

## EU prepares for winter

In September, the European Parliament voted on several proposals to address the energy crisis. Meanwhile the EU Commission proposed a new law to manage energy prices.

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## Countries struggle to meet NEC directive

In 2020, less than half of member states met all their national emission reduction commitments.

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## Wind technologies for cleaner shipping

A large ongoing EU project demonstrates that the expansion of direct wind propulsion technologies for ships will be an important and impactful step towards cleaner shipping.

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## Ireland intends to cut farm emissions by 25%

The Irish government has announced GHG emissions from the farm sector must drop by a quarter by 2030.

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## How iron and steel emissions can be cut

The huge emissions from the steel industry can be virtually eliminated by using hydrogen from green power, or from other electric processes.

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## Climate change effects on marine litter

As heavy rains and storms become more frequent more litter will be transported to the sea. Marine litter is projected to triple by 2040.

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# EU must step up energy shift

Paris Agreement compatible scenarios need the EU to do much more to reduce emissions and increase renewables and energy savings

In June of 2020 a large consortium of NGOs, led by Climate Action Network (CAN) Europe and the EEB, published

an innovative, bottom-up energy scenario for the European Union which showed

# 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

With the sustained heat, drought and forest fires that are wreaking havoc across Europe, one would think European countries would be incentivised to increase action to tackle climate change.

The Russian invasion of Ukraine has also made it crystal clear that our addiction to and dependence on fossil fuels has put us in a very undesirable situation. Despite all this, EU greenhouse

gas emissions in the first quarter of this year have risen 6% compared to last year. These numbers are worrying and indicate that the EU is not on track to achieve its pledge to reduce its greenhouse gas emissions by more than half by 2030. While we should actually be doing more.

In 2015, countries pledged in the Paris Climate Agreement to keep temperature rise to 1.5°C as going beyond that temperature threshold will bring devastating impacts for all. The world definitely is not on track to keep this promise and current countries' promises are likely to lead to an average global temperature rise of around 2.5°C. All countries therefore need to do more than they have promised so far, and this definitely also applies to the EU.

In fact, the EU should do more than many other countries as it has a large historical responsibility for past emissions that are still active in the atmosphere, and also has the financial and other means to invest in a rapid transformation of its economy. But we actually witness the opposite. According to the proposals that EU governments and the European Parliament are currently discussing, under the so-called Fit for 55 package, the EU is set to emit double the amount of greenhouse gases over the period 2021 to 2050 that would be permitted if the remaining emissions (to keep us within 1.5°C) are divided on an equal per capita basis. This is clearly unacceptable and the EU needs to urgently do more and agree to reduce its greenhouse gas emissions by at least 65% by 2030 (as compared to its emission levels in 1990).

**‘they will need to discuss and agree on a new 2030 climate target to reduce emissions by at least 65%’**

This is also the message coming out of multiple studies indicating what the EU can do to tackle the climate change crisis. It is high time our decision-makers listen

to our scientists and adapt current plans to reduce greenhouse gas emissions, increase the use of renewable energy and limit energy waste so that the use of fossil fuels, and our dependence on the untrustworthy states that produce them, can be completely phased out as soon as possible.

European governments and the European Parliament are currently looking at how to best implement and possibly go beyond the current EU's climate pledge through extensive negotiations on a package of new legislation which is called the Fit for 55 Package. At the same time, the European Commission has proposed additional measures to support renewables and energy savings in response to the Russian invasion of Ukraine, through its so-called REPowerEU Communication. EU decision-makers need to ensure these proposals lead to new action and greater ambition in the coming weeks. We have no time to waste.

**The EU, through** Frans Timmermans, Vice-President of the European Commission, has undertaken to review its 2030 climate pledge to the Paris Agreement by COP27, which takes place in November this year. The EU thus has just a few months left to do so. As EU Heads of State and Government have taken the responsibility for setting climate targets, they will need to discuss and agree on a new 2030 climate target to reduce emissions by at least 65% at the European Council meeting on 20–21 October. In order to do so, proposals obviously need to be launched and discussed now, rather today than tomorrow. All eyes are therefore on European Council president Charles Michel to push this process forward.

Wendel Trio

# EU must step up energy shift

*Continued from front page*

how the EU and its member states could transform their energy system, in line with the targets of the Paris Agreement. This Paris Agreement Compatible (PAC) energy scenario<sup>1</sup> mapped out how the EU could phase out fossil fuel consumption between 2030 and 2040, reduce greenhouse gas emissions by at least 65% by 2030 and achieve net zero emissions by 2040, by rapidly moving to 100% renewables, drastically reducing energy consumption to half current levels and a substantial electrification of our economy. The scenario was developed by NGOs and other experts on the basis of existing studies, dedicated workshops and some basic testing.

**In September** a new report was published written by climate scientists at Climate Analytics, in which they analysed a number of Integrated Assessment Models from the database of the Intergovernmental Panel on Climate Change (IPCC). The IPCC in its very recently published Sixth Assessment Report listed 97 models that allow temperature rise to be limited to the 1.5°C target of the Paris Agreement with no or limited overshoot (this is important as the IPCC also indicated that even slightly going beyond 1.5°C for a short period of time can have irreversible impacts).

Climate analytics in its report (1.5°C Pathways for EU27: Achieving the highest plausible climate ambition<sup>2</sup>) looks specifically at three least-cost, technically feasible scenarios produced by the Integrated Assessment Modelling framework REMIND. These three scenarios focus on: an exceptionally high integration of renewables (the HighRE scenario); exceptionally high synergies with the Sustainable development Goals, and subsequent high levels of energy and resource efficiency (the SusDev scenario); and a more generic but ambitious socio-economic pathway (the SSP1 scenario).

In its report, Climate Analytics down-scales these three scenarios to the EU and compares the results with the PAC scenario. The report's analysis enables an assessment of whether the EU's current

targets are aligned with limiting warming to 1.5°C.

The report finds that, to be 1.5°C compatible, the EU would need to cut its domestic emissions faster than currently planned. In order to realise 1.5°C compatible pathways, the following targets should be met:

- By 2030: greenhouse gas emission reductions (excl. land-based emissions and removals) of 63–73% below 1990 levels. This is substantially above the 52.8% target currently in the EU's 2030 target (which rises to 55% if land-based emissions and removals are included);
- Net-zero greenhouse gas emissions to be achieved between 2040 and 2045. This is substantially earlier than the 2050 target in the EU Climate Law.

The report thus clearly indicates that current EU climate targets cannot be seen as compatible with the Paris Agreement and its 1.5°C temperature target.

The report also demonstrates how the EU could achieve these 1.5°C compatible benchmarks through a rapid transition to an efficient and electrified energy system based on renewable energy. Based on a more detailed assessment of the HighRE and the PAC scenario, the report makes the following assessment of what this would require:

- High electrification: electricity to provide 66–70% of final energy in 2050;
- Key but limited role for hydrogen: providing 5–11% of final energy demand by mid-century;
- Large-scale demand reduction: strong and sustained reductions in final energy demand, which means that by 2050, total energy demand in the EU can be up to 55% lower than in 2019;
- High level of renewables: overall renewables provide 48–54% of final energy demand in 2030, rising to 92–100% of final energy by 2050.

**In both pathways**, fossil fuels are rapidly displaced from the energy system, with particularly strong action in the power sector, where rapid deployment of wind and solar is the cornerstone of the energy



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transition. Key milestones for the power sector include:

- Coal phased out of power generation by 2030;
- Fossil gas phase out by the mid-2030s;
- 100% renewable electricity by the mid-2030s.

All in all, the Climate Analytics report clearly shows that with completely different methodologies (top-down vs bottom-up; least-cost vs cost-agnostic; ...), 1.5°C compatible scenarios come to very similar conclusions: the current EU climate and energy targets and policies as developed in the EU's NDC (Nationally Determined Contribution to the Paris Agreement), Climate Law, Fit for 55 package and REpowerEU proposal, cannot be considered compatible with the Paris Agreement and its overall long-term objective to limit temperature rise to 1.5°C by the end of the century. EU decision makers should have the guts to admit this and stop claiming they are fulfilling the Paris Agreement. More action and more ambition are needed.

Wendel Trio

<sup>1</sup> [www.pac-scenarios.eu](http://www.pac-scenarios.eu)

<sup>2</sup> The report is part of a collaboration between Climate Analytics, Airclim and CAN Europe, and funded by the Swedish Postcode Foundation. Link to the study: <https://caneurope.org/eu-can-achieve-climate-neutrality-a-decade-earlier-than-planned-new-report-climate-analytics/>



# Keys to meet the 1.5°C target

Climate Action Network International (CAN) has issued several statements and articles in 2022 outlining how the UN should act on science policy in reviewing the long-term goal of the Climate Convention at COP 27.

**Summarising the demands** from CAN for the COP27 meeting in Egypt in November 2022:

The conference should increase efforts to strengthen the resolve to limit global warming to 1.5°C and avoid the worst of the climate crisis. Compared to 2°C of warming, 1.5°C would see much less severe extreme events and fewer disruptions to human and ecological systems (this year we have seen the multiple severe impacts of ‘just’ 1.2 degrees of warming in many parts of the world), and consequently fewer people would be impacted by water scarcity, crop yield loss, food insecurity and extreme poverty. The adopted reports of the three IPCC working groups for IPCC-AR6 show that the 1.5°C warming limit is still within reach but requires very urgent and rapid action. Stringent emission reductions need to take place in the very near term to halve current projections for 2030 CO<sub>2</sub> emissions. 1.5°C pathways require CO<sub>2</sub> emissions to peak now and reach net zero by mid-century, with total greenhouse gases quickly following suit in the second half of the century. While the world is not on track for 1.5°C and most countries still lack adequate climate targets, recent updates in national climate targets are a step forward to limiting warming to 1.5°C.

CAN welcomes the presentations of the three expert dialogue sessions in the Periodic Review (PR2) during 2020–2022 and concludes that science tells us that even a restriction to 1.5 degrees of warming is not safe. This should be a key component of the conclusions of PR2.

Message from IPCC:

The scientists delivered a grim message in the expert dialogue sessions: human-induced climate change is causing dangerous and widespread disruption affecting the lives of billions of people, with people and ecosystems least able to cope being hit the hardest. They gave a dire warning about the consequences of

inaction with the world facing unavoidable multiple climate hazards over the coming decades – even if we are able to limit temperature rise to 1.5°C. And they also made clear that even temporarily exceeding this magnitude of warming will result in additional severe impacts, some of which will be irreversible. IPCC lead authors of the Working Group III report told Parties that it is still possible to limit temperature rise to 1.5°C and inform them about the pathways available to do this.

*Definition of the long-term goal:* CAN considers that the only acceptable long-term goal that truly reflects the Paris Agreement is to limit temperature rise to 1.5°C compared to pre-industrial levels by the end of this century. There is a need to assess whether the objectives of the Paris Agreement are in line with Article 2 of the Convention. Such an assessment, even if it does not aim to change the Paris Agreement’s goals, would be timely and necessary, as effects such as the impacts of 1.5°C of warming on the cryosphere beyond 2100, and over time frames of centuries, cause reason for serious concern. The Second Periodic Review should improve our collective understanding of the long-term scenarios that will help achieve the highest ambition from all actors.

*Consideration of the risks of overshooting the long-term goal:* the reference in the Paris Agreement to keeping temperature rise well below 2°C opens the door to substantially overshooting the 1.5°C threshold during the course of this century. CAN considers this a dangerous option. As evidenced in the scientific literature, there are many risks and uncertainties concerning both the impact of even a temporary overshoot and the realistic possibilities of bringing the temperature down, at least at the scale that might be needed.

*Scenario development to reach the long-term goal:* since the adoption of the Paris

Agreement, substantial progress has been made on the development of scenarios that would limit temperature rise to 1.5°C by the end of this century, as evidenced in the IPCC’s Special Report on Global warming of 1.5°C. Since its adoption in October 2018 substantial additional progress has been made. The results of the Structured Expert Dialogue should incorporate an overview of the latest findings of 1.5°C pathways with limited or no overshoot.

Recognition of the gap to reach the long-term goal: it is very clear that we are facing a gap between current action and the scenarios that will allow us to limit temperature rise to 1.5°C. The October 2021 revised UNFCCC Synthesis Report of Nationally Determined Contributions under the Paris Agreement indicated we are heading towards 2.7°C of warming by the end of the century with current National Determined Contributions (NDCs).

*Identification of action delivered so far:* in the assessment of the gap, it will be useful to look at emission reductions and limitations that have been realised by 2020, which is an important milestone in particular for assessing commitments made under the Second Commitment Period of the Kyoto Protocol (KP2). As it looks now, although further data is needed, countries with commitments under KP2 collectively reduced their CO<sub>2</sub> emissions by 32% between 1990 and 2020. When looking at all Annex 1 countries, reductions have been smaller but still reached 22% in 2020. This compares to an overall increase in global emissions of 53% by 2020.

CAN calls upon the Structured Expert Dialogue (SED) of the Second Periodic Review of the long-term global goal to accept that only the IPCC’s C1 Illustrative Mitigation Pathway, which limits warming to 1.5°C with zero or limited overshoot, can ensure the achievement of the long-term goal of the Paris Agreement.



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This pathway assumes that emissions are reduced on average to 31 GtCO<sub>2</sub>-eq in 2030 and 9 GtCO<sub>2</sub>-eq in 2050.

