News Release

University of East Anglia

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CO_2 emissions set to reach new 40 billion tonne record high in 2014
Remaining CO_2 emission 'quota' may be used up in one generation and more than half of all fossil fuel reserves may need to be left untapped

Carbon dioxide emissions, the main contributor to global warming, are set to rise again in 2014 - reaching a record high of 40 billion tonnes.

The 2.5 per cent projected rise in burning fossil fuels is revealed by the Global Carbon Project, which is co-led in the UK by researchers at the Tyndall Centre for Climate Change Research at the University of East Anglia and the College of Engineering, Mathematics and Physical Sciences at the University of Exeter.

It comes ahead of the New York Climate Summit, where world leaders will seek to catalyse action on climate change.

This latest annual update of the Global Carbon Budget shows that total future CO_2 emissions cannot exceed 1,200 billion tonnes – for a likely 66 per cent chance of keeping average global warming under 2°C (since pre-industrial times).

At the current rate of CO_2 emissions, this 1,200 billion tonne CO_2 'quota' would be used up in around 30 years. This means that there is just one generation before the safeguards to a 2°C limit may be breached.

The international team of climate scientists say that to avoid this, more than half of all fossil fuel reserves may need to be left unexploited.

Prof Corinne Le Quéré, Director of the Tyndall Centre at UEA, said: "The human influence on climate change is clear. We need substantial and sustained reductions in CO_2 emissions from burning fossil fuels if we are to limit global climate change. We are nowhere near the commitments necessary to stay below 2°C of climate change, a level that will be already challenging to manage for most countries around the world, even for rich nations.

"Politicians meeting in New York need to think very carefully about their diminishing choices exposed by climate science."

The annual Global Carbon Budget, published today, includes a projection for 2014, as well as figures for 2013 by country and per capita. It is accompanied by a series of papers in *Nature Climate Change, Nature Geoscience* and *Earth System Science Data Discussions.*

Lead author of the *Nature Geoscience* paper, Prof Pierre Friedlingstein, from the University of Exeter said: "The time for a quiet evolution in our attitudes towards climate change is now

over. Delaying action is not an option - we need to act together, and act quickly, if we are to stand a chance of avoiding climate change not long into the future, but within many of our own lifetimes.

“We have already used two-thirds of the total amount of carbon we can burn, in order to keep warming below the crucial 2˚C level. If we carry on at the current rate we will reach our limit in as little as 30 years’ time - and that is without any continued growth in emission levels. The implication of no immediate action is worryingly clear – either we take a collective responsibility to make a difference, and soon, or it will be too late.”

Key facts and figures:

- CO_2 emissions from burning fossil fuel are projected to rise by 2.5 per cent in 2014 - 65 per cent above 1990 levels, the reference year for the Kyoto Protocol

- China, the USA, the EU and India are the largest emitters – together accounting for 58 per cent of emissions.

- China’s CO_2 emissions grew by 4.2 per cent in 2013, the USA’s grew by 2.9 per cent, and India’s emissions grew by 5.1 per cent.

- The EU has decreased its emissions by 1.8 per cent, though it continues to export a third of its emissions to China and other producers through imported goods and services.

- China’s CO_2 emissions per person overtook emissions in the EU for the first time in 2013. China’s emissions are now larger than the US and EU combined. 16 per cent of China’s emissions are for goods and services which are exported elsewhere.

- Emissions in the UK decreased by 2.6 per cent in 2013 caused by a decline in the use of coal and gas. However the UK exports a third of its emissions by consuming goods and services which are produced elsewhere.

- CO_2 emissions are caused primarily by burning fossil fuels, as well as by cement production and deforestation. Deforestation accounts for 8 per cent of CO_2 emissions.

- Historical and future CO_2 emissions must remain below a total 3,200 billion tonnes to be in with a 66 per cent chance of keeping climate change below 2°C. But two thirds (2,000 billion tonnes) of this quota have already been used.

- If global emissions continue at their current rate, the remaining 1,200 billion tonnes will be used up in around 30 years – one generation.

- Global emissions must reduce by more than 5 per cent each year over several decades to keep climate change below 2°C.

- This emission quota implies that over half of proven fossil reserves might have to remain unused in the ground, unless new technologies to store carbon in the ground are developed and deployed in large quantities.

