

A fair share of climate responsibility

Annex 1 countries need to have negative emissions of 441 GtCO₂ by 2050, according to a new equity proposal from several Latin American countries.

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Proposal for coal phase-out in Germany

BUND, a German environmental organisation, suggests a legally binding law to close all coal power stations by 2030.

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UK brought to court on bad air quality

New figures from the UK government show air quality in some of the country's biggest cities will not meet European Union pollution limits until after 2030, twenty years after the original deadline.

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Sustainable food choices

Excluding meat from our diet is not enough on its own to benefit the climate. Eating a lot of cheese or simply eating a lot of everything also leads to high greenhouse gas emissions.

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New figures for global ship emissions

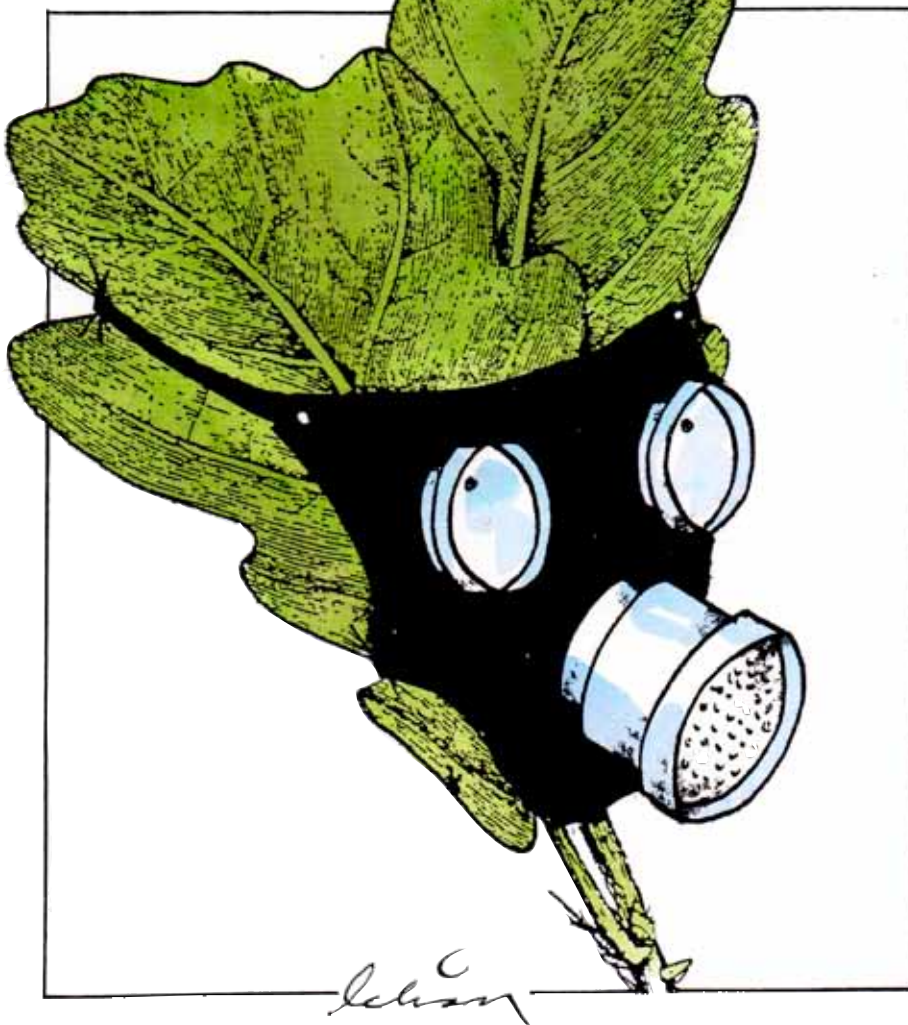
In 2012 worldwide shipping consumed some 300 million tonnes of fuel oil, resulting in emissions of 949 million tonnes of carbon dioxide.

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Carbon dioxide concentration surges

The concentration of carbon dioxide in the atmosphere increased last year at the fastest rate for nearly 30 years, according to the latest data from the WMO.

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Air pollution still harms ecosystems

While acidification has been greatly reduced since its peak in 1980, emissions of nitrogen-containing air pollutants continue to damage more than half of sensitive ecosystems.

According to the EU's Environment Action Programme, the long-term objective and core of the EU's air quality policy is to attain air quality levels that do not give rise to significant negative impacts on, or risks for, human health and the environment. Specifically for ecosystems, the long-term objective is to achieve "no exceedance of the critical loads

and levels", i.e. scientifically determined limits of ecosystem tolerance to air pollution exposure. This objective was recently echoed in the Commission's Clean Air Package proposal from December 2013.

A new study by the European Environment Agency (EEA) evaluates how European ecosystems were affected by

Acid News

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

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

In order to fulfil the purpose of Acid News, we need information from everywhere, so if you have read or heard about something that might be of general interest, please write or send a copy to:

Air Pollution & Climate Secretariat

Norra Allégatan 5, 413 01 Göteborg, Sweden
Tel: +46 31 711 45 15
Fax: +46 31 711 46 20
E-mail: info@airclim.org
Internet: www.airclim.org

Editor: Kajsa Lindqvist

Assistant editors: Christer Ågren & Reinhold Pape

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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

Since their peak around thirty years ago, emissions of air pollutants in Europe have come down significantly. Tougher emission standards for industry and road vehicles have resulted in less polluting power plants and cars. In addition, stricter environmental legislation has helped to speed up structural changes in the energy and transport sector and improved energy efficiency.

While the air we breathe has become cleaner, it is still unhealthy or even deadly. Current levels of air pollution are responsible for more than 400,000

premature deaths in the EU every year, as well as allergies and respiratory and cardiovascular diseases which result in extra medication, hospitalisations and millions of lost working days.

These health impacts carry enormous costs to society. In the year 2010 alone, health damage in the EU from air pollution was estimated to amount to between €330 and €940 billion. This means that even a pure economic cost-benefit approach motivates a significant stepping up of action to tackle air pollution, since the health benefits alone outweigh by far the additional costs for emissions control.

For example, the monetized health benefits of the Commission's recent proposal for a new national emissions ceilings (NEC) directive are up to 42 times greater than the estimated emission abatement costs.

Moreover, it is not only people that suffer. Air pollution also damages nature and biodiversity, with the deposition of acidifying and eutrophying pollutants and the concentrations of ground-level ozone still exceeding the tolerance limits of sensitive ecosystems over millions of hectares in Europe.

Clean air and water, healthy forests and heathlands, and a rich flora and fauna are necessary for a high quality of life, and

**‘minimising
the use of
fossil fuels is
key to resolving
both climate
change and
air pollution’**

must not be overlooked by policy makers just because they are difficult to value in monetary terms.

The gravity of the current air pollution situation calls for an EU air quality strategy that establishes a very high level

of ambition. It is certainly not acceptable that even after 2030 air pollution will still cause a quarter of a million of premature deaths among EU citizens, and that millions of hectares of valuable ecosystems will still be exposed to pollutant levels in excess of their critical loads, as would be the case

under the ambition level of the Commission's proposed new NEC directive.

Applying new and improved emission control techniques must be part of the solution, but minimising the use of fossil fuels is key to resolving both climate change and air pollution, as it cuts emissions of the main greenhouse gas carbon dioxide as well as those of health-damaging sulphur dioxide, nitrogen oxides, fine particulate matter and mercury.

Improvements in energy efficiency, increased use of less- or non-polluting renewable sources of energy and behavioural change (e.g. reducing car usage and meat consumption) are examples of measures that will benefit both air quality and the climate.

Going for tougher climate and energy targets will help to achieve air quality targets, and the significant short-term co-benefits for health and nature from the resulting air pollution reductions should also help to motivate a much higher level of ambition for climate policy.

Christer Ågren

Continued succes for renewables

Denmark got 41 per cent of its power from the wind in the first six months of 2014. Renewables are advancing all over Europe.

Wind and solar are now big in absolute numbers, and of major importance to some countries.

Denmark got 41 per cent of its electricity from wind in the first six months of 2014, and another two per cent from solar. For shorter periods wind alone can supply more than 100 per cent of Denmark's needs; the surplus is exported. Portugal got more than 25 per cent of its power from the wind, and Spain 21 per cent power from the wind (and 6 per cent from solar) in the first eight months of 2014.

Integration obviously works, in practice.

Portugal and Spain have some hydro that can balance the variability of wind and solar, but they do not have very much transmission capacity to third countries. Denmark has no hydro but can use export and import to balance demand.

Most countries can do either, well before issues of storage or demand-side management or new backup thermal power need to be addressed.

Germany, the world leader in photovoltaic solar energy, with 30 TWh in 2013, has also shown that it is easier to integrate both solar and wind power than either one of them. For the first seven months of 2014 a graph shows that the monthly total of wind and solar is almost constant (figure).

Wind power produced more than seven per cent of EU electricity in 2013, totalling 237 TWh, equivalent to the output of 34 large nuclear reactors or an even larger number of coal power plants. Wind power in the EU was 16 per cent up from 2012.

Solar produced 83 TWh, 17 per cent up.

The share of wind and solar, and their growth, varies widely between countries for no very good reason. In 2013, Denmark got 33 per cent of its power from the wind, Sweden 7 per cent but Finland only 0.9 per cent. It is hardly likely that this can be explained by different wind strengths.

Spain, the top wind power nation in Europe, has almost four times as much wind power as France.

Many ex-communist countries have very little wind power, for example Slovakia, Czech Republic, Hungary and the Baltic states (while Russia has none at all). Poland and Romania are now picking up, however.

The differences, whatever their cause, show that there is room for much more. Costs are being cut; the Danish government has found that (onshore) wind power is the cheapest option for new power. A recent US government study also shows that wind is cheaper than coal or nuclear. (Gas is still cheaper in the US, but not in Europe.)

Ten years ago the conventional wisdom was that renewables and efficiency were nice ideas, but the real way to cut CO₂ emissions was coal with carbon capture, CCS, and nuclear power.



Wind power in the EU was 16 per cent up from 2012 and solar power was 17 per cent up.

Now we know otherwise. CCS has got nowhere so far. Nuclear is declining in the EU. Its output fell 14 per cent between 2003 and 2013, from 999 to 878 TWh. Half of it is in France.

Meanwhile wind grew from 44 to 237 TWh, solar from 0.4 to 83 TWh and "other renewables", excluding hydro, mainly biomass from 103 to 489 TWh.

As for efficiency, it is a fact that EU electricity consumption peaked in 2007 and has been dropping since then. Consumption of oil, gas and coal is also dropping. Energy demand is effectively de-linked from GDP.

All is not well. Some renewable subsidies have been poorly designed, with busts following booms. Retroactive legislation in Spain and Italy, for example, has scared off investors. Some governments are more interested in protecting the existing power companies than in the environment and climate.

But if the idea was to spread renewable tech from Europe to the world, it has worked.

China is now the world leader in wind and in photovoltaics, and many other countries are following suit.

Fredrik Lundberg

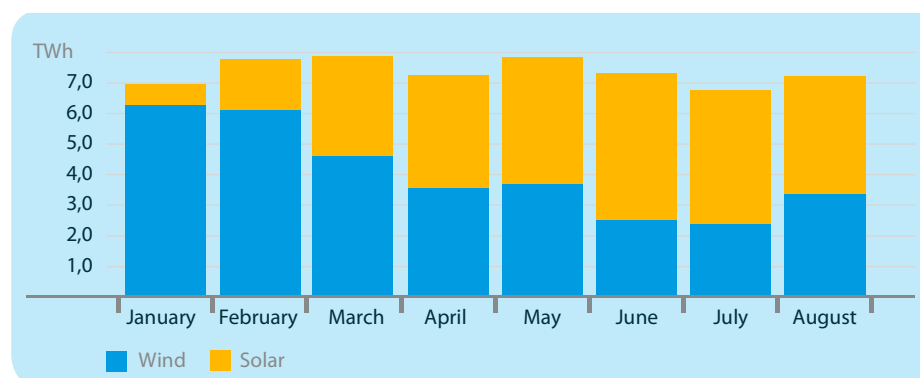


Figure: German production of solar and wind electricity in the first eight months of 2014.

Air pollution still harms ecosystems

Continued from front page

acidifying and eutrophying air pollutants in the past decades, and projects the levels of impacts in the near future under a scenario where the 2012 amended Gothenburg Protocol under the Convention on Long-range Transboundary Air Pollution (LRTAP) is assumed to be fully implemented by 2020.

The deposition of acidifying air pollutants causes acidification of surface waters (lakes, rivers and streams) and forest soils, leading to loss of nutrients such as potassium and magnesium from soils and the release of toxic aluminium into soils and waters, resulting in adverse effects on animals and plants.

Looking at the historical development of the acidification problem shows that peaks in exceedances of the critical loads for acidification of fresh water and forest soils occurred in 1980, with 43 per cent of the EU's ecosystem area suffering from excess deposition of acidifying air pollutants.

The high political profile of the "acid rain" and "forest dieback" problems in the late 1970s and early 1980s generated both national and international action to cut emissions, initially focussing on sulphur dioxide (SO_2). International co-operation under the LRTAP Convention, and later also within the EU, contributed significantly to reducing emissions.

Twenty years later, in the year 2000, the area suffering from excess acid inputs had shrunk to 18 per cent, and by 2010 it was further reduced to seven per cent. Findings suggest that by 2020 the ecosystem area where acidification critical loads are exceeded, as well as the magnitude of the exceedances, will be as low as they were in 1880, i.e. only four per cent of the EU area will still be in exceedance.

It should be noted, however, that even though most EU ecosystems in the future



will receive deposition levels not exceeding the critical loads, some countries will still have a significant percentage of their ecosystem area exceeded in 2020. This is the case, for example, in the Netherlands (63%), Czech Republic (50%), Lithuania (30%) and Poland (24%).

And despite some countries showing seemingly low percentage figures of exceedance, the actual area at risk can still be very significant in those countries that have a large total area of ecosystems. For example, the projected exceedance figure for 2020 for Sweden is down to six per cent. However, in practice this means that sensitive ecosystems will still be exposed to excess acid inputs over more than 17,000 square kilometres, equivalent to over half the area of Belgium.

Moreover, research has shown that both chemical and biological recovery from acidification damage can be very slow, and in many areas it may take several decades before a full recovery from past acidification damage occurs.

Excess input of nitrogen compounds – emitted as nitrogen oxides or ammonia – into terrestrial ecosystems causes eutrophication (nutrient enrichment) resulting among other things in increased plant growth and changes in biodiversity, such as a lowering in species richness.

