quality plans with appropriate measures, so that the exceedance period can be kept as short as possible. This new approach was first applied against Belgium in November last year. On 24 January, the Commission sent formal notices to Bulgaria, Latvia and Slovenia, urging them to take effective measures to reduce PM_{10} concentrations. Other states will follow. The full list of member states with PM_{10} exceedances is Austria, Belgium, Bulgaria, the Czech Republic, Germany, Greece, Spain, France, Italy, Hungary, Latvia, Portugal, Poland, Romania, Sweden, Slovakia and Slovenia.

PM_{10} limit values were to be met by 2005, but extensions until June 2011 were possible. Such exemptions were subject to a number of conditions. Most importantly, member states had to present an air quality plan setting out the relevant abatement actions during the extension period and demonstrate that they had taken all the necessary steps to achieve compliance by the extended deadline.

Source: European Commission press release, 24 January 2013 *http://europa.eu/rapid/press-release_IP-13-47_en.htm*

WHO experts call for stronger EU air pollution policies

Long-term exposure to fine particulate matter ($PM_{2.5}$) can trigger atherosclerosis, adverse birth outcomes and childhood respiratory diseases, according to a World Health Organization (WHO) review released on 31 January. It also suggests a possible link with neurodevelopment, cognitive function and diabetes, and strengthens the causal link between $PM_{2.5}$ and cardiovascular and respiratory deaths.

Over 80 per cent of Europeans are exposed to particulate matter (PM) levels above the standards – known as Air Quality Guidelines (AQGs) – recommended by the WHO. On average this deprives each citizen of 8.6 months of life.

IAN BROYLES/FLICKR.COM/CC BY-NC-SA

Most Europeans are exposed to PM levels above the WHO standards.

Recent studies show associations between $PM_{2.5}$ and mortality at levels below the current AQG of 10 micrograms per cubic metre ($\mu g/m^3$) annual mean and so the review recommends a revision of the AQGs for PM by 2015.

As the current limit value for $PM_{2.5}$ in the EU's Ambient Air Quality Directive is more than twice as high as the current WHO standard, the EU should tighten its air quality legislation. The directive sets a limit value of 25 $\mu g/m^3$ to be met by 2015 and it also contains an indicative limit value of 20 $\mu g/m^3$ from 2020, subject to a review in 2013. Regarding PM_{10}, the EU should maintain or possibly tighten its existing limit values.

The WHO review found new evidence for effects of long-term exposures to ozone (O_3) on respiratory mortality and on deaths among persons with predisposing chronic conditions. This adds to previous findings on short-term effects, which are the focus of current regulation. An impact of ozone exposure on cognitive development and reproductive health, including pre-term birth is also suggested. The review recommends that the WHO should develop AQGs for long-term average ozone concentrations and that the EU considers setting a long-term target value.

New studies have associated short- and long-term exposure to nitrogen dioxide (NO_2) with mortality, hospital admissions, and respiratory symptoms at concentrations at or below the current EU limit values (which are set at the same level as the AQGs). An update of the AQGs is therefore recommended, and dependent on the outcome of such an update the EU should consider revising the NO_2 limit values.

The WHO-led project "Review of evidence on health aspects of air pollution – REVIHAAP" was commissioned within the framework of the 2013 review of the European Union's air policy. A full technical report from the project will be available in the spring 2013. WHO Regional Director for Europe Zsuzsanna Jakab said: "We are confident that this new knowledge will ultimately lead to more stringent air pollution control policies to protect the health of European citizens".

Christer Ågren

Report: "Review of evidence on health aspects of air pollution – REVIHAAP Project" – First results: *http://www.euro.who.int/en/what-we-do/health-topics/environment-and-health/air-quality/publications/2013/review-of-evidence-on-health-aspects-of-air-pollution-revihaap/*

Source: European Commission press release, 31 January 2013: *http://europa.eu/rapid/press-release_IP-13-72_en.htm*

Air pollution a top health risk factor in Europe

A global review of the burden of disease, published on 14 December, points to outdoor air quality as a top-level risk for public health. The study shows exposure to air pollution as one of the top ten risk factors for health globally. It is ranked 11th for countries in Western Europe, 14th for Central Europe and 15th for Eastern Europe.

"Everyday exposure to outside air pollution in Europe is now recognised as one of the big factors affecting our health," said Anne Stauffer of the Health and Environment Alliance (HEAL). "For the first time, the Global Burden of Disease assessment has ranked an environmental factor among the more widely discussed 'lifestyle' risk factors, such as tobacco and alcohol."

The analysis shows over 430,000 premature deaths and over 7 million years of healthy life lost in Western, Central and Eastern Europe in 2010 from exposure to fine particulate matter ($PM_{2.5}$), with 166,000 premature deaths in Western Europe, 95,000 deaths in Central Europe, and 169,000 deaths in Eastern Europe, which includes Russia.

Global burden of disease study: *http://www.thelancet.com/themed/global-burden-of-disease.*

Source: HEAL press release, 14 December 2012: *www.env-health.org*

Nitrogen overload still harms ecosystems

Two-thirds of EU ecosystems are currently exposed to more nitrogen deposition than they can cope with and one-tenth is receiving too much acid fallout. Significant additional reductions in the emissions of ammonia, nitrogen oxides and sulphur dioxide are needed to correct the situation.

Critical loads are scientific estimates of the amounts of pollutants that various ecosystems can tolerate without being harmed. They are sometimes referred to as the limits on what "nature can tolerate." If pollutant depositions exceed the critical load limit, damage to sensitive ecosystems will by definition occur sooner or later.

The maps show the extent to which European ecosystems are exposed to more air pollutant depositions than they can tolerate in the long term without damage, i.e. where the critical load limits for acidification and eutrophication (nutrient nitrogen) are exceeded, and how the situation has changed over time.

It should be noted that the maps give a snapshot of deposition versus ability to resist at a given point in time – they do not really reflect the environmental situation right now. Environmental monitoring, experiments and calculations show that there may be considerable time lags, and that the damage that has already been caused by excess air pollutant inputs will persist for decades, in some places even for centuries.

Following the emission cuts over the last 40 years in the main acidifying air pollutants, especially sulphur dioxide, the area of sensitive ecosystems at risk of acidification in Europe is now less than 250,000 square kilometres (km^2), nearly eight times smaller than it was in 1980 (see table).

Progress is however markedly slower for eutrophication, which is caused by excess nitrogen deposition. Here the affected area has shrunk by less than 40 per cent over the same time period, and still covers 1.6 million km^2.

Assuming that all the European countries that agreed in May last year to adopt the revised Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution (see AN 2/12) actually implement their new emission reduction commitments by 2020, some further improvements are to be expected. But there is still a long way to go to actually achieve the long-term environmental objectives of the Protocol, one of which is that there should be no exceedance of the critical loads for acidification and eutrophication.

If all countries were to implement readily available technical emission abatement measures by 2020, the area at risk of acidification would shrink to only one per cent in Europe (three per cent in the EU)

How much do we need to cut emissions?

When evaluating the environmental improvements that are expected to result from the revised Gothenburg Protocol by 2020, scientists at the CCE also made a rough estimate of what additional reductions in acidifying and eutrophying emissions are needed to achieve levels of depositions that no longer exceed the critical load limits.

