

## Shipping lobby hinders progress at the IMO

Shipping has a carbon footprint roughly matching that of Germany, and its emissions are projected to grow significantly up to 2050.

► Page 7

## Humans can only survive below a threshold of 35°C

Middle East, North Africa and Southern European levels of intense heat could make outdoor work very difficult this century and human life impossible around the Arabian Gulf.

► Page 10

## Harmful air pollution hits urban citizens

Air quality in Europe is slowly improving, but excessive levels of tiny particles are still responsible for more than 400,000 premature deaths every year.

► Page 14

## Effects of climate change on salmonids

Salmonid fish are sensitive to increased water temperatures. Decreased precipitation, forest fires and ocean acidification are other threats that come with climate change.

► Page 22

## Coal is finished, CCS doesn't work

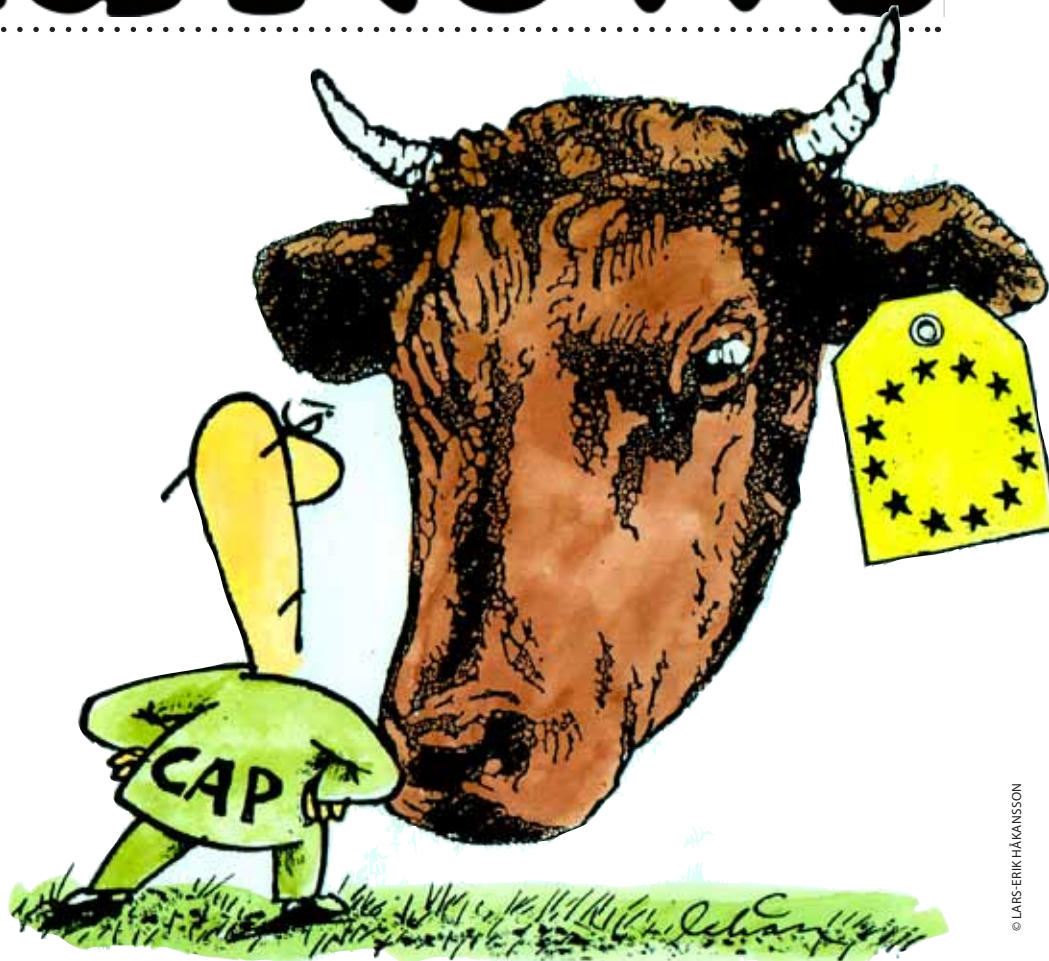
The worldwide movement against coal power is getting stronger and has already made some progress.

► Page 24

## 9 million Londoners under threat from PM

Although transport is the main source, between a quarter and a third of London's PM pollution comes from domestic wood burning.

► Page 27



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# CAP fails to target emission sources

Greenhouse gas emissions from farming in the EU are on the rise, while the Common Agricultural Policy (CAP) fails to deliver climate action, according to a new “fitness check”.

**Out of the** seventeen Sustainable Development Goals (SDGs), the CAP has a positive impact on only two of them – “No poverty” and “Zero hunger” – according to the study “Is the CAP Fit for purpose? An evidence-based fitness-check assessment”, which is a review of 450 scientific papers and reports commissioned by BirdLife Europe and the European Environmental Bureau. The SDG “Climate action” is one of the most neglected goals, as reflected by its score of two red minuses – “cannot deliver”.

Since agriculture is not part of the

European Emissions Trading Scheme, the CAP is the primary policy instrument for implementing climate policies in the sector. Climate action is one of the areas that has been priority for recent reforms of the CAP and a specific objective for several of the instruments in both pillars. Though there is an ambition to address climate mitigation on paper the CAP fails to deliver on the ground.

Greenhouse gas emissions from agriculture represent around 20 per cent of total EU greenhouse gas emissions, but only

# 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

Första Långgatan 18, 413 28 Göteborg, Sweden

Tel: +46 31 711 45 15

Fax: +46 31 711 46 20

E-mail: [info@airclim.org](mailto:info@airclim.org)

Internet: [www.airclim.org](http://www.airclim.org)

Editor: Kajsa Pira

Assistant editors: Christer Ågren, Reinhold Pape & Stefan Larsson

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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

A few weeks ago the European Commission presented a communication on “The Future of Food and Farming”, which is one of the first stepping stones in a long CAP reform process (see next page).

The document contains a lot of talk about climate and references to the Paris Agreement. But the fact that significant reductions in agricultural greenhouse gas emissions cannot be achieved without reducing the number of livestock is not mentioned. And that, in turn, cannot be done without limiting the amount of beef people put on their plates.

This is hardly surprising – the livestock industry is an important part of the economy, not least in Ireland, the home of the agricultural commissioner, Phil Hogan. This means there is a strong agricultural lobby that wants to maintain the status quo.

In addition, decision makers are, quite reasonably, afraid of alienating citizens who like to eat meat, as often expressed in the phrase “we shouldn’t tell people what to eat”.

Since we are in a situation where we cannot choose to ignore any greenhouse gas emissions it makes sense to ask the question: is there a way to overcome these two barriers in the near future?

First, there is a need to grow the part of the economy that can offer alternatives to producing bargain beef for the masses. There is already a growing industry in various types of plant-based foods. This existing trend can be enhanced by public procurement and supporting research and development. To some extent, this may also include the production of more exclusive animal products. If the revenue per unit of product was higher it would be possible for a farmer to make a living while keeping fewer livestock. Growing these sectors will create new jobs and strengthen national and regional economies,

while also building a new lobbying force to balance the existing livestock industry. This would work in the same way as the wind power industry today – as a voice that can respond to the conservative arguments from the fossil lobby.

Secondly, politicians must challenge the idea that what we eat is a fundamentally private matter. Why should it be more private than how we get to work or warm up the house? Besides, it is also a false notion that politics is not already interfering in this area. As long as there has been agricultural policy some foods have been directly or

indirectly favoured over others. But there is a reason why decision makers seldom acknowledge this. For most of us, the food we eat is more important to our identity than which fuel we use in our boiler. So this subject needs to be addressed with a little more delicacy and sensitivity. Introduce soft measures to support the sustainable dietary choices that people are already willing to make, include sustainability as a factor in dietary guidelines, provide information and promote plant-based alternatives in lunch restaurants and school canteens.

Here the communication actually provides a little something to hold on to, for the first time, it states that “the CAP also has a role to play in promoting healthier nutrition, helping to reduce the problem of obesity and malnutrition”. Since there is a strong correlation between healthy and sustainable diets this statement could constitute a first stepping stone towards policy action. There is of course a high risk that this ambition will simply end up as a decorative element in a directive. However, I believe the Commission can do better than this.

Kajsa Pira

**‘we are in a situation where we cannot choose to ignore any greenhouse gas emission’**



# More flexibility risks further erosion of sustainability ambitions

Direct payments will remain the core of the budget, “greening” will be abolished and member states will get more power, as the Commission points out the future direction for the Common Agricultural Policy (CAP).

On 29 November 2017 the European Commission presented a communication on “The Future of Food and Farming”, a document that set out the guidelines for a real CAP proposal that is expected to be published in spring or summer 2018.

The Commission announced that they want to abolish the much-criticised “greening” mechanism of the first pillar, noting that its implementation has been “sometimes less ambitious than intended”. The three instruments that are supposed to contribute to environmental objectives – cross-compliance, green direct payments and voluntary agri-environmental and climate measures – are going to be replaced by “a more targeted, more ambitious yet flexible approach”. This is in line with a recurring theme in the document – giving more power to member states to shape the policy instruments. EEB Policy Manager for Agriculture and Bioenergy, Faustine Bas-Defossez, expressed her concern:

“Time and time again we’ve seen that when EU governments are given more flexibility they go for the lowest common denominator. If freedom and flexibility do not come hand in hand with accountability then history will repeat itself and the flexibility afforded will be nothing more than a smokescreen to systematically water down environmental ambition. We need

a future policy where the Commission does not shy away from applying real financial penalties on countries that don’t follow the rules.”

If the commission prevails, direct payments will remain untouched in a future CAP. Being one of the EU’s largest budget items, they are often criticised for delivering too little public good in relation to the large sums that are paid out. Since direct payments are based on farmland area it results in the somewhat strange situation where 80 per cent of the money goes to the largest 20 per cent of farms. The Commission is considering adjusting this distorted allocation of economic support to some extent, e.g. through capping payments or introducing digressive payments.

Climate issues are referred to repeatedly in the document. One of the three main objectives for a future CAP is “to bolster environmental care and climate action and to contribute to the environmental and climate objectives of the EU”. The fact that greenhouse gases from farming have been increasing in recent years is not mentioned in the document, instead the long-term trend from 1990 is put forward. However, it is noted that “in the absence of stronger and more ambitious policy support it is unlikely that EU agricultural emissions will continue to decrease at the

same pace”. What form such support should take is less clear. Climate-smart farming supported by training, advice and innovation is said to be one part of the answer.

Any mention of the impact of livestock production on climate and environment is however conspicuous by its absence. Greenpeace EU agriculture policy director Marco Contiero said: “The industrial production and overconsumption of meat, milk and eggs in Europe is having a devastating impact on our health, nature and the climate. The Commission’s failure to even mention the problem shows the EU is asleep at the wheel while our food and farming system heads straight for disaster. The new EU farming policy should reward farmers who provide healthy food while protecting nature, water and soil, and the climate.”

Kajsa Pira

“The Future of Food and Farming” is available here: [https://ec.europa.eu/agriculture/sites/agriculture/files/future-of-cap/future\\_of\\_food\\_and\\_farming\\_communication\\_en.pdf](https://ec.europa.eu/agriculture/sites/agriculture/files/future-of-cap/future_of_food_and_farming_communication_en.pdf)

The road ahead is still hidden in fog. Watch out for too much flexibility and watered down environmental ambitions.



# CAP fails to target emission sources

*Continued from front page*

about half of these emissions are covered by the “agriculture” category in reports to the UNFCCC. This is because emissions from energy use, land use and land use change and emissions from industrial inputs such as fertilisers are reported under other categories. Animal farming is responsible for about two-thirds of agricultural emissions.

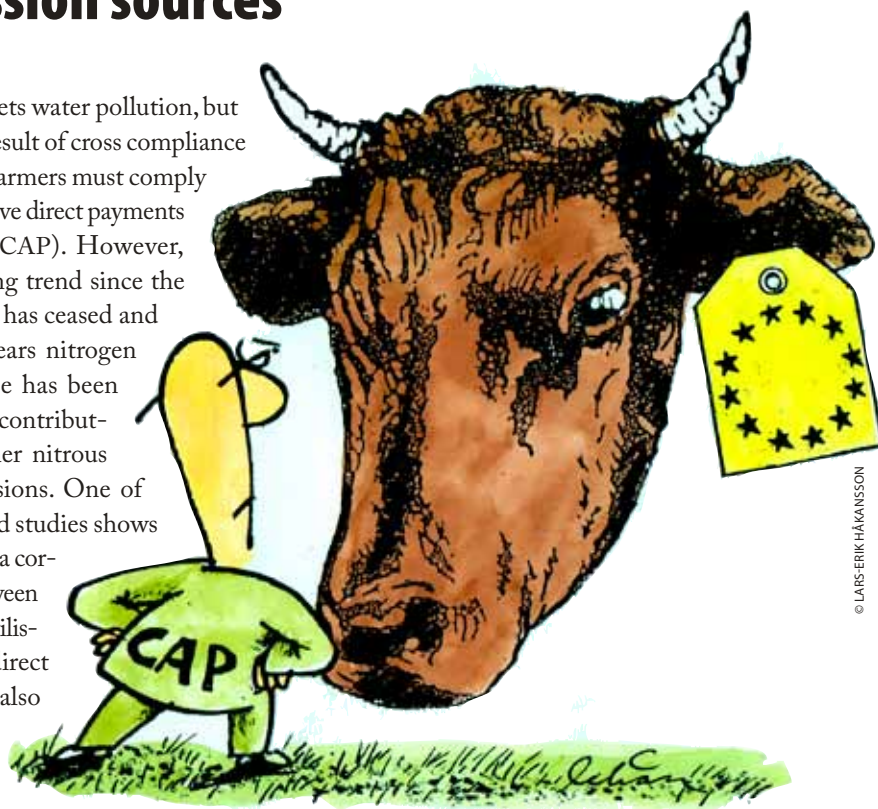
The visible trends in greenhouse gas emissions from agriculture in the EU cannot be attributed to climate action under the CAP. The main explanation is that greenhouse gas emissions closely correlate to the number of cattle. During the 1990s the number of cattle in Eastern Europe shrank due to the economic recession followed by the collapse of communist regimes, and in Western Europe intensification has had a smaller but similar effect on livestock numbers. However, since the abolishment of milk quotas in 2015, the number of cattle has been increasing and so have greenhouse gas emissions.