Exceedances of critical loads for eutrophication peaked in 1990, with 84 per cent of the EU's ecosystem area under threat. Reductions in the emissions of nitrogen oxides (NO_x) and ammonia (NH_3) started later and have been much slower, as compared to those for SO_2 .

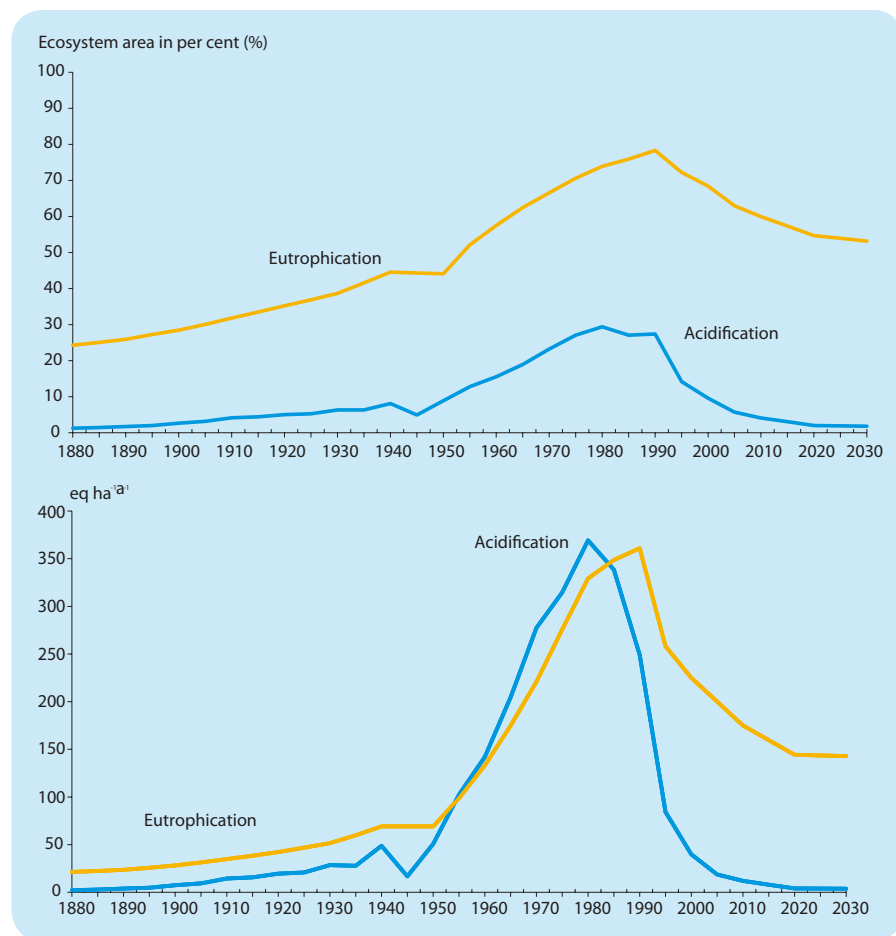


Figure: Development since 1880 of the area at risk in Europe (in per cent, top graph) and magnitude (in equivalents per hectare and year, lower graph) of exceedance of acidification (red) and eutrophication (green), with projections for 2020 and 2030.

Table: Ecosystem area in EU28 exposed to excess nitrogen deposition (eutrophication) and acid deposition (acidification).

	Eutrophication (km ²)	Acidification (km ²)
1980	1,346,000 (80%)	764,000 (43%)
1990	1,413,000 (84%)	657,000 (37%)
2000	1,312,000 (78%)	320,000 (18%)
2005	1,127,000 (67%)	17,800 (10%)
2010	1,060,000 (63%)	12,400 (7%)
2020 (Gbg Prot)	908,000 (54%)	7,100 (4%)

Consequently, improvements in the eutrophication status have also been slower.

By 2000 and 2010, the area exceeded had come down to 78 and 63 per cent, respectively, and it is projected to decrease to 54 per cent by 2020 under the amended Gothenburg Protocol. As the total amount of nutrient nitrogen that is deposited annually on each hectare decreases, the absolute magnitude of the exceedance will be reduced considerably in most areas, with the exception of a few “hot spot” areas in western France and the border areas between the Netherlands, Belgium and Germany, as well as in northern Italy.

Specifically for Natura 2000 areas, the extent of eutrophication critical load exceedance is still projected to be 65 per cent in 2020. Natura 2000 is an EU-wide network of nature protection areas, set up with the aim to ensure the long-term survival of the most valuable and threatened species and habitats.

A first assessment of possible impacts of nutrient nitrogen deposition on species richness in nutrient-poor grasslands is

presented in the report. The results show that the computed species richness in these grasslands is projected to improve from below 70 per cent in 1980 to 82 per cent by 2020. This relative (percentage) increase in species richness indicates that emission reductions have a positive effect on biodiversity.

Hans Bruyninckx, EEA Executive Director said: “Although air pollution does not cause as much harm as it once did, we are still struggling to protect sensitive ecosystems from harmful effects such as eutrophication. This changes habitats, endangering a wide range of species from fish to flowering plants. It is particularly striking that the problem appears to be just as bad in Europe’s protected natural areas.”

Christer Ågren

The report: Effects of air pollution on European ecosystems: Past and future exposure of European freshwater and terrestrial habitats to acidifying and eutrophying air pollutants (June 2014). EEA Technical report No 11/2014.

www.eea.europa.eu/publications/effects-of-air-pollution-on

Further SO₂ cuts give greater health benefits

Air pollution legislation to reduce sulphur dioxide (SO₂) has effectively reduced rates of premature deaths, new research suggests, and additional reductions would lead to even further public health benefits.

European SO₂ emissions have come down by more than 80 per cent since 1990. The EU Aphecom project has assessed deaths associated with changes in SO₂ concentrations in 20 cities prior to the legislation and during each of its phases. An increase of 1 microgram of SO₂ per cubic metre was shown to have the same impact on mortality in the late 2000s (post-legislation) as in early 1990 (pre-legislation). This confirms the previously identified relationship between SO₂ and mortality, and suggests that also low SO₂ levels are associated with health impacts.

The results imply that SO₂ concentrations have a consistent and direct relationship with mortality at both high and low concentrations, which suggests that legislation limiting SO₂ emissions further will result in even greater public health benefits.

Source: Science for Environmental Policy, 5 June 2014

Study: Tertre, A. et al. (2014). Impact of legislative changes to reduce the sulphur content in fuels in Europe on daily mortality in 20 European cities: an analysis of data from the Aphecom project. *Air Quality, Atmosphere & Health*. 7(1): 83–91. DOI:10.1007/s11869-013-0215-x.

High diesel NOx emissions prevail

A study by Dutch consultancy TNO has found that in spite of facing a tighter NOx emissions limit of 80 mg/km, diesel-driven Euro 6 vehicles emitted around 500 mg/km in real-world driving circumstances, which means they are approximately equal to Euro 4 and Euro 5 vehicles. The new Euro 6 standard was introduced at the start of 2014.

Part of the reason for the huge difference between a car’s performance in the real world and in a type approval test is that these tests are obsolete, so that carmakers are able to circumvent the rules. A new

system of better real-world emissions tests was due to be introduced in 2012 but has been delayed through industry lobbying and arguments intended to weaken the new rules.

“The delays to real-world driving emissions tests are contributing to hundreds of thousands of needless deaths. The weakening of proposed new test procedures casts significant doubt on whether the new system will ever be effective. Cities have no choice but to ban diesels and restrict vehicle access until tests can effectively distinguish between clean and polluting

vehicles,” said Greg Archer of T&E.

Sales of diesel cars have grown strongly in Europe from around one-third of new cars in 2000 to over half today. This is largely the result of generous tax breaks for diesel cars.

Source: T&E News, 1 August 2014. www.transportenvironment.org

TNO report: “Investigations and real world emission performance of Euro 6 light-duty vehicles.” TNO 2013 R11891. www.tno.nl

Cracks found close to Norwegian CCS operation

An EU-funded project called ECO₂ has investigated the influence of CO₂ seeping from the Norwegian CCS project by the Sleipner gas field in the North Sea. They have studied the seabed above the area where the CO₂ has been injected, and have also gathered high-resolution seismic data of the geological layers above the storage area. What they found was one big crack 25 kilometres north of the storage area, and numerous vertical, smaller so-called pipes and chimneys in the rocks covering the CO₂ storage site. Some of them went all the way down to the sandstone formation that contains the CO₂. The researchers state that there is no evidence of any seepage from the CO₂ injected through these cracks.¹

Professor Peter M Haugan from the Geophysical Institute at the University of Bergen, Norway, says that this may be just a coincidence. No such research was conducted prior to the start of injection. The biggest crack (up to 10 metres wide and 3 kilometres long) could well have been situated right above the injection site. His conclusion is that this proves the need for very expensive exploration of sites intended for storage of CO₂.²

The Sleipner gas field is seen by many as an example of a successful CCS project. However, the Sleipner CCS operation is a very special case, as stated in a report from AirClim published in 2008³. The

CO₂ is extracted from fossil gas from the Sleipner gas field, which is cold and under very high pressure.

Extracting CO₂ from hot exhaust gases at

How to make your own CCS-project.

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atmospheric pressure from a fossil-fuelled power plant is a very different matter. This makes it difficult to use the Sleipner CCS, as well as the Snøhvit CCS in Northern Norway, as arguments in favour of CCS in general.

The Sleipner CCS started operating in 1996. Since then, about one million tonnes of CO₂ per year have been separated from the natural gas extracted from the gas field. In total nearly 48 million cubic metres of CO₂ have been injected into the sandstone since 1996.

Tore Braend

¹ECO₂ Brochure (July 2014) http://www.eco2-project.eu/?file=tl_files/eco2/media/Info%20Material/ECO2_Brochure_Update_July2014.pdf

²Professor Peter M Haugan, Personal communication, 11 September 2014

³Last gasp of the coal industry (October 2008) can be downloaded at <http://www.airclim.org/>

Vattenfall to co-operate on Canadian CCS

Vattenfall has stopped its CCS research in Europe, including Schwarze Pumpe CCS. The company has instead taken some first steps to cooperate with SASK Power in Canada and its Boundary Dam Power Station CCS project. Vattenfall is defending the decision with the need to concentrate resources in other research areas that are of more immediate value to the company's profitability. A press release issued on 8 April announced the signing of a Memorandum of Understanding between SASK Power and Vattenfall. The document sets out the two parties' "intentions to explore opportunities for collaboration on CCS opportunities", but does not include any statements about economical investments.

Vattenfall press release, 6 May 2014, <http://corporate.vattenfall.com/news-and-media/press-releases/2014/vattenfall-opts-for-efficient-research-projects-to-boost-its-business/>

SASK Power press release, 8 April 2014, <http://www.saskpower.com/about-us/media-information/news-releases/saskpower-signs-agreement-on-ccs-with-one-of-europes-largest-power-companies/>

Norway invests in Dutch CCS

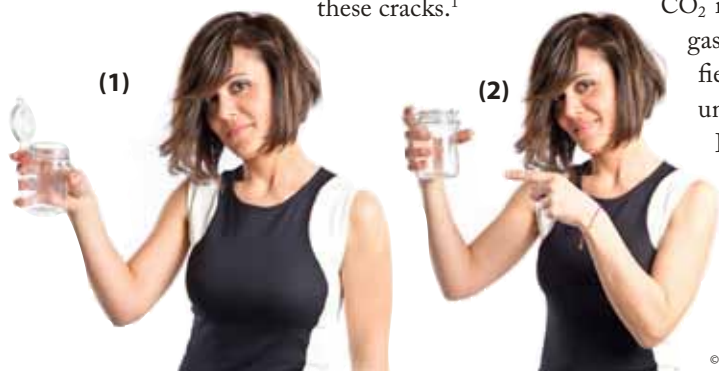
The Norwegian government cancelled its national CCS project in Mongstad in 2013 because of spiralling cost estimates for setting up a full-scale CCS plant. Instead, it will invest 14 million euro in a CCS demonstration project in Rotterdam in the Netherlands.

ROAD (Rotterdam Capture and Storage Demonstration Project) is the most advanced CCS project in the EU, says the Norwegian Minister for Oil and Energy, Tord Lien. The full financing of the ROAD project is not clear yet, and efforts are being made to secure this. Mr. Lien says that it is not one hundred per cent certain that the ROAD project will be chosen for part funding by the Norwegian government in the end. He also states that Norway's support for the ROAD project is not a

substitute for a full-scale Norwegian CCS project. Mr. Lien did not, however, say anything concrete about when and where such a national project would be launched.

The coal-fired power plant that will be retrofitted with the CCS plant is owned by E.ON and GDF Suez. The owners have increased the cost estimates for the ROAD project several times. The Norwegian Bellona Foundation asks if this is a signal that the owners are not really interested in carrying through the project, hoping to be allowed to continue running the new power plant without CCS.

Source: Bellona website, 26 June 2014, <http://bellona.no/nyheter/olje-og-gass/co2-fangst-og-lagring/2014-06-norge-vil-bidra-med-midler-til-ccs-prosjekt-rotterdam>



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[coal]

Beijing shuts down big coal-fired power plant

Beijing has closed the first of four large coal-fired power plants set to be decommissioned as part of the city's efforts to cut smog-forming air pollution. Beijing's three remaining coal-fired power plants are all to be closed by the end of 2016. It plans to fill the gap by building new natural gas-fired power stations and bringing in electricity from other provinces.

Source: PlanetArk, 24 July 2014

China bans dirtiest coal types

China, which depends on coal for about 65 per cent of its energy, will ban sales and imports of coal with high contents of ash or sulphur in a move to promote cleaner types of the fuel and improve the nation's air quality.

Coal with an ash content of more than 40 per cent and sulphur of more than three per cent is banned from sales and imports into China starting 1 January 2015. Lignite containing ash of more than 30 per cent and sulphur of more than 1.5 per cent is also prohibited. Other limitations involve coal with chemical content such as mercury and arsenic.

Coal used in some coastal and developed regions including Beijing, Shanghai and Guangzhou should have ash content of less than 16 per cent and sulphur of less than one per cent, according to the regulation. Lignite is required to have a heating value higher than about 3,946 kilocalories per kilogram, a sulphur content below one per cent and an ash content below 20 per cent.

Source: Bloomberg News, 16 September 2014

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[shut down]

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Saving Turkey from coal

Turkey should stop the construction of new coal- and lignite-fired power stations and start phasing out the existing ones, says Greenpeace Mediterranean.

Emissions of air pollutants from the nineteen large coal- and lignite-fired power plants in operation in Turkey in 2010 are estimated to have caused approximately 7,900 premature deaths and some 1.7 million lost working days in that same year.

