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climate change research and policy

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

August 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

IPCC reaction

Carbon Brief has collated [scientists' reaction](#) to the UN's Intergovernmental Panel on Climate Change (IPCC) sixth assessment (covered in last month's report). It also published a summary of the [media reaction](#); a [detailed Q&A](#); a piece on the assessment's [findings on extreme weather](#); and an analysis of when it believes [warming of 1.5°C and 2°C](#) will be reached. Reuters published an article on the [IPCC's geoengineering findings](#).

Hottest year in Europe

Europe experienced its hottest year on record by a significant margin last year, according to the American Meteorological Society, [the BBC reported](#). The [31st State of the Climate report](#) shows that all five of the continent's hottest years on record have occurred since 2014, and that in 2020 temperatures across the continent were 1.9°C above the average for 1981 to 2010. The Science Media Centre published [expert reaction](#).

Unicef on climate crisis

Almost half the world's 2.2bn children are already at "extremely high risk" from the impacts of the climate crisis and pollution, according to a [report](#) from Unicef. The UN agency's head called the situation "unimaginably dire", the [Guardian reported](#). The report is the first to combine high-resolution maps of climate and environmental impacts with maps of child vulnerability, such as poverty, access to clean water, healthcare and education.

German floods and climate crisis

The record rainfall that caused deadly flooding across Germany and Belgium in July was made up to nine times more likely by the climate crisis, according to [research](#) published by World Weather Attribution scientists. The study also shows that human-caused global heating has made downpours in the region up to 20% heavier, [the Guardian reported](#), and

made extreme rainfall between 1.2 and nine times more likely in Germany, Belgium and The Netherlands. The Science Media Centre published [expert reaction](#).

Biden moves on EVs and on climate & health

US president Joe Biden set a goal for half of all new US vehicle sales to be electric by 2030, the [BBC reported](#). As well as fully electric vehicles, the target includes hybrids and hydrogen fuel-cell vehicles. The target is non-binding but is to be backed up by tougher fuel consumption and emissions regulations. Separately, the administration announced the formation of the Office of Climate Change and Health Equity, the first federal programme aimed at understanding the impacts of climate change on health, [Reuters reported](#).

India infrastructure plan

India is to spend 100tn rupees (£972bn) on a national infrastructure plan to boost economic growth and help meet its climate goals, [Reuters reported](#). Details were not released. Narendra Modi, prime minister, also said India would become energy independent by 2047 and announced a National Hydrogen Mission to boost clean energy plans.

Shipping decarbonisation

Maersk, the world's biggest shipping company, said it would [invest \\$1.4bn](#) to accelerate its move to carbon neutrality, ordering eight container vessels that can run on green methanol as well as traditional bunker fuel. The order, with Hyundai Heavy Industries, is the single largest step taken so far to decarbonise global shipping, the [FT said](#).

Renewables and adaptation

Renewable energy can significantly contribute to climate change adaptation and create opportunities for innovative practices to address it, finds a [detailed report](#) by the International Renewable Energy Agency (IRENA). Renewables allow implementation of energy-intensive adaptation solutions – such as air conditioning, desalination and irrigation – with net-zero emissions, enabling win-win solutions, rather than trade-offs between mitigation and adaptation, it says. The report focuses on five areas – water; food, agriculture and forestry; natural disaster response; oceans, coasts and small islands; and human health.

UK Climate and Energy Research and Policy

UK Hydrogen Strategy

The UK government released its [Hydrogen Strategy](#), setting out how it would deliver its goal of 5GW of production by 2030. It estimates the sector will be worth £900m by then and support more than 9,000 jobs, [the BBC reported](#), and hopes to attract at least £4bn of investment into the hydrogen economy, [the Guardian said](#). The Science Media Centre published [expert reaction](#). The BBC also published a piece on the implications for [hydrogen in Scotland](#) and a [Science Focus feature](#); Carbon Brief published a [Q&A](#).

