



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

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

August and September 2019

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 Scottish policymakers informed of issues relevant to the Scottish Government's Energy and Climate Change policy portfolio.

International Climate and Energy Research and Policy

COP26 to be hosted in Glasgow

The COP26 climate change summit [will be hosted in Glasgow](#), November 2020. The UK will host the main COP summit, and partner country, Italy, will host preparatory events including a youth event. COP26 will be crucial as it is when countries have been [asked to submit their next round of climate pledges for 2030](#). It is also when Parties have agreed to start discussing the new climate finance goal.

UN climate summit

At the [summit](#) held in New York for world leaders, 65 countries and major sub-national economies committed to reducing GHG emissions to net zero by 2050, while 70 countries announced they will either boost their national action plans by 2020 or have started the process of doing so. Major announcements included: a commitment by France that it would not enter into trade agreements with countries that have policies counter to the Paris Agreement and; a commitment by Germany to be carbon neutral by 2050.

Alongside commitments being made by countries, cities and businesses, youth leaders including Greta Thunberg raised the urgency of greater action being needed by world leaders, and that they will be held to account.

IPCC report says land is a critical resource

The latest [report from the IPCC](#) says that keeping global warming to well below 2°C can only be achieved by reducing GHG emissions from all sectors including land and food. The report shows that better land management can contribute to tackling climate change, but is not the only solution.

Land must remain productive to maintain food security as the population increases and the negative impacts of climate change on vegetation increase. This means there are limits to the contribution of land to addressing climate change, for instance through the cultivation of energy crops and afforestation. It also takes time for trees and soils to store carbon effectively. Bioenergy needs to be carefully managed to avoid risks to food security, biodiversity and land degradation. Desirable outcomes will depend on locally appropriate policies and governance systems.

IPCC Special Report on the ocean and cryosphere

This [special report](#) covers how the ocean and cryosphere have and are expected to change with ongoing global warming, the risks and opportunities these changes to ecosystems and people, and mitigation, adaptation and governance options for reducing future risks.

Carbon Brief has produced an [in-depth Q&A](#) to unpack what the report says about how climate change is affecting the Earth's ice and oceans – and the wider impacts that is having on sea levels, marine life and human society, as well as extreme events and potential 'tipping points'.

How to halve GHG emissions by 2030, and make the case for earlier action

The ExponentialRoadmap.org initiative (which brings together technology innovators, scientists, companies and NGOs) has published [two reports](#): a roadmap on how to accelerate 36 solutions to cut GHG emissions by 50% by 2030; and making the case for taking action sooner rather than later on meeting 1.5°C climate ambition.

Some of the recommendations on how to halve GHG emissions by 2030 worldwide include:

- Low cost solar, wind, and battery technologies are on profitable, exponential trajectories that if sustained, will be enough to halve emissions from electricity generation by 2030.
- Electric vehicle growth has the potential to reach a 90% market share by 2030 if sustained, but only if strong policies support this direction.
- Digital technology remains a wild card. It could support a rapid transformation of our economic systems or could drive emissions higher.
- Four drivers for rapid transformation are converging: growing social movements, the rise in the number of countries discussing a target of net-zero by 2050, the economic logic of rapid transition and the speed of technological innovation

A global call for leadership on climate resilience

A [report by the Global Commission on Adaptation](#) (a group of political and business leaders led by former UN Secretary General Ban Ki-moon) calls on governments to increase their investment in climate adaptation because it is not happening at the pace and scale required to address the worsening impacts of climate change. It highlights the five areas where

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investment is needed most urgently – early warning systems, climate-resilient infrastructure and water resources, dryland agriculture and mangrove protection. The report states that adaptation actions will bring multiple benefits – called the triple dividend – through avoided losses, positive economic benefits, and social and environmental benefits.

UK Climate and Energy Research and Policy

Climate change high priority in Scotland's Programme for Government

Tackling climate change has been made the centrepiece of the Scottish Government's [programme for 2019-20](#). Following the climate emergency declaration, and taking steps towards meeting the net zero target, the Government set out plans which include promoting low-carbon transport and heat.

Scottish Parliament approves net zero legislation

The [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Bill](#), which was amended to reflect recommendations by the Committee on Climate Change, has been approved by MSPs. It commits the Scottish Government to a target of reaching net zero emissions by 2045. The new legislation also includes an interim target of reducing GHG emissions by 70% by 2030 – the strictest statutory target set by any country.