These figures come from a new study by Greenpeace Mediterranean, which also includes estimates of the health impacts that would result if Turkey proceeds with building the 42 new power plants that were under construction or planned in 2010. By the time the study was finalised, in August 2014, the number of new coal- and lignite-fired power plants under construction or at the planning stage had actually increased to around 80.

Poor air quality is a big problem in Turkey. The levels of particulate matter (PM) in the twelve Turkish cities for which the World Health Organization (WHO) has such

information, exceed the levels recommended by WHO for health protection by at least three times.

While Turkish power plants are extremely dirty compared to the rest of Europe, the authors of the report conclude that requiring improved end-of-pipe emissions is not enough, and that there is no such thing as "clean coal" – even if new plants are built according to EU emission

standards they will still emit large amounts of air pollution and the main greenhouse gas, carbon dioxide (CO₂).

Instead it is recommended that fossil-fuelled power plants are phased out, starting with the oldest and dirtiest ones, and replaced by renewable sources of energy. It is noted that Turkey has one of the biggest wind, solar and geothermal power capacities in Europe, but currently only four per cent of the country's installed power comes from wind, and zero from solar or geothermal.

Such a transition to clean sources of energy, in combination with improved energy efficiency, is necessary both to fight global climate change and to ensure clean air and a healthy society.

Christer Ågren

The report: Silent Killers: Why Turkey Must Replace Coal Power Projects With Green Energy (August 2014). By L. Myllyvirta. Published by Greenpeace Mediterranean.



Despite great potential, solar contributes to almost none of Turkey's energy production.

J BREW / FLICKR.COM / CC BY-SA

A fair share of climate responsibility

Annex 1 countries need to have negative emissions of 441 GtCO₂ by 2050, according to a new equity proposal from several Latin American countries.

The new Intergovernmental Panel on Climate Change (IPCC) fifth assessment report published during 2013 and 2014 has for the first time agreed a figure on how much carbon dioxide mankind can still emit while staying below a 2°C global temperature increase.

The IPCC report suggests that to have at least a 66 per cent chance of keeping to less than 2°C of warming, mankind must emit no more than 2900 Gt of carbon dioxide, when accounting for non-CO₂ forcings, during the rest of this century. The conclusion of the IPCC is that more than half of this budget has already been used up (1630 to 2150 Gt tons of CO₂ were already emitted by 2011). The world is currently emitting about 50 billion tonnes of greenhouse gases in carbon-dioxide-equivalents each year, which means that with current emission levels the emissions budget would be used up within 15 to 25 years.

Governments around the world are discussing these figures to find out how this carbon budget could be shared. This very small carbon budget requires action by all countries and strong financial support to developing countries for mitigation and adaptation.

But many developing countries argue that this requires the participation of all countries in strict application of the principles of the UN Climate Convention based on equity, Common but Differentiated Responsibilities and Respective Capabilities (CBDR/RC) and historical responsibility. These countries also want an agreement to limit global temperature rise to less than 1.5 degrees and they are concerned with the inaction of developed parties in promoting real and effective solutions to raise the ambition of mitigation levels and comply with the Kyoto Protocol and its second commitment period.

Several Latin American countries like Ecuador, Bolivia and Nicaragua have, for instance, submitted to the UN Climate Convention several steps that they consider to follow on from the CBDR and Equity principles in the context of climate change:

Step 1. Concerning the calculation of the climate debt they point out:

“Cumulative global emissions have been around 1,200 GtCO₂ between the years 1850 to 2008. Of this figure, Annex I countries accounted for 864 GtCO₂, which is 72 per cent of the total. Since their share of population was nearly 25 per cent, their fair CO₂ emission share would have been 300 GtCO₂ and their overuse or carbon debt was therefore about 564 GtCO₂. Non-Annex I countries accounted for 336 GtCO₂, which is 28 per cent of the total CO₂ emissions. Their fair share would have been 900 GtCO₂ and thus

High time to set a budget.

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Table: Calculation of Annex I countries' climate debt to non Annex I countries.

Period 1850-2010	Annex I	Non Annex I
Total CO ₂	864 GtCO ₂ (72%)	336 GtCO ₂ (28%)
Share of population	25%	75%
Fair share	300 GtCO ₂	900 GtCO ₂
Overuse/underuse	Overuse by 564 GtCO ₂	Underuse by 564 GtCO ₂

they had an underuse of 564 GtCO₂ of emissions" (see table).

Step 2. Concerning the calculation of the carbon budget by 2050 they point out:

"According to the Working Group III contribution to the IPCC, mitigation scenarios in which temperature increase is more likely than not to be less than 1.5°C relative to pre-industrial levels by 2100 are characterised by concentrations in 2100 of below 430 ppm CO₂eq. Temperature change caused by anthropogenic GHG emissions can be kept to less than 2°C relative to pre-industrial levels if atmospheric concentrations in 2100 are limited to about 450 ppm CO₂eq (high confidence)."

Step 3. Concerning the distribution of the carbon budget to all parties up to 2050 they point out:

"In order to keep temperature rise between 1.5°C and 2°C and not to exceed the 2°C level, in the period between 2011 and 2050 it is estimated that cumulative CO₂ emissions (GtCO₂) should be limited to 900 GtCO₂. According to the United Nations Department on Economic and Social Affairs, the world population is projected to reach 9.6 billion by 2050, and the population of developed regions will remain largely unchanged at around 1.3 billion from now until 2050. This means, first, that in the period 2011 to 2050, Annex I countries should emit only 122 GtCO₂ of emissions since they represent only 13.5 per cent of the world's population; and if the population of developing countries represents 86.5 per cent of the world's total population, their fair share should be 778 GtCO₂. On top of this, in order to be able to claim this carbon budget of 122 GtCO₂ emissions, the developed countries would have to repay the 564 GtCO₂ of climate debt that they accumulated in the previous period, 1850–2010. This payment could be made by re-allocating the fair shares for the period 2011–2050. Thus, Annex I countries would have re-

sponsibility for negative emissions of 441 GtCO₂ (122 GtCO₂ minus 564 GtCO₂), while non-Annex 1 countries would have responsibility within a budget of 1,372 GtCO₂ (778 GtCO₂ plus 564 GtCO₂). If it is not possible for Annex I countries to implement their responsibility fully, keeping in mind the difficulty of achieving such a high level of negative emissions by 2050, these countries could arrange for non-Annex I countries to take on some of the responsibility through a scheme that involves payment of financial resources to implement mitigation or avoidance of emissions."

Step 4: Concerning the application of the principle of historical responsibility of the UN Climate Convention they point out:

"For different targets of per capita emissions for each country the principle of historical responsibility will apply according to a proposal by Brazil, which calculates the relative contribution of each country to temperature increase. This results in different per capita emission targets for each country, with the effect that those having higher historical responsibility will have to undertake more mitigation actions, while those having less historical responsibility will have more space for development. In order to ensure that all parties fulfil their commitments and actions, a Monitoring, Reporting, and Verification (MRV) system will be put in place."

These developing countries argue that these steps are necessary in order to deal with the climate crisis through the establishment of a carbon budget approach that is designed and implemented according to equity, CBDR and historical responsibility. They demand that the carbon budget approach should be included in the UN Climate Convention decisions as one of the key solutions to ensure global temperature rise stays below 1.5°C.

Reinhold Pape

Global CO₂ emissions up 2.5 per cent in 2014

Global CO₂ emissions from burning fossil fuels are projected to rise by 2.5 per cent in 2014, according to research by the Global Carbon Project. That is 65 per cent above 1990 levels, the reference year of the Kyoto Protocol, and will lead to record-high emissions of 40 billion tonnes.

In 2013, China's CO₂ emissions grew by 4.2 per cent, the USA's grew by 2.9 per cent, and India's emissions grew by 5.1 per cent. The EU has decreased its emissions by 1.8 per cent, though it continues to export a third of its emissions to China and other producers through imported goods and services.

Source: Tyndall Centre, 22 September 2014
<http://www.tyndall.ac.uk/communication/news-archive/2014/co2-emissions-set-reach-new-40-billion-tonne-record-high-2014-0>

The environment is important to Europeans

Despite the economic crisis, Europeans' concern about the environment has not diminished. In an overwhelming consensus, 95 per cent of the 28,000 interviewed citizens said that protecting the environment is important to them personally and many think more can be done.

Citizens' most cited environmental concerns related to air pollution (56%), water pollution (50%), chemicals (43%), waste (43%), and the depletion of natural resources (36%).

The most trusted sources of environmental information were scientists (40%), environmental protection associations (37%) and television (34%), while the least trusted sources were companies (2%), trade unions (3%) and national governments (6%).

Source: European Commission press release, 8 September 2014

The Eurobarometer survey: http://ec.europa.eu/public_opinion/index_en.htm

Lignite power provides bargain-priced pollution

Combustion of lignite is one of the environmentally worst ways to generate energy. Even so, there is a continued increase in many parts of Europe.

Lignite is a low-quality carbonaceous fuel in geological transition from peat to hard coal. Vast accessible deposits have made lignite, or brown coal, a preferred energy source in Central Europe, the eastern Mediterranean region, and Australia.

Burning a tonne of lignite produces only about a tonne of carbon dioxide (CO₂), since the mined fuel contains two-thirds water and impurities. However, correspondingly greater quantities of waterlogged lignite are required for electricity generation, emitting over twice the carbon dioxide of hydrogen-rich natural gas.

The high water content makes transport to distant power stations uneconomical. However, mined lignite can be delivered directly by conveyor belt to nearby power plants for less than €6 per MWh (megawatt-hour) of thermal energy, half the price of natural gas in North America, and less than a third of high-grade imported coal landed at European seaports. Delivered natural gas may be ten times as expensive.

The German Öko-Institut has calculated that the cost of domestic lignite is so low that even a CO₂ emissions penalty of €40 per tonne – six times recent EU ETS trading prices – might not be sufficient to eliminate the competitive advantage of an older, fully paid lignite power plant.

The economist Dieter Helm has criticised lignite power generation as “about as dirty as you can get”. The enormous scope of lignite extraction and generation testifies to the ongoing industrialised imperilment of natural environments.

Lignite is employed to achieve CO₂-intensive energy security even in regions availed of abundant solar and wind resources. On the basis of population, Greece burns more lignite than any other country in the world – over six tonnes per inhabitant.

Turkey is currently planning dozens of additional coal and lignite plants to reduce

dependency on Russian gas imports. An 8,000 MW lignite power station in the Afsin-Elbistan mining region may be erected with Chinese financing, equivalent to the capacity of eight modern nuclear reactors.

In Poland, domestic lignite deposits would be adequate for another two to three centuries of power generation. With only limited reserves of gas and oil, the economy ministry has noted that “lignite coal has to be perceived as the stabilising factor for Poland’s energy safety”. Long-term predictable mining costs contribute to make lignite “Poland’s *raison d’état*” according to Zbigniew Bryja of ZE PAK, the country’s second-largest lignite power corporation.

Germany leads the world in lignite production, with 183 million tonnes mined in 2013 sustaining one quarter of electricity generation. Renewable energies contributed another 24.6 per cent, but remained insufficient to compensate for nuclear power phase-out begun in 2011. Lignite usage instead increased by 8 per cent during the same period to a half-million tonnes per day. Two newly approved Vattenfall mine expansions at Nochten and Welzow near the Polish border will require the resettlement of 2,500 residents from traditional Lusatian communities fated for destruction. Future projects could impact over 4,000 additional inhabitants in this region alone. An additional 349-million-tonne MIBRAG mining site at Lützen would deface the landscape near the city of Leipzig and possibly involve the destruction of eight additional villages. In the western Rhineland, on the other hand, the RWE Garzweiler II mine was recently re-zoned to protect the homesteads of 1,400 inhabitants. Overall, however, the German government’s intention to reduce CO₂ emissions by 40 per cent between 1990

and 2020 cannot be realized on present coal and lignite trajectories.

In the Czech Republic, lignite extraction in Northern Bohemia was limited in 1991 to existing licensed boundaries. Despite mining termination foreseen after 2022, however, the state energy corporation ČEZ modernised its lignite power plant at Pruněřov for operation until 2040. The eastern German MIBRAG mining corporation was purchased in 2009 to facilitate trans-border lignite deliveries. MIBRAG was later sold by ČEZ to the Czech consortium EPH, after which lignite was shipped regularly to the Opatovice and Most-Komořany power plants. The Czech coalition government is now considering lifting particular mining restrictions, possibly by referendum, since two additional nuclear reactors originally planned at Temelin will likely not be built. However, the Czech Mining Act was revised in 2012 to prohibit expropriations of private property for maximising lignite extraction. In contrast with Germany, the preservation of essential human rights has thus become integral to mining policy.

Lignite qualifies as the least expensive of all fossil fuels only when its spurious effects are ignored. Preparing a mining site generally entails the destruction of homes, farms, cultural heritage sites, and nature refuges. In earlier industrial epochs, landscape disfigurement and human resettlement were integral to economic development. Lignite production today, however, sacrifices regional diversity to mechanised rationalisation.

Lignite deposits of relatively recent geological origin are accessible by surface mining. Shovel-wheel excavators often as heavy as the Eiffel Tower (100 t) remove overlying layers of topsoil from several square kilometres of land, while groundwater is pumped into nearby waterways



Belchatów in Poland is the largest point source of CO₂ in the EU.

GREENPEACE POLSKA/FICKR.COM/ CC BY-ND

or abandoned mines. In Germany, lignite extraction amounts to excavating the original 1869 Suez Canal 16 times per year.

Groundwater depletion extends in a subterranean funnel far beyond the mining boundaries. Fresh water is often piped in from other regions to replenish surface losses.

In the mining aftermath, groundwater ascends to fracture building foundations and masonry, roadwork and sewage networks. Iron pyrites rising in water from mining strata can discolour waterways in iron oxide hues. In the Lusatian region, aquacultures and tourism have been disrupted. Costly programmes of remediation will be necessary for a half-century, or more. Particularly high aluminium concentrations have been measured in groundwater. Acidified lakes (as low as pH 2.5) and pulpwood trees characterise former lignite mining sites. Re-deposited soil is too unstable for building construction. Post-lignite renaturalised landscapes

are largely unsuitable for subsequent commercial development, reducing the net regional economic value of surface mining.

Carbon-intensive lignite power generation is frequently criticised as a “climate killer”, but the worldwide combustion of about one billion tonnes per year accounts for only 3 per cent of total manmade CO₂ emissions.

In anticipation of future greenhouse gas regulations, the EU lignite industry originally supported carbon capture and storage (CCS) for reducing plant emissions. In 2006, German chancellor Angela Merkel named Vattenfall CEO Lars Josefsson as her personal climate advisor due to his advocacy of this technology.