**Nitrous oxide** is the other important greenhouse gas for which agriculture is a major source. Emissions come primarily from the reaction of nitrogen in soils with the air and can best be avoided by reducing the levels of applied nitrogen fertilisers. This has to some extent been achieved by the Nitrates Directive, which

mainly targets water pollution, but is also the result of cross compliance (rules that farmers must comply with to receive direct payments under the CAP). However, the declining trend since the early 1990s has ceased and in recent years nitrogen fertiliser use has been increasing, contributing to higher nitrous oxide emissions. One of the reviewed studies shows that there is a correlation between nitrogen fertiliser use and direct payments (also see article AN3/17).

An example from Ireland shows that through the effective design of a Rural Environmental Protection Scheme (under pillar II) it was possible for suckler beef farms to reduce nitrogen fertiliser use by 49 per cent with only small productivity decreases.

Two of the greening measures under pillar I, crop diversification and ecological focus areas, have the potential to increase the use of nitrogen-fixing crops, which in turn leads to a reduced need for nitrogen fertilisers and thus reduced emissions of



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nitrous oxide. In one Italian study, using a modelling approach, this was shown to reduce greenhouse gas emissions by 1–2 per cent. The effect of these measures is quite marginal since most EU farmers comply with them without any extra efforts.

Another source for both methane and nitrous oxide emissions is manure. This can be limited through improved storage and management, and is supposed to be an easier apple to pick than limiting methane emissions from enteric fermentation. For large pork and poultry farms this is regulated under the Industrial Emissions Directive, but there is no EU-wide legislation for cattle farms and smaller farms. On examining the crude statistics there is no sign that there have been any significant improvements in manure management. Although there was a 24 per cent reduction in methane emissions from this source between 1990 and 2011 this can be entirely explained by the change in herd size.

**Some of the** biggest emissions from land use come from the cultivation of organic soils. This largely involves drained peatlands that have been cultivated, where the high fraction of organic material breaks down and carbon dioxide is emitted. Flooding

## Climate in the common agricultural policy

Climate was first highlighted as one of the priorities for agricultural and land management payments under the rural development policy in the CAP in 2007. In the health check in 2008/2009 it was addressed further and climate was one of five priorities that received additional funding. Since 2014, climate action has been one of three cross-cutting priorities for the whole CAP. There is also a commitment under the Multiannual Financial Framework (MFF) for the period 2014–2020 to devote at least 20 per cent of the Union budget to support for climate change objectives. CAP is divided into two pillars. The

first pillar consists of direct payments to farmers, and 30 per cent of these payments are conditional on three “greening” measures: crop diversification, ecological focus areas (EFAs) and permanent grasslands.

In the second pillar, there are more measures that explicitly target climate action, as well as a great deal of flexibility for member states on how and what measures to implement. Member states design their own Rural Development Programmes (RDPs) on the basis of a given framework, and the results vary considerably.

them with water again is one way to stop this process. Since 2004, the CAP does not provide any direct payments for this climate-relevant measure. Pillar II payments for turning drained organic soils back into wetland are available under certain circumstances. There is a lot of potential for improvement, since organic soils represent only a fraction of the arable land in the EU, but a quite significant part of the land-use greenhouse gas emissions.

Even if the CAP fails to mitigate direct emissions from farming in Europe, there is at least some kind of awareness of the problem and the first attempts to tackle it. Indirect greenhouse gas emissions outside the EU on the other hand fall completely outside the CAP radar. These are mainly caused by the import of soy and other feedstocks from Latin America, causing land-use change and other environmental problems. It is difficult to estimate the exact impact, but there are estimates that feedstock production outside Europe contributes between 9 and 33 percent of the EU's livestock emissions.

**The authors conclude** that even though climate has become a common word in the CAP discourse, without any radical changes its main impact on greenhouse gas emissions in the future will continue to be unintentional effects of measures targeting other objectives such as the abolishment of the milk quotas. However, if legislators are serious about climate action they need to design policy instruments that deal with main sources of greenhouse gas emissions: livestock numbers, nitrogen fertiliser use, manure management, organic soils and feedstock imports.

Kajsa Pira

Source: "Is the CAP Fit for purpose?" An evidence-based fitness-check assessment, commissioned by BirdLife Europe and the European Environmental Bureau

[http://eeb.org/wp-admin/admin-ajax.php?juwpfisad\\_min=false&action=wpfd&task=file.download&wpfd\\_category\\_id=53&wpfd\\_file\\_id=67927&token=fbf740e3fc00751c440bf5863af5ac97&preview=1](http://eeb.org/wp-admin/admin-ajax.php?juwpfisad_min=false&action=wpfd&task=file.download&wpfd_category_id=53&wpfd_file_id=67927&token=fbf740e3fc00751c440bf5863af5ac97&preview=1)

## US expert panel calls for ammonia-based NAAQS

**Members of the** US Environment Protection Agency's Clean Air Scientific Advisory Committee (CASAC) examining the ecological effects of nitrogen oxides, sulphur oxides and particulate matter are urging the EPA to set a national ambient air quality standard (NAAQS) for nitrogen to mitigate rising ammonia emissions, a long-standing but so far unsuccessful goal of environmentalists.

There are currently NAAQS established for NO<sub>x</sub>, SO<sub>x</sub>, PM, carbon monoxide, lead and ozone under the Clean Air Act, requiring states to craft plans outlining control measures to cut these criteria air pollutants. But the EPA has so far not shown interest in doing so for ammonia, which contributes to adverse human health effects as well as increased nitrogen loading for water bodies and the environment.

Listing ammonia as a criteria pollutant would trigger air permitting requirements

under the prevention of significant deterioration and new source review programmes, as well as the Title V operating permit programme. Such efforts have been strongly opposed by industry groups, especially the agriculture sector whose animal feeding operations are one of the largest sources of ammonia emissions.

The CASAC's integrated science assessment will serve to support a review of the "secondary" NAAQS for NO<sub>x</sub> and SO<sub>x</sub>, which could result in a novel combined standard. Secondary standards are intended to protect the environment, while primary standards are aimed at protecting human health. The current review of the secondary standards will not conclude until 2020 or later.

Source: Car Lines No. 5, September 2017.

## New Nordic diet can reduce emissions

**A new report** from AirClim, "Future Nordic Diets", explores the subject of sustainable diets and the impact they could have on greenhouse gas and nitrogen emissions.

In this project, an agricultural mass flow model is used to assess two future food system scenarios for the Nordic countries Denmark, Finland, Norway and Sweden (hereafter "the Nordic countries"). In these scenarios, livestock feed production competes less with human food production and the majority of food is produced within the Nordic countries using organic farming practices.

The results show that the scenarios would be able to produce enough nutritious food for 31-37 million people in the Nordic countries. The scenarios would thus be able to support the projected population in 2030, albeit with changes in consumption patterns. Consumption of meat decreased by 81-90 per cent from current consumption levels; substituted by cereals, legumes and vegetable oil. The scenarios also included more vegetables than currently consumed in order to



comply with the Nordic nutrition recommendations.

Estimates of current greenhouse gas emissions from the agricultural production of food consumed in the Nordic countries range between 1,310 and 1,940 kg CO<sub>2</sub>-eq per person per year. The greenhouse gas emissions from agricultural production in the scenarios were estimated at 310-700 kg CO<sub>2</sub>-eq per diet per year.

Agricultural emissions of pollutants that cause acidification and eutrophication, especially ammonia, are also significantly lower in the scenarios than they are today.

The report : [http://airclim.org/sites/default/files/documents/future\\_nordic\\_diets.pdf](http://airclim.org/sites/default/files/documents/future_nordic_diets.pdf)



# State of the global climate

The World Meteorological Organization (WMO) reports on a number of worrying climate-related records for 2017.

## 2013-2017 warmest five-year period

2017 is set to be in the top three hottest years, with record-breaking extreme weather. The World Meteorological Organization's (WMO) provisional statement on the State of the Climate says the average global temperature from January to September 2017 was approximately 1.1°C above the pre-industrial era. As a result of a powerful El Niño event, 2016 is likely to remain the warmest year on record, with 2017 and 2015 being second and/or third. 2013–2017 is set to be the warmest five-year period on record.

## GHG emission increase

The rate of increase in CO<sub>2</sub> from 2015 to 2016 was the highest on record, 3.3 parts per million/year, reaching 403.3 parts per million. Global average figures for 2017 will not be available until late 2018. Real-time data from a number of specific locations indicate that levels of CO<sub>2</sub>, methane and nitrous oxide continued to increase in 2017.

## Millions displaced

In 2016, 23.5 million people were displaced during weather-related disasters. Consistent with previous years, the majority of these internal displacements were associated with floods or storms and occurred in the Asia-Pacific region. In Somalia, more than 760,000 internal displacements have been reported, according to the UN High Commissioner for Refugees and the International Organization for Migration (IOM).

## Arctic sea ice at record-low levels

The extent of Arctic sea ice was well below average throughout 2017 and was at record-low levels for the first four months of the year, according to the National Snow and Ice Data Center and the Copernicus Climate Change Service. The Arctic annual maximum extent in early March was among the five lowest in the 1979–2017 satellite record, and according to NSIDC data was at a record low. The five lowest maximum extents have occurred since 2006. A strong and persistent low-pressure system over the central Arctic helped to inhibit ice loss during the summer months. The Arctic sea ice reached its minimum in mid-September 2017, with an area 25–31 per cent below the 1981–2010 average for that time of year, and was among the eight smallest minimum extents on record. The

ten smallest minimum extents have all occurred since 2007. The Antarctic sea ice extent was also well below average. The annual minimum extent in early March was record low, and the annual maximum extent in mid-October was at or near record-low levels. Sea ice conditions in the Antarctic have been highly variable over the past several years, with the record-high sea ice extents occurring as recently as 2015. The Greenland ice sheet saw an increase of more than 40 billion tons of ice due to above-average snowfall and a short melt season. Despite the gain in overall ice mass this year, it is only a small departure from the declining trend, with the Greenland ice sheet having lost approximately 3,600 billion tons of ice mass since 2002.

## Ocean heat highest

Global sea surface temperatures are on track to be among the three highest on record says WMO. Global ocean heat content in 2017 to date has been at or near record-high levels. Elevated tropical sea surface temperatures which contribute to coral bleaching were not as widespread as during the 2015–16 El Niño. But some significant coral bleaching did still occur, including Australia's Great Barrier Reef. UNESCO reported in June that all but three of the 29 coral reefs with World Heritage listing had experienced temperatures consistent with bleaching at some point in the 2014–2017 period.

## Heatwaves increasing

According to the World Health Organization (WHO), the global health impacts of heatwaves depend not only on the overall warming trend, but on how heatwaves are distributed across regions where people live. Recent research shows that the overall risk of heat-related illness or death has climbed steadily since 1980, with around 30 per cent of the world's population now living in climatic conditions that deliver prolonged extreme heatwaves. Between 2000 and 2016, the number of vulnerable people exposed to heatwave events has increased by approximately 125 million.

Source: WMO, 6 November 2017 <https://public.wmo.int/en/media/press-release/2017-set-be-top-three-hottest-years-record-breaking-extreme-weather>



# Shipping lobby hinders progress at the IMO

Shipping has a carbon footprint roughly matching that of Germany, and its emissions are projected to grow significantly up to 2050.

**A new report** by the business lobbying watchdog InfluenceMap says that the shipping industry has aggressively lobbied the UN International Maritime Organization (IMO) to obstruct climate change action for shipping. The report was released just ahead of the second meeting of the IMO's Intersessional Working Group on the reduction of greenhouse gas emissions from ships in October.

Despite being responsible for close to three per cent of the global emissions of the main greenhouse gas carbon dioxide, shipping is still not subject to any specific emission reduction targets.

According to a recent European Parliament report, shipping could be responsible for 17 per cent of global greenhouse gas emissions by 2050 if left unregulated, potentially jeopardising global ambitions set out under the Paris Agreement.

The report by InfluenceMap concludes that progress on regulation has been hindered by powerful shipping trade associations, led by the International Chamber of Shipping (ICS). The ICS, alongside the Baltic and International Maritime Council (BIMCO) and the World Shipping Council, have jointly opposed action on climate change at the IMO and lobbied to delay implementation of any climate regulations until 2023.

By analysing delegate lists, it was shown that at the most recent IMO environmental committee meeting nearly one third of nations were represented in part by direct business interests. The report said that the IMO appears to be the only UN agency to allow such extensive corporate representation in the policy-making process.

According to the report, the shipping sector is maintaining its business model regarding carbon emissions by capturing the regulatory process. It also points out that the shipping sector's lack of disclosure contrasts with increasing investor expecta-



Climate change – let those landlubbers take care of it.

tions of more such disclosure, as shown by the Financial Stability Board's Task Force on Climate-related Financial Disclosures recommendations on climate risk.

It is pointed out, however, that AP Moller-Maersk is a key exception, by being transparent on its climate policy positions and appearing to support ambitious action on climate policy. Moreover, that Maersk has been joined recently by some Scandinavian companies and national shipowners' associations that appear supportive of action to decarbonise the shipping industry. The report notes that this indicates a "potential for a future coalition of progressive voices in shipping to promote greater corporate climate policy disclosure and action on climate at the IMO".

Commenting on the InfluenceMap report, UK shipping executive Andrew Craig-Bennett wrote that its conclusions were basically right, and that "We all know that if we try to regulate emissions by measuring fuel consumption, and so on, people in our business are going to

cheat. It's what people in our business do. The only way to keep ourselves honest is to ban the infernal combustion engine altogether, along with the external one, and to adopt zero emissions".

He continued: "...the only sensible proposal before the IMO is the one coming from the Pacific Islands – including the Marshall Islands – calling for zero emissions by 2035. That would give us 17 years to scrap every ship on the planet and replace them with ships that do not consume hydrocarbons and emit greenhouse gases when in operation".

Christer Ågren

Sources: [climatechangenews.com](https://climatechangenews.com), 23 and 26 October 2017; [splash247.com](https://splash247.com), 26 October 2017.