The ‘Global Carbon Budget 2014’, led by UEA Tyndall Centre director Prof Le Quéré is made available in the journal *Earth System Science Data Discussions* on September 21, 2014.

It is accompanied by a *Nature Geoscience* paper 'Persistent growth of CO_2 emissions and implications for reaching climate targets', led by Prof Friedlingstein from the University of Exeter.

Meanwhile 'Sharing a quota on cumulative carbon emissions' led by Dr Michael Raupach director of the Climate Change Institute at the Australian National University, and a comment article 'Betting on negative emissions', led by Dr Sabine Fuss, at the Mercator Research Institute on Global Commons and Climate Change in Germany, are published in *Nature Climate Change,*

For more information see the Global Carbon Atlas, which allows users to explore, visualise and interpret data of global, regional and national emissions, visit www.globalcarbonatlas.org.

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EDITOR'S NOTES

1/ For more information, or to arrange an interview with Prof Le Quéré, please contact Lisa Horton in the UEA press office on +44 (0) 1603 592764 or email l.horton@uea.ac.uk. To arrange an interview with Prof Friedlingstein, contact Duncan Sandes, University of Exeter Press officer on +44 (0)1392 722391 or email D.Sandes@exeter.ac.uk

2/ The University of East Anglia (UEA) is a UK Top 15 university and ranks in the top one per cent of universities in the world. Known for its world-leading research and outstanding student experience, it has achieved a Top 10 rating in the National Student Survey every year since the survey began. UEA is a leading member of the Norwich Research Park - one of Europe's biggest concentrations of researchers in the fields of environment, health and plant science. The city of Norwich boasts more highly cited scientists than any UK city outside London, Oxford and Cambridge. www.uea.ac.uk.

3/ The Tyndall Centre for Climate Change Research is an active and expanding partnership between the Universities of East Anglia (headquarters), Cambridge, Cardiff, Manchester, Newcastle, Oxford, Southampton, Sussex, and recently Fudan University in Shanghai. It conducts research on the interdisciplinary aspects of climate change and is committed to promote informed and effective dialogue across society about the options to manage our future climate. www.tyndall.ac.uk

4/ The University of Exeter is a Russell Group university and in the top one percent of institutions globally. It combines world-class research with very high levels of student satisfaction. Exeter has over 18,000 students and is ranked 8th in The Times and The Sunday Times Good University Guide league table, 10th in The Complete University Guide and 12th in the Guardian University Guide 2014. In the 2008 Research Assessment Exercise (RAE) 90% of the University's research was rated as being at internationally recognised levels and 16 of its 31 subjects are ranked in the top 10, with 27 subjects ranked in the top 20. Exeter was The Sunday Times University of the Year 2012-13.

The University has invested strategically to deliver more than £350 million worth of new facilities across its campuses in the last few years; including landmark new student services centres - the Forum in Exeter and The Exchange on the Penryn Campus in Cornwall, together with world-class new facilities for Biosciences, the Business School and the Environment and Sustainability Institute. There are plans for another £330 million of investment between now and 2016. www.exeter.ac.uk

This media release is part of the Global Carbon Budget 2014 of the Global Carbon Project, based on four analyses published on 21 September 2014, 6:00 pm UK time.

- Le Quéré et al. (2014) Global Carbon Budget 2014. *Earth System Science Data Discussions* (manuscript in discussions), http://dx.doi.org/10.5194/essdd-7-521-2014
- Friedlingstein et al. (2014) Persistent growth of CO_2 emissions and implications for reaching climate targets. *Nature Geoscience*, http://dx.doi.org/10.1038/ngeo2248
- Raupach et al. (2014) Sharing a quota on cumulative carbon emissions. *Nature Climate Change*, http://www.nature.com/doifinder/10.1038/nclimate2384
- Fuss et al. (2014) Betting on Negative Emissions. Nature Climate Change (commentary)

Access:

- Data and figures: http://www.globalcarbonproject.org/carbonbudget
- Data interface for exploring data: http://www.globalcarbonatlas.org
- Prior to embargo: Nature/s paper can be requested for media purposes to press@nature.com
- After embargo papers are free for one month for registered uses at www.nature.com

Social media:

- Facebook https://www.facebook.com/globalcarbonproject
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