To better understand where we are in achieving the long-term temperature goals and what consequences this could have for mitigation targets in NDCs, the PR2 on the long-term goal of the Paris Agreement 2020–2022 must elaborate and conclude on the following questions:

- What does the temperature threshold of the Paris Agreement mean for emission reductions for regions and sectors and the remaining carbon budget? Are there potential tipping points for e.g. coastal zones in relation to sea-level rise, food production systems, drinking water, health problems from high temperatures, global and regional ecosystems, ice sheets and sea ice at 1–2°C global temperature increase up to 2300? What can we learn from science about the damages and losses if we could limit warming to 1.5°C degrees compared to a limitation of warming to well below 2°C? What are the socio-economic, environmental and ecological effects of 1.5°C overshoot scenarios?
- How can projected emission trajectories be best adapted to the 5-year ambition

cycle of the Paris Agreement? For the current round of NDC revisions, there is considerable attention to and awareness of where emissions need to be in 2030 to meet temperature targets. This should move ahead in regular 5-year steps, so that in the 2023 GST and the next round of NDCs by 2025, the scientific community produces comparable awareness of where emissions need to be in 2035, and so on.

- Should the temperature goal of the Paris Agreement – well below 2°C and preferably 1.5°C – be defined as a threshold or should it be seen as a multi-year or multi-decadal average? Will parties adopt the average over a 30-year period as defined by the IPCC?

#### ► **CAN Demands**

Stringent reductions in emissions of greenhouse gases must not rely on technological fixes that could pose further harm to the environment, biodiversity and human health, such as geoengineering. CAN's vision for a safe climate is focused on rapid economy-wide decarbonisation and a transition to a just, equitable and sustainable future. A range of solutions and climate mitigation tools can help achieve

this vision, including shifting to sustainable consumption patterns, renewable energy, energy efficiency, forest conservation, reforestation, and reduced meat consumption. Geoengineering proposals distract from the need to take concerted action across multiple sectors in the near term to dramatically reduce emissions. Overall, to meet the 1.5°C limit, we need to consume less, consume efficiently and to consume sustainably as far as possible.

Concerning the preparations of the Seventh Cycle of IPCC and its Assessment Report, CAN demands that the original planned timetable is kept and that the publishing of the final reports will be available for the Third Periodic Review (TPR) in 2027, which should feed the GST in 2028.

Compiled by  
Manfred Treber  
and Reinhold Pape

Source: CAN International submissions, Eco articles  
and Wendel Trio

# European Union prepares for winter



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In September, the European Parliament voted on several proposals to address the energy crisis. Meanwhile the EU Commission proposed a new law to manage energy prices.

**When it comes** to the renewable energy target the European Parliament voted in favour of a 45% target for the EU's energy mix by 2030. To achieve the EU-wide goal, each EU country will have to implement a minimum of two cross-border electricity projects, or a minimum of three for those with an annual electricity consumption of more than 100 terawatt-hours (TWh).

The new target is an increase from the 40% target endorsed by the member states in June. However, that endorsement did not take into account the REPowerEU plan (presented in May) which revised the EU's goals upwards. The Greens and the left tried to push for an even higher renewable target of 55–56% by 2030 in order to reach 100% renewables by 2040.

There were also sub-targets for sectors such as transport, buildings, and district heating and cooling. The text includes an increase from 13% to 16% in the greenhouse gas emission reduction target for transport, as well as a 5.7% share of renewable fuels of non-biological origin (RFNBO) in the fuel market by 2030, as presented in the Commission's REPowerEU programme. However, the REPowerEU goals, including the definition of “go-to areas” and faster permitting procedures for renewable energies, were not included in this version of the directive. There is an aim to merge the two revision procedures during final talks with EU member states later in the year.

There are still important aspects lacking from the proposals. There are no binding national renewable energy targets for EU countries. The definition of renewable energy includes biomass. Although the Parliament text introduces a phase-down of biomass, it lacks an end date, which did not satisfy environmentalists and the left, who called for a complete phase out by 2030.

When it comes to the vote on energy savings, the Parliament backed a mandatory target to reduce the EU's energy consumption by 14.5% by 2030. In its REPowerEU plan, the European Commission proposed raising the EU's energy efficiency savings target to 13% by 2030, up from the 9% goal it had initially tabled a year before. Measures include an annual energy savings rate of 2% for the energy savings obligation. The level of the target is not ambitious enough to stay within the limits of the Paris Agreement. However, since there was no other target level on the table to be voted on it is a step in the right direction.

“We are in a crisis where Putin is shutting off gas. One of our most effective answers to this is energy efficiency,” said Niels Fuglsang, an MEP from Denmark from the socialist S&D Group, who steers the Parliament's position on the proposal. “Parliament has today voted for ambitious and binding energy efficiency targets for the EU and for individual member states,” Fuglsang said after the vote.

The Energy Efficiency Directive (EED) 2012 is in the process of being revised as part of EU plans to cut emissions by more than half by 2030.

While they voted in favour of the amended directive, the Greens said the Parliament could have aimed higher. At the same time, “it was very important to us that we go into the trilogue with a strong mandate,” explained Jutta Paulus, a German MEP and the Greens' negotiator on the directive. However, efficiency advocates are worried that EU member states will not follow the Parliament's lead. There have been difficulties gaining acceptance for energy savings targets and there will be further negotiations with reluctant EU countries. In the past, EU countries have missed their European objectives for 2020.

During the last EU Council meeting in July, some EU countries attempted to water down the revised directive, until a last-minute intervention by Germany.

With the plenary vote cleared for both the RED and EED directives, the Parliament can now enter negotiations with the Council and the Commission as part of so-called “trilogue” talks to finalise the updates. Czechia currently holds the EU presidency and will chair negotiations between the Parliament, Commission and EU member states to finalise the law before the end of the year.

**In addition to** updating the RED and EED directives the EU Commission has outlined draft proposals to tackle the high energy prices gripping Europe, including a mandatory target for reducing electricity use, capping the revenues of energy firms, and recycling the money raised to help vulnerable households. The indicative target requires EU member states “to lower overall electricity consumption” from households, for example through public information campaigns or tenders for “energy not consumed” as well as “a mandatory target of at least a 5% reduction in net electricity consumption during peak price hours”. “Saving energy is the key thing to do right now,” said Bram Claeys from the Regulatory Assistance Project (RAP), a clean energy think-tank. “It's one of the few actions that can still have an impact this winter”. For Claeys, the proposal for peak reduction is particularly important. “It is exactly the way to go; demand-side flexibility and storage need to take over the role gas power plants are playing in the power system.”

Emilia Samuelsson



# Scientists agree: 100% renewable energy is possible

An increasing number of research studies show that an energy system based solely on renewable energy sources is possible by or before 2050.

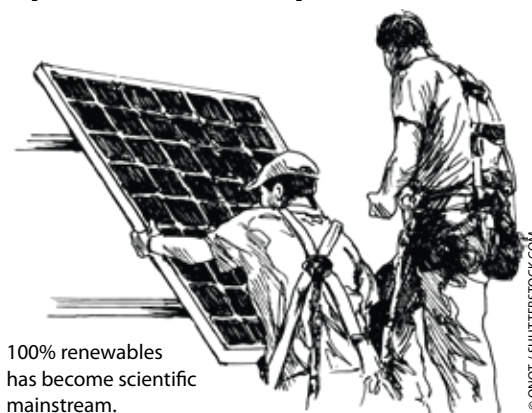
Research from LUT University in Finland and 14 other leading international universities suggests that the new energy system would be based largely on solar and wind energy, energy storage, sector coupling and direct and indirect electrification of almost all energy demand. An energy system that is 100% based on renewables has emerged to become scientific mainstream. Hundreds of scientific studies have proven that 100% renewable energy systems can be achieved at global, regional, and national levels by or before 2050. The number of published studies has grown by 27% annually since the year 2010 and continues to grow each year.

“A quickly increasing number of researchers conclude that the entire energy system demand can be met based on renewables, and that doing so will actually be cheaper in the long term, while fulfilling sustainability requirements,” concludes professor Christian Breyer from LUT University.

“According to the United Nations, over 160 firms with \$70 trillion in as-

sets are committed to decarbonize the global economy, which means phasing out fossil fuels by 2050. Our research has shown that we have the technologies to implement a global energy supply based entirely on renewable energy,” says Dr. Sven Teske, Associate Professor at the University of Technology Sydney (UTS). “The science clearly shows that a global 100% renewable energy supply is technically and economically possible. The next step is for our research to be included in the Intergovernmental Panel on Climate Change (IPCC) assessment reports, which are currently based on outdated energy scenario research,” Teske adds.

Initially, research into 100% renewable energy systems encountered strong scepticism. Now, leading researchers in the 100% renewable energy systems research community have combined their views. The study reflects developments in the research field, its current status, previous critique, and provides an outlook on future research needs. More than 20 authors from 15



100% renewables has become scientific mainstream.

organisations and 9 countries contributed to this joint research. According to these 15 leading universities, companies, NGOs, and governments need to work together in order to foster the public engagement that is needed to implement distributed sustainable energy systems. Researchers say that local ownership, governance, and market models must be developed to suit the varied contexts and cultural traditions around the globe.

Compiled by Reinhold Pape

Source: Helsinki Times and LUT University  
Link to the study: <https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=9837910>

## Climate action has stalled

Climate Action Tracker said in a mid-year report for 2022 that climate action has stalled. The summary of the report says: “Despite the clear warning on the extreme dangers of exceeding 1.5°C warming from the IPCC, progress on new, more ambitious 2030 climate targets and participation in sectoral initiatives have stalled since COP26 in Glasgow. This goes against the clear agreement of the Glasgow Pact to update national 2030 climate targets in 2022. Without increased government action, the world will still emit twice the greenhouse gas emissions in 2030 than is allowed under the 1.5°C



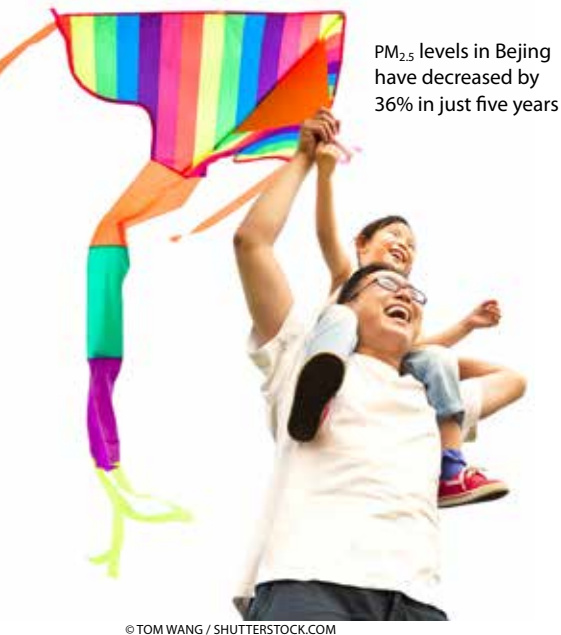
When you know you need to update your NDC target, but cannot pull yourself together.

important that all governments revisit and strengthen their climate targets. It is not enough for them to make marginal or no improvements. If the EU, the USA and China were to increase their NDC values by 5 to 10 percentage points, this would only narrow the 17–20 GtCO<sub>2</sub>e gap by a further 3–4 GtCO<sub>2</sub>e or around 20%. The EU would be the primary candidate for

limit of the Paris Agreement. The world is heading to a warming of 2.4°C with 2030 targets and even higher, 2.7°C, with current policies. With this looming emissions gap in 2030, it is im-

being the first large country to update its NDC, as the agreement to increase the renewable target would lead to overachievement of the NDC. Governments need to take several steps to update their climate targets in 2022. Ultimately, they need to submit a full updated NDC with a more ambitious target. Along the way they can participate in new sectoral initiatives and/or implement additional national policies, whose effect goes well beyond the originally proposed target – and then officially submit this information to the UNFCCC.”

Link to report: [https://climateactiontracker.org/documents/1051/CAT\\_2022-06-03\\_Briefing\\_MidYearUpdate\\_DespiteGlasgowTargetUpdatesStalled.pdf](https://climateactiontracker.org/documents/1051/CAT_2022-06-03_Briefing_MidYearUpdate_DespiteGlasgowTargetUpdatesStalled.pdf)



PM<sub>2.5</sub> levels in Beijing have decreased by 36% in just five years

## Cleaner air in Beijing and London

It is no longer news that urban residents around the world are breathing unhealthy levels of pollution. But there are differences in pollution distributions. PM<sub>2.5</sub> pollution tends to be highest in low- and middle-income countries, whereas NO<sub>2</sub> levels are high across countries at all income levels. The good news is that interventions targeting pollution at the local scale have proven to successfully improve air quality in some cities. For example, Beijing, China, reduced its PM<sub>2.5</sub> levels by 36% in just five years thanks to limits

on power plants and industrial emissions along with new fuel quality and emission standards for vehicles. London's Ultra Low Emission Zone initiative delivered a NO<sub>2</sub> reduction of 36% in the first six months after its launch in 2019. Hopefully this is just the start, as mayors in more than 45 cities around the world have made a commitment to provide healthy air for everyone and implement substantive clean air policies by 2025.

Source: State of the Global Air 2020, <https://www.stateofglobalair.org/>

## Corporate leadership? Few businesses pledge to reduce their flying

Whilst corporate leaders pledge to reduce the climate impact of their businesses, too few go the extra mile and tackle the problem of air travel emissions.

Before the pandemic, flying for business was second-nature for many white-collar workers. Employers across the world would, with no hesitation whatsoever, send their staff to another country for a few meetings only. This was revealed in a ranking published by the Travel Smart Campaign earlier this year. It ranked 230 US and European companies according to nine indicators, relating to emissions reduction targets, reporting and air travel emissions. In times of climate crisis, and despite the lessons learnt during the pandemic, too few businesses are reducing corporate travel emissions.

