



Scotland's centre of expertise connecting
climate change research and policy

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

July 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 sixth assessment

The world is more likely than not to reach 1.5°C of warming within 20 years even in a best-case scenario of deep cuts in greenhouse gas emissions, the UN's Intergovernmental Panel on Climate Change (IPCC) warned in [its sixth assessment](#). The landmark report says that, even with rapid emissions cuts, temperatures will continue to rise until at least 2050 and cause further extreme weather, the [FT reported](#) (paywall). A key development since the IPCC's last assessment report in 2013-14 is the strengthening of the link between human-caused warming and extreme weather; the report says this is now "an established fact", Carbon Brief notes in its [Q&A](#) on the report.

EU climate action

The European Union unveiled [a wide-ranging package of measures](#) aimed at reducing emissions by 55% by 2030, up from an earlier target of 40%, and at achieving net zero by 2050. Reuters published several articles on the 'Fit for 55' plan, including on: plans to increase [renewables](#); the [effective ban](#) on new petrol and diesel cars from 2035; a [fund to support vulnerable households](#) if fuel bills rise; [natural carbon sink targets](#) for member states; and the world's first [carbon border tariff](#). It also published a [fact sheet](#) on the latter and [reaction](#) to the package. The [BBC said](#) the plan's scale was 'breathtaking'. However, UNCTAD, the UN's trade and development arm, said in a [report](#) that the carbon border tariff would do little to mitigate climate change. Carbon Brief published a [Q&A](#) on the package.

Biden's infrastructure package advances

President Joe Biden secured bi-partisan backing for his \$1tn infrastructure investment bill which contains many critical climate mitigation and adaptation measures. The package was

advancing through Congress at the time of writing, [AP reported](#). The White House released a [fact sheet](#) on the key measures.

Natural gas rebounds

Natural gas demand is set to rebound strongly in 2021 after record falls last year, putting global climate goals at risk, the [IEA has warned](#). The agency said demand would rise further if governments did not implement strong net-zero policies. Global gas demand is set to rise by 3.6% in 2021 before easing to an average of 1.7% over the following three years, it said.

Oxfam warning on net zero

Net-zero targets risk fuelling demand for land in low-income countries which, if not subject to careful safeguards, might increase hunger and fuel land inequality, Oxfam warns in a [report](#) covered [by the Guardian](#). Land-based climate solutions must centre on ‘food-first’ approaches that help achieve both zero emissions and zero hunger, the charity says. Planting trees on even a fraction of the area needed to offset global greenhouse gas emissions would encroach on land needed for food crops. Food prices could rise by up to 80% by 2050 if offsetting emissions through forestry is over-used.

Bioenergy challenges

The use of biomass to produce fuels or electricity should be heavily restricted — and two to three times less than the IEA suggests — to prevent bioenergy demand harming the fight against climate change, finds a [report](#) by the Energy Transitions Commission (ETC), a private sector coalition, [Recharge reports](#). Plant material naturally sequesters carbon as it grows, so burning it to produce energy can be counterproductive, the study says. It should also not be used for energy if it competes with food production, triggers deforestation or negatively impacts biodiversity and ecosystem health.

UK Climate and Energy Research and Policy

State of UK Climate 2020

Last year was the UK’s third warmest, fifth wettest and eighth sunniest on record, according to the [State of the UK Climate 2020 report](#). No other year has fallen in the top 10 for all three variables, [Reuters reported](#). All the top 10 warmest years for the UK have occurred since 2002 while the past decade has been 9% wetter than 1961–1990 for the UK overall. The Science Media Centre published [expert reaction](#) to the report.

UK transport decarbonisation plan

The UK is to ban the sale of new petrol and diesel heavy good vehicles from 2040 as part of its long-awaited [transport decarbonisation plan](#), Reuters [reported](#). The plan is one of several government documents that are expected to pave the way for an overarching net-zero strategy ahead of COP26 in November, Carbon Brief noted in a [Q&A](#) on the measures.

In a victory for campaigners, the plan pledges to review the UK's £27bn roadbuilding strategy to take account of environmental commitments, [the Guardian reported](#).

OBR on climate change costs

The UK faces another jump in public debt to achieve net-zero emissions but quick global action could make the cost less severe than that of the coronavirus pandemic, according to [new research](#) from the Office of Budget Responsibility, [reported by Reuters](#). An early-action scenario would add the equivalent of 21% of gross domestic product to public sector net debt in 2050-51. In a delayed-action scenario - whereby no decisive global action is taken by 2030 before subsequently being rushed - debt in 2050-51 would be 23% of GDP higher than in the early-action scenario, the OBR said.

