NO. 2, MAY 2016

Acid News

Ecosystems more sensitive than previously thought

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

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 sensitivity of various ecosystems to exposure to acidifying and eutrophying air pollutants has been monitored and mapped for more than 25 years, and European countries coordinate this work through the Coordination Centre for Effects (CCE) of the Convention on Long-range Transboundary Air Pollution (CLRTAP).

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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.

Editorial

AirClim

This summer the Convention on Long-Range Transboundary Air Pollution (LRTAP) will present a new report "Towards cleaner air", an assessment of the current scientific knowledge on air pollution based on 35 years of research, monitoring and policy developments.

Some of the report's key findings have been published in a brief summary for policymakers. It makes for interesting reading. Despite some significant progress in reducing the emissions of many pollutants, it notes that problems still exist, and that additional action is urgently needed.

"We need clean air."

Each year, air pollution causes nearly half a million premature deaths in the EU. It is also the cause of allergies and respiratory and cardiovascular diseases, which result in extra medication and hospitalisations as well as millions of lost working days.

But it is not only people that suffer from air pollution. Excess deposition of acidifying and eutrophying air pollutants damages nature and biodiversity. Agricultural crops, forest trees and even man-made materials, including monuments and buildings of high cultural value, are all suffering.

Air pollution is transboundary in nature – it can be carried hundreds and even thousands of kilometres by winds in only a few days. Many cities have taken action to improve local air quality, for example by banning cars from city centres or improving public transport. This is both necessary and good. But even in big cities a significant share of the pollution emanates from sources outside of the city, or even outside of the country.

This is why local and national measures have to be complemented by international action at European level, and – when it comes to dealing with ground-level ozone – even at the northern hemispheric level.

This is also why the EU has a National Emissions Ceilings (NEC) directive that is designed to make all member states contribute to improvements in air quality in a fair and cost-effective manner. The current NEC directive dates back to 2001 and sets national emission caps for 2010. It is now subject to revision, with the aim of setting new national emission reduction targets up to the year 2030. (See article on page 6.)

Despite all the negative impacts of air pollution and the fact that most member states are struggling with bad air quality, many national governments – including those of large countries such as the UK, France, Poland and Italy – refuse to accept the fair (and actually quite unambitious) targets of the original proposal.

In particular, they want to lower their national targets for ammonia reductions. And they want to scrap the methane targets. As agriculture is responsible for 90 per cent of ammonia emissions and half of methane emissions, it is obvious that these positions are being pushed by organisations primarily representing the interests of industrial livestock farming.

Some member states are also seeking greater flexibility, which in this context is a euphemism for a greater right to pollute. Paradoxically, in most cases, the countries that argue for lower national emission reduction targets and greater flexibility are the same ones that are currently the subject of infraction measures by the Commission because they have failed to comply with the EU's minimum air quality standards. In essence this means that they have failed to protect the health of their citizens.

What we need now is a new NEC directive with targets that ensure a high level of protection for health and the environment, resulting in reduced health bills, improved productivity, longer and healthier lives and a richer natural environment for the benefit of us all. We need clean air.

Christer Ågren

Land is a crucially important sector to keep global warming below 1.5°C.

A quarter of human induced greenhouse gas emissions comes from agriculture, forestry and other land use.

Climate Action Network (CAN) argues that land is a crucially important sector for ambitious action to stabilize greenhouse gas emissions in the atmosphere below dangerous levels, in order to keep global warming below 1.5°C.

About one quarter of all human-induced emissions come from agriculture, forestry and other land use (AFOLU), mainly from land use change, fertilizer use, livestock and peatland degradation. The potential for both sequestration and emissions reductions in the AFOLU sector is thus large, but it must be ensured that AFOLU mitigation does not compromise adaptation, food security or other social and environmental safeguards. Reducing emissions (for example, by reducing deforestation) and enhancing removals (for example, by afforestation or reforestation) are already important components of some countries' emission reduction pledges and will no doubt continue to be so. It is therefore vital that all countries both report on and account for emissions and removals from AFOLU in a comparable and transparent way, especially those countries which intend to include emission reductions or increased removals from the sector as part of their emission reduction target.

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Given the unique nature of this sector, its relation to food security, ecological integrity, and cultural identity must be recognized in climate agreements. CAN says that a process for developing principles and guidelines to ensure these values are protected and maintained must be mandated. Principles and guidelines should ensure social protections; food security; security of indigenous peoples' and local communities' land tenure; gender equity; ecological integrity; and animal welfare. Actions in the land sector, in addition to actions in other sectors, should prioritize the protection, maintenance and restoration of natural ecosystems, while respecting customary and sustainable land use systems and existing agricultural ecosystems.

Common accounting rules for the land sector are essential for assessing comparability of effort. Accounting should be both comprehensive and complete, so that nations "account for what the atmosphere sees" in terms of emissions and removals. The basic principles should according to CAN be a land-based reporting system and that the base year should be historical, not projected. To ensure that climate policies affecting agriculture can include consideration of small-scale farmers, food security and indigenous peoples should be recognized.

CAN summarizes the main demands as follows:

Comprehensiveness and completeness

Parties should comprehensively report on and account for their emissions and removals from all sectors, including land use. All human-induced emissions contribute to climate change and removals help to mitigate it. Nations should account for "what the atmosphere sees" in terms of emissions and removals, when they occur. Parties' reporting and accounting should be complete, meaning that it covers all significant sources and sinks, as well as all significant pools and gases for which methodologies are provided in the 2006 IPCC Guidelines or for which supplementary methodologies have been agreed by the UN. Completeness also means the full geographical coverage of the sources and sinks of a country.

Base year or period

The base year or period used for reporting and accounting for AFOLU should be consistent with a Party's overall ADP contributions to facilitate comparability within a contribution, i.e., baseline periods should be the same for the AFOLU sector as others and be historical, not projected. Furthermore, the AFOLU base year/period should be measured using agreed methodologies to estimate the emissions, removals, and stocks of the sector. It may be advisable to use a base period rather than a base year, as studies conducted by CAN indicate that this would be more reliable for forestry and other land types.

Transparency

The data sources, assumptions and methodologies used should be clearly explained, in order to facilitate the replication and assessment of information. The transparency of inventories and accounts is fundamental to the success of the process for the communication and consideration of information.

Consistency

An inventory should be internally consistent for all reported years in all its elements across sectors, categories, pools and gases. The same methodologies should be used for the base year or period and all subsequent years, and consistent data sets should be used to estimate emissions or removals.

Accuracy

Emission and removal estimates should be accurate in the sense that they are systematically neither over nor under true emissions or removals, and that uncertainties are reduced as far as practicable. Appropriate methodologies should be used, in accordance with the 2006 IPCC Guidelines, to promote accuracy in inventories and accounts.

Compiled by Reinhold Pape. Source: CAN submissions to the UN. Link: https://unfccc.int/files/documentation/submissions_from_observers/application/pdf/548.pdf

Ecosystems more sensitive than previously thought

Continued from front page 1

Recently, the CCE has developed a new set of maps, using updated information from the countries' national experts. By comparing the critical load maps with data on air pollutant deposition, the CCE has also produced maps that 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 are exceeded.

This new data shows that the areas at risk are greater than previously assumed – the acidity critical loads are now exceeded in eight per cent of the ecosystems in the EU (7% in the whole of Europe). The area exposed to nitrogen overload now extends

Table : Area of ecosystems exposed to excess deposition of eutrophying and acidifying air pollutants in 2010 (km²).

	EU		Europe	
Acidification	157,000	8%	237,000	7%
Eutrophication	1,206,000	75%	1,879,000	62%

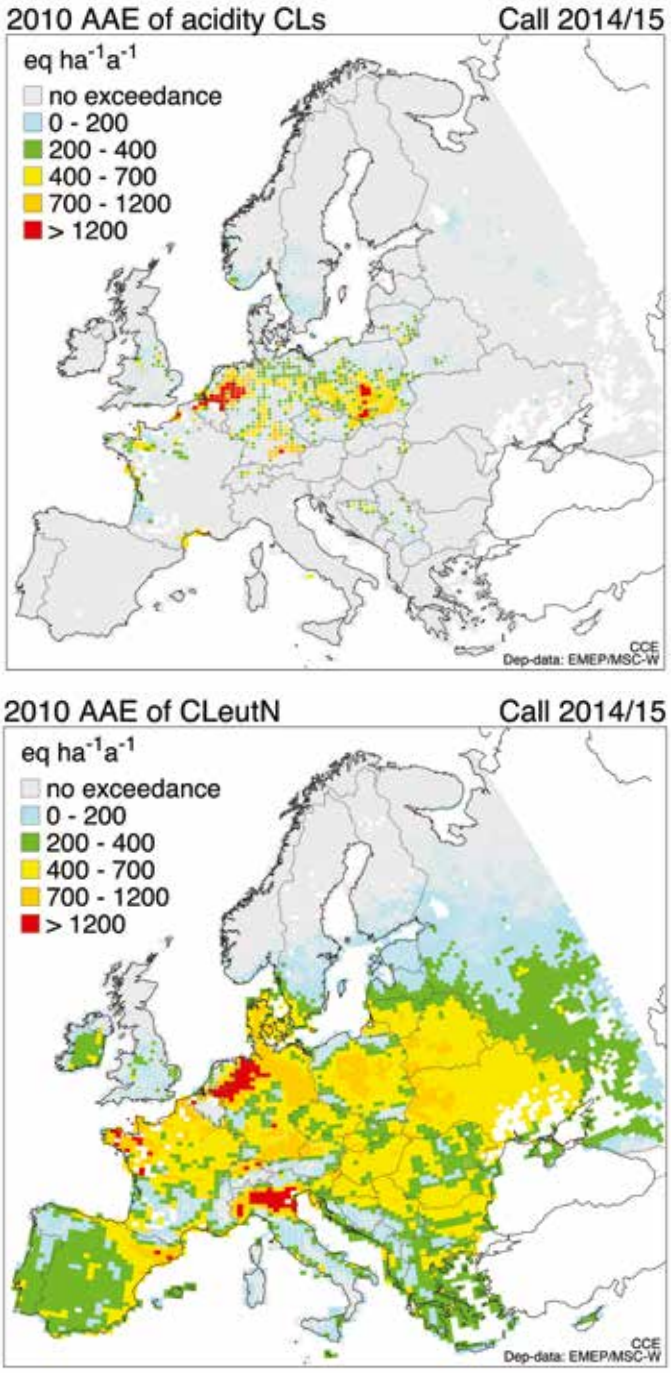

Figure : Areas where critical loads for acidification are exceeded by acid depositions (top) and areas where critical loads for eutrophication are exceeded (bottom) at 2010 emission levels.

