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

November 2020

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 win 'pivotal' for climate change

Joe Biden won the US presidential election in what many [commentators](#) said was a 'pivotal moment' for climate change. In one of the president-elect's first appointments, political heavyweight John Kerry was named as the first-ever US climate envoy. Kerry, who as Secretary of State under President Obama signed the Paris Agreement, [urged](#) global leaders to lift their ambitions and make next year's COP26 climate summit a success. Biden also reiterated his pledge to re-join the Paris Agreement as soon as he takes office.

IEA Renewables 2020

Global wind and solar capacity will double over the next five years and exceed that of both gas and coal by 2025, according to a new International Energy Agency (IEA) [report](#). It predicts a 1,123GW increase in wind and solar, saying the market for renewables had been more resilient through the Covid-19 pandemic than expected. In its main scenario, the IEA says wind, solar, hydro and other renewables will account for 95% of the increase in global electricity generating capacity over the next five years, with solar the main driver.

Say on Climate campaign

British billionaire Chris Hohn has stepped up his campaign to force big companies to cut their emissions, Reuters [reports](#). Hohn set a precedent in October by using a shareholder resolution to force Aena, the Spanish airports operator, to draft a new climate plan and submit it to an annual vote. Hohn is mobilising investors to sponsor similar resolutions at other companies under his [Say on Climate](#) campaign, which has attracted support from funds managing more than \$3 trillion in assets. Rather than focusing on high emitters, it aims to make submitting annual climate plans standard practice for all big companies. Mark Carney, former Bank of England Governor, now a UN climate envoy, has backed the idea.

Global250 and climate reporting

The world's largest companies are still some way from demonstrating good practice in reporting on climate risk, although the picture is mixed, according to a new [report](#) by consultants KPMG. There are notable variations in different geographies and sectors, it finds. German companies lead the world in setting net-zero targets, but lag behind on transparent reporting of their progress. The report, which offers examples of good practice, looks at the 250 largest companies based on the Fortune 500 list.

Forest-related carbon credits

Corporate demand for forest-related carbon removal could generate \$800bn in annual revenues by 2050, according to [new research](#) by Principles of Responsible Investment (PRI), the UN-supported investor body. A new industry could emerge that values carbon stored in vegetation and soil, unlocking new business models and investment opportunities for avoided deforestation, reforestation and afforestation, and land restoration, it concludes.

Shift to electric vehicles

China is leading a switch to electric vehicles (EV) in emerging markets which is expected to cut growth in global oil demand by 70% by 2030, according to a new [report](#) from Carbon Tracker, the financial think tank. Transport in emerging markets accounts for more than 80% of all expected growth in oil demand up to 2030, based on the IEA's business as usual scenario, with half forecast to come from China and India. However, the report notes these countries are already reducing their dependence on oil and actively supporting EVs as prices fall close to those of petrol and diesel vehicles.

CCS projections

Carbon capture and storage (CCS) technology is likely to be incorporated in nearly 40% of global electricity production by 2100, according to a [new study](#) in *Climate Change Economics*. The forecast is under a scenario aligned with the 2° C Paris goal. Achieving it, however, would require a considerable expansion of today's nearly four-dozen commercial-scale carbon capture projects around the world. The [authors also found](#) that CO₂ storage potential is larger than storage demand, both globally and regionally. Renewables could outcompete CCS, depending on how intermittency costs are defined.

Hydrogen briefing

The hydrogen economy could be all-encompassing, or it could fill a series of niches, depending on hydrogen availability, cost and performance relative to alternatives, says Carbon Brief in an in-depth [briefing](#) on hydrogen. Between these two extremes, there is still potential for hydrogen to play a hugely significant role in reaching net-zero emissions, requiring a dramatic scaling up of production and use, it notes.

Wood in construction

Increasing the use of wood as a building construction material would significantly reduce the environmental impact of building construction, according to a new [study](#) from Finland. If 80% of new residential buildings in Europe were made of wood, and wood was used in the structures, cladding, surfaces, and furnishings of houses, the buildings would store 55m tonnes of CO₂ a year, equivalent to 47% of the annual emissions of Europe's cement industry, [it finds](#).