A German parliamentary hearing on 6 June 2011, however, showed that CO₂-free lignite power generation could require 50 per cent more fuel and over 80 per cent more cooling water for the same grid power output. These added resource

expenditures effectively eliminated any prospect of commercial viability, even before questions of geological CO₂ storage were examined.

Fossil fuels contain mercury and other heavy metals deposited by prehistoric volcanic activity. Due to its low energy content, particularly high quantities of lignite are burned, releasing the greatest amounts of contaminants. Without the Mercury and Air Toxics Standards (MATS) specified in the United States for flue gases, a European lignite power station emits up to a half-tonne of toxic mercury per year.

All 50 US states have issued health advisories on the threats of mercury contamination from fish consumption, particularly for pregnant women, nursing mothers, and children. In parts of Europe, however, far greater mercury effluents from power plants continue to accumulate in lakes open to fishing and recreation.

As lignite extraction disfigures landscapes and diminishes real estate valuations, it also promotes a fatalistic acceptance of any mining practices allowed by law. The wide latitude of potential human rights violations has been dramatically illustrated in eastern Germany.

Before 1990, state lignite combines were under the pervasive surveillance of the East German secret police (Stasi), who recruited informants from the workforce. After German reunification, some former agents falsified their biographies and became leading managers of the mining companies Vattenfall and MIBRAG. With their experience in undercover activity, they now directed the social destabilisation of communities resisting lignite resettlement. German politicians informed of this hideous practice have disclaimed any responsibility for protecting the constitutional rights of citizens, which under German mining law can be compromised arbitrarily without legislated legal recourse.

Private security is imperilled by all mining projects. However, the means of commercial espionage and surveillance have been greatly advanced since mining laws were originally formulated at the beginning of modern industrial society.

After sulphur dioxide (SO₂) emissions responsible for acid rain were reduced in the 1990s, lignite power appeared less objectionable despite ongoing contradictions with EU climate policy. However, the mines are now increasingly surrounded by wind and solar farms, providing alternative zero-carbon generation for the power grid.

Renewable power generation in eastern Germany therefore contributes to superseding nuclear reactors in other parts of the country. Furthermore, the Bavarian government has rejected building any high-voltage power lines for electricity from lignite. A transmission corridor already under construction to the eastern mining regions must instead be extended to northern wind farms. In a further step, undersea cables would provide supplementary hydropower from Sweden and Norway.

While this strategy could ultimately circumvent the need for lignite generation altogether, existing power plants are also being modernised under the apparent as-



A human chain for "a future without brown coal" was formed by 7500 people in Poland and Germany on 23 August 2014.

sumption of hybrid strategies. The ongoing retrenchment of lignite throughout the former Black Triangle region (Germany, Poland, Czech Republic) may nevertheless challenge future EU climate policies.

According to Vattenfall corporate statements, profits from lignite extraction in eastern Germany are being devoted to financing the energy transition in Sweden. Electricity supplied in the future to Continental Europe could therefore help supplant the very lignite operations that have provided essential investment capital. Vattenfall is now erecting 72 North Sea wind turbines equal to the electricity needs of the Bavarian capital of Munich. The city's utility company is included as a 49 per cent project partner.

Such renewable energy transition projects are indispensable for limiting the progress of climate change. CO₂-induced ocean acidification is already causing pH values in seawater to decline 100 times more rapidly than at any time over the last 300 million years. The resulting loss of marine life could reach disastrous proportions by

mid-century, disrupting fish protein supplies for billions of people. There is no way to avert this prospect except by drastically reducing fossil fuel emissions to a level that can be compensated by the natural environment, since the process of ocean acidification is irreversible.

Lignite-producing countries remain

irresponsive to these prospects. According to data compiled by Greenpeace, the realisation of all currently planned European lignite power stations could account for 118 million tonnes of carbon dioxide per year. Total EU emissions would likely not increase under the ETS trading scheme. However, another generation of lignite power plants would impose an additional half-century of environmental degradation and monolithic economic development on the mining regions.

Jeffrey H. Michel

Proposal for coal phase-out in Germany

BUND, a German environmental organisation, suggests a legally binding law to close all coal power stations by 2030.

The Federation for Environment and Nature Conservation Germany (BUND/ FOE Germany), one of the largest and most powerful NGOs in the country, has now proposed a phase-out plan for coal similar to the nuclear phase-out in Germany. BUND is suggesting a binding law to close coal power stations and believes that this phase-out could be achieved by 2030.

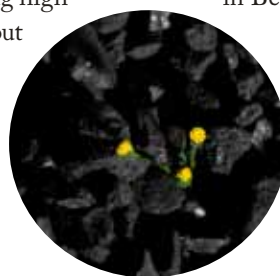
The phase-out plan and bill are explained in a report from the end of August 2014 and were submitted to the Federal Minister for the Environment, Barbara Hendricks, and the Minister for Economic Affairs, Sigmar Gabriel.

As a first step BUND is demanding that the German government limits the lifetime of older brown coal (lignite) power stations by law. BUND President Hubert Weiger explained at a press conference: "At 25 per cent, the current share of lignite in the German electricity mix is far too high. The only way to get away from the high CO₂ emissions from coal-fired power plants is a speedy exit from lignite electrification". Weiger said that initially it would be necessary to adopt a law that limits the life of the 24 oldest and most inefficient lignite power stations to 35 years. "So by 2020, all those lignite power stations must be switched off that went into operation before 1985."

"BUND expects the immediate examination of the proposal by the German government. A successful climate and energy policy cannot be delayed," said the president of BUND.

One of the criticisms levelled by BUND was that the increase

in electricity production from lignite in recent years and the resulting high CO₂ emissions had cancelled out the climate policy successes already achieved through the development of renewable energies in Germany. Old lignite power stations, which currently emit more than one kilogram of CO₂ per kilowatt hour, run at full speed. "If electricity production from coal in old and inefficient lignite power plants is maintained at the same level as it is today, the federal government can write off its climate goals,"



MARKUS REINHARDT/FLICKR.COM/ CC BY Time for change!

the president of BUND said to the press in Berlin.

About half of today's lignite capacity, about 10 gigawatts, would be shut down by 2020 as a result of the bill proposed by BUND. This would affect the 24 oldest power plant units in Germany, most of them in North Rhine-Westphalia (Niederaußem, Neurath, Frimmersdorf, Weisweiler) and Brandenburg/Saxony (Jänschwalde, Boxberg, Buschhaus).

This would immediately reduce CO₂ emissions from lignite by around 90 million tonnes per year, explains BUND.

Table: Coal power plants proposed to be phased out before 2020.

Name of plant	Net output in MW	CO ₂ annual load in Mt	Year commissioned	Proposed year of closure
Weisweiler E (RWE)	312	2.98	1965	2016
Niederaußem C (RWE)	294	2.78	1965	2016
Frimmersdorf P (RWE)	284	2.71	1966	2016
Weisweiler F (RWE)	304	2.82	1967	2016
Niederaußem D (RWE)	297	2.65	1968	2016
Frimmersdorf Q (RWE)	278	2.58	1970	2016
Niederaußem E (RWE)	295	2.64	1970	2016
Niederaußem F (RWE)	299	2.67	1971	2016
Neurath A (RWE)	277	2.57	1972	2016
Neurath B (RWE)	288	2.56	1972	2016
Neurath C (RWE)	292	2.59	1973	2016
Weisweiler G (RWE)	590	5.26	1974	2016
Niederaußem H (RWE)	648	5.75	1974	2016
Niederaußem G (RWE)	653	5.82	1974	2016
Weisweiler H (RWE)	592	4.85	1975	2016
Neurath D (RWE)	607	4.94	1975	2016
Neurath E (RWE)	604	4.94	1976	2016
Boxberg N (Vattenfall)	465	3.83	1979	2016
Boxberg P (Vattenfall)	465	3.83	1980	2016
Jänschwalde A (Vattenfall)	498	4.10	1981	2016
Jänschwalde B (Vattenfall)	498	4.10	1982	2016
Jänschwalde C (Vattenfall)	498	4.10	1984	2018
Jänschwalde D (Vattenfall)	498	4.10	1985	2019
Buschhaus D (Mirbag)	2.99	352	1985	2019

After 2020, lignite power stations would be closed down step by step, earlier than the 35-year lifetime of individual power stations, if climate policy targets are to be met. With political support it should be possible to put an end to climate-damaging electricity production from coal by 2030, concludes BUND.

BUND is also proposing to establish a commission similar to the "Ethical Commission for Safe Energy Production", which was formed in Germany in 2011 to prepare for the nuclear phase-out. This commission would prepare the societal consensus for the coal phase-out and the technical, ethical, economic and socio-political aspects of closing down lignite and hard coal electricity production in Germany.

Reinhold Pape

Source: Der BUND-Abschaltplan: Laufzeitbegrenzung für die ältesten Braunkohleblöcke bis 2020 (29 August 2014). http://www.bund.net/fileadmin/bundnet/pdfs/klima_und_energie/140828_bund_klima_energie_laufzeitbegrenzung_kohlekraftwerke.pdf

Emissions are falling – but not enough

While emissions of acidifying sulphur pollutants in the EU have come down by 84 per cent since 1990, those of nitrogen compounds have fallen only by 41 per cent.

Emissions in the EU of most air pollutants continue to gradually decline, according to a new report by the European Environment Agency (EEA) that documents trends in emissions between 1990 and 2012 and constitutes the EU's annual report to the Convention on Long-range Transboundary Air Pollution (LRTAP).

The 1999 Gothenburg Protocol to the LRTAP Convention contains national emission ceilings for four pollutants – sulphur dioxide (SO₂), nitrogen oxides (NO_x), non-methane volatile organic compounds (NMVOC) and ammonia (NH₃) – that parties to the protocol must meet by 2010 and thereafter. In addition to ceilings for individual countries, the protocol also specifies ceilings for the EU, itself a party to the protocol.

For the year 2012, seven member states (Austria, Belgium, France, Germany, Ireland, Luxembourg and Slovenia) reported NO_x emissions higher than their ceilings, and four countries exceeded their NH₃ ceilings (Croatia, Denmark, Finland and Spain). The ceilings for NMVOCs and SO₂ were met by all member states.

Between 1990 and 2012, emissions in the EU's 28 member states of the four pollutants SO₂, NO_x, NMVOC and NH₃ dropped by 84, 51, 60 and 28 per cent respectively. The report includes country-by-country data as well as information on which sectors are responsible for the emissions.

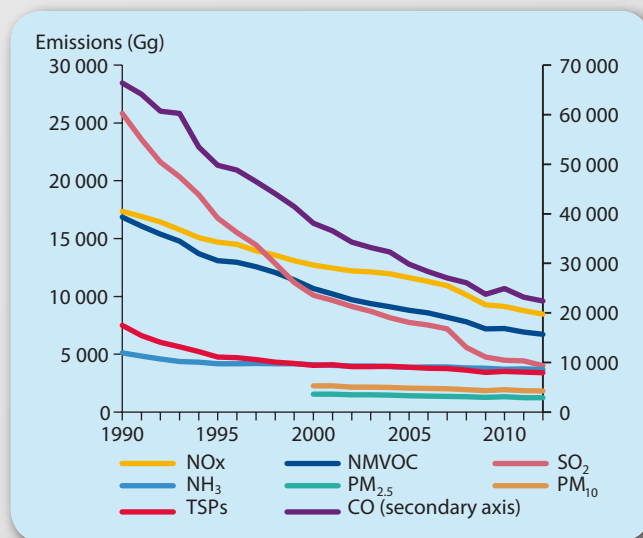


Figure 1: Emission trends in the EU for some of the main air pollutants 1990-2012.

It also provides emissions data for a number of other air pollutants that are covered by various protocols under the LRTAP Convention, such as particulate matter (PM), heavy metals and persistent organic pollutants. For example, emissions of mercury (Hg) dropped by 67 per cent between 1990 and 2012, and those of PM_{2.5} came down by 19 per cent between 2000 and 2012.

Christer Ågren

The report: European Union emission inventory report 1990-2012 under the UNECE Convention on Long-range Transboundary Air Pollution (LRTAP) (June 2014). EEA Technical report No 12/2014.

