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

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

April 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

US pledges to halve GHG emissions by 2030

The US administration updated its pledges under the Paris Agreement, committing to cut greenhouse gas (GHG) emissions by 50-52% by 2030, against 2005 levels. The pledge was made ahead of President Joe Biden's Earth Day climate summit with 40 world leaders and is a more ambitious target than that set by the Obama administration, Politico reported. The US also promised to double US international climate finance by 2024 and triple adaptation funding, Climate Home News reported. Ahead of the summit, the US and China committed to cooperating on climate change after a visit to Shanghai by Mr Biden's climate envoy John Kerry, the Guardian reported.

Germany ordered to strengthen emissions' targets

Germany's top court ruled that its government must set clear goals for reducing GHG emissions after 2030, arguing that existing legislation placed too much of a burden on younger generations, AP reported. Germany aims to cut emissions 55% below 1990 levels by 2030, with 2019 legislation setting targets for sectors such as heating and transport, but not for how to achieve net zero by 2050. In a unanimous decision, the Constitutional Court said the 2019 legislation pushed a "very high burden" of emissions reduction into the post-2030 period and ordered the government to set new targets by the end of next year.

State of the Global Climate 2020

The coronavirus pandemic made the intensifying impacts of global warming even worse for millions of people while last year's temporary dip in CO_2 emissions had no discernible impact on atmospheric concentrations of greenhouse gases, according to the World Meteorological Organization (WMO). Last year tied with 2016 and 2019 as the hottest on

record, despite the cooling effect of La Niña, making the decade 2011-20 the hottest ever, the WMO says in its State of the Global Climate 2020 report.

IEA on electricity security

Governments, industries and other stakeholders need to improve their frameworks for ensuring electricity security through updated policies, regulations and market designs, the International Energy Agency says in a series of four reports on electricity security. It says electricity is undergoing a systemic change and is increasingly at the forefront of the entire energy system as it transitions to renewable rather than fossil fuel generation.

Strong global growth for renewables

More renewable energy capacity was added globally in 2020 than ever before despite the economic slowdown caused by the Covid-19 pandemic, according to the International Renewable Energy Agency's (IRENA) Renewable Capacity Statistics 2021 report. More than 260 gigawatts of renewable energy capacity was added last year, an increase of 10.3%, it said. More than 80 per cent of all new electricity capacity added was renewable. The increase in renewables' share is partly due to net decommissioning of fossil fuel power generation in Europe, North America and, for the first time, across Eurasia.

UN-led finance sector climate alliance

More than 160 financial institutions have signed up to a UN-led alliance aimed at accelerating the net-zero transition. Chaired by former Bank of England governor, Mark Carney, the Glasgow Financial Alliance for Net Zero (GFANZ) requires members to use science-based guidelines to reach net zero, cover all emission scopes, include 2030 target setting, and commit to transparent accounting. The UN said the alliance would work to mobilise finance for the net-zero transition and provide a forum for strategic coordination.

Financing coal

New research indicates that, while Asian countries attract criticism for building new coal-fired power plants, financial institutions from the US, Europe and Japan play a major role in financing them. Based on a newly constructed dataset, the research, published in *Environmental Research Letters*, analyses financial flows and proposes a methodology to calculate 'finance-based emissions' associated with construction of coal-fired power plants. The authors discuss the paper in a guest post for Carbon Brief.

Ikea and Amazon investments in renewables

Ikea is to spend an extra €4bn (£3.4bn) by the end of the decade to build wind and solar farms, fit its stores with electric vehicle charge points and invest in energy storage, the Guardian reported. The new investment will bring Ikea's clean energy spending to €6.5bn by 2030. Amazon, meanwhile, announced plans for nine "utility-scale" wind and solar energy projects around the world, including a large offshore wind farm in Scotland, the Scotsman

reported. The Scottish project will have capacity of 350 megawatts and is believed to be the largest corporate renewable energy deal announced by any business in the UK to date.

Hydrogen deployment accelerating

Deployment of hydrogen projects is accelerating rapidly with projects worth more than $300bn planned by 2030, according to a Hydrogen Council report. Written with McKinsey, it finds that, as of early 2021, nearly 230 large-scale projects had been announced, with 85% located in Europe, Asia, and Australia. From a total cost of ownership (TCO) perspective – hydrogen can become the most competitive low-carbon solution in more than 20 applications by 2030, including long-haul trucking, shipping and steel, it says.