The pandemic has offered a once-in-a-lifetime opportunity to lock in reductions in global corporate flying and to introduce a new culture of purposeful and effective travel. In 2020, businesses successfully adapted to a new way of working. The ease with which many employees and customers adjusted to being home and

flying less revealed that those long-held ideas of the need to fly for work no longer stand.

Yet, out of the 230 companies, 193 - including Swedish Ericsson - are not acting with sufficient speed and ambition to tackle corporate travel emissions. Only 8 companies, including Zurich Insurance Group, Lloyds Banking and Ernst & Young demonstrate climate leadership with their ambitious corporate travel emissions reduction plans.

The likes of Vodafone, Renault & L'Oréal have all made company-wide emissions reductions targets but not gone far enough by committing to reduce corporate air travel emissions by a certain date. This step - which would see businesses privilege digital meetings and rail travel - could help them become climate leaders. They could make ambitious business travel commitments in line with the reduction they experienced in 2020, helping to reduce greenhouse gas emissions, in order to limit global warming to 1.5°C. Yet, the ranking shows that businesses like Google, Facebook and Microsoft make no effort of the sort.

Why do we need to reduce air travel so urgently? In 2019, business travel accounted for about 15 to 20% of air travel, or about 154 million MtCO<sub>2</sub>. T&E's Roadmap to climate neutral aviation showed that a reduction in corporate travel was the

Global companies reducing air travel emissions.

Leaders		Laggards	
Company	Score	Company	Score
Novo Nordisk	A	Novartis	C
Swiss Re	A	Walmart	C
Legal & General Group	A	Volkswagen	D
PwC	B	Microsoft	D
Salesforce	B	Google	D

single most effective way to reduce aviation emissions in the short term, where it counts most for the climate.

The Travel Smart Campaign is a coalition of partners across Europe, North America and Asia aiming at reducing corporate air travel emissions. It asks companies to reduce business air travel by -50% or more of pre-Covid levels by 2025 or sooner. Reducing corporate air travel by 50%, would mean the same as taking 16 million polluting cars off the road.

Although not all business travel by plane can be avoided, virtual meetings are an effective substitute, especially for the highest-polluting global flights. Already 40 leading global companies have announced targets to cut corporate flying by 50%. The path is clear for others to equally step up, fly less and achieve more.

Eva Erin,  
Transport & Environment

Learn more about the Travel Smart Campaign: <https://travelsmartcampaign.org/about/>

Source: McKinsey & Company, The Travel Industry Turned Upside Down Report, September 2020, <https://www.mckinsey.com>

Many companies find it difficult to let go of their favourite mode of transport.



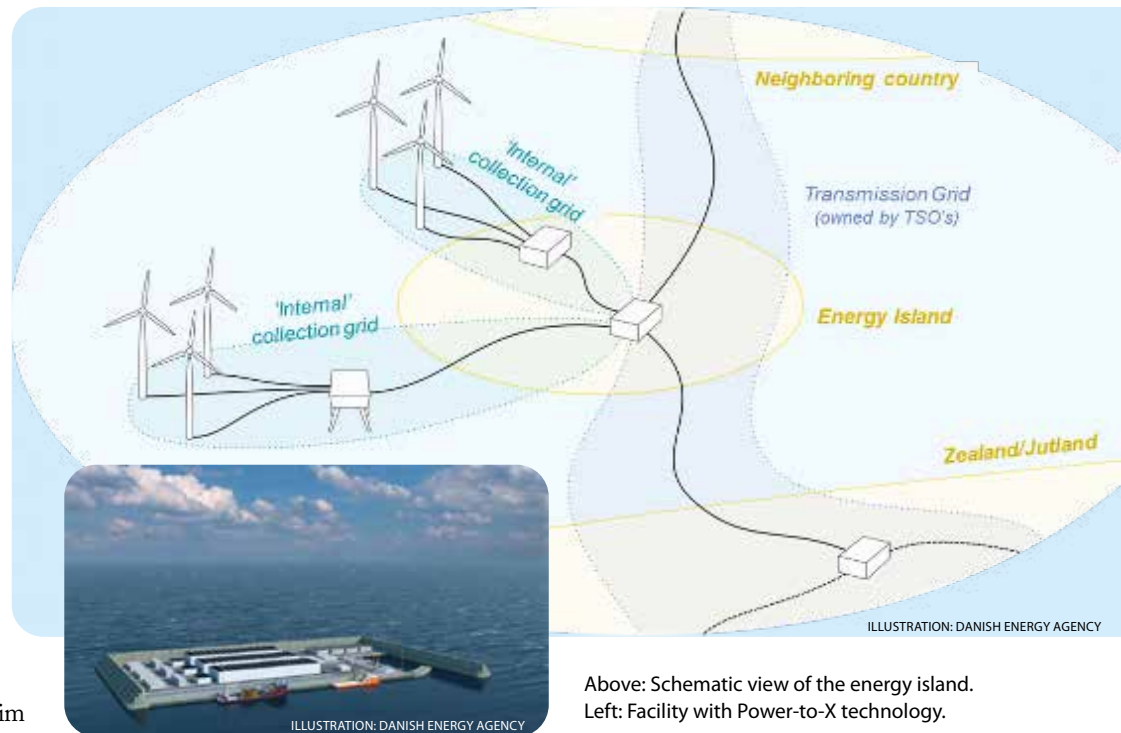
# Denmark aims to build world's first energy island

An artificial island, with wind power and installations to convert excess energy into fuel, is planned in the North Sea. When completed it may provide electricity for 10 million households.

**Energy islands like** this will allow wind turbines to be placed significantly further from land and be more efficient at distributing the generated electricity to multiple countries. The island will be situated 80 km off the west coast of Jutland. The energy hub will serve as an offshore power plant, gathering and distributing green electricity from thousands of wind turbines surrounding the island directly to consumers in countries around the North Sea.

The island is expected to have a total area of 150,000 square metres and a depth of 20–30 metres. Political agreement on the construction of an energy hub in the Danish North Sea was reached in February 2021, with the aim of installing 200 wind turbines with a combined capacity of 3 GW in the first phase of the project (by 2033), and expanding this to 10 GW in the second phase (by 2040). The electricity will be distributed between Denmark, Germany and the Netherlands.

The project is only the latest step in Denmark's push for sustainability. Last year the nation pledged to reduce greenhouse gas emissions by 70 per cent from 1990 levels and to achieve carbon neutrality by 2050. In late 2020 it also ended oil and gas exploration in its North Sea territory. Denmark has the highest proportion of wind power in Europe and globally. It was the first country in the world to construct an offshore wind farm, in 1991. And in 2019, Denmark generated 47 per cent of its total electricity needs from wind power. In the same year the Danish wind power industry employed roughly 32,000 people full-time. Danish Vesta, one of the world's largest wind power companies, had a turnover of just over €15 billion in 2021.



Above: Schematic view of the energy island.  
Left: Facility with Power-to-X technology.

The Danish Energy Agency has selected the Swedish engineering consultancy Sweco as the adviser on the North Sea Energy Island for the next nine years. Under the €54 million contract, which is capped at around €81 million, Sweco will provide the Danish Energy Agency with technical advice throughout the remaining phases of the North Sea Energy Island project, including tendering, design, construction and the final handover.

“The energy island is at the forefront of technology development and it will be interesting to follow the development of energy transmission and storage in the future,” says Tore Lucht, head of the ocean and geological department at Sweco in Copenhagen.

**The energy island** will be built using Power-to-X technology, which is considered a key factor in reliable wind power supply. This means that when there is a lot of wind, but low demand for electricity, the surplus can be converted into hydrogen

and climate-neutral fuels, which can be used by aircraft, ships and heavy industry.

The artificial island is one of two energy islands that Denmark will establish as part of the green transformation of the energy sector. The Danish parliament has also decided to build a smaller energy island for wind power on Bornholm in the Baltic Sea, but the energy island west of Jutland is significantly larger. When fully developed, this energy island will produce 45 TWh (terawatt hours) per year.

Other countries are also looking to build similar energy islands. The innovators behind the energy islands hope their project is only the beginning. As offshore wind technology matures, it could tap into tremendous unrealised potential. And if this experiment succeeds, the model it tests in the North and Baltic seas could soon be imitated by coastal nations around the world.

Emilia Samuelsson

# Member states are struggling to meet NEC directive

In 2020, less than half of member states met all their national emission reduction commitments. Only two of them are already in line with their 2030 commitments.

**One part of** the EU regulation to provide clean air is the National Emission reduction Commitments (NEC) directive. EU member states are required to meet national commitments to reduce emissions for five air pollutants. In 2020, the Directive underwent a transition to a new and more ambitious set of national emission reduction commitments. In 2020, less than half of member states met all their national emission reduction commitments. Two member states, Lithuania and Romania, need to reduce their NO<sub>x</sub> emissions to meet their 2020–2029 national emission reduction commitments. The road transport sector is largely responsible for emissions of NO<sub>x</sub>, and due to the fall in road traffic during the Covid-19 lockdowns in 2020 a significant decline was seen in many member states. The EEA says this is likely to be just a short-term effect, with NO<sub>x</sub> emissions expected to have rebounded once lockdowns ended and traffic levels increased. Regarding NO<sub>x</sub> emissions in 2020, seven member states met their emission reduction commitments for 2030, while the remaining 20 member states will need to reduce emissions further and many will need to reduce them significantly.

Two member states, Romania and Hungary, need to reduce their PM<sub>2.5</sub> emissions to meet their 2020–2029 national emission reduction commitments. The main source of PM<sub>2.5</sub> emissions is energy consumption in the residential, commercial and institutional sectors, followed by emissions from the

manufacturing and extractive industries and from road transport. Regarding PM<sub>2.5</sub> emissions, seven member states met their 2030 emission reduction commitments in 2020. Two countries, namely Hungary and Romania, will need to reduce their emissions by more than 50% from 2020 levels, while seven countries will need to reduce emissions by between 30% and 50%, and eleven member states by up to 30%. More pollutants can be found in the table

**The NEC directive** is one of the legislative instruments that supports delivery of the zero-pollution ambition for a toxic-free environment announced in the European Green Deal and is particularly critical to delivering on the 2030 targets related to air pollution under the zero-pollution action plan. Those targets aim to reduce the number of premature deaths caused by air pollution by 55% and the EU ecosystems where air pollution threatens biodiversity by 25%, in both cases compared to 2005 levels. To achieve these targets, EU member states that have not met their respective emission reduction commitments set for 2020–2029 and for 2030 onwards, need to speed up their efforts. Member states

are obliged to draw up and implement national air pollution control programmes (NAPCPs), with measures to reduce emissions from relevant sectors to meet national emission reduction commitments. Ensuring consistency between member states' national energy and climate plans (NECP) and their NAPCPs can help to increase the reductions in emissions of air pollutants and greenhouse gases across the energy, industrial, transport and agricultural sectors.

The EEA also published the annual EU emission inventory report 1990–2020 issued by the EU under the UNECE Air Convention. It shows a continued, albeit recently slowing, downward trend in emissions from 1990 to 2020 of six key air pollutants: carbon monoxide, ammonia, nitrogen oxides, non-methane volatile organic compounds, sulphur oxides and particulate matter. Abatement and legislative measures were key to reducing emissions. The Third Clean Air Outlook will be published by the end of 2022 and will include more of the Commission's assessment of member states' prospects of meeting 2030 emission reduction commitments for all main pollutants.

Ebba Malmqvist

The NEC report can be found at <https://www.eea.europa.eu/publications/nec-directive-reporting-status-2019/nec-directive-reporting-status-2019>, while the emission inventory report is at <https://www.eea.europa.eu/publications/nec-directive-reporting-status-2019/nec-directive-reporting-status-2019>



Table.. EU Member States' percentage emission reductions compared with 2020 levels to meet their emission reduction commitments for 2020-29 and 2030 onwards

Country name	2020					2030				
	NH <sub>3</sub>	NM VOC	NO <sub>x</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	NH <sub>3</sub>	NM VOC	NO <sub>x</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>
Austria	●	✓	✓	✓	✓	●	✓	●	●	✓
Belgium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bulgaria	●	✓	✓	✓	✓	●	●	✓	●	✓
Croatia	✓	✓	✓	✓	✓	●	●	●	●	✓
Cyprus	✓	✓	✓	✓	●	●	✓	●	●	●
Czech Rep.	✓	✓	✓	✓	✓	●	●	●	●	✓
Denmark	●	✓	✓	✓	✓	●	✓	●	●	✓
Estonia	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Finland	✓	✓	✓	✓	✓	✓	●	✓	✓	✓
France	✓	✓	✓	✓	✓	●	✓	●	●	✓
Germany	✓	✓	✓	✓	✓	●	✓	●	●	●
Greece	✓	✓	✓	✓	✓	✓	✓	✓	●	✓
Hungary	●	✓	✓	●	✓	●	●	●	●	●
Ireland	●	●	✓	✓	✓	●	●	●	●	✓
Italy	✓	✓	✓	✓	✓	●	●	●	●	✓
Latvia	●	✓	✓	✓	✓	●	✓	✓	●	✓
Lithuania	●	●	●	✓	✓	●	●	●	●	✓
Luxembourg	●	✓	✓	✓	✓	●	✓	●	✓	✓
Malta	✓	✓	✓	✓	✓	✓	✓	●	●	✓
Netherlands	✓	✓	✓	✓	✓	●	●	●	✓	✓
Poland	✓	●	✓	✓	✓	●	●	●	●	●
Portugal	●	✓	✓	✓	✓	●	●	●	●	✓
Romania	✓	✓	●	●	✓	●	●	●	●	✓
Slovakia	✓	✓	✓	✓	✓	●	✓	✓	✓	✓
Slovenia	✓	✓	✓	✓	✓	●	●	●	●	●
Spain	●	✓	✓	✓	✓	●	●	●	●	✓
Sweden	●	✓	✓	✓	✓	●	✓	●	✓	✓
EU-27	✓	✓	✓	✓	✓	●	●	●	●	✓
Member States that meet their emission reduction commitments										✓
Emission reductions by up to 10% of current levels needed										●
Emission reductions between 10% and 30% of current levels needed										●
Emission reductions between 30% and 50% of current levels needed										●
Emission reductions by more than 50% of current levels needed										●

Romania is one of the member states that needs to reduce emissions the most to reach its PM<sub>2.5</sub> target by 2030.



