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climate change research and policy

Monthly Report on Research and Policy Developments - Energy and Climate Change

October 2021

Purpose: This document provides a summary of recent key developments in policy and research relating to energy and climate change. It has been prepared by the [ClimateXChange](#) Secretariat and is intended to keep policymakers informed of issues relevant to the Scottish Government's Energy and Climate Change policy portfolio.

International Climate and Energy Research and Policy

COP26 week one highlights and reaction

- More than 100 countries signed up to a US-EU [Global Methane Pledge](#) to cut methane emissions but at least 30% by 2030, [Inside Climate News reported](#). Carbon Brief published a [guest post](#) on why the pledge should go further. In parallel, the US Environmental Protection Agency released a draft of stringent new methane regulations for the oil and gas industry. Ahead of the summit, the IEA published a [report](#) on methane; the Science Media Centre published [expert reaction](#).
- In a surprise move, India's prime minister Narendra Modi said the country, the world's third largest emitter, would achieve net zero by 2070, [the BBC reported](#). [Nature published](#) reaction from scientists.
- More than 100 countries, including Brazil, promised to end and reverse deforestation, [the BBC reported](#). The pledge includes almost £14bn of public and private funds. The Conversation published a [commentary](#).

WMO State of the Global Climate 2021

The build-up of warming gases in the atmosphere rose to record levels in 2020 despite the pandemic, according to the World Meteorological Organization's [State of the Global Climate 2021 report](#). It finds that the amounts of CO₂, methane and nitrous oxide rose by more than the annual average in the past 10 years, the [BBC reported](#). The Science Media Centre published [expert reaction](#).

UNEP Emissions and Production Gap reports

The world is on track to warm by 2.7°C with hugely destructive impacts, UNEP warns in its [annual emissions gap report](#), the [New Scientist reported](#). Released just before COP26, the report analyses national emissions reductions plans. It finds that, when added together, they cut emissions in 2030 by around 7.5% compared to pledges made five years ago.

However, limiting warming to 1.5°C temperature would require cuts of 55%, the [BBC reported](#). The [Science Media Centre published expert reaction](#) while [Carbon Brief released in-depth analysis](#). Meanwhile, UNEP's [annual production gap report](#) finds that the world's big economies will produce more than double the amount of fossil fuels in 2030 than is consistent with meeting Paris Agreement goals. Fifteen major fossil fuel producers plan to produce around 110% more fossil fuels in 2030 than would be consistent with limiting warming to 1.5°C, and 45% more than is consistent with 2°C.

UNEP Adaptation Gap report 2021

Estimated adaptation costs in developing countries are five to ten times greater than current public adaptation finance flows, and the adaptation finance gap is widening, UNEP warns in its [Adaptation Gap Report 2021](#). Covid-19 recovery packages are also becoming a lost opportunity to finance climate adaptation. On the positive side, it says climate change adaptation is increasingly being embedded in policy and planning, with nearly 80% of countries adopting at least one national-level adaptation planning instrument – an increase of 7% since 2020. The [Science Media Centre published expert reaction](#) to the report.

World Energy Outlook 2021

Public spending on renewables is only at a third of the future levels required to achieve net zero while consumption of coal is growing strongly this year, pushing CO₂ emissions towards their second largest annual increase, according to the IEA's flagship [World Energy Outlook report for 2021](#). The agency said current plans to cut emissions will fall 60% short of their 2050 net-zero target, [the Guardian reported](#). But the IEA also said more than 40% of the required reduction could come from measures that “pay for themselves”, such as improving efficiency, limiting gas leakage, or installing wind or solar in places where they are already cheap and efficient. Carbon Brief published [in-depth analysis](#) of the report.

China releases NDC

China's long-awaited national plan on greenhouse gas emission reductions was met with disappointment by many commentators. [The Guardian reported](#) that the new nationally determined contribution (NDC) represented little progress on previously announced ambitions and would be insufficient to limit global heating to 1.5°C. China's emissions would peak by 2030, falling to net zero by 2060. It also committed to increase the share of non-fossil fuels in primary energy consumption to 25% by 2030, up from a previous pledge of 20%, [Reuters reported](#). China and the US also announced an unexpected [agreement](#) at COP26 to work together on achieving the 1.5°C goal.

US infrastructure bill passes

After weeks of wrangling, the US Congress passed Joe Biden's US\$1tn infrastructure bill, [the BBC reported](#). The package includes \$73bn for clean energy and \$66bn for railways. The Guardian published [expert commentary](#).

