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climate change research and policy

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

April 2022

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

Global warming below 2°C

New and updated climate pledges up to, and including those at, COP26 could help keep global warming below 2°C – if “implemented in full and on time”, according to [research](#) published in *Nature*, the [Guardian reported](#). The widely reported analysis is the first peer-reviewed study to assess the peak temperature rise that would result from countries fulfilling their pledges. It used two independent modelling approaches, one of which assessed more than 1,400 different scenarios and included recent pledges on shipping and aviation emissions. However, limiting warming to “well-below” 2°C or 1.5°C, as per the Paris Agreement, “urgently requires policies and actions to bring about steep emission reductions this decade, aligned with mid-century global net-zero CO₂ emissions”, the study says. An accompanying [News & Views](#) paper warns that “optimism should be curbed until promises to reduce emissions in the future are backed up with stronger short-term action”. Former UN climate chief Christiana Figueres wrote a [comment piece](#) on the research in the *Guardian*, noting “the Paris Agreement is working, even if not fast enough”.

Methane reduction

A global hub to slash methane emissions has been launched to support implementation of the Global Methane Pledge, agreed at COP26, [Climate Home News reported](#). Set up with \$340m of philanthropic funding, the Global Methane Hub will offer grants and technical support to implement the pledge, to which 110 countries have signed up, collectively committing to reduce their methane emissions by 30% between 2020 and 2030. Marcelo Mena, former environment minister of Chile, is leading the hub.

State of the Climate 2022 Q1

After a slightly cooler 2021 on the Earth's surface, the world is on track for 2022 to be between the fourth and eighth warmest year since records began in the mid-1850s,

according to Carbon Brief's [State of the Climate analysis](#) for the first quarter. It is very unlikely to be a record warm year due to moderately strong La Niña conditions, it notes. However, March 2022 saw record warmth over China and large parts of southern Asia, as well as exceptionally high temperatures in the Arctic. In Antarctica, a March heatwave saw temperatures nearly 40 C above normal in the eastern part of the continent; Antarctic sea ice saw the lowest sea ice extent on record in late February.

Coal plant construction continues

China was responsible for more than half of the new coal power station capacity being built around the world last year, accounting for 52% of the 176 gigawatts of coal capacity under construction in 20 countries, according to a [report](#) from Global Energy Monitor (GEM), the US NGO, [covered by New Scientist](#). The global figure barely changed from the 181 GW that was under construction in 2020, despite analysis showing that no more new coal projects can be built if climate goals are to be met. New construction, overwhelmingly in Asia, is more than offsetting the closure of old plants, it notes. Carbon Brief has an interactive [global map](#) of coal plants, which uses GEM data.

UNDRR global assessment

The number of medium-sized or large disasters, caused in part by human activity, could rise to 560 a year, or 1.5 a day, by 2030, up from 350 to 500 a year at present, according to the UN, [Reuters reported](#). In its [global assessment report](#), the UN Office for Disaster Risk Reduction says climate change is causing more extreme weather events such as fires and floods; decisions are too narrow in focus and are over-optimistic about the risk of potential disasters, leaving us unprepared. The impact of disasters has also been heightened by population growth in areas more prone to natural catastrophes, it says.

Stanford climate school

California's Stanford University is to create a new school on climate change after receiving a \$1.1bn gift, its largest ever, the [Independent reported](#). As well as funding research, the donation, from Silicon Valley venture capitalist John Doerr and his wife Ann, will establish an accelerator to provide grants for new projects.

UK Climate and Energy Research and Policy

Electricity system operation

The UK Government is to create a new public body to oversee Britain's energy systems as it transitions away from fossil fuels, effectively renationalising critical responsibilities held by National Grid, [Reuters reported](#). To achieve the UK's low-carbon goals, [BEIS said](#) it would launch a Future System Operator (FSO) to oversee the integration of technologies such as hydrogen and carbon capture and storage into existing gas and electricity systems. Business secretary Kwasi Kwarteng the overhaul was both "vital" for achieving net zero but also for

“national security, and to becoming energy independent in the long term”, the [FT reported](#) (paywall).

Fracking review

Business secretary Kwasi Kwarteng has requested a new report on the impact of fracking in the UK, the [BBC reported](#). The minister has given the British Geological Survey (BGS) three months to “assess any changes to the science around the controversial practice”. A moratorium on fracking has been in place since 2019 after operator Cuadrilla triggered a series of earthquakes at an exploration well at a site in Lancashire. However, the Government is reconsidering the ban under efforts to boost energy security following Russia’s invasion of Ukraine.