The report "Corporate capture of the IMO – How the shipping sector lobbies to stay out of the Paris Agreement on climate" (October 2017) by InfluenceMap.

<https://influencemap.org/report/Corporate-capture-of-the-IMO-902bf81c05a0591c551f965020623fda>

# Grass-fed beef is not a climate solution

Livestock can under certain conditions and for limited periods of time contribute to carbon sequestration in grasslands, but this can at best offset no more than 11 per cent of all livestock emissions.

**Ruminants** (cattle, buffalo, sheep and goats), have in recent decades gained a bad reputation as an environmental culprit and been blamed for climate change, deforestation and biodiversity loss, as well as the pollution of soils, air and water. But there is also a counter argument. Not all beef is bad they say, claiming that well-managed grazing systems allow ruminants to sequester carbon in grasslands, such that this sequestration partially or entirely compensates for the carbon dioxide, methane and nitrous oxide these systems generate.

The report “Grazed and confused” by the Food and Climate Research Network is a thorough analysis that aimed to find out if there is any truth behind that claim. Though it might be possible under special circumstances and for a limited period of time, the general the answer the authors give is no.

There are only a few peer-reviewed studies that have made global estimations

of the biophysical sequestration potential of grasslands. The most optimistic study says that the potential can reach 800 Mt CO<sub>2</sub>-eq a year, and the most pessimistic one only 295 Mt CO<sub>2</sub>-eq a year. This can be compared to current annual emissions from grazing ruminants that are estimated at about 1.32 Gt CO<sub>2</sub>-eq (a figure that includes supply chain and land use change-related impacts). It can also be compared to the 7.1 Gt CO<sub>2</sub>-eq a year caused by the entire livestock chain and 49 Gt CO<sub>2</sub>-eq, which is an estimate of all anthropogenic emissions. In other words, the potential for offsets is 20–60 per cent of emissions from grazing systems: 4–11 per cent of total livestock emissions, and between 0.6 and 1.6 per cent of total annual greenhouse gas emissions

It is important to note that the sequestration potential is very context-specific. In some places and over a limited period of time sequestration can be quite high. This is often true for degraded soil, since there

is more room for improving management practices and “restoring” the carbon stock, but low rainfall levels may be a limiting factor, and the economic and logistical obstacles will often be greater. However, the reverse can also happen, a lot of carbon will be lost when grasslands are exposed to drought or overgrazing.

Another fact to be aware of is that some management practices that will promote carbon sequestration, such as fertilisation, irrigation and introducing new grass species, can have other environmental implications.

The exact number of animals that feed entirely on grass is not known but it is likely to be very low and their contribution to overall animal protein will be even lower. As to the grasslands that the animals graze, these are among the largest ecosystems in the world, occupying between 20 and 47 per cent of the land area. Only a smaller part of this is natural and semi-natural grasslands, which host

Grasslands with grazing livestock cover between 20 and 47 per cent of the global land area.

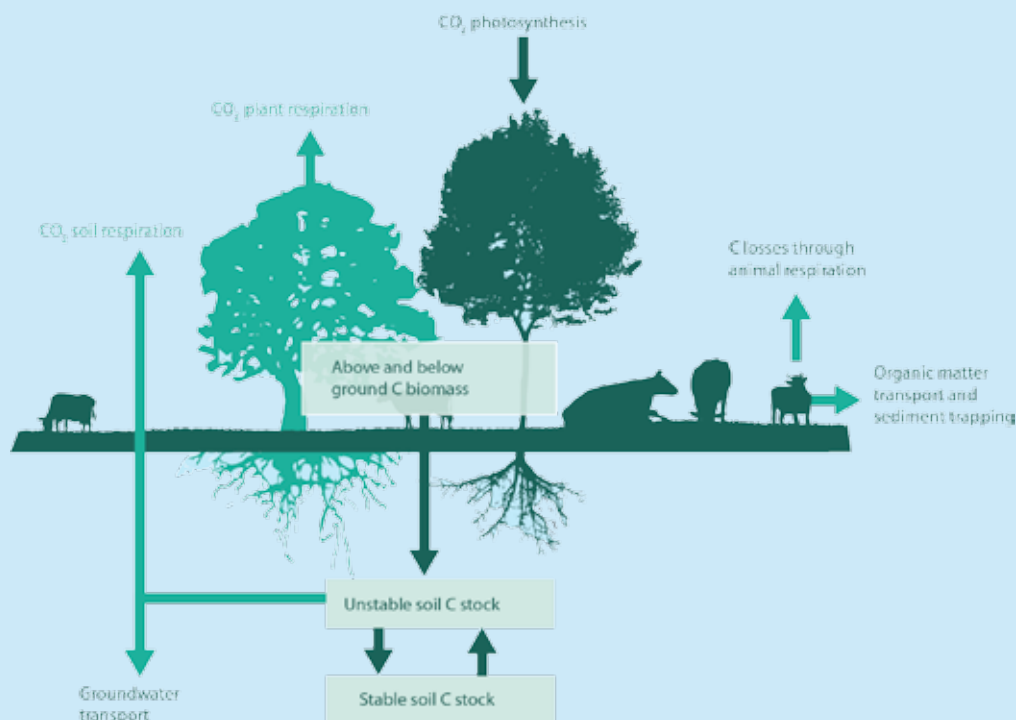




## Carbon sequestration – how does it work?

Land-based ecosystems can be a sink of carbon when the pace of CO<sub>2</sub> fixation through photosynthesis exceeds respiration and organic matter oxidation. However, if the opposite happens the process will be reversed and the ecosystem will be a source of carbon dioxide. Any carbon sequestered can easily return to the atmosphere, if land is overgrazed, trees felled, biomass burned, or carbon-rich peat soils are drained or ploughed up.

Another important aspect of carbon sequestration is that the process will reach equilibrium after a while. This happens when the amount of carbon sequestered equals the amount released through different degradation processes. The equilibrium is different for different ecosystems and if the land



use is changed it may take some years, decades or even a century before a new equilibrium is reached. There is a risk of presenting unrealistic figures when the high levels of carbon sequestration

that can sometimes be observed when a baseline condition for an ecosystem is altered are extrapolated as a general figure for all similar ecosystems over a long period of time.

most of the biodiversity. Most is improved grasslands and pastures. And most of it would turn to forest if left unmanaged.

There is some evidence that grasslands can store more carbon than forests. But in most regions forests are better than grasslands at storing carbon. Boreal forests are the ecosystems with the greatest per hectare capacity, only outperformed by wetlands. Meaning that from a narrow climate perspective the best approach would be to grow food on as small an area as possible and afforest all remaining land.

Another aspect is that grass-fed ruminants only contribute to a fraction of all meat and milk. The animals that are only fed on grass contribute just one gram of protein per person per day. Though there are also animals in mixed agricultural systems, often a greater part of their feed comes from other sources. It is hard to put a figure on this, but some of the protein produced in those systems should also be attributed to grass. Nevertheless, it is reasonable to assume that ruminants feeding on grasslands only make a minor contribution to global human nutrition. The

entire animal livestock sector contributes to 27 grams of protein per person per day and most protein in human diets comes from plant sources. There are naturally local exceptions, especially for people living on marginal lands for whom grazing livestock can be a vital source of nutrition.

Another common argument in support of grass-fed livestock is that their methane emissions are “natural”, since they have been preceded by wild ruminants in historic and prehistoric times. In one study, it was found that during the late Pleistocene, 12–13,000 years ago, the emissions of the existing megafauna were virtually equivalent to those of farmed animals today. When they died out and forests spread over the northern hemisphere this caused a cooling effect on the climate. Smaller cooling effects have been observed following the mass bison slaughter and after the greatest outbreak of African Rinderpest, both in the 1800s. The authors note that although the notion of some kind of prehistoric ecological baseline might be interesting, “its relevance to the challenges we face

today is negligible”. A more important conclusion from these studies is that the number of ruminants has a significant effect on our climate.

The report also discusses whether the other two greenhouse gases emitted by the livestock sector, methane and nitrous oxide, should be seen as more important or less important greenhouse gases. On the one hand, they are more potent per tonne than carbon dioxide, but on the other hand they are less stable and have a shorter lifetime in the atmosphere. That means that measures to reduce methane and nitrous oxide can have quite a big effect in the short term. But if these measures are taken instead of reducing carbon dioxide emissions the effects will be worse in the long run. The sound conclusion reached by the authors is that we are not really in a position where we can pick and choose. More or less all means available should be used to combat climate change.

Kajsa Pira

The report “Grazed and confused” by the Food and Climate Research Network: <http://www.fcrrn.org.uk/projects/grazed-and-confused>



CINTY IONESCU - FLICKR.COM/CC BY-NC

# Humans can only survive below a threshold of 35°C

Middle East, North Africa and Southern European levels of intense heat could make outdoor work very difficult this century and human life impossible around the Arabian Gulf.

**A study in** the science magazine *Nature* explains that the human body may be able to adapt to extremes of dry-bulb temperature (commonly referred to as simply temperature) through perspiration and associated evaporative cooling provided that the wet-bulb temperature (a combined measure of temperature and humidity or degree of ‘mugginess’) remains below a threshold of 35°C. This threshold defines a limit of survivability for a fit human under well-ventilated outdoor conditions and is lower for most people. Using an ensemble of high-resolution regional climate model simulations, the study projects that extremes of wet-bulb temperature in the region around the Arabian Gulf are likely to approach and exceed this critical threshold under the business-as-usual scenario of future greenhouse gas concentrations. The results expose a specific regional hotspot where climate change, in the absence of significant mitigation, is likely to severely impact human habitability in the future.

Other studies show that rising temperatures will affect the health and productivity of workers in Europe as

well as in the world’s hottest regions, CNW reports. We are hot, we are tired, and we work less, the studies say. Rising temperatures caused by climate change that result in higher temperatures in the workplace will also lead to a significant drop in economic productivity. Ongoing studies into the impact of rising temperatures on various economic sectors suggest that the productivity reduction could be up to 25 per cent in some cases for workers in agriculture, transport, construction, manufacturing and tourism across Europe. Economic productivity will drop not only in parts of the world already experiencing extreme heat – such as southern Europe, the Middle East and the southern states of the US – but also in countries and companies in northern Europe, which could see big drops in economic output.

Recent results from time and motion studies looking at agriculture in Cyprus showed that the working hours of labourers in the sector dropped by 25 per cent when temperatures reached 35°C when compared to temperatures of 25°C or less. Increasing temperatures also led to more work-related accidents. The researcher say

that previous estimates suggesting that rising global temperatures will result in declines in overall global productivity of between one and two per cent were too conservative.

Rising temperatures have been blamed for an increase in mortality rates among foreign workers involved in construction projects in the Gulf state of Qatar.

A 2016 study by scientists at Germany’s Max Planck Institute concluded that across much of the Middle East and North Africa levels of intense heat will make any outdoor work virtually impossible by mid-century, CNW reports.

Compiled by Reinhold Pape

#### Sources:

Nature Climate Change, 26 October 2015  
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<http://climatenewsnetwork.net/rising-temperatures-cut-economic-output/>



# Energy efficiency has multiple benefits

**Reducing energy waste** through appropriate energy efficiency measures is the most direct way to reduce greenhouse gas emissions, says Climate Action Network Europe. Moreover, energy efficiency offers multiple benefits that go beyond greenhouse gas emission reductions, such as lower dependency on energy imports, job creation and improved health. The impact assessment accompanying the EU Commission's proposal to revise the Energy Efficiency Directive shows that higher levels of ambition deliver significantly greater benefits.

Thanks to the EU Energy Efficiency Directive (EED), member states have to save energy that corresponds to 1.5 percent of energy sold to consumers every year. On the ground, this can translate into support for home insulation, double-

glazing installation, or more efficient appliances and heating systems. Strong action on energy efficiency is absolutely necessary for achieving the goals of the Paris Agreement. Energy efficiency is the most direct way to reduce greenhouse gas emissions. It is clear that the European Commission's proposal for an EU binding 30 per cent energy efficiency target for 2030 does not maximise the benefits for citizens and society. A binding energy savings target of at least 40 per cent is needed to substantially improve EU energy security, create jobs and reduce pollution. A higher energy efficiency target also facilitates the transition towards a 100 per cent renewable energy system.

Source: Briefings from Dora Petroula, Energy Savings Policy Coordinator at Climate Action Network Europe

Energy efficiency is the most direct way to reduce greenhouse gas emissions.



NBT NATURAL BUILDING TECHNOLOGIES - FLICKR.COM/CC-BY-ND

# Climate change will force mass migration of 1 billion people by 2100

**The Asian Development Bank (ADB)** and the Potsdam Institute for Climate Impact Research (PIK) released in summer 2017 a joint report entitled "A Region at Risk: the Human Dimensions of Climate Change in Asia and the Pacific", which showed that the region faces severe consequences for the environment, economy and human living conditions as a result of climate change.

Massive migration is foreseen all over the world by the end of the century, with the Asia-Pacific region identified as the most vulnerable if the current climate change scenario does not improve.

"Migration is happening all the time, but with unabated global warming ... we'll have to move over a billion [people]," said

Professor Hans Joachim Schellnhuber, director of climate science research institute PIK in a press conference.

According to the report, a temperature increase of 6°C above pre-industrial times is projected for some parts of Asia and the Pacific by the year 2100. Such increases in temperature will lead to drastic changes in the region's weather systems, agriculture and fisheries, biodiversity, trade and urban development.

A summer heat wave known as a 3-sigma event that happens once in 740 years, and an event stronger than a 5-sigma event that occurs once in 3 million years, could become commonplace in tropical countries such as those of Southeast Asia by the late 21st century.

The living conditions that result in the tropics would make it almost impossible for people to live outside, prompting migration on a massive scale.

The following six Asia-Pacific territories are the most susceptible to climate change-related migration: Bangladesh, which has the world's largest delta, the Philippines archipelago, China, which suffers from droughts, the Mekong Delta, which faces a serious food security issue, the flood-prone Indus Delta, and small island states like Tuvalu, Maldives and Fiji.

