

## Unlocking the potential of ocean energy

To ensure affordable energy and limit global temperature rise to below 1.5 °C there is an urgent need to transition rapidly from a centralised energy system that heavily relies on fossil fuels.

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## Ocean acidification in the climate negotiations

If ocean acidification was redefined as an effect of climate change, the UNFCCC could interpret its existing framework so that parties were required to take action on the issue.

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## The forefront of cleaner, people-centred cities

Cities are dense and struggling with high levels of air pollution, sedentary behaviour and noise problems linked to car-centred urban planning.

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It takes four times as much energy to drive a car on e-fuels compared to batteries.

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## Nitrogen deposition a threat to 60% of European ecosystems

Most affected are regions with intensive livestock rearing. Scenarios show that both technical measures and a reduction in animal numbers are needed to tackle the problem.

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# Making the most of waste heat

The total excess heat in the EU covers almost all of the EU's total energy demand for heat and hot water in residential and service sector buildings. This potential needs to be utilised, especially during these times of energy and climate crises.

**There are multiple** ways to use excess heat and the three main ones are described below.

The easiest way to use excess heat is to reintegrate it into the same activities. A heat recovery unit is beneficial where unused heat energy is produced as a "waste product" in order to increase the efficiency of the overall industry. These units make waste heat usable for processes at a similar or lower temperature level. For example, supermarkets have cooling systems which generate significant amounts of excess

heat, which is often released directly into the atmosphere and wasted.

SuperBrugsen, a local supermarket in Southern Denmark, has successfully reduced its energy consumption by reusing and selling excess heat from its cooling systems. Since 2019, the supermarket has covered 78% of its heat consumption by reusing heat generated by its cooling processes, and has also sold 133.7 MWh of excess heat to neighbouring buildings through the district heating grid.

# Acid News

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

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

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

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## The Air Pollution and Climate Secretariat

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

The essential aim of the Secretariat is to promote awareness of the problems associated with air pollution and climate change, and thus, in part as a result of public pressure, to bring about the needed reductions in the emissions of air pollutants and greenhouse gases. The aim is to have those emissions eventually brought down to levels that man and the environment can tolerate without suffering damage.

In furtherance of these aims, the Secretariat:

- \* Keeps up observation of political trends and scientific developments.
- \* Acts as an information centre, primarily for European environmentalist organisations, but also for the media, authorities, and researchers.
- \* Produces information material.
- \* Supports environmentalist bodies in other countries in their work towards common ends.
- \* Participates in the advocacy 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

**Preventing heat waste** has largely been ignored as a solution. A new report by the global engineering company Danfoss highlights the potential of excess heat recovery.

“The global energy crisis is a wakeup call to stop wasting energy,” said Toby Morgan, senior manager of built environment at the Climate Group, an environmental not-for-profit. He adds that “we need to make better use of the energy we already produce, we simply can’t afford to let it literally escape out the window. Energy efficiency improvements, like capturing and recycling excess heat, are absolutely critical to lower fossil fuel demand and lower bills.”

Various sources, including supermarkets, transportation networks, data centres and commercial buildings, emit excess heat. Much of this can be harnessed and utilised through existing heat recovery technologies like heat pumps, as well as more efficient air conditioning systems and manufacturing machinery. Further opportunities lie in improved urban planning and district energy systems that rely on networks of renewable energy sources.

The research is led by Brian Vad Mathiesen, a professor in energy planning and renewable energy systems at Aalborg University. According to Vad Mathiesen: “The amount of cities, regions and countries in Europe which waste heat while spending billions on natural gas or electric heating is mind-blowing,” and he warns that Europe’s energy security is at stake.

“Take the Netherlands – there is virtually no district heating even though there is almost twice the amount of waste heat compared to the heat demand. Denmark is the same size but has towards 60% per cent district heating with only one third of the population. The use of waste heat is certainly not connected to technical differences. While the physical laws are the same, the political will and traditions are very different.”

**“we  
simply can’t  
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window”**

The report highlights the excess heat potential of cities in the EU. On average, 78.8% of the excess heat from these cities could be recovered from their top three sites alone. In Brussels, the top three sites

provide 1.3 TWh out of a possible 1.5 TWh. Kim Fausing, CEO of Danfoss stated that the emissions savings and revenue from selling this heat would be significant and that “in Greater London, we have identified at least 648 eligible excess heat sources, including data centres,

underground stations, supermarkets, wastewater treatment plants and food production facilities. Why aren’t businesses and local government organisations using these?” Fausing adds that London’s excess heat equated to 9.5 TWh a year, roughly enough to heat 790,000 households.

Reusing excess heat offers incredible opportunities for businesses to reduce their emissions, save money and make money. To rapidly tackle the energy crisis, Vad Mathiesen proposes a heat planning directive that enables local authorities to base their plans on local conditions. This would involve mapping existing waste heat sources in greater detail, then proposing thermal networks that distribute heat more effectively and initiatives that improve energy efficiency in buildings. Energy efficiency improvements are climate-critical and the time for action is now.

Emilia Samuelsson

based on

Report by Danfoss. (2023). The world’s largest untapped energy source: Excess heat. <https://www.whyenergyefficiency.com/solutions/allsolutions>

and Recapturing excess heat could power most of Europe, say experts, Anna Turns, The Guardian, <https://www.theguardian.com/environment/2023/feb/23/recapturing-excess-heat-could-power-most-of-europe-say-experts> 3924=3424



## Meat, dairy and rice production will bust 1.5°C climate target, shows study

Emissions from the food system alone will drive the world past 1.5°C of global heating, unless high-methane foods are tackled.

Climate-heating emissions from food production, dominated by meat, dairy and rice, will by themselves break the key international target of 1.5°C if left unchecked, a detailed study has shown.

The analysis estimated that if today's level of food emissions continued, they would result in at least 0.7°C of global heating by the end of the century, on top of the 1°C rise already seen. This means emissions from food alone, ignoring the huge impact of fossil fuels, would push the world past the 1.5°C limit.

The study showed that 75% of this food-related heating was driven by foods that are high sources of methane, i.e. those coming from ruminant livestock such as cattle, and rice paddy fields. However, the scientists said the temperature rise could be cut by 55% by cutting meat consumption in rich countries to medically recommended levels, reducing emissions from livestock and their manure, and using renewable energy in the food system.

Source: The Guardian 6 March 2023, <https://www.theguardian.com/environment/2023mar/06/meat-dairy-rice-high-methane-food-production-bust-climate-target-study>



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## Germany shuts down last three nuclear reactors, ending nuclear power era

**Germany switched off** its last three nuclear reactors on 15 April, marking the end of its nuclear power era.

Despite many western countries investing in atomic energy to reduce their emissions, Germany has abandoned nuclear power as it seeks to wean itself off fossil fuels. Germany has been looking to move away from nuclear power since 2002 and has a powerful anti-nuclear movement. "The risks of nuclear power are ultimately unmanageable," said Environment Minister Steffi Lemke, who this week made a pilgrimage to the ill-fated Japanese plant ahead of a G7 meeting in the country.

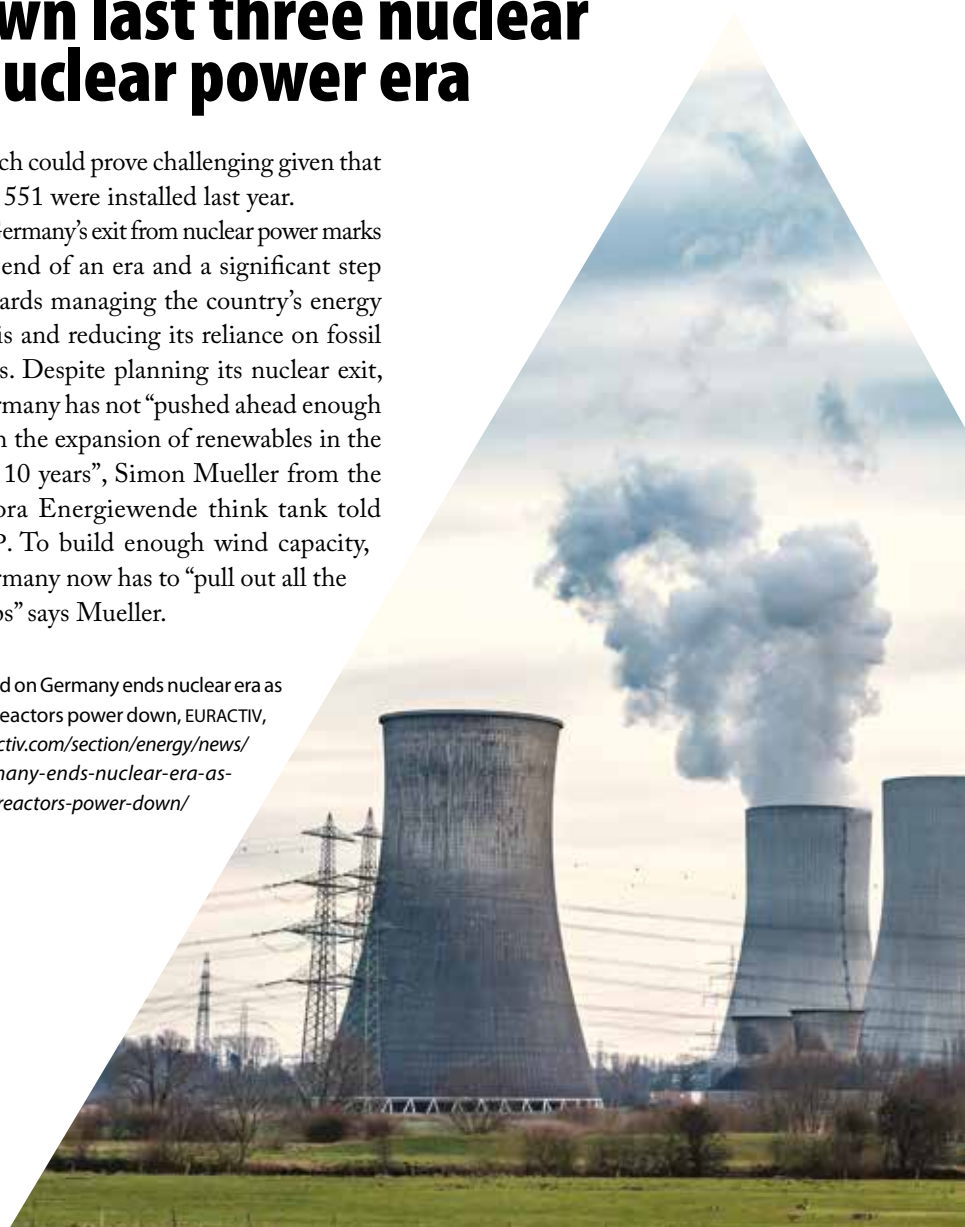
Anti-nuclear demonstrators have taken to the streets in several German cities to highlight the closures, and Greenpeace organised a celebration at the Brandenburg Gate in Berlin. "We are putting an end to a dangerous, unsustainable and costly technology," said Green MP Juergen Trittin.

The three final plants provided just 6% of Germany's energy last year, compared with 30.8% from all nuclear plants in 1997. The minister is now focused on getting Germany to produce 80% of its energy from renewables by 2030. To achieve this, Chancellor Olaf Scholz has called for the installation of "four to five wind turbines a day" over the next few years,

which could prove challenging given that just 551 were installed last year.

Germany's exit from nuclear power marks the end of an era and a significant step towards managing the country's energy crisis and reducing its reliance on fossil fuels. Despite planning its nuclear exit, Germany has not "pushed ahead enough with the expansion of renewables in the last 10 years", Simon Mueller from the Agora Energiewende think tank told AFP. To build enough wind capacity, Germany now has to "pull out all the stops" says Mueller.

based on Germany ends nuclear era as last reactors power down, EURACTIV, [euractiv.com/section/energy/news/germany-ends-nuclear-era-as-last-reactors-power-down/](https://euractiv.com/section/energy/news/germany-ends-nuclear-era-as-last-reactors-power-down/)



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## Making the most of waste heat

*Continued from front page*

The outcome was driven by three key initiatives: first, the supermarket switched from using chemical refrigerants to a natural refrigerant that has excellent heat recovery properties. Second, a heat recovery unit was installed, which enables the recovered heat to be reused to heat the store and produce domestic hot water. Third, SuperBrugsen has implemented energy efficiency programmes to ensure long-term efficiency. These programmes involve monitoring the cooling systems, adjusting technical parameters and conducting regular maintenance, resulting in further energy efficiency improvements and reduced energy consumption.

**Another important solution** is sector integration and smart urban planning. The process of optimising the combination of at least two different sectors of energy demand and production is important in harnessing excess heat (i.e. electricity, heating, cooling, transport and industrial processes). Sector integration is about maximising synergies between sectors, converting and storing energy. This can take place on a small scale through urban planning or a larger scale through district energy networks. Urban planning can connect energy producers with energy consumers through a smart grid. Large synergies can occur when a producer of excess heat, for instance a data centre, is located close to entities that can buy and use large amounts of the excess heat (for example, horticulture).

In Dublin, Amazon Web Services has built Ireland's first, custom-built sustainable solution to provide low-carbon heat to a growing suburb. The recently finished data centre will provide heat for initially 47,000 m<sup>2</sup> of public sector buildings. It will also provide heat for 3,000 m<sup>2</sup> of commercial space and 135 rental apartments.

Another example is found in Norway, where a data centre has been co-located with the world's first land-based lobster farm. The co-location company uses a fjord cooling solution, with seawater entering the facility at 8°C and then being released back at 20°C. This is the right temperature for the optimal growth of lobsters. So, moving forward, a new production facility will be built in close proximity to the data centre,

allowing it to use the heated seawater for the breeding of lobsters.

Synergies like these in urban planning are known as industrial cluster planning and can contribute to decarbonising our energy system. Furthermore, the collaboration between nearby companies has been shown to provide economic benefits to both the buyer and the seller.

**Developing district energy** systems is also an important measure. In many parts of the world, district energy systems supply homes and companies with heating as well as cooling. The district heating network taps into heat from a combination of sources, such as renewable sources (solar, geothermal and biomass) and fossil sources, such as at power plants, and distributes it through pipelines to end users in the form of heated water. Today, the majority of global district heat production relies on fossil fuels.

According to the IEA, the world needs to double the share of renewable sources in district heating by 2030 to reach net zero. If successful, this will help cut carbon emissions from heat generation by more than 33%. One of the main strengths of district energy systems is their capacity to integrate different heat sources that can push fossil fuels out of the heating and cooling mix. Today, the so-called 4th generation district energy system allows very low temperature heat sources to be integrated into the district energy system and provide heating for new buildings that can operate at low temperatures. The fact that more and more renewable sources of energy can be used in district heating and cooling puts district energy systems at the heart of the green transition.