How much do we need to cut emissions?

A few years ago, while evaluating the environmental improvements that are expected to result from the revised Gothenburg Protocol by 2020, scientists at the CCE 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.

Source: CCE Status Report 2012, link: www.wge-cce.org/Publications/CCE_Status_Reports/Status_Report_2012

to 75 per cent of EU ecosystems (62% in Europe). See table and maps.

Following emission cuts over the last 40 years in the main acidifying air pollutants, especially sulphur dioxide (SO_2), the area of sensitive ecosystems at risk of acidification in Europe has now shrunk to less than 250,000 square kilometres (km^2), nearly eight times smaller than it was in 1980.

Progress is however markedly slower for eutrophication, which is caused by excess nitrogen deposition resulting from emissions of nitrogen oxides (NOx) and ammonia (NH_3). Here the affected area has shrunk by less than 40 per cent over the same time period, and still covers 1.9 million km^2.

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.

Clearly there is still a long way to go to actually achieve the long-term environmental objectives of the EU's 7th Environmental Action Programme, one of which is that there should be no exceedance of the critical loads for acidification and eutrophication. The same objective is also enshrined in the CLRTAP Gothenburg Protocol.

The key legal instrument in the EU for cutting emissions of acidifying and eutrophying air pollutants is the National Emissions Ceilings (NEC) directive, which is currently being revised, and negotiations on new emission reduction targets up to 2030 are now ongoing between EU institutions, with the aim of reaching a final compromise by June 2016.

Christer Ågren

Source: Modelling and mapping of the impacts of atmospheric deposition of nitrogen and sulphur: CCE Status Report 2015. By J. Slootweg, M. Posch, and J-P Hettelingh (eds.). RIVM Report 2015-0193, Coordination Centre for Effects, the Netherlands. Link: www.wge-cce.org/Publications/CCE_Status_Reports/Status_Report_2015

Sea levels could rise 1.3 to 2 metres by 2100

New studies have been published concluding that sea levels could rise far more rapidly than expected in coming decades. The UN's climate science body had predicted up to a metre of sea level rise this century. But a new study led by the Potsdam Institute for Climate Impact Research for the first time, combines the two most important estimation methods for future sea level rise and yields a more robust risk range. Sea levels worldwide will likely rise by 50 to 130 centimetres by the end of this century if greenhouse gas emissions are not reduced rapidly. A second study provides the first global analysis of sea level data for the past 3,000 years. It confirms that during the past millennia the sea level has never risen nearly as fast as during the last century. Even if ambitious climate policy follows the 2015 Paris Agreement, sea levels are projected to increase by 20 to 60 centimetres by 2100.

According to a third study, published in the journal Nature, collapsing Antarctic ice sheets are expected to double sea-level rise to two metres by 2100, if carbon emissions are not cut.

Previously, only the passive melting of Antarctic ice by warmer air and seawater was considered, but the new work added active processes, such as the disintegration of huge ice cliffs.

The Guardian quoted Prof Robert DeConto, at the University of Massachusetts Amherst, who led the work: "this [doubling] could spell disaster for many low-lying cities". He said that if global warming was not halted, the rate of sea-level rise would change from millimetres per year to centimetres a year. "At that point it becomes about retreat [from cities], not engineering of defences."

"Many coastal cities are growing fast as populations rise, and analysis by World Bank and OECD staff has shown that global flood damage could cost them $1 trillion a year by 2050 unless action is taken. The cities most at risk in richer nations include Miami, Boston and Nagoya, while cities in China, Vietnam, Bangladesh and Ivory Coast are among those most in danger in less wealthy countries."

"The new research follows other recent studies warning of the possibility of ice sheet collapse in Antarctica and suggesting huge sea-level rises. But the new work suggests that major rises are possible within the lifetimes of today's children, not over centuries."

Compiled by Reinhold Pape from press releases. Links: https://www.pik-potsdam.de/news/press-releases/sea-level-rise-too-big-to-be-pumped-away, https://www.pik-potsdam.de/news/press-releases/sea-level-rise-past-and-future-robust-estimates-for-coastal-planners.

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Tougher air pollution targets needed

Revision of EU's key legal instrument for improving air quality – the NEC directive – is currently the subject of intense negotiations.

Starting in late February, representatives of the EU's three legislative bodies (the Council, Parliament and Commission) have held a series of trialogue meetings over spring and early summer to negotiate a revised National Emissions Ceilings (NEC) directive with the aim of reaching a final compromise by June 2016.

While the Commission and the Parliament aim for an ambition level that would result in a 52 per cent reduction in premature deaths from air pollution between 2005 and 2030, the Council (i.e. the member states) argues for a significantly less ambitious target of 48 per cent. The latter would in effect result in an additional 16,000 annual premature deaths in 2030, on top of the more than a quarter of a million annual premature deaths that are expected to remain if the Commission's proposal was to be implemented.

According to the environmental group European Environmental Bureau (EEB), approximately 130,000 EU citizens could die prematurely between 2016 and 2030 if the emission reduction targets for air pollutants are weakened in line with the Council's position.

The Council's 48-per-cent target was the outcome of mismanaged negotiations under the Luxembourg Presidency last year, when many member states got away with very unambitious emission reduction commitments (ERC). For example, Denmark, Bulgaria, Greece and Romania got away with weakening their ERCs for all five pollutants, and Italy and the UK managed to lower their national targets for four of the pollutants. (See table in AN 1/16, page 9.)

Now it is up to the Parliament and the Commission, hopefully with support from the Dutch Presidency, to push member states to accept more ambitious ERCs, especially for particulate matter (PM) and ammonia (NH_3) – pollutants that have particularly high adverse effects on human health. Ammonia is also the main culprit for ecosystem damage through eutrophication.

A possible compromise that would achieve a 50 per cent reduction in premature deaths has ben put forward by the Dutch Presidency to the member states. This would among other things imply that big member countries such as Germany, France, Italy, Spain and the UK, which are also responsible for large shares of the emissions, would need to accept slightly stricter ERCs, especially for PM and ammonia.

Another issue of debate is that the Parliament is also pushing for binding targets for 2025, compared to the Commission's proposed indicative targets, while the Council only wants some sort of vague guiding figures for 2025. Having binding intermediary targets would obviously better ensure that countries really are on track to meet their 2030 ERCs.

When the Council agreed its position in December 2015, member states removed the ozone precursor methane completely from the directive. However, both the Commission and the Parliament want to keep it in, although a majority in the Parliament supported exclusion of the main source of methane emissions from agriculture, i.e. from livestock's enteric fermentation, which in 2005 contributed more than a third of the EU's total methane emissions. A compromise has been tabled that would reduce the EU's overall methane ERC from 33 to 20 per cent, which equals the result of excluding enteric methane.

Other issues of contention include among others the five additional flexibilities introduced by the Council in order to make it easier for member states to comply; to what extent emission abatement measures listed in Annex III should be binding or just voluntary; the timing and extent of reporting and review; and public access to information and justice.

A fourth, possibly final, trialogue meeting on the revision of the NEC directive is due in early June.

Christer Ågren

Analysis of the implementation on the Paris Agreement

An analysis on how to translate the Paris agreement into action in a German context.

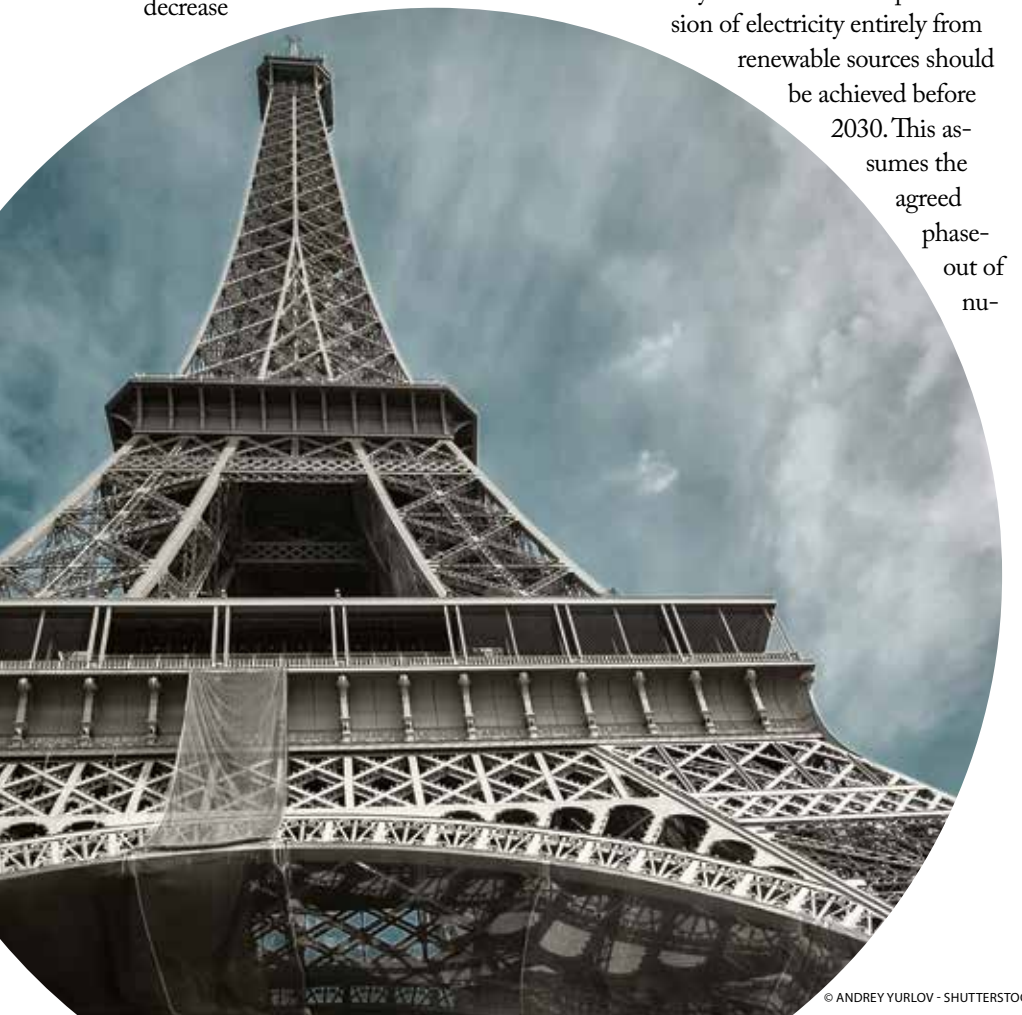
Greenpeace Germany and consultancy New Climate Institute have completed a first brief analysis of how to translate the goals of the international climate regime as determined by the Paris Agreement into the German context.