This was done using the very simplified approach of assuming uniform (same percentage) gradual emission reductions for all European countries and for international shipping. The starting point was the emission levels projected for 2020, assuming full implementation of the revised Gothenburg Protocol.

For eutrophication it was shown that an additional 70 per cent reduction in total nitrogen emissions (nitrogen oxides and ammonia) would bring the exceedance of the critical loads for nutrient nitrogen close to zero. The total area at risk of eutrophication in Europe would still cover about two per cent, but the magnitude of exceedance in these areas would be quite low.

As regards acidification, exceedance of the critical loads approached zero at an additional 60 per cent combined reduction in emissions of sulphur dioxide, nitrogen oxides and ammonia. The remaining area at risk in Europe would come down to less than one per cent.

No detailed analysis was made regarding the locations of the remaining areas at risk (e.g. their spread between countries) or what types of ecosystems (e.g. nature protection areas) would still be exposed to excess deposition.

Table: Change in area of ecosystems exposed to excess deposition of eutrophying and acidifying air pollutants from 1990 to 2010 and projection for 2020 assuming full implementation of the revised Gothenburg Protocol (million km^2).

Acidification				
	Europe		EU27	
1980	1.80	43%	0.87	45%
1990	1.74	41%	0.79	41%
2000	0.53	13%	0.42	22%
2010	0.24	6%	0.19	10%
2020	0.18	4%	0.14	7%
Eutrophication				
	Europe		EU27	
1980	2.58	67%	1.30	80%
1990	2.82	73%	1.36	84%
2000	2.07	54%	1.23	76%
2010	1.73	45%	1.10	68%
2020	1.63	42%	1.01	62%

Source: Coordination Centre for Effects (CCE), February 2013

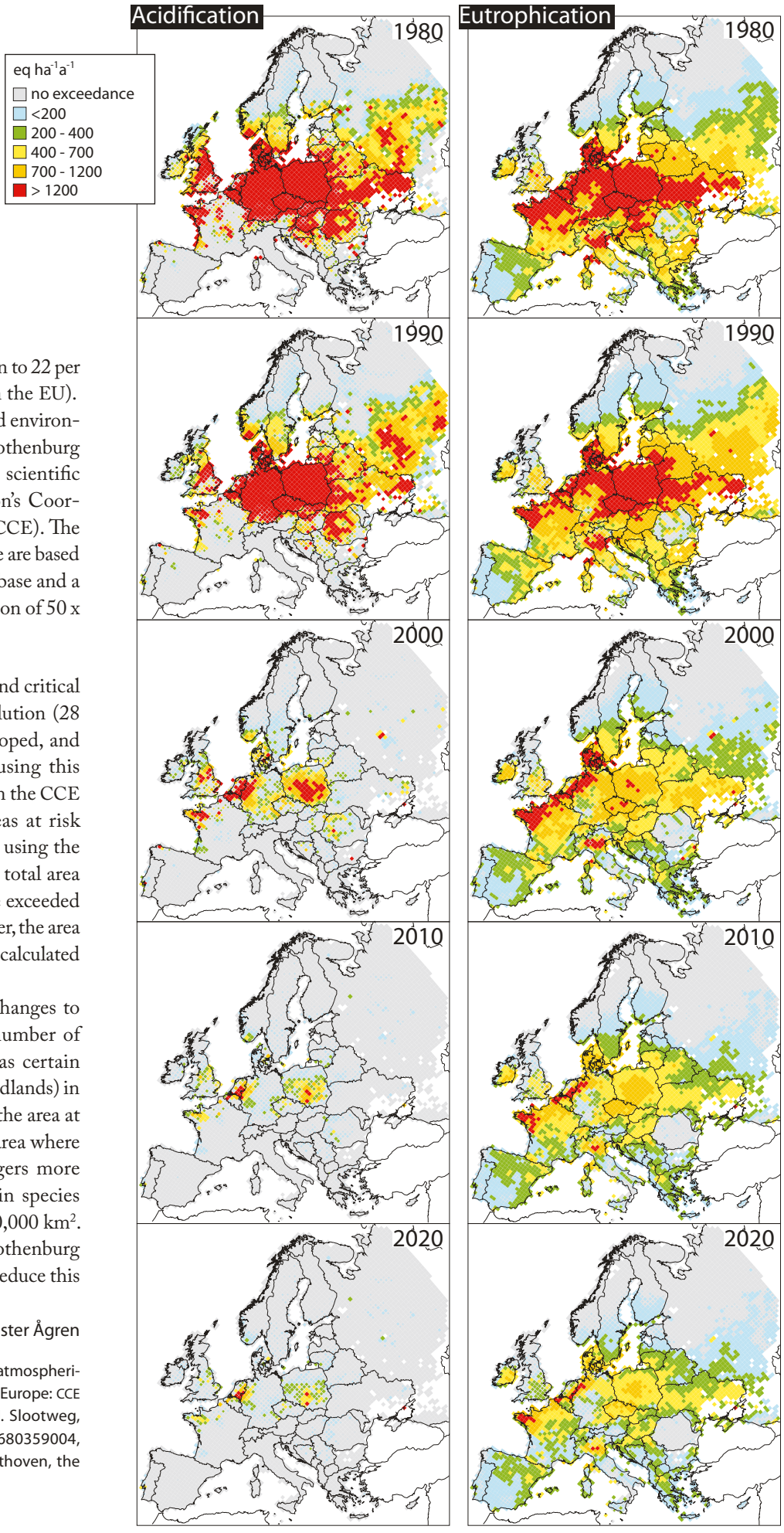

Figure: Areas where critical loads for acidification are exceeded by acid depositions (left) and areas where critical loads for eutrophication are exceeded by nutrient nitrogen depositions (right) caused by emissions between 1980 (top) and 2020 (bottom), the last projected under the Revised Gothenburg Protocol (RGP).

and that at risk of eutrophication to 22 per cent in Europe (38 per cent in the EU).

These figures on the expected environmental effects of the revised Gothenburg Protocol come from a recent scientific assessment by the Convention's Coordination Centre for Effects (CCE). The figures and maps presented here are based on the 2008 critical loads database and a geographical mapping resolution of 50 x 50 kilometre squares.

More recently, deposition and critical loads data with a higher resolution (28 x 28 km) has also been developed, and some preliminary results of using this newest data are also included in the CCE analysis. These show that areas at risk remain largely the same when using the new set of data, and while the total area where acidity critical loads are exceeded turns out to be somewhat smaller, the area exposed to nitrogen overload is calculated to be even greater.

A tentative assessment of changes to ecosystem biodiversity in a number of classified nature areas (such as certain grasslands, scrublands and woodlands) in the EU indicates that in 1990 the area at risk – which is defined as the area where air pollutant deposition triggers more than a five-per-cent change in species diversity – covered around 290,000 km^2. Full implementation of the Gothenburg Protocol commitments could reduce this area to 68,000 km^2 by 2020.