<http://www.eea.europa.eu/publications/lrtap-2014>

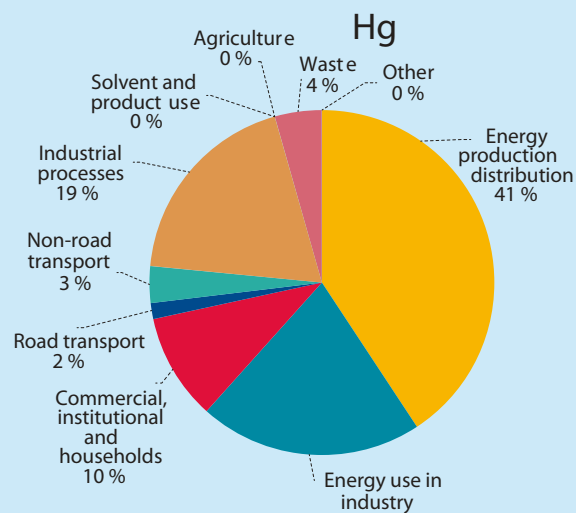
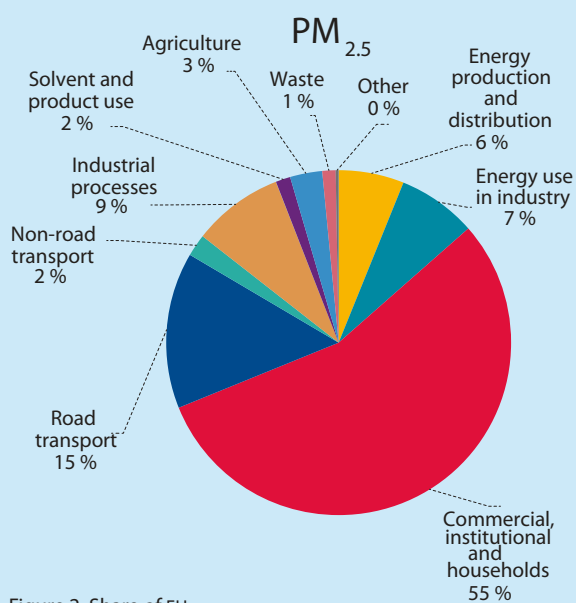
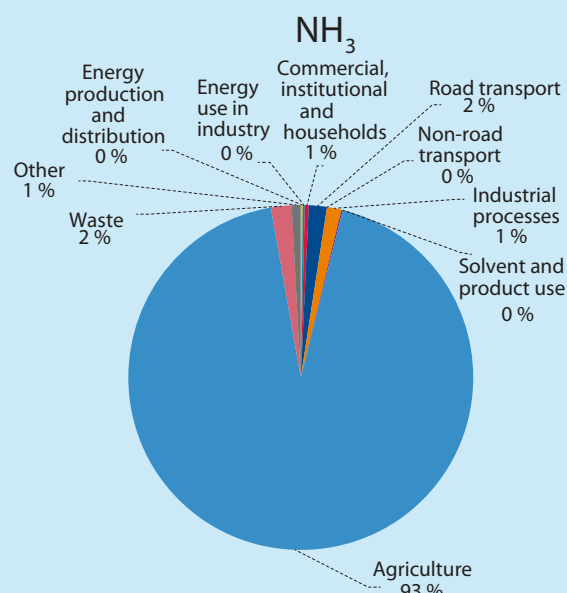
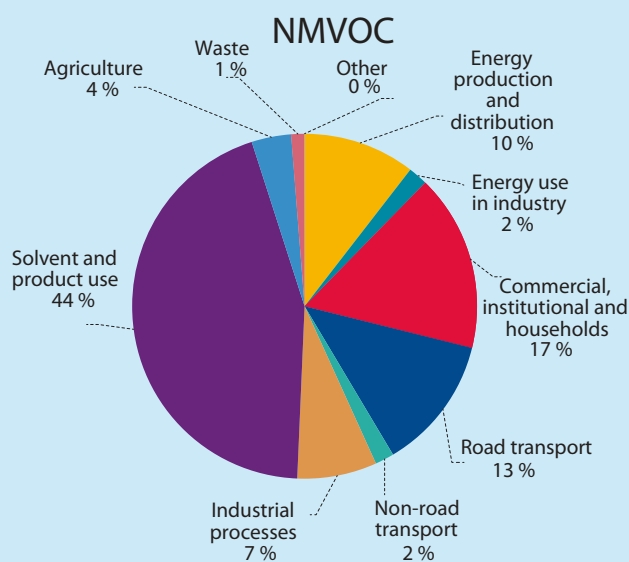
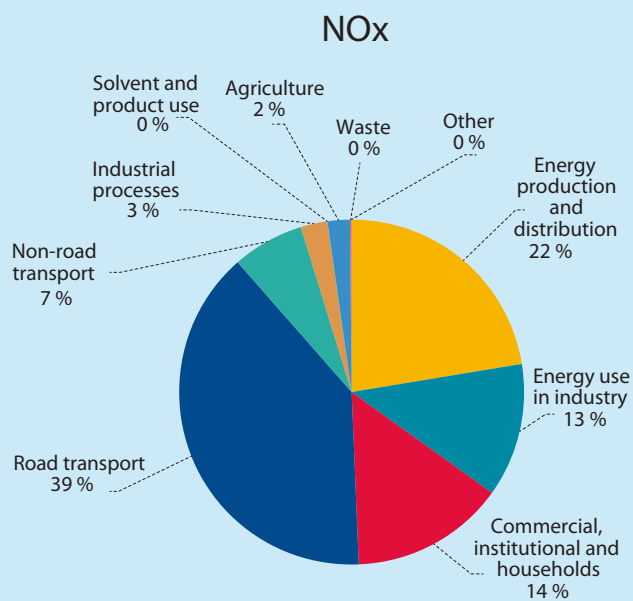
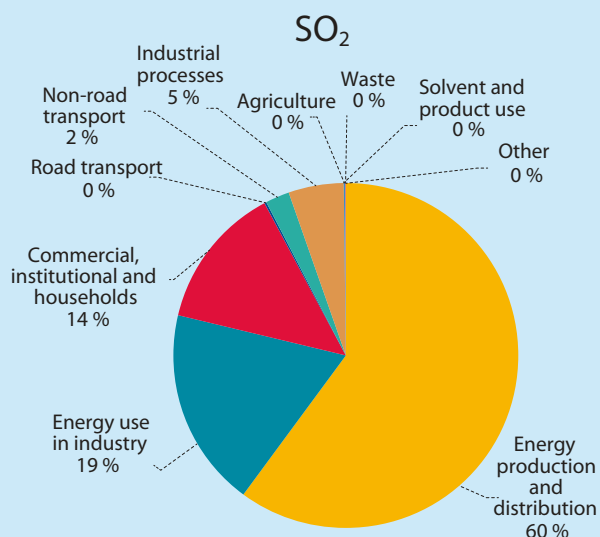


Figure 2: Share of EU emissions by sector group in 2012.

UK brought to court on bad air quality

New figures from the UK government show air quality in some of the country's biggest cities will not meet European Union pollution limits until after 2030, twenty years after the original deadline.

Under the EU's air quality legislation, member states were supposed to comply with limits on nitrogen dioxide (NO₂) in 2010, but could extend that to 2015 if they delivered plans that specified how these limits were to be achieved by that later date.

Until this summer, the UK government has maintained it would meet NO₂ limits by 2025 in London and by 2020 in 15 other zones, i.e. long after the legal deadline.

But on 10 July, at a European Court of Justice (ECJ) hearing, the UK government revealed that it will not meet the NO₂ limits until after 2030 in the Greater London urban area, West Midlands urban area and West Yorkshire urban area. This is 20 years after the original legal deadline and five years later than previously admitted.

According to ClientEarth, this information had previously been disclosed by the UK in legally privileged correspondence responding to a separate legal action brought by the European Commission in February this year.

Alan Andrews, a lawyer for ClientEarth, which has brought a case against the UK for the air quality breach that was heard by the ECJ, said: "It's bad enough that the government has no intention of complying with these limits in the foreseeable future. It's even worse that they're trying to hide behind legal procedural rules to keep this quiet. We have a right to breathe clean air and the right to know when the government is failing to protect us. Another five years of delay means thousands more people will die or



OMAR PARADA / FLICKR.COM / CC BY-NC-ND
Clear message from the UK to the European Commission.

be made seriously ill. The UK needs to act now to get deadly diesel vehicles out of our towns and cities."

Lawyers representing the European Commission told the ECJ that the case was "a matter of life and death" and "perhaps the longest-running infringement of EU law in history".

Last year, the UK Supreme Court declared that the UK government was breaching its legal duty to achieve limits for nitrogen dioxide. It then asked the ECJ to rule on what remedial action it can compel the government to take. The ECJ's judgment is expected before the end of 2014. It will be binding on the UK courts and the national courts in all 28 EU member states. The case will then return to the UK Supreme Court in early 2015 for a final ruling.

Alan Andrews, ClientEarth lawyer, said: "This case is about the right to breathe clean air and could have a huge impact far beyond the UK's borders. It could force governments across the EU to take action." Also in July, air pollution experts at King's College in London said that NO₂ levels in London's Oxford Street were

among the worst in the world. Monitoring data showed that concentrations of NO₂ reached an average of 135 micrograms per cubic metre (µg/m³) of air, over three times the EU's limit of 40 µg/m³. This figure is a 24-hour average that was reached by including night times when traffic was lower, meaning that shoppers, workers and tourists are facing much higher levels of NO₂ during the day.

In March this year, concentrations as high as 463 µg/m³ were recorded during a peak episode. The high NO₂ levels at Oxford Street are primarily due to the intense congestion of diesel-powered buses and taxis on the high street.

Exhaust emissions from diesel vehicles in road traffic are a main source of NO₂, and UK tax policies have encouraged the uptake of diesel cars. From 2000 to 2010 the share of diesel-powered cars increased from 14 per cent to almost 50 per cent of new cars sold in the country.

Client Earth argues that the latest scientific evidence shows NO₂ to have similar health effects to particulate matter (PM_{2.5}), which has been estimated to cause around 29,000 premature deaths in Britain each year.

Christer Ågren

Source: ClientEarth press release, 10 July 2014.
www.clientearth.org

Link: UK Department for Environment, Food and Rural Affairs (Defra) air quality information: <http://uk-air.defra.gov.uk/library/no2ten/index>

Shipping sulphur enforcement alliance grows

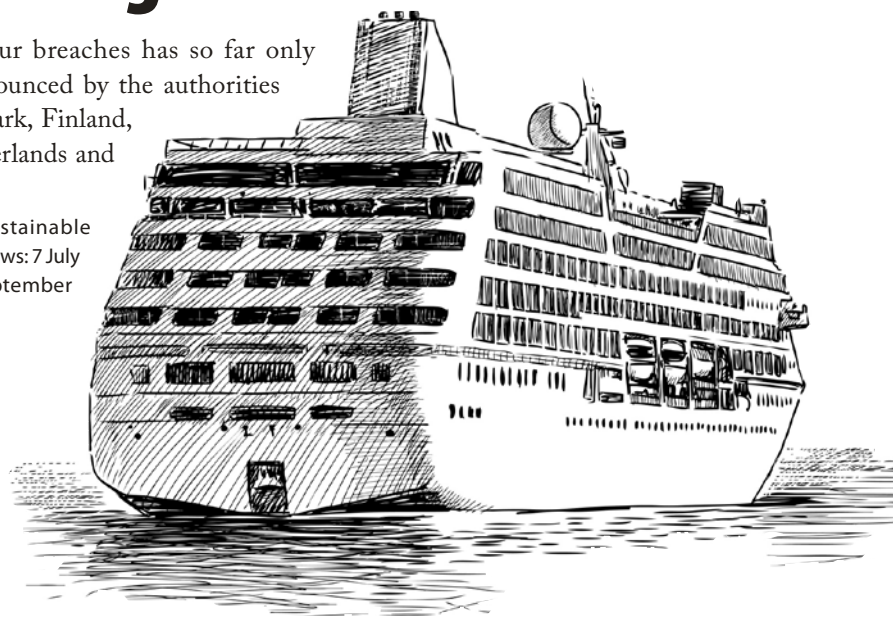
Nine more shipping companies have joined Maersk and Wallenius Wilhelmsen Logistics (WWL) by signing up to the Trident Alliance, an industry-led initiative to ensure enforcement of the stricter ship sulphur regulations, which was formally launched on July 7. The sulphur content limit of bunker fuel in designated sulphur emissions control areas (SECAs) falls to 0.10 per cent from 1 January 2015.

“Robust enforcement of sulphur regulation is needed for health and the environment and, from the perspective of maintaining a level playing field, it is a business imperative,” said Roger Strevens (WWL), chairman of the Alliance.

Possible new action to improve enforcement and introduce stiffer penalties

for sulphur breaches has so far only been announced by the authorities in Denmark, Finland, the Netherlands and Sweden.

Source: Sustainable Shipping News: 7 July and 11 September 2014



Italy introduces ship emissions control rule

Stricter maritime sulphur rules regulating the Adriatic and Ionian seas are due to come into effect on 1 January 2018. The new rule would prohibit a sulphur content in bunker fuel of more than 0.10 per cent in both seas, according to an Italian government statement. The rule will come as an amendment to an earlier government directive that proposed a deadline of 2020 for a 0.10 per cent sulphur cap on bunker fuel in Italian waters.

Source: Sustainable Shipping News, 5 and 18 August 2014

Environmental classification of ships

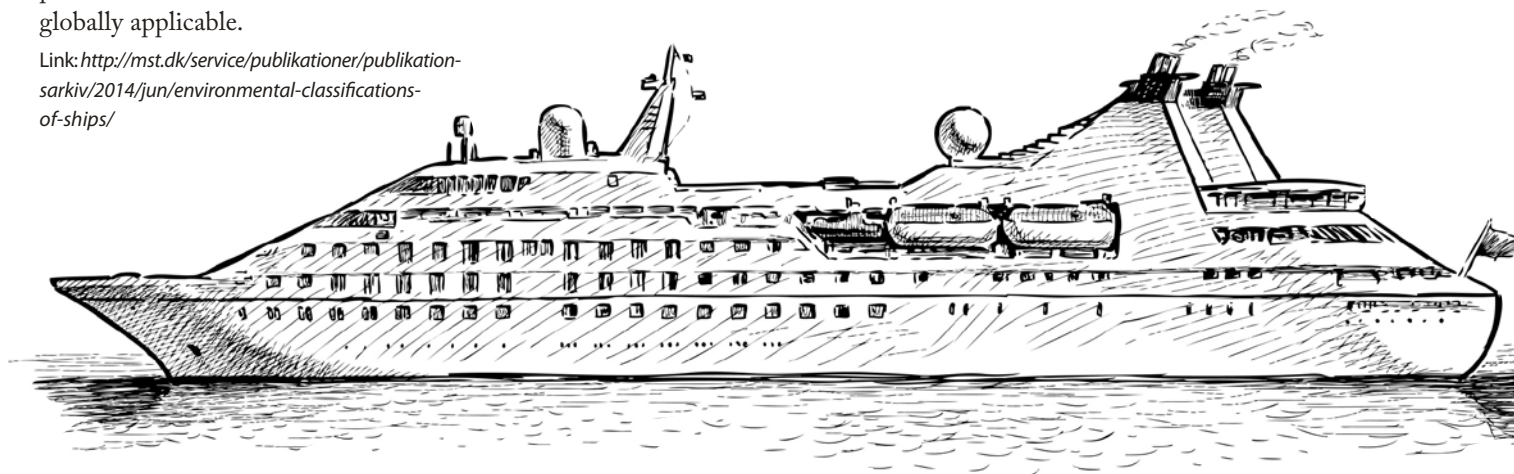
A new report for the Danish Environmental Protection Agency provides an overview of the existing mechanisms for classifying ships with respect to their environmental and climate performance. It also assesses the applicability of the systems for ports, shipping companies and cargo owners, and discusses a proposal for a set of criteria which could be globally applicable.

Link: <http://mst.dk/service/publikationer/publikation-sarkiv/2014/jun/environmental-classifications-of-ships/>

Large cruise ships banned from Venice

The Italian government is banning all cruise ships exceeding 96,000 tonnes from Venice's historic centre and the Giudecca Canal from 2015, and is restricting visits by smaller ships of no more than 40,000 tonnes. As well as the risk of collision, the big ships have long been blamed for threatening the city's precious medieval buildings with corrosive smog, and questions have also been raised about the effects of vibrations from the ships on the foundations of centuries-old buildings.

Source: Sustainable Shipping News, 11 August 2014



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Sustainable food choices

Excluding meat from our diet is not enough on its own to benefit the climate. Eating a lot of cheese or simply eating a lot of everything also leads to high greenhouse gas emissions.

As part of the “Zero Carbon Britain” project the Centre for Alternative Technology (CAT) has compared 13 diets for their effects on health, greenhouse gas emissions and land use. They experimented with different degrees of excluding meat and dairy products, and examined what happens if we eat more than we need, including more junk food. In addition to examining the current average diet of the whole population they also looked at the poorest tenth. They also investigated the importance of reducing food waste, choosing locally grown produce and reducing energy consumption for cooking and storage in relation to changes in diet.