Source: <http://www.eco-business.com/news/climate-change-will-force-mass-migration-of-1-billion-by-2100/>





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# Global energy systems based on 100% renewables

**Accelerated deployment of renewables and energy efficiency can achieve around 90% of carbon emission reductions in the energy sector.**

**In November 2017**, the Energy Watch Group presented a study that models a global transition to 100 per cent renewable electricity. The study, “Global Energy System based on 100% Renewable Energy – Power Sector”, shows that existing renewable energy potential and technologies, including storage, can generate sufficient and secure power to cover the entire global electricity demand by 2050. With favourable political frameworks, this transition can be realised even earlier. As costs for renewable energy keep falling, and emerging markets lead in green energy investment, a global power system fully based on renewable energy is no longer a long-term vision, says the Energy Watch Group. The cost of wind turbines has fallen by nearly a third since 2009 and that of solar PV modules by 80 percent. Renewable energy is now the most affordable source of power in many parts of the world, offering reliable opportunities for countries to decarbonise their energy sector and reach climate objectives.

Reuters reported in October that solar power costs will fall by another 60 per cent over the next decade, giving an already booming market another boost, according to the head of the International Renewable Energy Agency (IRENA). Solar power is in the midst of a boom because of sharp drops in costs and improvements in efficiency, pushing global capacity from virtually zero at the start of the century to 300 gigawatts (GW) by the end of 2016, a figure expected to rise again by 2020. IRENA expects 80 to 90 GW of new solar capacity, enough to power more than eight billion LED light bulbs, to be added globally each year over the next five to six years, Adnan Amin, the director general of IRENA told Reuters.

Stanford University’s atmosphere and energy programme reports in the journal

Joule that their roadmaps to a new energy world free of fossil fuels and nuclear energy can be achieved without the mining, transporting or processing of fuels. They say it would also create a net gain of 24 million long-term jobs, all by 2050, save up to seven million lives each year and at the same time limit global warming to 1.5°C. According to their roadmaps, 139 nations could be 80 per cent complete by 2030 and entirely committed to renewable sources by 2050. Jobs lost in the coal and petroleum industries would be more than compensated for by growth in the renewable sectors, and in the end, there would be more than 24 million new jobs worldwide. The switch to renewables would require massive investment, but the overall cost would be one fourth of what fossil fuel dependency already costs the world.

**Another study recently** published in the Proceedings of the US National Academy of Sciences, argues that there’s enough energy over the oceans to power all of human civilisation with wind alone. The reason offshore wind power has so much more potential than land-based wind farms is that wind speeds can be as much as 70 per cent higher over the sea. The study found that it would take a three-million-square-kilometre wind installation over the ocean to provide all of humanity’s current power needs, or 18 terawatts. That’s a lot of turbines; it would need to cover an area roughly the size of Greenland. Still, it’s possible.

IRENA also argues that by 2050, the accelerated deployment of renewables and energy efficiency can achieve around 90 per cent of carbon emission reductions in the energy sector necessary to keep the global average temperature rise to well below 2°C above pre-industrial levels – in line with the Paris Agreement. To put

the world on a pathway to limiting global warming to well below 2°C, investment in renewables needs to reach on average USD 790 billion per year between 2017 and 2030. In 2016, roughly USD 270 billion was invested in renewable energy. More new jobs are being created in renewables than in all fossil fuel technologies combined. Around 9.8 million people work in renewable energy today. This number is expected to double in the next ten years. Under a decarbonisation scenario, global GDP could be boosted by roughly 0.8 percent in 2050 according to IRENA.

Compiled by Reinhold Pape

Sources:

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# Fossil gas is not a bridge to a clean energy future

The climate cannot afford Europe's gas addiction and NGOs are campaigning strongly against fossil gas projects.

**Civil society organisations** are trying to stop the building of new fossil gas fired power stations and pipelines all over Europe. Special efforts have also been made in recent months to stop the establishment of Liquefied Natural Gas (LNG) terminals in various harbours in European countries, for instance in Gothenburg, Sweden. One of the business plans is that fossil gas from fracking in the USA, from Norway and the Middle-East is exported to Europe and is used by countries that are not so well connected to international fossil gas pipelines. The transportation of LNG increases its climate change impact by an average of 20 per cent and up to 134 per cent, says Friends of the Earth Europe, which recently released a new scientific study. It also answers the question of whether fossil gas offers a solution for compliance with the climate Paris Agreement objectives and could serve as a transition fuel.

"Recent empirical studies of fossil fuel producing areas have found official methane emissions levels reported by governments to be large underestimates: On average, official inventories would be between 50 and 60 per cent below actual levels of emissions. Methane emissions are at dangerously high levels, as high as the 'top end' of IPCC scenarios," says the study.

The study argues that "the Paris Agreement and equity commitments demand a minimum reduction in EU energy-only carbon emissions of around 95 per cent by 2035, which means no substantial role beyond 2035 for fossil fuels – including natural gas – in

an EU energy system compatible with staying below 2°C."

The study, conducted by the Tyndall Centre for Climate Change Research, shows "that EU countries can afford just nine more years of burning gas and other fossil fuels at the current rate before they will have exhausted their share of the Earth's remaining carbon budget for maximum temperature rises of 2°C. Even with a managed phase-out, fossil fuels including natural gas, can have no substantial role beyond 2035 in an EU energy system compatible with 2°C. The findings are a stark reminder of the urgency with which Europe, as a region historically responsible for climate change, needs to shift to an energy system free from fossil fuels".

This warning comes as the EU is poised to publish a list of 55 new major gas projects it is considering for public funding. In the last three years, the EU has granted more than one billion euro in public finance to gas projects.

**The analysis says** that "there is categorically no role for bringing additional fossil fuel reserves, including gas, into production. Considering both carbon dioxide and methane emissions, an urgent programme to phase out existing natural gas and other fossil fuel use across the EU is an imperative of any scientifically informed and equity-based policies designed to deliver on the Paris Agreement."

"Europe needs to urgently quit gas if

it is to reduce greenhouse gas emissions to internationally agreed levels", the new science shows. Under the terms of the Paris climate agreement, gas and other fossil fuels would need to be phased out even faster. Because of the high levels of both CO<sub>2</sub> and methane emissions throughout the gas lifecycle, the authors conclude that "an urgent programme to phase out existing natural gas and other fossil fuel use across the EU is an imperative". Jagoda Munic, director of Friends of the Earth Europe, said: "Europe's infatuation with gas is totally incompatible with serious action on climate change. The oil and gas industry is going all out to paint gas as green and keep us hooked on fossil fuels, but the truth is there is absolutely no room for gas in the transition we need to a clean energy future. Europe needs to urgently get off all fossil fuels, realise the full potential of energy savings, and go for a 100 per cent renewable system in the hands of people." Professor Kevin Anderson, of the Tyndall Centre for Climate Change Research and Teesside University, said: "If the EU is to transform its energy system to align with the Paris temperature and equity commitments, it cannot continue with business as usual and must instead initiate a rapid phase out of all fossil fuels including natural gas. This needs to begin now and be complete within the coming two decades."

This is not such a difficult task since energy production from sun and wind is already cheaper than that from fossil gas.

Compiled by  
Reinhold Pape

Source: "Can the climate afford Europe's gas addiction?" by Friends of the Earth Europe; the research report, "Natural gas and climate change", by Anderson and Broderick, Brussels, 7 November 2017

Action outside COP23  
"gas is unsustainable in sustainable, fossil-free future."



# Harmful air pollution hits urban citizens

Air quality in Europe is slowly improving, but excessive levels of tiny particles are still responsible for more than 400,000 premature deaths every year.

In its annual air quality report the European Environment Agency (EEA) presents new estimates of the health impacts of air pollution based on official data from more than 2,500 monitoring stations across Europe in 2015.

The data show that air quality in Europe is slowly getting better (see figure), but despite these improvements high concentrations of air pollutants, particularly in urban areas, still have significant health impacts, with particulate matter (PM), nitrogen dioxide (NO<sub>2</sub>) and ground-level ozone (O<sub>3</sub>) causing the greatest harm.

Moreover, almost all city dwellers continue to be exposed to pollutants at levels deemed unsafe by the World Health Organization (WHO). In 2014, around nine out of ten urban citizens in the EU were exposed to PM<sub>2.5</sub> and ozone levels above the WHO guideline values. See Table 1.

In the 41 countries considered, 428,000 premature deaths in 2014 were attributed to PM<sub>2.5</sub> exposure and 78,000 and 14,400

premature deaths to nitrogen dioxide and ozone exposure, respectively. In the EU28, the numbers of premature deaths attributed to PM<sub>2.5</sub>, NO<sub>2</sub> and O<sub>3</sub> exposure were 399,000, 75,000 and 13,600, respectively.

Table 2 shows country-by-country the best-estimate figures for total mortality due to exposure to each of the three pollutants, for all the European countries included in the analysis.

The report also provides country-by-country data on the estimated number of years of life lost (YLL) and the YLL per 100,000 inhabitants due to exposure to the different pollutants.

When considering YLL per 100,000 inhabitants due to PM<sub>2.5</sub>, the largest impacts are observed in the central and eastern European countries, which is also where the highest concentrations are observed, i.e. Bulgaria, Kosovo, Macedonia, Poland, Serbia, Hungary, Romania, the Czech Republic, and Slovakia.

The largest health impacts attributable to NO<sub>2</sub> exposure, expressed as YLL per

100,000 inhabitants, are found in Italy, Serbia, Belgium, the UK, and Germany. Regarding ozone, the countries with the highest rates of YLL per 100,000 inhabitants are Greece, Italy, Malta, Slovenia, and Croatia.

It should be noted that the impacts estimated for each pollutant may not be added to determine the total impact attributable to exposure to the three pollutants. Because concentrations – especially those of PM<sub>2.5</sub> and NO<sub>2</sub> – are correlated, additions may result in double counting.

**On top of** the health impacts, air pollution continues to damage vegetation and ecosystems. Elevated concentrations of ground-level ozone damage agricultural crops, forests and plants by reducing photosynthesis. In 2014, the EU's long-term objective for the protection of vegetation was exceeded in 86 per cent of the total EU agricultural area, and the critical level for the protection of forests was exceeded in 68 per cent of the total EU forest area.

Almost all city dwellers are exposed to pollutants at levels deemed unsafe by WHO.





Table 1. Percentage of EU urban population exposed to air pollutant concentrations above EU and WHO reference levels (2013–2015).

Pollutant	EU reference value (µg/m³)	Exposure estimate (%)	WHO air quality guideline (µg/m³)	Exposure estimate (%)
PM <sub>2.5</sub>	Year (25)	7–8	Year (10)	82–85
PM <sub>10</sub>	Day (50)	16–20	Year (20)	50–62
O <sub>3</sub>	8-hour (120)	7–30	8-hour (100)	95–98
NO <sub>2</sub>	Year (40)	7–9	Year (40)	7–9
BaP	Year (1 ng/m³)	20–25	Year (0.12 ng/m³)	85–91
SO <sub>2</sub>	Day (125)	< 1	Day (20)	20–38

Colour coding: < 5% 5–50% 50–75% > 75%



Figure: Percentage of EU urban population exposed to air pollutant concentrations above WHO air quality guidelines (2000–2015)

Excess deposition of sulphur and nitrogen compounds (from emissions of SO<sub>2</sub>, NO<sub>x</sub>, and NH<sub>3</sub>) contribute to the acidification of soil, lakes and rivers, causing the loss of biodiversity. In 2014, seven per cent of the European ecosystem area was exposed to acidifying depositions exceeding the limits of nature's tolerance.

Emissions of NH<sub>3</sub> and NO<sub>x</sub> also disrupt land and water ecosystems by introducing excessive amounts of nutrient nitrogen, causing eutrophication, the oversupply of nutrients, with resulting impacts on biodiversity. In 2014, about 70 per cent of Europe's ecosystem area was exposed to nitrogen deposition exceeding the critical eutrophication limits.

**This year's report** also puts special focus on agriculture, which is an important source of air pollutants (NH<sub>3</sub>, PM<sub>10</sub>, PAHs, and NMVOCs) and of greenhouse gases (CH<sub>4</sub> and N<sub>2</sub>O). For example, in 2015, 94 per cent of EU ammonia emissions stemmed from agriculture.

The impact of agricultural emissions on human health is mainly linked to particles, both to primary PM emissions and to the formation of secondary PM from gaseous precursors, mainly ammonia.

A wide range of actions, including technically and economically viable measures, are available to reduce emissions from agriculture but have yet to be adopted at the scale and intensity needed, the report notes. Moreover, measures to abate ammonia would be more effective if they targeted primarily a small number of larger industrial-scale farms, considering that 80 per cent of the EU's ammonia emissions are generated by less than 10 per cent of the farms.

Christer Ågren

The report "Air quality in Europe – 2017 report" (EEA Report No. 13/2017) is available at: [www.eea.europa.eu](http://www.eea.europa.eu)

Table 2. Estimates of premature deaths attributable to exposure to PM<sub>2.5</sub>, O<sub>3</sub> and NO<sub>2</sub> in 41 European countries.

	PM <sub>2.5</sub>	O <sub>3</sub>	NO <sub>2</sub>
Austria	5,570	260	1,140
Belgium	8,340	190	1,870
Bulgaria	13,620	200	740
Croatia	4,430	180	300
Cyprus	600	30	20
Czech Rep.	10,810	310	550
Denmark	3,470	110	130
Estonia	750	20	10
Finland	2,150	60	40
France	34,880	1,630	9,330
Germany	66,080	2,220	12,860
Greece	11,870	570	1,660
Hungary	11,970	350	1,210
Ireland	1,480	20	10
Italy	59,630	2,900	17,290
Latvia	2,190	50	60
Lithuania	3,350	70	60
Luxembourg	230	10	40
Malta	220	20	10
Netherlands	11,200	250	2,560
Poland	46,020	970	1,700
Portugal	5,170	280	610
Romania	23,960	350	1,860
Slovakia	5,160	160	100
Slovenia	1,710	80	60
Spain	23,180	1,600	6,740
Sweden	3,710	150	130
UK	37,600	590	14,050
<b>Total EU28</b>	<b>399,000</b>	<b>14,000</b>	<b>75,000</b>
Albania	1,670	60	90
Andorra	40		
Bosnia & Herz.	3,450	160	110
Iceland	80		
Kosovo	3,290	60	10
Lichtenstein	20		
Macedonia	3,060	50	60
Monaco	20		
Montenegro	550	20	
Norway	1,560	60	190
San Marino	30		
Serbia	10,770	190	1,380
Switzerland	4,240	220	980
<b>Total all</b>	<b>428,000</b>	<b>14,000</b>	<b>78,000</b>

EEA: Air Quality in Europe – 2017 report

# Electrification of road, air and sea transport

Industry is fast developing visions for an electrified transport system.