Christer Ågren

Source: Modelling and mapping of atmospherically induced ecosystem impacts in Europe: CCE Status Report 2012. By M. Posch, J. Slootweg, J-P Hettelingh (eds). RIVM Report 680359004, Coordination Centre for Effects, Bilthoven, the Netherlands. *www.pbl.nl/cce*

Scope for reducing ammonia emissions

By applying already known techniques and agricultural practices, the EU could reduce agricultural emissions of ammonia by more than 30 per cent, figures show in a new report from the International Institute for Applied System Analysis (IIASA).

Agriculture is responsible for 90 per cent of all ammonia emissions in Europe. Under current legislation total EU emissions of ammonia are expected to increase by about three to four per cent between 2010 and 2020. Ammonia contributes significantly to acidification, eutrophication and the formation of secondary fine particles ($PM_{2.5}$). It will be extremely difficult to achieve the EU environmental objectives for these areas, if more is not done to curb ammonia emissions.

In a recent report[1] IIASA assesses the potential to reduce these emissions by full-scale implementation of already available techniques and practices. Overall, IIASA estimates that in 2020 such measures could reduce EU ammonia emissions from agriculture by about 32 per cent (more than 1.1 million tonnes), compared to business as usual.

The potential varies considerably between member states (figure). A few countries already have relatively strict regulations in place and the potential for further action is therefore limited, this applies in particular to the Netherlands. Some abatement measures are difficult to implement on small farms, which affects the potential of member states dominated by small-scale family farming, such as Romania and Hungary. Ireland, which has a higher proportion of grazing animals, also has less scope, since there are no effective measures to further reduce ammonia emissions from this kind of farming.

Germany, followed by France and Spain, has the greatest scope to reduce ammonia emissions both in percentage and in total numbers.

The measures on which the estimates are based are found in all stages of the nitrogen cycle: feeding, housing, manure storage, manure application, fertiliser application and overall nitrogen management. Measures taken early in the nitrogen cycle have the advantage that they also lead to emission reductions in the subsequent stages.

One of the most cost-effective measures is the introduction of low-protein feeding. Total ammonia emissions from all farm sources may decrease by 5–15 per cent (average 10 per cent) for a decrease in mean protein content by 10 grams per kg in the diet. This also leads to a more efficient use of nitrogen and reduced emissions of nitrous oxide.

For animals housed indoors, there are a range of measures that can be taken, several of which are described in the newly revised guidance document[2] to the Convention on Long-range Transboundary Air Pollution. The possible measures partly depend on the species kept. But the principles are similar, reducing the floor area covered by manure, quickly removing manure, keeping the temperature and pH low, drying manure, scrubbing outlet air and increasing grazing time. Many of the measures are related to buildings and

Letting animals graze for longer hours outdoors, low nitrogen feeding and improved nitrogen management are some effective ways to curb ammonia emissions.

RAOUL POP/FLICKR.COM/CC BY-NC

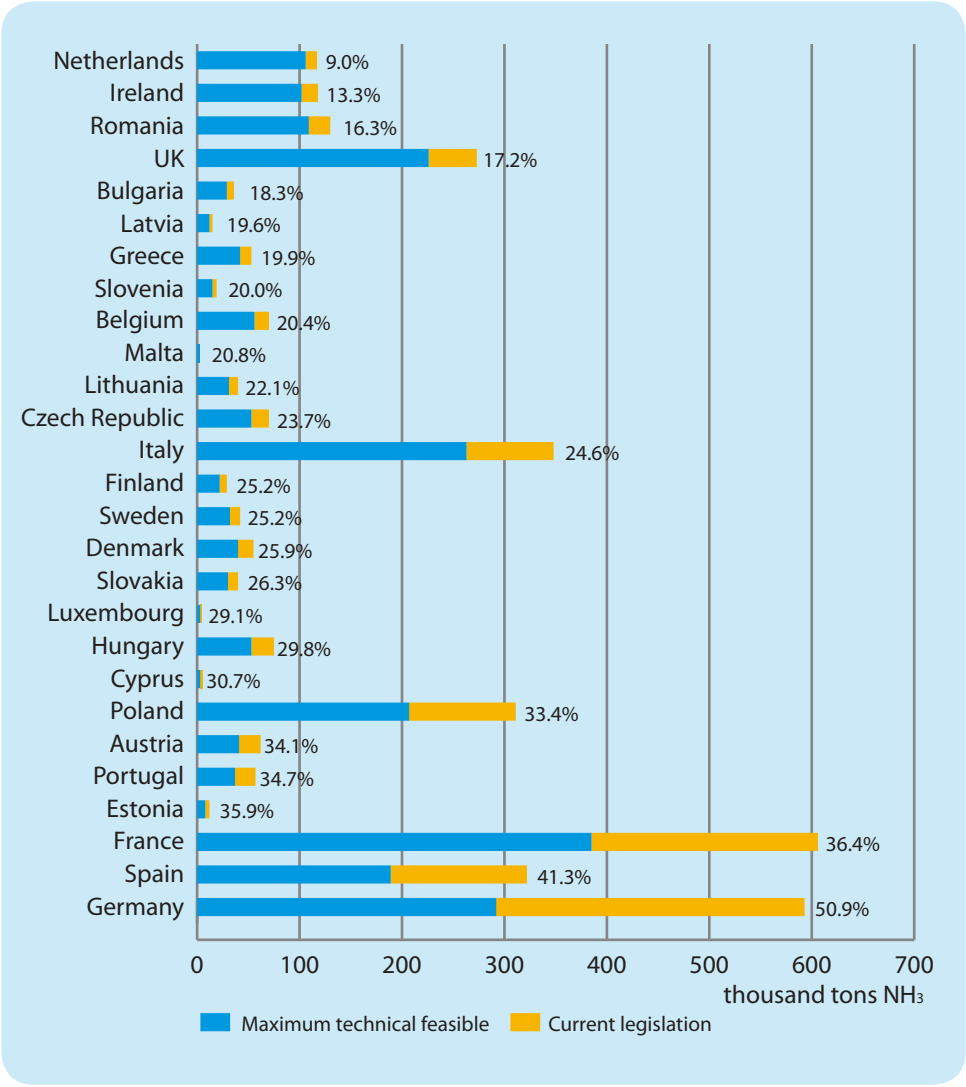

Figure: Agricultural ammonia emissions by country for the year 2020; emissions from current legislation (CLE) scenario and the maximum technically feasible reduction (MFTR) and the percentage reductions from MFTR compared to CLE.

are cheaper to implement for new constructions or as part of major refurbishments of old ones.

Another approach is to let the animals graze for longer hours. Cattle grazing twenty-four hours a day emit half as much ammonia as livestock kept in conventional cubicle housing all day.

For manure storage, there are good opportunities to reduce ammonia emissions, by covering the tank. The no-cost option of allowing the formation of a natural crust on slurries by minimising stirring reduces emissions by 40 per cent. The slightly more expensive solution, to put a tight lid on the reservoir, reduces ammonia emissions by 80 per cent. The nitrates directive requires leak-tight manure storage, but there is not yet any requirement that the reservoir should be covered.

There are several techniques aimed at reducing air exposure and thereby ammonia emissions, when manure is applied to the fields. One of the most effective ones is injection, where a slit 50–200 mm in length is cut into the soil and slurry is injected into it. For solid manure, direct incorporation by ploughing or light cultivation is the best option. Done directly after application this can reduce ammonia emissions by 90 per cent.

