2050 Calculator

What's happening in the 2050 Calculator community?

We are pleased to bring you the latest updates from our ever-growing 2050 Calculator community. In this edition, we discuss the use of carbon capture usage and storage (CCUS) in the current energy mix, and bring you highlights from Nigeria's programme journey (we are excited to announce new country joiners to the programme in the near future – stay tuned!) We also provide details of our conference webinar, which will take place from **24-26 November** – hold the dates! And there are links to relevant publications you may be interested in reading.

The £3M 2050 Calculator programme was commissioned to support up to 15 countries around the world to upgrade and/or develop new 2050 Calculators. The ultimate objective is to support governments to deepen their domestic action on climate change and strengthen ambition under the 2015 Paris Agreement. Visit our new website for further information and/or join us on LinkedIn.

In this issue:

Why capturing and using or storing carbon is essential for a low carbon energy future

Mott MacDonald's CCUS Global Lead, Dr Adina Popa, says carbon capture, utilisation and storage (CCUS) has the potential to achieve much more

CCUS has proved to be too costly to be commercially viable, and governments have largely failed to offer policies to support the technology. However, the widespread adoption of CCUS is crucial for meeting the Paris Agreement's goal of limiting the rise in the global temperature to well below 2°C. As ambition increases in the pursuit of net-zero energy system emissions, the role of CCUS becomes even more pronounced. According to international energy and climate change agencies, wider deployment of CCUS is especially important to decarbonise the industrial sector, where emissions are among the hardest to abate.

There is a new wave of interest to seriously revisit CCUS technologies and bring them back to the climate change agenda. However, the difficult commercials of a low margin business are not compelling for the traditional oil and gas operations and therefore investors are less likely to commit to CCUS unless they are sure of government support in a shifting market. Policy makers can accelerate the low-carbon transition by supporting policies that promote the technology. Rollout, however, depends on subsidies and the need to deliver value for money. Support for carbon dioxide infrastructure will be an essential element of policy incentives for

CCUS. Competing concepts are required, with hydrogen to be used as an intermediary transition pathway.

Economies of scale

The infrastructure for CCUS and hydrogen is initially expensive to roll out; but, with the right policies in place, costs will fall.

Leading governments are realising that CCUS can play a key role in future-proofing high-emissions industries, enabling them to compete in an increasingly carbon-constrained world. Policies are beginning to be implemented to provide sufficient incentive for businesses to consider CCUS through higher carbon prices, tax incentives and greater support for individual projects.

Government support around the world has been a key factor in reducing costs, sparking innovation and expanding renewable power generation. Similar support would have a similar impact on CCUS.

The UK is already a leader in developing business models for emerging technologies. The combination of a regulated asset base (RAB) funding model, which provides secure payback and return on investment for developers, and an off-take arrangement that guarantees a purchase price to enable developers to secure investment, is a potential way forward for funding CCUS and hydrogen projects worldwide.

Expansion of CCUS and hydrogen use would produce a virtuous circle of reduced costs, greater innovation and faster delivery. CCUS industrial hubs offer cost advantages because of proximity to geological storage, existing pipeline infrastructure and/or a high concentration of stationary emitters. Additionally, clusters/hubs maximise economies of scale and lower the unit costs of developing CCUS infrastructure and hydrogen networks, the same as repurposing existing assets.

However, scaling up requires a network of suppliers, investors and users. While key policy developments are likely sufficient to trigger new investments, remaining uncertainty among investors may impede this.

Levelling up

The benefits of CCUS go further than helping the countries to meet their 2050 carbon ambitions. Investment in CCUS would also support governments in a post-COVID world to create and maintain high-value jobs and infrastructure in industrial heartlands.

Without CCUS, there is little prospect of relatively quickly decarbonising industries and processes that require high-grade heat, with the result that many businesses will be forced to relocate overseas where the ambitions are less stringent.