"Firstly, emissions reduction scenarios on a sectoral level from existing literature sources are compared. Since the literature on this topic does not cover 1.5°C scenarios for Germany to a sufficient degree, global scenarios and the total CO_2 budget available for 1.5°C are taken as a basis. Conclusions are drawn from the comparison of different emissions reduction scenarios.

Key messages

To be compatible with the long-term goals of the Paris Agreement …

- … global CO_2 emissions from energy generation and use as well as from agriculture and forestry will need to decrease +to zero by 2035. This way, temperature increase is likely to be kept "well below 2°C" and aim towards 1.5°C without taking the risk of needing to remove CO_2 from the atmosphere on a large scale in the future. Simultaneously, a smaller budget of emissions remains for sectors where (according to most models) a reduction in emissions would be exceedingly demanding, as is the case for non-CO_2 emissions from agriculture through livestock and soil.
- … developed countries such as Germany would have to decrease greenhouse gas emissions to zero earlier than the global average, i.e. CO_2 emissions before 2035.
- … the share of renewables in the energy mix (electricity production, building heating and cooling, industry, and transport) should reach 100% in Germany before 2035. The provision of electricity entirely from renewable sources should be achieved before 2030. This assumes the agreed phase-out of nuclear energy and no use of CCS.
- … the lignite and hard coal phase-out from electricity production should be achieved by around 2025 in Germany.
- … avoidance of travel, modal shift and increase in share of cars without combustion engines, e.g. through the development of electric mobility, are necessary beyond current targets in Germany.
- … 5% of Germany's existing buildings need to be renovated to nearly zero energy standards per year, in addition to 100% of new stock conforming to nearly zero energy standards.
- … energy efficiency and electrification in industry have to be enhanced, in addition to research and development.
- … emissions from agriculture and forestry need to eventually be reduced to nearly zero as well, even if a little later than energy-related emissions.



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A large part of the CO_2 budget available to limit temperature increase to 2°C or 1.5°C has already been spent. In order to limit the global average temperature increase to the above-mentioned levels, the cumulative emissions over this century are the determining factor. If emissions are too high now, CO_2 could theoretically still be removed from the atmosphere at a later point in time. However, the technology that could enable this subsequent removal, i.e. the utilization of biomass in combination with carbon capture and storage (CCS), entails significant problems and risks. This brief analysis consequently assumes that the emission budget has to be reached without these "negative emission" technologies."

Compiled and translated from German by Reinhold Pape

https://newclimateinstitute.files.wordpress.com/2016/02/160222_klimaschutz_paris_studie_02_2016_fin_neu1.pdf

Methane levels increase rapidly in the Arctic

"We see an alarming development," says senior researcher Cathrine Lund Myhre at the Norwegian Institute for Air Research (NILU).

Levels of methane increased sharply from 2013 to 2015 and are the highest ever measured.

Director of the Norwegian Environment Directorate, Ellen Hambro, said that the development gives reason for concern. "If the reason is release of methane from thawing permafrost and from the Arctic Ocean, then it is alarming. It will give climate change a self-reinforcing effect," Hambro said.

The main sources of methane include boreal and tropical wetlands, rice paddies, emission from ruminant animals, biomass burning, and extraction and combustion of fossil fuels. Further, methane is the principal component of natural gas, and leaks from sources such as pipelines and offshore and onshore installations are a known source of atmospheric methane. The distribution between natural and anthropogenic sources is approximately 40/60 respectively. Of natural sources there is a large unknown potential methane source under the ocean floor, known as methane hydrates and seeps. Further, a large unknown amount of carbon is bound up in the permafrost layer in Siberia and North America, and this could be released as methane if the permafrost layer melts in response to climate change.

Reference: compiled from press release http://www.thebarentsobserver.com/ecology/2016/03/scientists-beat-alarm-levels-methane-increasing-rapidly-arctic

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World's largest solar farm

China is helping Pakistan build the largest solar farm in the world. When complete in 2017, the solar farm could have 5.2 million photovoltaic cells, producing as much as 1,000 MW of electricity, enough to power about 320,000 households.

Photo credit: Quaid-e-Azam Solar Power Park

Visit the Death Ticker

The European Environmental Bureau (EEB) has published an online Death Ticker to show that delays to the implementation of environmental performance standards set under the Industrial Emissions Directive (IED) will result in deaths and chronic diseases that could be avoided. Implementation of these standards would force the EU's largest power plants to reduce emissions by putting in place best available techniques (BATs) that would prevent more than 20,000 annual deaths from air pollution and result in economic benefits of up to €20 billion/year.

The Death Ticker calculates the accumulated external health impact costs which could have been prevented as from 1 August 2014 if BAT had been implemented from that date at the 290 largest coal or lignite-fired large combustion plants (LCP) in the EU. The figures include the external health costs due to some major air pollutants (NOx, SO_2, PM and mercury), but exclude other air pollutants (CO_2 , heavy metals, N2O, etc.) and water-pathway-related damage costs. The information provided by the Death Ticker therefore is an underestimate of the potential external health and environmental costs that would have been prevented as a result of strict enforcement of the LCP BAT conclusions.

Source and link: http://www.eeb.org

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Germany to exit coal power "well before 2050"

Reuters reported at the beginning of May 2016 that "according to a draft environment ministry document", coal-fired power production in Germany should come to an end "well before 2050".

The draft document:

- says that CO_2 emissions from the energy sector will need to be halved by 2030 compared to 2014 levels;
- proposes setting up a committee to come up with recommendations on how to phase out coal while averting economic hardship for those working in coal-producing regions;
- calls for a faster expansion of renewables than currently envisaged and says support for solar power needs to be increased;
- says the amount of energy produced by green sources should increase by around 75 percent by 2030;
- says that support for research into energy-storage technologies should be doubled over the next 10 years;
- says that the government will also push for a stricter European emissions trading system and is considering whether an additional levy on petrol, heating oil and gas would increase demand for green technologies.

Source and link: http://www.reuters.com/article/us-germanyenvironment-coal-idUSKCN0XU1R1

Stricter air pollution rules for machinery agreed

Emissions from non-road mobile machinery are a significant source of air pollution, especially nitrogen oxides and particulate matter.

The non-road mobile machinery (NRMM) directive – which dates back to 1997, but has been amended and extended several times since then – regulates emissions of the major air pollutants from diesel and petrol engines in a wide variety of off-road applications, including bulldozers, trains, chainsaws, larger inland ships and many other forms of machinery.

Despite the emission limits set by the NRMM directive, emissions of nitrogen oxides (NOx) and particle matter (PM) pollutants from this sector are still high and have grown in relative terms. This is explained by the steep increase in the number of non-road machines put into service and by the fact that the emission limits set for NRMM are less strict compared to those mandated for similar engines used by road vehicles.

In 2010, the NRMM sector was responsible for around 15 per cent of the total NOx emissions and 5 per cent of the total PM emissions in the EU. While the PM share is expected to decrease, the NOx share is expected to increase to nearly 20 per cent in 2020.

Against this background, in September 2014 the Commission proposed a new regulation to strengthen the emissions standards. According to the Commission's impact assessment, the stricter standards would bring benefits of between €26.1 and 33.3 billion by 2040, while the costs would be in the range of €5.2 to 5.8 billion in the same time period.

Negotiations between the EU's decision-making institutions resulted on 6 April in a deal on new pollution limits and an implementation timetable that is largely in line with the Commission's original proposal. The main exception is a weaker emission limit for NOx from barges.

The new harmonised type-approval conditions, including emission limit values, for new engines installed in non-road mobile machinery will start to apply gradually from 2018 up to 2020 depending on the category of the engine.

Added to the agreement is the possibility of retrofit requirements for existing engines to reduce their emissions. The Commission is tasked to assess the possibility of establishing EU-wide rules in this regard by 31 December 2018. Moreover, a review to establish whether further emissions reductions are needed is to take place by 31 December 2020, with a particular focus on barges and trains.

Environmental groups criticised the weaker rules for barges and the fact that no particle number (PN) limit had been adopted for diesel locomotives. Julia Poliscanova, air pollution manager at Transport and Environment (T&E), said: "More diesel machines will now be required to clean up their act with diesel particulate filters. But diesel trains and inland barges shouldn't be allowed to belch toxic fumes while the technology to clean up the emissions is available and routinely fitted to modern trucks. Moving more goods and people by rail and water shouldn't result in a trade off for higher air pollution."