# Improve communication on air quality research

**More than half** of Europeans do not feel well informed about their local air quality, according to a 2019 EU Commission survey. Furthermore, 68% believed that scientists should be consulted in political decision-making, but they rarely are due to time constraints. This highlights the need for civil society involved in issues relating to air quality and health to help spread scientific findings to policymakers. The Health and Environment Alliance (HEAL) has created a toolkit with the aim of providing civil society organisations with the resources needed to effectively communicate air quality and health science. It is based on two decades of HEAL's experience and expertise in communicating scientific findings.

Targeted and timely science-to-policy communication can greatly inform decision-making and lead to more evidence-based policies. Most EU policymakers want to draw on a sound evidence base when devising policies. As noted in the 7th EU Environmental Action Programme,

emphasis should be given to science, and decisions should be informed by the latest data. Communicating to the public helps to narrow the gap between scientific research and the public. The public can be made aware of the health impacts of air pollution, or of effective solutions to reduce their own health risks. While both the public and policymakers in general tend to value evidence-based information sharing, much valuable research remains unseen. The rapid transition of information from varying sources adds to confusion among the public and policymakers. In Germany, for example, so-called health experts claimed that there was no proof that air pollution led to people dying, and "no scientific justification" for current pollutant limits. This letter was widely reported in the German media, until an investigative journalist realised that some so-called lung experts were car industry lobbyists and that there was a major statistical error in their claims, making them invalid. Simultaneously, science networks and organisations published detailed explanations of the science

on air pollution to disprove the claims previously made.

But the German Transport Minister had already sent an inquiry to the European Commission, asking for a review of current limits.

**Research shows that** people are often unable to distinguish misinformation from fact. In order to do so, citizens would need to be able to understand scientific literature, be able to set it in the context of existing research on the same issue, understand the source information and judge if the author is an academic or whether vested interests are involved. Most

people are both unable and do not have the time to do this, so they must be able to rely on official, qualified sources. The overload of contradictory and sometimes false information available online, coupled with the expertise required to understand the issues at stake, has produced the so-called post-truth era.

In these times it is important that civil society takes pride in translating scientific findings. While scientists present findings in an academic way, civil society organisations can and should couple this evidence with clear and actionable recommendations that support the case for clean air. Air quality can be approached from various health frames – such as health impacts, economics, co-benefits, inequalities and potential solutions. Each frame has a substantial evidence base to support it and can be exemplified with local or national context if this is available.

It is also important to identify the audience and acknowledge that policymakers have limited time, and a one-page summary of the evidence is often enough. Evidence to a policymaker needs to be cited clearly, with rigorous references linked to concrete issues, and there needs to be a clear recommendation of relevance to that person's policy field. It should also be short and concise in order to fit into their busy schedules. For the public it is also helpful to include visual graphics and involve them in citizen-science projects to narrow the gap between science and the public. When talking to the media, advocacy should be avoided, and a personal story gives a more interesting angle.

Ebba Malmqvist

The toolkit "Advocating for clean air: how to communicate the science" can be downloaded here: [https://www.env-health.org/wp-content/uploads/2022/08/HEAL-Toolkit\\_clean-air\\_web.pdf](https://www.env-health.org/wp-content/uploads/2022/08/HEAL-Toolkit_clean-air_web.pdf)

Evidence to a policymaker should be short and concise.

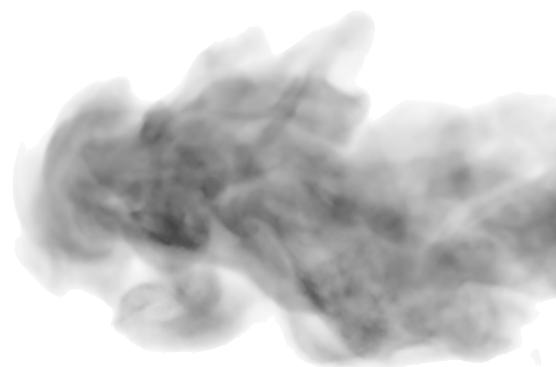


# Condensable aerosols contribute to inconsistent reporting

**Condensable primary organic** aerosol emissions, described from here on as condensables, are organic compounds that occur in the gas (vapour) phase at the chimney stack, but as the stack air is cooled and diluted, they can undergo both condensation and evaporation processes. If we measure them incorrectly, we might under- or overestimate the amount of particulate matter (PM) or gas that enters the atmosphere. This has led to considerable debate in recent years as there are no clear definitions in inventories such as EMEP that explain how such condensable organics should be counted. The emission factors (EF) are clearly dependent on filter types, dilution, and sampling conditions of the emissions. Studies have shown that these discrepancies will impact the consistency of emissions if treated differently by different nations. Most of the focus has been on harmonising the emission factors for residential wood-burning but it can also apply to other contexts such as road transport. Ongoing efforts to harmonise data have been made in 2020–2022. One problem has been that there are no fixed guidelines that describe how to choose appropriate emission factors in some in-

ventories. Closer examination has revealed a wide variation in implied biomass emissions that was too large to be explained by the inclusion of condensables and the variation in technology and abatement levels alone. There is thus a strong need for consistent sets of emission data from residential wood-burning.

New emission factors have been established for the most important sources of primary PM from residential combustion, based on the available literature, consistently taking condensable organics into account. But the emission factors were found to vary by a factor of up to 10 for the same installations due to variations in measurements and local conditions. Another important factor is how to weigh in “bad combustion” of moist wood and loading, which can impact emission numbers and are currently not accounted for, despite being common issues among inexperienced users. Given all the uncertainties described above, three scenarios were defined (ideal, typical and high EF scenario) to illustrate the range of uncertainty, and to support the modelling exercise in this project. These are the “typical” case, which is as described in the preceding paragraph, an



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alternative “ideal” case that excludes the impact of “bad combustion”, and a “high EF” scenario in which higher emission factors are assumed than in the typical scenario. The modelling indicates that including condensables in a consistent way for all countries gives model results (concentrations, trends and bias) that are in better agreement with observations for OC and PM<sub>2.5</sub> than EMEP emissions, which use inconsistent data for condensables from different countries.

The report was produced in collaboration between five European research institutes and can be found here: <https://pub.norden.org/temanord2022-540/#108663>

# Electrifying vehicle fleet could save 45 billion euro in external costs

**What would happen** to pollutants and their external costs if we replaced diesel-fuelled vehicles with a different technology? This has been evaluated in a recent report by CE Delft looking at the effects of both tank-to-wheel and well-to-wheel emissions on the climate, air pollution and noise in the year 2030 in Europe.

They found that replacing diesel vehicles with fully electric vehicles is the most effective way of reducing emissions and external costs. Only half as effective are

plug-in hybrid vehicles, new Euro 6/VI diesel vehicles and CNG/LNG. This also applies if well-to-wheel emissions are included. HVO and ethanol (E85) have limited benefits. The limited effect of HVO is because exhaust emissions remain much the same, but if HVO was produced from truly renewable sources it has substantial potential to reduce well-to-wheel emissions. In the case of noise, the only reduction was in engine noise for electric vehicles. When it comes to CO<sub>2</sub> emissions, the biggest potential was

for electric vehicles and HVO. The total reduction in external costs could be as high as 45 billion euro, for a shift to fully electric vehicles. The authors also want to highlight that shifting from motorised transport to active travel by walking and biking could have a bigger impact, but was not included in this report.

CE Delft report, Fuel and drivetrain options for road transport, June 2022, <https://epha.org/wp-content/uploads/2022/06/ce-delft-fuel-and-drivetrain-options-road-transport-june-2022.pdf>

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# Wind technologies for cleaner shipping

A large ongoing EU project demonstrates that the expansion of direct wind propulsion technologies for ships will be an important and impactful step towards cleaner shipping.

**On a global** scale, 80 to 90% of cargo is transported by ships. Shipping therefore underpins the ever-increasing global trade. However, this high transport share also comes at a price, and while it is the most efficient means of transporting goods over long distances it still burns around 7 million barrels of oil every day – three to four times the oil exports of Kuwait – and generates CO<sub>2</sub> emissions comparable with those of Germany or the whole of South America. Shipping thus contributes significantly to global warming and air pollution that endangers health. If shipping was a nation, it would be the sixth largest polluter in the world. The CO<sub>2</sub> emissions from shipping will grow significantly in parallel with the expected growth in the sector unless further actions are taken.

**The most important** step towards cleaner shipping is to make shipping even more energy efficient. The development and use of cleaner fuels such as electricity (batteries and shore power) and electro-fuels is one essential course of action. Operational

measures, such as slower speed, better design and maintenance, etc., are further essential steps, and by combining efficiency technologies shipping can become even more energy efficient. However, another alternative that delivers propulsive energy very efficiently straight to the ship is to install sails, as wind technologies provide free non-polluting propulsion for the lifetime of the ship.

For thousands of years, wind was the main technique used for ship propulsion, which is why ships are said to be “sailing” when they are at sea. Large commercial ships do not generally use sails any longer. Instead, they use oil. Hence, these ships do not “sail” – they pollute.

Wind technologies provide the ship with free non-polluting energy directly at sea without investments in fuel infrastructure, and these technologies are increasingly available today. Wind as green propulsion is more efficient than any green fuel, since the energy losses from generating, transmitting, converting, bunkering the fuel, and then delivering that power through

the propulsion train to the propeller, accounting for up to 90% of the energy first produced. Meaning for every 1 kW of power to the propeller, 10 kW must be produced by a wind turbine or solar panel. Fuel savings from wind technologies retrofitted on existing large cargo or passenger ships are expected to be between 5 and 25% depending on ship size, type, speed, route and weather conditions, etc., as well as the type, size and number of wind technologies applied. However, these numbers are based on a ship that still operates as a motorship, without making any changes to optimise wind use. For new ships, where wind technologies are further developed and fully integrated on vessels that are designed to use wind propulsion, fuel savings are expected to be well above 30%, and far greater when deployed on windier routes and operated more as a sailing ship.

These facts led the EU to set up the Wind Assisted Ship Propulsion (WASP) project through the Interreg North Sea Europe programme. WASP has thoroughly



Ship name: Copenhagen  
Type: RoPax Ferry  
Vessel data: LOA 169 m; max beam: 25.4 m; 24,000 GT  
Wind system installation: 5 m dia. and 30 m tall Flettner rotor (installed 2020).  
Expected average annual fuel savings: 4%  
Company: Scandlines



Ship name: Annika Braren  
Type: Bulk carrier  
Vessel data: LOA 86.93 m; max beam: 15 m; 5,023 DWT  
Wind system installation: 3 m dia. and 18 m tall Flettner rotor (installed 2021).  
Expected average annual fuel savings: 2–4% depending on route  
Company: Rörd Braren Bereederungs-GmbH & Co. KG



Ship name: Frisian Sea  
Type: General Cargo  
Vessel data: LOA 118.19 m; max beam: 13.43 m; 6,477 DWT  
Wind system installation: 2 x 11 m tall suction wings (installed 2021)  
Expected average annual fuel savings: 2–4% depending on route  
Company: Boomsma Shipping



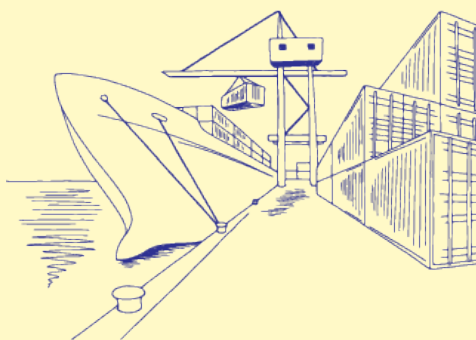
# “Cost of clean shipping is negligible” says case study

Transport & Environment has assessed “...the likely cost increase in seaborne transport in a hypothetical fully decarbonized scenario”. More specifically, the assessment investigated a substantial strengthening of the FuelEU Maritime (FEUM) and the Marine ETS and looked at the probable cost effect of an increase in the 2030 fuel GHG intensity target of the FEUM from -6% to -14%. In addition, the assessment considered “...mandating an additional 6% sub-quota for renewable fuels of non-biological origin (RFNBOs, or e-fuels) and incorporating well-to-wake (WtW) CO<sub>2</sub> equivalent emissions in the maritime ETS, which currently only covers tank-to-wake (TtW) CO<sub>2</sub> emissions”. (Essentially, WtW

includes all emissions produced during the entire process of fuel production, delivery and operational use, whereas TtW only covers operational use.)

The case study presents a cost calculation, using the shipment of a single standard container (TEU) from China as an example. The calculation suggests that compared with historic prices the

increase would be between roughly 1 and 5%. Compared with current (higher) costs for such a shipment, the increase would be under 0.8%. It is demonstrated that the effect on consumer prices is negligible, i.e. counted in euro cents. Examples of price increases on popular consumer goods are given for scenarios in which RFNBO/e-fuels would comply with the most ambitious FEUM and ETS proposals. The examples include a pair of shoes (0.81 euro cents), a TV (10.01 euro cents) and a refrigerator (80.91 euro cents).