Australian fires

The smoke cloud from Australia's bushfires earlier this year was three times larger than any previously recorded globally, according to [research](#) published in *Nature Communications Earth & Environment*. The cloud, which measured 1,000km across, remained intact for three months, reaching a height of 35km. Nearly 6m hectares for forest were destroyed in the fires, the intensity of which were caused, in part, by climate change, the researchers said.

Sentinel-6 launched

The Sentinel-6 satellite, considered critical to the understanding of climate change, has been launched, the [BBC](#) and many other media reported. The joint European-US endeavour is set to become the primary means of measuring the shape of the oceans: its data will track not only sea-level rise but also how the great mass of waters is moving around the world.

UK Climate and Energy Research and Policy

UK sets 68% net-zero target

Prime Minister Boris Johnson has lifted the UK's 2030 carbon emissions reduction target to 68% relative to 1990 levels, among the world's most ambitious pledges. The 68% target represents the UK's nationally determined contribution (NDC) towards meeting the Paris Agreement and is a notable increase on its previous target of 57%, the [FT said](#).

Green industrial revolution

The UK Government pledged to invest £12bn as part of a 10-point plan for a green industrial revolution that it [said](#) would create and support up to 250,000 jobs. Measures include quadrupling wind power to 40GW by 2030; the creation of two carbon capture clusters by the mid-2020s with another two by 2030; bringing forward the ban on new petrol and diesel cars and vans to 2030; and up to £500m on hydrogen production and trials for use in homes. Carbon Brief [published](#) a summary of the reaction while UKERC issued a [response](#).

CCC's Sixth Carbon Budget

The (recently renamed) Climate Change Committee (CCC) has recommended the UK aims for a 78% reduction in UK territorial emissions between 1990 and 2035 in its [Sixth Carbon Budget](#). In effect, this brings forward the previous 80% target by nearly 15 years, it said. It set out four key steps to achieve this: take up of low-carbon solutions; expansion of low-

carbon energy supplies; reducing demand for carbon-intensive activities; and land management and greenhouse gas removals.

Future of the North Sea

By fully developing offshore wind, the North Sea could provide one-third of the UK's energy needs, and this proportion will grow if low-carbon hydrogen and carbon capture, utilisation and storage (CCUS) are also fully developed, according to a [report](#) from think tank Policy Exchange. This transition could generate £20bn per year of investment in coastal regions and lead to a net increase of 40,000 direct jobs connected to the North Sea energy industry, it says. However, these benefits can only be realised if government overcomes a number of barriers, including resolving spatial conflicts in the UK's increasingly congested seas.

Heat decarbonisation

The UK Government needs to set out a clear roadmap for decarbonising home heating including a date for the mandatory phase-out of natural gas boilers, says a new [report](#) from the Social Mobility Foundation (SMF), the cross-party think tank. However, it must ensure the country is ready; otherwise it risks a backlash. Despite broad support, only 30% of the public can correctly identify the meaning of 'net zero', SMF-commissioned polling finds, with a similar proportion saying they are unfamiliar with alternatives to gas heating.

District heating in Scotland

ClimateXChange has published two studies on district heating (DH), or heat networks, in Scotland aimed at supporting emerging policy on its deployment. The [first](#) analyses and maps data relating to previous DH feasibility studies. Data, obtained primarily from industry stakeholders, was analysed to identify common barriers restricting DH heating development. A total of 109 proposed DH schemes were reviewed and mapped. The second [study](#) identifies waste heat, with potential for DH use, of nearly 1,700GWh across some 930 sites in Scotland. The greatest potential was in the distillery and waste-water treatment sectors. About a quarter of the waste heat sites identified were within 500m of an existing district heating scheme.

Air and energy accounts

Air and energy accounts for Scotland have been produced covering 1998 to 2018, with emissions estimated for the seven major greenhouse gases, in [research](#) published by ClimateXChange. The accounts enable more accurate monitoring of sectors' emissions and energy use in relation to their economic output. Among other things, they are intended to improve understanding of how emissions and energy use have changed over time.

Climate Change Fund

The Climate Change Fund's (CCF) community focus allows it to play a unique role in Scotland's transition to a low-carbon society, a ClimateXChange [study](#) finds. The CCF contributes by directly helping people to explore and adopt low-carbon behaviours; and by

building community capacity to embed a legacy of continued bottom-up change that can also support larger-scale policy interventions. As of mid-2020, over 1,150 projects had been awarded CCF grants, with total funding since 2008 exceeding £111m. The research centres on in-depth case studies of five CCF projects which the team followed for 18 months.