Bellona on hydrogen

Bellona, the Norwegian foundation, has released two briefings on hydrogen. In the first, it says Europe is in danger of increasing emissions if all present hydrogen projects are pursued. It has published what is believed to be the first go-to guide on CO_2 intensity of hydrogen calculation methodology, saying it is imperative to check the source of the electricity being used to produce hydrogen. In the second, it looks at heat and the role of the different energy carriers in keeping homes warm. It says its modelling to 2050 suggests hydrogen will play only a marginal role in heating European buildings.

Blue vs green hydrogen

So-called 'blue hydrogen' will make little economic sense versus 'green hydrogen' created using renewable energy as soon as 2030, according to a BloombergNEF study, reported Upstream magazine. Blue hydrogen is created using fossil fuels with the carbon captured and stored. Green hydrogen is set to "rewrite the global energy map", with the falling price of solar power the key factor behind its improved appeal.

Fossil fuel vehicles decline in Europe

Sales of fossil fuel vehicles in Europe fell sharply last year, dropping by five million vehicles, more than a third, compared to 2019, while electric vehicle (EV) sales more than doubled, despite the overall fall in consumer spending, according to analysis by Bellona. Sales of new diesel and petrol vehicles fell 35% and 37% respectively while EVs rose 107% to 745,000.

France restricts domestic air travel

French MPs voted to suspend domestic airline flights on routes where a direct train takes less than two and a half hours, the Guardian reported. President Emmanuel Macron's citizens' climate convention had recommended banning flights on routes where a direct train takes less than four hours, but the move was resisted by Air France and some regions.

Methane levels in record rise

Methane levels in the atmosphere unexpectedly rose sharply in 2020, marking the biggest increase since records began in 1983, the FT reported. New data from the US National

Oceanic and Atmospheric Administration (NOAA) showed both methane and carbon dioxide reached record amounts in the atmosphere, despite the pandemic slowing economic activity. NOAA said it did not yet know the full reasons for the increase. Methane concentrations are up 6% and CO_2 concentrations about 12% on 2000 levels.

Cities and renewable energy

More than 1bn people, a quarter of the global urban population, lived in a city with either a renewable energy target and/or policy in 2020, according to the Renewables in Cities 2021 Global Status Report. City governments are taking action to accelerate the global uptake of renewables, an important development given that urban energy use has increased sharply, it finds. The study, published by REN21, a global renewables coalition, examines the targets, policies and actions being taken.

Rise of alternative proteins

Europe and the US could reach 'peak meat consumption' in 2025, following the rapid growth of plant-based alternatives, according to a report by Boston Consulting Group. If alternative proteins grow to 11% of sales over the next 15 years, a highly likely scenario, BCG estimates that 1bn tonnes of CO_2 emissions will have been avoided and farmland equivalent to the area of the UK will have been freed from supporting livestock.

UK Climate and Energy Research and Policy

UK sets new 78% emissions reduction target

The UK Government said it would set in law the world's most ambitious climate change target, cutting emissions by 78% by 2035 compared to 1990 levels. The move is in line with the recommendations of the Climate Change Committee and, if achieved, would bring the UK more than three quarters of the way to net zero by 2050, it said. For the first time, the UK's sixth Carbon Budget (2033-2037) will also incorporate the UK's share of international aviation and shipping emissions. A commentary in The Conversation argues that to achieve the new target immediate action is needed.

UK marine assets

The value of the UK's marine renewable energy production grew in value by 37 times from 2008 to 2018, according to an Office for National Statistics report on the UK's marine accounts. Fossil fuel production is less than half of that at the start of the millennium, but the carbon cost of using them in 2019 is estimated at £16.6bn, based on UK non-traded carbon prices. The report also looks at the extent of, and value provided by, saltmarshes in protecting against floods, and measures the cost of flood damage to agricultural land.

Met Office/Microsoft supercomputer

The Met Office is to work with Microsoft to build the world's most powerful weather and climate forecasting supercomputer. The supercomputer will be in the top 25 in the world

and twice as powerful as any other in the UK, the Met Office said. Set to be operational in mid-2022, it will be used to provide more accurate warnings of severe weather and to take forward ground-breaking climate change modelling.