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Source: T&E, The small price to pay to clean up shipping, 28 June 2022 <https://www.transportenvironment.org/discover/the-small-price-to-pay-to-clean-up-shipping/>

investigated the potential of wind for ship propulsion, performing several real-life experiments by retrofitting different wind technologies on different ship types, operated as wind-assisted motor vessels. In the project, Flettner rotors, suction wings, and a rigid wing sail system are being modelled and tested on ferries and small cargo ships in the North Sea region.

Results from Scandlines ferry Copenhagen have been validated by WASP partner SSPA, and WASP sea trials confirm the potential for an annual average net fuel saving of around 4% with just one Flettner rotor. The Röd Braren bulk carrier Annika Braren also has a Flettner rotor installed. WASP sea trial results confirm the potential for an annual average net fuel saving of 0.6–1 kg of fuel per nautical mile. She primarily sails North Sea and Baltic Sea routes. Boomsma Shipping's general cargo vessel Frisian Sea also operates mostly on North Sea and Baltic Sea routes and test trials confirm a potential for an average yearly fuel saving of 0.6–0.8 kg per nautical mile. All results are route-dependent and are regularly updated on the project webpage: [www.northsearegion.eu/wasp](http://www.northsearegion.eu/wasp)

**Technologies that reduce** fuel consumption will:

1. Reduce emissions of air and climate pollutants from the existing and future fleet.

2. Reduce the price gap between fossil-fuelled ships and zero-emission shipping.
3. Reduce the investments and time needed for decarbonising shipping.

However, various market barriers (lack of information, a conservative industry, business structures, externalities, focus on short-term profit, etc.) slow down the rate of implementation of wind technologies. The related health and climate benefits thus remain unrealised. By externalising these costs and exploiting other indirect subsidies, the true costs of fossil fuels are masked. The barriers can be overcome by introducing flag- and technology-neutral regulations at IMO, EU, national and/or regional level. Furthermore, wind technologies for ships need to be further optimised, integrated, upscaled and standardised, and be manufactured in significant numbers to lower costs and improve efficiency and power, just as we have seen in the wind turbine industry over the last 30 years. With these measures to support wind propulsion systems, they will be ready to radically contribute to cleaner shipping in the coming decade.

Kåre Press-Kristensen & Tanja Willumsen,  
Green Transition Denmark

Gavin Allwright,  
International Windship Association

## Ten African mayors sign a clean air declaration

C40 is a network of mayors from nearly 100 world-leading cities that has promised to deliver the action needed to reduce the climate crisis. It also has a clean air declaration, to implement substantive clean air policies by 2025. It has now been signed by ten of the largest cities in Africa. As an example, Lagos has committed to reducing traffic congestion by expanding the rapid transit bus network, piloting a low-emission bus system, improving walking and cycling infrastructure, restoring three illegal waste dumping sites and promoting the installation of solar photovoltaic systems on buildings. Babajide Olusola Sanwu-Olu, Governor of Lagos State, said: “The need to breathe clean air is more important than the licence to pollute it. Lagos has committed to improve air quality and I appeal to the responsibility of every citizen, because together we can.”

Source: C40 Press release, 19 May 2022, <https://www.c40.org/wp-content/uploads/2022/05/C40-Press-Release-ACFCA-1.pdf>



Lagos has committed to reducing traffic congestion by expanding the rapid transit bus network and piloting a low-emission bus system

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# Towards a Latin American agenda for a just socio-ecological transition

Climate Action Network Latin America hosted a series of regional dialogues during 2021 on how to jointly advance the climate, biodiversity and human rights agendas.

**Latin America and the Caribbean (LAC)** is home to a spectacular biological and cultural diversity. A plethora of different environments span across the continent, from glaciers and snowy peaks in the Andes, to the lush rainforests of the Amazon and beyond.

Indigenous peoples, afro-descendants, local communities and peasants that inhabit these biocultural landscapes are holders of invaluable traditional knowledge, cosmovisions and wisdom. For centuries, their livelihoods have been strongly defined by – and dependent on – a close relationship to land and nature.

Yet, the region's natural and cultural heritage is under serious threat. Climate impacts, profound social inequalities and environmental degradation cut across the continent. Problems that, by and large, derive from a globalised economic model that demands infinite growth, and in which only a small portion of society continues to appropriate and accumulate an unequal share of natural resources and externalise the negative environmental costs.

The expansion of “misdevelopment” models across the region – strongly based on an intensive, unequal and indiscriminate exploitation of nature to meet the primary commodities demand from the North – has, in turn, led to a rise in socio-environmental conflicts.

In fact, Latin America is the most dangerous and deadly region for environmental activism in the world, where defenders of the land and the environment are being systematically displaced, threatened, prosecuted and assassinated. An investigation conducted by Global Witness found that almost three-quarters of frontline defender murders recorded in 2020 happened in Latin America.<sup>1</sup>

Climate impacts are already causing widespread losses and damages, and driving humanitarian crises in many countries. Higher temperatures, glacier loss, storms, droughts and other extreme

weather events are leading to water and energy-related shortages, agricultural losses, displacement and compromised health and safety of millions.

Increasing fires and deforestation are also a key concern as not only do they pose direct consequences for the people that depend on them, but also threaten one of the world's largest carbon sinks: Almost half of the continent is covered by forests, representing about 57% of the world's remaining primary forests and storing an estimated 104 gigatons of carbon.<sup>2</sup>

All this underscores the fact that climate change and the degradation of nature can no longer be seen merely as environmental crises, but also as human rights and inequality crises. In LAC, this multidimensionality calls for an integrated, locally led and truly transformative response that should be conceived from the region, for the region, and respond to the realities and needs of people in their territories.

With this in mind, Climate Action Network Latin America (CAN-LA) – the regional node for a global network of more than 1,800 civil society organisations – held a series of regional talks during 2021 focused on the interlinkages between climate change, biodiversity and human rights.

This series of dialogues brought together high-level experts, Indigenous leaders, researchers, NGO representatives and other stakeholders to share and exchange views and perspectives on this deeply complex issue.

**The first dialogue** focused on understanding the shared causes and interlinkages between climate change and biodiversity in the Latin American context. One of the guest speakers, Ernesto Ráez-Luna, executive director at Instituto del Bien Común (Peru), asserted that climate change, biodiversity loss and the Covid-19 pandemic are all symptoms of the global

economic system itself, which is leading to an unrelenting pressure on natural resources, ecosystems and Indigenous territories.

In addition to sharing the same root causes, both crises compound one another. The 2019 IPBES Global Assessment Report on Biodiversity and Ecosystem Services concluded that climate change is one of the main drivers of biodiversity loss, increasing attention on this nexus.

However, as IPBES Chair Ana María Hernández Salgar pointed out during the talks, these findings were not new. She explained that biodiversity is intimately connected to climate, and that any actions to solve these challenges must address both the direct and indirect drivers underlying nature deterioration.

Although degrowth and larger systemic changes are needed to tackle the root causes of these problems, urgently phasing out fossil fuels in parallel with protecting and restoring degraded natural ecosystems through a rights-based approach, were highlighted as crucial approaches to mitigate global warming and strengthen socio-ecological resilience.

Central to this discussion is the fact that Indigenous territories account for 80% of the planet's biodiversity and store at least 17% of the above-ground carbon in the world's forests.<sup>3</sup>

Gregorio Mirabal, an Indigenous leader from the Guarinuma community in the Amazon rainforest, explained “while you say that Indigenous people are the best conservationists, the response from governments and extractive companies is violence, murder and the systematic violation of our rights”. He called for the urgent need to stop the destruction of their communities, cultures and lands, and emphasised that support is needed from all actors and movements, including science, youth and religious organisations.

It is worth pointing out that, according to a report by Rainforest Foundation

Norway, Indigenous Peoples and local communities (IPLCs) tenure and forest management in tropical countries receive only a very small share of international donor funding<sup>4</sup>.

**The second dialogue** of this series revolved around the role and the need to integrate the work of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD).

While over the last decade there has been increasing scientific and political recognition that climate change and biodiversity loss cannot be addressed independently or without addressing inequality, much remains to be done within national and international policy frameworks.

As pointed out by Alexandra Deprez (IDDRI), high-level discussions on the climate-biodiversity nexus are often focused on maximising the synergies between both agendas – or how biodiversity can “help” climate change – but much less attention is being paid to the dangerous trade-offs that arise from some mitigation approaches, such as large-scale afforestation and bioenergy with carbon capture and storage (BECCS).

This is particularly relevant for the region, since 50% of the potential bioenergy production area is located in biodiversity hotspots, with Central America and southwestern South America leading the list of areas most at risk of conversion to bioenergy<sup>5</sup>.

It was also highlighted that increasing coherence between climate and biodiversity planning at the national level is essential, and that more structured joint work programmes between the CBD and UNFCCC should be called for.

An interesting discussion also took place around “Nature-based Solutions” (NbS), a term that has emerged as an increasingly popular approach to address both crises, and that has been a subject of heated debates at multilateral spaces and within civil society itself.

While some actors are promoting this concept as a vehicle to connect the cli-

mate change and biodiversity conventions, there are increasing concerns that the ambiguity of this term enables co-option and greenwashing, and that it further reproduces systemic North-South power imbalances.

**Finally, the last** dialogue focused on exploring the relevance of the Escazú Agreement and the human rights-based approach in accelerating climate and biodiversity action in the region. Escazú is the first multilateral agreement in Latin America and the Caribbean on human rights and the environment.

Signed in 2018 by 25 countries, this treaty seeks to raise minimum standards on the rights of access to information, participation and justice in environmental matters, urging Parties to safeguard the rights and work of environmental human rights defenders.

The UN Special Rapporteur, David Boyd, stated “by bringing environmental obligations and human rights obligations together, we get a very powerful convergence that forces countries to prioritise and accelerate their progress towards the environmental goals”. The Escazú treaty is critical because it gives people the tools to hold governments accountable.

Although this agreement marks a regional milestone in advancing environmental democracy, to date it has only been ratified by 13 countries. Further ratification is a key priority for civil society in the region, so that the agreement can effectively serve as a widely accepted multilateral instrument.

Latin America and the Caribbean has the potential to play a greater leadership role in international environmental policy.

Not only is it a highly vulnerable region and harbours irreplaceable natural carbon and biodiversity reservoirs, but also has its own unique narrative on the rights of nature and ethnic communities that provides a field of transformative action of enormous scope. These types of dialogues are key to start consolidating a regional agenda for a just and sovereign socio-ecological transition.

Catalina Gonda,  
Climate Policy Coordinator, Fundación  
Ambiente y Recursos Naturales (FARN).

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# Haarlem bans meat ads

The Dutch city of Haarlem has decided to ban adverts for meat in public spaces by 2024. This follows the addition of meat to a list of products that are considered to have a large negative impact on the environment.

“We can’t tell people there’s a climate crisis and encourage them to buy products that are part of the cause,” Haarlem GroenLinks councillor Ziggy Klazes, who tabled the motion, told the Trouw newspaper.

The city, with a population of 160,000, thus becomes the first in the world to introduce this type of ban.

This is happening at the same time as the country’s meat sector has started an advertising campaign “Nederland Vleesland” to encourage people to eat more meat.

The municipal government has not yet decided whether sustainably produced meat will be included in the ad ban.

Source: DutchNews.nl, 5 September 2022 <https://www.dutchnews.nl/news/2022/09/haarlem-first-city-to-ban-ads-for-meat-in-public-spaces/>



Prohibited from 2024.

# Ireland intends to cut farm emissions by a quarter by 2030

**Greenhouse gas emissions** from Ireland’s farming sector must drop by 25 per cent by 2030. This was announced by the Irish coalition government in July and is part of the country’s climate pledge to halve all carbon emissions by 2030 and reach net zero by 2050.

Ireland is a bit of an outlier when it comes to farm emissions. Cattle outnumber the human population, which results in the highest per capita methane emissions in the European Union. Just over a third of the country’s total greenhouse gas emissions come from the agricultural sector.

The new sectoral target was a compromise between farmers who wanted 22 per cent reductions and environmental groups and other sectors who wanted agriculture to cut emissions by 30 per cent.

Friends of the Earth CEO Oisín Coghlan commented on the deal in a press release:

“25% is lower than we need from agriculture. It makes other sectors’ emission cuts even more challenging as they’ll now have to pick up the slack and make cuts of around 65%.”

“On the other hand 25% is not what the agri-lobbyists wanted either. The last few weeks have shown that the Irish Farmers’ Association don’t have a veto on Irish climate policy like they used to. They said that anything more than 22% would impact the current business model for Irish agriculture.”

Other sectors face significantly greater emission reductions according to the deal: a 75% cut from electricity, a 50% cut from transport, as well as 45% and 40% emission reductions for commercial and residential buildings respectively.

There is no common understanding of what the new 2030 target will mean for livestock numbers. According to calculations by the Irish Farmers’ Journal it would entail a 13% decrease in the beef herd and 11% in dairy cattle. Meanwhile, the Irish Minister for Agriculture, Charlie McConalogue, has stated that no farmer will be forced to reduce their herd as a result of the climate plan.

This should be seen in the light of steady expansion in the dairy herd, since the EU milk quotas were scrapped in 2015.

However, there is no reason to doubt that the long-term net-zero goal will require transformative changes to Irish agriculture. According to a recently published research study in Nature Sustainability, the number of livestock in Ireland would need to be halved in combination with major afforestation efforts.

Kajsa Pira

Sources: The Guardian, 29 July 2022, Ireland targets 25% cut in agriculture emissions but farmers voice anger <https://www.theguardian.com/world/2022/jul/29/ireland-targets-25-cut-agriculture-emissions-farmers-anger>

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# EU must cut livestock numbers to deliver on methane

The European Union is unlikely to deliver on its pledge to cut methane emissions by 30% by 2030 without cutting livestock numbers, reveals a report released in June. The Global Methane Pledge was launched by the EU and US at the UN Climate Summit in Glasgow, where countries committed to a collective goal of reducing global methane emissions by at least 30 per cent from 2020 levels by 2030.