Scottish industrial cluster

The 'Scottish Cluster' could support an average of more than 15,000 direct and supply chain jobs between 2022 and 2050 according to a [report](#) commissioned by Storegga, lead developer of the Acorn project. The cluster aims to deploy carbon capture and storage (CCS), Direct Air Capture (DAC) and hydrogen technologies across up to nine emitters, linking to the CO₂ transport and storage system Acorn is developing. Separately, Acorn received a significant boost, clinching important agreements with potential customers. It [signed an MOU](#) with the owners of two of the St Fergus gas terminals on carbon capture; emissions from the plants would be transported via existing oil and gas infrastructure to be stored permanently offshore. Acorn also signed [an MOU with INEOS and Petroineos](#) for CCS at Grangemouth, to commence in 2027. In all, the Scottish Cluster aims to capture 6.7m tonnes of CO₂ a year by 2030, rising to over 23Mtpa in the longer term.

Economics of CCS

A new [report](#) published by the Carbon Capture and Storage Association (CCSA) looks at the economic impact of scaling up CCUS in the UK in 2020s, the funding required and the lessons that can be learned from offshore wind deployment in the 2010s. It examines both the UK Government's commitment to capture 10Mt of CO₂ a year by 2030 and the Climate Change Committee's proposal to capture 22Mt of CO₂. It estimates annual funding requirements of delivering these scenarios at £1.2bn and £2.6bn respectively. Separately, MIT published [research](#) in *Applied Energy* examining the role of CCS in decarbonising hard-to-abate sectors such as cement, including analysis of the expected costs.

Offshore wind and CCUS

An Offshore Wind and CCUS Co-location Forum has been formed to identify the key challenges and opportunities associated with the co-location of offshore wind and Carbon Capture Utilisation and Storage (CCUS) infrastructure, the [Crown Estate announced](#). With seabed space limited, some areas are likely to require infrastructure in the same location. The Forum also includes the Oil & Gas Authority (OGA), the Carbon Capture and Storage Association (CCSA), RenewableUK and Crown Estate Scotland.

GHG removal technologies

The UK Government must commit to the wide-scale deployment of new greenhouse gas removal technologies by 2030 in order to meet its climate change obligations, according to a [report](#) by the National Infrastructure Commission. The report sets out how the engineered removal and storage of CO₂ offers the most realistic way to mitigate hard-to-abate emissions from sectors such as aviation and agriculture.

Orkney wind power

A tidal-powered turbine, which its makers say is the most powerful in the world, has started to generate electricity in Orkney, [the BBC reported](#). The Orbital O2 has the capacity to meet the annual electricity demand of 2,000 homes for the next 15 years. The 680-tonne turbine is anchored in the Fall of Warness where a subsea cable connects the 2MW offshore unit to the local onshore electricity network. It is also providing power to an onshore electrolyser to generate hydrogen.

UK renewables record

Renewable electricity generation reached record levels last year, contributing a 43% share of UK generation, [UK government figures show](#). For the first time, renewables outpaced annual fossil fuel generation which contributed nearly 38%, a record low and a fall of 75% from 2010. The year saw an unprecedented drop in energy demand caused by the Covid-19 pandemic, with transport demand dropping 29% compared to 2019.

Renewables savings

The UK could reach net zero faster and save almost £50bn by 2050 with a renewables-led energy system supported by decarbonised gas, long-duration storage, electricity market reform and network coordination, according to [research](#) commissioned by SSE, the Perth-based utility. It finds a renewables-led system, centred on offshore wind, would deliver significant system cost savings against the current expected pathway.

Blue hydrogen potential

The UK has the opportunity to become a world-leading blue hydrogen producer within the next decade, even outpacing current government targets, but only with the right policy support, according to a [position paper](#) published by the Hydrogen & Fuel Cell Association (HFCA). The paper says the UK could produce 10GW of blue hydrogen a year by 2030 and 80GW by 2050 and that, in the near-term, blue hydrogen will be the fastest way to deploy large volumes of hydrogen, [Upstream reported](#). Blue hydrogen is the process of converting natural gas to hydrogen and CO₂, with the CO₂ captured and stored.

