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climate change research and policy

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

March 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

Biden climate summit

President Joe Biden invited 40 world leaders to a virtual summit on the climate crisis later this month. The White House said the summit aimed to “catalyse efforts” to limit global warming to 1.5°C while also highlighting the economic benefits, [the FT reported](#). The new president also [unveiled](#) a \$2tn infrastructure plan he said would “finally address climate crisis as a nation”. The plan – which Congress must approve - includes \$100bn for power grid modernisation, \$80bn for rail networks, and \$174bn for the electric vehicle market as well as incentives for renewable energy.

Green recovery in danger

Governments around the world are failing to match their green rhetoric as they rebuild following the Covid-19 pandemic, with prospects for a ‘green recovery’ in danger according to a new [UNEP-backed report](#) on 50 leading economies. Countries are spending an unprecedented \$14.6tn on rescuing their economies but only \$368bn, or about 18%, can be regarded as green, it finds.

Global Electricity Review

Wind and solar electricity generation rose robustly in 2020 by 15% to account for almost a tenth (9.4%) of global electricity last year, up from 4.6% in 2015, according to think tank Ember's [Global Electricity Review 2021](#). Europe is leading the way with Germany at 33% and the UK at 29%. The UK is phasing out coal faster than any other G20 nation, but still relies on natural gas for 37% of its electricity, significantly above the global average of 23%.

Climate credit rating risk

The sovereign credit ratings of many countries could be downgraded within a decade if current levels of carbon emissions continue, increasing the cost of debt globally, according to [research](#) led by the University of Cambridge. It finds that, under a ‘business-as-usual’ scenario with no action in curbing emissions, the sovereign ratings of 63 countries would fall by an average of one notch by 2030. Germany, India, Sweden, and the Netherlands would fall three notches, the US and Canada by two, and the UK by one.

Net-zero pledges

More than a fifth of the world’s biggest public companies have made commitments to cut their emissions to ‘net-zero’, according to a new [report](#) by the Energy and Climate Intelligence Unit and Oxford Net Zero. It finds that 417 of the 2,000 largest publicly traded companies have set net-zero goals, but that only 27% of the companies that set targets include emissions across all “scopes” including “scope 3” emissions, which include customers using their products.

Bottom trawling

The fishing practice of bottom trawling – dragging heavy nets across the seabed - is responsible for 1bn tonnes of underwater carbon emissions a year, according to a widely reported [study](#) published in *Nature*. The emissions released are on a par with those of international aviation, yet are not included in national carbon accounts, Climate Home News [reported](#). China has the highest emissions from bottom trawling, accounting for about three quarters of the total.

Sharp rise in deforestation

The rate at which the world’s forests are being destroyed increased sharply last year, with at least 42,000 sq km of tree cover lost in key tropical regions, according to a [report](#) from the World Resources Institute. The losses were well above the average for the last 20 years. Altogether, 12.2m hectares of tree cover were lost in the tropics in 2020, an increase of 12% on 2019. Brazil’s forested areas fared the worst, partly due to fires in the Amazon.

Fossil fuel finance

Banks provided £750bn in financing to coal, oil and gas companies last year, despite pledges to support the Paris Agreement and cut funding for fossil fuels, according to a [report](#) from a coalition of NGOs. While lending and debt-and-equity underwriting for the sector fell by 9% in 2020, this may be due to the Covid pandemic, it finds, the [Guardian reported](#).

Volkswagen outlines EV ambitions

Volkswagen is to open six battery factories across Europe as part of ambitious plans to build 26m all-electric cars by 2030, up from the 230,000 it sold in 2020, the [FT reported](#). It is also launching investment joint ventures in the UK, Germany, Spain and Italy to produce public fast-charging EV networks.

Food waste and emissions

New figures from UNEP suggest that 900Mt of food are thrown away every year globally causing about 10% of global GHG emissions, the [BBC reported](#). The UNEP Food Waste Index shows that 17% of food available to consumers goes directly into the bin, with the majority wasted in the home. Cutting food waste is ranked higher than electric cars and plant-based diets in terms of mitigation measures.

