

Briefing

Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment, Working Group 1 report

Questions and answers in advance of publication

The Intergovernmental Panel on Climate Change is a UN body tasked with producing five yearly updates of knowledge on the scientific, technical and socio-economic aspects of climate change. It has three scientific working groups each producing and publishing a detailed report. These are synthesised into one document after completion of all three.

The first group – Working Group 1, The Physical Science Basis (WG1) – will publish a summary of their report on 27th September 2013 and the full report on 30th September.

This Questions and Answers briefing – produced in advance of the report – explains what the report will cover, what their last report said, and predicts the content of the forthcoming report.

Take home messages

Even taking into account likely, and disputed, changes in estimates of climate sensitivity (see below) in the new IPCC report we are still well on course for temperature increases well above 2 degrees in the latter half of the century compared to pre-industrial levels and potentially as high as 4 degrees.

Over coming years and decades we will see increased extreme weather events with severe social, environmental and economic consequences, especially for people in developing countries but also those in developed countries. Impacts on food production will be of particular concern. The more we cut carbon pollution emissions the more we reduce these impacts.

There are still significant uncertainties on how carbon sinks (soil, oceans, biomass) will respond to a warmer world. If they release more carbon than thought then warming levels could be much higher.

For more than 40 years we've seen that the wellbeing of people and planet go hand in hand – and it's been the inspiration for our campaigns. Together with thousands of people like you we've secured safer food and water, defended wildlife and natural habitats, championed the move to clean energy and acted to keep our climate stable. Be a Friend of the Earth – see things differently.

Questions and answers - *Note that the predictions of what will be in the report are based on reading of science over past years plus media reports and rumours about the forthcoming report. They should therefore be treated with caution.*

What is the report and how was it produced?

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The first group – Working Group 1, The Physical Science Basis (WG1) – will publish a summary of their report on 27th September 2013 and the full report on 30th September. The other working groups will publish their reports in spring 2014 and the final synthesis report is due to be published in October 2014.

The WG1 report will have 14 chapters produced by 209 lead authors and 50 review editors from 39 countries. Over 600 authors from 32 countries will have contributed. Over 9200 scientific publications will be cited in the report. The summary report will be agreed line by line by up to 195 countries in Sweden on 23rd to 26th Sept. The report can therefore be considered very robust and, because of the nature of the process, is likely to be conservative in its conclusions.

What does it cover?

The report will cover: releases of greenhouse gases and the amount of current global warming, direct observations of climate change (for example, extreme weather events and changes to oceans, ice sheets, sea level rise, and precipitation), estimates of likelihood that the changes are a result of human influences, and projections of future climate change based on a number of scenarios (to 2100 and beyond).

What doesn't it cover?

It doesn't identify the human, environmental and economic impacts from climate change. These will be covered by Working Group 2. Nor does it identify options for mitigation. These will be covered by Working Group 3.

It does make a judgement of the temperature threshold for dangerous climate change. Many developed country politicians have said the threshold is 2 degrees above pre-industrial levels whereas many developing countries have identified 1.5 degrees as the threshold. In Friends of the Earth's view the scientific understanding of the impacts of climate change is more consistent with the lower of these.

What did the last report say?

- It said that there was very high confidence that man-made climate was happening (9 out of 10 chance of being correct) and greater than 90 per cent chance that most of the increased temperatures since the mid-20th century is due to human actions.
- It said that if greenhouse gases were to double in concentration in the atmosphere compared to pre-industrial times it was likely that the planet would warm by 2°C to 4.5°C with a best estimate of about 3°C. This is called climate sensitivity.
- Warming of the planet reduces the ability of the land and oceans to absorb carbon emissions, although there are significant uncertainties on the behaviour of these 'carbon

sinks'. Also it is thought that a warmer planet would increase natural releases of carbon (e.g. from soils) in a, so called, positive feedback. They said this reduced the amount of carbon that humans could release (carbon budget) through their activities (fossil fuel, agriculture, deforestation) by around a quarter (if 2 degrees of warming was to be avoided).