Regarding the possible retrofitting of existing diesel off-road machinery, Julia Poliscanova said: "The Commission should present an ambitious proposal to clean up existing trains, barges and construction machinery, which will continue to be used for decades."

Diesel exhaust is carcinogenic, according to the World Health Organization (WHO), and diesel machines are a major local source of urban air pollution near some railway stations and construction sites. Every year air pollution causes more than 400,000 premature deaths and over 100 million sick days, costing society hundreds of billions of euro.

Before being finally adopted, the first-reading agreement will have to be confirmed by the Parliament and the Council, in accordance with the EU's ordinary legislative procedure.

Christer Ågren

Sources: Council press release 168/16, 6 April, and T&E press release, 7 April 2016.

Huge health impacts from Balkan coal plants

New study quantifies the public health costs of polluted air from existing coal-fired power plants in the Western Balkans at up to €8.5 billion per year.

New estimates of the huge health costs associated with air pollution from coal power plants in the Western Balkan region were published in March by the Health and Environment Alliance (HEAL). The report provides an estimate of the total health damage from air pollution released from coal power plants in five countries: Serbia, Bosnia and Herzegovina, Macedonia, Montenegro and Kosovo.

Table : The ten European coal power plants with the biggest emissions of sulphur dioxide (tonnes).

Country	Plant name	SO_2
Bosnia & Herzegovina	Ugljevik	154,385
Serbia	Nikola Tesla B	93,200
Serbia	Kostolac B	89,100
Greece	Amintaio	85,600
Bosnia & Herzegovina	Kakanj	73,123
Macedonia	Bitola	66,892
Poland	Belchatow	61,000
Bulgaria	Maritsa iztok 2	54,100
Serbia	Kostolac A	51,700
Bosnia & Herzegovina	Tuzla	51,644

Source: Emissions data for 2013 from European Pollutant Release and Transfer Register (EEA).

Currently home to 15 existing coal plants with an installed capacity of 8.1 gigawatt (GW), the region could see the installation of 24 new projects with 7.8 GW capacity. The estimated health costs of future coal plants are also shown in the report.

For its energy production, the region is heavily dependent on coal and lignite (the most polluting form of coal), and seven of the ten most polluting coal-fired power stations in Europe are located here (see table).

Air pollution is at levels that are up to two and a half times above national air quality safety limits and well beyond what the World Health Organization (WHO) recommends. According to the WHO, the estimated economic cost of early deaths from air pollution in Serbia amounts to 33.5 per cent of its GDP; in Bosnia and

Herzegovina 21.5 per cent, in Macedonia 19.9 per cent and in Montenegro 14.5 per cent. By comparison, the figures for Germany and the UK are respectively 4.5 and 3.7 per cent.

The study puts the costs to health of emissions from existing coal plants in the five Western Balkan countries at up to €8.5 billion per year. This estimate covers costs directly related to air pollution from coal-fired electricity plants, including from premature deaths, respiratory and cardiovascular hospital admissions, new cases of chronic bronchitis and lower respiratory problems, medication use and days of restricted activity due to ill-health, including lost working days.

A large proportion – more than half – of the health costs caused by air pollution from coal-fired power plants in the five Western Balkan countries is borne by the population in surrounding countries due to the transboundary effects of air pollutants being carried by the wind. According to HEAL, this shows that the EU's current efforts to improve air quality in its member countries should not stop at its borders. EU policy-makers should also put their weight behind demands for strong air quality and pollution control measures in its Western Balkan neighbours.

"Our new report quantifies the huge health costs associated with coal power generation in the Western Balkans, and uncovers the myth that coal is the cheapest form of energy," says Anne Stauffer, Deputy Director of HEAL.

She continues: "Opting out of coal offers the prospect of a healthier and more prosperous future. The EU should encourage the change to a healthy energy future by significantly increasing financial support for renewables and energy savings – for example, under the pre-accession programme. It would improve air quality and help tackle climate change in both the Western Balkans and in the rest of Europe.".

Christer Ågren

Source: HEAL press release 15 March 2016.

The report "The Unpaid Health Bill – How coal power plants in the Western Balkans make us sick" can be downloaded at: http://env-health.org/IMG/pdf/14032016_technical_report_balkans_coal_en_final.pdf

More than half US population exposed to dangerous air pollution

A total of 166 million Americans live in areas that have unhealthy levels of either ozone or particle pollution, according to the American Lung Association, raising their risk of lung cancer, asthma attacks, heart disease, reproductive problems and other ailments.

While there has been a gradual improvement in air quality in recent years, the report warned that progress has been too slow and could even be reversed by efforts in Congress to water down the Clean Air Act. "There are wide-ranging extreme measures to undermine the Clean Air Act," said Paul Billings of the American Lung Association. "If we roll back and weaken these protections, the health consequences will be dire.

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"We've certainly seen dramatic improvements in air quality but far too many cities and counties exceed levels where adverse effects occur. Progress should be faster. Americans deserve to breathe clean air and there's still a lot of work to be done." Billings said more needed to be done to prevent pollution from wood stoves and from oil and gas extraction.

Source: The Guardian, 20 April 2016.

The report: "State of the Air 2016" http://www.lung.org/our-initiatives/healthy-air/sota/

Save lives and costs by cutting GHG

The greenhouse emission cuts that the United States of America agreed to at the Paris climate conference may come with a significant public health benefit – the prevention of 295,000 premature deaths – according to a Duke University study, if the US reduces its emissions by 40 per cent by 2030, compared with 2005 levels. The US would prevent many premature deaths and save the economy billions of dollars should it make the necessary emissions cuts, the Duke study shows. A total of 295,000 Americans who would otherwise die from lung cancer, heart attacks or respiratory diseases by 2030 would be saved due to the reduction in air pollution.

Similarly, in the EU, many lives could be saved through greenhouse emission cuts, which would also bring cost savings.

This would bring multiple economic and environmental benefits that would make the EU more sustainable and competitive. Not only GHG emissions but also air pollution will be cut, benefiting human health. Raising the GHG reduction target for 2020 from 20 to 30 per cent would reduce costs related to air pollution in the EU by €6.5–11 billion per year. The Commission argues that the EU target of 40 per cent reduction in GHG will bring cuts in particulate matter ($PM_{2.5}$) concentrations that would reduce health damage from air pollution in 2030 by around €5 to 11 billion and air pollution control costs by more than €2 billion. NGOs demand that the EU should reduce GHG emissions in the EU by at least 60–90 per cent by 2030, which would cut many billions from the costs of dealing with health damage and air pollution.

Compiled by Reinhold Pape

Source: "Climate and Health Impacts of U.S. Emissions Reductions Consistent with 2 Deg C," Drew T. Shindell, Yuhna Lee, Greg Faluvegi. Nature Climate Change, Feb. 22, 2016. DOI: 10.1038/nclimate2935. Link: https://today.duke.edu/2016/02/lowcarbon

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Big benefits of cleaner marine fuel

Air quality in coastal areas improved significantly in 2015 after stricter sulphur limits for marine fuels were introduced in the North Sea and the Baltic Sea.

In several countries bordering the North Sea and the Baltic Sea, concentrations of sulphur dioxide (SO_2) have come down by 50 per cent or more in 2015 compared to previous years, according to a recent study by the Dutch research consultancy CE Delft conducted on behalf of the German environmental group NABU (Nature and Biodiversity Conservation Union).

The study has investigated the experiences of the first year of applying stricter marine fuel sulphur standards in the Sulphur Emission Control Area (SECA) covering the North Sea and the Baltic Sea. It focussed on air quality, socio-economic effects, impacts on business, and on compliance and enforcement.

As from 1 January 2015 the maximum sulphur content of marine fuels used in SECAs was reduced by 90 per cent, from 1.0 to 0.1 per cent. The resulting health benefits of better air quality were estimated to amount to between €4.4 and 8 billion. This can be compared to the cost to the maritime sector of moving to low-sulphur marine gas oil (MGO) in the North Sea and the Baltic Sea, which was estimated at €2.3 billion.

The researchers conclude that the health benefits of lower emissions of SO_2 and particulate matter (PM) were between 1.9 and 3.5 times higher than the increase in fuel costs, which means that the benefits of introducing the new regulations clearly outweighed the cost.

Before its implementation, there were industry concerns that the stricter fuel standard would significantly increase fuel costs and that there would be problems with the availability of low sulphur fuels. There were also concerns about impacts on the industry, such as closures of companies or services, and potential shifts towards road

transport. The lack of effective surveillance schemes to ensure compliance and enforcement were also subject to debate.

The study found that the availability of MGO has proven to be sufficient and that the price of MGO actually decreased – the latter mainly as the result of reduced oil prices in general. However, the MGO price decreased more sharply than the price of heavy fuel oil (HFO) and automotive diesel. In fact, by the end of 2015, the price of 0.1 per cent sulphur MGO was at the same level as the price of high-sulphur HFO was at in the beginning of 2015.

No significant shifts towards road transport were found for RoRo transport, which is regarded as the market segment that is most sensitive to a modal shift. Moreover, no company or service closures, nor any decrease in cargo turnover in Northern European ports, was found that could be clearly linked to the introduction of the stricter sulphur standard. Interestingly, some shipping companies reported a financial record year for the year 2015 and established new services.

According to data for 2015 from the European Maritime Safety Agency (EMSA), between three and nine per cent of the ships were non-compliant in the Baltic Sea and North Sea, respectively. It should be noted that countries typically use a margin of up to 20 per cent above the legal threshold during control in ports for reporting deficiencies and 50 per cent for applying sanctions.

It is believed that the rate of non-compliance on the open seas might be significantly higher, but the limited data available does not allow any firm conclusions. More and better data are needed in order to estimate the actual compliance rate on the open seas. In addition, fuel sampling needs to be intensified in 2016 in order to meet the required 30–40 fuel samples per 100 administrative inspections, as required by EU legislation.