Heat decarbonisation in Europe

[Research](#) published by ClimateXChange reviews the heating technologies and heat policies of nine European countries: the UK (with a focus on Scotland), the Netherlands, Norway, Sweden, Finland, Denmark, France, Germany and Ireland). It assesses how government policy has been used to change the way heat has been delivered, and current approaches to policy-driven heat decarbonisation.

Accessing adaptation finance

[Research](#) published by ClimateXChange reviews the learnings for Scotland from international attempts at assessing and securing the optimum level of investment in order to keep pace with climate change, a fast moving and emergent policy area. The research has a particular emphasis on flood risk management, coastal change and coastal erosion.

UK Climate and Energy Research and Policy

Industrial Decarbonisation Strategy

The UK Government unveiled its [Industrial Decarbonisation Strategy](#), which pledges to cut CO₂ emissions from industry by two thirds within 15 years. It also includes direct [funding](#) of £171m for nine projects, including £31m for Scotland's Acorn CCS and hydrogen projects. Carbon Brief published an [in-depth analysis](#) of the new strategy.

UK's COP26 goals

[Writing](#) in the Guardian, Alok Sharma, president designate of COP26, set out the UK's key goals for the climate summit. It wants all countries to set net-zero emissions targets; to formulate adaptation plans for countries; to encourage rich countries to help finance emissions cuts and adaptation in poorer countries; and for civil society to take a strong role in the talks. Mr Sharma also said the UK wanted countries to commit to ending the sale of new petrol and diesel vehicles, to phasing out coal and to securing a green recovery from the coronavirus pandemic.

North Sea Transition Deal

The UK Government announced a £16bn [North Sea Transition Deal](#) that will allow continued oil exploration for new reserves as long as companies pass a 'climate compatibility' test. The investment, from government and the oil and gas sector, will help support 40,000 North Sea jobs while also cutting the sector's carbon emissions by 50% by 2030.

Renewables surge

Scotland generated the equivalent of 97.4% of its electricity demand from renewables in 2020, up from 90.1% in 2019, narrowly missing a target to generate 100% from renewables by 2020. Scottish Renewables, the industry body, [said](#) renewables output had tripled in the last 10 years, providing enough power for the equivalent of 7m households.

UK emissions targets

The UK is halfway towards meeting its net-zero emissions target, according to [new analysis](#) from Carbon Brief. The estimates suggest the UK's GHG emissions in 2020 were 51% below 1990 levels, after an expected 11% fall last year, mainly due to the coronavirus pandemic. Almost all of the fall was due to changes in three areas – eliminating coal, cleaning up industry and cutting emissions from fossil fuel supply. Tackling the remaining 50% means cutting emissions from more difficult sectors, such as transport and heating, it notes.

Just Transition Commission report

Climate action, fairness and opportunity must go together, Scotland's Just Transition Commission says in its [final report](#). Taking action to tackle climate change must make Scotland a healthier, more prosperous and more equal society, whilst restoring its natural environment, it finds. Scotland needs rapid interventions to fully realise the potential and mitigate the potential injustice associated with the net-zero transition; without broad-based support, progress towards net-zero will not be achieved, it finds.

Cost and green options

Cost is deterring many Scottish residents from switching to greener lifestyle options, according to a [survey](#) conducted for the BBC. Of those who indicated they had considered buying an electric vehicle in the past year, for example, 71% said they had not proceeded because of the cost. The survey also indicated low awareness of the impacts of climate change.

Twenty-minute neighbourhoods

Scotland has an opportunity to be a global leader in 20-minute neighbourhoods, showing they are feasible in both urban and rural locations, [research](#) published by ClimateXChange shows. Twenty-minute neighbourhoods are places designed so residents can meet their day-to-day needs within a 20-minute walk of their home.

Communicating on climate change after Covid-19

The impact of Covid-19 has widened the narrative around climate change to highlight that collective action and change are possible, finds [research](#) published by ClimateXChange. It identifies the potential impact the response to the pandemic has had on how the Scottish public responds to climate change messaging and narratives – learnings that can be used to support a green recovery.