Being vegetarian is often cited as a positive thing when it comes to reducing

greenhouse gas emissions. The reason behind this is the high emissions related to meat production, in particular meat from ruminants. This theory was shown to be correct in the sense that all diets in the study that excluded meat resulted in lower emissions than the current average diet. But a vegetarian diet high in dairy products, especially cheese, can actually have a higher carbon footprint than some more health- and climate-conscious meat diets. In the end it turns out that a balanced vegan diet (excluding meat and dairy products) is the most climate-friendly option of all.

Of special interest for everyone who feels that excluding all meat and dairy is a bit too radical, is the so-called carbon

minimiser diet. This involves reducing the consumption of animal products, but not excluding them completely. Instead low-emission alternatives are chosen: yogurt and milk instead of cheese, chicken and pork instead of red meat. In this way, omnivores¹ can also contribute to significant reductions in greenhouse gas emissions.

CAT also investigated a so-called junk food vegan diet, in which a large proportion of all calories comes from foods with a high fat and sugar content. It turns out that this leads to slightly higher greenhouse gas emissions than the more healthy vegan diet, but still lower than all the other diets examined. It thus undermines the belief that there is an absolute

Table: The impact of dietary choices and behaviours on greenhouse gas emissions and land use.

Measure	Change compared to current average for GHG	Change compared to current average for land use
Eating what is recommended in calories	-15%	-15%
Following nutritional guidelines	-19%	-50%
Eliminating all animal products	-43%	-70%
Being a climate-conscious omnivore	-34%	-65%
Reducing amount of meat, fruit and vegetables grown outside Europe	-8-13%	-
Halving food waste	-13-25%	-16%

correlation between eating healthy and eating climate friendly. However when the current average diet is compared to a diet designed in accordance with nutritional recommendations, the latter is also preferable from a climate perspective. Eating too much is also inadvisable – not only from a health perspective. When the intake of food increases, emissions increase subsequently. Overeating is common. If Brits started to eat according to national dietary recommendations (in terms of calories) emissions would go down by 15 per cent.

The report also examines the impact of different diets on land use. In this case there is a much clearer connection with meat consumption. Diets that entail high meat consumption use more land than diets with low or zero meat consumption. Supplying the entire British population with food today requires 230,000 square kilometres of land globally. In comparison the total agricultural land area in the UK is just 180,000 square kilometres. The area needed could be reduced to less than 100,000 square kilometres with diets that are low in meat or exclude it entirely.

But just looking at the total area of land use is oversimplifying the issue. All land cannot be used for the same purposes. It is worth noting that more than half of the land used in the UK for current food production is grassland. This may be land that is unsuitable for growing food crops. A more likely alternative land use would be growing biofuels.

When discussing the environmental impact of food production, reduced waste is often put forward as an attractive measure since it has the potential to save money for both producers and consumers. A halving of food waste at all stages was shown to reduce emissions by 13–25 per

cent, and land use by about 16 per cent, which makes it an important but less significant measure than shifting diet.

Another often-mentioned measure to reduce environmental impact is to buy locally produced food. The 13 original diets that were examined included both local and imported food. The authors of the study chose to compare two extremes, one where as much as possible is shifted to UK produce and another where all food products are imported from outside of Europe. When this is done with the current average diet, greenhouse gas emissions increase by 23 per cent under the all-imported scenario, while eating as much domestic produce as possible would reduce emissions by nine per cent. It is worth noting that with the current average diet it is not possible for everyone to make this shift – there is simply not enough land.

The report also discusses the potential for other food-related behavioural change, such as reducing energy use during cooking and storage, walking or cycling instead of taking the car to the grocery store, or reducing packaging. However the potential is considered marginal compared to the other measures examined, although there might be other benefits for health and the environment.

Kajsa Lindqvist

People, Plate and Planet – The impact of dietary choices on health, greenhouse gas emissions and land use. Report by The Centre for Alternative Technology. Available at: [http://zerocarbon-britain.org/images/pdfs/PPPR\(OFW\).pdf](http://zerocarbon-britain.org/images/pdfs/PPPR(OFW).pdf)

¹ An omnivore is someone who eats food of both animal and plant origin.

New ozone standard assessment

On 31 August 2014 the US Environmental Protection Agency's (EPA) Office of Air Quality Planning and Standards released the final version of the policy assessment for the review of the ozone National Ambient Air Quality Standard (NAAQS).

Established in 2008, the current standards for ground-level ozone (O₃) include a primary standard to protect public health of 75 parts per billion (ppb) as an eight-hour average, and a secondary standard to protect public welfare (vegetation and ecosystems), set identically to the primary standard. These 2008 standards are now under review, as required by the Clean Air Act.

The report recommends lowering the primary ozone standard to a level within the range of 60–70 ppb. As a level of 70 ppb would provide little margin of safety, the policy advice is that the level should be set lower. The combined occurrence of respiratory symptoms and lung function decrements has been reported to occur at levels above 65 ppb, and 60 ppb corresponds to the lowest exposure concentration demonstrated to result in lung function decrements and pulmonary inflammation.

With regard to the secondary standard, it is concluded that it is appropriate to consider a revised secondary standard in terms of a cumulative, seasonal, concentration-weighted form, called the W126 index. A range of levels from 17 to 7 ppm-hours as cumulated daily means over a three-month period is recommended. The Clean Air Scientific Advisory Committee (CASAC) noted that a level of 15 ppm-hours is requisite to protect median crop yield loss to no more than 5 per cent and that a level below 10 ppm-hours is required to reduce foliar injury prevalence. It also noted that a level of 7 ppm-hours limits median relative biomass loss for trees to no greater than 2 per cent and offers additional protection against crop yield loss and foliar injury.

The report Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards. Link: www.epa.gov/ttn/naaqs/standards/ozone/data/20140829pa.pdf

New figures on global ship emissions

In 2012 worldwide shipping consumed some 300 million tonnes of fuel oil, resulting in emissions of 949 million tonnes of carbon dioxide. Unless concerted action is taken, these emissions are expected to grow by up to five times by 2050.

Greenhouse gas emissions (GHG) from shipping activities around the world dropped by 14 per cent between 2007 and 2012, largely as a result of the economic crisis, according to a recent study for the International Maritime Organization (IMO).

The report says that shipping, in total, accounted for approximately 3.1 per cent of global carbon dioxide (CO₂) emissions and 2.8 per cent of total GHG emissions

on a carbon dioxide equivalent (CO₂e) basis, on average for the six-year period 2007–2012.

Estimates of ships' fuel consumption and emissions vary depending on the methodology used, and the study used both the top-down (bunker sales data) and the bottom-up (fleet activity data) methods for its estimates. According to the authors, the bottom-up approach provides the best estimates. Based on this main approach,

the annual fuel consumption for all ships was approximately 300 million tonnes in 2012, resulting in CO₂ emissions of 949 million tonnes, which equals 2.7 per cent of global CO₂ emissions for that year.

Average annual emissions of the air pollutants nitrogen oxides (NO_x) and sulphur dioxide (SO₂) during the six-year time period 2007–2012 were estimated to amount to 20.9 and 11.3 tonnes, respectively, which represent about 15 and 13 per cent of global man-made emissions of these pollutants. (See Table 1.)

Table 1: Annual emissions from global shipping 2007–2012 (thousand tonnes).

	2007	2008	2009	2010	2011	2012
CO ₂	1,100,000	1,135,000	978,000	915,000	1,022,000	949,000
CH ₄	177	196	187	236	288	288
N ₂ O	50	52	45	42	45	43
SO ₂	11,581	11,892	11,646	10,550	11,632	10,240
NO _x	22,801	23,639	20,756	18,756	20,310	19,002
PM	1,622	1,679	1,574	1,432	1,563	1,402
NM VOC	827	858	739	683	741	696
CO	998	1,039	921	893	975	936

Regarding fuel consumption for international shipping specifically (i.e. excluding domestic shipping and fishing vessels), the study cited sales in 2011 of 648.9 million tonnes according to the top-down estimate. Using the bottom-up approach resulted in fuel use of 849.5 million tonnes in that same year.

Heavy fuel oil dominates the fuel consumed by international shipping, with a share of approximately 85 per cent in 2012. Marine distillates accounted for nearly 15 per cent.

According to the IMO's global sulphur monitoring reports, the worldwide average fuel sulphur content in 2012 was 2.51 per cent for heavy fuel oil and 0.14 per cent for marine distillates.

Three types of ship dominate ship fuel consumption and consequently emissions. These are container ships, bulk carriers and oil tankers, which in 2012 were responsible for 26, 21 and 16 per cent respectively of the CO₂ emissions from international shipping.

According to the study, widespread reductions in ship speed took place during the 2007–2012 period, probably as a result of operators trying to cut costs. The average reduction of at-sea speed relative to design speed was 12 per cent, which led

Table 2: Summary of scenarios for future (2020 and 2050) emissions from international shipping. Figures show the median change relative to 2012, with the minimum and maximum changes shown in parenthesis.

		Scenario	2012	2020	2050
Greenhouse gases	CO ₂	Low LNG	100	111 (107-111)	240 (105-352)
		High LNG	100	109 (104-109)	227 (99-332)
	CH ₄	Low LNG	100	1,600 (1,600-1,600)	14,000 (6,000-20,000)
		High LNG	100	7,800 (7,500-7,800)	42,000 (18,000-62,000)
	N ₂ O	Low LNG	100	111 (107-111)	238 (104-349)
		High LNG	100	108 (103-108)	221 (96-323)
Air pollutants	HFC		100	108 (105-108)	216 (109-304)
	NO _x	Constant ECA	100	110 (105-110)	211 (92-310)
		More ECAs	100	102 (98-102)	171 (75-250)
	SO ₂	Constant ECA	100	65 (63-65)	39 (17-57)
		More ECAs	100	57 (54-57)	25 (11-37)
	PM	Constant ECA	100	99 (95-99)	199 (87-292)
		More ECAs	100	83 (79-83)	127 (56-186)
	NM VOC	Constant ECA	100	111 (107-111)	241 (105-353)
		More ECAs	100	109 (105-109)	230 (101-337)
	CO	Constant ECA	100	115 (110-115)	271 (118-397)
		More ECAs	100	127 (121-127)	324 (141-474)



Container ships account for 26 per cent of the CO₂ emissions from international shipping.

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to a fall in average daily fuel consumption of 27 per cent. Some oil tanker size categories reduced daily fuel use by 50 per cent and some container ship size categories even reduced by more than 70 per cent. It was noted, however, that this does not translate into an equivalent percentage increase in efficiency, because a greater number of ships (or more days at sea) are required to do the same amount of freight work.

It is expected that global demand for shipping will keep growing over the next few decades, resulting in a projected rise in fuel use and CO₂ emissions of between 50 and 250 per cent under a business-as-usual scenario. Additional action to improve efficiency and reduce emissions can limit the growth in emissions, but it was noted that even modelled improvements with the greatest energy savings could not yield a downward trend.

In total, the study modelled 16 scenarios with different economic conditions, levels of fuel use and air pollution controls, and

with and without further efficiency rules.

The scenario analysis starts with four different scenarios of transport demand (disaggregated into cargo groups). For each of these there is one ECA/fuel mix scenario that keeps the share of fuel used in Emission Control Areas (ECA) constant over time and has a slow penetration of liquefied natural gas (LNG) in the fuel mix, and another that projects a doubling of the amount of fuel used in ECAs and has a higher share of LNG in the fuel mix.

Then, for each of the eight combinations of demand and ECA scenarios, there are two efficiency trajectories, one assuming an ongoing effort to increase the fuel-efficiency of new and existing ships after 2030, resulting in a 60 per cent improvement over the 2012 fleet average by 2050, and the other assuming a 40 per cent improvement by 2050.

According to the scenario analysis, emissions of nitrous oxide (N₂O), volatile organic compounds (NMVOC) and carbon monoxide (CO) will rise roughly in line with those of CO₂, while a greater

increase is projected for methane (CH₄) as more ships switch to LNG. (See Table 2.)

Emissions of NO_x and particulate matter (PM) are also expected to continue to increase, but at a slightly slower rate compared to CO₂. The only pollutant showing a downward trend is SO₂ – reductions that will result from implementing the strengthened sulphur standards adopted by the IMO in 2008.

The report will be presented to the 67th meeting of the IMO's Marine Environment Protection Committee (MEPC 67) to be held in London in mid-October, where it is intended to feed in to the discussions about how to best address GHG emissions from the shipping sector.

Christer Ågren

The report: Third IMO GHG Study 2014. International Maritime Organization (IMO) MEPC 67/INF.3, 25 July 2014.

Electric vehicle sales surge

Sales of electric vehicles in Europe have doubled every year since 2010, and provisional figures for 2013 indicate that almost 50,000 plug-in vehicles were sold, i.e. around 0.4 per cent of all car sales in the EU.

“Electric vehicles can play an important role in the shift to more sustainable mobility, and their increasing sales are being driven by

carmakers’ need to innovate to meet EU CO₂ regulations,” said T&E’s clean vehicles programme manager, Greg Archer.

T&E’s Electric Vehicles in 2013 report also highlights how Europe constitutes a quarter of the global market for plug-in vehicles including hybrids. Sales in California remain the highest in the world, largely driven by a mandate requiring manufacturers to sell electric vehicles. T&E advocates a similar system for the EU instead of the existing “supercredits” that reduce the need for carmakers to improve the efficiency of their non-electric fleet.

Source: T&E News, 31 July 2014. www.transportenvironment.org

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Bulgaria and Latvia in need of air quality action

Bulgaria and Latvia have to improve protection for citizens from particulate matter (PM₁₀) pollution. Citizens in all six zones and agglomerations in Bulgaria (AG Sofia, AG Plovdiv, AG Varna, North, South-West and South-East) have been exposed to excessive levels of PM₁₀ since at least 2007. In Latvia, one zone is concerned: Riga, with breaches reaching back to 2007.

According to the Commission, both countries have failed to take the necessary measures to protect citizens’ health, and it is asking them, through a reasoned opinion, to take forward-looking, speedy and effective action to comply as soon as possible. If they fail to act, the Commission may take the matter to the Court of Justice of the European Union.

Source: European Commission press release, 10 July 2014

Largest climate rally in history

On 21 September, two days before the big UN General Secretary’s climate summit, more than 310,000 people participated in the People’s Climate March in New York City. That is well above the 80,000 who attended the 2009 march at the Copenhagen climate talks – making it the largest climate rally in history.

On the same day, around the world, over half a million people joined 2800

events in 160 countries. Marches around the world also exceeded expectations with more than 30,000 people taking to the streets in both London and Melbourne and over 25,000 in Paris.

“People around the world are tired of waiting for our politicians to act,” said Payal Parekh, Global Managing Director for 350.org, one of the organizations coordinating the global day of events.