Another vital benefit of district energy is that it supports the balancing of the grid. By looking at the energy system holistically and connecting different energy sources, district energy allows for the flexible use of power. It enables discrepancies in supply and demand to be evened out so we can use the full capacity of the grid. Balancing the peaks will be especially important as we increase the use of renewables and electrification. There are vast district energy systems in China and Europe, and more are expected to come. Denmark is one of

the world's most energy-efficient countries, due primarily to the widespread use of district heating. In Denmark, 65% of buildings cover their demand for heating with district heating, and more than half of the heat is from green sources such as waste, biomass and excess heat from various commercial processes.

**In addition** to the technical and structural solutions, it is essential that decision makers are aware of the potential of excess heat when managing urban planning and designing the financial and regulatory framework for the future energy market. Below are some policy recommendations which can enable the usage of excess heat.

First of all policy makers must ensure that regulations support rather than prevent the use of recycled heat.

Today there are a number of market barriers that prevent market players from leveraging the potential of reusing excess heat. Regulation can remove these barriers, for instance by supporting the equal treatment of waste heat and renewable energy sources used in heat networks. Regulation can also push for greater use of excess energy by making it mandatory for entities such as data centres or industries to draw up plans to exploit their excess heat.

For example, in Denmark, municipalities were asked to map existing heat demand, the existing heat supply method and the quantities of energy used. They also estimated future demand and supply possibilities. Based on this information, overall energy plans were prepared to show the priority of heat supply options in any given area and identify locations for future heat supply units and networks.

**To further improve** energy efficiency by using wasted energy, it is essential to remove financial barriers. The current design of the energy market is, in many places, a barrier to sector integration technologies. It either hinders the use of sector integration technologies in specific markets, or it fails to internalise all positive and negative externalities of low-carbon and carbon-intensive technologies respectively. It is crucial that tax legislation favours the use of surplus heat and that appropriate



network tariff structures are considered. Additionally, administrative barriers need to be removed to incentivise users to connect to district heating networks, which will also encourage district heating utilities to boost their efficiency.

**A final policy** recommendation is to establish partnerships. As more systematic use of excess heat is, at its core, an exercise that spans sectors and stakeholders. Partnerships between local authorities, energy suppliers and energy sources such as supermarkets, data centres, wastewater

facilities and industries can help to maximise the full potential of excess heat.

The world cannot afford to waste this valuable resource, and governments, industry and other stakeholders need to take action to harness the power of excess heat. With the right policies, investments and collaborations, excess heat recovery could become the world's largest source of clean energy, helping to mitigate climate change and build a more sustainable future.

Emilia Samuelsson



Based on report by Danfoss. (2023). The world's largest untapped energy source: Excess heat. <https://www.whyyenergyefficiency.com/solutions/all solutions>

# Global heating threatens northern forests

In the last month, fires have ravaged forests in both Canada and Russia. This is just the latest of many similar examples.

**Global temperature increase** is taking a heavy toll on forests in the northern hemisphere, leading to events such as forest damage due to drought, harmful insect attacks and increasing the risk of forest fires. Here are some examples of related reports in the media in recent months.

Seventy-five active wildfires burned in Alberta in Canada in May 2023, with 23 listed as out of control, and more than 100 wildfires burned across the province of British Columbia in July 2021.<sup>1</sup> There was a similar picture in the western US two years ago, with several wildfires in the forests of far northern California where flames have already forced many communities to evacuate.<sup>2</sup>

At least 21 people died in wildfires in Russia's Ural mountains in May 2023, according to state media. Wildfires have raged in the Kurgan region of the Urals and in Siberia. Local media reported that most of the dead were older people unable to leave their homes. A state of emergency was introduced in Kurgan province, where more than 5,000 buildings have burned down. Fires have also engulfed thousands of hectares in Sverdlovsk province, and areas of Siberia's Omsk and Tyumen provinces. The EU's Copernicus Atmosphere Monitoring Service (CAMS) said its data showed "active fires burning in a band stretching from Russia's Chelyabinsk region across Omsk and Novosibirsk regions to Primorye in

the far east, also affecting Kazakhstan and Mongolia.<sup>3</sup>

In recent years many forest fires have also been reported from the Mediterranean region and central Europe. Forest experts have called for immediate improvements in Germany's forest fire protection as incidents cost the country over 600 million euro in 2022 in damages to health, nature and the economy. Regional heat records in northern Germany, drought in many regions, and large forest and field fires in the east plagued the country in the summer of 2022.<sup>4</sup> The impact of changing climate conditions on Germany's forests has become an increasing cause for concern in the country over the past few years as a series of exceptionally hot and dry summers has inflicted great damage.

Forest loss in Germany is considerably higher than previously thought according to researchers at the German Aerospace Center (DLR).<sup>5</sup> For the first time, they have made visible how much of the forest inventory has been lost throughout Germany. The results are alarming: from January 2018 until the end of April 2021, some 501,000 hectares of tree loss have been recorded in Germany. This represents almost five per cent of the entire forested area, and thus considerably more than previously assumed. The triggers are primarily considered to be unusually intensive periods of heat and drought in these years, which in turn favoured infestation by

harmful insects. The view from space shows that it is mainly central Germany with its conifer forests that is affected, from the Eifel and Harz mountain ranges to the Thuringian Forest and the heights of Saxon Switzerland. Within three years, the state of North Rhine-Westphalia alone lost more than a quarter of its pine forests and, in some counties, over two-thirds. Trees died or were sacrificed in large-scale distress felling. Deforestation is often the last measure in cases of massive pest infestation. It is not just pine forests that are affected by the consequences of drought. The analyses show that in addition to pine, which is the most common tree species in Germany, oak, beech and spruce forests show considerable damage.

Further impacts of this type due to global heating could seriously impair the ability of northern forests to act as a carbon sink.

Reinhold Pape

<sup>1</sup> The Guardian 12 May 2023 <https://www.theguardian.com/world/2023/may/12/western-canada-record-temperatures-heat-dome-wildfires>

<sup>2</sup> The Guardian 2 July 2021 <https://www.theguardian.com/world/2021/jul/02/canada-wildfires-british-columbia-heatwave>

<sup>3</sup> The Guardian 10 May 2023 <https://www.theguardian.com/world/2023/may/10/many-dead-as-wildfires-rage-across-urals-and-siberia>

<sup>4</sup> Clean Energy Wire, 1 August 2022 <https://www.cleanenergywire.org/news/july-marks-heat-records-germany-drought-and-forest-fires-plague-countrys-east>

<sup>5</sup> German Aerospace Centre, 21 February 2022 [https://www.dlr.de/en/latest/news/2022/01/20220221\\_concern-about-german-forests](https://www.dlr.de/en/latest/news/2022/01/20220221_concern-about-german-forests)



# Unlocking the potential of ocean energy

To ensure affordable energy and limit global temperature rise to below 1.5 °C there is an urgent need to transition rapidly from a centralised energy system that heavily relies on fossil fuels. Ocean energy is one of the technologies that should be scaled up to support the transition of the energy system to reach full decarbonisation.



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**The International Renewable Energy Agency (IRENA)** has released a report titled “Scaling up Investments in Ocean Energy Technologies” that highlights the potential of this emerging sector. The sector currently includes wave, tidal and ocean thermal energy conversion technologies, as well as extracting energy from differ-

ences in salinity concentrations and ocean currents. Tidal stream and wave energy converters are the most mature solutions applicable across different geographies. Wave energy is now at prototype stage, with several small-scale and full-scale devices being tested in real sea conditions. After the successful completion of

these projects, the next step will be the deployment of the first wave energy pilot farms. Co-location with other renewable energy sources, such as offshore wind or floating photovoltaic systems, can also be applied to optimise the power production profile and the use of marine space.

Tidal stream energy is already at the



pilot farm stage, and the first multi-device arrays have been producing power for the past six years. Further full-scale devices have been demonstrated in real sea conditions and are ready to be deployed in the next wave of pilot farms.

There are several examples of successful ocean energy projects from around the world. The MeyGen project in Scotland, is the world's biggest tidal energy farm, MeyGen, which comprises four bottom-fixed turbines. It was deployed in 2016 and has generated over 50 GWh. Minesto has deployed two tidal "kites" (turbines) harnessing low-flow tides on the Faroe Islands. The company has an agreement with the Faroese electric utility company SEV with the objective of deploying an additional 4 MW in the Vestmanna Sund strait. Sustainable Marine deployed their floating tidal platform, previously tested in Scotland and in Nova Scotia, Canada, in 2022. Located within some of the most powerful tides in the world, the project will be expanded to 9 MW in future years.

Even though ocean energy is still in the early stages of development it has significant potential to provide clean energy as well as creating jobs in coastal and island communities. The report forecasts that ocean energy has a global market potential of 350 gigawatts (GW) and could create 680,000 direct jobs by 2050. At present, around 535 megawatts (MW) of ocean energy capacity has been installed worldwide.

Fewer wave and tidal power projects were installed in European waters in 2022 than any other year in over a decade, leaving the EU's ambitious ocean energy deployment targets "increasingly at risk", according to latest figures from industry advocacy body Ocean Energy Europe (OEE).

"Europe's industrial leadership in ocean energy is increasingly at risk. Despite ambitious EU deployment targets, fewer projects hit European waters in 2022 than in any year since 2010," said OEE in its annual report. "Meanwhile, global competitors like the US and China are catching up fast. If the EU is determined to come out on top in this new era of global cleantech competition, it cannot let its frontrunner position slip away."

According to Rémi Gruet, CEO of OEE: "It's not too late [for Europe] – the EU Green Deal Industrial Plan can empower the European Commission to rapidly restore Europe's leadership in ocean energy. These statistics should be a wake-up call. Europe has the technical skills, the entrepreneurialism and the creativity to be the world number one in ocean energy but we need a clear plan."

IRENA's report states that the main barriers to the development of ocean energy technologies are the high cost of deployment and the lack of a supportive policy framework. Many countries have not yet developed specific policies or incentives to support the development and deployment of ocean energy technologies.

This lack of policy support has hindered the growth of the sector and prevented it from achieving its full potential.

To overcome these barriers, dedicated ocean energy policies and incentives need to be developed, a supportive regulatory framework must be established and the necessary funding and financial support must be given to ocean energy projects.

Another important factor is international collaboration and knowledge sharing to accelerate the development and deployment of ocean energy technologies. This includes the sharing of best practices, the establishment of international standards and certification schemes, and the creation of a global database of ocean energy projects and technologies.

In conclusion, with the right policies and incentives in place, ocean energy technologies could provide a significant contribution to the global energy mix, creating a more sustainable and resilient energy system for future generations.

Emilia Samuelsson

Based on IRENA's report "Scaling up Investments in Ocean Energy Technologies". Published March 2023. Retrieved from <https://www.irena.org/publications/2023/Mar/Scaling-up-Investments-in-Ocean-Energy-Technologies>

'Historic low' wave and tidal power build off EU sinking Brussels's cleantech vision: OEE, Recharge. 1st March 2023. <https://www.rechargenews.com/energy-transition/historic-low-wave-and-tidal-power-build-off-eu-sinking-brussels-cleantech-vision-oe-2-1-1411885>

## IPCC calls for urgent climate action

The IPCC's new Synthesis Report, released in March 2023, underscores the urgency of taking more ambitious action. IPCC says that "if we act now, we can still secure a liveable sustainable future for all".

In 2018, the IPCC highlighted the unprecedented scale of the challenge required to keep warming to 1.5°C. Five years later, that challenge has become even greater due to the continued increase in greenhouse gas emissions. The pace and scale of what has been done so far, and current plans, are insufficient to tackle climate change.

More than a century of burning fossil fuels, as well as the unequal and unsustainable use of energy and land, have led to global warming of 1.1°C above pre-industrial

levels. This has resulted in more frequent and more intense extreme weather events that have caused increasingly harmful impacts on nature and people in every region of the world.

Every increment of warming results in rapidly escalating hazards. More intense heatwaves, heavier rainfall and other weather extremes further increase risks for human health and ecosystems. In every region, people are dying from extreme heat. Climate-driven food and water insecurity is expected to increase with increased warming. When the risks combine with other adverse events, such as pandemics or conflicts, they become even more difficult to manage.

Keeping warming to 1.5°C above pre-industrial levels requires deep, rapid and sustained reductions of greenhouse gas emissions in all sectors. Emissions should be decreasing by now and will need to be cut by almost half by 2030, if warming is to be limited to 1.5°C.

IPCC press release 20 March 2023 <https://www.ipcc.ch/2023/03/20/press-release-ar6-synthesis-report/>



# A quantitative take on Russian forests

Russia has one fifth of the global forest area. This area has remained relatively constant in recent decades, but clear cutting and wildfires are altering the species composition.

**Due to the** inconsistency of world data on the state of forests, data from the United Nations Agriculture and Food Organization (FAO), which has been publishing summaries of this kind for many decades, are used to show the role of Russia in world forestry.

According to the FAO (2020), the total forest area of the world is about 4 billion hectares. Of this area, 45%, i.e. 1.8 billion hectares are tropical forests, and 27% (about 1.1 billion hectares) are boreal forests (or taiga), which mainly include Russian forests. The remaining 28% are temperate and subtropical forests.

Among the countries of the world, Russia ranks first in terms of forest area – with 815 million hectares (21% of the global forested area).

Unlike the rapid destruction of tropical

forests of Africa, Latin America and Southeast Asia, boreal forests (two thirds of which are located on the territory of Russia) are stable in area. If we take into account the new forests that have arisen on abandoned agricultural land, but are so far ignored by the authorities, then the area of Russian forests is increasing. At the same time, there are negative changes in their species composition. Due to fires, clearing, the impact of diseases and pests, the areas of typical coniferous stands (spruce, pine) are somewhat reduced, and these species are being replaced by secondary species – birch and aspen.

The total area of intact forests in the world that have still not experienced significant anthropogenic impact is about 1.1 billion hectares (i.e. more than a quarter of all the forests in the world). According to the FAO, the largest areas of intact forests have been preserved in Russia: 255 million hectares.

When using Russian forest statistics one should be aware that a number of the indicators they contain may differ from corresponding FAO estimates. FAO figures allow for maximum comparability of data at the global level. Russian forest statistics allow for a deeper and more detailed analysis.

According to Rosreestr, the Russian statistics agency, as of 1 January 2020 the forest lands of the Russian Federation covered 897 million hectares. The definition of forest land includes land occupied by forest ecosystems, as well as land intended for growing forests, but temporarily devoid of forest cover (burnt areas, dead stands, clear cuts, etc.). The main area of forest land is part of the Forest Fund (863.4 million hectares, or 96.3% of their total area), for which there is the most

detailed information on the species and age composition of forests. However, official statistics ignore the presence of 34 million hectares of forests that have grown in recent decades on currently unused agricultural lands.