UK carbon pricing

Carbon pricing should be part of a significant package of post-Covid fiscal reforms in the UK, argues a [commentary](#) published by the Grantham Institute. A fiscal adjustment is needed to bring down high public borrowing; there is growing recognition that taxing GHG gas emissions - 'bads' - should be prioritised as these taxes are less distorting than labour or income taxes, it argues. The authors suggest that if carbon is not priced and fossil fuels are subsidised, the post-COVID-19 recovery will favour a high-carbon economy, with unavoidable future vulnerability to climate change.

Environmental Audit Committee on energy efficiency

The UK faces a 'colossal task' in retrofitting its housing stock to reduce GHG emissions, with the sector having the potential to let down the rest of the economy on decarbonisation, the UK Parliament's Environmental Audit Committee has warned. In a [report](#) on energy efficiency in existing homes, the committee says emissions reductions in homes have stalled and the failure of government schemes is of 'great concern'. The UK Government has significantly underestimated how much decarbonising homes will cost, and needs to 'get a grip' on this, before it is too late, it says.

BP hydrogen investment

BP unveiled plans to build Britain's largest hydrogen plant by 2030, saying it was considering a plant on Teesside with capacity of up to 1GW of blue hydrogen. The H2Teesside project would also involve carbon, capture and storage (CCS), piping the plants emissions to offshore storage in the North Sea, [Reuters reported](#).

Microwave-powered boiler

The creators of the world's first microwave-powered boiler have said it can provide a straightforward, zero-emissions replacement for the gas boilers that heat most UK homes, the Guardian and several other media outlets [reported](#). The boiler, made by [Heat Wayv](#), uses electricity to heat water which is then pumped through existing radiators and to taps. The company expects to trial the boilers in homes by end-2022.

Climate Science, Impacts and Adaptation

Soil carbon storage potential

The storage potential of soils, among the planet's biggest carbon sinks, may have been overestimated, according to [research](#) published in *Nature*. Rising carbon dioxide levels in the atmosphere can increase plant growth and, until now, it was assumed carbon storage in soils would increase too. However, the study, based on more than 100 experiments, found the opposite: when plant growth increases, soil carbon does not.

Agriculture productivity

Climate change caused by human activity has reduced global agricultural productivity by about 21% since 1961, a slowdown equivalent to losing the last seven years of productivity growth, according to new [research](#) published in *Nature Climate Change*. The effect is substantially more severe in warmer region such as Africa, Latin America and the Caribbean where the reduction is up to 34%.

UK agriculture risk

Occurrences of potato blight could increase by 70% in East Scotland by 2070 under a high-emissions global warming scenario, according to a new study into 'compound hazard events' that affect the UK's agricultural sector. The [research](#), published in *Climate Risk Management*, looks at case studies, comparing the frequency of events today to those in 50 years' time under the RCP8.5 scenario.

Seaweed supplement reduces methane

Adding a small amount of red seaweed (*Asparagopsis taxiformis*) to the diets of cows can reduce their methane emissions by more than 80%, according to new [research](#) published in the journal *Plos One*. The researchers found no evidence of detrimental effects on animal productivity or meat quality from the supplementation.

Agricultural technologies

A perspectives [paper](#), published in *Nature Plants*, discusses technological options that could deliver both food security and routes to CO₂ removal from the atmosphere. The technologies include enhanced weathering, agronomy technologies to increase soil organic carbon, and high-yielding resource-efficient crops that would free up land that is less suited for intensive cropping for land use practices to increase carbon storage, it says.

Food chain emissions database

A [study](#), published in *Nature Food*, presents EDGAR-FOOD, the first database of emissions from every stage of the food chain between 1990-2015, broken down by sector, greenhouse gas and country, Carbon Brief [reported](#).

Record UK rainfall

Record-breaking rainfall like that seen in the UK last October could be 10 times more likely by 2100, according to a new [study](#) by the Met Office. The research also finds that [3 October 2020](#) was provisionally the UK's wettest day in a daily series stretching back to 1891.