SSE and ScottishPower in green hydrogen moves

SSE is to produce green hydrogen at its Gordonbush onshore wind farm in Sutherland in the Highlands using technology from Siemens Gamesa Renewable Energy (SGRE). The [Perth-based utility said](#) the facility would have production capacity of up to 2,000 tonnes of green hydrogen a year using wind energy generated at Gordonbush. Separately, [SSE announced](#) a move into southern Europe, agreeing to buy SGRE’s existing European renewable energy development platform for €580m, [Bloomberg reported](#). The portfolio includes 3.9GW of onshore wind development projects – around half of which is located in Spain with the remainder across France, Italy and Greece – with scope for up to 1GW of additional co-located solar development opportunities. In a further development, ScottishPower and Storegga, lead developed of the Acorn CCS and Hydrogen project, have formed a partnership to develop, build and operate green hydrogen production plants across Scotland. The first project to be progressed will be the Cromarty Hydrogen Project, located just north of Inverness at Cromarty Firth. It aims to deliver up to 20 tonnes of green hydrogen per day from 2024, with the potential to scale up to 300MW, the [companies said](#).

Calls to act on ‘carbon leakage’

MPs have called on the UK Government to develop plans immediately for a carbon border adjustment mechanism (CBAM) to address carbon leakage and support global efforts to achieve net-zero emissions, the [Independent reported](#). In [a report](#), the Environmental Audit Committee says a CBAM could drive green policies in UK industries as the practice of ‘offshoring’ UK emissions is addressed. Putting a price on imported carbon can incentivise sectors to move away from carbon intensive practices and promote behaviour change to more low-carbon products, it notes. Currently, the UK’s emissions figures do not include carbon from imports, which understates the true picture of the carbon associated with UK consumption.

Scottish waters warming

Water in lochs and reservoirs in Scotland has undergone “rapid and extensive climate change-drive warming” in recent years, according to a [report](#) from CREW, Scotland’s Centre

of Expertise for Waters. The study finds that 97% of monitored lochs and reservoirs had increased in temperature between 2015 and 2019. Most warmed by up to 1C per year but 9% rose by more, some by up to 1.3C. The warming risks harmful algal blooms developing, which could restrict their use for recreation and water supply, and as a safe habitat for wildlife.

UKERC on green jobs

Policy support for, and investment in, low carbon energy (including renewables) and energy efficiency can deliver more jobs than gas or coal power generation, according to [research published by UKERC](#). Renewable energy was found to create three times as many jobs per £million invested as compared to fossil fuels; for energy efficiency this rises to a fivefold increase, it finds. The research also says there is a need for a new nationwide programme of energy efficiency and heat decarbonisation retrofitting in UK buildings, which could help to stimulate ongoing, countrywide demand for low-carbon jobs over several decades.

Climate Science, Impacts and Adaptation

Soil carbon monitoring

Most soil carbon stock changes in European soils are not being monitored, which is the most important “blind spot” of land-related climate policy, according to a [Perspective](#) piece published in *Nature Climate Change*. If soil carbon were properly monitored across the EU, new emissions to the order of 70 MtCO₂ a year could appear in croplands, while new removals of the same order of magnitude could appear in grasslands and forests, it finds. As long as soil carbon is not properly monitored, it will not be possible to identify the priority areas where new removals can be targeted and incentivised, it notes.

Enhanced rock weathering benefits

Enhanced rock weathering – which involves modifying soils with crushed silicate rocks such as basalt – “could play a crucial role in national climate mitigation strategies”, according to [research](#) published in *Nature Geoscience*. The authors assessed the CO₂ removal potential and agricultural benefits of implementing enhanced rock weathering strategies across UK arable croplands. They find that enhanced rock weathering could deliver 6-30m tonnes of CO₂ removal per year by 2050 for the UK – representing up to 45% of the atmospheric carbon removal required to reach the country’s net-zero target. Co-benefits include substantial mitigation of nitrous oxide, widespread reversal of soil acidification and considerable cost savings from reduced fertilizer usage.

Diet and climate change

Substituting just 20% of ruminant protein consumed globally with cell-cultured microbial protein by 2050 could cut annual deforestation and its associated CO₂ emissions “roughly in half”, according to [research](#) published in *Nature* and [covered by the Independent](#). The researchers used a land-use model and three different scenarios of microbial protein

substitution to determine environmental and climate impacts. They note that reducing meat consumption in this way would also necessitate finding alternatives for non-food animal products such as leather and fertilisers. Separately, [research](#) published in *Nature Food* finds that replacing animal-source foods with “novel” or “future” foods – such as cultured milk, insect meal or mycoprotein – in European diets could reduce global warming potential, water use and land use by over 80% each, the [BBC reported](#). An accompanying [News & Views](#) paper suggests that at the individual level, Europeans now better informed, may start modifying their diets.