It is recommended that there should be further development of monitoring and control techniques, including control on the open seas, to improve the effectiveness of the inspection regime. The authors also recommend that countries apply sanctions that are proportionate to the economic benefits of non-compliance.

Christer Ågren

Sources: CE Delft press release and Ends Europe Daily, 20 April 2016

The study: "SECA Assessment: Impacts of 2015 SECA marine fuel sulphur limits" (April 2016). By CE Delft, the Netherlands. Downloadable at: http://www.cedelft.eu/publicatie/seca_assessment%3A_impacts_of_2015_seca_marine_fuel_sulphur_limits/1780

Finland: 1,600 early deaths every year due to air pollution

Air pollution is estimated to cause some 1,600 premature deaths in Finland every year, says a new report from the Environment Ministry. Deaths caused by air pollution shorten the lifetime of the individuals by an average of 16 years. Taken across the entire population, this means that the life expectancy of Finns is shortened by an average of over five months due to air pollution.

Most of the health damage is caused by tiny particles (PM) or by nitrogen oxides. About half of the PM concentrations in Finland emanates from emissions from outside the country, while the other half comes from domestic emission sources, primarily from small-scale wood burning (46%), other energy production (16%), traffic exhaust gases (12%), street dust (10%), peat production (9%), and industry (7%).

Source: Environment ministry press release, 13 April 2016

http://www.ym.fi/en-US/Latest_news/Press_releases/New_report_over_1000_premature_deaths_in(38896)

UK air pollution is a public health emergency

According to a cross-party committee of Members of Parliament, air pollution in the UK is a "public health emergency" – the government's own data shows air pollution causes 40,000–50,000 early deaths a year. The MPs' heavily critical report says more action is required to tackle the crisis, such as giving dozens of cities that currently suffer illegal levels of air pollution stronger powers to deter polluting vehicles through charges.

The MPs' report also says farmers must step up action to cut pollution. Ammonia emissions from farms contribute to the formation of tiny particles, one of the main causes of premature deaths and other health impacts.

Alan Andrews, a lawyer at ClientEarth, which defeated the government in the supreme court in 2015, said: "We've been telling the government it needs to act on air pollution for five years. Due to our legal case, the government was ordered to act. Now, almost a year on, a cross-party group of MPs has told the government it must get a grip. It seems there is near-unanimous agreement on the need for urgent action from everyone other than the ministers responsible for dealing with our toxic air."

Source: The Guardian, 27 April 2016

The report: http://www.parliament.uk/business/committees/committees-a-z/commons-select/environment-food-and-rural-affairs-committee/news-parliament-2015/air-quality-report-published-15-16/

Baltic Sea and North Sea move towards becoming NOx Emission Control Areas

Significant health and environmental benefits will result from action to cut NOx emissions from international shipping.

In March the Helsinki Commission (HELCOM), which consists of the nine Baltic Sea coastal countries, and the European Union, finally agreed to submit proposals to apply NOx emission limits for international ships in the Baltic Sea.

This decision has been in the pipeline for the last five years, after an impact assessment was produced in 2010, but has repeatedly been postponed due primarily to opposition from Russia.

Emissions from international shipping are regulated by the International Maritime Organization (IMO). The emissions of sulphur dioxide (SO_2), and indirectly also of particulate matter (PM), in the Baltic Sea and the North Sea have been regulated for the past ten years through the designation of these two sea areas as Sulphur Emission Control Areas (SECA).

However, setting stricter limits for emissions of nitrogen oxides (NOx) as well will require a specific designation as NOx ECAs, which can only be decided by the IMO after the countries surrounding the sea area in question make a formal request to that effect, including submitting an impact assessment.

Until now, only the North American and US Caribbean ECAs apply the stricter Tier III NOx limit[1]. Here, the stricter standard took effect from 1 January 2016 and applies to newly built ships delivered from that same date.

The fact that HELCOM has now decided to proceed with the submission of its NECA application for the Baltic Sea to the IMO opens the way for the North Sea countries to submit a similar application for the North Sea. A NECA impact assessment for the North Sea was prepared back in 2012, but no application was submitted pending a decision by HELCOM.

It is now expected that the impact assessments for both sea areas will be updated, and that formal submissions to the IMO will be made in July, in order for these applications to be discussed at a meeting of the IMO's Marine Environment Protection Committee in October this year. A final decision on the new NECAs is likely to follow in 2017, and the stricter Tier III NOx standard would then apply to all newly built ships as from January 2021, i.e. with a five-year delay as compared to the North American NECA.

The emissions of NOx from international shipping in the Baltic Sea and the North Sea are significant – in 2010 they were estimated to amount to around 900,000 tonnes, more than twice the amount currently emitted jointly from all land-based sources in Denmark, Sweden and Finland combined. While NOx emissions from land-based sources have been halved in the EU over the last 20 years, those from shipping have continued to rise.

Reducing ship NOx emissions will bring significant health benefits, as it will lower the concentrations of the three most important health-damaging air pollutants: PM, nitrogen dioxide (NO_2) and ozone (O_3). According to the 2012 impact assessment for the North Sea, the health benefits from NOx emission reductions were valued at up to €1,900 million annually in 2030, while the costs were estimated at €280 million for that same year. This would imply a total net benefit to society of around €1,600 million, and that the health benefits alone are up to seven times larger than the costs. (Note that in this study it was assumed that the NECA emission limits would apply from 2016, i.e. five years earlier than is currently expected.)

Moreover, the NOx reductions will bring environmental benefits by reducing eutrophication of sensitive terrestrial and marine ecosystems. The Baltic Sea has for many decades suffered from serious eutrophication problems, and ship emissions are a major source of airborne deposition of nitrogen to this sea. According to HELCOM, the Baltic Sea NECA could significantly reduce nitrogen input to the Baltic Sea – by around 7,000 tonnes per year. A North Sea NECA is likely to contribute additional improvements.

A major shortcoming of the NECA standard is that it applies only to newly built ships. As the average lifetime of ships is between 25 and 30 years, there will be a considerable time lag until all ships actually meet the Tier III emission standard. This makes it vital to push for an early introduction of the NECA standard, and for the consideration of additional measures that also target emission reductions from existing ships.

Christer Ågren

Sources: HELCOM press release 10 March 2016; Impact assessment for NECAs in the Baltic Sea and the North Sea, summarised in Acid News No. 1/2011 and No. 3/2012.

1) As from January 2011, all new ships globally have to fulfil IMO's Tier II NOx standard, meaning that these ships will emit about 15–20 per cent less than the older ones. The stricter Tier III standard is set to cut NOx emissions by about 80 per cent, but will only apply to new ships (as from the effective date of the NECA) and only while operating in NECAs.

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Livestock holds major potential for GHG reductions

Policies targeting the livestock sector could potentially reduce global greenhouse gas emissions by 1.8 gigatons of CO_2 equivalents per year.

A new study, published in Nature Climate Change, estimates that livestock could account for up to half of the mitigation potential of the global agricultural, forestry, and land-use sectors, which are the second largest source of emissions globally, after the energy sector.

Researchers estimate that agriculture, forestry, and other land use are responsible for approximately one quarter of global greenhouse gas emissions. According to the new study, livestock production is responsible for 5.6–7.5 gigatons of CO_2equivalents per year, or approximately 14 per cent of total anthropogenic emissions.

The study considers both the supply and demand sides of the industry. It found that the sustainable and healthy levels of livestock product consumption in human diets is a crucial part of the mitigation potential.

"Livestock has a role in a healthy and sustainable diet, and the sector has an important economic and social role, particularly in developing countries," says Mario Herrero, a researcher at CSIRO in Australia who led the study, in collaboration with IIASA scientists.

The analysis shows that policies targeting the livestock sector could potentially reduce greenhouse gas emissions by 1.8 gigatons of CO_2 equivalents per year, at a carbon price of US$ 100 per ton of CO_2 In order to go further, however, the researchers say that changes in consumption and a focus on land-use change emissions would be required.

"We currently have a strong global drive for curbing global emissions following last year's Paris agreement. This study shows that livestock should be high on the climate mitigation agenda," adds IIASA researcher Hugo Valin, who also worked on the study.

Reference: Herrero, M., Henderson, B., Havlik, P., Thornton, Philip K., Conant, R.T., Smith, P., Wirsenius, S., Hristov, A.N., Gerber, P., Gill, M., Butterbach-Bahl, K., Valin, H., Garnett, T. and Stehfest, E. (2016) Greenhouse gas mitigation potentials in the livestock sector. Nature Climate Change.

Source: IIASA News, 22 March 2016

Sweden and the climate change performance index

Sweden always scores well for climate policy on the annual scorecard of Climate Action Network Europe and Germanwatch. But for some years this has been more due to luck than to real progress.

Sweden usually ranks highly on the climate change performance index (CCPI), published by Germanwatch and Climate Action Network Europe. In 2015 it was #2, and in the three previous years it was #4, #2 and #1 among ranked nations, essentially the OECD and some others. The formal ranking is actually lower, but the scorecard leaves the first three places vacant, as a statement that no nation is on track to climate sustainability.
Nevertheless, Sweden is clearly top of the class. A quite easy task, according to many people within the Swedish NGO community.

This is not to say that there is anything fundamentally wrong with the index. Just that its methodology fits Sweden very well.

Sweden has a power system based on hydro (50 per cent) and nuclear (35–40 per cent), with the remainder mainly wind power and biomass CHP. The hydro plants were built long ago, before climate was an issue, but it rains more than it used to. Nuclear power also preceded climate policy, as did most of the district heating and biomass use.