Energy-to-waste and CCS

Suez and BP are considering a commercial-scale demonstration carbon capture and storage project from energy-to-waste, in what would be a UK first. The initiative would see CCS retrofitted to Suez's Haverton Hill plant, one of four energy-from-waste facilities it operates in Teesside. The captured CO₂ would be supplied to the Net Zero Teesside CCUS project to be permanently stored beneath the North Sea. Suez [said](#) it hoped learnings from the project would enable large-scale roll out of CCS across its energy-from-waste plant portfolio.

Energy system change governance

UKERC has called for mass upgrades/electrification transformations of buildings; increases in electricity generation capacity and in electricity network capacity; conversion of parts of the gas network to hydrogen; and an expansion in the scale of district heating. The recommendations are made in a new [paper](#) investigating the importance of governance for energy system change. It focuses on areas where net-zero targets imply significant infrastructure change or expansion.

Renewables and electricity system integration

UKERC has released a [paper](#) examining the additional costs of integrating variable renewable electricity (VRE) sources, such as wind and solar, into electricity systems. The [study](#), published in *Nature Energy*, finds that integration costs are likely to be relatively low when the contribution from VRE to total electricity supply is in the low tens in percentage terms. At higher levels, significantly enhanced system flexibility may be required to minimise integration costs. A key task for policymakers and regulators is, therefore, to ensure that this flexibility is provided in the most economically efficient way, it says.

Farming roadmap for England

The UK Government [unveiled](#) what it said was the biggest overhaul of agricultural policies in England in half a century aimed at creating more sustainable farming and tackle climate change, [the Guardian reported](#). Its [Path to Sustainable Farming](#) includes an Environmental Land Management scheme to incentivise sustainable farming practices, create habitats for nature recovery, and establish new woodlands. It will also invest in improving animal health and welfare and launch a Farming Investment Fund to support innovation and productivity.

Climate Science, Impacts and Adaptation

Food systems and climate change

Two new reports highlight the negative impact of global food systems on climate change. The [first](#), published in *Science*, says that even if fossil fuel emissions were eliminated immediately, emissions from food alone would make it impossible to limit warming to 1.5°C and difficult even to realise 2°C without major changes. The [second](#), published by the UK Health Alliance on Climate Change, has a similar message, also highlighting that half of the UK's food-related emissions come from imports. Red meat consumption will need to halve if the food system is to stay within sustainable environmental limits, it says, while replacing animal protein with plant-based protein will also improve health.

Food and Agriculture Organisation soils report

The future of global soils looks “bleak” without action to halt degradation, according to a [FAO report](#). There are also major gaps in knowledge about soils, which store as much carbon as all plants above ground and are therefore critical in tackling the climate emergency. The report, the first on the global state of biodiversity in soils, was compiled by 300 scientists, who describe the worsening state of soils as at least as important as the climate crisis and destruction of the natural world above ground, [the Guardian reported](#).

Soil carbon and global warming

Global warming of 2°C would lead to about 230bn tonnes of carbon being released from the world's soil, equivalent to more than double the emissions from the USA over the last century, according to a [study](#) in *Nature Communications*. The authors said that, while their findings suggested substantial soil carbon losses, they had ruled out the most extreme projections. The response of soil carbon to climate change has been the greatest area of uncertainty in understanding the carbon cycle in climate change projections. The researchers said they had reduced an uncertainty of about 120bn tonnes of carbon at 2°C global mean warming to about 50bn tonnes.

Trees and carbon storage

A new [study](#), published in *Nature Communications*, has examined which types of forest, in terms of biodiversity, are the most effective in storing carbon. Data from natural forests on five continents show that species diversity is optimal for storing carbon for equatorial and tropical rainforests, and that, conversely, in forests located in cold or dry regions, it is the abundance of trees and not their diversity that favours the recapture of CO₂.

Airborne lab

The UK's Facility for Airborne Atmospheric Measurements (FAAM) has been awarded £61m in government funding, securing the airborne laboratory's future for another ten years, [UKRI said](#). Based at Cranfield University, the laboratory investigates climate change, pollution and severe weather, is the largest of its kind in Europe, and is capable of operating nearly everywhere in the world.