

2050 Calculator



What's happening in the 2050 Calculator community?

“The Calculator gives us a common framework, a common language to describe our shared vision. It’s an exciting vision. And I would invite all of you to use the Calculator, and ... to share your vision for the pathway to net zero with us here in government.”

Rt Hon Kwasi Kwarteng, Minister for Business, Energy and Clean Growth

Launch of the new MacKay Carbon Calculator, UK

As this strange year draws to a close, Minister Kwarteng’s words provide us with hope that, through the 2050 Calculator community, we are leading the way to a brighter future. It is within that spirit that we are pleased to bring you the latest updates from our global 2050 Calculator community. In this edition, we discuss the [China Energy Calculator](#) – an important tool to study carbon neutrality, and bring you highlights from the [Philippines](#), [Thailand](#), [Malaysia](#), [Nigeria](#) and the [new UK Calculator](#). We also provide an overview of our [international conference webinar](#), which took place on 25-26 November.

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 [website](#) for further information and/or join us on [LinkedIn](#).

We wish you and your families a safe and happy holiday season and look forward to keeping in touch in the New Year.

In this issue:

- [China Energy Calculator: An important tool to study carbon neutrality](#)
- [Calculators around the world](#) – updates
 - [Philippines](#) – marks the fifth country to join the extension programme
 - [Thailand](#) – welcome to the programme
 - [Malaysia](#) – progressing with draft model
 - [Nigeria](#) – sectoral training continues
 - [UK](#) – launch of the MacKay Carbon Calculator
- [Conferences and events](#)
 - [2050 Calculator international conference webinar](#)
- [About us – delivery team](#)
 - [Delivery team highlights](#)

China Energy Calculator: An important tool to study carbon neutrality

Yufeng Yang, Honorary Research Fellow, Imperial College London

"Achieving carbon neutrality in China before 2060" is a positive goal-oriented and an anti-driving mechanism for emissions reduction, which are in line with the basic methodological logics of the China Energy Calculator. Goal-oriented design is a typical methodology commonly used by countries or economies around the world in formulating plans, policies and prospects. For example, the European Union (EU) proposed three goals of 20% by 2020 (increasing the proportion of renewable energy to 20%, improving energy efficiency by 20%, carbon emissions are reduced by 20% compared to 1990 levels), the EU's target of achieving its carbon neutrality in 2050, the

United Kingdom's goal of achieving net zero emissions in 2050, and so on. All these goals mentioned above are driving the development of countries and economies towards a green and low-carbon direction. They have also become effective means for countries to force CO₂ emission reduction, improve the quality of the eco-environment, achieve energy transition and high-quality economic growth. Furthermore, the goals are also very conducive to the international community since they help unite everyone to achieve a win-win cooperation on the issue of climate change. As an analysis platform for energy economic pathway, 'Energy Calculator' can combine target inversion and balance analysis and analyse scenarios based on the 1.5°C-2°C emission reduction scenario in various periods before 2050. In the meantime, follow the path learning method, through the update and expansion of the China Energy Calculator, the Calculator generated the relevant data for 2060, and the results of different emission reduction scenarios can be pushed back and connected.

We did a preliminary analysis to use the China Energy Calculator through setting 2060 as the latest year for China to achieve 'carbon neutrality'. The basic results are as follow: CO₂ will reach its peak in 2025, and CO₂ emissions from the energy sector will be approximately 9.6 billion tons. CO₂ emissions from the energy sector will be approximately 4.18 billion tons in 2050, while 3.1 billion tons CO₂ emissions can be offset by reforestation, negative emission technologies and energy-saving measures. In 2060, the CO₂ emissions from the energy sector will be about 1.67 billion tons, and the CO₂ emissions from the non-energy sector will drop to about 350 million tons (mainly industrial processes), requiring maintained reforestation to offset 700 million tons. As for carbon sink contribution, the negative emission technology can absorb about 500 million tons, and reinforced energy-saving measures reinforce need to contribute a reduction of about 820 million tons.