Nitrogen management is highlighted in the report as one of the most important measures, since it both reduces emissions and improves the economy of farms. For example on dairy farms, which is the most common type of mixed farm system in Europe, improving the use of manure and decreasing the use of nitrogen fertilizers is a cost-effective way to decrease excess nitrogen.

Besides the introduction of new technologies and changes in management, ammonia emissions may be affected by outside influences that lead to changes in the number of animals and level of agricultural activity. Examples include abolishment of milk quotas, animal welfare regulation or changes in diets, but the impact of such changes was not analysed in the study.

The study also addresses emissions of primary particulate matter (PM) from agriculture, which is estimated to contribute about 20 per cent of EU's total emissions of PM_{10} and 15 per cent of $PM_{2.5}$ emissions. The largest source of agricultural PM emissions is open burning of agriculture waste, despite the fact that this practise has been banned in most EU countries (exceptions are Cyprus, France, Ireland and Slovenia). But satellite data show that it is still common in large parts of Europe, suggesting that the introduction of laws is not enough, if efforts are not made at the same time to ensure that they are complied with.

The other source of PM emissions is when agricultural soils are stirred up by machines or animals in motion. It is much more difficult and costly to reduce these emissions, than to stop open field burning, but it is possible, for example through the introduction of low-till farming.

The member states with the greatest scope to reduce their agricultural particulate emissions are the Czech Republic, Greece and Romania.

Kajsa Lindqvist

[1] Emissions from agriculture and their control potentials, IIASA, November 2012

http://gains.iiasa.ac.at/images/stories/reports/TSAP/TSAP-AGRI-20120612.pdf

[2] Draft guidance document for preventing and abating ammonia emissions from agricultural sources, UNECE, April 2011

http://www.unece.org/fileadmin/DAM/env/documents/2011/eb/wg5/WGSR48/Informal%20docs/Info.doc.7_Ammonia_Guidance_Document.pdf

Global mercury deal

On 19 January, after four years of deliberation, more than 140 countries agreed on the first global treaty to cut mercury pollution. It contains a mixture of mandatory and voluntary elements intended to control the growing global mercury crisis.

The new treaty covers all phases of the mercury cycle, from primary mining to waste disposal, including trade provisions, rules for artisanal and small-scale gold mining, products containing mercury and mercury emissions into the air.

Increasing gold prices have triggered a significant growth in small-scale mining where mercury is used to separate gold from the ore-bearing rock. Emissions from such operations and from coal-fired power stations are the biggest sources of mercury pollution worldwide.

"Adoption of a global legal agreement on mercury is a major accomplishment," said Michael T. Bender, co-coordinator of the Zero Mercury Working Group (ZMWG), an international coalition of over 100 public interest NGOs from more than 50 countries. "Yet the instrument is hampered by weak controls on mercury emissions from major sources like coal-fired power plants."

Countries agreed to install the best available technologies (BAT) on new power plants and facilities, with plans to be drawn up to bring emissions down from existing plants. But new facilities will not be required to have mercury pollution controls for five years after the treaty enters into force, with existing facilities given ten years before they begin their control efforts.

The initial ambition of the negotiations was to set thresholds on the size of plants or level of emissions to be controlled, but these issues were deferred until the first meeting of the treaty after it comes into force.

The production, export and import of a range of mercury-containing products will be banned by 2020. These products include: batteries, except for "button cell" batteries used in implantable medical devices; switches and relays; certain types of compact fluorescent lamps (CFLs); mercury in cold-cathode fluorescent lamps and external electrode fluorescent lamps; and soaps and cosmetics.

The ZMWG expressed concerns about the treaty not reaching far enough nor fast enough to address the spiralling human health risks from mercury exposure. However, in spite of its flaws, the treaty is said to be a good starting point and presents a real opportunity to work towards significant reduction of mercury globally.

The Minamata Convention on Mercury needs ratification from 50 countries to enter in force. Countries will officially sign up to the new treaty at a special meeting in Japan in October, and it is expected to come into force in four to five years' time.

Christer Ågren

Sources: Zero Mercury Working Group press release, 21 January: *www.zeromercury.org*. UNEP press release, 19 January: *http://www.unep.org*

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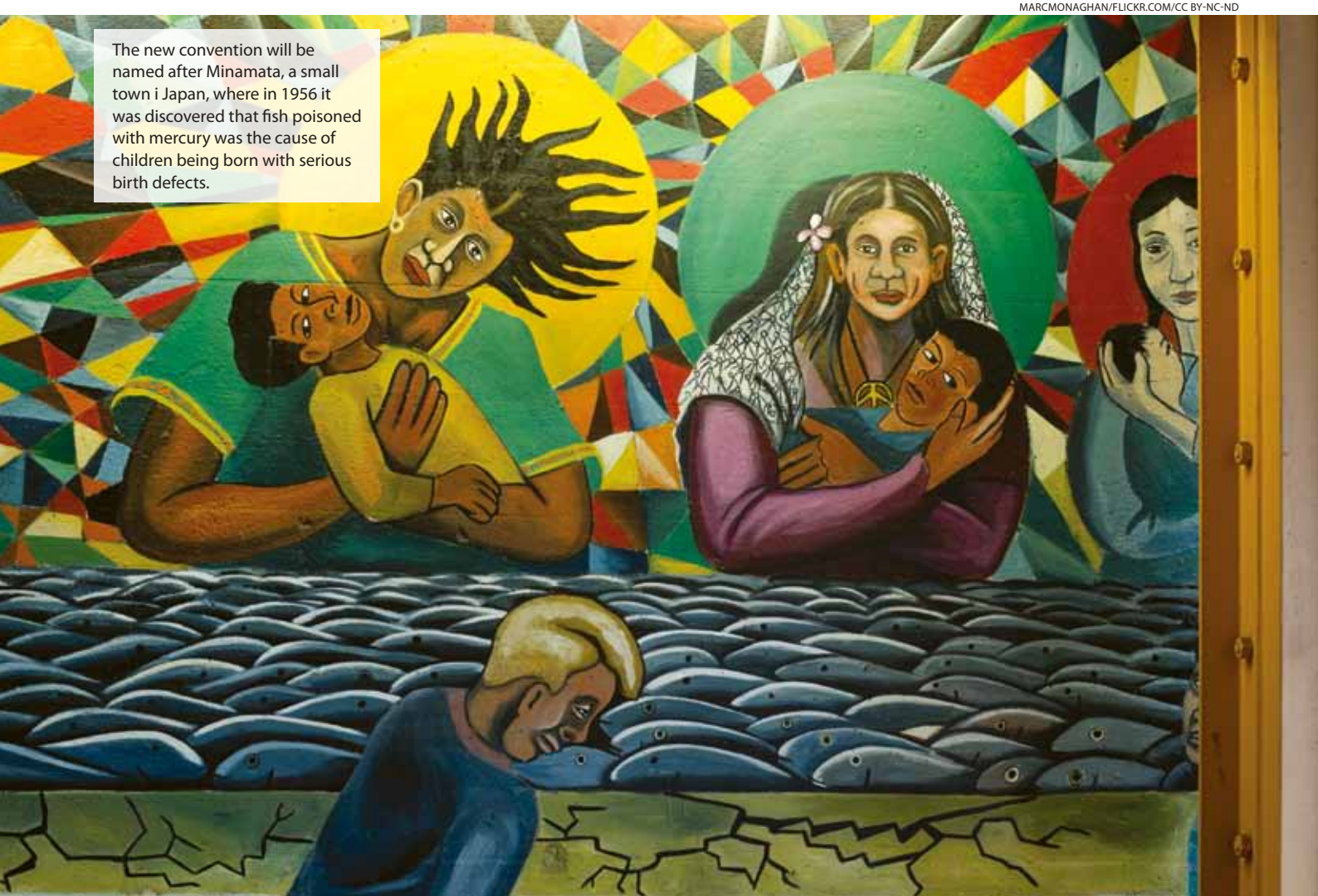


The new convention will be named after Minamata, a small town i Japan, where in 1956 it was discovered that fish poisoned with mercury was the cause of children being born with serious birth defects.