The average forest cover on Russian territory in recent decades has remained quite stable. At present it is 46.5%, but it varies greatly from region to region: from 0.2% in the Republic of Kalmykia to 82.5% in the Irkutsk region. About two-thirds of all forests in the Russian Federation grow on permafrost, which occupies vast areas of Siberia and the Far East.

On land managed by the Forest Fund and occupied by the main tree species, coniferous forests (mainly larch, pine and spruce) prevail, occupying 76% of the area. Deciduous forests (mainly birch and aspen) occupy 22% of the area, while the rest of the territory (2%) is populated by hardwoods and shrubs.

Looking at statistics on changes in the forest area of Russia, it is worth noting that, at the beginning of 2021 (compared to 2000), the forest area of the Russian Federation slightly decreased, namely by 179 thousand hectares. The decline in forest area was mainly driven by two factors:

1. Illegal deforestation in the Russian Federation;
2. Large forest fires that have occurred over the past five years in particular.

As noted in the Strategy for the Development of the Forest Complex of the Russian Federation until 2030, approved by decree 312-r of the government of the Russian Federation on 11 February 2021, the problems of conservation and use of forests are becoming more diverse and complex. Forest management standards are changing to meet increased international, social, environmental and economic requirements. Threats of harmful organisms, forest death from fires, and other adverse factors have increased due to the consequences of climate change, as well as the risks of loss of forest biodiversity.

Andrey Laletin





# Ocean acidification in the climate negotiations

If ocean acidification was redefined as an effect of climate change, the UNFCCC could interpret its existing framework so that parties were required to take action on the issue.

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**Ocean acidification**, the often-neglected "other CO<sub>2</sub> problem," poses a serious threat to marine ecosystems and coastal communities worldwide (IPCC, 2022). The alteration of seawater chemistry, a direct consequence of human-induced carbon dioxide (CO<sub>2</sub>) emissions, disrupts the delicate balance on which marine organisms rely for survival. Coral reef regions are particularly vulnerable to ocean acidification, but its impacts extend beyond these areas, affecting biodiversity in high seas and marine regions at high latitudes (Fabry et al., 2009). As a result, coastal communities that depend on marine resources for sustenance and livelihoods face significant risks.

Despite its far-reaching implications, ocean acidification often remains overlooked amidst the multitude of consequences linked to climate change and rising CO<sub>2</sub> levels in the atmosphere. Termed the "other CO<sub>2</sub> problem" and the "equally evil twin of climate change", it languishes on the periphery of mainstream climate discourse. Framing ocean acidification as a distinct problem has left it in a legal "twilight zone" without a specific jurisdiction for mitigation efforts (Harrould-Kolieb, 2016). The UNFCCC is a body tasked with addressing climate change problems, but it seems that even at this level the Ocean Acidification problem is not properly addressed.

The Subsidiary Body for Scientific and Technological Advice (SBSTA) within the UNFCCC has so far acknowledged ocean acidification as an emerging issue of relevance. Recognising the significance of this problem, the SBSTA has outlined ocean acidification research as a priority under the Convention. Additionally, the Ad Hoc Working Group on Long-term Cooperative Action under the Convention has acknowledged ocean acidification as a

slow-onset event, which is relevant to the discussion of loss and damage caused by climate change (Harrould-Kolieb, 2016). But there is still no overall clear picture or strategy that describes how the UNFCCC should respond to the issue of acidification.

Proposals for legal amendments, the creation of a separate treaty, etc. have been suggested but may face challenges and conflicts among existing frameworks. A logical and straightforward approach would be not to separate ocean acidification from climate change issues, but to redefine ocean acidification as an effect of climate change (Harrould-Kolieb, 2019). By doing so, the UNFCCC could interpret its existing framework to include an obligation to address ocean acidification alongside other climate change impacts like sea-level rise.

Many countries, including those with significant ocean territories, have not yet fully documented the impacts of increasing CO<sub>2</sub> emissions on regional food security, ocean industries and marine economies (Gallo et al. 2017). To accurately assess the comprehensive effects of anthropogenic CO<sub>2</sub> emissions, it is crucial to increase emphasis on vulnerability assessments to illuminate the impacts of OA and to explicitly include the impacts of ocean acidification and ocean change within mitigation targets and adaptation strategies at national levels.

In recent years there has been a shift within the UNFCCC towards recognition of the ocean-climate nexus (under the Ocean and Climate Change dialogue process, in the texts etc.). But this is not enough to properly "institutionalise" and address ocean acidification across the UNFCCC, since the Ocean and Climate Change dialogue still lacks concrete, action-oriented goals. The dialogue should become a platform that addresses knowledge, capacity and process

gaps, and mainstream ocean-climate action within the UNFCCC and other UN bodies, including strengthening coordination of ocean acidification activities.

Addressing ocean acidification within the context of the UNFCCC and under the Ocean and Climate Change dialogue process is essential for preserving marine life and the well-being of communities that depend on the oceans' resources. Now is the time for concerted efforts to address this "equally evil twin of climate change" within the context of the UNFCCC, to protect our oceans and secure a sustainable future for all.

Sofia Sadogurska,  
Ecoaction, Ukraine

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# Children are not small adults when it comes to air pollution

Health effects – from the womb to the grave.

Exposure to air pollution has been documented to cause an alarming range of health effects among children. These not only affect children when they are young but can also negatively impact their health for the rest of their lives. The most direct health effects of air pollution exposure for children include impaired lung function, acute infections in the lower respiratory tract (i.e., the lungs, bronchial tree and trachea) and an increased risk of developing asthma and exacerbated asthma symptoms. However, children already begin suffering from the negative health consequences of air pollution while they are in the womb, with increased risk of being born prematurely or with a low birth weight. There is strong evidence that exposure to air pollutants in the form of small particles will harm children's neurodevelopment and decrease their mental development and motor skills. After being inhaled, these particles are small enough to enter the blood stream through the air-blood barrier (the alveolar-capillary barrier) in the lungs. As a result, the particles

gain unrestricted access to the rest of the child's body and its organs, including the brain, where they are believed to harm the blood-brain barrier.

Apart from these acute health risks, exposure to air pollution during childhood can also impair lung development, causing chronic lung disease and cardiovascular disease in adulthood. In other words, immense gains can be made in human health and wellbeing, as well as economic savings, by shielding our children from air pollution exposure. This text and some more information on children in Europe and air pollution has recently been released and can be downloaded here: <https://airclim.org/publications/air-pollution-europe-and-children%E2%80%99s-health>

Emilie Stroh



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## EU failing its children the right to breathe clean air

The European Environment Agency has also released a report on the state of air for children in Europe, showing that nearly all children across the continent are exposed to air pollution above World Health Organization (WHO) recommended limits.

Over 1,200 deaths in people under 18 years of age are estimated to be caused by air pollution every year in EEA member and collaborating countries. Nearly one in ten children in the EU are affected by asthma, placing a large burden on children, their families and societies. The risk of developing asthma itself and exacerbation of asthma symptoms is clearly linked to air pollution. Asthma symptoms can range from mild to very severe, even life-threatening. Exposure to short-term increases in air pollution increases the risk of asthma hospitalisation and emergency department visits for children.

"You can't think about children as little adults when it comes to air pollution. They receive more pollution, and it starts in

the womb and continues in kindergarten and onwards. We are failing our children on air pollution," says Gerardo Sanchez Martinez, an expert in environment and health at the EEA.

One in nine Europeans living in urban areas are exposed to levels deemed detrimental by WHO. The exposure is not equally distributed. Eastern European states with high levels of coal burning for domestic heating suffer the worst exposure, closely followed by Italy and in particular its lax air pollution measures in the Po Valley. A proactive stance by adults to protect European children is urgently needed, as the impact during childhood and pregnancy is non-reversible and may last a lifetime. Children have little choice

over where they live and cannot take measures to protect themselves. They are more exposed, more vulnerable and will suffer the health consequences of today's air pollution in the future. They have no voice, they cannot vote and they are often unaware of the threat to their health. They need adults to back policies to protect them and politicians to remember that every year ambitious air pollution policies are delayed means irreversible and life-long damage to children.

Air pollution and children's health — European Environment Agency (europa.eu) <https://www.eea.europa.eu/publications/air-pollution-and-childrens-health>



## T&E: Polluting planes and ships get green investment label from EU

According to a press-release by Transport & Environment (T&E), planes and ships that run on fossil fuels could be given 'green' investment status as the EU Commission recently published its updated list of sustainable investments.

T&E notes that "investments in more 'efficient' planes and ships would now be considered green, regardless of whether they still run on fossil fuels. Millions of euros could therefore be channelled towards some of Europe's biggest polluters like Airbus, Ryanair and MSC".

Cited in the press-release, Faig Abbasov, shipping director at T&E, said: "The inclusion of polluting planes and ships is the nail in the coffin of the EU's Taxonomy. If planes running on oil and ships running on gas are now considered sustainable, there is little hope for the Taxonomy. Europe's lawmakers must vote down this measure and save what's left of it."

T&E also highlights that the updated taxonomy comes

with a loophole for container and cruise ships powered by LNG. Even if LNG-powered ships in principle emit less CO<sub>2</sub> than traditional shipping fuels, "the EU's criteria ignore methane slips and downstream emissions from LNG". These factors can in fact result in climate effects that are even worse than those from the traditional fuels that are replaced. "This provides no incentive for shipping giants such as MSC and Carnival Cruises to invest in green shipping fuels as they will continue to benefit from green financing for ships fully powered by fossil fuels", as concluded by T&E.

T&E 6 April 2023, <https://www.transportenvironment.org/discover/polluting-planes-and-ships-get-green-investment-label-from-eu/>

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## EU Ambient Air Quality Directive

The European Parliament's Environment Committee published draft reports containing amendments on the proposal for a Directive on Ambient Air Quality and Cleaner Air for Europe in April 2023. The ENVI Committee will vote on the draft report and any amendments tabled to it on 26-27 June 2023. The European Parliament will then vote on adopting its negotiating position during a plenary

session provisionally scheduled for the week of 10-13 July 2023. In the Council, work is still ongoing at working party level. The Swedish Presidency of the Council plans to hold a first policy debate on the file at the Environment Council on 20 June 2023. The Council will need to finalise their internal position on the proposal, before informal negotiations (trilogues) are expected to begin with the aim of reaching an agreement, which then needs to be approved by the European Parliament and by the Council.

## ENVI committee ready to vote on Euro 7

The European Parliament's Environment (ENVI) Committee has indicated that it is now provisionally expected to adopt its report on the proposal on light- and heavy-duty vehicle emissions (Euro 7) on 20 September 2023. The Committee is provisionally scheduled to exchange views on the forthcoming rapporteur's draft report on the proposal on 15 June 2023, while ENVI MEPs would have until 21 June to table amendments. The three committees in the European Parliament that provide an opinion on the proposal – TRAN, ITRE and IMCO – have published draft reports. Transport & Environment (T&E) published

a position paper on Euro 7 in May 2023. The document starts by pointing to the failures of the European Commission's proposal and making recommendations. For cars, T&E says the proposal fails to set limits for the lifetime of the vehicle, to reduce pollution limits beyond those set for petrol cars 15 years ago, and will not reduce brake particles to a low level.

Draft reports from Committees can be found here: [europarl.europa.eu/doceo/document](https://europarl.europa.eu/doceo/document)

The T&E position paper is at [transportenvironment.org/wp-content/uploads/2023/05/2023\\_04\\_TE\\_Euro7\\_position\\_paper\\_2023.pdf](https://transportenvironment.org/wp-content/uploads/2023/05/2023_04_TE_Euro7_position_paper_2023.pdf)



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# The forefront of cleaner, people-centred cities

Cities are dense and struggling with high levels of air pollution, sedentary behaviour and noise problems linked to car-centred urban planning. Traffic also takes up large areas in cities, resulting in lack of green spaces, and it is obvious that our oil dependency has fuelled climate change. Three cities with governments that are up for the challenge of re-thinking cities are Paris, Oslo and Barcelona, which are working to transform their cities from car-centred to people-centred.

Ebba Malmqvist



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## Paris

**The brain behind** the 15-minute city is Carlos Moreno. The idea is simple: that anyone living in an urban environment, like Paris, should have access to all their daily needs – shopping, education, health, leisure, even work – within an easily reachable 15-minute walk or cycle ride. And because we are talking about Paris, somewhere to socialise, such as a bar, café or restaurant, is of course part of the planning.

“Unnecessary transport times have accelerated our lives, shortened our days to the detriment of family, leisure and the environment,” says Carlos Moreno, the city planner who came up with the concept in 2015.

The concept is that cities should be developed for people rather than cars and that the whole idea is to make life easier and healthier for everyone.

Paris is going ahead with the concept and has been doing so since 2020. An expanded network made up of hundreds of kilometres of new bike lanes is a key part of the project and it is certainly well used, with more and more people taking up cycling. Another focus is an expanding area of car-free streets and walkways along the banks of the Seine. Moreno’s idea was driven by his desire to come up with ways of cutting carbon emissions in cities and address the way that long commutes degrade quality of life. Mayor Hidalgo wants to make Paris greener, less polluted and more practical for its 2.2 million residents. She is also driven by a desire to make life more bearable during increasingly frequent and deadly summer heatwaves – in August last year, a temperature of 56°C was recorded in Paris. The mayor

wants to plant 170,000 trees by 2026 to mitigate the urban heat island effect. The city authorities are also tearing up concrete school yards to lay down soil and plant trees. School yards are also opened after school hours to serve as green areas for residents. Those who remember Paris for the crazy traffic around the Arc de Triomphe and Champs-Élysées will have to rethink their image of Paris. These areas will be turned into gardens, and polluting cars will be heavily restricted. The clean-up of the Seine has been accelerated so that people will be able to swim again in the Seine in 2025 – just over 100 years after the practice was banned in 1923.

Paris, the 15-minute city – The New European, <https://www.theneweuropean.co.uk/paris-the-15-minute-city/>



## Barcelona

**The government of** the city of Barcelona has approved a campaign christened “Let’s fill the streets with life” with the aim of improving the quality of life of people and bringing the city closer to solving environmental challenges. The goal is to make Barcelona a pleasant city to live in, by implementing “Superilles” (superblocks) based on reversing the distribution of public space between vehicles and people to prioritise citizens. The aim is to improve the environmental conditions and quality of life of the people. The first steps were taken in 2016 and involve creating superblocks in three neighbourhoods of Barcelona: Poblenou, Sant Antoni and Horta. In Sant Antoni, a 25% reduction in NO<sub>2</sub> levels and a 17% reduction in PM10 levels were observed in the intervention area. People report better rest, less perceived noise and air



pollution, and increased socialization. They found the superblocks to be quieter, more comfortable and safer environments that facilitate social interactions. A study found that the re-design of the city could

save 667 premature deaths from reductions in air pollution and noise, and more active travel.

