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## UN Intergovernmental Panel on Climate Change (IPCC) Assessment Report: Analysis/Implications

### Summary

On 27 September, the United Nations' Intergovernmental Panel on Climate Change (IPCC) published its fifth assessment report saying that scientists are 95% certain that humans are the "dominant cause" of global warming since the 1950s.

The report asserts that while there has been a pause in warming over the last 15 years, all aspects of the ecosystem suggests unequivocal global warming, and continued emissions of greenhouse gases (GHGs) will cause further warming and changes in all aspects of the climate. It concludes by arguing for "substantial and sustained reductions of GHG emissions".

**Upcoming CII Thinkpiece:** the CII will shortly be publishing a Thinkpiece on this report by Professor Sir John Beddington, former Chief Scientific Adviser to the UK Government. He will analyse this report in more detail and offer specific implications for the insurance industry.

### Overview and Background

On 27 September, the United Nations' Intergovernmental Panel on Climate Change (IPCC) published its fifth assessment report.<sup>1</sup> It states that scientists are 95% certain that humans are the "dominant cause" of global warming since the 1950s.

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### Main Report

Its overall finding is that: "warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased."

### Terminology

Much of the politics around the IPCC's work, and criticism levelled against it, relates to its degree of certainty about projections. This Fifth Assessment Report tries to adopt a more careful terminology in its policy level pronouncements:

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<sup>1</sup> IPCC, Fifth Assessment Report, Summary for Policymakers, Sep 2013: [http://www.climatechange2013.org/images/uploads/WGIAR5-SPM\\_Approved27Sep2013.pdf](http://www.climatechange2013.org/images/uploads/WGIAR5-SPM_Approved27Sep2013.pdf)

- Likelihood is set out in very unlikely (0-10%), unlikely (10-33%), likely as not (33-66%), likely (66-100%), very likely (90-100%), extremely likely (95-100%), and virtually certain (99-100%).
- Confidence is also expressed as very low, low, medium, high and very high.
- Evidence can be limited, medium or robust.

## Human-Induced Climate Change

The report is more direct in isolating the extent of climate change that is attributable to human intervention.

One of its main findings since the 2008 report is the attribution of more than half the increase in global surface temperatures from 1951-2010 to human activities, underlining the dominant role of fossil fuel burning as a driver for climate change. It states that:

- “human influence has been detected in warming of the atmosphere and the ocean, in changes in the global water cycle, in reductions in snow and ice, in global mean sea level rise, and in changes in some climate extremes.”
- this evidence for human influence has grown since the Fourth Assessment Report in 2008. “It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century.”

Although this new report is likely to stress a greater certainty among scientists that human activities are causing climate warming, in terms of the scale, level and impacts, the word "uncertainty" features heavily.

- "What we are seeing now is that this working group is getting more careful than they already were," said Prof Arthur Petersen, chief scientist at the Netherlands Environmental Assessment Agency.
- "Overall, the message is, in that sense, more conservative I expect, for this IPCC report compared to previous ones."

## Atmosphere

Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since 1850. In the Northern Hemisphere, 1983–2012 was *likely* the warmest 30-year period of the last 1400 years

## Sea Temperatures

“Ocean warming dominates the increase in energy stored in the climate system, accounting for more than 90% of the energy accumulated between 1971 and 2010 (*high confidence*). It is *virtually certain* that the upper ocean (0–700 metres depth) warmed from 1971 to 2010, and it *likely* warmed between the 1870s and 1971.”

## Global Average Temperatures

Global surface temperature change for the end of the 21st Century is "likely" to exceed 1.5°C relative to the period 1850-1900 for all but one of the greenhouse gas emissions scenarios proposed in the IPCC's computer climate simulations.

Limiting the global average temperature rise to 2°C (above the pre-industrial average) is a commonly agreed means of avoiding "dangerous climate change". But a significant amount of the maximum quantity of CO<sub>2</sub> that can be emitted while still keeping the mercury under 2°C had already been released by 2011. The report says that however the data is sliced, the rationale for cutting greenhouse emissions is still powerfully underlined.

## Sea Levels

“The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia (*high confidence*). Over the period 1901–2010, global mean sea level rose by 0.19 metres.”

The IPCC's moderate projections clearly contradict alarmist rhetoric such as the recurring claims from activists of sea level rise of 1-2 metres, or Al Gore's 6 metres.

## Pause in Climate Change

The 2007 IPCC report was criticised because it made no mention of any slowdown or standstill in temperature rises in recent decades. They pointed out the now-famous “hockey stick chart” that the linear warming trend over the previous 50 years was 0.13°C per decade, which was twice that for the past 100 years. They forecast that, if emissions of carbon dioxide continued on their existing path, over the next century the climate would respond by warming between 2° and 4.5°, with a most likely rise of 3°. But since 2007, climate sceptics have loudly argued that global average temperatures haven't actually gone above the level recorded in 1998.

The issue is now being taken more seriously by the IPCC and other respected science organisations. Addressing the pause in global temperature rise since 1998 had been described as "central" to this report. While acknowledging this hiatus, the final analysis downplays it and points out that this period began with a very hot El Nino year. El Nino is a cyclical weather and climatic pattern that affects the Pacific Ocean, but which has knock-on impacts for conditions felt over the rest of the globe.

The report's authors ultimately conclude that 15 years is still not a long enough timescale to draw firm conclusions about the pause. Scientific studies on the slow-down have cited uptake of heat by the upper oceans as a possible cause, along with the properties of particulate matter in the atmosphere which can reflect solar energy back into space. But published research is still relatively sparse.

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