**German Chancellor** Angela Merkel last summer signalled support for an eventual ban on combustion engines, as planned by other European countries, such as France and the UK. In a televised interview with a public broadcaster Merkel said that the German car industry had to “see the writing on the wall” regarding the future of mobility. “Otherwise, foreign companies will come one day and show how it’s done, how e-cars are made. I would like to avoid that,” she said. A researcher connected to German carmaker Mercedes has evaluated worldwide sales figures for electric cars and their possible future growth. Figures have been recorded since 2011. At that time the Nissan Leaf was the first mass market electric car. Since then, the number of battery-powered electric cars sold has doubled every 15 months. This natural growth is described by an exponential function. If you select a logarithmic scale, the function appears as a straight line whose values can be read for the coming years. At this rate of growth, production would reach 100 million electric cars annually in 2026, which is expected to be the total global production.

But at present it is mostly combustion-engined cars running on fossil fuels that are sold in the EU. Sales of gasoline-powered cars have overtaken diesel in the first half of this year for the first time since 2009, industry association ACEA said. The shift saw gasoline car sales rise by nearly 10 per cent from the first half of 2016, compared with an approximate 4 per cent drop in diesel car sales. Diesel’s market share fell to 46.3 per

cent of new-car registrations from 50.2 per cent in the first half of last year. In absolute numbers, 152,323 fewer diesel cars were sold, ACEA said.

The drop was offset by an increase in gasoline car sales which accounted for 48.5 per cent of sales, up from 45.8 per cent. This translates into 328,615 extra gasoline cars sold year-on-year. Sales of “alternative” vehicles – hybrid, electric, LPG (liquefied petroleum gas) and natural gas-powered cars – also rose by more than 35 per cent to account for 5.2 per cent of total car sales. ACEA also called on governments to do more to promote “alternative” cars. Sales of hybrid electric vehicles rose 58 per cent in the first half, and electric car sales rose by 37 per cent, but these groups still account for just 2.6 per cent and 1.3 per cent, respectively, of total car sales. “More needs to be done to encourage consumers to buy alternatively-powered vehicles, for instance by putting in place the right incentives and deploying recharging infrastructure across the EU,” ACEA said.

**Concerning electrification of air traffic,** EasyJet announced last September that it could be flying electric planes powered by batteries rather than petroleum to destinations inside Europe including Paris and Amsterdam within a decade. The UK-based airline has linked up with US firm Wright Electric to build battery-powered aircraft for flights under two hours. EasyJet said the move would enable battery-powered aircraft to travel short-haul routes. Wright Electric is aiming for an aircraft range of 335 miles, which would cover the journeys of about a fifth of passengers flown by EasyJet. EasyJet said the aerospace industry

would follow the lead of the automotive industry in developing electric engines that would cut emissions and noise.

In the marine transport sector, one of the world’s leading technology companies, ABB, is now proposing an electric, digital, connected approach to shipping. With this new approach, ABB focuses on harnessing the full potential of its power, control and automation solutions through a programme of digital integration that will bring about a step change in vessel and fleet management, ABB said. “We believe the next generation of ships will be electric, digital and connected as the industry moves towards the use of new energy sources and automated ship operations.”

The automotive industry’s wider adoption of hybrid electric systems and autonomous control sets the stage for the anticipated developments in the maritime industry. Based on greater efficiency and sustainability, electric propulsion will become a maritime imperative rather than an alternative. Electric power plants on board vessels optimise fuel consumption, maximise operational flexibility and allow for new energy sources, such as batteries and fuel cells. There is already evidence of this in place. ABB just announced the delivery of the first fuel cell system for Royal Caribbean.

Compiled by Reinhold Pape

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Possible to plug-in air planes within a decade, according to EasyJet.

MARCO WERCH - FLICKR.COM/CC BY



# Italy's most polluting coal plant taken to court

**Italy's largest and dirtiest** coal plant is facing legal action by environmental lawyers. WWF Italy and ClientEarth claim the new permit for Enel's Federico II power plant in Brindisi is illegally allowing it to pollute above legal limits. The plant has undergone no environmental or health impact checks in 24 years, but has been granted permission to operate for another 11 years. If the case is successful, the plant could lose its permit to operate.

ClientEarth lawyer Ugo Taddei said: "It is scarcely believable that the authorities granted a new permit for this plant, completely ignoring clear evidence of the health impacts for the local population. Everyone has the right to live in a clean and healthy environment. Plant owners have a legal and moral obligation to ensure the best available techniques are

being used to protect people's health – we're fighting to uphold this obligation."

The Italian government recently announced a national coal phase-out, meaning that if it goes through, all plants in the country will have to be closed by 2025.

Taddei added: "The phase-out needs to happen as soon as possible, for the health of people and the planet. In the meantime, we cannot allow remaining coal power plants to break pollution rules."

More information on the Federico II plant can be found in the Europe Beyond Coal campaign's interactive map of Europe's coal plants: <https://beyond-coal.eu/data/>

Source: ClientEarth, 8 November 2017

<https://www.clientearth.org/clientearth-wwf-take-italys-polluting-coal-plant-court/>



The Brindisi coal power plant, in southern Italy, has been granted permission to operate for another 11 years, despite not having undergone an environmental impact check in 24 years.

# Greenhouse gas emissions from global shipping 2013–2015

**A new report** by the International Council on Clean Transportation (ICCT) that describes trends in global shipping activity and emissions for the years 2013 to 2015, found that emissions generally increased over this period, with efficiency improvements more than offset by increases in activity. Key findings include:

- Fuel consumption is increasing. Total shipping fuel consumption increased from 291 to 298 million tonnes (+2.4%) from 2013 to 2015.
- Shipping GHG emissions are increasing despite improvements in operational efficiency for many ship classes. Increasing emissions are being driven by rising demand for shipping and the associated consumption of fossil fuels.
- After carbon dioxide (CO<sub>2</sub>), black carbon (BC) contributes the most to the climate impact of shipping, representing 7 per cent of total shipping CO<sub>2</sub>-eq emissions on a 100-year timescale and 21 per cent of CO<sub>2</sub>-eq emissions on a 20-year time scale.

- Increases in efficiency have not reduced absolute CO<sub>2</sub> emissions from ships. Although the CO<sub>2</sub> intensity of many major ship classes decreased (i.e. they became more efficient) from 2013 to 2015, total CO<sub>2</sub> emissions from ships increased. Thus, increases in distance travelled due to a greater demand for shipping more than offset gains in operational efficiency during the period studied.

- The biggest ships are speeding up and emitting more. Whereas average ship cruising speeds remained largely unchanged between 2013 and 2015, the largest oil tankers and the largest container ships sped up and emitted more in 2015 than in 2013. If more ships follow suit and speed up, the CO<sub>2</sub> efficiency of the maritime transport sector will degrade.
- Absolute reductions in ship emissions will require concerted action to improve the energy efficiency of shipping and to develop and deploy alternative fuel and propulsion concepts. The only way to reduce emissions from ships without constraining demand is to substantially reduce the amount of greenhouse gases emitted per unit of transport supply.

Source: ICCT, 17 October 2017.

The report: <http://www.theicct.org/publications/GHG-emissions-global-shipping-2013-2015>

The biggest ships are speeding up and emitting more.



# Regulating ship speed could cut emissions by a third

Reducing the speed of three main ship types by 30 per cent could decrease annual CO<sub>2</sub> emissions by nearly 200 million tonnes.

**Emissions of the** main greenhouse gas carbon dioxide (CO<sub>2</sub>) from three ship types – container ships, bulkers and tankers – could be reduced by a third, on average, by reducing their speed, according to a new study that was presented to the International Maritime Organization (IMO) in October.

The cumulative emission savings from 2018 to 2030 from reducing the speed of these ships alone, would amount to around 2.5 gigatonnes – equalling as much as 12 per cent of shipping's total remaining carbon budget if the world is to remain below 1.5°C global temperature rise, according to environmental groups Seas At Risk and Transport & Environment, who commissioned the study from CE Delft.

Ship speed can be regulated either globally, unilaterally as a condition of entry into a port or as a condition to navigate in coastal waters, or bilaterally between ports in two states. The study concludes that in order to effectively reduce emissions, speed regulations should be mandatory and accompanied by an enforcement system that deters ships from not complying. Speed regulations should best be differentiated by ship type and size so that ships do not have to operate at technically challenging low loads and to avoid interfering with competition between ship types.

As slow steaming may have impacts on the competitiveness of countries that are far away from their main markets, the study analysed two cases of exports from South America to the EU. Even with very conservative assumptions, the impacts are modest – export values could be reduced by a few tenths of a per cent at most, and the overall economic impact would be

well below a tenth of a per cent for the whole of South America. Such impacts do not take account of the significant cost savings that accrue from reducing speed and burning less fuel, meaning that any speed regulation will likely provide a net financial benefit.

Moreover, reducing operational speed would provide a boost to jobs and growth in shipbuilding nations, where production would have to grow by over 30 per cent in order to maintain transport capacity for global trade.

The three ship types analysed jointly account for more than half of global shipping's carbon footprint. Substantial additional savings will be made if the speed of the remainder of the fleet is also reduced.

At the meeting of the IMO's Working Group on greenhouse gases in October, calls for urgent action to reduce ships' emissions were met with resistance from many states and big industry groups. A group of Pacific Island and mainly European states clashed repeatedly with those saying that decisions on immediate measures should await the final iteration of the IMO's comprehensive greenhouse

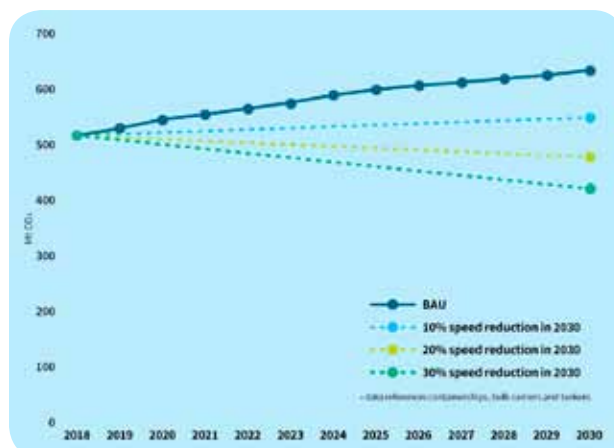


Figure: Global CO<sub>2</sub> emissions up to 2030 from container ships, bulkers and tankers under the business-as-usual (BAU) scenario and under three different speed regimes.

gas strategy in 2023, rather than be part of the initial strategy in 2018.

Environmental organisations concluded that operational speed reduction is the only measure on the table that can deliver the substantial and immediate short-term emissions reductions that the Paris agreement demands.

John Maggs, senior policy advisor at Seas At Risk and president of the Clean Shipping Coalition, said: "Can a strategy that doesn't prioritise emissions reductions in the next six years be considered 'comprehensive' or indeed fit for the urgent purpose of tackling the climate crisis? We don't think so. The IMO meeting heard that ship greenhouse gas emissions are rising again and need to peak soon, but key flag states and developing countries blocked an agreement to prioritise and develop measures for immediate short-term emission reductions."

The initial IMO greenhouse gas strategy is due to be finalised in April 2018.

Christer Ågren

Table: Average annual CO<sub>2</sub> emission savings in the period 2018–2030 (million tonnes)

	Speed reduction		
	10%	20%	30%
Container fleet	34	62	85
Dry bulk fleet	32	59	83
Crude & product tanker fleet	10	19	25
Total	76	140	193

Source: T&E News, 18 and 30 October 2017.

The report "Regulating speed: a short-term measure to reduce maritime GHG emissions" (October 2017) by J Faber, T Huigen and D Nelissen. CE Delft ([www.cedelft.eu](http://www.cedelft.eu)).





# New NGO coalition wants to end coal in EU by 2030

In early November a wide coalition of environmental organisations launched a campaign to make Europe coal-free by 2030. The groups have issued a five-point policy plan for EU lawmakers and called on EU governments, cities, companies, banks and investors to cement their plans to move out of coal before the 2018 international climate meeting in Katowice, Poland. The five key points are:

1. Stop coal subsidies;
2. Fix the Emission Trading System;
3. Support the Just Transition;
4. Stop wasting energy and commit to 100% renewables; and,
5. Enforce and strengthen EU protections on air quality.

Since 2016, “Europe Beyond Coal” groups have

helped retire 16 coal plants, and 39 more are to close, with the governments of the Netherlands, the United Kingdom, Finland, France, Portugal and Italy all committing these countries to being coal-free by 2030 at the latest. The campaign is focussing its efforts on turning these government coal

phase-out announcements into action, and hastening the closure of the EU’s 293 remaining plants.

Climate Action Network (CAN) Europe, ClientEarth, European Environmental Bureau, Greenpeace, and the Health and Environment Alliance (HEAL) are among 37 groups to have signed the “Europe Beyond Coal” manifesto.

Source: Europe Beyond Coal news release, 2 November 2017. <https://beyond-coal.eu>

NGO policy recommendations: [http://eeb.org/wp-admin/admin-ajax.php?juwpfisadmin=false&action=wpfd&task=file.download&wpfd\\_category\\_id=113&wpfd\\_file\\_id=64162&token=05ea34161b11a990abdda55fc225d45d&preview=1](http://eeb.org/wp-admin/admin-ajax.php?juwpfisadmin=false&action=wpfd&task=file.download&wpfd_category_id=113&wpfd_file_id=64162&token=05ea34161b11a990abdda55fc225d45d&preview=1)



# The biggest polluters

New report shows just 100 companies are source of over 70% of carbon dioxide emissions.

**New research from** CDP reveals that 71 per cent of all global GHG emissions since 1988 can be traced to just 100 fossil fuel producers. This group is the source of 635 billion tonnes of GHGs emitted since 1988, the year human-induced climate change was officially recognised. The data also shows that 32 per cent of these legacy emissions come from companies that are public investor-owned, highlighting the power of investors in the transition to a sustainable economy. CDP is a not-for-profit charity that runs the global disclosure system for investors, companies, cities, states and regions to manage their environmental impacts.