The 2050 Calculator allows users to create their own energy pathways. It can support governments to assess technology and development channels for all applications, including with CCUS in the mix. By enabling comparison of trade-offs to all parts of the economy, the Calculator can have a real impact on reducing greenhouse gas emissions through evidence-based policy decisions.

Calculators around the world – updates

Nigeria – training has commenced

August was a busy month for the Calculator team at the Energy Commission of Nigeria (ECN) and their partner ministries, including the Federal Ministry of Environment (Department of Climate Change), Federal Ministry of Petroleum Resources, Federal

Ministry of Power and National Environmental Standards and Regulations Enforcement Agency.

Our consortium partner, Imperial College London, provided virtual introductory training on the 2050 Calculator tool and discussed the global context with participants. Training included an overview of the new model that is planned for the NECAL2050 update.

Introductory training was followed by an advanced Excel model workshop, conducted in Abuja by Syscomptech Communications. The objective of the specialised training was to enable technical readiness for the updates to NECAL2050. The rigorous, interactive training program was conducted over five days. The results from the pre- and post-training tests revealed that new concepts and topics were now easily explained by the delegates thanks to the workshop modules. Participants were presented with training certificates on successful completion of the Excel course.

Further application of the training is planned through online exercises, whereby future team roles and responsibilities will be assigned. Well done to the team!

Conferences and events

2050 Calculator international conference webinar

24-26 November 2020 – hold the dates!

We will be inviting experts from across the world to explore how we can collaborate to further strengthen the global community of 2050 Calculator teams who have adopted, or are looking to develop, the 2050 Calculator model for exploring sustainable energy and emissions pathways. The webinar conference will be hosted in two-hour sessions over three days. The sessions will allow you to showcase your work, learn from best practice and virtually network with other 2050 Calculator teams. Planned conference

topics include a training session for new users; model developments from around the world; a focus on green recovery; air quality use; and the impact of hydrogen/CCUS. Look out for invites in the coming weeks.

Journal publications

Energy Strategy Reviews

This special issue of Energy Strategy Reviews demonstrates the scientific foundations and relevance of the 2050 Calculator modelling, and thus the 2050 Calculator programme. The issue titled '*The Calculator movement – a novel energy and climate modelling approach'* was coordinated by Jan Kiso (formerly of BEIS) and includes several papers of interest and relevance to the programme.

About us

2050 Calculator delivery partner

To deliver the 2050 Calculator programme, BEIS appointed a Mott MacDonald-led consortium as its delivery partner. Our consortium includes Mott MacDonald, Climact, Imperial College London and Ricardo.

We bring technical and capacity building support to work with governments and other stakeholders as they develop and use their Calculators; and we are responsible for disbursing UK Government funding to in-country downstream partners where required to ensure sufficient resources are available. Over the course of the programme, we will also be working to build and connect the international Calculator community through conferences, communication channels (please join us on LinkedIn) and the Calculator website. We look forward to working with all of you!

Delivery team highlights

Dr Brendan Donegan

Programme Lead, 2050 Calculator Programme, Department of Business, Energy and Industrial Strategy (BEIS), UK Government

Brendan is a senior policy advisor in the UK civil service. Before joining the civil service in 2017, he worked for a decade as an academic researcher and lecturer focusing on social, economic and environmental aspects of industrial development in India. Brendan has taken over the 2050 Calculator programme lead role from Laura Aylett at BEIS, who remains involved overseeing the programme.

Dr Onesmus Mwabonje

Research Fellow, Imperial College London

Onesmus is a Research Fellow at Imperial College London's Centre for Environmental Policy. He has combined academic and industrial experience in the application of lifecycle assessment to supply chains for biochemicals and bioenergy in the UK, EU and East Africa policy context. Onesmus worked on the EU Calculator project funded by the EU Horizon 2020, with the overall aim of developing pathways towards the decarbonisation and resilience of the European economy in the time frame 2030-2050 and beyond.

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