The two important conclusions are:

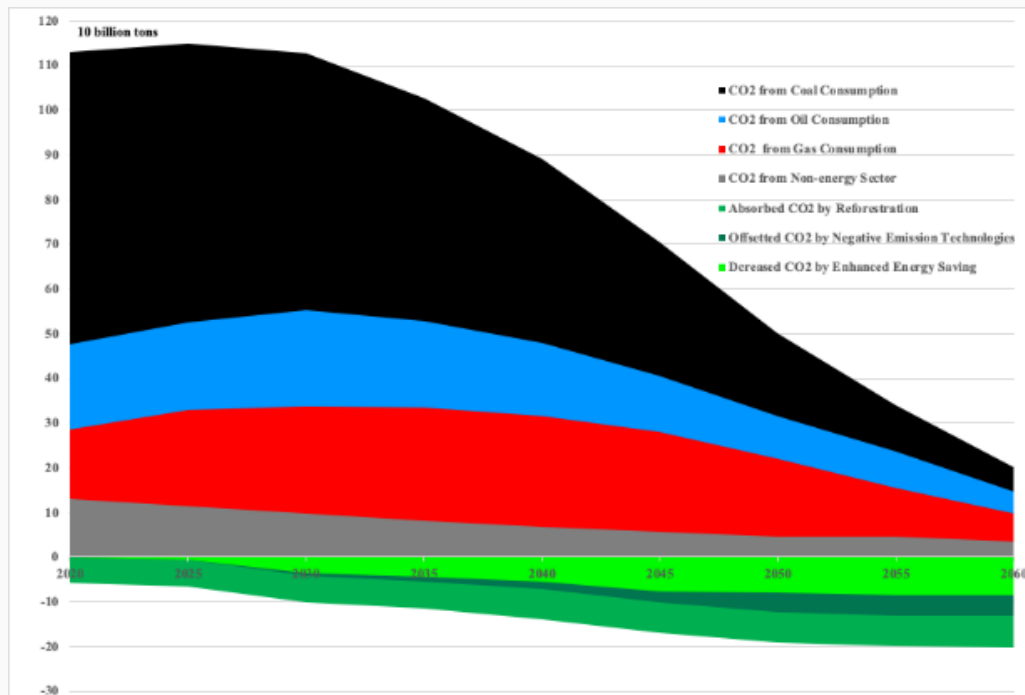
1. Energy conservation is the most important and economical strategic measure for China to achieve the goal of 'carbon neutrality'.

Enhanced energy conservation will become the most important means for China to achieve the goal of carbon neutrality in the energy sector.

Compared with emission reduction technologies such as renewable energy, nuclear energy and CCUS, etc, enhanced energy-saving measures are more economical and are conducive to energy security and improvement of the ecological environment. Following 'renewable energy equipment and manufacture', 'energy-saving and carbon-reduction' will become the most important sector in China and the market scale is huge in the future.

2. Accelerating the construction of an energy system centred on the 'green load centre' is the key to achieving China's energy and power transition and the goal of carbon neutrality.

In the process of China's energy transition and achieving the goal of carbon neutrality, an extremely important issue is how to realise the transformation of load centre from coal powered base load to green power load centre, which are mainly answered by renewable energy and appropriate energy storage. Moreover, all of the green power load centres (such as provincial and regional load centres) should be connected to form a green grid system with the highest security standard. This should be the largest, most challenging, and most specialised energy work for upgrading and transformation of China's energy system in the future. With the continuous maturity of digital technology and various advanced green energy technologies and lower and lower cost trends, the energy system will mainly consist of circular economy, hydrogen energy, digitalisation, energy storage technology, zero-carbon power generation technology and terminal consumer electrification.



Calculators around the world – updates

Philippines – marks the fifth country to join the extension programme

The Philippines' Department of Energy signed a Memorandum of Understanding to collaborate with the UK Government on the development of a Philippines 2050 Calculator energy and emissions model, under the 2050 Calculator extension programme. Read our [press release](#).



Thailand – welcome to the extension programme

In October, the Energy Policy and Planning Office (EPPO) of the Ministry of Energy in Thailand and the UK Government signed a Memorandum of Understanding to collaborate on the Thailand 2050 Calculator development.

The Ministry of Energy gives priority to supporting the development of climate change related policy. Due to the fact that the energy sector is the main economic sector contributing to relatively high greenhouse gas emissions compared with other sectors, it also has the greatest potential to reduce greenhouse gas emissions and support Thailand in achieving its emissions goal.



Malaysia – progressing with draft model

The Malaysia team continues with regular sectoral training sessions to develop the logic trees underpinning the model. Their one-pagers and draft Excel model are expected to be completed early next year.

Nigeria – sectoral training continues

This past quarter, the Nigeria team has received regular fortnightly sectoral training sessions in land use, buildings, transport and industry sectors and are preparing their draft one-pagers. The National Steering Committee continues to support the project through networking, advocacy and data collection.