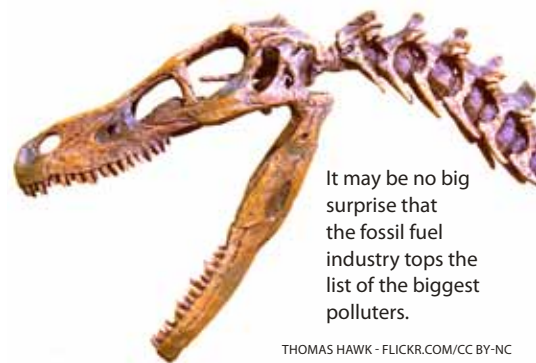
The Carbon Majors report has been produced using the most comprehensive dataset of historic company-related greenhouse gas emissions produced to date.

The report also shows that these global-scale emissions are concentrated over a small number of producers. From 1988 to 2015, just 25 fossil fuel producers are linked to 51 per cent of global industrial

GHG emissions. The highest emitting companies over the period since 1988 include:

- Public investor-owned companies such as ExxonMobil, Shell, BP, Chevron, Peabody, Total, and BHP Billiton;
- State-owned entities such as Saudi Aramco, Gazprom, National Iranian Oil, Coal India, Pemex, CNPC and Chinese coal, of which Shenhua Group & China National Coal Group are key players.

**Looking further back** in time, the report also points towards a doubling in the contribution of fossil fuels to climate change since 1988. All fossil fuel company operations and products worldwide have released more emissions in the last 28 years than in the 237 previous years: 833 Gt CO<sub>2</sub>e in the 28-year period from 1988 to 2015, compared with 820 Gt CO<sub>2</sub>e in the 237 years between 1988 and the birth of the industrial revolution, measured from 1751. Including all historical years of data, the database captures nearly one trillion



tonnes (923 billion) of GHGs from the 100 producers, which amounts to 52 per cent of all industrial GHGs ever emitted.

If the trend in fossil fuel extraction continues over the next 28 years as it has over the last 28, global average temperatures would be on course to rise by 4°C by the end of the century.

Compiled from press release  
by Reinhold Pape

Carbon majors report 2017 <https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions>



Studded tyres are one of the targets in the Icelandic air pollution programme.

ROYAL BROIL - FLICKR.COM/CC BY-SA

## Iceland aims for zero

Iceland has published a national air pollution control programme, under which they aim to cut the number of days per year when particulates from traffic exceed health limits from the current 7-20, to zero. Increased duties on diesel, levies on studded tyres and more frequent dust binding on roads are part of the package.

Despite having Europe's lowest levels of fine particles (PM<sub>2.5</sub>) and nitrogen dioxide (NO<sub>2</sub>) as well as a small population, the country still has 80 deaths a year that can be attributed to air pollution.

Source: ENDS Europe Daily, 24 November 2017.

# Mayors want drastic EU measures to cut car emissions

The mayors of nine EU capitals have asked the EU institutions to adopt tougher mandatory legislation to minimise air pollution from cars, including a new Euro 7 "technologically neutral" standard for vehicles, and that all vehicle sales be "zero emissions" in the coming two decades.

In a letter dated 25 October 2017, the mayors of Paris, Rome, Amsterdam, Madrid, Copenhagen, Brussels, Helsinki, Vienna and Sofia wrote to the European Commission, the Council and the

European Parliament, saying that they need "new tools" to cut air pollution and CO<sub>2</sub> emissions from public transport fleets and private vehicles.

They argue that zero-emission cars, vans and buses are the future solution for cities to provide clean, energy-efficient and affordable transport for their citizens, and call among other things for the introduction of mandatory sales targets for electric vehicles and a Euro 7 emissions limit that would be technologically neutral.

Source: euractiv.com, 7 November 2017.



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# EU "clean mobility" package presented

On 8 November the European Commission proposed a legislative package aimed at reducing CO<sub>2</sub> emissions in road

transport and encouraging the uptake of electric cars. Under the proposal, average CO<sub>2</sub> output from new cars and vans should fall by 30 per cent by 2030.

The proposal sets an intermediate target of a 15 per cent CO<sub>2</sub> emissions cut by 2025, based on the average emissions from a manufacturer's entire fleet of vehicles registered in a given year. The percentage reductions are calculated from base year 2021, by which time current regulations

stipulate average emissions should not exceed 95 grams of CO<sub>2</sub> per kilometre for new cars, or 147 g/km for vans.

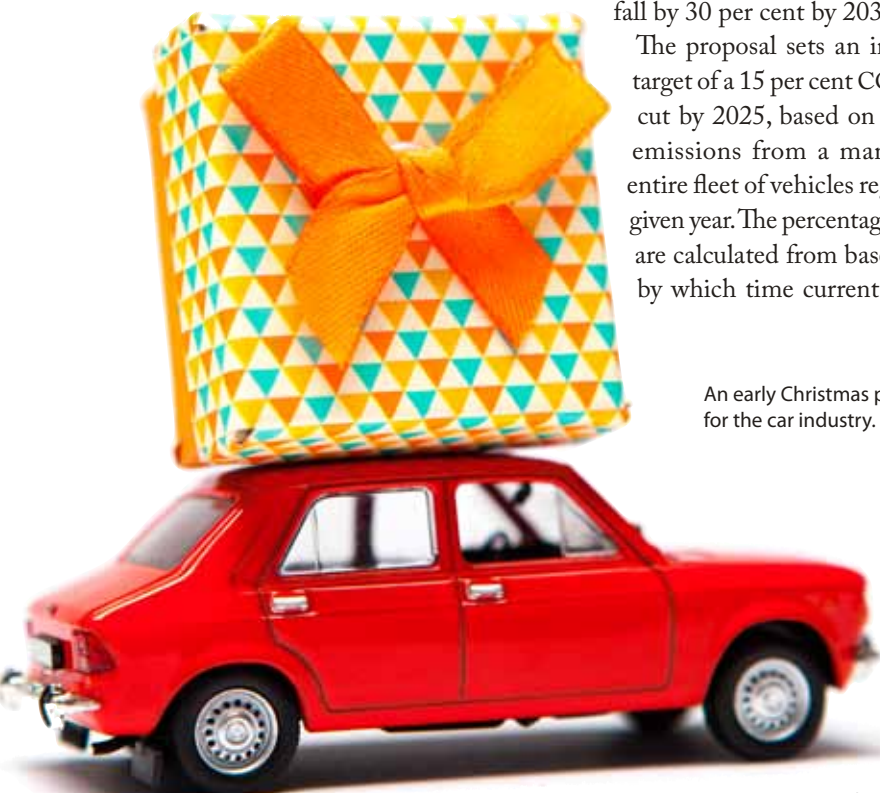
Rather than a production quota to boost the production of electric and other clean vehicles, the proposal relies on an incentive mechanism.

Environmental group Transport & Environment commented that the 30-per-cent target would only cover a third of the emissions cuts needed in the sector by 2030, and the package was an "early Christmas present" for the car industry.

The proposal will now be considered by the European Council and Parliament, which will suggest their own changes before a final compromise is struck, probably in early 2019.

Source: Ends Europe Daily, 8 November 2017.

Commission's proposal: [https://ec.europa.eu/clima/policies/transport/vehicles/proposal\\_en](https://ec.europa.eu/clima/policies/transport/vehicles/proposal_en)



An early Christmas present for the car industry.



# Excess diesel NOx causes 5,000 deaths per year

Every year about 7,500 lives could have been saved in the EU if diesel cars had emitted as little NOx as petrol cars.

Over the last 25 years, the share of diesel cars in the EU increased dramatically, from 15 to more than 50 per cent of new car sales. There are now more than 100 million diesel cars running in the EU, twice as many as in the rest of the world together.

Despite the introduction of gradually stricter EU emission standards, emissions of nitrogen oxides (NOx) from diesel cars are significantly higher than those from petrol cars. In fact, in real-world driving, diesel car NOx emissions are even much higher than in the official certification tests – on average emissions on the road are four to seven times higher.

In a new study, researchers at the International Institute for Applied Systems Analysis (IIASA) and the Norwegian Meteorological Institute (NMI) have calculated the premature deaths from these excess NOx emissions for the population in all EU countries plus Norway and Switzerland in 2013.

NOx is a precursor to fine particulate matter (PM<sub>2.5</sub>), which is a key health-damaging air pollutant responsible for more than 400,000 premature deaths annually in the EU28, Norway and Switzerland. The study estimates that roughly 10,000 premature deaths annually can be attributed to NOx emissions from diesel cars, vans and light commercial vehicles. About half – around 5,000 premature deaths annually – are due to NOx emissions being much higher than limit values in real-world driving.

Excess concentrations of nitrogen dioxide (NO<sub>2</sub>) can also have direct health impacts, but as these to some extent overlap with the impacts from PM<sub>2.5</sub>, they were not included in the analysis.

The countries with the highest number of premature deaths at-

tributable to PM<sub>2.5</sub> from diesel cars' NOx emissions are Italy, Germany and France, due to the high number of diesel cars and their large populations. However, the risk per capita varies between countries and is almost twice as high in Italy as in France.

“Had diesel cars met the EU emission standards, almost 5,000 premature deaths per year could have been avoided,” said Jens Borken-Kleefeld, transportation expert at IIASA. “And if diesel car NOx emissions were as low as those from petrol cars, about 7,500 premature deaths per year could have been avoided.”

The authors point out that they believe that the calculated impacts are probably a lower estimate, because recent findings indicate that the officially reported NOx emissions from diesel cars are likely to be revised upwards.

It should be noted that road transport contributes about 40 per cent of total NOx emissions in the EU, and the high NOx emissions from diesel cars is one of the main reasons why several countries,

including Germany, France, Austria, Belgium and Ireland, consistently have failed to achieve their binding national emission ceilings under the EU's NEC directive and the Gothenburg Protocol.

Moreover, exceedances of the EU air quality limits for NO<sub>2</sub> occur mostly in heavily trafficked areas and have to a large part been attributed to emissions from diesel vehicles.

Christer Ågren

Source: IIASA News, 18 September 2017.

The study: “Impact of excess NOx emissions from diesel cars on air quality, public health and eutrophication in Europe.” By J.E. Jonson, J. Borken-Kleefeld J, D. Simpson, A. Nyiri, M. Posch, and C. Heyes. 2017. *Environmental Research Letters* 12: e094017. DOI:10.1088/1748-9326/aa8850



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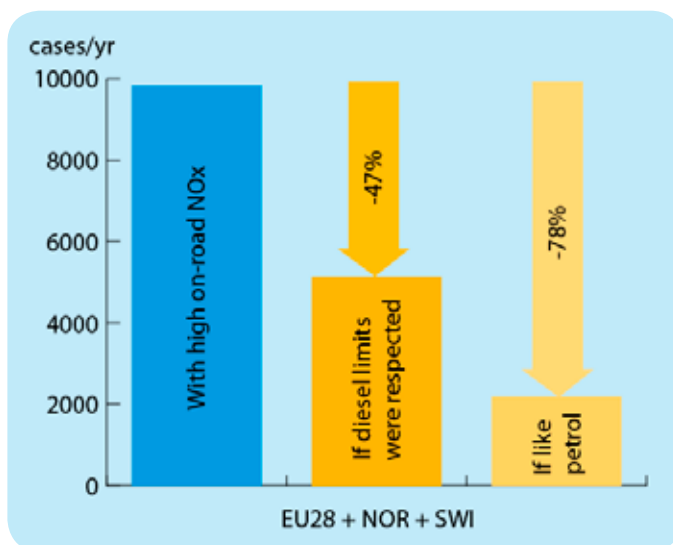


Figure: Premature deaths caused by NOx emissions from diesel cars, vans and light commercial vehicles in the EU plus Norway and Switzerland.

# Effects of climate change on salmonids

Salmonid fish are sensitive to increased water temperatures. Decreased precipitation, forest fires and ocean acidification are other threats that come with climate change.

**Salmonid fish all** originate in the Northern Hemisphere. Most species occur as freshwater, landlocked or anadromous populations, where the latter spawn and evolve as juveniles in fresh water and then swim downstream to the ocean where they grow until they are ready to migrate back to freshwater habitats like brooks, rivers or lakes to spawn and thus complete their life cycle.

This article deals with salmonid species of two genera only, viz. *Oncorhynchus* and *Salmo*, the species of which normally exist as anadromous populations, even if numerous populations occur as landlocked or stream dwelling.

All species described in this article have been and are of immense economic importance to the peoples and countries where they occur naturally, and in countries where some of them have been introduced. In the former group of countries the fish are caught both commercially and by sport fishermen and are very important in aquaculture. In the latter group of countries where these fish have been introduced and sometimes have formed self-sustaining populations, they are also of great economic importance, mainly to anglers. The latter group includes countries such as New Zealand, Chile and southern Argentina. Sea-run European brown trout have also established self-sustaining populations in Argentina.

Pacific salmon occur in coastal (marine) and/or river waters, from

Alaska, western Canada and eastern Russia in the north to Taiwan and Mexico in the south. In this case we only considered the seven species of *Oncorhynchus* that are mainly anadromous, but this genus contains at least 12 recognized species. The Atlantic salmon and the indigenous anadromous brown trout occur on the high seas, and in coastal and river waters of the North Atlantic roughly from the White Sea in western Russia and in western Europe down to Portugal (salmon); both species also occur in Icelandic waters, but only salmon are found to the west of Iceland; in Greenland – in one river only; and in numerous lakes and rivers in eastern Canada and a few rivers in New England. The introduction of European brown trout has resulted in a few established anadromous trout populations in Newfoundland, Canada.