Blue vs green hydrogen

The chair of the UK Hydrogen and Fuel Cell Association resigned over concerns about blue hydrogen (produced with fossil fuels). Chris Jackson said oil companies had used false claims on the costs of making blue hydrogen to secure government backing, [the Guardian reported](#). Separately, scientists from Cornell and Stanford universities published a [controversial paper](#) questioning blue carbon's environmental benefits, saying it could lead to more emissions than using natural gas. [The Conversation published](#) a discussion of the paper and of blue hydrogen. Some scientists strongly rebutted the findings. [Sintef](#), the Norwegian research organisation, said, among other things, the research's findings were not applicable to Europe. On Twitter, David Joffe of the Climate Change Committee said the paper had, among other things, potentially "cherry-picked a climate metric to make [blue hydrogen] look as bad as possible".

Scotland and hydrogen

Scotland has the resources to become a global leader and exporter in the emerging clean hydrogen market due to its location, renewable energy potential, established oil and gas industry, geology, infrastructure and commitment to net zero by 2045, finds a detailed new analysis. [The report](#), published by Scottish Enterprise, the Net Zero Technology Centre and the Offshore Renewable Energy Catapult. Among other things, it examines green and blue hydrogen technologies in the Scottish context; scalability and cost reduction opportunities; and assesses potential sites.

Siemens Gamesa expansion

Siemens Gamesa is to double the size of its Hull wind turbine factory after securing partial grant funding from the UK government, the [BBC reported](#). The £186m upgrade to the company's Alexandra Dock site, already the UK's largest offshore wind manufacturing facility, would create 200 jobs, [the company said](#). The scheme, set to complete by 2023, will enable manufacturing of next-generation blades.

Ofgem innovation fund

Ofgem has launched a [£450m fund](#) aimed at innovative energy network projects to help the UK achieve net zero. The financing is available over five years and projects should be scalable and address energy transition challenges: whole system integration; data and digitalisation; heat; and transport.

SSE and National Grid heat recovery project

SSE and National Grid have [launched](#) a project to capture waste heat from electricity transformers and use it in homes and businesses. The companies are to begin trials on capturing heat generated by transmission network transformers, owned by National Grid, to provide heating for households connected to district heating networks operated by SSE. At present, hot air is vented from the giant substations to cool the transformers. If the trials

are successful, about 1,300 National Grid substations could act as neighbourhood “boilers”, piping water heated by the substations into nearby heating networks, and on into homes, [the Guardian reported](#).

Shell to expand EV charging network

Shell announced plans to install 50,000 on-street electric vehicle (EV) charging points in the UK over four years, in an attempt to provide a third of the network needed to hit national climate change targets. [Shell said](#) the investment would be made through ubitricity, which it acquired earlier this year. The business supplies local authorities’ EV power points, with a network of 3,600 chargers in lamp posts or bollards. Shell will try to attract business from local authorities by offering to meet upfront installation costs not covered by government grants, [the Guardian reported](#).

WWF/Vivid Economics budget analysis tool

The UK government is spending many times more on measures that will increase greenhouse gas emissions than on policies to tackle the climate crisis, according to an analysis from the WWF and Vivid Economics, the [Guardian reported](#). Only £145m in the March 2021 budget was devoted to environmental spending, most of it on the post-Brexit emissions trading scheme for industry, according to the [analysis](#). The findings come from a new budget tagging tool which measures the impact of policy decisions that affect the environment.

Low-carbon economy

The UK’s low-carbon economy is now worth more than £200bn, almost four times the size of the manufacturing sector, according to [analysis](#) by consultancy kMatrix, published in the [Guardian](#). The analysis finds that more than 75,000 businesses employ more than 1.2m people in the UK’s green economy, which was worth £206bn in 2020/21. The low carbon sector grew by 7.4% in the year to 2019/20, fell by 9.0% in the last financial year but is expected to bounce back in the post-Covid recovery.