“From the islands of the Pacific to the streets of New York City, we’re demanding action, not words. We’re showing what real leadership looks like.”

People’s Climate March, press release 21 September, <http://peoplesclimate.org/press-release/official-crowd-count-310000-join-peoples-climate-march-in-new-york-city/>

LIGHT BRIGADING/Flickr.com / CC BY-NC-SA



US to cut CO₂ from existing power plants

By 2030, the CPP proposal should reduce CO₂ emissions from the power sector by 30 per cent nationwide, compared to 2005 levels, and provide up to US\$93 billion in climate and public health benefits

On 2 June, the United States Environmental Protection Agency (EPA) published its Clean Power Plan, a proposal to cut carbon dioxide (CO₂) emissions from existing power plants. Accounting for roughly one-third of all domestic greenhouse gas emissions in the US, power plants are the country's single largest source of carbon pollution.

While there are already limits in place for air pollutants such as sulphur dioxide, nitrogen oxides, particulate matter (PM), mercury and arsenic from this sector, there are currently no national limits on carbon pollution levels.

In 2009, following a US Supreme Court decision, the EPA determined that greenhouse gas pollution threatens Americans' health and welfare by leading to long-lasting changes in Earth's climate that can have a range of negative effects on human health and the environment. This determination gave the EPA the authority to regulate CO₂ emissions.

It is estimated that by 2030 the proposal will cut CO₂ emissions from the power sector by 30 per cent nationwide below 2005 levels. As a co-benefit it will also reduce emissions of PM, nitrogen oxides, and sulphur dioxide by more than 25 per cent, thus avoiding up to 6,600 premature deaths, up to 150,000 asthma attacks in children, and up to 490,000 missed work or school days – providing up to US\$93 billion in climate and public health benefits. Moreover, it will shrink electricity bills roughly eight per cent by increasing energy efficiency and reducing demand from the power grid.

“By leveraging cleaner energy sources and cutting energy waste, this plan will clean the air we breathe while helping



The 1900s called, they want their means of energy production back.

slow climate change so we can leave a safe and healthy future for our kids,” said EPA Administrator Gina McCarthy.

The plan is to be implemented through a state-federal partnership under which states identify a path forward using either current or new electricity production and pollution control policies to meet the goals of the programme. The proposal provides guidelines for states to develop plans to meet state-specific goals to reduce CO₂ emissions and gives them the flexibility to design a programme that makes the most sense for their specific situation. States can choose the right mix of generation using diverse fuels, energy efficiency and demand-side management to meet the goals. It allows them to work alone to develop individual plans or to work together with other states to develop multi-state plans.

The EPA will accept comments on the proposal for 120 days after its publication and will hold several public hearings. Based on this input, EPA will finalize standards by June 2015.

Friends of the Earth US acknowledges the proposed rule, which is supported by Barack Obama, as “the most significant step any American president has taken

to mitigate climate disruption”, but states that it needs to be strengthened in order deliver the emission reductions needed to avoid the worst impacts from climate change and recommends the following changes to the rule:

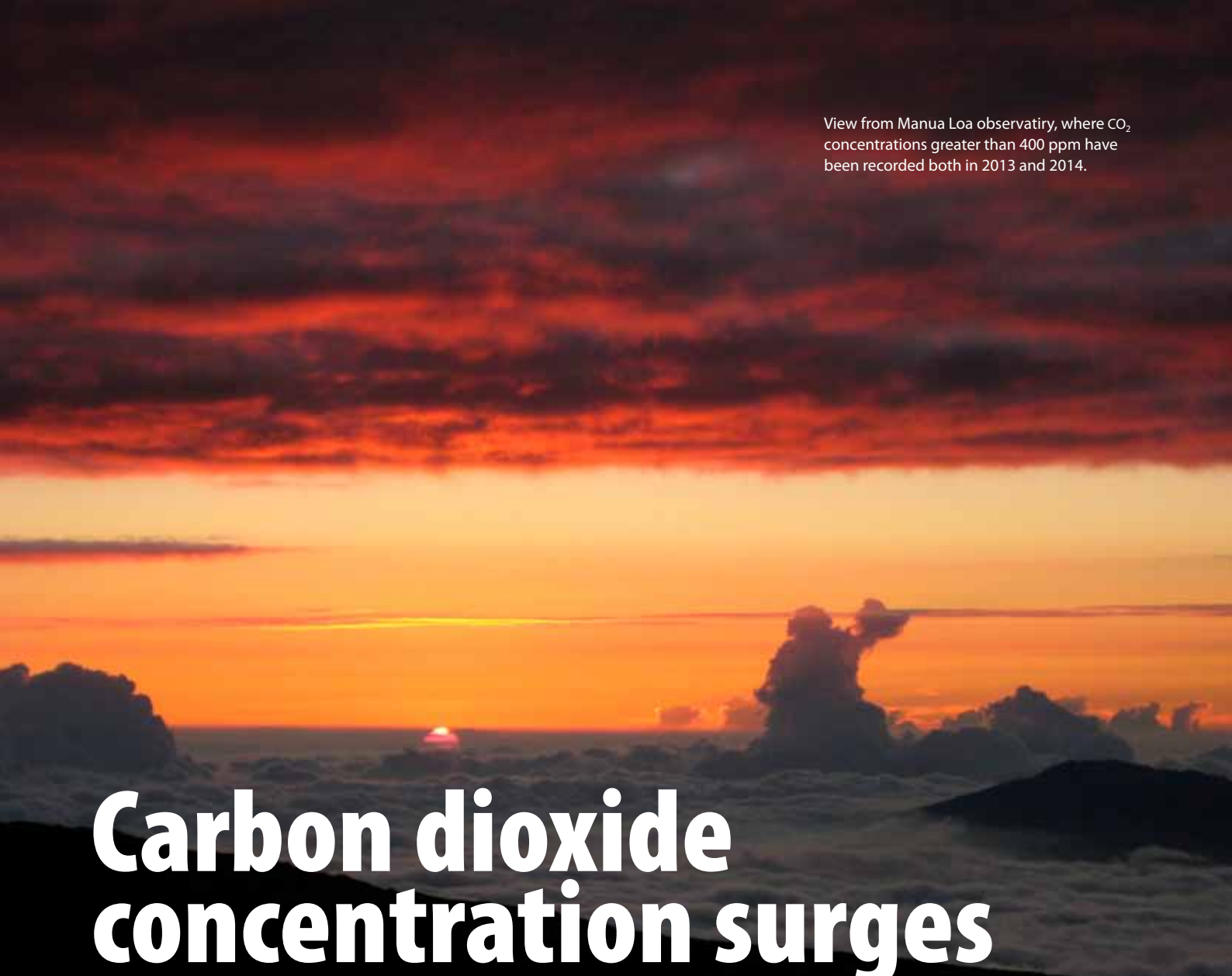
- Increase state targets to require greater emission reductions substantial enough to avert catastrophic climate disruption;
- Require reductions to be made by 2020, rather than 2030, to accelerate action to prevent the accumulation of greenhouse gas emissions;
- Change the base year from 2005 to the internationally accepted baseline of 1990, which will more accurately reflect the required reductions;
- Promote the use of clean renewable energy, such as wind and solar, over dirty fossil fuels, such as natural gas and coal; and
- Allow a sufficiently robust carbon tax as a means for states to comply with the rule.

Kate DeAngelis, climate and energy campaigner at Friends of the Earth, calls on the EPA to “heed public demand and release more stringent state targets. The rule remains woefully insufficient and will not lead to the emission reductions necessary to avoid catastrophic climate disruption. The EPA must strengthen the rule so that the state targets are stringent enough to substantially shift our energy system from dirty fossil fuels to a clean, renewable energy future”.

Source: EPA press release 2 June 2014.

Information: <http://www.epa.gov/cleanpowerplan>

Fact sheet by FOE US: http://libcloud.s3.amazonaws.com/93/7e/a/4714/Carbon_rule_factsheet.pdf



View from Manua Loa observatory, where CO₂ concentrations greater than 400 ppm have been recorded both in 2013 and 2014.

Carbon dioxide concentration surges

NOAA PHOTO LIBRARY/FLICKR.COM/CC BY

The concentration of carbon dioxide in the atmosphere increased last year at the fastest rate for nearly 30 years, according to the latest data from the WMO.

The World Meteorological Organization (WMO) reported in September 2014 that the amount of greenhouse gases in the atmosphere reached a new record high in 2013, propelled by a surge in levels of carbon dioxide.

“We must reverse this trend by cutting emissions of CO₂ and other greenhouse gases across the board,” said WMO Secretary-General Michel Jarraud. “We are running out of time.”

Between 1990 and 2013 there was a 34 per cent increase in radiative forcing – the warming effect on our climate – because of long-lived greenhouse gases such as carbon dioxide (CO₂), methane and nitrous oxide.

In 2013, the concentration of CO₂ in the atmosphere was 142 per cent of the pre-industrial era (1750), while concen-

trations of methane and nitrous oxide were 253 per cent and 121 per cent of pre-industrial levels respectively.

CO₂ levels increased more between 2012 and 2013 than during any other year since 1984. The WMO says that this was possibly related to reduced CO₂ uptake by the earth’s biosphere in addition to the steadily increasing CO₂ emissions.

The atmospheric concentrations represent what remains in the atmosphere after the complex system of interactions between the atmosphere, biosphere and the oceans. About a quarter of the total emissions are taken up by the oceans and another quarter by the biosphere, thus reducing the amount of CO₂ in the atmosphere.

The ocean cushions the increase in CO₂ that would otherwise occur in the

atmosphere, but with far-reaching impacts. The current rate of ocean acidification appears unprecedented at least over the last 300 million years, according to the WMO analysis.

The WMO general secretary said: “we know without any doubt that our climate is changing and our weather is becoming more extreme due to human activities such as the burning of fossil fuels. The concentration of carbon dioxide in the atmosphere actually increased last year at the fastest rate for nearly 30 years. Carbon dioxide remains in the atmosphere for many hundreds of years and in the ocean for even longer. Past, present and future CO₂ emissions will have a cumulative impact on both global warming and ocean acidification. The laws of physics are non-negotiable.”

Facts on atmospheric concentrations

Carbon dioxide (CO₂) accounted for 80 per cent of the 34 per cent increase in radiative forcing by long-lived greenhouse gases from 1990 to 2013, according to the U.S. National Oceanic and Atmospheric Administration (NOAA) Annual Greenhouse Gas Index.

On the global scale, the amount of CO₂ in the atmosphere reached 396.0 parts per million in 2013. The atmospheric increase in CO₂ from 2012 to 2013 was 2.9 parts per million, which is the largest annual increase for the period 1984–2013. Concentrations of CO₂ are subject to seasonal and regional fluctuations. At the current rate of increase, the global annual average CO₂ concentration is set to cross the symbolic 400 parts per million threshold in 2015 or 2016.

Methane (CH₄) is the second most important long-lived greenhouse gas. Approximately 40 per cent of methane is emitted into the atmosphere by natural sources (e.g., wetlands and termites), and about 60 per cent comes from human activities like cattle breeding, rice agriculture, fossil fuel exploitation, land-

fills and biomass burning. Atmospheric methane reached a new high of about 1824 parts per billion (ppb) in 2013, due to increased emissions from anthropogenic sources. Since 2007, atmospheric methane has been increasing again after a temporary period of levelling off.

Nitrous oxide (N₂O) is emitted into the atmosphere from both natural (about 60%) and anthropogenic sources (approximately 40%), including oceans, soil, biomass burning, fertilizer use, and various industrial processes. Its atmospheric concentration in 2013 was about 325.9 parts per billion. Its impact on climate, over a 100-year period, is 298 times greater than the same emissions of carbon dioxide. It also plays an important role in the destruction of the stratospheric ozone layer, which protects us from the harmful ultraviolet rays of the sun.

Ocean acidification: The ocean currently absorbs one-fourth of anthropogenic CO₂ emissions, reducing the increase in atmospheric CO₂ that would otherwise occur because of fossil fuel combus-

tion. Enhanced ocean CO₂ uptake alters the marine carbonate system and leads to increasing acidity. The ocean's acidity increase is already measurable as oceans take up about four kilogrammes of CO₂ per day per person.

The current rate of ocean acidification appears unprecedented at least over the last 300 million years, based on proxy-data from paleo archives. In the future, acidification will continue to accelerate at least until mid-century, based on projections from Earth system models.

The potential consequences of ocean acidification on marine organisms are complex. A major concern is the response of calcifying organisms, such as corals, algae, molluscs and some plankton, because their ability to build shell or skeletal material (via calcification) depends on the abundance of carbonate ions. For many organisms, calcification declines with increased acidification. Other impacts of acidification include reduced survival, development and growth rates, as well as changes in physiological functions and reduced biodiversity.

Annual carbon dioxide concentrations in the Earth's atmosphere are very close to reaching 400 parts per million for the first time in three million years. At the current rate of increase, the global annual average CO₂ concentration is set to cross the symbolic 400 parts per million threshold in 2015 or 2016 according to WMO. Instruments at the Mauna Loa Observatory in Hawaii recorded daily atmospheric levels of carbon dioxide greater than 400 parts per million in spring 2013 and 2014.

The Mauna Loa carbon dioxide (CO₂) record, also known as the "Keeling Curve," is the world's longest unbroken record of atmospheric carbon dioxide concentrations. This record, from the Mauna Loa Observatory, near the top of Mauna Loa on the big island of Hawaii, shows that carbon dioxide has been increasing steadily from values around 317 parts per million (ppm) when Charles D. Keeling began measurements in 1958, to nearly 400 ppm today.

Geologist Ralph Keeling, director of the CO₂ and O₂ measurement pro-

grammes, said that the next significant milestone to be passed will be monthly averages in excess of 400 ppm. Fossil fuel burning continues to increase concentrations of the greenhouse gas to levels not seen in human history and not in perhaps as many as three to five million years.

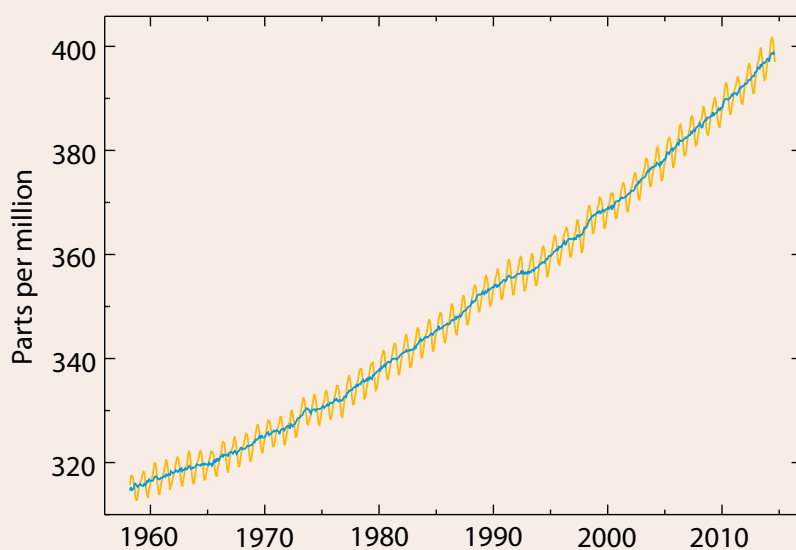
"We're already seeing values over 400," said Keeling. "It's just a matter of time before it stays over 400 forever. At this pace

we'll hit 450 ppm within a few decades."