The analysis, conducted by CE Delft for the Changing Markets Foundation, shows that the

EU's policies at the beginning of the decade put it on track to cut methane emissions by 13.4% by 2030. Recent developments, particularly in the energy sector, could deliver further reductions of

at least 3.4% by 2030 but will still leave the EU well off target.

According to their calculations, the EU can cut emissions by up to 34% by persuading just 10% of EU consumers to switch to diets with less meat and dairy and accelerating existing plans for tackling emissions from animal manure, food waste and energy.

Furthermore, it is stated that a 45% cut, which scientists say is needed to stop global temperatures from rising above 1.5°C, cannot be achieved without



Aliens helping out with the EU methane pledge.

cutting livestock numbers. Reductions of 38–47% can be achieved if half of Europeans reduce their meat and dairy consumption, and additional measures – including action to tackle food loss and waste – are introduced alongside existing plans.

Source: Changing Markets Foundation Press release, 14 June 2022

The report, Methane Reduction Potential in the EU: [http://changingmarkets.org/wp-content/uploads/2022/06/PRESS-RELEASE\\_English-FINAL.pdf](http://changingmarkets.org/wp-content/uploads/2022/06/PRESS-RELEASE_English-FINAL.pdf)

# Navigating nitrogen

**“The less fossil-fuel-based** fertilisers we use, the less dependent we are on fossil fuel imports,” Ursula von der Leyen stated in a response to one of the group leaders’ interventions just after her “State of the European Union” speech in the European Parliament on 14 September 2022.<sup>1</sup>

The importance of fossil gas for nitrogen fertiliser production has become increasingly apparent in recent months as a result of soaring gas prices. According to data from Independent Commodity Intelligence Services (ICIS), most European nitrogen fertiliser plants had limited their production in mid-September 2022, due to the high prices. Some were completely halted, while others such as YARA’s facilities were running at just 35% capacity.<sup>2</sup> Fertilizers Europe estimates that around 70% of European ammonia production capacity has been curtailed.<sup>3</sup>

When the European Commission presented the ambition to halve nitrogen losses and reduce fertiliser use by 20 per cent by 2030, as part of its Farm to Fork Strategy, it could not have expected this development. By the end of the year the Commission intends to publish an Integrated Nutrient Management Action Plan aimed to help achieve the set targets.

Over the years the European Union has

tackled nitrogen pollution under several directives and regulations, for example the Nitrates Directive, the National Ceilings Directive, the Water Framework Directive and the Wastewater directive. Most of them reflect a simple “source – receptor/ effect” model of understanding.

Despite the number of laws that already exist, the European Environment Agency estimates that current nitrogen losses surpass the planetary boundaries by a factor of 3.3.<sup>4</sup> Taking a holistic approach to nitrogen is a fair next step.

One might think that the ongoing development could provide support for the Commission. The European Union can reduce the need for import-dependent inputs, while curbing emissions that harm biodiversity and human health.

In the short term, decisions go in the opposite direction. In her State of the Union speech, von der Leyen promised financial support to energy-intensive sectors. The fertiliser industry was subsequently mentioned explicitly as a potential recipient.

The European Commission is also considering suspending tariffs on nitrogen fertilisers, so that imports can more easily replace domestic

production. Quite naturally, farmers organisations are in favour of cheaper imports, while the European fertiliser industry is opposed.<sup>5</sup>

It is clear that neither financial subsidies to support the fertiliser industry nor abolished tariffs for imported fertilisers will contribute to the EU embarking on a path of increased resilience. The question is how the EU’s decision-makers manage to achieve a balance between dealing with acute crises and sticking to targets set a few years ahead.

Kajsa Pira

<sup>1</sup> <https://www.euractiv.com/section/politics/news/von-der-leyens-ukraine-tinted-speech-falls-short-on-policy-vision/>

<sup>2</sup> [https://twitter.com/ICIS\\_Sylvia/status/1572607793873444864/photo/1](https://twitter.com/ICIS_Sylvia/status/1572607793873444864/photo/1)

<sup>3</sup> <https://www.euractiv.com/section/agriculture-food/news/farmers-industry-diverge-over-fertiliser-tariff-suspensions/>

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## Zero emission zones the next step for clean cities

A Clean Cities Campaign analysis of the most comprehensive database of low-emission zones in the EU-27, the UK and Norway shows that there is sustained momentum and a new wave of low-emission zones being set up, taking the total from 228 to 320 between 2019 and 2022, and rising to 507 by 2025. Also by 2025, at least 27 existing LEZs will have been expanded or set progressively stricter restrictions for polluting vehicles. Zero-emission zones (ZEZs), which will no longer allow the use of vehicles with internal combustion engines, are also emerging.

Clean Cities, The development trends of low- and zero-emission zones in Europe, July 2022 <https://cleancitiescampaign.org/wp-content/uploads/2022/07/The-development-trends-of-low-emission-and-zero-emission-zones-in-Europe-1.pdf>



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## Only 11 European cities have clean air

In July, the European Environment Agency (EEA) published its updated European City Air Quality Viewer report, which covers over 340 cities. Cities are ranked from the cleanest to the most polluted based on average levels of fine particulate matter (PM<sub>2.5</sub>) obtained from monitoring data over the past two calendar years. For air quality to be considered as good it needs to be below the World Health Organization's (WHO) health-based guideline for long-term exposure to PM<sub>2.5</sub> of 5 micrograms per cubic metre of air (5 µg/m<sup>3</sup>). From 2020 to 2021, air quality was good in only 11 cities. The guideline was exceeded in 97% of the 343 European cities included in the



Funchal can probably thank its location, for receiving the bronze medal in the European Championships in low particle levels.

viewer. The European Union's (EU) annual limit value for PM<sub>2.5</sub> is way higher than the WHO guideline, at 25 µg/m<sup>3</sup>, and was only exceeded in the three most polluted cities, including Nowy Sacz, Poland, and Cremona and Padova in Italy.

Interested in your city? The Air Quality Viewer is available to download at [eea.europa.eu/highlights/air-pollution-which-european-cities?utm\\_source=EEASubscriptions](https://eea.europa.eu/highlights/air-pollution-which-european-cities?utm_source=EEASubscriptions)

## Global ammonia emissions underestimated

Satellite observations show that global ammonia emissions are higher than reported by bottom-up inventories. The study is a first attempt to use remote sensing to quantify county-level annual rates of ammonia emissions and was published in a pre-print article in June.

The new observations show that already known anthropogenic sources are around 80 per cent higher than indicated by data from inventories. When new anthropogenic sources and natural sources are included, ammonia emissions are a staggering four times as high as previously believed. The

latter include small but detectable emissions over large areas, such as the Russian taiga, that have previously been assumed to be zero. The researchers note that the observed emissions tend to deviate less from the reported emissions in countries with ammonia regulations in place, such as the European Union.

Despite the differences in the reported size of emissions, satellite-based methodology shows a familiar geographical pattern of global hotspots, with the central United States, north-western Europe, the Po Valley in northern Italy, the Nile Delta, Indo-Gangetic-Plain and eastern China having the largest emissions.

Source: Dammers, et al. (2022). County-level ammonia emissions monitored worldwide. 10.21203/rs.3.rs-1752718/v1.

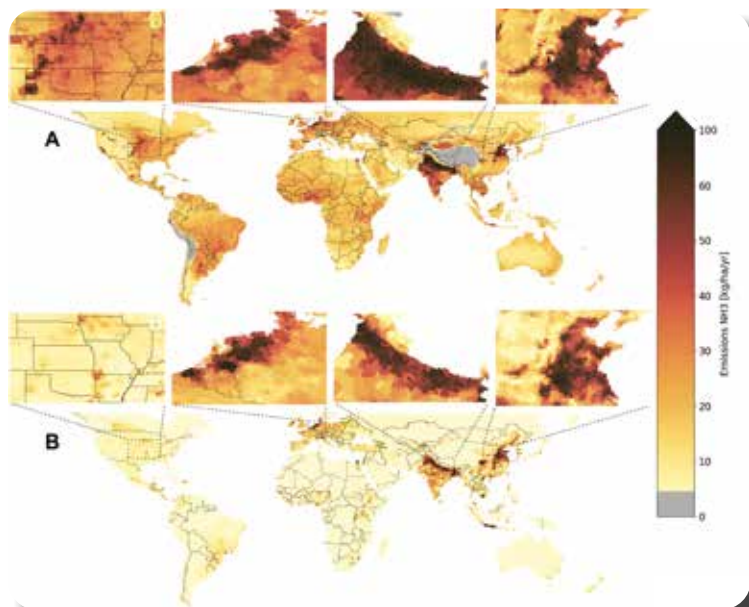


Figure . Global satellite-based (panel A) and inventory (panel B) annual NH<sub>3</sub> emissions derived over the period of 2013-2020. The four insets in each subplot show enlarged and aggregated totals at county/provincial level for four hot-spot regions around the globe.



# How iron and steel emissions can be cut

The huge emissions from the steel industry can be virtually eliminated by using hydrogen from green power, or from other electric processes. CCS is not used, not needed and not likely to be a mitigation option.

**The main climate** issue for iron- and steel-making is the CO<sub>2</sub> emissions from the use of coke and coal to reduce ore (iron oxide) to elemental iron in blast furnaces. For every atom of iron product, about 1.5 molecules of CO<sub>2</sub> are emitted. Every ton of steel produced in 2018 emitted on average 1.85 tons of carbon dioxide, equating to about 8 per cent of global carbon dioxide emissions.

The steel industry generates between 7 and 9 per cent of direct emissions from the global use of fossil fuel, according to worldsteel.org.

The competing, but much less widely used technology is Direct Reduced Iron, which usually uses (fossil) natural gas as the reducing agent, and which then also emits smaller but still considerable amounts of CO<sub>2</sub>. Fossil fuels are also used for heating the steel before rolling it. Electric arc furnaces have indirect CO<sub>2</sub> emissions, depending on the source of electricity, and often also have direct emissions from the fossil fuels used to assist the melt.

The Swedish Hybrit project was launched in 2016 to replace coal with hydrogen in steel production. It was the first of its kind. Now, many of the biggest steel companies in the world are heading in more or less the same direction.

Just a few years ago the climate strategy of the global steel industry specifically or heavy industry in general could be summarised in three letters: CCS. Or rather in six letters “Say CCS”, as nothing much actually happened. After almost 20 years of hype, no CO<sub>2</sub> has been captured anywhere in the world from the production of steel, cement, glass, aluminium or paper pulp, and very little from power plants.

The big EU ULCOS project (ultra-low-CO<sub>2</sub> steel-making), which began in 2004, eventually sank without a trace. Its main message was to keep blast furnaces, keep coal and coke, but add CCS.

Only months after the Paris climate agreement, in April 2016, Swedish steel-maker SSAB, iron ore miner LKAB and power producer Vattenfall launched a new decarbonisation strategy: to produce hydrogen with renewables and use the hydrogen to reduce iron oxide ore pellets to sponge iron. This was a bolt out of the blue, a radical departure from the previous strategy.

Four years later, McKinsey found a very different situation:

“All major European steel players are currently building or already testing hydrogen-based steel production processes, either using hydrogen as a PCI replacement or using hydrogen-based direct reduction.”

**ArcelorMittal is the** second-biggest steel producer in the world. It does the same thing as SSAB and is also trying another very different no-carbon tech. The company states that it is “exploring iron ore reduction technologies using hydrogen and electrolysis, both of which could deliver significant carbon reductions if powered with clean electricity. In March 2019, we launched a €65 million pilot project in Hamburg, Germany to test hydrogen steel-making on an industrial scale, with an annual production of 100,000 tonnes of steel. At the same time, we have been exploring direct iron ore reduction using electrolysis for a number of years. We lead the EU-funded Siderwin project, which is now constructing an industrial cell to pilot the technology.”

The company aims to have the Hamburg plant operating in 2025, which is one year before SSAB and LKAB also aim to have their (ten times bigger) hydrogen steel demo plant operating.

The Siderwin technology dissolves the ore, for example iron-rich residues from bauxite. It works at low temperature (110 degrees C) and is expected to reach

industrial scale by 2030.

If it achieves this it will still rely on green electricity.

Chinese Baowu, now the world's largest steel producer, has a hydrogen partnership with Linde, a global industrial gases company, “with the aim of beating the Swedish steel maker SSAB to commercialising clean steel production”, according to an article in the Australian Financial Review, which considers this as potentially bad news for exports of Australian coking coal.

The coming competitiveness of hydrogen, and the shrinking market for coking coal, was also recently pointed out by a Friends of the Earth report on a possible new coal mine in Cumbria, England.

According to its energy campaigner, Tony Bosworth: “The UK steel industry will only buy a small percentage of the Cumbrian coal, and with European steel-makers already moving to greener steel production, the market for this mine is declining before it has even opened.”

The third biggest steel producer, NS-SCM (Nippon Steel), is also working with hydrogen (as well as CCS) and also boasts a new steel for hydrogen infrastructure.

It is too early to say “problem solved” for CO<sub>2</sub> from steelmaking, but it surely looks as if green electricity and green hydrogen can do the job, whereas CCS is going nowhere.

Hydrogen is getting much more attention for reasons aside from steel production, such as short-term and long-term (seasonal) storage to balance wind and solar, or for ships, trucks and buses. The implication is that hydrogen will be produced by electrolysis using renewable electricity, abundant and cheap wind and solar. Hydrogen will be green. Future power is increasingly synonymous with solar and wind.