MPs urge fairness in net-zero transition

The UK Government should follow the principles set out by Climate Assembly UK and ensure fairness underpins the transition to net zero, the Business, Energy and Industrial Strategy

(BEIS) Committee says in a new [report](#). The report makes recommendations on public engagement and education, building on the Climate Assembly's work. It says government efforts on engagement to date are 'insufficient' and urges it to come forward with the delayed Net Zero Review and Strategy to ensure genuine consultation, [Reuters reported](#).

Green trade

The UK's low-carbon economy has the potential to grow by 11% a year while the global export market for low-carbon products could be worth £1.8tn by 2020, according to a [report on 'green trade'](#) published by the UK Government's Board of Trade. The UK is well-placed to bring together the trade and environmental agendas and help accelerate the global green transition as a leader on decarbonisation and in green finance, it argues.

National Food Strategy

A new tax on salt and sugar should be considered to help curb obesity and combat climate change, according to a [landmark study](#), the [Independent reported](#). Meat consumption must fall by 30% over the next decade if the UK is to get to grips with the interlinked climate, nature and health crises, says the National Food Strategy, England's first major review of the food system in more than 70 years.

Red Cross heatwaves warning

There is a dangerous perception gap in the UK over heatwave dangers with a quarter of the population believing the country is not hot enough to be at risk, a [British Red Cross report warns](#). As well as lack of awareness, the report examines public preparedness for rising temperatures; it notes that by 2050, the UK will be 50% more likely to experience hot summers and that heat-related deaths could more than triple to 7,000 a year.

Climate Science, Impacts and Adaptation

Extreme weather more likely

'Record-shattering' extremes – which break weather records by large margins – will become more likely as a result of climate change, according to a [new study](#) published in *Nature Climate Change*. It finds that the northern mid-latitudes are particularly vulnerable to record-shattering heat as exemplified by the recent heatwave in north-western USA and Canada, [Carbon Brief reported](#). The speed of warming is more important than the level of warming reached when determining the likelihood of extremes, it finds, the [Independent reported](#).

Blue carbon wealth

A [new paper](#), published in *Nature Climate Change*, maps the 'blue carbon' uptake from marine and coastal ecosystems to highlight how natural sinks and climate change redistribute global wealth. The research provides a spatial and economic assessment of carbon sequestration and storage in three coastal ecosystem types at global and national

levels. This enables it to calculate each country's contribution to, and redistribution of, global blue carbon wealth; Australia, Indonesia and Cuba contribute the most, it finds. Carbon Brief published a [guest post](#) by the authors.

Basalt soil amendment potential

Adding powdered basalt to soil should be considered prominently when assessing land management options for mitigating climate change, argues a [new paper](#) published in *Nature Geoscience* and [covered in Physics World](#). First, however, potential unknown side-effects, as well as limited data on field-scale deployment, need to be addressed. Basalt is an abundant rock resource which reacts with CO₂ and removes it from the atmosphere while also improving soil fertility. It could also be upscaled rapidly, the research finds.

Land-use changes

Nature Geoscience has published a [collection](#) of journal articles on the trends and impacts of land-use change. It includes research on [changes in rainfall in Europe caused by forestation](#) (covered by [the BBC](#)) and a comment article on managing fire regimes.

Bioenergy crop water constraints

Constraints on sustainable irrigation could hold back supplies of the crops needed for bioenergy with carbon capture and storage (BECCS), according to [new research](#) published in *Nature Sustainability*. Without careful management for environmental sustainability, bioenergy crop plantations on a large spatial scale would lead to adverse effects, such as water scarcity, diminished biodiversity, land degradation and desertification, it warns.

Flood-prone areas and population growth

Many more people will live in flood-prone areas in the coming decade while population growth in areas likely to flood is greater than in other places, according to a new [study](#) published in *Nature*, [the Guardian reported](#). The research draws on daily satellite observations of floods during 913 large flood events between 2000 and 2018, a period in which 255m-290m people were directly affected by floodwaters. Population growth in these areas was 34%, compared with a global rate of 19%.

Mortality cost of carbon

The lifestyles of 3.5 Americans will create enough planet-heating emissions to kill one person, and the emissions from a single coal-fired power plant are likely to result in more than 900 deaths, according to a study that calculates the mortal cost of carbon emissions, [The Guardian reported](#). The widely-reported [research](#), published in *Nature Communications*, builds upon the "social cost of carbon", a monetary figure placed upon the damage caused by each tonne of CO₂ emissions, by assigning their expected death toll.