UK – launch of the MacKay Carbon Calculator

Dr Patrick Royce, Department for Business, Energy & Industrial Strategy

On 3 December, the UK launched the MacKay Carbon Calculator, a new 2050 Calculator with two online tools for creating pathways to net zero. The event was opened with a speech by the UK Minister for Business, Energy and Clean Growth, Kwasi Kwarteng. The



new Calculator tools update the 'original' Calculator published by DECC in 2010, for which the late Sir David MacKay was the driving force.

The first online tool is My2050, a universal Calculator with 15 levers to help the public understand what net zero is, how it can be reached, and what they can do to help. The tool includes information about each lever, which you can see by clicking the lever icon. It was based on a concept in the Belgian My2050 which was used successfully in secondary school education. We are hoping to emulate their example, and with the help of the Royal Geographical Society, have created teaching resources for schools for which there are links on the UK government Carbon Calculator page, where you can also find the Excel model which the online tools use.

The second, more detailed tool, is the MacKay Carbon Calculator, which has 45 levers, inviting the user to choose between competing options for decarbonisation. The levers are grouped under lever headings that can be expanded or collapsed, and clicking the lever name opens an information page. The tool has 30 interactive graphs covering sectors of the energy system which appear under page tabs that mirror the lever headings. We have expanded the technologies needed to meet net zero and the 'CO2 removal & gases' levers offer options on hydrogen and greenhouse gas reduction.

You can select fractional levels of ambition, and the tool includes a '2100 mode' which allows you to vary the start date and deployment period for your selected level of ambition for each lever.

For further information, please contact:

mackaycarboncalculator@beis.gov.uk

Conferences and events

2050 Calculator international conference webinar

24-26 November 2020

We recently held the programme's annual international conference, exploring how to further strengthen the global community who have adopted, or are looking to develop, the 2050 Calculator to support a more sustainable future.

This year's conference started with an invite-only training day, followed by east and west webinar sessions over two days. Attended by 100 participants from 43 countries, the sessions enabled



Calculator teams to showcase their work, learn from others and share best practice with other 2050 Calculator teams. The sessions opened with a keynote address from John Murton, the UK Government's COP26 Envoy. Other topics discussed included the UK's 10-point plan for a green industrial revolution, use of the 2050 Calculator as a public communications tool, stakeholder engagement and the path to a hydrogen future. We also received updates from the Calculator teams in Vietnam, Malaysia, China, Nigeria, the EU and the UK.

Thanks to all our speakers and participants. It was inspiring to see the continuing great work being done to lower carbon emissions worldwide.

You can view the conference recordings and read the webinar event synopsis on our [LinkedIn group](#).

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

Jerome Meessen

Senior Consultant, Climact



Jerome Meessen holds a master and PhD in electrical engineering from the University of Louvain (Belgium). After about 10 years in the ICT sector, he became a climate and energy consultant at Climact to support public and private decision-makers to elaborate science-based climate strategies. He worked for 3.5 years as a climate finance expert in Vietnam for the Belgian Development Agency. Now back at Climact, Jerome manages several climate-related projects, including the development of 2050 Calculators in developing countries.

Sam Carter

Renewable Energy Advisor, Mott MacDonald



Sam is a Renewable Energy Advisor based in Mott MacDonald's Singapore office. She primarily works on technical advisory roles for solar PV, bioenergy and waste to energy projects across East Asia. Sam first worked on the 2050 Calculator during her MSc programme, undertaking analysis for the Ecuadorean government on solar PV levels and levers. She now looks after the Southeast Asian projects in the 2050 Calculator extension programme.

[CONTACT US](#)



mottmac.com

[Twitter](#) [LinkedIn](#) [Instagram](#) [Facebook](#) [YouTube](#)

Mott MacDonald Limited. Registered in England and Wales no. 1243967
Mott MacDonald House, 8-10 Sydenham Road, Croydon CR0 2EE, United Kingdom

The information contained in this e-mail is intended only for the person or entity to which it is addressed and may contain confidential and/or privileged material. If you are not the intended recipient of this e-mail, the use of this information or any disclosure, copying or distribution is prohibited and may be unlawful. If you received this in error, please contact the sender and delete the material from any computer.

[Unsubscribe](#)

Privacy notice

Mott MacDonald and its Group companies are committed to respecting your privacy and recognise the need to protect and manage any personally identifiable information (personal information). Read our [Privacy policy](#).

If you have any questions, comments or requests regarding our data processing practices, including if you would like us to stop using your personal information, please contact 2050CalculatorConference@mottmac.com.

© 2020 Mott MacDonald