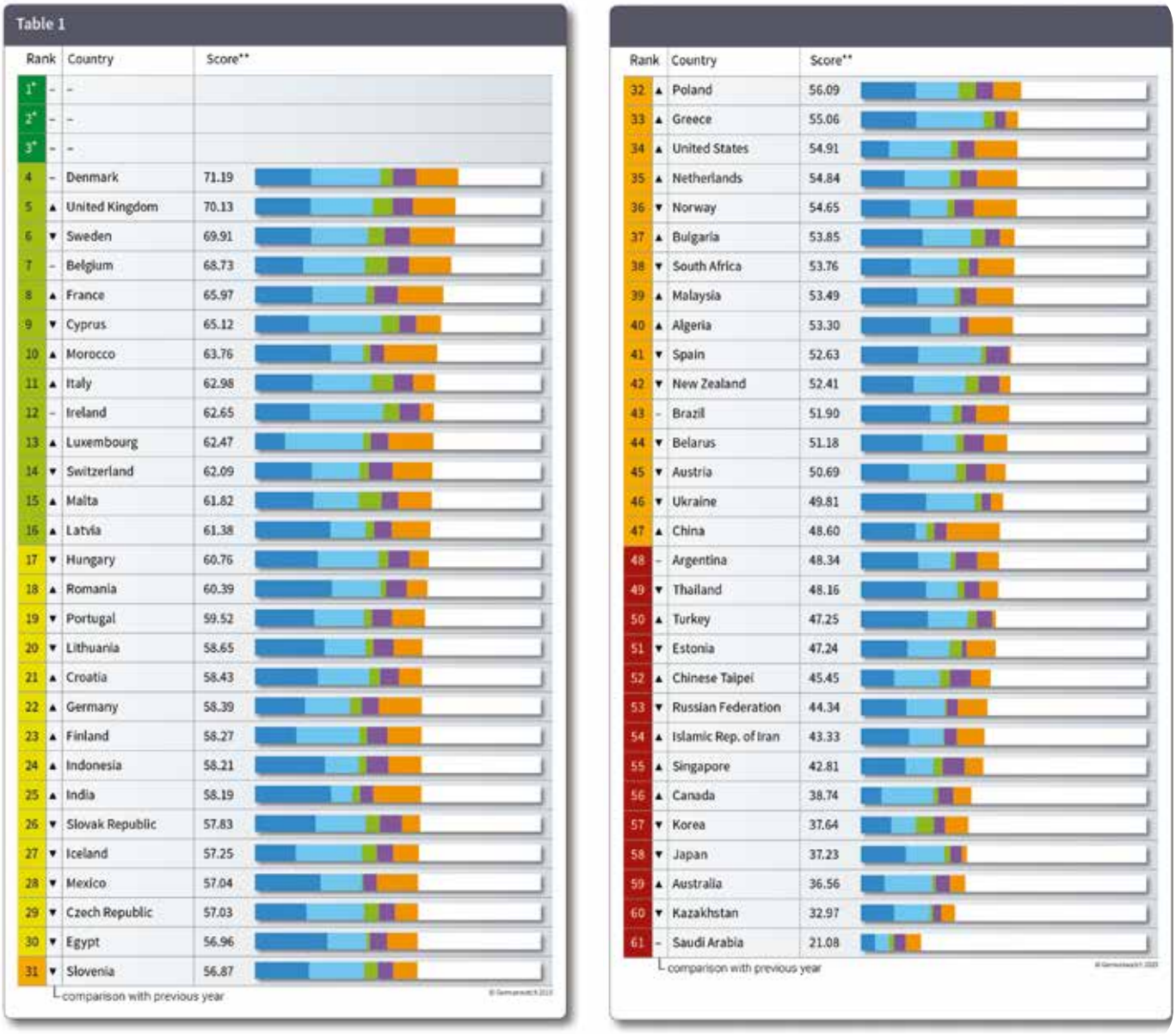
Sweden has almost no fossil power and not much fossil heat.

These factors automatically give Sweden a high score for low CO_2 emissions per capita, low emissions per GDP unit, high renewables share, and for "efficiency" as defined by the CCPI, which is CO_2 emitted per total energy supply.

The index measures both levels and trends, and Sweden's trends are not so bad. Before the index started we had the worst gas-guzzling cars in Europe, because they were mainly produced by Volvo and Saab. The spectacular improvement mainly reflects how bad the situation was.

As for electricity, Sweden used to have an absurd overconsumption per capita, now slowly levelling off to a more normal European standard. Building automation in industry, offices and flats has cut electric power use. Heat pumps replace direct electric heating. Electricity demand has dropped some 8 per cent from the 2001 peak.

Sweden's nuclear power is getting old, or is poorly managed, or both, so it has produced fewer TWh since 2006 than before. This means, by definition, a higher efficiency for the economy, because nuclear power wastes a lot of energy as tepid water that is discharged into the sea. The energy loss is included in the energy supply.



* None of the countries achieved positions one to three. No country is doing enough to prevent dangerous climate change.
* * Rounded

Index catagories

- **Emissions Level** (30% weighting)
- **Developmentof Emissions** (30% weighting)
- **Renewable Energies** (10% weighting)
- **Efficiency** (10% weighting)
- **Climate Policy** (20% weighting)

Rating

- Very good
- Good
- Moderate
- Poor
- Very poor

Emissions from industry have also dropped, mainly because the market for cement, steel, ore, etc., has not quite recovered since 2008. The paper and pulp industry also switched from expensive oil to cheap biomass.

Some of the good scores are results of national policy. Sweden will produce 15–16 TWh of wind power in 2015, against only 1 TWh in 2006, a result of the green certificates. Sweden has built most wind power per capita in the world over the last few years. This is due to Green Certificates, enacted in 2003, but most of the increase took place from 2012 on.

Biomass use for heating and electricity has a long tradition, but it has been sustained and expanded to vehicle fuels.

Most of the index, 80 percent, uses objective criteria. Sweden comes out well because the country is large, and it rains a lot, so we have a high proportion of hydropower and extensive forests. That gave us a good head-start. The remaining 20 per cent is judgemental, from experts, on policy.

Sweden has done a few good things, such as pioneering heat pumps and efficient windows and some good biofuels. Our greenhouse gas emissions have dropped continuously, and may well continue to do so, though three out of 12 nuclear power reactors are shut down, and another three will be closed down by or before 2020.

We did nothing to pioneer the real climate-savers from scratch, as Denmark did with wind power and Germany with photovoltaics. Maybe they did better in that respect because they had a more uphill task, starting with a lot of coal power.

Fredrik Lundberg

See also article in Acid News 1, 2016 p.6-7
http://www.airclim.org/acidnews/how-account-emissions-greenhouse-gases-imported-goods

Reference: climate-change-performance-index-2016. http://www.caneurope.org/can-and-press/935-climate-change-performance-index-2016

IPCC starts work on the 1.5°C target and 6th Assessment Report

The Paris Agreement of the UN Framework Convention on Climate Change says that global temperature increase should be limited to 1.5°C compared with pre-industrial times. The UN therefore asked the Intergovernmental Panel on Climate Change (IPCC) to provide a special report in 2018 on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways. The IPCC has now agreed during a meeting in April in Nairobi to prepare a special report on 1.5°C and will start work this summer with a call for experts to scope the report.

The two accompanying tables show the different probabilities of achieving the 1.5°C target, and the remaining carbon budgets are calculated according to the IPCC 4th Assessment Report from 2013/2014.

At the 43rd Session of the Panel in Nairobi the IPCC also agreed on a roadmap for the production and delivery of the 6th IPCC Assessment Report (AR6). When drawing up the outlines for AR6 the IPCC decided to pay special attention to the impacts of climate change on cities and their unique adaptation and mitigation challenges and opportunities. Preparations for the main AR6 report, which is expected to be released in three working group contributions in 2020/2021 and a Synthesis Report in 2022, will start later this year. The panel also agreed to prepare two other special reports: on climate change and oceans and the cryosphere; and on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. These will be produced as early as possible in the AR6 cycle.

Reinhold Pape

Carbon countdown

How many years of current emisssion would use up the IPCC's carbon budgets for different levels of warming?

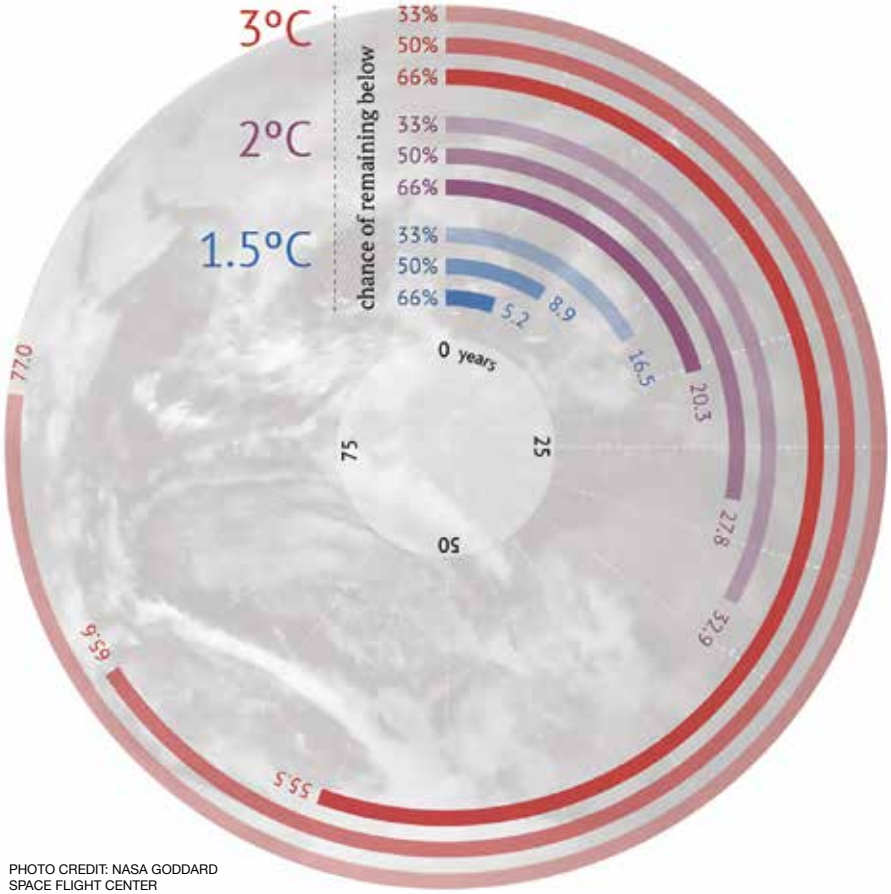
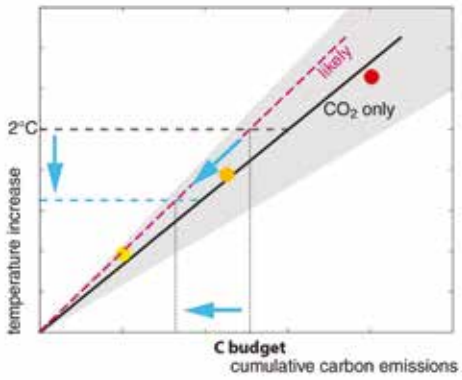


