



British  
High Commission  
New Delhi

# Global Calculator

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## Overview

By 2050, the global population is expected to grow from 7 billion today to 10 billion, and the global economy is expected to triple in size<sup>1</sup>, pushing energy and food demand even higher as countries develop and lifestyles improve.

However, by 2050 the world needs to cut harmful greenhouse gas emissions to around half of today's levels to have a fair chance of limiting global mean temperature increase to 2°C. So the big question now is: Will it be possible to ensure food security and improved lifestyles by 2050 and still meet our climate commitments.

To answer this question, international experts from over ten organisations came together to build a model of the world's energy, land and food systems to 2050. We built the "Global Calculator" to model what is physically possible, from kilometres travelled per person to calorie consumption and diet, and to show the energy and land requirements to satisfy this demand. We also illustrate the climate impacts of different choices by linking the model to the latest Intergovernmental Panel on Climate Change (IPCC) climate science. We have tested the model methodology and assumptions with experts from more than 150 different organisations around the world.

The Global Calculator is designed for anyone interested in exploring what a low-carbon world could look like. Businesses will be able to explore the potential size of future markets for their products and the impact they can have by reducing their emissions. NGOs can use it to inform their strategies and campaigns, and governments will be able to use benchmarks from the tool to see if their plans are aligned with a 2°C pathway.

### The findings of the Global Calculator are:

- Yes, it is physically possible that all 10 billion of us could eat well, travel more and live more comfortably, whilst at the same time reducing emissions consistent with a 50% chance of 2°C warming.

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<sup>1</sup> Global GDP is \$67 trillion in 2011, projected to rise to \$200 trillion in 2050 (OECD stats (<http://stats.oecd.org/>). Economic Outlook no. 95, May 2014, Long Term Baseline Projections. Potential output of total economy, volume (PPP prices).)

- But to do so, we need to transform the technologies and fuels we use. For example, our electricity should be decarbonised from its current level of 580 gCO<sub>2</sub>/kWh to under 70 gCO<sub>2</sub>/ kWh by 2050, and the proportion of households that heat their homes using electric or zero carbon sources need to increase from 5% today to 25-50% by 2050.
- We also need to make smarter use of our limited land resources. In particular, we must protect and expand our forests by 5-15% by 2050 because forests remove carbon from the atmosphere and store it in trees and the soil.

The Global Calculator has only limited geographical detail, so it cannot report details of which countries the technologies should be rolled out in or who should pay for them. It also does not specify how consumption should be distributed by country. Some of these country specific questions could be answered by using respective country calculators, e.g. for India you can use IESS 2047 (India Energy Security Scenarios) <http://indiaenergy.gov.in/index.php> , model housed within the Niti Aayog.

However the Global Calculator does unequivocally demonstrate that it is possible to achieve our economic development and climate change goals by 2050. The world has enough energy, land and food resources for us all to live well if we use them well. The technology, fuels and land use methods already exist for us to meet our economic development goals, whilst tackling climate change, but we need to make the right choices and implement them.

Making this transition to a low carbon future will require a massive effort across all sectors and we must act now. We need a step change in the take up of clean technologies across the electricity, buildings, transport and manufacturing sectors, increased R&D and significant improvement in our land management practices. And 2050 is not the end of the journey: our technological and land management reforms must extend throughout the rest of the century such that global greenhouse gas emissions can be completely eliminated by 2100 to be on track for our 2°C target.

To ensure that these changes are rolled out, leaders from businesses, civil society and politicians must support urgent action to cut emissions through an ambitious global deal in the December 2015 United Nations Framework Convention on Climate Change negotiations.