Heavy metals treaty updated

In December, countries in Europe and North America ended three years of negotiations by agreeing updated emission control requirements for particulate matter and the three heavy metals cadmium, lead and mercury, by adopting amendments to the 1998 Protocol on Heavy Metals under the Convention on Long-range Transboundary Air Pollution.

To meet the emission limit values in the protocol, countries must apply the best available techniques to existing and new stationary emission sources such as combustion, manufacturing and other production plants.

To encourage and enable countries in Eastern Europe, the Caucasus and Central Asia to join the amended protocol in the coming years, considerable flexibilities in the obligations for these countries were introduced into the text.

The 1998 Protocol on Heavy Metals entered into force in 2003 and currently has 31 parties.

Source: UN ECE press release, 19 December 2012: *http://www.unece.org/index.php?id=31845*

High costs of mercury damage

Cleaning up mercury pollution and reducing prenatal exposure to methylmercury could save the European Union at least €9 billion per year, according to a new study published in the Environmental Health journal.

The researchers point out that if sensitivity analyses are based on a logarithmic response curve, the estimated benefits would be four times higher. In addition, benefits might be underestimated because costs linked to all aspects of neurotoxicity and long-term disease risks were not considered.

After being emitted, mercury can be converted to methylmercury (MeHg), a potent neurotoxin that bioaccumulates and enters the human body readily via the dietary route. Unborn children (i.e., foetuses) are the most susceptible population group, the exposure being mainly from fish in the diet of the mother. Prenatal exposure is said to be of particular concern because even very small amounts of methylmercury can cause irreversible health effects in a developing brain, resulting in a lower IQ.

It is estimated that between 1.5 and 2 million children in the EU are born each year with methylmercury exposures above the safe limit of 0.58 µg/g and 200,000 above the WHO recommended maximum of 2.5 µg/g. But not every child in Europe is equally at risk. Mercury levels are lowest in Eastern Europe and highest in Southern Europe.

Article in Environmental Health: *http://www.ehjournal.net/content/12/1/3/abstract*

Time is running out for Paris, Berlin and several other cities.

BRANDON CHRISTOPHER WARREN BY /FLICKR.COM/CC BY-NC

20 per cent for climate in EU budget

On 8 February, the EU heads of state agreed on a new budget for 2014–2020, which includes cuts by €32 billion compared with the previous budget period. Several budget items that are of major importance for green investments i.e. the Rural Development Fund and the LIFE programme will be slashed, while the much criticised direct payments to agriculture are untouched.

Jeremy Wates, EEB Secretary General, said: "This is the worst of both worlds: a smaller budget that is explicitly dedicated to keep pumping money into Europe's most wasteful and harmful policies and projects, in particular the CAP."

The budget deal, however, includes a commitment that at least 20 per cent of the spending will go to climate action objectives. Climate commissioner Connie Hedegaard:

"This is a major step forward for our efforts to handle the climate crisis. Rather than being parked in a corner of the EU budget, climate action will now be integrated into all main spending areas."

This is not the last word on the EU budget. The four largest political groups in the European Parliament have stated in a joint press release that they will reject the budget as it stands.

Source: ENDS Europe Daily, 8 February 2013

France and Germany want more time to meet NO_2 limits

The European Commission has dismissed all applications from France to delay a 2010 deadline for meeting the EU's NO_2 air quality standard. It has also rejected many requests from Germany for derogations.

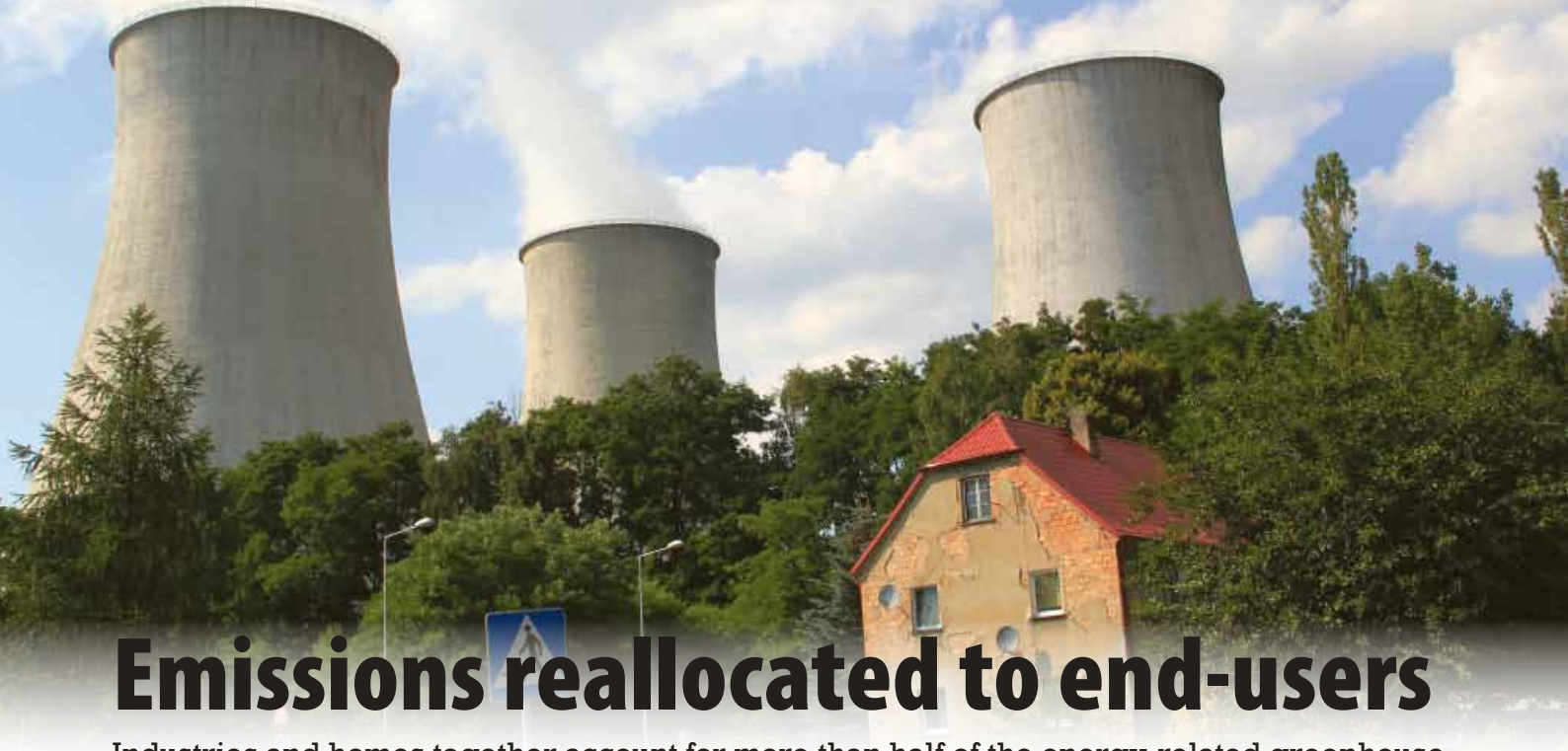
France had sought five more years to meet the annual average concentration limit of 40 micrograms per cubic metre in 21 areas. It also wanted more time to comply with the annual and hourly limits in Marseilles, Lyons and Paris. But the country failed to provide enough evidence to prove it would comply by 2015, and demonstrating compliance is a key condition for getting the five-year derogation. The French government is currently preparing new policies to avoid paying an EU fine for breaches of EU law.