PHOTO CREDIT: NASA GODDARD SPACE FLIGHT CENTER

Source: www.carbonbrief.org. Link: http://www.carbonbrief.org/analysis-only-five-years-left-before-one-point-five-c-budget-is-blown

Control the carbon budget



- Higher likelihood to achive target implies lower budget
- Lower temperature target implies lower budget
- 2°C budgets for CO_2 only are (90%/60%/50%/33%/10%): 730/1000/1212/2675 GtC
- 1.5 °C budgets for CO_2 only are (90%/66%/50%/33%/10%): 548/750/909/1176/2675 GtC
- Non-CO_2 implies lower budget: likely <2°C budget from 1000 PgC down to about 790 GtC for RCP2.6, 515 GtC emitted.

IPCC AR5 WORKING GROUP I
CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE

Health and climate co-benefits of dietary change

Widespread adoption of a vegetarian diet would significantly cut food-related emissions of greenhouse gases and make people healthier too.

By 2050, greenhouse gas (GHG) emissions related to agriculture and food production are likely to increase by more than 50 per cent, from 7.6 to 11.4 gigatonnes CO_2 equivalents, according to research led by scientists at the Oxford Martin School in the UK. However, shifting to a mostly vegetarian diet, or even simply cutting down meat consumption to within accepted health guidelines, would significantly reduce GHG emissions.

While energy generation, transport and heating of buildings have long been a target for climate policy measures, the impact from food production has often been left out. But on current trends, with intensive agriculture increasingly geared towards livestock rearing, food production will be a major concern.

Adhering to health guidelines on meat consumption could cut global food-related emissions by nearly a third in 2050, as compared to the reference scenario, i.e. down to 8.1 gigatonnes.

Widespread adoption of a vegetarian diet, including eggs and dairy, would halve emissions to 4.2 gigatonnes, while a vegan (i.e. completely plant-based) diet would achieve an emissions cut of around two-thirds, resulting in 3.4 gigatonnes CO_2 equivalents in 2050.

Such steps would also save lives, argued Dr Marco Springmann, lead author of the study that was published in the Proceedings of the National Academy of Sciences in April.

"Imbalanced diets, such as diets low in fruits and vegetables and high in red and processed meat, are responsible for the greatest health burden globally and in most regions," he said.

More than 5 million premature deaths could be avoided globally by 2050 if health guidelines on meat consumption were followed, rising to more than 7 million with a vegetarian diet and 8 million for veganism. These steps, if widely followed, could also reduce global healthcare costs by US$ 1 billion a year by mid-century.

Using the value-of-a-statistical-life approach, the overall economic benefits of improving diets were estimated at US$ 20–30 trillion per year in 2050, amounting to between 9 and 13 per cent of the global GDP in that same year.

Linking health and climate change in challenging our eating habits could have more effect than focusing on each of these issues alone, said Springmann. "By combining the two benefits, you have a more powerful impact. I think this will make more of an impression."

"We do not expect everybody to become vegan. But the climate change impacts of the food system will require more than just technological changes. Adopting healthier and more environmentally sustainable diets can be a large step in the right direction."

Reference: M. Springmann, H. C. J. Godfray, M. Rayner, and P. Scarborough (2016) Analysis and valuation of the health and climate change cobenefits of dietary change. http://www.pnas.org/content/113/15/4146.abstract

Source: The Guardian, 21 March 2016

Germany sets its sights on coal phase-out

Coal must be phased-out for Germany to meet its ambitious climate protection goals.

Renewable energies in Germany currently account for nearly one-third of electricity usage. However, they cover only 12 per cent of total energy demand, since the heating, industrial, and transportation sectors still largely depend on fossil fuels. An all-inclusive revision of national economic strategies is therefore now required for decarbonising energy usage to fulfill climate protection obligations.

In 2013, the CDU/CSU/SPD coalition government committed to eliminating between 80 and 95 per cent of Germany's greenhouse gas emissions by mid-century compared with 1990. Since carbon dioxide (CO_2) constitutes 88 per cent of the greenhouse gases in question, the systematic reduction of carbon-based fuel usage is essential to realizing a climate-tolerant economy. The staged retirement of Germany's final eight nuclear reactors has been legislated by the end of 2022. The continuing expansion of renewable energy capacities is therefore essential for supplanting this lost generation. Less than a tenth of power demand is covered by costly natural gas. Domestic lignite and imported coal account for about 25 per cent and 20 per cent of electricity generation, respectively.

To promote renewable energy deployment, Germany provides guaranteed power feed-in tariffs for operators. By 2015, wind (13.5%), solar (5.9%), bioenergy from waste (7.7%), and hydroelectric (3.0%) power accounted for 30.1 per cent of overall generation. Daily availability widely deviates from these annualized figures, however. Recurrent wind and solar deficiencies (grid "droughts") mean that fossil fuel generation remains essential for insuring uninterrupted electricity supplies. Limited pumped hydropower reserves would be exhausted within a few hours without these conventional capacities.

According to the most recently available data for an entire calendar year (2014), renewable energies with a total capacity of 91.8 billion watts (GW) – including 1.5 million PV solar installations (38.5 GW) and 24,867 wind turbines (38.1 GW) – delivered scarcely more electricity in Germany than lignite power plants with a capacity of 23.1 GW. Whenever this combined fluctuating generation surpasses grid demand, the excess electricity is redirected to local utilities, hydroelectric storage plants, and the export market. The necessary routing costs have been estimated at €500 million for

2015 alone by the grid operator 50Hertz.

Shortly after the Paris COP21 conference, the Agora Energiewende group in Berlin presented a programme with "Eleven Principles for a Consensus on Coal" on 13 January 2016. According to these findings, the current 42 per cent usage of coal and lignite for electrical power generation must be phased out over the next quarter-century for Germany to realize its ambitious climate protection goals. Carbon-based market mechanisms will be insufficient to achieve this objective alone. "Even if the CO_2 price were to increase to about 40 euros per ton of CO_2 by 2040," Agora notes, "the proportion of electricity generated by coal in the system would still be too high". Overall emission reduction targets for 2030 and 2040 could not be attained without comprehensive phase-out schedules, additional carbon taxes, or public plant decommissioning premiums.

Once nuclear power has been completely retired, more than three quarters of Germany's energy will be derived from fossil fuels. An entirely market-based approach would be inadequate for effecting the necessary decarbonization transition. Without policy incentives, no market exists for climate-neutral transportation and buildings. In the Agora proposal, the increasing electrification of these sectors could accelerate the transformation of power generation. With electric vehicles and heat pumps drastically increasing the demand for wind and solar power, far greater capacities would be required.

Agora has particularly emphasized the need for RWE to retire lignite power generation in the Rhineland by 2040 for Germany to attain its CO_2 reduction targets. Fulfilling this requirement would eliminate 77.8 TWh of the electricity generated in 2015, constituting 12 per cent of total grid power (bmwi.de). RWE also generated 46.5 TWh (7.2%) of electricity from hard coal, while nuclear contributed 14.1 per cent nationwide in 2015. Germany would therefore have to double its current renewable energy commitment just to make RWE carbon-free while also phasing out nuclear power.

Jeffrey H. Michel

Even "most efficient" coal puts global climate goals out of reach – report

WWF has published a new report that shows that even the most efficient coal plants are not compatible with the global climate change goal. The Ecofys study shows that any coal-fired power generation will take the world off course from the

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internationally agreed target of keeping temperature rise well below 2°C above pre-industrial levels.

"This report discredits claims from the coal industry and governments such as those of Japan, Germany, South Korea, Australia and Poland that efficient coal plants are compatible with climate action. It is clear that in a post-Paris world, there is quite simply no role for coal, however 'efficient'," said WWF. This conclusion was reached through an assessment of scenarios from the IPCC and IEA. Currently, 2,300 new coal power plants – 1,400 GW of capacity – are planned worldwide.

WWF concludes that governments need to end public financial support for coal immediately, and phase out all coal plants by 2035 in Organisation for Economic Cooperation and Development (OECD) countries and by 2050 globally to avoid the worst impacts of climate change. potential added up to just over US$ 5 billion.

Reference: compiled from WWF press release

Link to the report: http://bit.ly/1SeRhYG

Babies harmed by air pollution

Air pollution in the United States may be causing thousands of premature births each year and costing the nation billions of dollars, according to a new study published in the journal Environmental Health Perspectives. The researchers concluded that just over three per cent, close to 16,000, of all the preterm births in 2010 could be attributed to fine particulate matter (PM).

It is believed that exposure to air pollution can cause inflammation of the placenta during pregnancy, which can ultimately lead to an early delivery. Preterm birth is associated with a variety of medical problems including an increased risk of infant mortality, breathing and feeding difficulties, cerebral palsy, increased risk of developing other diseases and developmental delays that can lead to cognitive impairment throughout life.