Fredrik Lundberg

(A longer more detailed article with references will be published in a report by AirClim soon)



PHOTO: SSAB

## July infringements of EU air quality law

The European Commission recently announced decisions it had made in its July Infringements package. In the area of air quality, the Commission is calling on Finland (INFR(2022)2029) and Ireland (INFR(2022)2053) to bring national legislation fully in line with EU law on air quality with regards to sampling points, data quality objectives and providing public information. Finland and Ireland have two months to respond and address the shortcomings raised by the Commission.

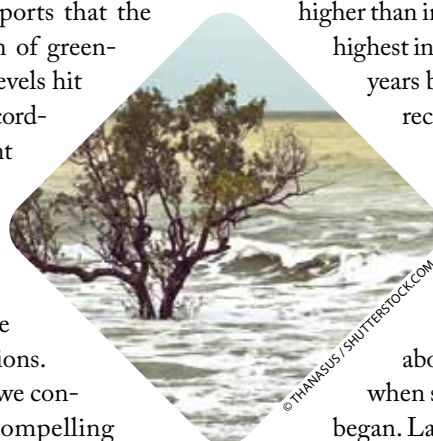
Full details of the EC decisions are at [ec.europa.eu/commission/presscorner/detail/en/INF\\_22\\_3768](https://ec.europa.eu/commission/presscorner/detail/en/INF_22_3768).



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## Atmospheric CO<sub>2</sub> and sea levels hit record highs in 2021

AFP news agency reports that the Earth's concentration of greenhouse gases and sea levels hit new highs in 2021, according to a US government report published in summer 2022, showing that climate change keeps surging ahead despite efforts to curb emissions. "The data are clear – we continue to see more compelling scientific evidence that climate change has global impacts and shows no sign of slowing," said Rick Spinrad, administrator of the National Oceanic and Atmospheric Administration. The rise in greenhouse gas levels comes despite an easing of fossil fuel emissions the previous year as much of the global economy slowed sharply due to the Covid-19 pandemic. The US agency said that the concentration of greenhouse gas in the atmosphere stood at 414.7 parts per million in 2021, 2.3 ppm



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higher than in 2020. The level is "the highest in at least the last million years based on paleoclimatic records," the annual State of the Climate report found. The planet's sea levels rose for the 10th straight year, reaching a new record of 97 millimetres above the average in 1993 when satellite measurements began. Last year was among the six warmest on record since the mid-19th century, with the last seven years all the seven hottest years on record, it said. The number of tropical storms were also well above average last year, including Typhoon Rai, which killed nearly 400 people in the Philippines in December, and Ida, which swept the Caribbean before becoming the second strongest hurricane to hit Louisiana after Katrina.

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## Loopholes in EU shipping proposal criticised

The European Commission has proposed to include the shipping industry in the European Union's Emissions Trading System (ETS). However, Transport and Environment and a number of other NGOs and industry representatives have criticised loopholes in the proposal. The criticism is presented in an open letter, in which the signatories "...urge the gross tonnage threshold for Monitoring, Reporting and Verification (MRV) Regulation, the Emissions Trading System (ETS) Directive and the FuelEU Maritime Regulation be brought down to 400 gross tonnage and that offshore and service vessels are included in these laws".

The open letter highlights six points in support of its demands, namely:

1. Green tech is ready
2. Long-term investment decisions require predictability now
3. A level playing field means ending fossil fuel subsidies

4. Companies already know their fuel consumption; the additional administrative burden is negligible
5. Ending loopholes is a no-brainer for industry, the climate and human health
6. Empower green European business



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In a concurrent report by Transport & Environment, entitled "Lost at sea: EU States' €20 billion giveaway to the shipping industry", the positions of EU institutions (co-legislators) are analysed. Concerning the tonnage limit, the analysis points out that the exclusion of smaller ships could delay or compromise decarbonisation, since there would be an incentive for ships to run on Liquefied Natural Gas (LNG) and since small vessels are often used to test

Smaller vessels should not be exempted.

new (greener) technologies. The analysis also addresses other exemptions in the proposal. In monetary terms, the analysis that compared the positions of the institutions concludes that the Council's proposal would amount to the said €20 million giveaway to the shipping sector.

Sources: Shippingwatch, "Businesses and NGOs urge stricter requirements for shipping in ETS", 21 September 2022, <https://shippingwatch.com/regulation/article14425376.ece>

T&E report, "Lost at sea: EU States' €20 billion giveaway to the shipping industry", September 2022 [https://www.transportenvironment.org/wp-content/uploads/2022/09/TE-Report\\_Shipping-ETS-Trilogues.pdf](https://www.transportenvironment.org/wp-content/uploads/2022/09/TE-Report_Shipping-ETS-Trilogues.pdf)

T&E Joint letter, September 2022, <https://www.transportenvironment.org/wp-content/uploads/2022/09/Final-Joint-Letter-EU-Shipping-Exemptions-1.pdf>



# Particles from electric vehicles

Electric cars cause more wear and tear on road and tyres due to the extra weight of the battery. Nevertheless they have lower net particle emissions than normal cars.

In the 20th century PM emissions from vehicles largely originated from exhaust fumes (80–90%). As stricter regulations were applied, exhaust emissions have fallen (at least in high-income countries), making the relative contribution of non-exhaust emissions larger. With the end of the era of Internal Combustion Engine (ICE) cars, as many governments introduce legislation to end their sale, many motorists will replace their ICE vehicles with electric vehicles. This move will naturally eliminate exhaust emissions, including ultrafine particles and the toxic nitrogen dioxide and other exhaust gases. There have nevertheless been conflicting findings on the contribution of EVs to non-exhaust emissions (from brake, tyre and road surface wear). It has been suggested that due to their increased weight, non-exhaust emissions of particles from EVs may be higher than their combustion counterpart.

An often-cited article found that EVs emitted more non-exhaust PM than ICE vehicles. One important factor that will influence results is which cars you compare, and here the choice of comparison was questionable. An erratum was later written as the authors had claimed to belong to a university but actually came from a company with a conflict of interest.<sup>1</sup>

This study was also the basis of a recent PhD thesis that compared the health impacts of vehicle types.<sup>2</sup>

A more recent modelling study found that the outcome is critically dependent on regenerative braking relative to the use of friction brakes, but overall found only modest changes in total local PM emissions between EVs and ICEVs.<sup>3</sup>

Previous studies were modelling studies based on simple assumptions and had not (as far as we know) been confirmed by experimental studies. It was not until recently that a Korean team compared three cars of the same model, but with different drive trains: petrol, diesel and fully electric (EV). The EV was 20% heavier than its combustion counterparts, which is a common average weight gain for the

battery. The on-road vehicle experiment was run 30 times on asphalt and combined with actual driving experiments with mobile sampling on rural roads, urban roads and motorways. The PM emission factors (EFs) from wear and tear of road and tyres were generally 20% higher for the EV than the ICEVs. The emission factors (EF) for the total PM emissions of ICEVs and EV were highly dependent on the inclusion of secondary exhaust particulate matter (PM) from ICEVs, the brake pad type, and the regenerative braking intensity of the EV. When only primary exhaust PM emissions were considered in vehicles equipped with non-asbestos organic (NAO) brake pads, the total PM<sub>10</sub> EF of the EV was 10% higher than those of the ICEVs. However, in vehicles equipped with low-metallic (LM) brake pads, PM emissions from brake wear significantly increased but using regenerative braking effectively reduced the brake wear PM, such that the total PM EF of the EV was comparable or lower than those of the ICEVs. When secondary PM emissions were included, the EF was always significantly lower for the EV than ICEVs. The replacement of ICEVs by EVs can therefore improve air quality and reduce the adverse impact of PM on human health.

**The particles from** brake wear are generated by the friction between the brake pads and discs, and the energy is lost to heat. While EVs still have friction brakes for use in an emergency (faster action) they can also use regenerative braking. Regenerative braking instead uses another technique in which the braking energy generated in a deceleration event can be stored in batteries and increase the driving range. How much of the braking is provided by regenerative braking will depend on the driver and operating conditions, so the EFs will be lower if most braking is done by regenerative braking. Another factor influencing the EFs is the pad type. Generally, brake pads can be divided into non-asbestos organic (NAO) and low-



The wear and tear on roads and tyres can be 20 per cent higher for electricified models.

metallic (LM) types. The emissions from LM pads are reportedly five times higher than from NAO pads, due to the greater surface roughness of LM pads.

To summarise, the wear and tear of road and tyre PM emissions can be 20% higher in EVs compared to ICEVs of similar models. PM emissions from brake wear will depend on the intensity of regenerative braking and choice of brake pad types. This will heavily influence how large the non-exhaust emissions from EVs will be and influence whether the total primary PM is slightly worse (10%) or the same or a little better than their ICEV counterparts. The comparison with ICEVs is complex and secondary organic aerosols from ICEVs will also impact the total emissions, which in this study always gave EVs the advantage in lower total emissions.

Ebba Malmqvist

<sup>1</sup> Atmospheric Environment, June 2016, Non-exhaust PM emissions from electric vehicles <https://doi.org/10.1016/j.atmosenv.2016.03.017>

<sup>2</sup> Forskning.se "Fler elbilar kan ge sämre luft i städerna", 6 September 2022, <https://www.forskning.se/2022/09/06/fler-elbilar-samre-luft-staderna/>

<sup>3</sup> Atmospheric Environment, 1 January 2021, PM<sub>10</sub> and PM<sub>2.5</sub> emission factors for non-exhaust particles from road vehicles: Dependence upon vehicle mass and implications for battery electric vehicles, <https://doi.org/10.1016/j.atmosenv.2020.117886>

Science of The Total Environment, 10 October 2022, Comparison of total PM emissions emitted from electric and internal combustion engine vehicles: An experimental analysis, <https://doi.org/10.1016/j.scitotenv.2022.156961>



# Climate change is everywhere – so is marine litter

As heavy rains and storms become more frequent more litter will be transported to the sea. Marine litter is projected to triple by 2040.

**Marine litter consists** of persistent and manufactured or processed materials that end up in marine or coastal environments, for instance through deliberate littering or by accidentally being lost at sea. The sources of marine litter are, however, not only to be found at sea or on shore, because marine litter can also consist of materials that have been transported by rivers, sewage and storms, for instance.

Marine litter has direct effects on marine and coastal environments but it does not operate in isolation. A fundamental and critical pressure on marine and coastal environments virtually everywhere is climate change. Interlinkages between marine litter and climate change were recently reviewed in an article by Susana Lincoln and co-workers that was published in *Science of the Total Environment*<sup>1</sup>.

In addition to providing definitions of marine litter, the authors explain that plastics are the largest and most harmful fraction of marine litter, and account for at least 85% of marine litter. They also explain that “In the absence of interventions, at the current rate the amount of plastic waste entering aquatic eco-

systems is projected to nearly triple from some 9–14 million tonnes/year in 2016 to a 23–37 million tonnes/year by 2040”. (The source for these pieces of background information was a report by UNEP<sup>2</sup>.) Here we highlight some of the findings of the study, especially regarding climate change effects on the transport of litter, and ecosystem and biodiversity effects.

A very basic coupling between marine litter and climate change is the fact that climatic phenomena that are driven by climate change affect the sources and transport of marine litter. For instance, heavy rain can increase the transport of microplastics and litter from land to rivers, which ultimately transport these materials to estuaries. Heavy rain also increases run-off from rivers and therefore affects the magnitude of riverine transport. Another climatic effect that increases the transport of litter from land to the sea is the occurrence of storms that cause erosion, and hence lead to the release of litter that has been trapped or buried on beaches and other coastal sources. The threat of erosion is moreover worsened by climate-change-driven sea level rise. Climate factors that are literally extreme are extreme weather events, such as cyclones and hurricanes. Storm surges as well as heavy winds and rain are factors that cause significant transport of debris to the sea during such weather events.

Climate change also affects the transboundary nature of marine litter because winds and currents transport litter around. Many large-scale weather phenomena are susceptible to climate change. One such example is El Niño and La Niña, although it is not clear how these events will change in the future. Nevertheless, the authors conclude that “Should there be any significant, long-term changes in oceanic and atmospheric circulation and in the timing and duration of El Niño and La Niña phases,

this could change how and where marine litter ends up in our oceans”.

In addition to all these relationships between climate change and the transport of marine litter, climate change can affect the breakdown of marine litter and perhaps especially that of plastics. Rising temperatures can speed up the breakdown of plastics into smaller fractions and eventually into micro- and nano-plastics. Additionally, mechanical abrasion can occur as a result of large waves and strong currents. Storms can also lead to the resuspension of particles in the water.

**As evidenced by** these highlights, climate-change-related phenomena can affect the fate of marine litter in many ways. Just as importantly, climate change and marine litter can have cumulative effects on ecosystems and biodiversity, and the authors warn that “There are growing concerns that the interaction between marine plastic pollution and climate change can significantly impact marine biodiversity, and that this impact is set to accelerate and worsen worldwide over the coming years and decades, conflating to diminish the adapting capacity of the world’s oceans”.

Although the authors acknowledge that there are knowledge gaps concerning the interactions between marine litter and climate change pressures, the effects of these combined threats are considered for several groups of species and several habitats. Marine megafauna, for instance, are particularly vulnerable to plastics, and based on their review the authors report that half of the species (out of a total of 663 species) are suffering from marine litter (especially plastics). Around 30% of sea turtles and birds, as well as 4% of marine mammals, reportedly have plastics in their stomachs. Special attention is called for regarding seabirds, especially



as their distributions are shifting because of climate change, and the interactions between seabirds and plastics are therefore also changing.