The Commission also rejected requests for a five-year derogation in 33 German cities and regions. It did, however, approve 21 applications. The decision leaves Germany's eight largest cities, including the capital Berlin, in breach of the annual NO_2 limit, which means that the Commission may now begin infringement action for non-compliance in these areas.

Germany also sought more time to meet the hourly concentration limit in four areas. Applications for Stuttgart and Munich were refused, while those for Tübingen and Hamburg were approved under certain conditions.

In December, the Commission turned down Luxembourg's request for a five-year extension with the NO_2 standards. It did however approve extended compliance deadlines in three parts of Spain, which means that Granada will have until 2015 to meet the annual standard. But the Henares corridor (near Madrid) and the southern part of the capital must comply by the end of the year.

Source: ENDS Europe Daily, 11 January and 26 February 2013



Emissions reallocated to end-users

Industries and homes together account for more than half of the energy-related greenhouse gas emissions, when emissions are aggregated at end-user level.

A significant part – 40 per cent – of the EU's greenhouse gas emissions are attributed to the energy sector in reports to the UNFCCC, however all these emissions can also be seen as indirect emissions from other sectors.

For example if your home is heated by district heating from a large thermal plant, carbon emissions from the production of that energy is reported under the energy sector to the UNFCCC. If your neighbour instead has installed a gas boiler for heating, the corresponding carbon emissions will be reported under the residential sector. This kind of traditional breakdown by sector is useful when you want to monitor overall greenhouse gas emissions targets, but less useful when you want to understand the drivers behind changes in emissions.

In December the European Environment Agency published a report, End-user GHG emissions from energy, in which both the direct emissions and the indirect emissions are compiled. The indirect emissions were in 2010 distributed fairly evenly between industrial, commercial and residential sectors (figure), while transport and other sectors account for a smaller share of the indirect emissions.

The report specifically focuses on the changes in emissions between 2009 and 2010. The total emissions increased in this period after several years of reductions. Industry accounted for about half of the energy-related increase in emissions, (40 per cent direct and 10 per cent indirect) mainly due to the economic recovery after the recession in 2008. Above all, there was a significant increase in the production of crude iron.

Total greenhouse gas emissions in the residential and commercial sector were also higher in 2010 than in 2009, since the winter was colder and hence the demand for heating was higher. The use of residential electricity also increased significantly between the two years.

The transport sector was the only area where energy-related greenhouse gas emissions, both direct and indirect, decreased in 2010.

The report also presents the direct and indirect emissions of nitrogen oxides (NOx) and sulphur oxides (SOx). For NOx, energy sector emissions account for 21 per cent of the total and are distributed relatively evenly between the residential, industrial and commercial sectors. However the bulk (52 per cent) of the NOx emissions are direct emissions from the transport sector. For SOx the indirect emissions are greater, at 62 per cent, but are distributed between the different sectors in much the same way as the indirect NOx emissions.

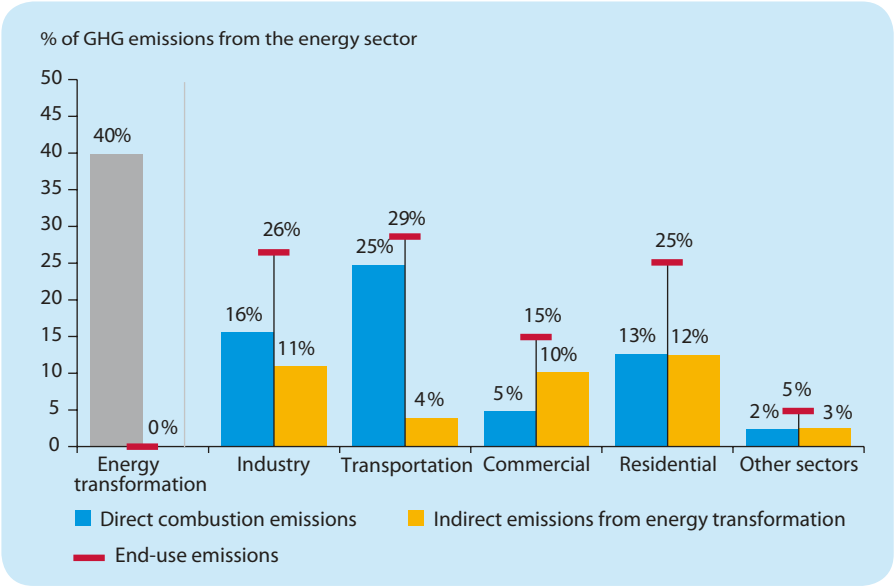


Figure: End-use greenhouse gas emissions from energy use in EU-27 in 2010

Kajsa Lindqvist

Source: End-user GHG emissions from energy, EEA Technical report No 18/2012 *http://www.eea.europa.eu/publications/end-user-ghg-emissions-energy*

Road charges for lorries could cut air pollution

Introducing road charges for heavy goods vehicles that reflect the varied health effects of traffic pollution in different European countries would mean charges should be much higher in some countries compared to others.

Health effects of air pollution from lorries and trucks alone cost €43–46 billion per year, making up almost half of the approximately €100 billion cost of air pollution from all transport modes in the member countries of the European Environment Agency (EEA). In a new report, the EEA presents updated estimates of the external costs of air pollution for different categories of heavy goods vehicles (HGVs).

Heavy goods vehicles are responsible for 40–50 per cent of road transport emissions of nitrogen oxides (NOx) in countries covered by the EEA. Both NOx and fine particulate matter ($PM_{2.5}$) are considered in the report, as they can cause respiratory diseases, cardiovascular illnesses and other health problems.

The 2011 Eurovignette directive (2011/76/EU) prescribes how EU member states could incorporate the health costs from air pollution into any charging structure for large roads and motorways. The revenue from such schemes should be invested in sustainable transport, the directive states. However, adoption of road user charges depends on a decision by individual countries, and EU member states must report to the Commission by October this year on how they will implement road charging, if at all.