Drax BECCS study

Deploying bioenergy with carbon capture and storage (BECCS) at North Yorkshire's Drax power plant will save the UK more than £4.5bn over the coming decade in meeting its climate goals, according to a report commissioned by the company. Drax is developing two BECCS units, set to be operational by 2030; it says these will deliver 40% of the negative emissions from BECCS that the Climate Change Committee indicates the UK will need for the UK to reach net zero by 2050.

Humber power stations

Energy companies Equinor and SSE Thermal announced plans for two low-carbon power stations in the Humber region. The first would be one of the UK's first power stations with carbon capture and storage while the second would be the world's first 100% hydrogen-fuelled power station, they said. The projects would use the hydrogen and CO_2 pipeline infrastructure being developed by the Zero Carbon Humber industrial cluster partnership.

Glasgow green hydrogen

ScottishPower unveiled plans for what it said would be the UK's largest electrolyser, on the outskirts of Glasgow. It has submitted a planning application for a 20MW electrolyser to be built close to Whitelee, the UK's largest onshore windfarm. The project is part of a facility capable of producing eight tonnes of green hydrogen a day. The application also includes proposals for a combined solar farm, up to 40MW, and battery energy storage scheme, up to 50MW. It is the first project of the 'Green Hydrogen for Scotland' partnership which aims to supply hydrogen to the commercial market before 2023.

Natural England on carbon storage

Restoring England's upland and lowland peatlands to a natural condition should be a top priority if the UK is to reach its net-zero emissions target, according to a new report by Natural England, the government agency. The report reviews the carbon storage and sequestration rates of different semi-natural habitats, facilitating comparison, and applies the evidence - from British and European sources - to England.

UK woods and trees

A review of the UK's woodlands has found that only 7% of native woods and trees are in good condition. In its inaugural State of the UK's Woods and Trees report, the Woodland Trust says that, while woodland cover is slowly increasing, the wildlife within it is decreasing and most new saplings are non-native species. The UK's ability to tackle climate and nature crises will be "severely damaged" if threats to woodland are not tackled, it says. The charity also warns that Scotland's unique rainforests are at risk of being wiped out.

Climate Science, Impacts and Adaptation

Extreme weather public engagement

The science of extreme event attribution (EEA) - which connects specific extreme weather events with anthropogenic climate change - shows significant promise for climate change communication, according to new research published in the US journal *Weather, Climate and Society.* Based on focus groups conducted in the UK, it finds that EEA has "the ability to connect novel, attention-grabbing, and event-specific scientific information to personal experiences and observations of extreme events".

Planning for extreme weather

A new generation of very high-resolution climate models – known as "convection-permitting models" (CPMs) – is providing a step change in the information available for climate risk assessment in Europe and how to project changes in weather extremes such as flash floods. A Carbon Brief guest post discusses two *Climate Dynamics* papers on CPMs.

Glacier melting accelerates

The melting of the world's glaciers has nearly doubled in speed over the past 20 years and contributes more to sea-level rise than either the Greenland or Antarctic ice sheets, according to the most comprehensive global study of ice rivers ever undertaken. Between 2000 and 2019, glaciers lost 267 gigatonnes of ice per year, equivalent to 21% of sea-level rise, according to a widely-reported paper published in *Nature*.

EV discontinuance

Dissatisfaction with the convenience of charging and not having level 2 (240 volt) charging at home were among the main reasons for "discontinuance" of electric vehicle (EV) ownership - people who gave up the technology - according to research published in *Nature Energy*. Based on user experience in California, it finds that discontinuance occurs at a rate of 20% for plug-in hybrid EV owners and 18% for battery EV owners. The research is believed to be the first published study on EV discontinuance.

Peatland re-wetting benefits

Substantial cuts in global greenhouse gas emissions could be achieved by raising water levels in agricultural peatlands, according to a study published in Nature. The research team studied CO2 emissions in 16 peatland areas and methane emissions in 41 peatland areas across the British Isles, along with data from other countries, and estimate the potential reduction in emissions by restoring all global agricultural peatlands.