Climate action

The [State of Climate Action 2021 report](#), published by the World Resources Institute and others, identifies 40 indicators across key sectors that must transform to address the climate crisis. Positive trends include the higher-than-expected growth of wind and solar power and of electric vehicle sales. However, overall the transition is not happening fast enough with none of the 40 indicators on track to reach 2030 targets.

WEF on climate technologies

Early-stage technologies such as hydrogen-based fuels, carbon capture and bioenergy are in urgent need of funding to scale up globally and help organisations hit zero emission targets, according to a [World Economic Forum report](#). The report presents financing blueprints and policies to help mobilised investment, developed by experts from more than 50 financial institution and from the public sector.

GGR technologies

Further work is needed on the evidence base for greenhouse gas removals (GGRs) according to an in-depth [technology assessment report](#) published by BEIS. The study assesses and compares deployment pathways, costs, impacts on the energy system and barriers to deployment of different GGRs. The engineered GGRs investigated in depth were direct air carbon capture and storage (DACCS), bioenergy with carbon capture and storage (BECCS), and the use of wood in construction (WIC). The land-based GGRs investigated were afforestation, habitat restoration of peatland and saltmarsh, soil carbon sequestration in agricultural land, enhanced weathering, and biochar.

Oil majors at Congress

The head of ExxonMobil was accused of lying to the US Congress after he denied that the company covered up its own research about oil's contribution to the climate crisis, the [Guardian reported](#). For the first time Darren Woods and senior executives of Chevron, BP and Shell were questioned under oath at a congressional hearing into the industry's campaign to discredit and deny the evidence that burning fossil fuels drives global heating. When pressed to make specific pledges or to stop lobbying against climate initiatives, all four executives declined, the paper added. A Congress committee said it would subpoena the executives for additional documents, [Reuters reported](#).

Global Status of CCS 2021

The carbon capture and storage (CCS) project pipeline grew by almost a third in a year, according to the Global CCS Institute's annual [Global Status of CCS report](#). As of September, the CO₂ capture capacity of CCS facilities under development had grown 48 per cent to 75 million tonnes per annum (Mtpa) over 2020 levels. Clusters – in which multiple emissions sources share CCS transport and storage infrastructure – are increasingly becoming the dominant operating model, it says. Separately, ECCSEL, an EU research project, published a [report](#) on carbon capture and utilisation markets. Meanwhile, a [paper](#) in *Nature*, raises

concerns that CCS might not achieve its ambitious climate mitigation projections due to the shortage of CO₂ storage sites.

Military GHG emissions

An [article in The Conversation](#) discusses the “immense contribution” global militaries are making to the climate crisis, noting, for example, that the US Department of Defense is the world’s largest institutional consumer of fossil fuels. It also says that surprisingly little is known about military emissions but that, according to some estimates, militaries and their supporting industries might account for up to 5% of global emissions: more than civilian aviation and shipping combined.

Mining sector and net zero

The world’s top mining companies committed to a goal of net-zero direct and indirect carbon emissions by 2050 or sooner, [Reuters reported](#). The International Council on Mining and Metals (ICMM) issued an open letter signed by the leaders of the world’s 28 largest miners which also pledged to report annually on their progress to decarbonise. The collective commitment involves a third of the global mining and metals industry.

Democracy and climate change

Democracies must act decisively on climate change or risk being overtaken by populism and authoritarian forms of government, according to a [report](#) published by International IDEA, an intergovernmental organisation based in Stockholm. It notes that the wealthiest 1% of the global population were responsible for more than twice the CO₂ emissions of the poorest 50% between 1990 and 2015. It also notes that democracies such as Australia, Canada and US have exceptionally low rankings in the Climate Change Performance Index, scoring below several authoritarian states, including China.

French reindustrialisation plan

French president Emmanuel Macron announced a €30bn five-year investment plan to ‘reindustrialise’ France, including making it a global leader in green hydrogen, [the Guardian reported](#). The plan, €8bn of which is earmarked for the energy transition, will also support the building of new, smaller nuclear reactors with efficient waste management systems and of lower emission aircraft.

Nobel prize for climate change researchers

Three scientists were awarded the Nobel prize in physics for their work on complex physical systems including human influences on climate, [the Guardian reported](#). Dr Syukuro Manabe and Dr Klaus Hasselmann were honoured for their physical modelling, including linking increases in CO₂ to global warming from the 1960s. Prof Giorgio Parisi was recognised for identifying the hidden rules influencing the apparently random behaviour of solid materials and finding a way to describe them mathematically, [the BBC said](#). A piece in [The Conversation discusses](#) their contributions.