[https://www.aspb.cat/documents/english-aspb\\_salut-carrers-resultsreport-superblocks/](https://www.aspb.cat/documents/english-aspb_salut-carrers-resultsreport-superblocks/)

## Oslo

**Oslo is another** city where politicians want to change the paradigm of cities built for cars. The Car-Free Livability Programme is about giving the streets back to people. Citizens of Oslo asked for more green areas, seating, culture and social interactions. They also asked for roads that accommodate cyclists, better public transport and fewer cars in the city centre.

“Our main objective is to give the streets back to the people,” Hanna Marcussen, Oslo’s Vice Mayor for Urban Development told BBC Future.



To reach this goal, Oslo began closing off streets in the city centre to cars entirely. The city removed 760 on-street parking spots inside the city’s inner ring road and replaced them with cycling lanes, benches and miniature parks. The first actions took place in six pilot areas in the summer of 2017, when half of the parking spaces were removed. Further parking spaces were removed in 2018, and measures were taken to change mobility patterns.

Oslo opened several new pedestrian streets and installed benches and playgrounds. Most importantly, they turned the traditional planning pyramid upside down – putting people’s needs at the top and private cars at the bottom. There has of course been opposition, but one key success was the involvement of public and private interests in the design process. Stakeholders, such as shop owners and trade associations, feared the consequences for customer access to shops in the city centre. The dialogue inspired and promoted innovations within the private sector, giving rise to environmentally friendly and health-promoting forms of mobility. Accessibility was also important and

those with disabilities were given more parking spaces than previously. Public acceptance improved even more when people started enjoying the people-centred streets, and the planners are expanding to more areas.

At the root of the changes in Oslo was a survey conducted by urban architect Jan Gehl which showed that many people found the city centre to be lacking in life. To bring about urban transformation and create more people-oriented cities, Jan Gehl recommends:

- Design based on environmentally friendly and efficient transportation, not “cheap petrol”.
- Let city life guide urban design.
- Design for all your senses, not just the ones you use when driving.
- Make public transportation and shared solutions more attractive and more accessible.
- Remove the cars!

Car-free Livability Programme, <https://www.oslo.kommune.no/getfile.php/13319592-1553857948/Content/Politics%20and%20administration/City%20development/Car%20free%20city/The%20Car-free%20Livability%20Programme%202019.pdf>

# The Swedish Greenwashing Prize

## – more than a decade of ironic awards highlighting misleading claims

Each year, for over a decade, Friends of the Earth Sweden has announced a winner of its Swedish Greenwashing Prize – an ironic booby prize that turns the spotlight on misleading and false claims.



**The award is** an important catalyst for debate on greenwashing and awareness on the issue, highlighting greenwashing by companies as well as authorities and politicians.

On 24 October 2022 the Svenska Skogen

campaign suddenly shut down its website, silencing the PR platform of forest owners in Sweden. On the same day, Friends of the Earth Sweden announced the winner of its annual Greenwashing Prize, which just happened to be the Svenska Skogen

PR campaign – as “a schoolbook example of greenwashing”.

One of the claims made by the PR campaign was that Swedish forests were managed in a way that “creates the conditions for species and new life”. This is a misleading claim. About a thousand forest species in Sweden are currently threatened, and more than a third of them are directly affected by clear-cutting. Another example of greenwashing by the campaign was a photo of a Canadian nature reserve which was used to illustrate the excellence of Swedish forestry.

The Svenska Skogen campaign is not alone in its use of greenwashing. An audit by the EU Commission showed that 42 per cent of statements about the environment online were exaggerated, false or misleading. So there is evidence

Five tips from Charlotte at FoE Sweden for those who want to scrutinise and raise awareness about greenwashing:

- ✦ Educate – explain what greenwashing is and why it is problematic, such as lulling consumers into a false sense of security.
- ✦ Activate – get the public involved, for example by asking them to vote for or report misleading adverts.
- ✦ Define – have a clear definition of greenwashing, preferably a broad one that includes different methods and actors.
- ✦ Use images – advertising is visual and there are great opportunities to highlight adverts with images that illustrate the bizarre aspects of greenwashing.
- ✦ Satire and humour – perhaps the most effective tool of all.



that greenwashing is increasing on a wide scale.

Friends of the Earth Sweden works systematically to highlight and scrutinise greenwashing. Since 2009, the organisation has selected an annual winner of its Swedish Greenwashing Prize – an ironic booby prize that turns the spotlight on organisations that “falsely present their activities as sustainable”. FoE Sweden uses a broad definition of greenwashing that includes other actors such as political parties or authorities that have failed to fulfil their environmental promises or have been misleading in their communications. Nominations for the Greenwashing Prize are made by the public, and Friends of the Earth’s board of directors then selects the candidates for the final vote. The winner and other finalists are all invited to a dialogue so that they can give their views on the issue.

Charlotte Lundqvist from Friends of the Earth describes the award as a catalyst for debate on greenwashing: “The award has contributed to greater scrutiny of greenwashing in the media, and to wider public awareness of greenwashing and its consequences”.

In 2019 the prize was won by the oil company Preem. The company was planning a massive expansion of its oil refinery at that time. The plans, which were later shelved due to widespread protests, would have made Preem Sweden’s largest emitter of fossil fuels, doubling its annual emissions from 1.7 to 3.4 million tonnes.

Some winners of the Greenwashing Prize over the years:

- 2022 – Svenska Skogen (campaign by the Swedish forest industry)
- 2021 – AP-fonderna (pension funds)
- 2020 – Sveaskog (state-owned forest company)
- 2019 – Preem (petroleum and bio-fuel company)
- 2017 – Svenskt Flyg / Swedish Air Transport Society
- 2012 – Stora Enso (forest company)
- 2009 – Vattenfall (state-owned energy company)

A complete list of winners of the Greenwashing Prize since it was introduced in 2009 can be found here on the FoE Sweden website.

At the same time Preem was promoting its plans as part of preparedness efforts in editorial adverts, as well as highlighting its work on “green” diesel made from pine oil. Greenpeace Sweden compiled and analysed Preem’s misleading adverts under the banner Preemwashing. For example, there are editorial adverts with headlines such as “Preem has the lowest carbon dioxide emissions in Europe”, “New fuel lets you fly without anxiety” and “When the crisis comes to Sweden – Preem meets Swedish preppers” – each of them with misleading messages.

Another winner worth mentioning is Swedish airline Svenskt Flyg, which was singled out for its inaccurate calculations of its climate impact by stating emissions per seat instead of its total climate impact. AP Fonderna, the Swedish national pension funds, has won the prize twice – for its extensive investments in oil companies despite its sustainable investment goals and claims of being a “world leader”.

There is also a whole group of winners that includes authorities and politicians who have given misleading information or broken promises, such as the Swedish Transport Administration’s work on the Stockholm bypass motorway and the Environment Minister at the time, Andreas Carlgren, who claimed it was an “environmental and climate-friendly alternative for Stockholm”. Charlotte Lundqvist believes it is important to scrutinise those in power from a greenwashing perspective, although she adds that the most impactful winners of the Swedish Greenwashing Prize have been companies. She also sees potential for more nominations of think tanks and financial actors in the future.

– Ultimately, we need legislation and action by the authorities to put an end to greenwashing,” she says. “So far, there have been too few cases that have led to fines. This is a problem. So more resources are needed to pursue cases in court. It is also vital that we and other actors in civil society continue to scrutinise and highlight examples of greenwashing,” adds Charlotte. “We know from experience that this is of great importance.

So what does the Svenska Skogen website look like today? As of April 2023, it is still closed due to “work in progress”. Meanwhile, Friends of the Earth have already started work on selecting the winner of the Swedish Greenwashing Prize for 2024.

Anna Jonsson

## More than 1.6m homes will be powered by the world’s deepest offshore wind turbine

**The world’s deepest** offshore wind turbine has been installed in Scotland at a sea depth of over 58 metres. The turbine is one of 114 turbines in the £3bn Seagreen project. It is a joint venture between SSE Renewables and France’s TotalEnergies, and is located 27 kilometres off the Angus coast.

The 1 GW wind farm started generating electricity in August 2022 and will be fully operational by summer. At this point it will power the equivalent of 1.6 million homes.

The installation of the world’s deepest offshore wind turbine foundation marks a significant milestone in the Seagreen project, which is part of SSE’s plan to invest £12.5bn by 2026 in projects that can accelerate the UK’s path towards becoming a net-zero economy.

Alistair Phillips-Davies, the SSE chief executive, said “This is not only a significant step on the road to project completion but also shows how we continue to innovate and push the boundaries of technology to power change.” He added “But we want to

do more and now is the time to accelerate if we are to achieve the UK’s target of 50 GW of offshore wind by 2030.”

Source: The Guardian 11 April 2023, <https://www.theguardian.com/business/2023/apr/11/worlds-deepest-offshore-wind-turbine-scottish-coast-sse-seagreen>



# The EU needs to do more to reduce methane emissions

The EU has signed the Global Methane Pledge but action to slash methane emissions in the energy and agriculture sectors is lagging behind. Urgent measures are needed to reduce methane emissions while at the same time much more action is also needed to reduce all other greenhouse gas emissions.

**Methane (CH<sub>4</sub>)** is a powerful greenhouse gas, second only to carbon dioxide (CO<sub>2</sub>) in its overall contribution to climate change and responsible for about a third of current climate warming. Although it remains in the atmosphere for a shorter period than carbon dioxide (around 12 years), methane is a far more powerful climate forcer (with a global warming potential of around 28 times that of carbon dioxide over 100 years and around 81 times over 20 years). The Intergovernmental Panel on Climate Change (IPCC) notes that deep reductions in methane emissions must be achieved by 2030 for the world to stay below the Paris Agreement's 1.5°C global temperature target. The most recent Assessment Report of the IPCC (AR6) underlines the role of methane as one of the main greenhouse gases responsible for climate change. The report explains that methane levels are at an all-time high and well above emission levels compatible with limiting warming to 1.5°C. There is thus a need for a sharp, rapid and sustained reduction in methane emissions to slow down global average temperature rise.

**As greenhouse gases** differ in how they impact temperature rise and climate change, scientists and policymakers use simple accounting measures called 'metrics' to compare the effects of different gases. Metrics can be used to place emissions of different greenhouse gases on a common scale, usually taking CO<sub>2</sub> as the reference, thus expressing emissions as CO<sub>2</sub>-equivalents (CO<sub>2</sub>-e). One of the most commonly used metrics is the Global Warming Potential (GWP). GWP measures the climate effect resulting from emissions of a given greenhouse gas over a chosen time horizon, relative to the effect of emissions of CO<sub>2</sub> (the reference gas).

As greenhouse gases differ in how long they persist in the atmosphere, the choice of time horizon can strongly influence the metric and reflects a value judgement with respect to short- and long-term priorities of mitigation and temperature targets. For example, CH<sub>4</sub> has a lifetime of around 12 years and a GWP of around 28 (meaning 1 unit of methane is counted as equivalent to 28 units of CO<sub>2</sub>) over a time horizon of 100 years (GWP100), and a GWP of around 81 over a much shorter period of 20 years (GWP20) (see table 1 from the IPCC's Sixth Assessment Report).

Obviously it is crucial that in both international and national climate policies the metric used is consistent with the choice that informed the Paris Agreement: the Global Warming Potential over a time horizon of 100 years (GWP100). While the Paris Agreement itself allows for different interpretations with regard to the appropriate choice of metric, in the Paris Agreement Rulebook countries agreed to use the GWP100 metric to report aggregate greenhouse gas emissions and removals. In addition, countries may use other metrics to report supplemental information but the main reporting has to be based on the GWP100 metric.

Advocates for increased action on methane (and other short-lived gases such as HFCs) have been using the GWP20 metric to highlight the importance of action on short-lived gases and to stress the benefits of slashing methane to avoid temporary overshoots of the 1.5°C temperature limit. There have also been proposals that the UN-FCCC should adopt a dual-term greenhouse gas accounting standard: using a 20-year GWP alongside the presently accepted 100-year GWP. Because many countries' Nationally Determined Contributions (NDCs) and Long-Term Low Greenhouse



Gas Emissions Development Strategies have a “basket of gases” approach, where the emissions of greenhouse gases are weighted by the GWP100 metric, shifting greenhouse gas emission reduction goals to be set under a 20-year GWP increases the weighting of short-lived gases in any target. This would have the consequence of significantly increasing the reductions of gases like methane while reducing the pressure on long-lived gases like CO<sub>2</sub>. It is argued that the advantage of such a change would be to more rapidly reduce short-term warming and buy time for CO<sub>2</sub> reductions.

Multiple scientists have spoken out to make it clear that such changes would be counterproductive and the benefits overstated. They conclude that:

- Within a basket of gases approach, differentially reducing emissions from short-lived gases more than CO<sub>2</sub> may reduce the rate of warming for several years, but the relative cooling effect will diminish in time and be massively outweighed by the additional warming over subsequent decades and centuries caused by the relatively higher concentrations of CO<sub>2</sub>;
- As a consequence, introducing a 20-year GWP in reporting or accounting would



**Table 1. Emissions metrics for selected species: global warming potential (GWP), global temperature-change potential (GTP).**

Species	Lifetime (Years)	Radiative Efficiency (W m <sup>-2</sup> ppb <sup>-1</sup> )	GWP-20	GWP-100	GWP-500	GWP-50	GWP-100	CGTP-50 (Years)	CGTP-100 (Years)
CO <sub>2</sub>	Multiple	1.33 ± 0.16 × 10 <sup>-5</sup>	1.	1.000	1.000	1.000	1.000		
CH <sub>4</sub> -fossil	11.8 ± 1.8	5.7 ± 1.4 × 10 <sup>-4</sup>	82.5 ± 25.8	29.8 ± 11	10.0 ± 3.8	13.2 ± 6.1	7.5 ± 2.9	2823 ± 1060	3531 ± 1385
CH <sub>4</sub> -non fossil	11.8 ± 1.8	5.7 ± 1.4 × 10 <sup>-4</sup>	79.7 ± 25.8	27.0 ± 11	7.2 ± 3.8	10.4 ± 6.1	4.7 ± 2.9	2675 ± 1057	3228 ± 1364
N <sub>2</sub> O	109 ± 10	2.8 ± 1.1 × 10 <sup>-4</sup>	273 ± 118	273 ± 130	130 ± 64	290 ± 140	233 ± 110		
HFC-32	5.4 ± 1.1	1.1 ± 0.2 × 10 <sup>-1</sup>	2693 ± 842	771 ± 292	220 ± 87	181 ± 83	142 ± 51	78,175 ± 29,402	92,888 ± 36,534
HFC-134a	14.0 ± 2.8	1.67 ± 0.32 × 10 <sup>-1</sup>	4144 ± 1160	1526 ± 577	436 ± 173	733 ± 410	306 ± 119	146,670 ± 53,318	181,408 ± 71,365
CFC-11	52.0 ± 10.4	2.91 ± 0.65 × 10 <sup>-1</sup>	8321 ± 2419	6226 ± 2297	2093 ± 865	6351 ± 2342	3536 ± 1511		
PFC-14	50,000	9.89 ± 0.19 × 10 <sup>-2</sup>	5301 ± 1395	7380 ± 2430	10,587 ± 3692	7660 ± 2464	9055 ± 3128		