New centre to help cut North Sea emissions to net zero

A [new centre](#) aimed at making the UK North Sea the world's first decarbonised oil and gas region is to be created in Aberdeen. The Net Zero Solution Centre (NZSC) will be based at the Oil and Gas Technology Centre (OGTC) to develop new innovations to remove emissions from the industry. The NZSC will focus on projects which initially aim to reduce the UK sector's emissions by two-thirds. It will look at repurposing oil and gas infrastructure for the production of cleaner fuels like hydrogen, powering oil platforms with renewable energy and data analysis to help reduce emissions and flaring. It is also expected to play a key role in developing CCS technology.

Highest-ever resolution of climate projections produced

DEFRA, BEIS, Met Office and the Environment Agency are [launching](#) the highest-ever resolution of climate projections produced for the UK. Until now, these events have been challenging to represent in lower-resolution climate models. By dividing the UK up into a grid of squares measuring just 2.2 km, Met Office scientists have been able to provide an improved representation of small-scale features, such as the development of thunderstorms, and the influence of mountains, coastlines and cities. Additionally, the science team has been able to look at weather events which only last less than a day, providing new information essential for understanding flood risk.

Visions for the future of community energy in the UK

[Research](#) conducted by UKERC, via a series of workshops held around the UK, has found that community energy actors feel they have lots to offer to, and gain from, the transition to a decentralised and flexible energy system. The system appears to be moving towards a future where there is a clear need for organisations that combine technical knowledge with the skills and trust to effectively engage citizens – such as community energy groups.

The overarching message is that community energy could become much more than electricity generation. In this future, community energy organisations would combine multiple business models to make best use of their complementarities and to stack revenues.

Climate Science, Impacts and Adaptation

Developing a method to assess the impact of incremental loss of floodplain in Scotland

Based on a literature review, [research produced by ClimateXChange](#) sets out a possible method for estimating floodplain loss and corresponding flood risk impacts. The review identified a range of methods suitable for use in Scotland, including existing SEPA models. The analysis suggest that the most appropriate approach to estimating incremental and piecemeal loss of fluvial floodplain over time is one which uses historical maps and aerial photography together with hydraulic modelling.

Approaches and implementation pathways for greenhouse gas removal technologies in Scotland

Greenhouse Gas Removal (GGR) technologies can play a significant role in meeting Scotland's emissions goals. Recent [research by ClimateXChange](#) provides an explanation of five technologies that are potentially applicable in Scotland at scales of millions of tonnes of carbon dioxide (MtCO₂) per year.

The report finds that:

- Soil and land use can be actively managed to provide a carbon sink that supports Scotland in achieving its climate targets.
- Biochar is a mature technology with a high degree of feedstock flexibility. Large scale biochar contribution to GGR is likely to be limited by availability and competition of low-cost biomass to use as feedstock.
- Large scale BECCS for low carbon heat or power in Scotland will be limited by competing demands for resources, a network of small-to-medium scale facilities may be more viable subject to managing competing biomass demands.

- EWAM offers a number of storage pathways to greenhouse gas reduction that may support Scotland's longstanding agricultural, aggregate and heavy industries. However quarrying and transport implications may constrain the scale of application.
- DACCS is an emerging technology that is flexible and highly scalable. It is energy intensive and relatively costly however these costs are likely to fall as the technology matures.

China's CO₂ peak before 2030 implied from characteristics and growth of cities

By examining CO₂ emissions from 50 Chinese cities over the period 2000-2016, [researchers have found](#) a close relationship between per capita emissions and per capita gross domestic product (GDP) for individual cities. Results show that carbon emissions peak for most cities at a per capita GDP of around US\$21,000. Projections show that emissions for China should peak at 13-16 GtCO₂ / year between 2021 and 2025, approx. 5-10 years ahead of the current Paris target of 2030.

A new scenario logic for the Paris Agreement long-term temperature goal

Current scenarios for keeping global warming well below 2°C, and even 1.5°C, typically focus on reaching specific climate goals in 2100. This could result in delayed action, high mid-century warming, and a reliance on net removal of CO₂ to compensate for an initial shortfall in emissions reductions. [New research](#), drawing on insights from physical science, proposes a scenario framework that focuses on capping global warming at a specific maximum level with either temperature stabilisation or reversal thereafter. This approach mirrors the intention of the Paris Agreement, and helps consider intergenerational equity into scenario design choices.