UK Climate and Energy Research and Policy

UK Net Zero Strategy

The UK Government published its [Net Zero Strategy](#), setting out for the first time how it will halve emissions in a little over a decade and eliminate them by 2050. It said its commitments would unlock up to £90bn of private investment by 2030. The [Climate Change Committee said](#) the strategy was achievable and affordable, and a 'genuine step forward'. The Government published several other related documents, including a [Net Zero Research and Innovation Framework](#), a [Heat and Buildings strategy](#) and responses to the CCC on [adaptation](#) and [mitigation](#). Carbon Brief published in-depth Q&As on the [overall strategy](#) and the [heat strategy](#); the Science Media Centre released [expert reaction](#); The Conversation published a [piece on the skills implications](#) and a [commentary on the financing and costs](#).

UK budget

The UK Government is to cut air passenger duty on short-haul flights within the UK, it announced in its autumn budget in a move that angered climate activists, [Bloomberg reported](#). It also froze road fuel duty for the 12th year in a row. In an [in-depth analysis](#), Carbon Brief, like many others, noted the budget speech was light on references to climate change. The BBC published a [commentary](#) and the Science Media Centre published [expert reaction](#); many of its contributors welcomed the budget's increase in R&D spending.

Environment Agency adaptation report

The climate emergency can only be successfully tackled through greater focus on adapting to already evident climate impacts, the Environment Agency warned, [the BBC reported](#). In its [third adaptation report](#) to government, the agency says that even with a 2°C temperature rise, winter rainfall is expected to increase 6% by the 2050s, compared to a 1981-2000 baseline, while summer rainfall is set to fall by 15%. River flows will be more extreme. Peak flows are expected to be up to 27% higher in the 2050s, while in the summer they could be 82% lower by as soon as 2050.

Fusion energy

The [UK Government released](#) a shortlist of five sites to be the home of a prototype fusion energy plant under its Spherical Tokamak for Energy Production (STEP) programme. One of the sites is in Scotland, at Ardeer, North Ayrshire; a final decision is expected in late 2022, [the BBC reported](#). The Government also published a [fusion energy strategy](#) and a [green paper on the regulatory framework](#). The Government has pledged to invest £222m in STEP. Separately, in the autumn budget, the Government announced up to £1.7bn in funding for a new nuclear plant, a move that could benefit EDF's Sizewell C project, [Reuters reported](#).

North Sea oil ruling

Scotland's highest civil court ruled against Greenpeace in a case it brought against the UK Government over a North Sea oil field permit, [Reuters reported](#). The environmental group argued there had been myriad failures in the public consultation over BP's Vorlich site off Aberdeen and that the permit did not consider the climate impacts of burning fossil fuel. It said it was the first time an offshore oil permit had been challenged in court and that it would appeal against the Court of Session ruling, [the BBC reported](#).

Domestic boilers

The British public wants the government to move faster on banning gas boilers from UK homes, according to new polling reported by the [i newspaper](#). Almost half of adults support government plans to ban the sale of gas boilers, according to an in-depth [Public First poll](#) on attitudes to different forms of heating. Less than a quarter (23%) oppose the policy. Of those in support, 59% said the ban should be introduced within a decade. Separately, The Conversation published [an article on electric boilers](#) as a green alternative.

Climate Science, Impacts and Adaptation

Urban heat

Exposure to "deadly urban heat" has almost tripled since the 1980s, due to the combination of rising temperatures and the growing number of people living in cities, according to a study [published in the Proceedings of the National Academy of Sciences](#) and reported in [the Guardian](#). Cities that have at least half of their heat exposure caused by global heating include Baghdad, Cairo and Mumbai. Of the more than 13,000 cities studied, 17% experienced an extra month of extreme heat days every year.

Blue Carbon potential

The Guardian published a three-part series on blue carbon - the sequestration and storage of carbon by ocean ecosystems - and its importance in combatting climate change. The first piece [introduces the subject](#) and looks at mangrove restoration; the second reports on [seagrass restoration in Scotland](#); and the third focuses on [sea marshes](#).

Climate justice series

Carbon Brief published a series on 'climate justice'. It includes an in-depth Q&A explaining [what climate justice is](#) and [new analysis on the countries historically responsible for climate change](#). Other articles cover: [why it matters](#); [the challenge of achieving a just transition in agriculture](#); and the [lack of diversity in climate-science research](#).