Source: Table 7.15 in the IPCC ARG WGI report

**Table 2. Sectoral GHG emissions and reductions depending on different scenarios**

	BSL	MIX-50	REG	MIX	MIX-non-CO <sub>2</sub> variant	CPRICE	ALLBNK
% change 2030 GHG emissions versus 1990							
Total GHG incl. LULUCF112	-46.9%	-51.0%	-55.0%	-55.0%	-55.1%	-55.0%	-57.9%
Total GHG excl. LULUCF	-45.1%	-49.0%	-52.8%	-52.8%	-52.8%	-52.8%	-55.5%
% change 2030 GHG emissions versus 2015							
CO <sub>2</sub> emissions	-32.7%	-37.7%	-42.7%	-42.6%	-41.9%	-42.6%	-46.0%
Supply side113	-50.3%	-58.0%	-67.3%	-67.5%	-65.7%	-67.5%	-73.1%
Power generation114	-53.0%	-60.8%	-69.6%	-70.8%	-68.7%	-70.4%	-76.1%
Industry115	-18.2%	-20.3%	-21.0%	-22.4%	-22.1%	-23.3%	-25.1%
Residential	-47.2%	-56.5%	-63.6%	-62.0%	-61.9%	-61.0%	-64.8%
Services	-48.7%	-56.5%	-53.5%	-57.8%	-58.1%	-60.4%	-60.6%
Agriculture energy	-30.5%	-36.3%	-37.0%	-37.3%	-37.4%	-37.7%	-39.2%
Transport	-12.5%	-14.9%	-17.6%	-16.3%	-16.4%	-15.6%	-17.7%
Of which Road Transport	-16.4%	-18.3%	-20.7%	-19.6%	-19.6%	-18.9%	-20.6%
Intra EU aviation & navigation	23.5%	16.7%	11.6%	13.7%	13.7%	14.4%	8.5%
Non-CO <sub>2</sub> emissions	-22.3%	-26.7%	-31.0%	-31.0%	-34.5%	-31.0%	-34.5%

Source: [https://eur-lex.europa.eu/resource.html?uri=cellar:749e04bb-f8c5-11ea-991b-01aa75ed71a1.0001.02/DOC\\_1&format=PDF](https://eur-lex.europa.eu/resource.html?uri=cellar:749e04bb-f8c5-11ea-991b-01aa75ed71a1.0001.02/DOC_1&format=PDF)

- likely give countries a perverse incentive to refrain from the deep reductions of CO<sub>2</sub> emissions that have already been delayed for far too long;
- This would result in higher CO<sub>2</sub> concentrations than would otherwise be the case. Which would not only affect climate change but would also increase ocean acidification (resulting from higher levels of CO<sub>2</sub> absorption by our oceans);
  - Given the ultimate objective of the Convention in its Article 2 to “prevent dangerous interference in the climate system”, moving to an accounting framework that reduces mitigation focus on CO<sub>2</sub>, and as a consequence adds to long-term warming compared to the present 100-year GWP approach, does not seem well justified;
  - If the focus shifts to reducing short-lived greenhouse gases, we shift the burden of

increased climate impacts and damages more and more to future generations and would ultimately increase the need to deploy negative CO<sub>2</sub> emissions technology.

Interpreting the Paris Agreement goals by using a metric that is significantly different from the GWP100 metric used in the IPCC Fifth Assessment Report could lead to profound inconsistencies in the mitigation architecture of the Agreement. It could even undermine the integrity of the Agreement’s mitigation target altogether by failing to deliver net-zero CO<sub>2</sub> emissions and thus failing to ensure warming is halted.

**An example of** how greater emphasis on reducing emissions of non-CO<sub>2</sub> gases within an existing framework can lead to policy changes can be found in the European Commission’s 2030 EU Climate Target Plan. In the Impact Assessment

for this proposal, the Commission looked at multiple scenarios, including a scenario with increased action on non-CO<sub>2</sub> gases. In the assessment the Commission analyses the impact of the most ambitious scenarios for reducing non-CO<sub>2</sub> emissions (within a framework where the overall target remains at -55%): “If this level of non-CO<sub>2</sub> mitigation is achieved, it could in principle allow for taking less action on RES and EE to achieve the same 55% GHG reductions.”

Table 2 shows the different impact of scenarios with regular (MIX) and additional action on non-CO<sub>2</sub> emissions (MIX-non-CO<sub>2</sub> variant).

It should be noted that in all scenarios of the 2030 Climate Target Plan, reductions of methane emissions will be lower than the reductions that will be achieved for CO<sub>2</sub> emissions. There are multiple reasons for

this, including that: (a) methane emissions were reduced substantially faster than CO<sub>2</sub> emissions prior to 2015 and hence CO<sub>2</sub> emission reductions are catching up; (b) most methane reductions were achieved in the energy sector and reductions would now have to focus on the agriculture and waste sectors which are harder to achieve; and (c) in general EU emissions reductions have taken place more stringently under the EU Emissions Trading Scheme, which only covers CO<sub>2</sub> emissions.

So before looking at 2030 methane policies and targets, let's have a look at the evolution of methane emissions in the EU. Four elements are important:

1. Methane emissions were, on average, reduced more sharply than CO<sub>2</sub> emissions until the start of substantial climate action in the EU in 2005, after which emission reductions in CO<sub>2</sub> and greenhouse gases overall have caught up;
2. The biggest reductions in methane emissions occurred prior to the start of EU climate action in 2005 and reductions have slowed down (rather than increased) since then;
3. These early reductions in methane emissions occurred most prominently in Central and Eastern European ("new") member states that joined the EU in 2004 or later, and thus can be linked to economic developments that happened after the break-up of the Warsaw Pact rather than to dedicated action; and,
4. Reductions in methane emissions were largest in the energy sector, while emission reductions in the waste and agricultural have been slow, leading to an increase in the share of methane emissions from these two sectors from 78% in 1990 to 88% in 2020.

First, comparing reductions in methane and in CO<sub>2</sub> emissions. Graph 1 shows the evolution of both methane and CO<sub>2</sub> emissions in the EU27 for the period 1990 to 2020. While CO<sub>2</sub> emissions have seen a slight decrease between 1990 and 2005 (almost exclusively occurring in Central and Eastern Europe), methane emission reductions have been rather stable and have not visibly increased after 2005. By 2020, methane and CO<sub>2</sub> emission reductions are almost at the same level.

Second, comparing reductions in methane emissions pre- and post-2005.

Table 1 below compares average annual

reductions in EU27 methane, CO<sub>2</sub> and overall greenhouse gas emissions for the periods 1990 to 2005 and 2005 to 2020. The numbers clearly show that while EU policies starting from 2005 contributed to increased emission reductions of CO<sub>2</sub> and all greenhouse gases in general, reductions in methane emissions actually slowed down substantially. To be in line with 1.5°C compatible pathway, the EU would need to almost double its annual emission reductions since 2005.

Third, comparing methane emission reductions in "new" (EU13) and "old" (EU14) member states. Graph 2 shows that reductions in methane emissions have occurred more strongly in the EU's Central and Eastern European member states, which joined the EU from 2004 onwards (referred to as the "new" member states). Most of this difference happened in the period before 2005. Since then, annual methane emission reductions have been very similar across the EU27.

And finally comparing methane emission reductions in different sectors, when looking at the three main sectors where methane emissions occur, we note that a very large share of reductions in methane emissions occur in the energy sector while hardly any progress is made in the agriculture sector (see Graph 3).

**The EU is a signatory to the Global Methane Pledge** that was launched at COP 26 in November 2021 in Glasgow. Participants who joined the Pledge agreed to take voluntary actions to contribute to a collective effort to reduce global methane emissions by at least 30 per cent from 2020 levels by 2030. The Pledge recognises that action on methane must "complement and supplement, not replace global action to reduce carbon dioxide emissions". More than 150 countries have subscribed to the pledge. Various studies indicate that to be in line with 1.5°C pathways, global methane emissions would need to be reduced by as much as 35 to 45% between 2020 and 2030.

The EU is definitely not on track to contribute fairly to the -30% commitment under the Global Methane

Pledge. With current policies, EU methane emissions are estimated to decline by 13.4% between 2020 and 2030. Hence the European Commission developed a Methane Strategy and proposed a Regulation to reduce methane emissions from the energy sector to complement actions in the agriculture and waste sectors that are (to be) embedded in the "Farm to Fork" strategy, the Common Agricultural Policy, the Industrial Emissions Directive, the Landfill Directive and EU waste legislation.

But even then, the EU would lag behind in contributing its fair share to the Global Methane Pledge. When the effect of the proposed Regulation on methane reduction in the energy sector is included, a 15 to 17% reduction could be realised.

CE Delft has calculated that much greater emission reductions, even well beyond 30% are possible through a combination of different measures across sectors:

Three scenarios, which constitute different combinations of methane mitigation measures, have been worked out and their effects on potential EU methane reduction examined.

- In the Maximum scenario, all methane mitigation measures are included, and 100% of EU consumers switch to an advised diet following national dietary health guidelines. This scenario indicates that the maximum methane reduction that could be realised in the EU between 2020 and 2030 is 7.5 to 10.3 Mt/year, or 49 to 68% of annual methane emissions.
- In the Pledge scenario, we have combined measures with which a total EU methane reduction of 30% can be obtained, in line with the Global Methane Pledge ambition. In this scenario, only 10% of EU consumers switch to an advised diet with lower meat and dairy consumption. A reduction of 26 to 34% is estimated to be achievable by means of various methane mitigation measures, distributed among the sectors.

- In the Science scenario, we have combined measures with which a total EU methane reduction of 45% can be obtained, following the scientific advice in the Global Methane Assessment. Here, 50% of EU





Graph 1: Reductions in EU27 methane and CO<sub>2</sub> emissions since 1990 (source: EEA GHG data viewer)

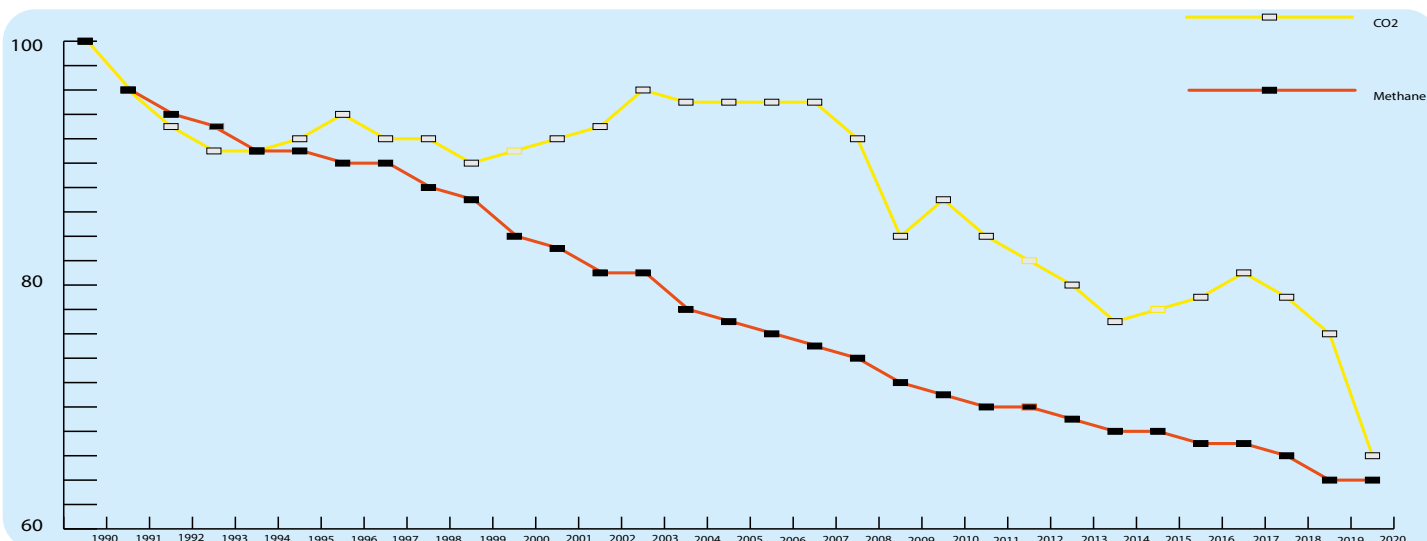


Table 3. Average annual EU27 emission reductions for different gases (source: EEA GHG data viewer)

	Average annual reductions		
	Methane	CO <sub>2</sub>	All GHG
1990-2005	1.50	0.31	0.52
2005-2020	0.90	1.96	1.70
1990-2020	1.20	1.13	1.11

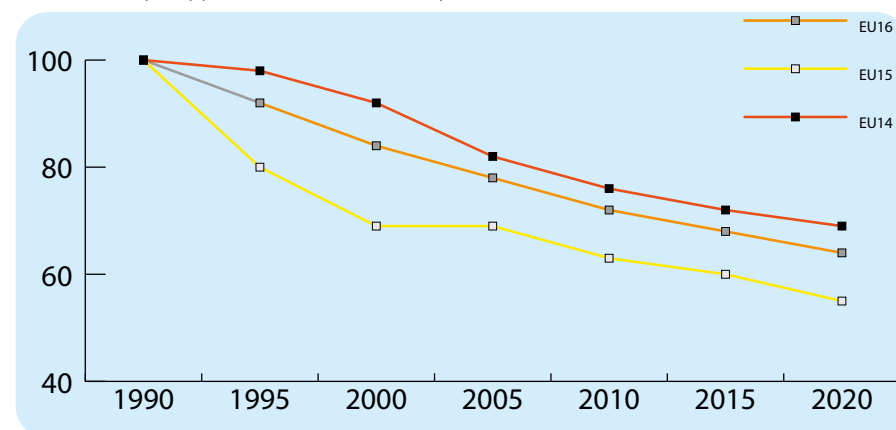
Table 4. EU27 methane emissions from different economic sectors (source: EEA GHG data viewer)

	Percentage of total anthropogenic methane emissions in EU27		
	Agriculture	Waste	Energy
1990	44	27	22
2005	46	30	17
2020	54	27	12

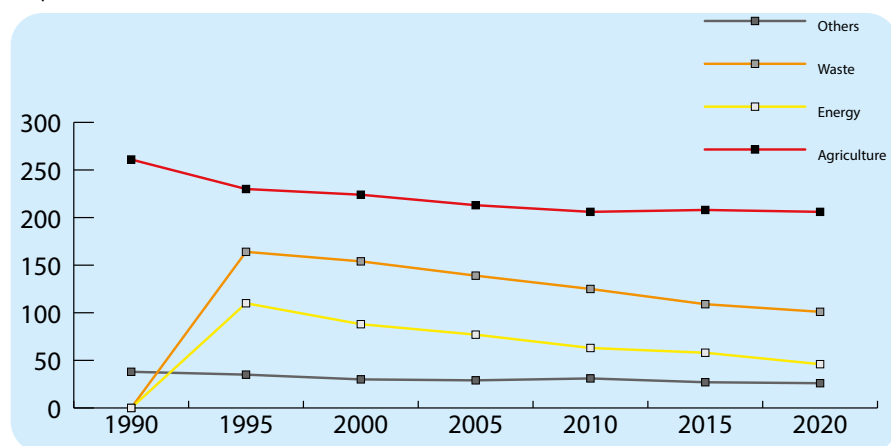
consumers switch to an advised diet with lower meat and dairy consumption. A total reduction of 38 to 47% is realised through a combination of different measures across sectors.