In some European countries the cost of air pollution from HGVs is up to 16 times higher than in others, the report notes. The average cost of pollution from a 12–14 tonne Euroclass III lorry is highest in Switzerland, at almost €0.12 per kilometre. Costs are also high in Luxembourg, Germany, Romania, Italy and Austria, at around €0.08/km. This is because the pollutants cause more harm where there are high population densities, or in landlocked regions and mountainous areas where pollution cannot disperse so easily.

LVDESIGN/FOTOLIA.COM

Lorries on the German Autobahn, where the costs of air pollution is around €0.08/km .

At the other end of the scale, the same lorry driving in Cyprus, Malta and Finland causes damage of around half a euro cent per kilometre.

In some regions the cost is also much higher than others. Zurich in Switzerland, Bucharest in Romania, Milan in Italy, the Ruhr Valley in Germany and Barcelona in Spain had some of the highest health costs compared to other large urban zones.

The calculations show that newer lorries would have a reduced impact, and therefore a lower cost. Euroclass IV lorries, which are up to six years old, or Euroclass V, up to three years old, would cause 40–60 per cent lower external costs on the same transport corridors. Charging haulage companies for the external costs of air pollution would incentivise newer and cleaner technologies, the report says.

By internalising the costs that road freight currently imposes on the rest of society, such a charging scheme would also help to level the playing field. The positive effects of road charging have been noted in Switzerland after the country adopted similar legislation.

Jacqueline McGlade, EEA Executive Director, said: "European economies rely on transporting goods long distances. But there is also a hidden cost, paid in years of reduced health and lost life. This cost is especially high for those living close to Europe's major transport routes. By incorporating these costs into the price of goods, we can encourage healthier transport methods and cleaner technologies."

Source: EEA press release, 28 February 2013

The report: "Road user charges for heavy goods vehicles (HGV)". EEA Technical report No. 1/2013.

Tailwind for wind

Wind power is coming of age. It supplies one-fortieth of the world's electricity, and has grown tenfold in 10 years. There is room for much more. China and the US now lead the world.

At the end of 2012 wind power accounted for 282 GW of global power generation, according to new statistics from the Global Wind Energy Council and European Wind Energy Association. That is ten times more than 2002. About 2.5 per cent of the world's electricity comes from the wind, about the same as the output of 100 nuclear reactors. (There are about 400 reactors in the world.)

2.5 per cent wind power is not enough to stop global warming, but if the breakneck pace of installation goes on for a few more years, it will open up a very real opportunity to roll back coal power. The US obtained 3.5 per cent of its electricity from wind power in 2012, which explains part of its big CO_2 emissions drop in 2012.

China installed most wind power in 2012 (13.2 GW), a whisker ahead of the United States. Between them they installed 60 per cent of new global capacity.

China has more capacity (75.6 GW) than the US (60 GW), but the US produces more energy, about 140 TWh, compared to 100 TWh in China 2012. This is because China built so fast that grid expansion has not been able to catch up. Some new mills have not been connected, others have been "curtailed" to avoid melting power lines. The situation is improving, though.

Wind power is already the third biggest source of electricity after fossil and hydro but just ahead of nuclear power. That is quite an achievement, as China currently has by far the biggest nuclear programme in the world, with 29 reactors under construction on top of the 17 already operating.

Over the last 10 years world wind power has grown by on average 25 per cent a year, and much faster in China.

Can this go on? A look at the statistics gives a hint that it actually can.

Wind power is extremely unevenly distributed. Germany operates 31 GW of wind power. Poland has 2.5 GW, though growing fairly fast. Russia has only 0.015. There is very little wind power in Japan, South East Asia, Africa and the former Soviet republics outside Russia.

It is not mainly a question of rich versus poor countries. India is a poor country but was both a pioneer of wind power in the 1990s and ranked fourth for new installations in 2012. Within India, almost half of the country's wind power is in the state of Tamil Nadu. Some parts of India have hardly any.

There are striking differences even among nations, which have otherwise much in common. Denmark, the world pioneer, still leads the Nordic countries with 4.2 GW, though Sweden (a very much larger country) is closing in. Finland, on the other hand, has just 0.3 GW.

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Wind is still an undeveloped source of energy in large parts of the world.

The cost of wind power is falling (20–40 per cent in capital costs since 2008–2009, according to Bloomberg New Energy Finance, while coal and nuclear tend to get more expensive even without any specific policy, though they also meet a lot of political resistance in many countries. Natural gas power is much cheaper to build than anything else, but the future price of gas is unknown, and has a security-of-supply issue in importer nations. New hydro is a limited option.

This leaves wind and solar as preferred options for new power in much of the world.

As for climate and air quality, the fast development of wind and solar is obviously very encouraging. EWEA records the changes in electric production capacity in the EU-27 for 2012. The clear winner was solar photovoltaics with almost 16.8 GW added, followed by wind 11.4 GW, and gas 5.5 GW. Biomass added 1.3 GW and concentrated solar thermal power 0.8 GW. The losers were oil, coal and nuclear, which decreased their capacity by 3.2, 2.4 and 1.2 GW respectively.

The rapid growth in gas and renewables, and decline in fossil fuels and nuclear, has been the pattern since year 2000. But new gas, which used to be the first choice for new capacity dropped to a poor third place in 2012.

Wind and solar have an intermittency issue, but it is not insurmountable.

Denmark got 30 per cent of its power from the wind, and Spain got 23 per cent from wind and solar in 2012.

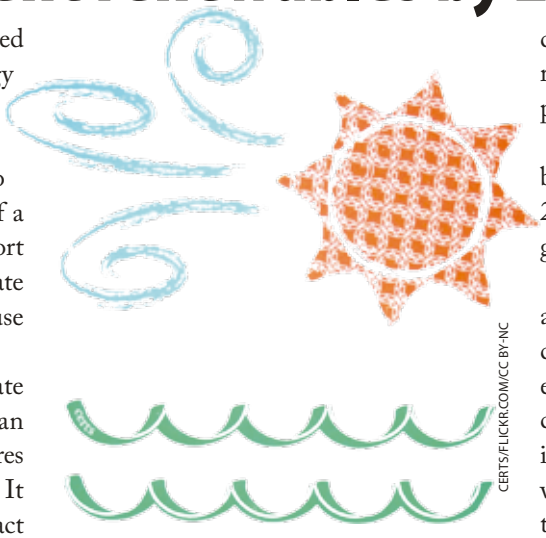
Fredrik Lundberg

WWF: 40 per cent renewables by 2030 is feasible

More than 40 per cent energy generated by renewables and 38 per cent less energy use compared to business as usual by 2030, leading to a reduction in greenhouse gases by 50 per cent compared to 1990 – these are the main features of a new energy scenario by WWF. The report is a contribution to the ongoing debate on EU targets for energy and greenhouse gases beyond 2020.

"Improving on Europe's 2020 climate and energy targets by introducing an ambitious package of post-2020 measures is a win-win situation for everyone. It would not only help reduce the impact of climate change, including huge health and environmental costs, but it would also help to generate up to five million jobs, significantly boosting the economy," said Jason Anderson, Head of Climate & Energy at WWF European Policy Office.