Among several habitats that are taken into consideration, one that appears to be especially susceptible to interactions is the habitat of sandy beaches. It is predicted that with the continued accumulation of plastics in this habitat over the coming decades, the resulting load of microplastics in the sand will lead to an increase in the temperature of the sand by approximately 2.4°C. A predicted parallel increase of 0.24°C per decade due to global warming will be superimposed. Through these parallel processes “an overall decline in the suitability of beaches for biodiversity” is therefore foreseen.

Apart from reviewing interactions that concern species, habitats etc. (many of which could not be included here) the study also provides case studies from five different biogeographical regions, namely the deep sea, remote small oceanic islands, the Mediterranean Sea, the Caribbean Sea, and the polar sea-ice environments in the Arctic and in Antarctica. The findings of these case studies are summarised in Figure.

Marko Reinikainen

Sources and further reading:

<sup>1</sup> Susana Lincoln et al., 2022. Marine litter and climate change: Inextricably connected threats to the world's oceans, *Science of The Total Environment*, Volume 837. <https://doi.org/10.1016/j.scitotenv.2022.155709>

<sup>2</sup> UNEP, 2021. From Pollution to Solution: A global assessment of marine litter and plastic pollution. <https://www.unep.org/resources/pollution-solution-global-assessment-marine-litter-and-plastic-pollution>

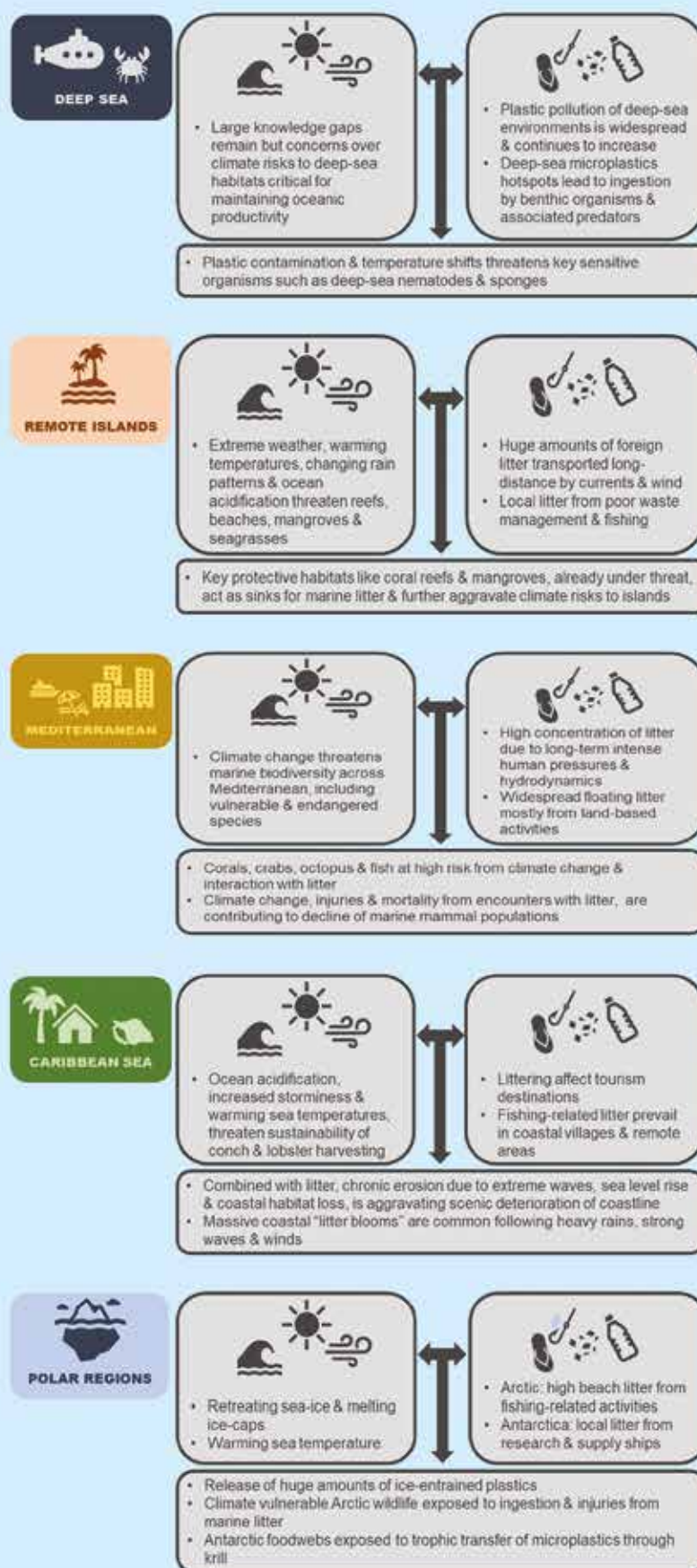


Figure. Interactions between climate change and marine litter in five different biogeographical regions (from source no. 1).



# Call for loss and damage and climate finance

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**The Alliance of Small Island States (AOSIS)** is urging support for the adoption of loss and damage response finance at COP27 in Egypt in November 2022.

“We have run out of time to waste – our islands are being hit with more severe and more frequent climate impacts and recovery comes at the cost of our development,” says AOSIS. “GDP losses from tropical cyclones average at 3.7% per year. My home of Antigua and Barbuda is still picking up the pieces from Hurricanes Irma and Maria in 2017 which wiped out Barbuda – that hurricane season cost the Caribbean a record-breaking \$300 billion in damages,” says the AOSIS chair. “Where are we finding the money to rebuild? Why must our islands, which contribute the least to the emissions that cause this crisis, pay the highest price?”

AOSIS argues that the IPCC Working Group report makes it clear that for our vulnerable countries there are severe impacts that simply cannot be addressed by adaptation efforts. There is presently no multilateral fund that is fit for purpose to address the immediate needs of territories which lose lives, livelihoods, lands, ancestral monuments, historical artefacts

and more, due to climate disasters.

The devastating floods in Pakistan and record-breaking heatwaves in Europe and the US are fresh reminders that climate change is wreaking havoc on lives and livelihoods. According to AOSIS, examples of severe impacts on island territories include:

- In 2004, Hurricane Ivan ravaged Grenada, causing damages costing twice the island's GDP.
- In 2017, Hurricanes Irma and Maria caused catastrophic damage to Antigua and Barbuda, totaling US\$136.1 million with the tourism sector accounting for 44% of this cost.
- In 2020, category 5 tropical Cyclone Harold devastated Northern Vanuatu, resulting in more than US\$500 million in L&D. Development aid to Vanuatu for recovery was less than US\$100 million.
- In the Cook Islands, cyclones and rising temperatures damage crops and decrease water availability. Islanders are forced to leave their homes and livelihoods behind.
- Tuvalu is continuously threatened by sea level rise. Groundwater is no longer drinkable, saltwater intrusion dam-

ages crops, fisheries are dwindling, and families are more prone to water-borne disease. Loss of land is beyond adaptation efforts.

- Marine heatwaves have doubled in frequency, causing widespread coral bleaching and reef degradation. Islands which are dependent on tourism and marine life for food are losing marine and coastal ecosystems.

At the same time, developing countries are demanding that wealthy nations provide at least \$1.3 trillion in climate finance to them annually starting in 2030. African countries and a group called the Like-Minded Developing Countries, which includes China, India and Indonesia, said in a statement they submitted to the United Nations at the climate summit in Glasgow in 2021 that half the money should go toward funding renewable energy in the developing world and half toward protecting these countries from the effects of global warming.

Compiled by Reinhold Pape

Source: AOSIS Press release, 14 September 2022



# Low and ultra-low emission zones proven to be effective

In spring 2019, London implemented an ultra-low emission zone (uLEZ) to tackle road transport air pollution. A recent study quantified the effects of this policy on London air quality, using models and monitoring stations and adjusting for meteorological variables. The results showed the uLEZ intervention was successful in reducing NO, NO<sub>2</sub>, and NO<sub>x</sub>

concentrations not just within the zone of implementation but also throughout the wider low emission zone (LEZ) and Greater London area. NO<sub>x</sub> levels were reduced by 20% in the uLEZ, 17% in the LEZ and 15% in the Greater London area respectively. For NO<sub>2</sub> the effect was largest in the Greater London area (13%).

A health impact analysis was conducted

NO<sub>x</sub> levels have been reduced by 20%.



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to estimate the effect of a hypothetical LEZ on mortality and morbidity in Malmö, Sweden. The scenario assumed that all vehicles on municipal roads would meet Euro 5 or lower emission standards with Euro 6 equivalents. This would decrease NO<sub>2</sub> concentrations by 13.4%, preventing an estimated 9–26 deaths in Malmö each year. It was also estimated that 12 respiratory disease hospitalizations, 8 childhood asthma cases and 9 cases of hypertensive disorders of pregnancy would be avoided annually. These results suggest that LEZs can effectively improve air quality and improve public health.

doi: 10.1016/j.apr.2022.101514.

<https://pubmed.ncbi.nlm.nih.gov/35998694/>

## Efficiency standards for Indian buses and trucks

In July, the Indian government proposed fuel consumption standards for heavy-duty vehicles in a draft notification issued by the road transport ministry. From April 2023, all types of buses and trucks would have to comply with the fuel consumption standards and fuel consumption target. The new norms will compel manufacturers and importers to make or bring fuel-efficient vehicles into the Indian market. Government-approved testing agencies will carry out compliancy tests for the Constant Speed Fuel Consumption (CSFC) standard and for compliance with the fuel consumption target.

A report on the measures can be found at: [timesofindia.indiatimes.com/business/india-business/govt-proposes-fuel-efficiency-norms-for-trucks-buses-from-april-23](https://timesofindia.indiatimes.com/business/india-business/govt-proposes-fuel-efficiency-norms-for-trucks-buses-from-april-23)

# Failure or success of air pollution policies in Delhi?

**The severe air** pollution events in Delhi due to sharp economic and population growth have been widely reported. A lot of the emissions are due to combustion of fossil fuels and in some cases a combination of biomass combustion in residential heating and cooking and agricultural burning, and fossil fuel combustion in power plants, transport and industry. Several policies have been implemented to curb these emissions, starting in the late 1990s, when on the suggestion of the Central Pollution Control Board (CPCB) and Delhi Pollution Control Committee (DPCC), the Supreme Court of India ordered the closure of nearly 680 companies, 246 brick kilns and a number of other furnaces and plants in Delhi. Several measures have been taken in the industrial sector such as emission standards, relocations, restricting the use of coal and installing filters. For the transport sector various action plans have been put in place on emission standards, sulphur content in diesel, reducing benzene and banning lead in gasoline, scrapping old vehicles and improvements in public transport

including replacing all diesel buses with natural gas buses. In Delhi, coal-burning boilers at thermal power plants have all closed during the past decade. The use of pet coke and furnace oil in industry is banned in Delhi, and since 2017, in the wider capital region too. Emission standards have also been set for major industries. However, their implementation is a major problem. Crop residue burning in nearby states is a significant source of pollution during the post-harvest season due to the very limited time gap between harvesting and sowing of the crop. Several measures have been introduced, including remote detection, training, incentives for farmers and even fines, and since 2018 agricultural mechanization has been promoted for the in-situ management of crop residues. The varying sources and the exponential growth of vehicles (7% per annum) makes it hard to evaluate the effectiveness of policy. In the case of industrial emissions it is difficult to analyse their impact due to a lack of transparency in implementation.

Source: Long-term trend analysis of criteria pollutants in megacity of Delhi: Failure or success of control policies, Nidhi Verma and Shiva Nagendra; Urban Climate (September 2022), Vol. 45, 101254, doi: 10.1016/j.uclim.2022.101254.

Delhi has introduced many measures to limit emissions, but it is still difficult to say anything certain about the effect they have had.

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## Coming events

**EU Environment Council.** Luxembourg, 24 October 2022. Information: <https://www.consilium.europa.eu/en/meetings/calendar/>

**N workshop – Halving nitrogen waste by 2030.** Madrid, 24-28 October 2022. Information: <https://nworkshop.org/>

**EU Energy Council.** Luxembourg, 25 October 2022. Information: <https://www.consilium.europa.eu/en/meetings/tte/2022/10/25/>

**UNFCCC COP 27.** Sharm El-Sheikh, Egypt. 7-18 November 2022. Information: <https://unfccc.int/>

**Air Quality Conference Future challenges in air protection in Europe.** Prague, Czech Republic, 24 November 2022. Information: <https://bit.ly/3MrygkF>

**UN Biodiversity Conference (COP 15).** Montreal, Canada, 7 - 19 December 2022. Information: <https://www.unep.org/events/conference/un-biodiversity-conference-cop-15>

**IMO Marine Environment Protection Committee (MEPC 79).** London, UK, 12 - 16 December 2022. Information: [www.imo.org](http://www.imo.org)

**CLRTAP Executive Body, 42nd session.** Geneva, Switzerland, 12 - 16 December 2022. Information: [www.unep.org/env/lrtap/welcome.html](http://www.unep.org/env/lrtap/welcome.html)

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

**EU Environment Council.** Brussels, Belgium, 20 December 2022. Information: <https://www.consilium.europa.eu/en/meetings/calendar/>

**The 7th Saltsjöbaden Clean Air Workshop 2023.** Gothenburg, Sweden, 13-15 March 2023. Information: <https://www.ivl.se/projektwebbar/saltsjobaden-air-science-and-policy-workshops.html>

**CLRTAP Working Group on Strategies and Review.** Geneva Switzerland 11 - 14 April 2023  
Information: <https://unece.org/info/events/unece-meetings-and-events/air-pollution>

**CLRTAP Meeting of the Task Force on Measurement and Modelling** Warsaw, Poland 10 - 12 May 2023  
Information: <https://unece.org/info/events/unece-meetings-and-events/air-pollution>

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

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

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