- Based on its scenarios it said the best estimates for temperatures at the end of 2100 were 1.8 to 4 degrees warming (with a range from 1.1 degrees to 6.4 degrees) relative to 1980-1999 average temperatures. Compared to pre-industrial times this equates to 2.5 to 4.7 degrees warming (range 1.8 degrees to 7.1 degrees).
- Man-made climate change was more likely than not (greater than 50% chance) to have contributed to trend of increasing extreme weather. Depending on the type of extreme weather it was very likely (e.g. heavy rainfall) to virtually certain (warmer and more frequent hot days and nights) that increased warming would increase these events.
- Sea levels may rise by up to 0.6 meters (in their worst case scenario).

What is likely to be different this time?

- The new report is extremely likely to say that man-made climate change is occurring with 95% certainty, up from the 90% previously stated. This represents a solidifying of the evidence.
- It is possible that, due to more recent research, the report will adjust downwards the likely climate sensitivity of the planet towards the lower end of their previous range (e.g. 2.5 degrees not 3 degrees). This is disputed by climate scientists such as [James Hanson](#), who argues the sensitivity is likely to be larger than 3-4 degrees. But as explained below, even a reduced estimate may be wholly or partially offset by increased understanding of carbon sinks and positive feedbacks, and accelerating emissions.
- The report is likely to confirm, however, that global greenhouse gas emissions are accelerating faster than ever – in excess of previous worst-case scenarios. This means that, even though climate sensitivity may be lower, the risks of us hitting higher temperatures (4 degrees+) by the end of the century continue to worsen.
- Scientists are now much better able to attribute man-made climate change as a contributory factor to extreme weather events than they were before. Therefore the report is likely to state with much greater certainty that man-made climate change is already leading to more extreme weather events and in a much warmer world extreme weather events will increase.
- Estimates of sea level rise within the report are also expected to increase but will be below one metre by 2100.
- There is greater understanding of carbon sinks and positive feedbacks resulting from warming but still significant uncertainties. For example, what happens to soil carbon as a result of warming (and agricultural practices) will have a very significant impact on future warming. The report may suggest that releases of carbon from soil are likely to be greater than previously thought, at least partially offsetting the reduced estimates of climate sensitivity.
- The report will address the recent observed slowdown in global warming; possibly suggesting that it may be due to volcanoes, the solar cycle, or more heat being absorbed by the deep oceans. It is unlikely to significantly alter longer-term predictions of warming.

- Its scenarios will predict a range in temperature increase of 1 degree centigrade to 5 degree C from current levels by 2100 (1.8 to 5.8 C above preindustrial levels), the former only if carbon emissions are zero by 2070 (which given agricultural emissions is not practical without deploying techniques and unproven technologies to take carbon out of the air).

Reasons to be worried

Even taking into account possible changes in climate sensitivity we are still well on course for temperature increases well above 2 degrees in the latter half of the century compared to pre-industrial levels.

Over coming years and decades we will see increased extreme weather events with the severe social, environmental and economic consequences, especially for people in developing countries but also those in developed countries. Impacts on food production will be of particular concern.

There are still significant uncertainties on how carbon sinks will respond to a warmer world. If they release more carbon than thought then warming levels could be much higher.

To have a high chance (75 per cent or higher) of avoiding 2 degrees warming is still going to require very rapid decarbonisation of developed country economies and developing countries to adopt low carbon development pathways. Around 80 per cent of fossil fuel reserves will still need to be left in the ground. It will still be madness to develop new sources of fossil fuels.

To have a high chance of avoiding 1.5 degrees warming will require the same, plus taking carbon out of the air which will require unproven and expensive new technologies.

What are others likely to say?

Most scientists will state the evidence of man-made climate change and the contribution to extreme weather events is more solid than ever. Many are likely to say that 2 degrees could still be avoided, although probably will shy away from the very rapid changes, including economic changes, that need to happen to achieve it (mitigation pathways will be covered in Working Group 3).

Climate sceptics are [already lining-up](#) to say that scientists and environmentalists have exaggerated the danger of climate change, pointing towards the likely change in the estimate of climate sensitivity. They will ignore greater understanding of positive feedbacks (e.g. releases of carbon from the soil). They will also ignore accelerating global emissions, and the need for rapid decarbonisation to avoid 2 degrees of warming.

Where are the reports?

The 2007 Summary of Working Group One Report can be found at:

<http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf>

The 2013 Working Group report will be published on 27th Sept at:

<http://www.climatechange2013.org/>

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