It has been made clear multiple times that the EU's 2030 climate target of at least -55% greenhouse gas emission reductions compared to 1990 levels is not compatible with the Paris Agreement's 1.5°C target. This target needs to be revised and increased. While that process is underway, increased action on reducing methane emissions should not reduce incentives to reduce CO<sub>2</sub> emissions and should be counted on

Graph 2: Reductions in methane emissions in the EU27, the "old" member states (EU14) and the "new" member states (EU13) (source: EEA GHG data viewer)



Graph 3: Evolution of EU27 methane emissions from different economic sectors



top of the envisaged reduction of methane emissions under the 2030 Climate Target Plan. This can be done, in a way that is very similar to how carbon removals from Land Use, Land Use Change and Forestry (LULUCF) have been dealt with in the Climate Law.

While the LULUCF Regulation has set a target for carbon removals from LULUCF to be increased to 310 million tons of CO<sub>2</sub> by 2030, the Climate Law stipulates: "In

order to ensure that sufficient mitigation efforts are deployed up to 2030, ..., the contribution of net removals to the Union's 2030 climate target shall be limited to 225 million tonnes of CO<sub>2</sub> equivalents. In order to enhance the Union's carbon sink in line with the objective of achieving climate neutrality by 2050, the Union shall aim to achieve a higher volume of its net carbon sink in 2030."

Wendel Trio

# Green alternatives can replace Russian gas by 2028

Europe could replace its Russian fossil gas supplies with green alternatives by 2028, but it will require significant investment, policy improvements and upskilling, according to a report by the Oxford Sustainable Finance Group.

The study titled “The Race to Replace: the economics of using renewables to free Europe from Russian gas” weighs up the costs and benefits of completely replacing pre-war levels of Russian gas imports with green alternatives in the next five years. This would help Europe achieve its climate goals, improve energy security and support EU industry. However, this transformation will be out of reach if Europe fails to put the necessary drivers in place.

To switch to green alternatives, European policymakers need to focus on four key areas. First, public and private funding is required to facilitate the massive rollout of renewables and heat pumps. The total investment requires capital expenditure of €811 billion, but up to 90% of the costs can be recovered from fuel savings that could be made by avoiding expensive gas purchases.

Second, policymakers need to ensure that Europe has the skilled workers it needs to install and maintain green technology. The European Union has a significant skills gap and has already started work to

address it with several skills partnerships created with the industry to train workers.

Third, Europe needs to address the security of its supply chains. There are growing concerns that the EU is over-reliant on countries like China for renewable technology materials, such as lithium and rare earths, leaving the bloc vulnerable to supply disruptions.

And finally, Europe’s permitting procedures need to be accelerated, and its electricity networks must be improved to accommodate the required surge in green energy. Many renewable projects are stuck in permitting processes, while others are curtailed due to a lack of grid capacity.

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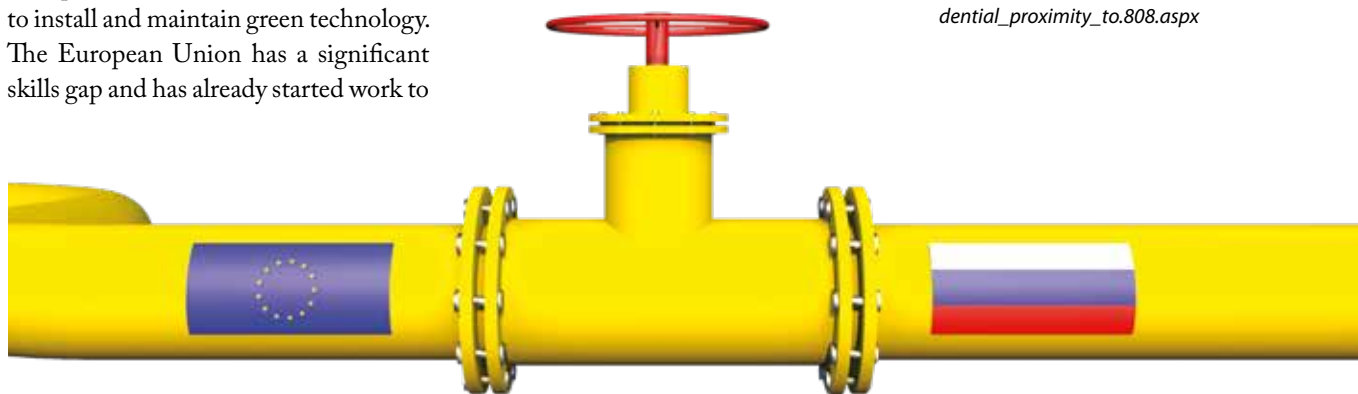


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## Petrol stations increase cancer risk

Benzene exposure is a known risk factor for childhood leukaemia and acute myeloid leukaemia in adults. One exposure route for benzene is living near a petrol station. A new study has investigated cancer risks in children living near petrol stations in Switzerland. The researchers found evidence of an increased risk of childhood cancer (all diagnoses combined) among children living in the close vicinity of petrol stations.

[https://journals.lww.com/environepidem/Full-text/2019/10001/Childhood\\_cancer\\_and\\_residential\\_proximity\\_to.808.aspx](https://journals.lww.com/environepidem/Full-text/2019/10001/Childhood_cancer_and_residential_proximity_to.808.aspx)



## The 7th Saltsjöbaden Clean Air Workshop 2023

In the middle of March this year over 200 experts, researchers, and negotiators from all over the world gathered in Gothenburg, Sweden. The aim was to strengthen the international work for better air quality. The meeting is arranged within the framework of the Swedish EU presidency. The meeting

included representatives from WHO, UNEP and the World Bank, as well as around 40 countries from Europe, North America, South America, Asia, and Africa. The meeting ended with a focus on expanded international cooperation through the newly started Forum for International Cooperation on

Air Pollution, FICAP, organized by the Environmental Protection Agency and the British government. The meeting was held under the Chatham House rules which opened for hearty discussions and solutions and we look forward to the meeting report of suggestions to move forward.



# E-fuels are a detour on our way to decarbonisation

It takes four times as much energy to drive a car on e-fuels compared to batteries. In addition, they emit as much air pollution as a car running on fossil fuels.

**At the eleventh** hour of the agreed EU-wide phase-out of Internal Combustion Engine (ICE) cars by 2035, Germany wanted to add a loophole. The push was championed by the oil and auto industries, to allow the continued production after 2035 of ICE cars. The push allowed for ICE cars beyond 2035 if they run on synthetic petrol and diesel – also known as e-fuels. This article will reflect on some of the implications of this push.

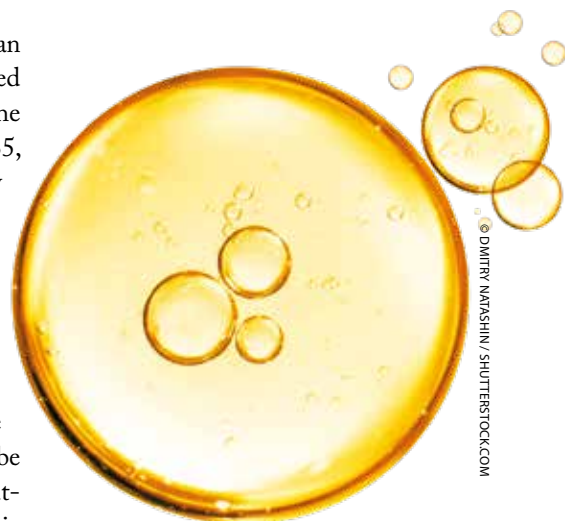
E-fuels are made by separating hydrogen from water and adding CO<sub>2</sub>. Although the fuels themselves may be made using renewable power, the process is energy intensive. The production of e-fuels would likely be a waste of valuable green energy and their combustion would require direct air capture technology to avoid releasing as much greenhouse gas as fossil fuels. It has been calculated that the e-fuels proposal would derail the decarbonisation of the new fleet and displace up to 46 million electric car sales. The e-fuel intended for new cars could instead have played a role in existing combustion engines not having to rely on fossil petrol. It is estimated that the new e-fuel cars could push old ICE cars to an additional burning of 135 billion litres of fossil petrol.

Furthermore, the complex production processes for e-fuels will make them expensive and energy-dense. In 2030, an average driver in the EU would pay €782 a year more for e-petrol than for conventional fuel, according to Transport & Environment studies. The Potsdam Institute has also calculated that the industrial-scale use of direct air capture to produce e-fuels would mean they would cost four times the price of petrol. Pulling molecules out of air and water is energy-intensive, making it four times more efficient to use renewable electricity to charge an electric vehicle battery than to use it to make e-fuel for a car, accord-

ing to an International Council on Clean Transport (ICCT) study. If all planned e-fuel projects were to materialise, the Potsdam institute forecasts that, by 2035, global production would still cover only 10 per cent of Germany's essential demand for e-fuels (from aviation, shipping, and the chemical industry).

**And finally,** the German push was also a sad day for air pollution, as combustion inevitably emits pollutants. While synthetic fuels can at least theoretically be carbon neutral, they still emit air pollutants, notably toxic NO<sub>2</sub> and carcinogenic particles. Cars running on e-fuels could emit up to 160,000 tonnes of additional NOx pollution in the EU by 2050 – more toxic emissions than from Italy's car fleet in an entire year. A study comparing air pollution from e-fuels with petrol found no reduction in NOx emissions for any of the e-fuels tested, either in the lab or on road tests, compared to today's petrol fuel, so the use of e-fuels in cars will have little impact on toxic NO<sub>2</sub>/NOx pollution across Europe's cities. While there was a decrease in particle number concentrations for e-fuels, they still emit an enormous number of particles – at least 2.2 billion particles for every kilometre driven. There was no difference in particle mass concentrations and there was an increase in carbon monoxide, ammonia and hydrocarbon emissions from e-fuels compared to fossil fuels. So, the push for e-fuels is not a push for cleaner air.

With road traffic being a large contributor to the air pollution problem in our cities, maybe e-fuels are best used in other areas. One person who is a bit more positive about e-fuels is Roland Dittmeyer, director of the Institute for Micro Process Engineering at the Karlsruhe Institute of Technology (KIT) in Germany. Dittmeyer drives an electric vehicle but thinks e-fuel



might be a helpful alternative for decarbonising aviation where heavy batteries might be a hindrance for longer distances.

One might ask who, given all the above, would push for e-fuels in passenger cars?

Seven of the eFuel Alliance's 15 board members currently work, or have previously worked, in the oil industry, including Jens-Christian Senger, ExxonMobil's managing director in Germany. Even if the push for a fossil-free society is underway, the question is now one of speed and scale. The oil industry's game is to slow things down in Europe while building up fossil demand elsewhere. But as the IPCC laid out very clearly, the future of our planet and our children requires us to move out of oil, coal and gas at breakneck speed.

Ebba Malmqvist

T&E 31 March 2023, "The big e-fuel lie <https://www.transportenvironment.org/discover/the-big-e-fuel-lie/>

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# Green incentives are at the heart as UK rolls out its CAP replacement

Public money for public goods is the principle behind the new Environmental Land Management schemes in England – the jury is still out on whether it can sustain farmers' livelihoods while also protecting the environment.

**In February 2023** the UK Government published a policy paper – Environmental Land Management (ELM) update: how government will pay for land-based environment and climate goods and services – which lays out the most significant reform to agricultural policy and spending in England in decades as the UK moves from the EU's Common Agricultural Policy (CAP).

The major difference in approach is that, while the CAP was never supposed to be a food production subsidy, it was in effect based on how much land was owned or managed by farmers. Now the UK Government is using the opportunity of leaving the EU to phase out these payments for land ownership and tenure and radically improve its services to farmers. There has been an openness to reform, which stands in stark contrast to the difficulties of changing the CAP in recent decades.

Agricultural policy in the UK is devolved, and when the UK was a member of the EU the four national governments were responsible for administering subsidies according to EU rules. Outside the EU, the different administrations are free to develop their own schemes. In this article I focus on the new ELM schemes in England, as they are currently at a critical stage.

In England, the Department of Environment, Food and Rural Affairs (Defra),

through what is termed the “Agricultural Transition”, is moving from CAP Basic Payment Scheme (BPS) direct payments to the ELMs system, in a transition that started in 2021 and is planned for completion in 2027. From 2024, BPS funding will no longer require land against which to set a claim, a process named “delinking” and the 2023 claim will be the last in which BPS entitlements can be activated for payment.

Defra is expanding its schemes to pay farmers and land managers to provide environmental goods and services alongside food production; and providing one-off grants to support farm productivity, innovation, research and development in a way that also helps achieve these goals. ELM schemes have been described, by the environment secretary, as the “main tool” for delivering improvements to water quality and biodiversity, key elements of the government's 25 Year Environment Plan. The scheme is also expected to support the government's net-zero ambitions by helping to reduce agricultural greenhouse gas emissions, protecting and increasing carbon stores and supporting ecosystem resilience.<sup>1</sup>

In 2018, UK farmers (in all four countries) received around £3.5 billion per year in CAP payments, that fell under two main pillars. Pillar one involved direct payments, which made up 80% of the UK's 2018 CAP budget,

where farmers received payments based on how much land they farmed, although they were required to meet “greening” requirements and risked having their subsidy cut if they did not comply with environmental regulations. Pillar two covered rural development payments, making up 20% of the UK's 2018 CAP budget, providing financial support for delivering environmental benefits such as preserving habitats and managing flood risks, improving farm efficiency through actions such as reducing feed and pesticide use, and supporting rural development. These payments were provided through multi-annual Rural Development Programmes, such as the Countryside Stewardship Scheme.

These CAP payments in England will now be replaced by the ELM schemes, which include transitional schemes before they become fully operational, worth £2.4 billion per year<sup>2</sup>. Thus, maintaining the level of spending on farming.

