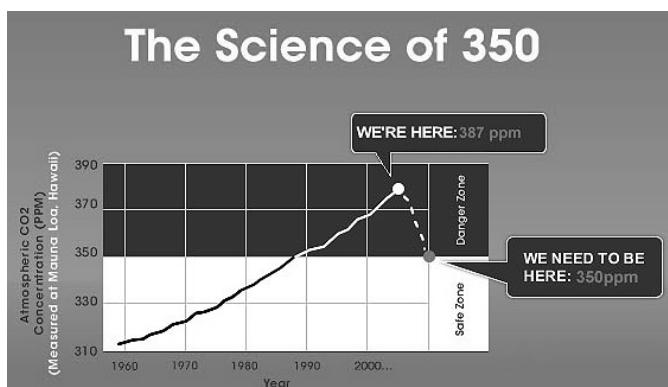


Climate Change

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There's good news and bad news in the latest research on climate change. The bad news is a growing consensus that if we fail to act, climate change may be more rapid and more severe than initially predicted. The good news is that this new research provides policymakers at all levels with more comprehensive and accurate information for taking action.



CO₂ Concentrations and Climate Change: 350 ppm is the limit

The latest research says that we need to drastically reduce overall concentrations of greenhouse gases (GHG) in our atmosphere. Dr. James Hansen, a leading global climate scientist with NASA, found that we should be aiming for a global target of less than 350 parts per million (ppm) carbon dioxide (CO₂) in our atmosphere.¹ Above that level, we face the possibility of runaway climate change with severe consequences for our planet and its people. A large and steadily growing number of leading scientists and environ-

mental figures, including David Suzuki, Al Gore and Dr. Rajendra Pachauri, the United Nation's top climate scientist, are supporting the 350 ppm target.²

But reaching this target is going to require focused action by industry, citizens and all levels of government. In 2009, CO₂ levels reached 390 ppm, and a major UK government report concluded that "if annual emissions were to remain at today's levels, greenhouse gas levels would reach close to 550 ppm CO₂ by 2050," leading to a global average rise in temperature of 2 – 5°C, or even higher.³ Because CO₂ stays in the atmosphere for a very long time, such temperature rises would be long term, and have potentially disastrous consequences.

Climate change may be worse than originally predicted

New knowledge has allowed scientists to develop more accurate climate change predictions. Some of the findings in the most recent report from the UN's International Panel on Climate Change^{4, 7} include:

- Sea level rises are likely to be higher and more rapid than originally forecast.

Greenhouse gas levels and the probability of temperature increases:

Likelihood, in percentages, of exceeding pre-industrial temperature as CO₂ levels increase

(Source: Nicholas Stern *The Global Deal*⁶, p.26)

CO ₂ level	2° C	3° C	4° C	5° C	6° C	7° C
450 ppm	78%	18%	3%	1%	0%	0%
500 ppm	96%	44%	11%	3%	1%	0%
550 ppm	99%	69%	24%	7%	2%	1%
650 ppm	100%	94%	58%	24%	9%	4%
750 ppm	100%	99%	82%	47%	22%	9%

- Even if GHGs are stabilized at present levels, climate impacts and sea level rise may persist for a very long time, even centuries.
- High CO₂ levels are increasing ocean acidification, threatening the marine environment and many fisheries.

Climate Change Feedbacks

Over the past few years, scientists have become aware of a number of unexpected feedbacks that are accelerating or otherwise worsening the impact of climate change. For example the darker water that is exposed as Arctic ice melts absorbs more solar energy, spurring further global warming.^{1,3,4} Melting permafrost in the Arctic is releasing larger amounts of methane into the atmosphere than previously forecast. Though shorter lived, methane is 20 to 25 times more potent a GHG than CO₂.

The Economics of Climate Change

Reducing carbon concentrations to a safer level will be challenging and require major changes in how we live, work, travel and produce energy. But the environmental, economic and human costs of doing nothing

are many times higher than taking necessary steps now to mitigate and adapt.

According to the UK government's 2006 Stern report, moving to an environmentally sustainable model will cost the world about 1% of annual global GDP by 2050. The report noted that inaction will lead to a global economic decline equivalent to at least 5% of GDP, and a severely diminished quality of life for most people.³

Four Key Numbers

350 ppm: The safe upper limit for CO₂ concentrations in the earth's atmosphere.¹

2015: If global CO₂ emissions level-off and start shrinking by 2015, we can avoid the worst effects of climate change.⁴

2°C: A rise of 2°C above the average pre-industrial temperature is widely considered the tipping point for more rapid, unpredictable and potentially uncontrollable global warming.⁴

90%: The amount industrialized nations need to cut carbon emissions to avoid runaway climate change.⁵

Sources & Further Reading

1. Dr. James Hansen, et al. (2008). *Target atmospheric CO₂: Where should humanity aim?* :http://pubs.giss.nasa.gov/abstracts/2008/Hansen_etal.html
 2. The 350.org campaign: www.350.org
 3. Nicholas Stern (2006). *The Stern Review on the Economics of Climate Change*: http://www.hm-treasury.gov.uk/sternreview_index.htm
 4. UN Intergovernmental Panel on Climate Change (2007). *Climate Change 2007: Synthesis Report*: <http://www.ipcc.ch/>
 5. George Monbiot (2006) *Heat: How to Stop the Planet Burning*
 6. Nicholas Stern (2009). *The Global Deal: Climate Change and the Creation of a New Era of Progress and Prosperity*
 7. David Suzuki Foundation website: http://www.davidsuzuki.org/Climate_Change/
- Also see the website of ICLEI - Local Governments for Sustainability: www.iclei.org/**

What the numbers mean:

Potential impacts of climate change, by degree of temperature increase

(Source: Stern Review³, p.57)

2° C	<ul style="list-style-type: none"> • Water supplies decrease by 20-30 % in vulnerable regions • 15-40% of species facing extinction, with Arctic species at especially high risk • Coastal flooding affects 10 million more people
3° C	<ul style="list-style-type: none"> • Water shortages suffered by 1-4 billion more people, while other parts of the world are threatened by increased flooding • 550 million more people at risk of hunger • 60% of mammals face extinction
4° C	<ul style="list-style-type: none"> • Agricultural production drops massively in many areas, with regions such as Australia pushed entirely out of production • Coastal flooding affects 300 million more people • 80 million more people exposed to malaria
5° C	<ul style="list-style-type: none"> • Major glaciers in Asia disappear, affecting hundreds of millions in China and India • Fish stocks and marine ecosystems seriously disrupted by ocean acidity • Rising sea levels threaten many major world cities
6° C and above	<ul style="list-style-type: none"> • Climate change on this level is outside human experience, and would likely be catastrophic on global scale