All anadromous salmon (of both genera) spawn in fresh water. The majority of

Pink salmon (*Oncorhynchus gorbuscha*)

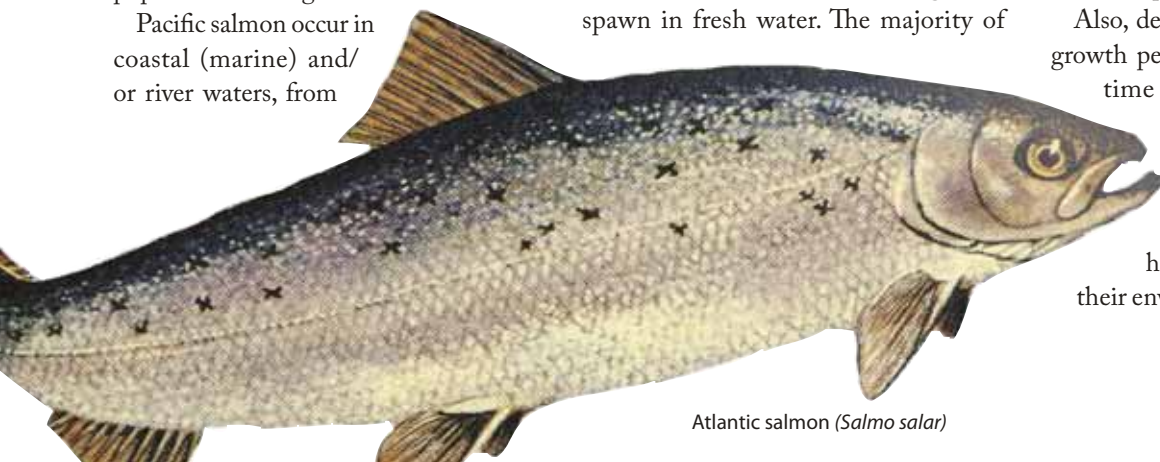


species spawn in the fall and their fertilized eggs require some three to eight months to hatch and develop into juveniles. A few species spawn in spring and require only a few weeks before the eggs hatch. When they are young and remain in running water these salmonids forage on small crustaceans, insects and even plankton, but when they have returned to sea they become typical predators, often depending on schooling small fish such as herring, sand lance, capelin, and juveniles of many other species. In addition, Pacific salmon also prey on euphausiids, pteropods and squid.

After hatching, the juveniles still depend on their yolk sacs for several weeks, and eventually the juveniles begin their downstream migration, during which time they develop their tolerance to salt water. Depending on the species and habitat, juveniles remain in the river from a few months up to seven years.

Also, depending on the species, their growth period, maturation process and time of return to fresh water to spawn may vary between one and seven years.

In addition to their economic importance these fish have important ecological roles in their environments, particularly in the



Atlantic salmon (*Salmo salar*)



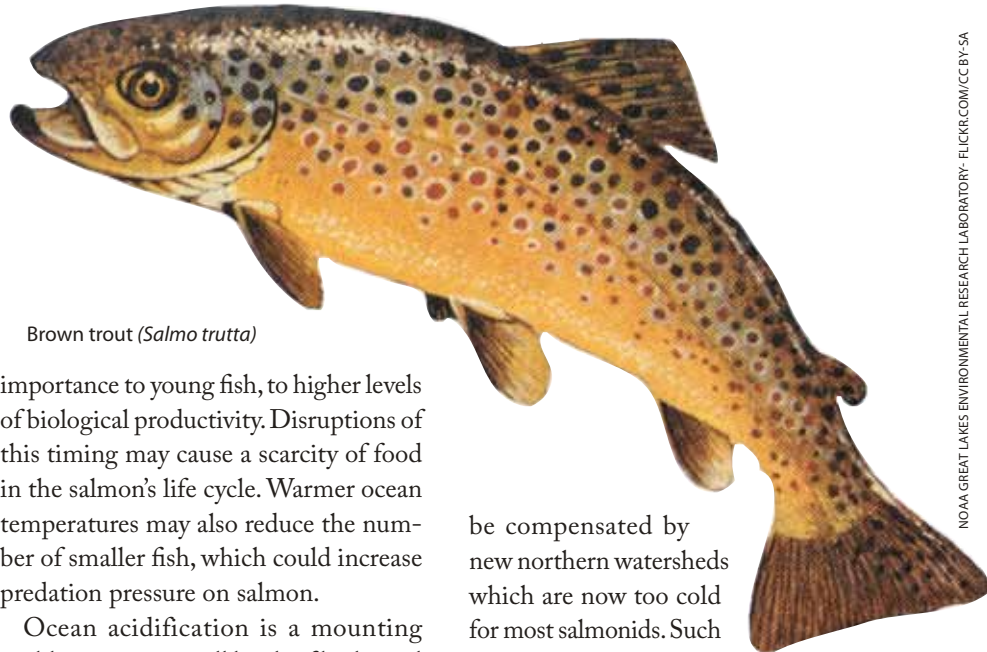
freshwater phase during which they are frequently the dominant species on which both the aquatic and terrestrial ecosystems surrounding their native streams depend. The latter fact applies in particular to the Pacific salmon.

Salmon are triggered by temperature increases. As water temperature increases some direct impacts on salmon biology can be predicted. These can include physiological stress, increased depletion of energy resources and increased susceptibility to disease. At extreme water temperatures in summer, massive fish kills may occur. Increasing water temperatures may cause rapidly developing juveniles to enter the sea before their planktonic food source is available in sufficient density. Increased summer temperatures may also present a thermal barrier which may delay or even prevent spawning.

In addition, loss of snowpack and less precipitation falling as snow will mean reduced stream flows in summer, and lower water flows in summer will also cause water temperatures to exceed the optimum temperature range for most salmonids. Reduced water flows will also impact the spawning migration of mature fish. Increased water flow in winter, due to most precipitation occurring as rain rather than snow, may also cause floods which will impact spawning habitats, by scouring river beds and causing physical damage to both salmon and trout eggs and young fish. It is reasonable to assume that increased input of fresh water will cause increasing sedimentation of river beds, which in turn will reduce the amount of gravel available for spawning redds.

Warmer and dryer conditions in summer have already substantially increased the number of forest fires, which may burn out root systems and contribute to increased erosion and silting in nearby rivers.

Predicting some of the specific effects of climate change on salmon in their marine environment is very difficult. This is due in part to our limited knowledge of where the salmon are in the high seas, but also uncertainties about how marine habitats at large will be affected. Warmer oceans will cause a northward shift in the range of salmon at sea, but probably more important are the effects of increased temperatures on the timing of new food webs, from planktonic species of



Brown trout (*Salmo trutta*)

importance to young fish, to higher levels of biological productivity. Disruptions of this timing may cause a scarcity of food in the salmon's life cycle. Warmer ocean temperatures may also reduce the number of smaller fish, which could increase predation pressure on salmon.

Ocean acidification is a mounting problem impacting all levels of biological productivity in the oceans. The continued release of greenhouse gases, above all CO<sub>2</sub>, is rapidly acidifying the ocean. The most direct effect is that some zooplankton and some shelled phytoplankton are rapidly losing their ability to build shells, and so are most reef-building corals and mussels, clams, starfish and urchins, which have trouble building shells in more acidic water. The larger zooplankton are fundamental to the survival of young salmonids and of course to numerous other fish in the ocean.

Sea-level rise caused by warmer water and melting of the large areas covered by continental ice sheets will inundate estuaries, which is where most salmonids make their transition between the freshwater and marine phases of life.


**Even at the** present temperature level, which approximates a 2-degree temperature (C) increase at northern salmon latitudes, it is predicted that sockeye salmon on the Pacific northwest coast of North America may suffer a decline by 2050 as a result of climate warming. In 2015 it was estimated that exceedingly warm stream temperatures were to blame for the loss of an estimated 250,000 adult sockeye in the same area.

Although the study was carried out for Pacific salmon, there is no reason to believe that Atlantic salmon would not react in the same manner. Salmon migrating between freshwater and oceans are important vectors of energy in the two ecosystems they inhabit. The occurrence of short-term heatwaves will be most common in the southern areas of salmonid distribution, but a temperature increase will partly

be compensated by new northern watersheds which are now too cold for most salmonids. Such an extension of northern distribution will probably require a long period of time to develop because of the strong homing behaviour of salmonids.

**If the present** increase in greenhouse gas emissions continues it can be estimated that the global ocean surface temperature may rise some 4 degrees (C) above the present level. This will change all aquatic ecosystems, freshwater and saline, at all biological levels – bottom fauna, aquatic flora, all the way up to fish, birds and marine mammals – and eventually also humans. Such changes are extremely complicated to predict in any detail but it is very likely that almost all anadromous salmonid populations will vanish, and even at higher latitudes few populations will have the ability to adapt within the short time span of just one century. The melting of permafrost areas in the north will release methane, an even more potent greenhouse gas than carbon dioxide, which will compound the negative effects of global warming both in terrestrial and aquatic ecosystems. It should also be pointed out that such a temperature increase will be augmented by a number of other human-induced threats to salmonids, such as overfishing, habitat destruction, pollution, and obstruction of migratory routes. Surely, this suite of threats will all jeopardise the chance of survival of all salmonid stocks.

Lennart Nyman



"No future in fossil fuels"  
and photos of Pacific  
islands projected onto the  
Neurath coal power plant  
during COP23 in Bonn.

# Coal is finished, CCS doesn't work

The worldwide movement against coal power is getting stronger and has already made some progress

© GREENPEACE

**"Coal is finished,** the hard question now is gas. I think CCS has not been successful. It doesn't work, let's call it what it is – it is simply too expensive, too cumbersome, the technology didn't fly," said Francesco Starace, president of Eurelectric, the trade association representing the electricity industry at European level in an EURACTIVE interview last month. The International Energy Agency (IEA) argued several years ago that no new coal power plants should be built in Europe if global temperature rise is to be kept below 2°C.

More than 15 coal plants in Europe have been shut down in the last two years. In 2016, Canada announced an accelerated phase-out of coal-fired electricity by 2030, and in October the UK announced their commitment to phase out coal by 2025. Italy also announced in October 2017 that it would phase out all coal power stations by 2025. CoalWire reports that the Netherlands are to end coal power before 2030. An agreement between four parties in the Dutch parliament has committed to phase out all five coal plants in the Netherlands before 2030. As part of the agreement, the oldest coal plant will be closed before 2022. The remaining four plants, including 3,500 MW of capacity commissioned in 2015 and 2016, will

be closed before 2030. Deutsche Welle reports that the German Advisory Council on the Environment, comprising seven university professors, has recommended the closure of the country's most polluting coal plants by 2020 and phasing out of the remaining units by 2030. The council's report estimated that the 1.5°C global temperature increase limit flagged in the Paris Agreement would require the closure of all of Germany's coal plants within the next two and a half years or within the next 10 years to achieve the 2°C temperature limit. Austria, Denmark, France, Finland; Portugal and Sweden have also announced phase out dates for coal ahead of 2030

Reuters reports that US power companies expect to retire or convert from coal to gas nearly 8,000 megawatts of coal-fired plants in 2017 after decommissioning almost 13,000 MW in 2016, according to US Energy Information Administration and Thomson Reuters data. In 2015, power companies shut almost 18,000 MW of coal-fired generation, the most in any year. Cheap gas from record shale production over the past decade has kept power prices low, making it uneconomic for generators to upgrade older coal plants according to Reuters.

Environmental NGO networks in Europe, including Greenpeace, Friends of the Earth and WWF, have been campaigning against air pollution and greenhouse gas emissions from coal power for decades and local citizen groups have also been fighting coal mining projects to defend communities and nature. In recent years the NGOs have increasingly been working on joint campaigns to achieve the phasing out of coal. With help from foundations such as ECF and Oak, Climate Action Network Europe has developed a platform known as "Beyond coal" since autumn 2017.

**Several important studies** about the coal industry have been published.

Who Owns the World's Coal? is a study by influencemap.org which analyses in detail the ownership chains of the world's thermal coal. It tracks the links between the coal reserves (the mines), the operating coal companies and the shareholders who own these companies. It shows roughly \$185bn in shareholder value associated with 117 listed thermal coal producers/owners.

The German environmental organisation NGO Urgewald and its 25 NGO partners published the "Global Coal Exit List" (GCEL), a comprehensive database of



companies participating in the thermal coal value chain. GCEL provides key statistics on over 770 companies whose activities range from coal exploration and mining, coal trading and transport, to coal power generation and manufacturing of coal plants. Out of the 775 companies featured in the GCEL, 218 mine coal, 214 operate coal plants, and 110 operate both coal mines and coal power plants. The remaining 233 companies provide various services throughout the coal value chain. The Global Coal Exit List also shows that a lot of coal plants are still online and even some new plants are planned. In the European Union, GCEL reports that the largest coal plant operator is RWE, in Germany, with an installed coal capacity of 20,163 MW. With an annual production of 91 million tons, RWE is also the world's biggest lignite miner. The biggest EU-based coal producer is Anglo American. While headquartered in the UK, it has coal mines in South Africa, Colombia and Australia, where it produces 95 million tons of coal annually. GCEL explains that although the coal industry is in decline in Europe, some companies are still intent on expanding their coal operations: 20 companies from the EU have coal power or mining expansion plans outside of Europe. Within the EU the biggest expansions are planned in Poland, where four companies are planning new coal mines and five companies are planning to build 10,845 MW of new coal power capacity. The biggest among these is PGE (5,260 MW), which makes it the number one coal power expansionist in Europe, according to GCEL.

Hopefully Poland will soon also restructure its power industry like it successfully did in the 1980s and 1990s to reduce air pollution and develop large-scale wind and solar power and its full integration into the European grid. AirClim is demanding a phase-out of coal in Europe by around 2025 to provide a 50 per cent chance of staying within the temperature targets agreed in Paris.

Compiled by Reinhold Pape

Sources: Who Owns the World's Coal? [https://influencemap.org/site/data/000/269/Who\\_Owns\\_the\\_Worlds\\_Coal\\_May\\_2017.pdf](https://influencemap.org/site/data/000/269/Who_Owns_the_Worlds_Coal_May_2017.pdf)

Global Coal Exit List [www.coalexit.org](http://www.coalexit.org)

The EU needs to step up, say representatives from the German and Swedish governments.

# Mind the gap

**The European Union must urgently strengthen its climate targets for 2020 and 2030.**

**EU national governments** need to deliver much stronger pledges after UNEP has published the eighth edition of the UN Environment's Emissions Gap report.