Scotland nature-based jobs plan

NatureScot has launched an [action plan](#) to boost nature-based jobs in Scotland, including an initial route map to develop the skills and opportunities needed for a green recovery from coronavirus and the transition to net-zero by 2045. Nature-based jobs already make a significant contribution to the Scottish economy, amounting to at least 195,000 jobs or 7.5% of Scotland’s workforce in 2019, it said.

Fisheries and climate crisis

Half the UK’s fishing fleet is at least 30 years old and uses heavily polluting fuel oil, according to a report which examines both the impact of the climate crisis on the fisheries sector and its contribution, [the Guardian reported](#). UK fisheries are estimated to have emitted 914 kilotons of CO₂ over a one-year period, equivalent to the annual energy use of more than

110,000 homes, according to [the report](#) by the Marine Conservation Society, WWF and RSPB. It calls on the government to increase UK seas' potential to act as a carbon sink by protecting blue carbon habitats and ending harmful practices such as bottom-trawling.

Tesco dairy scheme

Tesco is piloting a new scheme for UK dairy farmers, whereby they receive subsidies to grow more sustainable feed, [edie reported](#). As part of its partnership with WWF, the retailer will pay 80% of the cost of planting herbal leys – a mix of grasses and legumes to feed dairy cows – to some of its Sustainable Dairy Group members. The benefits include lower fertiliser usage, higher carbon sequestration rates and less dependence on soya, which is associated with deforestation, [Tesco said](#).

Climate Science, Impacts and Adaptation

AMOC/Gulf Stream weakening

New [research](#), published in *Nature Climate Change*, has detected warning signs of considerable instability within the Atlantic Meridional Overturning Circulation (AMOC), the currents of which the Gulf Stream are part, the [Guardian reported](#). The researchers said it had already been shown that AMOC is at its weakest in more than a millenium but that the loss of dynamical stability suggested it could be approaching its critical threshold beyond which the circulation system could collapse. BBC Science Focus published an [explainer and the Science Media Centre](#) published [expert comment](#). The latter noted the paper's findings did not imply that the Gulf Stream would collapse; rather, were AMOC to shut down, the Gulf Stream would flow a little further south. This would lead to cooler temperatures over the North Atlantic, including Northern Europe, which might offset global warming.

Personal carbon allowances

A [paper](#) in *Nature Sustainability* argues that personal carbon allowances (PCAs), a mitigation policy proposed in the 1990s, should be revisited. Recent advances in AI for sustainable development, together with the need for a low-carbon recovery from coronavirus, open a new window for PCAs which could contribute to a just transition, it says.

Climate change communication

Climatic Change has published a [collection of papers](#) on climate change communication and the IPCC, including studies on public understanding of terminology and on storytelling. The journal also published a [study](#) showing that personal experience of unusual or extreme local weather did not shape people's awareness of climate change as a political problem or their climate policy preferences in a sustained manner.

Enhanced rock weathering potential

Enhanced rock weathering – using pulverised silicate rocks to speed up carbon sequestration in soils and ocean sediments – may double the chances of limiting warming to www.climatexchange.org.uk

the 1.5°C target set in the Paris Agreement, according to a [study](#) in *Environmental Research Letters*. It finds that combining weathering with carbon capture and storage (CCS), which has a similar CO₂ drawdown effect, would triple the probability of meeting 1.5°C. Separately, Yale Environment published a [feature](#) on silicate rock dust and carbon removal.

Extreme rainfall in Scotland

Scientists from the Met Office and SEPA have published an analysis of the extreme rainfall Scotland experienced in August 2020. The [paper](#), published in the Royal Meteorological Society journal *Weather*, evaluates the performance of the Heavy Rainfall Alert Service.

Diet and carbon footprint

Reducing beef and processed meat consumption by just 10% could reduce 'dietary carbon footprint' by up to a third, according to [research](#) in *Nature Food*. The researchers developed a 'nutritional index' classifying nearly 6,000 foods into four different classes based on their nutritional benefit and environmental impact. They find that marginal dietary substitutions can result in both "compelling nutritional benefits and environmental impact reductions".