Environmental Land Management has three components:

- 1. The Sustainable Farming Incentive (SFI)** will pay farmers for taking actions above minimum legal requirements to promote wildlife diversity, use water efficiently, enhance hedgerows and manage croplands and grasslands, while continuing to use their land for production. Pilot schemes



were launched in 2021 and additional standards are being released sequentially with full rollout by 2025 and farmers being eligible from 2024. Three standards were introduced in 2022 for: Arable and Horticultural Soils; Improved Grasslands Soils and Moorland; and Rough Grazing (introductory level). These were followed in February 2023 by another six standards for: hedgerows; integrated pest management; nutrient management; arable and horticultural land; improved grassland; and low input grasslands.<sup>3</sup>

**2. Countryside Stewardship (CS)** will pay for more targeted actions relating to specific locations, features and habitats, with an extra incentive (CS Plus) for land managers to join up across local areas to deliver results at larger scale. The second tier of ELMs was originally Local Nature Recovery, but this was officially scrapped in favour of extending and enhancing the existing Countryside Stewardship schemes.

**3. Landscape Recovery** will pay for bespoke, longer-term, larger scale projects to enhance the natural environment e.g. large-scale tree planting and peatland restoration projects.

To meet the government's environmental goals, Defra is aiming for at least 70% of farmers, covering at least 70% of farmland, to take part in SFI, and "significant numbers" to participate in the CS scheme<sup>1</sup>. As the schemes evolve Defra intends to offer SFI and CS in a single, integrated online service, with farmers and land managers able to select a combination of actions in SFI and CS that works for them. Defra has also committed to delivering at least 10 Landscape Recovery projects covering over 20,000 ha by 2024<sup>4</sup>. As well as the three new schemes, the UK government intends to reform how subsidies are enforced by moving towards a model that relies more heavily on education and support rather than penalties.

By providing the services and goods that the actions in these standards will deliver, farmers will, as well as producing food and other goods, be collectively contributing to the government's priority environmental and climate targets and outcomes of:

- reducing greenhouse gas emissions across the economy to reach net zero by 2050;
- halting the decline in species abundance by 2030 and to ensure that species abundance

in 2042 is greater than in 2022, and at least 10% greater than 2030;

- improve the Red List Index for England for species extinction risk by 2042, compared to 2022 levels;
- restore or create in excess of 500,000 hectares of a range of wildlife-rich habitat outside protected sites by 2042, compared to 2022 levels;
- reduce nitrogen, phosphorus and sediment pollution from agriculture into the water environment by at least 40% by 2038;
- increase total tree and woodland cover to 16.5% by 2050;
- adapt to climate change.

The ELM schemes will collectively pay farmers and land managers to deliver climate and environment outcomes that can only be delivered by farmers and other land managers in the wider countryside. In terms of pollution, the UK government has already introduced some changes to CS in response to feedback. These include extending its Catchment Sensitive Farming supported options to both high- and medium-priority areas for water and air pollution management, and introducing two new capital options to improve air quality, reduce ammonia emissions and improve water quality. SFI and CS will also include new actions to cover a wider range of goods and services, such as support for the sustainable management of soils and water resources and providing advice on adopting more sustainable land management practices, including integrated pest management and nutrient use efficiency, and supporting agriculture in its move towards becoming net zero, in line with the government's net zero commitments. Plans for monitoring and evaluating progress towards meeting these targets are laid out in the UK Government's Environmental Improvement Plan 2023<sup>5</sup>.

Farming and environmental groups have been broadly supportive of the introduction of ELM schemes and the principle of public money for public goods. But industry has voiced concerns about the lack of focus on food production and uncertainty over long-term funding for farming operations. In response to these the UK government amended the Agricultural Bill to refer to food production explicitly and extended the SFI to include a broader range of basic environmental activities than originally planned, causing a response from some

environmental groups that the concessions could risk a return to CAP-style direct payments<sup>6</sup>. Farmers' unions have argued that supply chain problems and a shortage of labour are already making it hard for farmers to run effective businesses and that the ELM scheme may not be up to the challenge.

Some farmers have welcomed the scheme and initiatives such as the Integrated Pest Management standard for sustainable pest management that can be seen as supporting farmers who want to shift their operations towards more sustainable, regenerative systems, de-risking that change and encouraging a more holistic farming system. Farmers are also urging Defra to take a more integrated approach, as individual actions will not benefit businesses as much as stacking options that benefit nature, productivity and farm businesses. For pollution in particular such integrated approaches will be essential to stem the flow of pollutants such as nitrogen into the environment. Ideally the new nutrient management standard under the SFI will be able to incorporate integrated nutrient management into its planning process with farmers. Whether this will happen or not remains to be seen.

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2. <https://committees.parliament.uk/writtenevidence/39114/html/>

3. <https://www.gov.uk/government/publications/environmental-land-management-update-how-government-will-pay-for-land-based-environment-and-climate-goods-and-services/environmental-land-management-elm-update-how-government-will-pay-for-land-based-environment-and-climate-goods-and-services#nutrient-management-standard>

4. <https://www.gov.uk/government/publications/environmental-land-management-schemes-outcomes/environmental-land-management-schemes-outcomes>

5. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1133967/environmental-improvement-plan-2023.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1133967/environmental-improvement-plan-2023.pdf)

6. <https://www.fwi.co.uk/business/payments-schemes/elm/analysis-what-defras-elm-update-means-for-farmers>

# Nitrogen deposition threat to 60 per cent of European ecosystems

Most affected are regions with intensive livestock rearing. Scenarios show that both technical measures and a reduction in animal numbers are needed to tackle the problem.

**Excess nitrogen, from** air pollution, is still a serious threat to ecosystems in Europe. This is evident from a status report by the Coordination Centre for Effects (CCE) that was published last autumn<sup>1</sup>.

Critical load is a term used to describe how much deposition an ecosystem can withstand before it is damaged or altered (see box). In 2020, critical loads for eutrophication were exceeded in 61.2 per cent of all ecosystem areas (see figure and table). This is a slight decline from 2000, when critical loads were exceeded in 74 per cent of the surveyed area.

The impact on ecosystems is also determined by how much critical loads are exceeded. It is calculated as the average exceedance in each grid cell and is known as the Average Accumulated Exceedance (AAE). In 2020 the average AAE in Europe was 235 284 eq ha<sup>-1</sup> yr<sup>-1</sup> and 2020, which is a significant reduction compared to 434 538 eq ha<sup>-1</sup> yr<sup>-1</sup> in 2000.

Considering these two indicators, i.e. area where critical loads are exceeded and AAE, together, it can be concluded



that the former was only reduced by 17 per cent, while the latter was reduced by almost 46 47 per cent. Here it can be assumed that measures have been taken and have to some extent been successful in the areas that have the most severe

problems with excess nitrogen. But much effort it still needed to achieve zero exceedance of critical loads, the long-term aim stated in the Seventh EU Environment Action Programme.

If you take a closer look at the map, you can see that there are still several areas in dark red, where critical loads are exceeded by more than 1200 eq ha<sup>-1</sup> yr<sup>-1</sup>. These are all areas with intensive livestock production: the Po Valley in Italy, the Dutch-German and German-Danish border areas and north-eastern Spain. The impact by farming is also confirmed by that fact that in areas with the highest exceedances, reduced nitrogen (such as ammonia, ammonium and amines, mainly from agriculture) accounts for a higher proportion of nitrogen deposition. While in areas with low exceedance, reduced and oxidised nitrogen (mainly NO<sub>x</sub> from industry and traffic) are of equal magnitude.

The report also notes that protected nature areas, such as nature reserves and Natura 2000 areas, are affected to the same extent as other nature areas.

The CCE has investigated five differ-

## Critical loads

The concept of critical loads was introduced in the 1980s and has been used in Europe to develop cost-effective air pollution abatement strategies. Critical loads are scientific estimates of the amounts of pollutants that various ecosystems can tolerate without being harmed. They are sometimes referred to as the limits on what “nature can tolerate”. If pollutant depositions exceed the critical load limits, damage to sensitive ecosystems will by definition occur sooner or later.

The sensitivity of various ecosystems to exposure to acidifying and eutrophying air pollutants varies. Critical loads have therefore been assigned to different habitat classes based on empirical evidence, mainly observations from experiments and gradient

studies. For example, the most recent assessment<sup>1</sup>, which was published by the CCE in 2022, established that tundra can only tolerate 3–5 kg N ha<sup>-1</sup> yr<sup>-1</sup> (i.e. roughly 200–350 eq ha<sup>-1</sup> yr<sup>-1</sup>) without significant change in biomass and species composition. On the other hand, broadleaved deciduous woodland can tolerate 10–20 kg N ha<sup>-1</sup> yr<sup>-1</sup> (i.e. roughly 700–1400 eq ha<sup>-1</sup> yr<sup>-1</sup>). Europe has been monitored and mapped in this way for more than 30 years, and European countries have coordinated this work through the CCE under the Convention on Long-range Transboundary Air Pollution. The CCE since 2018 is hosted at the German Environment Agency.

<sup>1</sup> Review and revision of empirical critical loads of nitrogen for Europe | Umweltbundesamt



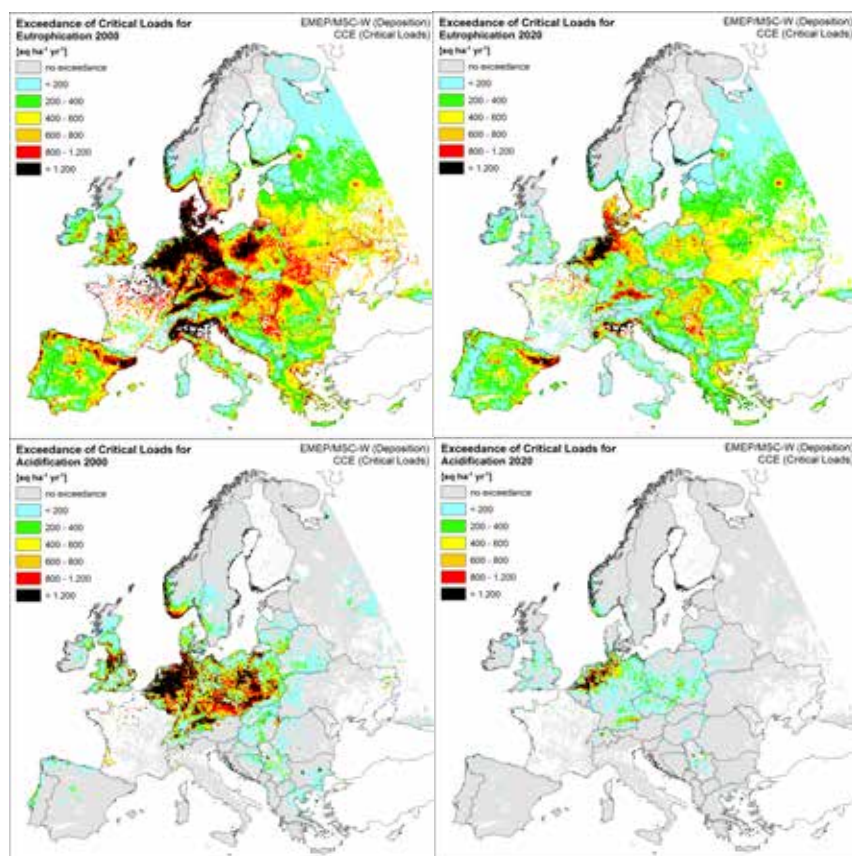


Figure: Areas where critical loads for eutrophication are exceeded (top) and where critical loads for acidification are exceeded by acid depositions (bottom) in 2000 (left) and 2020 (right).

ent scenarios, two for 2030 and three for 2050: Current legislation emissions (CLE), most feasible reduction (MFR) and in the latter case a low-emissions scenario (LOW). MFR includes the most efficient end-of-pipe technologies, but there is no difference in the scope of activities such as traffic and agriculture, compared to CLE. The LOW scenario includes changes due to global climate mitigation policy, including a significant transformation in the agricultural sector leading to a sharp reduction in livestock numbers, especially cattle and pigs.

The area of critical load exceedance in the scenarios shows great variation. In the CLE scenario the affected area is predicted to be 53% by 2030 and 49% by 2050. For MFR, the area of exceedance decreases to 44% by 2030 and 31% by 2050. In the most ambitious LOW scenario, it decreases to 22% by 2050. None of the scenarios succeed in achieving the long-term aim of zero exceedance. This does not mean that it is unachievable, but that it will require even greater structural change.

The report also covers critical loads for acidification. Here the situation is completely different. Exceedances of critical

loads for acidity occurred on 14.1% of the European ecosystem area in 2000 and had shrunk to 3.6% in 2020. The European average AAE was about 145 211 eq ha<sup>-1</sup> yr<sup>-1</sup> in 2000, and 20 years later it had fallen to 22 40 eq ha<sup>-1</sup> yr<sup>-1</sup> (2020). This development is mainly due to the fact that sulphur emissions in Europe have almost ceased. NO<sub>x</sub> also contributes to acidification and is the main culprit in the acidification hotspots that still remain, i.e. the Netherlands and its border areas with Germany and Belgium,

In the five future scenarios the affected area will decrease to 1–2%. Average AAE is projected to fall to 26–13 27 eq ha<sup>-1</sup> yr<sup>-1</sup> by 2050. It is only in the Netherlands where AAE values are not projected to fall below 200 eq ha<sup>-1</sup> yr<sup>-1</sup> even under the most ambitious 2050 LOW scenario.

Kajsa Pira

<sup>1</sup> CCE Status Report 2022 <https://www.umweltbundesamt.de/en/publikationen/cce-status-report-2022>

**Table: Percentage area of ecosystems exposed to excess deposition of eutrophying and acidifying air pollutants in 2000, 2015 and 2020.**

	% of the ecosystem area where critical loads are exceeded					
	Eutrophication			Acidification		
	2000	2015	2020	2000	2015	2020
Austria	82	65	50	2	<1	<1
Belgium	88	59	52	68	39	31
Bulgaria	92	83	76	4	<1	<1
Croatia	93	81	81	3	2	<1
Cyprus	100	100	100	<1	<1	<1
Czech Rep.	99	91	84	91	65	30
Denmark	100	100	100	41	10	2
Estonia	65	46	39	<1	<1	<1
Finland	15	3	2	2	<1	<1
France	85	69	61	12	4	3
Germany	88	78	70	75	43	26
Greece	100	100	100	3	<1	<1
Hungary	97	86	78	25	5	4
Ireland	60	36	48	3	<1	<1
Italy	81	62	53	3	<1	<1
Latvia	95	92	88	11	2	1
Lithuania	99	99	98	31	23	20
Luxembourg	100	100	100	18	14	12
Malta	99	99	99	<1	<1	<1
Netherlands	92	81	76	74	72	70
Poland	84	70	67	69	24	18
Portugal	89	81	76	8	1	<1
Romania	94	92	88	2	<1	<1
Slovakia	100	95	91	13	4	2
Slovenia	93	75	75	2	<1	<1
Spain	97	92	92	2	<1	<1
Sweden	19	15	15	14	2	2
<b>Sum EU 27</b>	<b>85</b>	<b>75</b>	<b>71</b>	<b>18</b>	<b>7</b>	<b>5</b>
Albania	92	89	89	<1	<1	<1
Belarus	100	100	100	14	2	1
Bosnia & Herz.	74	73	74	9	8	<1
Kosovo	79	78	80	6	<1	<1
Liechtenstein	100	99	98	46	25	6
Moldova	100	95	95	4	<1	<1
Montenegro	69	57	63	1	1	1
Norway	20	11	9	20	10	6
Rep. of Macedonia	82	77	71	6	<1	<1
Russia	70	54	56	2	<1	<1
Serbia	92	90	90	22	11	8
Switzerland	71	53	47	34	15	9
Ukraine	100	100	100	5	<1	<1
United Kingdom	36	14	12	29	5	4
<b>Sum Europe</b>	<b>74</b>	<b>63</b>	<b>61</b>	<b>14</b>	<b>5</b>	<b>4</b>

# Environmental impact included in the New Nordic Nutrition Recommendations

The upcoming sixth edition of the Nordic Nutrition Recommendations (NNR) will be launched on 20 June 2023, but a draft version was sent out for public consultation back in March.

