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climate change research and policy

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

April 2018

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

Bonn climate talks

Governments are meeting for the [next round of UN climate change negotiations](#) from 30 April to 10 May to further develop the guidelines for implementing the Paris Agreement. This will allow the agreement to become operational. The guidelines, or operating manual, are needed to unlock the practical actions needed to realise the full potential of the agreement. Final decisions will be taken at COP24 in Poland at the end of 2018.

The May session in Bonn will also hold the Talanoa Dialogue, i.e. facilitate the engagement of countries and a range of stakeholders in a conversation around ambition now and in the future. The dialogue will check progress, reaffirm the goals of the Paris Agreement and aim to find solutions to how countries can increase their ambition now and in the next round of their action plans or Nationally Determined Contributions (NDCs).

International deal on greenhouse gas emissions from shipping

[Countries have agreed](#), at an International Maritime Organisation (IMO) meeting, to peak and then reduce greenhouse gas emissions (not just CO₂) by at least 50% by 2050, compared to 2008 levels. This is the first-ever international climate goal for the shipping sector. The deal includes an absolute emissions reduction target for shipping, and calls for emissions to be phased out completely, though without any timeline. Several countries, including Brazil, the US and Saudi Arabia have reserved their positions on endorsing the absolute target part of the deal. The inclusion of the words 'at least' in the emissions reduction goal resulted in the Pacific island states getting on board with the deal.

A paper published in [Climate Policy](#) discussed how a share of a global CO₂ budget over the twenty-first century could be apportioned to international shipping, and, using a range of future trade scenarios explored the requisite cuts to the CO₂ intensity of shipping. The results demonstrate that, under a wide range of assumptions, existing short-term levels of efficiency must be urgently exploited to achieve mitigation commensurate with that required from the rest of the economy, with virtually full decarbonisation of international shipping required as early as before mid-century.

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Alternative pathways reduce the need for negative emission technologies

Research published in [Nature Climate Change](#) has, using an integrated assessment model (IAM), explored the impact of emissions reduction pathways that include lifestyle change, additional reduction of non-CO₂ greenhouse gas and more rapid electrification of energy demand based on renewable energy. Although these pathways face specific difficulties, they are found to significantly reduce the need for net CO₂ removal from the atmosphere (mostly accomplished through large-scale application of bioenergy with carbon capture and storage, and afforestation). The alternatives offer a means to diversify transition pathways to meet the Paris Agreement targets, whilst meeting other sustainability goals.

World added more solar than fossil fuel power generating capacity in 2017

The [Global Trends in Renewable Energy Investment 2018](#) report finds that falling costs for solar electricity, and to some extent wind power, is continuing to drive deployment. 2017 was the eighth year in a row in which global investment in renewables exceeded \$200 billion. China was the world's largest investing country in renewables, at a record \$126.6 billion, up 31% on 2016.

Solar energy dominated global investment in 2017, with a record of 98 gigawatts of new solar capacity being installed, far more than the net additions of any other technology.

New Zealand bans offshore oil exploration

[New Zealand is to ban all new offshore exploration](#) as part of its carbon neutral future. The ban will apply to new permits and won't affect the existing 22, some of which have decades left on their exploration rights. The government elected last year has committed to targets of 100% of electricity from renewable sources by 2035, and making the economy carbon neutral by 2050.

UK Climate and Energy Research and Policy

UK to seek advice on strengthening long-term climate goal

The UK Minister of State for Energy and Clean Growth, Claire Perry MP, has [announced](#) that the Government will ask the Committee on Climate Change to provide new advice on the implications of the 2015 Paris Agreement for the UK's long-term targets to reduce its greenhouse gas emissions. The request will be made following the publication of the IPCC's special report on 1.5°C. The UK Committee on Climate Change has [welcomed](#) the announcement.

International comparisons of heating, cooling and heat decarbonisation policies

BEIS has published [research](#) summarising the evidence base on how other countries provide heating and cooling. Focusing on heating and cooling in buildings, across residential and non-residential sectors, the report looks at two overarching questions: what challenges are shared by the UK and with

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other countries in the area of heat decarbonisation and where is there less commonality? And; what learning and innovation opportunities exist outside of the UK, both in countries where there are clear points of comparisons as well as contrasts?

The report finds that decarbonisation challenges include moving away from relatively low-cost sources of energy that form the natural endowment of a nation and that moving away from gas heating delivered via a gas network, despite substantial effort, is a particularly challenging aspect of heat decarbonisation. The report also states that effective transitions have been supported by a package of policies which span regulation, information, standard, research and development and long-term targets.

Record year for Scottish renewable electricity generation

The [BBC has reported](#) that renewable electricity generation in Scotland reached record levels last year. UK government published statistics showed that by the end of 2017, just over 10GW of installed renewables electricity capacity was operational in Scotland. It is estimated that the equivalent of 68.1% of gross electricity consumption in Scotland came from renewable sources, up year-on-year by 14.1%. The majority of the increase has been attributed to greater onshore wind capacity.

Sustainable seas inquiry launched

The UK Environmental Audit Committee has launched a [new inquiry](#) on the future of our seas, to examine how they will be protected from climate change, acidification, overfishing and pollution, and how the Government can create a sustainable blue economy.

Climate Science, Impacts and Adaptation

Longer and more frequent marine heatwaves over the past century

Using a range of ocean temperature data including global records of daily satellite observations, daily in situ measurements and gridded monthly in situ-based data sets, [researchers](#) have identified increases in marine heatwaves over the past century. From 1925 to 2016, global average marine heatwave frequency and duration increased by 34% and 15% respectively, resulting in a 54% increase in annual marine heatwave days globally. These trends, which can largely be explained by increases in mean ocean temperatures, suggest that further increases in marine heatwave days can be expected to continue under global warming.

Warming Atlantic current has weakened by 15%

Carbon Brief has [reported](#) on two studies, published in Nature, showing that the 'Atlantic Meridional Overturning Circulation' (AMOC) is in a weaker state now than it has been for decades – and possibly even centuries. The two studies differ on when and how they think the weakening was triggered. While one suggests it began in the mid-20th century as a response to human-caused climate change,

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the second proposes that it began a hundred years earlier following a natural shift in regional climate. Despite the debate the studies agree there has been a continued decline in AMOC over the 20th century that may be attributed to global warming and the melting of the Greenland ice sheet.

How Shared Socioeconomic Pathways explore future climate change

[Researchers have developed](#) a range of new 'pathways' that examine how global society, demographics and economics might change over the next century. They are collectively known as the 'Shared Socioeconomic Pathways' (SSPs). The SSPs are now being used as important inputs for the latest climate models feeding into the IPCC sixth assessment report due in 2020-21. They are also being used to explore how societal choices will affect GHGs and, how the Paris Agreement could be met.

The SSPs offer five pathways the world could take offering a broader view of a 'business as usual' world without climate policy, with global warming in 2100 ranging from a low of 3.1°C to a high of 5.1°C above pre-industrial levels. The pathways also show it would be much easier to mitigate and adapt to climate change in some versions of the future than in others.

Winter wave heights off Scotland rising

[New research](#) shows that winter wave heights along the Atlantic coast of Western Europe have been rising for almost 70 years, and suggests that the coastlines of Scotland and Ireland have seen the largest increases. The researchers have noted the importance of investigating whether human-induced climate change was responsible, and that their findings are important for scientists and coastal managers looking to predict future wave heights, and take measures to protect coastal communities.