In the Pliocene era, the last time that CO₂ reached the symbolic milestone of 400 parts per million in the atmosphere, temperatures rose by between three and four degrees and sea levels were between five and 40 metres higher than today.

Reinhold Pape

Edited from WMO press release 9 September 2014 and Scripps measurements notes 17 March 2014



Atmospheric CO₂ at the Mauna Loa Observatory, Hawaii.

Alternative Nobel prize for 350.org founder

Bill McKibben, founder of 350.org will be one of the recipients of this year's Right Livelihood Awards, often called the "Alternative Nobel prize". The motivation reads "...for mobilising growing popular support in the USA and around the world for strong action to counter the threat of global climate change."

Originally a journalist, McKibben is the author of several books. His first book, "The End of Nature", published in 1989, is considered to be one of the first-ever books written to inform a general audience about climate change. He began to devote more and more of his time to activism in the early 2000s.

Ahead of the Copenhagen climate summit in 2009 he founded 350.org campaign to draw attention to the need to reduce carbon dioxide in the atmosphere to 350



350 VERMONT/ FLICKR.COM / CC BY-NC-SA
Bill McKibben

ppm to avoid catastrophic global warming. Since then, the organisation has conducted several more climate campaigns that have mobilised millions of people and had a global reach.

"This recognition of our efforts comes at a perfect moment after the remarkable success of the People's Climate March and as we start the strongest push yet against the fossil fuel industry and the politicians it has purchased," said McKibben in a press release.

Source: Right Livelihood Award webpage: <http://www.rightlivelihood.org/mckibben.html>

350.org, Press release 24 September 2014, <http://350.org/press-release/mckibben-and-350-org-win-alternative-nobel-the-right-livelihood-award/>

LIFE focus on air quality

Since 1992 the European Union Life Programme has co-funded 298 projects with the direct ambition to improve air quality, with many more having an indirect impact on air as a co-benefit of their core actions. A recent publication entitled "LIFE and air quality" presents the highlights of this work in thematic chapters across a number of sectors: transport and urban mobility; monitoring and modelling; capacity building; encouraging behavioural change; agriculture; and industry, waste and energy.

Air quality has been the third biggest focus of the LIFE programme in terms of funding (after water and waste). The total funding for the air quality projects amounted to €628 million, of which the EU contributed some €217 million.

LIFE and Air quality is available at: <http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/air-quality.pdf>



Climate-smart agriculture – an issue of concern

On 23 September, at the Climate Summit, the UN launched a Global Alliance for Climate-Smart Agriculture. More than 20 governments, and 30 organisations and private companies have already announced that they will join.

The aim of the initiative is to achieve: "Sustainable and equitable increases in agricultural productivity and incomes; greater resilience of food systems and farming livelihoods; and reduction and/or removal of greenhouse gas emissions associated with agriculture (including the relationship between agriculture and ecosystems), wherever possible."

In an open letter, 76 civil society organisations, including Greenpeace, ActionAid and

Oxfam, criticise the newly formed alliance. They believe that the invitation to participate ignores several fundamental conditions that need to be addressed in order to deal with climate change, food insecurity and the resilience of communities.

They also note that there is no real definition of "Climate-Smart Agriculture" and fears that the term can be used to green-wash agricultural practices that will harm future food production, such as industrial agriculture practices or soil carbon offsetting.

UN Press release 23 September <http://www.un.org/climatechange/summit/wp-content/uploads/sites/2/2014/05/AGRICULTURE-PR.pdf>

Open letter from civil society <http://www.climatesmartagconcerns.info/open-letter.html>



EU's Dirty thirty

The thirty most CO₂-polluting power plants in Europe also cause 20 per cent of the health costs of the sector.

A new report by CAN Europe and other NGOs exposes the top 30 CO₂-polluting power plants in the EU. Kathrin Gutmann from CAN Europe and one of the authors of the report argues that “coal-fired power plants are the single biggest global source of greenhouse gas emissions. CO₂ emissions from coal in the EU are still far too high, as shown by the EU’s ‘Dirty 30 power plants’ report. The EU needs to tackle coal head on, if it wants to successfully meet its own long-term climate targets.”

The EU’s coal problem, the report reveals, is caused by the increased use of existing coal assets. Many of the EU’s coal-fired plants are now running at or near full capacity, due to the relatively low price of coal compared to gas.

This has led to an increase in CO₂ emissions from coal power plants in the EU, despite the rapid expansion of renewables and an overall decrease in total EU greenhouse gas emissions.

According to the report the heavy use of coal in some of the EU Member States with the highest populations, such as the UK and Germany, puts the EU in grave danger of not phasing out emissions from coal quickly enough, hence undermining the EU’s climate ambitions. Germany and the UK, which are the self-declared climate champions of the EU, have nine coal-fired

power plants each in the list of the top 30 CO₂-polluting thermal power plants in the EU. Germany uses more coal to generate electricity than any other EU country, while the UK comes third in absolute coal consumption for power after Poland.

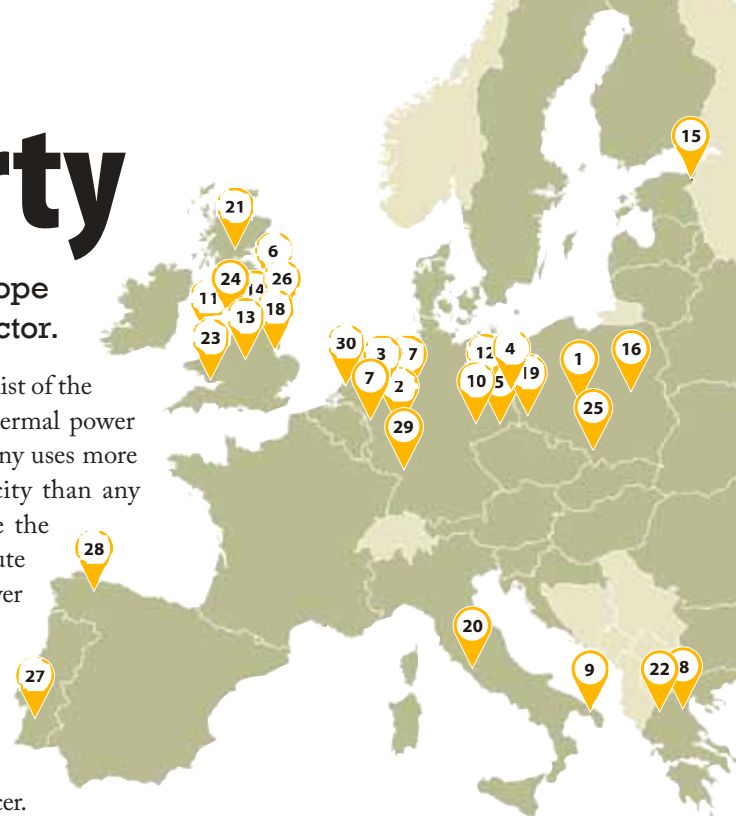
Burning coal also releases pollutants that are associated with a range of human health problems including asthma and cancer. Julia Huscher from the Health and Environment Alliance argues that “each of the largest coal-power stations in Europe is responsible for hundreds of millions of euros in health costs. The sheer amount of pollution they release, apart from the CO₂ emissions, contributes to higher levels of particulate matter, which is a major health concern. In addition, only 30 power plants cause 20 per cent of the health costs of the European power sector”.

The report says that rapid phase-out of CO₂ emissions from coal has to become a priority. Mona Bricke from Climate Alliance in Germany demands that “the next phase in Germany’s Energiewende must focus on how to transition away from coal. If Germany and the EU are serious about meeting their climate targets and transforming their power sector, a German coal phase-out is key. There is no way around that simple truth. The fact that 9 out of the 30 most CO₂ emitting power plants are located in Germany, most of which burn lignite, is a case in point.”

Julia Huscher concludes: “the phase-out of coal in Europe will be a win-win, because it will help to achieve clean air for more people, and avoid further health damage from climate change.”

Reinhold Pape

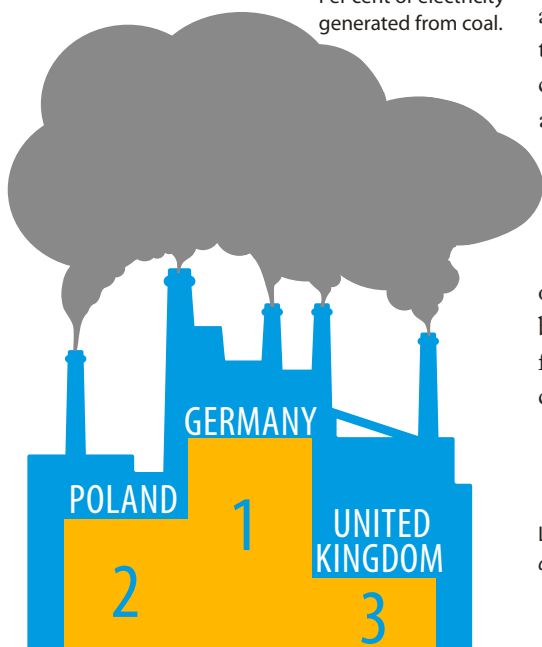
Link to the report: http://awsassets.panda.org/downloads/dirty_30_report_finale.pdf



EU's top CO₂ polluting power plants in 2013.

Ranking	Plant, Country
1	Bełchatów, Poland
2	Neurath, Germany
3	Niederaussem, Germany
4	Jänschwalde, Germany
5	Boxberg, Germany
6	Drax, UK
7	Weisweiler, Germany
8	Agios Dimitrios, Greece
9	Brindisi Sud, Italy
10	Lippendorf, Germany
11	Eggborough, UK
12	Schwarze Pumpe, Germany
13	Ratcliffe-on-Soar, UK
14	West Burton, UK
15	Eesti Elektriijaam, Estonia
16	Kozienice, Poland
17	Scholven, Germany
18	Cottam, UK
19	Turów, Poland
20	Torrevaldaliga, Italy
21	Longannet, UK
22	Kardia, Greece
23	Aberthaw, UK
24	Fiddler's Ferry, UK
25	Rybnik, Poland
26	Ferrybridge "C", UK
27	Sines, Portugal
28	Aboño, Spain
29	Mannheim, Germany
30	Maasvlakte, Netherlands

Per cent of electricity generated from coal.



Air Pollution & Climate Secretariat
Norra Allégatan 5
413 01 Göteborg
Sweden

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Gasping for air

Air pollution is one of Europe's gravest environmental threats. Every year 400,000 people die prematurely because of poor air quality, but the European Parliament has the power to change that. Members of the European Parliament are now starting to work on a number of EU laws, including the National Emissions Ceilings and Medium Combustion Plants Directives, which could substantially improve the air we breathe.

Twelve factsheets reveal how air pollution affects us, from our health to our economy, and explain what the main sources of pollution are. Crucially, they contain policy recommendations to MEPs that will help clean up our air. Everywhere.

The 1.5°C long-term global limit

Scientific assessments have shown that impacts are projected to worsen significantly above a global warming of 1.5, or 2°C from pre-industrial levels. Such assessments have contributed to the adoption of 2°C as a global goal. In Cancun in 2010 Climate Convention Parties agreed to review the global goal with the perspective of strengthening this to 1.5°C.

This report is an attempt to answer the questions: Does a long-term global goal actually help to streamline global efforts to reduce greenhouse-gas emissions and inspire local initiatives? Is the level adequately low to prevent dangerous interference with the climate system? Is the goal feasible, given socio-economic and technical constraints?

The 10 best climate measures in Northern Europe

A number of national environmental NGOs were asked to describe and rank their ten best climate measures.

There is a great diversity among these measures. Hardly any country seems to have noticed what their neighbours are doing. So all climate policymakers should take a look, not only at the ten winners, but at the full smorgasbord of measures in neighbouring nations.

Coming events

IMO Marine Environmental Protection Committee (MEPC). London, UK, 13 - 17 October 2014. Information: www.imo.org

UNFCCC intersessionary meetings. Bonn, Germany, 20 - 25 October 2014. Information: <http://unfccc.int/>

EU Environment Council. 21 October 2014. Information: <http://europa.eu/newsroom/calendar/>

IPCC. Approval and release of AR5 Synthesis Report. Copenhagen, Denmark, 27 - 31 October 2014. Information: <http://www.ipcc.ch/>

BAQ 2014 - Integrated Conference of Better Air Quality (BAQ). Colombo, Sri Lanka, 19 - 21 November 2014. Information: <http://baq2014.org/>

Pollution Atmosphérique Longue Distance: évaluation, risques, gestion et décision. Lille, France, 20-21 November 2014. Information: www.rst.developpement-durable.gouv.fr/pollution-atmospherique-longue-a729.html

UNFCCC Conference of the Parties (COP) 20. Lima, Peru, 1 - 12 December 2014. Information: <http://unfccc.int/>

Fifth International Conference on Plants & Environmental Pollution (ICPEP-5). Lucknow, India, 3 - 6 December 2014. Information: <http://isebindia.com>

CLRTAP Executive Body. Geneva, Switzerland, 8 - 12 December 2014. Information: www.unece.org/env/lrtap/

Air Quality in Europe - New Challenges. London, UK, 9 - 10 December 2014. Information: <http://aamg-rsc.org/meetings/monitoring-ambient-air-2014/>

EU Environment Council. 17 December 2014. Information: <http://europa.eu/newsroom/calendar/>

International Conference on Air Pollution and Control (ICAPC). Paris, France, 23-24 February 2015. Information: www.waset.org/conference/2015/02/paris/ICAPC

23rd European Biomass Conference and Exhibition. Vienna, Austria, 1 - 4 June 2015. Information: <http://conference-biomass.com/>

UNFCCC meeting of subsidiary bodies. Bonn, Germany, 3 - 14 June 2015. Information: <http://unfccc.int/>

UNFCCC Conference of the Parties (COP) 21. Paris, France 21 November - 11 December 2015. Information: <http://unfccc.int/>

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