In the upcoming edition, the NNR committee has not only looked at the health effects of the food we eat, but for the first time also included the impact of that food on the environment and climate. This has created great interest in the Nordic countries and internationally.

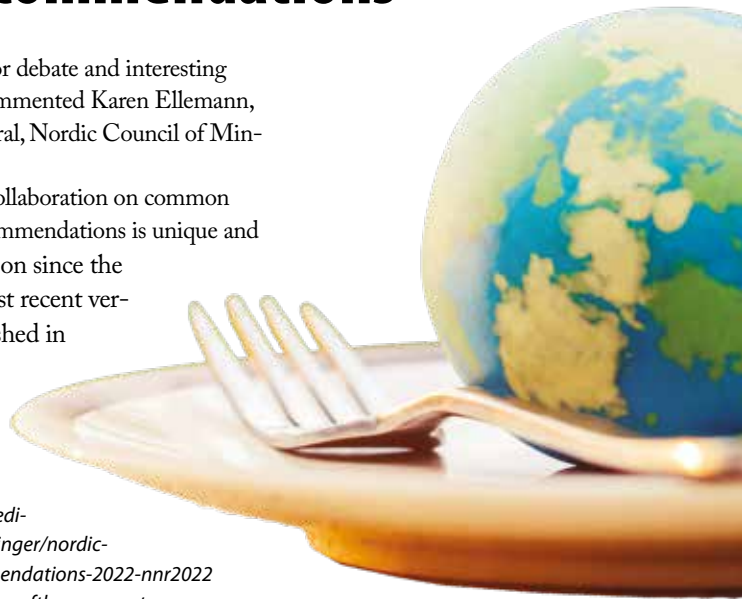
“For the first time, the Nordics will present scientific advice – not only about which food is good for health, but also what is good for the environment. As one of the first regions in the world, the Nordic region is taking a common step in courageous pioneering work and it will certainly be a

starting point for debate and interesting discussions,” commented Karen Ellemann, Secretary General, Nordic Council of Ministers.

The Nordic collaboration on common nutritional recommendations is unique and has been going on since the 1980s. The most recent version was published in 2012.

The draft of NNR2023:

<https://www.helsedirektoratet.no/horinger/nordic-nutrition-recommendations-2022-nnr2022>  
#publicconsultationofthennrreport



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## Dramatic vanishing of polar sea ice and ice sheets

Polar sea ice and ice sheets are continuing to melt rapidly according to many new studies. The end-of-winter Arctic sea ice extent in March 2023 was the fifth lowest in the satellite record<sup>1</sup>, while the area of Antarctic sea ice fell to a record low.<sup>2</sup>

“Antarctica might seem remote but changes around there can affect the global climate and the melting ice sheets affect coastal communities around the world. Everyone should be concerned about what’s happening in Antarctica,” say the scientists behind the study.

“The climate crisis has pushed the planet’s stores of ice to a widespread collapse that was unthinkable just a decade ago, with Arctic sea ice certain to vanish in summers and ruinous sea level rise from melting glaciers now already in motion. I have never seen such an extreme, ice-free situation here before,” says Professor Karsten Gohl, from the Helmholtz Centre for Polar and Marine Research in the Alfred Wegener Institute, Germany, who first visited the Antarctic region in 1994 in one study.<sup>3</sup>

Stronger El Niño events due to global heating may accelerate irreversible melting of the Antarctic ice sheet and ice shelves, as well as the rise in sea levels,

according to research from Australia’s premier government science agency. The examination of 31 climate models found stronger El Niños may accelerate the heating of deeper ocean waters. The dramatic vanishing of polar ice sheets will cause catastrophic sea level rise that will threaten cities.<sup>4</sup>

On behalf of AirClim, Climate Analytics has summarised the conclusions of the IPCC’s sixth assessment cycle concerning the effects of a global 1.5°C temperature rise in the Arctic and concludes that such a temperature rise could be a tipping point for the ecosystems in the Arctic region. An analysis of the Arctic Council declarations from the last 20 years shows that “while the contribution of CO<sub>2</sub> and non-CO<sub>2</sub> greenhouse gases to global warming was recognised, the Arctic Council declarations have shown a clear reluctance to cover CO<sub>2</sub> mitigation. Instead of pushing for fossil fuel phase out, the Arctic Council declarations

repeatedly emphasised ‘environmentally sound oil and gas activities’ (see e.g. the Tromsø Declaration, 2009), pushing the focus from CO<sub>2</sub> mitigation to black carbon, methane, and hydrofluorocarbon emissions reduction.”<sup>5</sup>

Reinhold Pape

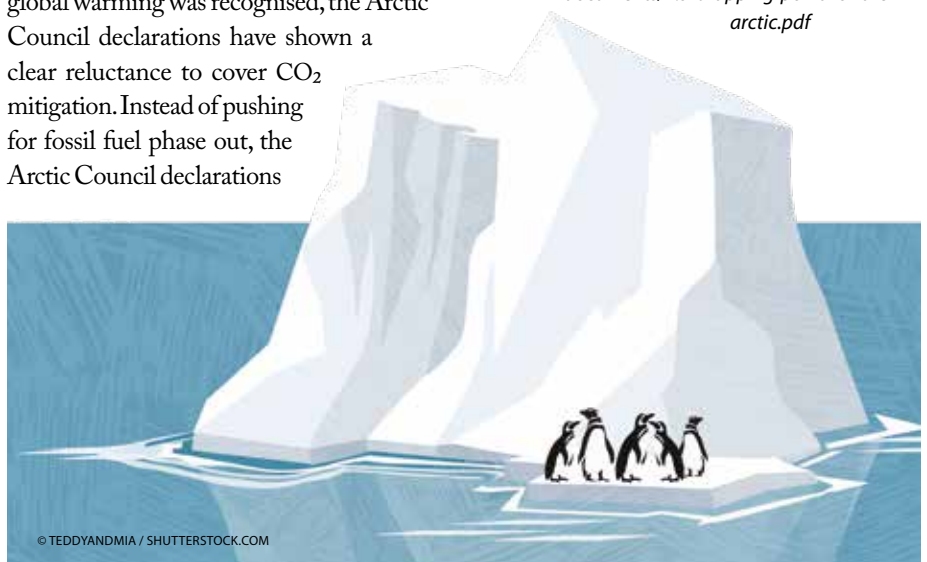
1. <https://earthobservatory.nasa.gov/images/151115/arctic-sea-ice-below-average-in-winter-2023>

2. <https://www.theguardian.com/world/2023/mar/04/everyone-should-be-concerned-antarctic-sea-ice-reaches-lowest-levels-ever-recorded>

3. <https://nsidc.org/arcticseaicenews/>

4. <https://www.theguardian.com/environment/2023/feb/21/stronger-el-nino-events-may-speed-up-irreversible-melting-of-antarctic-ice-research-finds>

5. <https://www.airclim.org/sites/default/files/documents/1.5-a-tipping-point-for-the-arctic.pdf>



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## The coupled climate and biodiversity crises

Humanity is facing major social and ecological impacts from climate change and biodiversity loss. These two crises are intertwined, with common causes and effects on one another. A new article in *Science* reviews the results of a joint meeting of members of the International Panels on Climate Change and Biodiversity and Ecosystem Services. They discuss the connections between biodiversity loss and climate change and propose potential solutions for addressing them as interconnected problems. Drastic reductions in greenhouse gas emissions, protection of multiuse landscapes and seascapes, and policies for providing equitable access to natural resources can help to ensure future ecological function and human well-being. Source: <https://www.science.org/doi/10.1126/science.abl4881>

## International Ocean Acidification Action Week

Ocean Acidification (OA) caused by CO<sub>2</sub> from the burning of fossil fuels puts our seas at danger. Corals, cod, salmon, shrimps and shellfish are among the organisms at peril, together with whole ecosystems. The threats to nature are also a great concern for humans and affect everyone who benefits from nature and the sea – for work, for leisure, and for inspiration.

The threat from OA is in general poorly recognised in the governance of marine waters. To raise awareness about OA, AirClim encourages other NGOs and all those concerned about our seas to take action to highlight OA. We hope that creative contacts with, for example, fishers, schools, artists, museums and journalists can be established so that information on OA will be widely spread in societies globally. Week 23 starts with UN World Environment Day on 5 June, which is followed by UN World Ocean Day on 8 June. This week also kicks off the Bonn Climate Change Conference (June 5–15) and therefore



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provides an excellent backdrop to this year's action week.

Materials on OA are available under the heading "Ocean Acidification Working Group" at [www.airclim.org](http://www.airclim.org).

## Petition for clean air

Just after the launch of HEAL's petition, more than 125,000 people are already calling on the European Union to align EU air quality standards urgently and fully with the latest available science to protect our health.

Here is the link if you want to sign the petition: <https://bit.ly/43HAOTZ>

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- ▷ 1.5°C Pathways for the EU27: accelerating climate action to deliver the Paris Agreement
- ▷ 1.5°C Pathways for the Council of Europe: accelerating climate action to deliver the Paris Agreement
- ▷ Failing to achieve 1.5°C puts a huge economic burden on our (grand)children
- ▷ Policy implications of Europe's dwindling carbon budget
- ▷ The EU too must revisit its 2030 climate pledge (NDC) as -55% is not compatible with 1.5°C
- ▷ Making the EU ETS and ESR legislation compatible with the Paris Agreement
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- ▷ Temperature overshoot – The concept of temporarily going beyond 1.5°C
- ▷ Why the EU must strengthen its climate target
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- ▷ Briefing on the proposal to integrate maritime transport in the EU ETS
- ▷ 1.5°C - A tipping point for the Arctic
- ▷ The Revision of the European Union Emissions Trading System Directive: Assessing Cap and Market Stability Reserve Reform Options
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- ▷ Forests of Russia and Climate Change

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- ▷ Overview briefing on the IPCC Special Report on Climate Change and Land
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- ▷ Ocean Acidification in the Baltic Sea
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- ▷ Air pollution in Europe and children's health

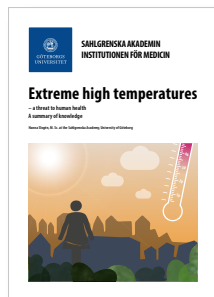




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## Recent publications from the Secretariat

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



**Extreme high temperatures – a threat to human health.** (November 2022). By Hanna Slogén. A summary of knowledge.



**Fossil-free electricity 2021** (March, 2023). By Fredrik Lundberg. Global EU status and trends.



**1.5°C Pathways for the Council of Europe: accelerating climate action to deliver the Paris Agreement** (September 2022). By Aman Majid et al.



**No further discussion needed. The agreed global goal is to limit temperature rise to 1.5°C.** (March 2023). By Wendel Trio.



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**Policy implications of Europe's dwindling carbon budget** (September 2022). By Wendel Trio. Defining 1.5°C compatible CO<sub>2</sub> targets for a range of European countries.



**Air pollution in Europe and children's health** (May 2023). Emilie Stroh.



**Failing to achieve 1.5°C puts a huge economic burden on our (grand)children** (September, 2022). By Wendel Trio. Costs of action and inaction for several EU scenarios.

## Coming events

**UNFCCC Climate Conference.** Bonn, 5–15 June 2023. Information: <https://unfccc.int/conference/first-sessional-period-2023>

**EU Transport, Telecommunications and Energy Council.** Luxembourg, Belgium, 19 June 2023. Information: <https://www.consilium.europa.eu/en/meetings/tte/2022/12/19/>

**IMO Marine Environment Protection Committee (MEPC80).** London, UK, 3–7 July 2023. Information: [www.imo.org](http://www.imo.org)

**International Action Week Against Ocean Acidification.** Everywhere, 3–11 June 2023. Information: <https://www.airclim.org/ocean-acidification-working-group>

**50th World Environmental Day.** Everywhere, 5 June 2023. Information: <https://www.un.org/en/observances/environment-day>

**World Ocean Day.** Everywhere, 8 June 2023. Information: <https://www.un.org/en/observances/oceans-day>

**EU Energy Council.** Luxembourg, 19 June 2023. Information: <https://www.consilium.europa.eu/en/meetings/calendar>

**EU Environment Council.** Luxembourg, 20 June 2023. Information: <https://www.consilium.europa.eu/en/meetings/calendar>

**CLRTAP Working Group on Strategies and Review, sixty-first session.** Geneva Switzerland, 4–6 September 2023. Information: <https://unece.org/info/events/unece-meetings-and-events/air-pollution>

**CLRTAP Ninth Joint Session of the EMEP Steering Body and Working Group on Effects.** Geneva Switzerland, 11–15 September 2023. Information: <https://unece.org/info/events/unece-meetings-and-events/air-pollution>

**International Transport and Air Pollution Conference.** Gothenburg, Sweden 25–26 September 2023. Information: [ivl.se/tapase](http://ivl.se/tapase)

**Fourth EU Clean Air Forum (2023).** Rotterdam, the Netherlands, 23–24 November 2023. Information: [https://environment.ec.europa.eu/events/fourth-eu-clean-air-forum-2023-2023-11-23\\_en](https://environment.ec.europa.eu/events/fourth-eu-clean-air-forum-2023-2023-11-23_en)

**UN Climate Change Conference.** United Arab Emirates, 30 November – 12 December 2023. Information: <https://unfccc.int/calendar/events-list>

**CLRTAP Executive Body, Forty-third session,** Geneva Switzerland, 11 – 14 December 2023, Information: <https://unece.org/info/events/unece-meetings-and-events/air-pollution>

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