The report considers it possible to reduce energy intensity (energy needed per unit of product), in industries such as aluminium, cement, steel and paper production, by 30–40 per cent compared to 2000 by 2030, through increased recycling of materials, refurbishment of existing plants and more stringent requirements to use the best available technology (BAT). For other industrial sectors (e.g. food and chemicals) it is estimated that energy efficiency improvements of two per cent a year can be achieved.



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By retrofitting 45 per cent of the existing building stock and ensuring passive house standard for all new buildings it will be possible to decrease energy intensity for buildings by 50–60 per cent of 2005 levels by 2030. Electricity intensity for commercial buildings can be reduced by 10 per cent, however electricity intensity for residential buildings must increase by 20 per cent due to increased cooling demand.

Energy intensity in transport can also be reduced by 30–40 per cent compared to 2000 levels, through efficiency technologies and electrification of the vehicle fleet.

The production of energy from renewable sources could quadruple by 2030 compared to 2005. For electricity generation the largest contribution would come from solar and wind. An increase in solar thermal and geothermal heating will bring up the share of renewables in the building sector. However WWF envisage a reduction in the use of biofuels for heating, in order to release that resource for industry and transport, where other renewable options are few.

Source: WWF report, Putting the EU on track for 100% renewable energy. *http://awsassets.panda.org/downloads/res_report_final_1_1.pdf*

Savings will slash prices

Energy efficiency measures can lead to significantly lower energy prices, according to a recent study commissioned by Climate Action Network and Friends of the Earth Europe. Every €1 saved on not using energy means there is another €1 that will be saved due to lower prices for energy.

Demand for expensive marginal electricity generated to cover peak hours will decrease. A general lower demand for fossil raw materials will also be reflected in prices, especially for gas sold on the regional market, but also to some extent for oil on the world market.

Energy efficiency will also mean a reduced need to invest in new energy infrastructure. According to the International Energy Agency, the EU needs to invest €130 billion a year in infrastructure between 2010 and 2035 with current policy. If the 20 per cent target is achieved by 2020, the authors of the report expect that the need for investments will be about 25 per cent lower, thereby saving energy companies around €30 billion a year. With the right regulatory framework these savings should be reflected in lower prices for end users.

Dora Petroula, energy savings policy officer for Climate Action Network Europe, links these findings with the situation for the European economy:

"Energy savings are a win/win solution to Europe's economic recovery, creating jobs while reducing greenhouse gas emissions. A binding energy savings target for 2030 would encourage long-term investment past 2020, the European Commission and national governments need to make it happen."

Source: Saving Energy: Bringing down Europe's energy prices for 2020 and beyond *http://caneurope.org/resources/publications/can-europe-publications/doc_download/2144-saving-energy-bringing-down-europes-energy-prices-for-2020-and-beyond*

New publication:

Environmental Policy in the EU – Actors, Institutions and Processes. Edited by Andrew Jordan and Camilla Adelle. Published in 2012 by Routledge.

Non-students can also benefit from an educational overview of EU environment policy. The book, which is the third revised edition, contains short summaries at the end of each chapter and suggestions for further reading. In accordance with the subtitle, the focus is on the actors and processes rather than actual directives and regulations, which is information that, after all, is relatively easy to find elsewhere. The authors have also put considerable effort into explaining current policies in a historical context as well as raising questions about oncoming challenges.

Recent publications from the Secretariat

Reports can be downloaded in PDF format from *www.airclim.org*

For Clean Air Everywhere

A new brochure from Transport & Environment, European Environmental Bureau and AirClim. Target readers are regional and local decision makers, local authorities, environmental organisations and the interested general public. It starts off with a short guide to the effects of major air pollutants on human health, recommended guidelines and current EU standards. Followed by twelve practical steps for cleaner air in our cities.

Ship emissions

Shipping is a major cause of harmful air pollution in Europe and by 2020 shipping emissions of SO_2 and NOx could exceed the emissions of these pollutants from all other EU sources.

This pollution must be reduced dramatically to protect health and the environment and to make shipping a more sustainable form of transport.

Technical measures exist that could cut the level of pollution from ships by at least 80-90 per cent and doing so would be much cheaper than cutting the same amount from land-based sources.

Boreal Forest and Climate Change

The fate of the vast boreal forest belt of the northern hemisphere is crucial for global climate. Regional perspectives on this issue are given in "*Boreal Forest and Climate Change - regional perspectives*" (by Roger Olsson, 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.

Our possibilities to protect and manage these forests for climate mitigation are presented in "*To Manage or Protect*" (by the same author, October 2011). Turning old-growth boreal forest into managed forest has a negative impact on climate in the short and medium term. Reducing consumption of paper and using more of the harvested wood for timber and fuel would be one option.

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Coming events

Air Quality and Emissions 2013. Telford, UK, 13 - 14 March 2013. Information: *www.aqeshow.com*

European Climate Change Adaptation Conference. Hamburg, Germany, 18 - 20 March 2013. Information: *http://eccaconf.eu/index.php/page/ECCA*

EU Environment Council. Brussels, Belgium, 21 March 2013. Information: http://europa.eu/newsroom/calendar/

5th Stakeholder Expert Group on EU Air Policy. Brussels, Belgium, 3 April 2013. Information: *http://ec.europa.eu/environment/air/index_en.htm*

Health Effects Institute 2013 Annual Conference, San Francisco, United States, 14 - 16 April 2013. Information: *http://www.healtheffects.org/annual.htm*

Informal meeting of the EU Environment Ministers. Main issues: Air Quality and 7th Environment Action Programme. Dublin, Ireland 22 - 23 April 2013. Information: *http://europa.eu/newsroom/calendar/*

CLRTAP Working Group on Strategies and Review. Geneva, Switzerland, 30 April - 3 May 2013. Information: *http://www.unece.org/env/lrtap/*

International Conference on Arctic Ocean Acidification. Bergen, Norway, 6 - 8 May, 2013. Information: *www.amap.no*

IMO Marine Environment Protection Committee (MEPC) 65. London, UK, 13 - 17 May 2013. Information: *http://www.imo.org/*

4th International EFCA-symposium on Ultrafine Particles. Brussels, Belgium, 16 - 17 May 2013. Information: *www.efca.net*

21st International Conference on Modelling, Monitoring and Management of Air Pollution. Siena, Italy, 3 - 5 June, 2013. Information: *http://www.wessex.ac.uk/13-conferences/air-pollution-2013.html*

UN FCCC Meeting of Subsidiary Bodies. Bonn, Germany, 3 - 14 June 2013. Information: *http://unfccc.int/*

Clean Air For All - EU Green Week Conference. Brussels, Belgium 4 - 7 June 2013. Information: *http://ec.europa.eu/environment/greenweek/*

Saltsjöbaden 5 - Taking international air pollution policies into to the future. Göteborg, Sweden, 24 - 26 June 2013. Information: *http://www.saltsjobaden5.ivl.se*

Mercury 2013, Edinburgh, Scotland, UK, 28 July - 2 August 2013. Information: *www.mercury2013.com*

IUAPPA 16th Annual World Congress on Air Quality. Cape Town, South Africa, 29 September - 4 October 2013. Information: *http://www.iuappa.org/*