UNEP writes that "national pledges in the Paris Agreement only bring a third of the reduction in emissions required by 2030 to meet climate targets, with private sector and sub-national action not increasing at a rate that would help close this worrying gap. As things stand, even full implementation of current unconditional and conditional Nationally Determined Contributions makes a temperature increase of at least 3 °C by 2100 very likely – meaning that governments need to deliver much stronger pledges when they are revised in 2020".

The European Union countries must urgently strengthen the EU targets for 2020 and 2030, argues Climate Action Network. Several countries have started to give such signals. The German negotiator Karsten Sach said at the UN climate conference in Bonn in November 2017, according to ENB, that "major emitters including the EU need to agree by 2020 how they will deepen current pledges to cut GHG emissions through the Paris Agreement". In addition, Jochen Flasbarth, State Secretary of the German Ministry of Environment, confirmed during a meeting at the same conference with the Small Island Developing States that Germany is supporting the 1.5 degree goal. The Swedish Minister of



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the Environment also issued a statement in October saying that climate targets have to be strengthened.

In Bonn, parties to the Paris Agreement negotiated the Facilitative Dialogue 2018, which will analyse how far countries have come in reducing greenhouse gases and will lead to a strengthening of commitments to reduce the gap that UNEP has identified. An important tool for the review will be the IPCC Special Report on the 1.5 degree target, which will be published in October 2018.

Reinhold Pape

Source:

Emission GAP report 2017, <https://www.unenvironment.org/news-and-stories/press-release/emissions-gap-report-2017-governments-non-state-actors-must-do-more>

ENDS Europe Daily, 7 November 2017

It feels so much better to drive on low-sulphur fuel.

## Ban on high-sulphur diesel

China has announced that from 1 November 2017 it would stop domestic sales of diesel with sulphur content higher than 10 parts per millions (ppm), typically used by tractors and ships, in its latest effort to clean up the nation's air. The decision follows a move earlier this year to stop sales of diesel with more than 50 ppm of sulphur and a 10 ppm sulphur cap on diesel used by automobiles.

Enforcing the ban on diesel used by fishing boats is likely to be challenging, with most of these small consumers using marine gasoil containing 5000 ppm sulphur. China's National Development & Reform Commission said in a statement that it would crack down on the production and distribution of oil products that do not meet government standards, and increase its supervision of major refiners and rural gas stations.

Source: Reuters, 31 October 2017.

## European Air Quality Index launched

A new European Air Quality Index has been launched that allows users to check the current air quality across cities and regions. The index is accompanied by new country fact sheets that provide updated air quality information for the member countries of the European Environment Agency (EEA).

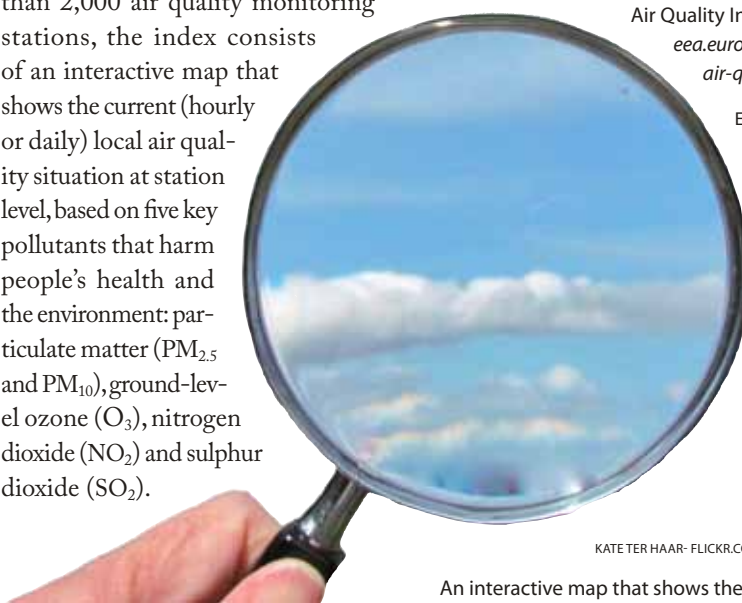
Based on measurements from more than 2,000 air quality monitoring stations, the index consists of an interactive map that shows the current (hourly or daily) local air quality situation at station level, based on five key pollutants that harm people's health and the environment: particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), ground-level ozone (O<sub>3</sub>), nitrogen dioxide (NO<sub>2</sub>) and sulphur dioxide (SO<sub>2</sub>).

Users can zoom in or search for any town or region to check the overall air quality and measurements per key pollutant. The index shows an overall rating for each monitoring station, marked by a coloured dot on the map, corresponding to the worst rating for any of the five pollutants.

Source: EEA news, published 16 November 2017

Air Quality Index: <http://www.eea.europa.eu/themes/air/air-quality-index>

EEA country fact sheets: <https://www.eea.europa.eu/themes/air/country-fact-sheets>



KATE TER HAAR - FLICKR.COM/CC BY

An interactive map that shows the current local air quality situation.

## New city PM pollution atlas

A new report entitled "Urban PM<sub>2.5</sub> Atlas – Air quality in European cities" and produced by the European Commission's Joint Research Centre (JRC) provides information on the levels and origins of fine particulate matter PM<sub>2.5</sub> in the air of 150 European cities. It is designed to help cities produce effective air quality plans.

Excessive levels of

PM<sub>2.5</sub> are responsible for about 400,000 premature deaths every year in the EU, and millions of citizens suffer from respiratory and cardiovascular diseases caused by air pollution.

Nearly all 150 cities have annual mean PM<sub>2.5</sub> levels above the World Health Organization's recommendation of 10 µg/m<sup>3</sup>. The cities with the highest pollution are located in southern Poland, the Italian Po Valley and Bulgaria. In 2015, the annual average PM<sub>2.5</sub> levels in Katowice, Kraków, Ostrava, Częstochowa, Plovdiv, Sofia, Łódź, Kielce, Poznań and Brescia were above the EU's limit value of 25 µg/m<sup>3</sup>.

The main sources of the PM<sub>2.5</sub> pollution in city air are emissions from residential heating, transportation (primarily diesel engines), industry and agriculture. PM<sub>2.5</sub> in ambient air originates both from primary particles emitted directly into the

air and from secondary particles produced as a result of chemical reactions of PM precursor pollutants, namely sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), ammonia (NH<sub>3</sub>) and volatile organic compounds (VOCs). Recent research has shown that PM<sub>2.5</sub> concentrations can be considerably reduced by additional cuts in agricultural NH<sub>3</sub> emissions. Depending on meteorological conditions, PM<sub>2.5</sub> can remain in the air for several days and may thus be transported hundreds and even thousands of kilometres by winds.

The Atlas provides a detailed analysis of the sources of particulate matter for each of the 150 cities. It ranks the sectors that contribute most to air pollution and indicates the share of pollution emanating from local, national and European sources.

Link to JRC and the report: <https://ec.europa.eu/jrc/en/news/air-quality-atlas-europe-mapping-sources-fine-particulate-matter>



Katowice, Poland in November 2017. Domestic coal heating is one reason for having one of the highest levels of PM<sub>2.5</sub> in Europe.

ASTRID WESTVANG - FLICKR.COM/CC BY-NC-ND



# Nine million Londoners under threat from particle pollution

Although transport is the main source, between a quarter and a third of London's PM pollution comes from domestic wood burning.

**Data from the** London Atmospheric Emissions Inventory shows that all people living in Greater London are exposed to concentrations of fine particulate matter (PM<sub>2.5</sub>) higher than the World Health Organization's guideline of 10 micrograms per cubic metre as an annual mean value. It also shows that 7.9 million Londoners – nearly 95 per cent of the capital's population – live in areas that exceed the WHO limit by 50 per cent or more.

Both short and long-term exposure to PM<sub>2.5</sub> increase the risk of mortality from respiratory and cardiovascular diseases, and the UK Committee on the Medical Effects of Air Pollutants (COMEAP) has estimated that exposure to PM<sub>2.5</sub> causes some 29,000 premature deaths every year in the UK.

Approximately half of the PM<sub>2.5</sub> annual mean levels in London originate from emission

sources outside of the city, and even outside of the country, which means that London cannot resolve this problem on its own – national and international action is also required.

The main local source of PM<sub>2.5</sub> emissions is road transport, mainly related to tyre and brake wear. Other big local sources are non-road mobile machinery (including construction machinery and inland shipping) and domestic wood burning.

In a letter sent to Environment Secretary Michael Gove in September, London's Mayor Sadiq Khan called for more powers for

London to clean up toxic air in the capital, including:

- Tougher enforcement of emissions limits for bulldozers, diggers and other construction machinery.
- Simplifying the policing of waterway emissions from the Thames, with a single regulator instead of the current five
- Reforming the Clean Air Act to set tighter emission limits for wood-burning stoves and create zones where the burning of solid fuels is forbidden.

“Non-transport sources contribute half of the deadly emissions in London so we need a hard-hitting plan of action to combat them, similar to moves I am taking to reduce pollution from road vehicles,” the mayor said, referring to the new Toxicity Charge (T-Charge) that came into force in early October and targets London's oldest, most polluting vehicles.

Wood-burning stoves are increasingly popular, and there is growing concern over their environmental impacts. Researchers at King's College London have found that wood-burning in the capital accounts for up to one third of the city's PM pollution, up from 10 per cent in the past.

Christer Ågren

Sources:

The report “PM<sub>2.5</sub> concentrations and exposure in London” (October 2017) by the Greater London Authority and Transport for London: <https://data.london.gov.uk/dataset/pm2-5-map-and-exposure-data>

The Guardian, 29 September 2017

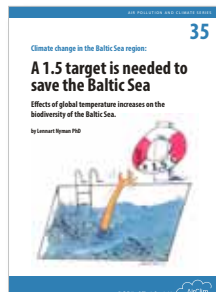
The battle of Trafalgar was a piece of cake compared to standing here surrounded by air pollution for more than a century.

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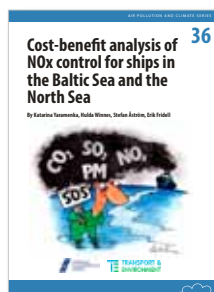
Air Pollution & Climate Secretariat  
Första Långgatan 18  
413 28 Göteborg  
Sweden

## Recent publications from the Secretariat

Reports can be downloaded in PDF format from [www.airclim.org](http://www.airclim.org)



**A 1.5 target is needed to save the Baltic Sea** (March 2016). By Lennart Nyman. Effects of global temperature increases on the biodiversity of the Baltic Sea.



**Cost-benefit analysis of NOx control for ships in the Baltic Sea and the North Sea** (April 2017). By Katarina Yaramenka, Hilda Winne, Stefan Åström, Erik Fridell.



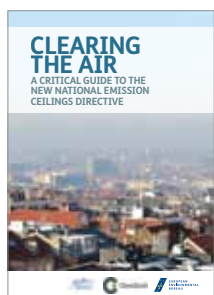
**Phasing out fossil gas in Europe** (March 2016). By Fredrik Lundberg. The natural gas industry faces strategic choices.



**Paths to a sustainable agricultural system** (March 2016). By Kajsa Pira et al. An agriculture and food system with reduced emissions.



**Carbon Capture and Storage in Norway** (2nd edition, March 2016). By Tore Braend. The Norwegian interest in CCS depends on the oil and gas sector.



**Clearing the air** (Feb 2017). A critical guide to the new National Emissions Ceilings directive.



**1.5 Stay Alive** (April 2015). Short documentary about climate change in the coastal zones of the Caribbean region. Winner of the Golden Sun award 2016. Contact [info@airclim.org](mailto:info@airclim.org) for access.

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## Coming events

**EU Environment Council.** Brussels, Belgium, 19 December 2017. Information: [www.consilium.europa.eu/en/press/calendar/](http://www.consilium.europa.eu/en/press/calendar/)

**Fighting air pollution in Europe.** Brussels, Belgium, 25 January 2018. Information: <http://www.publicpolicyexchange.co.uk/events/IA25-PPE2?ss=em&tg=1a>

**Eco-innovation for air quality.** Sofia, Bulgaria, 5-6 February 2018. Information: [http://ec.europa.eu/environment/ecoinnovation2018/1st\\_forum/](http://ec.europa.eu/environment/ecoinnovation2018/1st_forum/)

**IMO PPR 5 (Sub-Committee on Pollution Prevention and Response).** London, UK, 5 - 9 February 2018. Information: [www.imo.org](http://www.imo.org)

**20th international conference on air pollution and control (ICAPC).** Paris, France, 19 - 20 February, 2018. Information: <https://www.waset.org/conference/2018/02/paris/ICAPC>

**Air Quality – Science and Application: 11th International Conference.** Barcelona, Spain, 12 - 16 March 2018. Information: <http://www.airqualityconference.org>

**Saltsjöbaden 6: Clean air for a sustainable future – goals and challenges.** Göteborg, Sweden, 19-21 March 2018. Information: <http://saltsjobaden6.ivl.se>

**IMO MEPC 72 (Marine Environment Protection Committee).** London, UK, 9 - 13 April 2018. Information: [www.imo.org](http://www.imo.org)

**UNFCCC First sessional period in 2018.** Bonn, Germany, 30 April - 10 May 2018. Information: <http://unfccc.int/>

**EU Green Week "Green cities for a greener future".** Brussels, Belgium, 21 - 25 May 2018. Information: <https://www.eugreenweek.eu>

**CLRTAP Working Group on Strategies and Review.** Geneva, Switzerland, 22 - 25 May 2018. Information: [www.unece.org/env/lrtap/welcome.html](http://www.unece.org/env/lrtap/welcome.html)

**Air Pollution 2018: 26th International conference on modelling, monitoring and management of air pollution.** Naples, Italy, 19 - 21 June 2018. Information: <http://www.wessex.ac.uk/conferences/2018/air-pollution-2018>

**CLRTAP EMEP Steering Body and the Working Group on Effects.** Geneva, Switzerland, 10 - 14 September 2018. Information: [www.unece.org/env/lrtap/welcome.html](http://www.unece.org/env/lrtap/welcome.html)

**IMO MEPC 73 (Marine Environment Protection Committee).** London, UK, 22 - 26 October 2018. Information: [www.imo.org](http://www.imo.org)

**UNFCCC Second sessional period in 2018; COP 24.** Katowice, Poland, 3 - 14 December 2018. Information: <http://unfccc.int/>