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The direct medical costs were estimated at about US$ 760 million in 2010. Far weightier, though, were the costs associated with lost economic productivity, and altogether the medical costs and lost economic potential added up to just over US$ 5 billion.

Source: Washington Post, 29 March 2016

The study: "Particulate Matter Exposure and Preterm Birth: Estimates of U.S. Attributable Burden and Economic Costs", by Leonardo Trasande, Patrick Malecha, and Teresa M. Attina. http://ehp.niehs.nih.gov/15-10810/

Fines of up to €12.7 million for breaching sulphur standard

Ireland has penalty systems in place that could see bunker suppliers and ships that are in breach of the MARPOL Annex VI sulphur regulations face fines of up to € 12.7 million, while penalties for breaching EU sulphur regulations range from € 5,000 to 300,000.

Ireland will be working on a total figure for sulphur inspections in 2016 of about 150 ships. Of these, thirty ships will have samples taken for lab analysis, according to a spokesperson for the Department of Transport, Tourism and Sport.

The country is not bordering an emission control area, but as an EU member state, it is nevertheless required to inspect 10 per cent of ships calling at its ports for compliance with the EU sulphur directive, and to take fuel samples for sulphur testing from 20 per cent of the vessels subjected to such inspections.

Source: Sustainable Shipping Daily, 11 and 15 March 2016

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Ship fuel non-compliance around 5% in 2015

Forty-three incidents of ships using non-compliant fuel were detected in EU sulphur emission control areas (SECAs) in 2015, the first year for which new, more stringent sulphur standards were implemented. In total, 315 cases of non-compliance with the sulphur directive were reported to the European Maritime Safety Agency in 2015. Compared to the 6,800 ship inspections recorded, this would indicate a non-compliance rate of around five per cent. As of 1 January 2015, the sulphur content of fuel used in SECAs – i.e. the Baltic Sea, the North Sea and the English Channel – must be limited to 0.1 per cent.

Source: Ends Europe Daily, 30 March 2016

Football players' performance affected by air pollution

A group of health economists has found that football players' performance was impeded at levels of particulate matter (PM) well below the EU air quality limits. And at high levels – above the EU threshold – there was a significantly noticeable decline equivalent in performance, by as much as 16 per cent.

The findings are based on analysing the performance of players in Germany's Bundesliga between 1999 and 2011, mapped against hourly air pollution data collected outside each stadium. Now the academics want more work to be done to assess what impact pollution has on other professions' "physical and cognitive productivity" and to broaden knowledge on the benefits of environmental regulation.

Source: The Guardian, 6 March 2016

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Carbon dioxide levels in atmosphere spike

The annual growth rate of atmospheric carbon dioxide measured at the Mauna Loa Observatory in Hawaii jumped by 3.05 parts per million during 2015, the largest year-to-year increase in 56 years of research, according to the U.S. National Oceanic and Atmospheric Administration (NOAA).

The development is significant because Mauna Loa Observatory is the oldest continuous atmospheric measurement station in the world and is widely regarded as a benchmark site in the World Meteorological Organization's Global Atmosphere Watch network.

WMO will issue its own report on greenhouse gas concentrations in 2015 later this year, based on data from 50 countries, including stations high in the Alps, Andes and Himalayas, as well as in the Arctic, Antarctic and in the far South Pacific.

In January and February 2016, the monthly average concentration of CO_2 across the globe (not just Mauna Loa) passed the symbolic benchmark of 400 parts per million. In February, the level was 402.59 ppm, according to NOAA.

The jump in CO_2 is partially due to the current El Niño weather pattern, as forests, plant life and other terrestrial systems responded to changes in weather, precipitation and drought, according to NOAA. The largest previous increase occurred in 1998, also a strong El Niño year.

"The impact of El Niño on CO_2 concentrations is a natural and relatively short-lived phenomenon," said WMO Secretary-General Petteri Taalas. "But the main long-term driver is greenhouse gas emissions from human activities. We have the power and responsibility to cut these."

"This should serve as a wake-up call to governments about the need to sign the Paris Climate Agreement and to take urgent action to make the cuts in CO_2 emissions necessary to keep global temperature rises to well below 2°C," he said.

CO_2 remains in the atmosphere even for tens of thousands of years, trapping heat and causing Earth to warm further. Its lifespan in the oceans is even longer. It is the single most important greenhouse gas emitted by human activities.

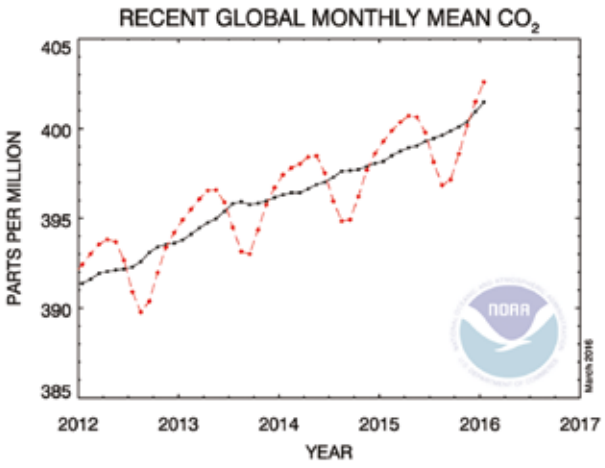
Concentrations of CO_2 are subject to seasonal and regional fluctuations. The seasonal maximum usually occurs early in the Northern hemisphere spring before vegetation growth absorbs CO_2. Levels are lower for the rest of the year.

The amount of CO_2 in the atmosphere has increased on average by 2 ppm per year for the past 10 years, reaching new record levels every year, according to WMO's annual Greenhouse Gas Bulletin. The next Bulletin, based on observations from around the world, will be published in November 2016.

The Global Atmosphere Watch network spans more than 50 countries. All stations are situated in unpolluted locations.

Reinhold Pape

Source and link: http://public.wmo.int/en/media/news/carbon-dioxide-levels-atmosphere-spike



Rreference: Compiled from press-release

Shipper fined US$ 130,000 for violating sulphur regulation

The California Air Resources Board (CARB) has fined the China Navigation Co. Pte. Ltd. US$ 129,500 for failure to switch its engines over from heavy bunker fuel to cleaner, low-sulphur fuel when close to the California coast, as required by state law. In December 2012, the vessel Chenan operated within Regulated California Waters (i.e. 24 miles or less from the coast) on non-compliant heavy fuel oil on 12 separate days (four voyages) while en route to and departing from the Port of Los Angeles.

CARB conducts an estimated 800 to 1,000 ship inspections each year, checking for proper fuel usage, record-keeping and other compliance requirements. Part of the inspection involves sampling each vessel's fuel, and analyzing the fuel sample.

Source: CARB news release, 3 March 2016
http://www.arb.ca.gov/newsrel/newsrelease.php?id=795

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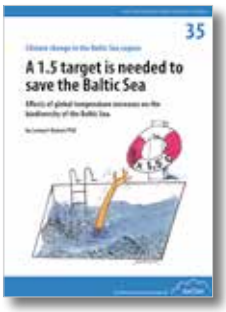

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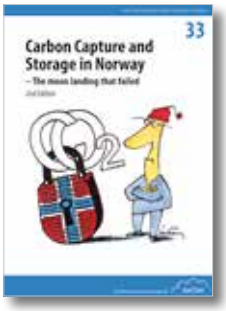
Short paper on the UNFCCC Structured Expert Dialogue on the 2013-2015 (Nov 2015). By Climate Analytics. Review, with a particular focus on the 1.5°C target.



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Coming events

Air pollution: how to avoid more than 1000 deaths per day. Brussels, Belgium, 31 May 2016. Information: https://www.regjeringen.no/no/aktuelt/air-pollution-how-to-avoid-more-than-1000-deaths-per-day/id2498738/

Environment for Europe Ministerial Conference. Batumi, Georgia, 8 - 10 June 2016. Information: http://efebatumi.com/en/

The road to efficiency: How fuel economy standards for cars and trucks can help governments meet their 2030 climate targets. Brussels, Belgium, 9 June 2016. Information: https://www.transportenvironment.org/events/road-efficiency

EU Environment Council. Brussels, Belgium, 20 June 2016. Information: http://europa.eu/newsroom/events/week_en

Air Pollution 2016: The 24th International Conference on Modelling, Monitoring and Management of Air Pollution, Crete, Greece, 20 - 22 June 2016. Information: http://www.wessex.ac.uk/conferences/2016/air-pollution-2016

European Photovoltaic Solar Energy Conference and Exhibition (EU PVSEC 2016). Munich, Germany 20 - 24 June 2016. Information: http://www.photovoltaic-conference.com

3rd International Conference on Energy, Sustainability and Climate Change (ESCC 2016). Marathon, Athens, Greece, 10 - 16 July, 2016. Information: http://saharidis.wix.com/escc

17th IUAPPA World Clean Air Congress and 9th Better Air Quality Conference – Clean Air for Cities – Perspectives and Solutions. Busan, South Korea, 29 August - 2 September 2016. Information: www.wcac2016.org

EU Environment Council. Luxembourg, 17 October 2016. Information: http://europa.eu/newsroom/events/week_en

IMO MEPC 70 (Marine Environment Protection Committee). London, UK, 24 - 28 October 2016. Information: www.imo.org

UNFCCC Conference of the Parties (COP) 22. Marrakesh, Morocco, 7 - 18 November 2016. Information: http://unfccc.int/

7th International Nitrogen Initiative (INI 2016). Melbourne, Australia, 4 - 8 December 2016. Information: http://www.ini2016.com/

CLRTAP Working Group on Strategies and Review + Executive Body. Geneva, Switzerland, 13 - 16 December 2016. Information: www.unece.org/env/lrtap/welcome.html