



The 2018 IPCC 1.5°C Special Report (on the 1.5°C limit)

Press release and Headline Statements

Peter Carter, main conclusions, 11 Oct 2018

- **1.5°C is a must do for a future livable planet – we really have no choice**
- **We are all in a dire global EMERGENCY**
- **1.5°C is globally disastrous, possibly recoverable, but 2°C is total planetary catastrophe**
- **Immediate rapid global emissions decline is the only predictably effective response**

Global Warming of 1.5 °C, an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

From IPCC Press release 8 October 2018

‘Limiting warming to 1.5°C is possible within the laws of chemistry and physics but doing so would require unprecedented changes

Limiting global warming to 1.5°C would require rapid, far reaching and unprecedented changes in all aspects of society, with clear benefits to people and natural ecosystems, limiting global warming to 1.5°C compared to 2°C.

We are already seeing the consequences of 1°C of global warming through more extreme weather, rising sea levels and diminishing Arctic sea ice, among other changes.

Every extra bit of warming matters, especially since warming of 1.5°C or higher increases the risk associated with long-lasting or irreversible changes, such as the loss of some ecosystems.

The report finds that limiting global warming to 1.5°C would require “rapid and far-reaching” transitions in land, energy, industry, buildings, transport, and cities. Global net human-caused emissions of carbon dioxide (CO₂) would need to fall by about 45 percent from 2010 levels by 2030, reaching ‘net zero’ around 2050.

Allowing the global temperature to temporarily exceed or ‘overshoot’ 1.5°C would mean a greater reliance on techniques that remove CO₂ from the air to return global temperature to below 1.5°C by 2100. The effectiveness of such techniques are unproven at large scale and some may carry significant risks for sustainable development.’

(from) **IPCC 2018 1.5°C Special Report**

Headline Statements

A. Understanding Global Warming of 1.5°

- A1. Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate.
- A2. Warming from anthropogenic emissions from the pre-industrial period to the present will persist for centuries to millennia and will continue to cause further long term changes in the climate system, such as sea level rise, with associated impacts
- A3. Climate-related risks for natural and human systems are higher for global warming of 1.5°C than at present, but lower than at 2°C. These risks depend on the magnitude and rate of warming...

B. Projected Climate Change, Potential Impacts and Associated Risks

- B1. Climate models project robust differences in regional climate characteristics between present-day and global warming of 1.5°C, and between 1.5°C and 2°C.

These differences include increases in:

- mean temperature in most land and ocean regions,
 - hot extremes in most inhabited regions,
 - heavy precipitation in several regions, and
 - the probability of drought and precipitation deficits in some region.
- B2. By 2100, global mean sea level rise is projected to be around 0.1 metre lower with global warming of 1.5°C compared to 2°C. Sea level will continue to rise well beyond 2100, and the magnitude and rate of this rise depends on future emission pathways. A slower rate of sea level rise enables greater opportunities for adaptation in the human and ecological systems of small islands, low-lying coastal areas and deltas.
 - B3. On land, impacts on biodiversity and ecosystems, including species loss and extinction, are projected to be lower at 1.5°C of global warming compared to 2°C. Limiting global warming to 1.5°C compared to 2°C is projected to lower the impacts on terrestrial, freshwater, and coastal ecosystems and to retain more of their services to humans.
 - B4. Limiting global warming to 1.5°C compared to 2°C is projected to reduce increases in ocean temperature as well as associated increases in ocean acidity and decreases in ocean oxygen levels.
 - B5. Climate-related risks to health, livelihoods, food security, water supply, human security, and economic growth are projected to increase with global warming of 1.5°C and increase further with 2°C.
 - B6. Most adaptation needs will be lower for global warming of 1.5°C compared to 2°C. There are limits to adaptation and adaptive capacity for some human and natural systems at global warming of 1.5°C, with associated losses

C. Emission Pathways and System Transitions Consistent with 1.5°C Global Warming

- C1. In model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by about 45% from 2010 levels by 2030 (up to 60%), reaching net zero around 2050. For limiting global warming to below 2°C, CO₂ emissions are projected to decline by about 20% by 2030 in most pathways (up to 30% and reach net zero around 2075. Non-CO₂ emissions in pathways that limit global warming to 1.5°C show deep reductions that are similar to those in pathways limiting warming to 2°C.
- C2. Pathways limiting global warming to 1.5°C with no or limited overshoot would require rapid and far-reaching transitions in energy, land, urban and infrastructure (including transport and buildings), and industrial systems.
- C3. All pathways that limit global warming to 1.5°C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 GtCO₂ over the 21st century. CDR deployment of several hundreds of GtCO₂ is subject to multiple feasibility and sustainability constraints. Significant near-term emissions reductions and measures to lower energy and land demand can limit CDR deployment to a few hundred GtCO₂ without reliance on bioenergy with carbon capture and storage

D. Strengthening the Global Response in the Context of Sustainable Development and Efforts to Eradicate Poverty

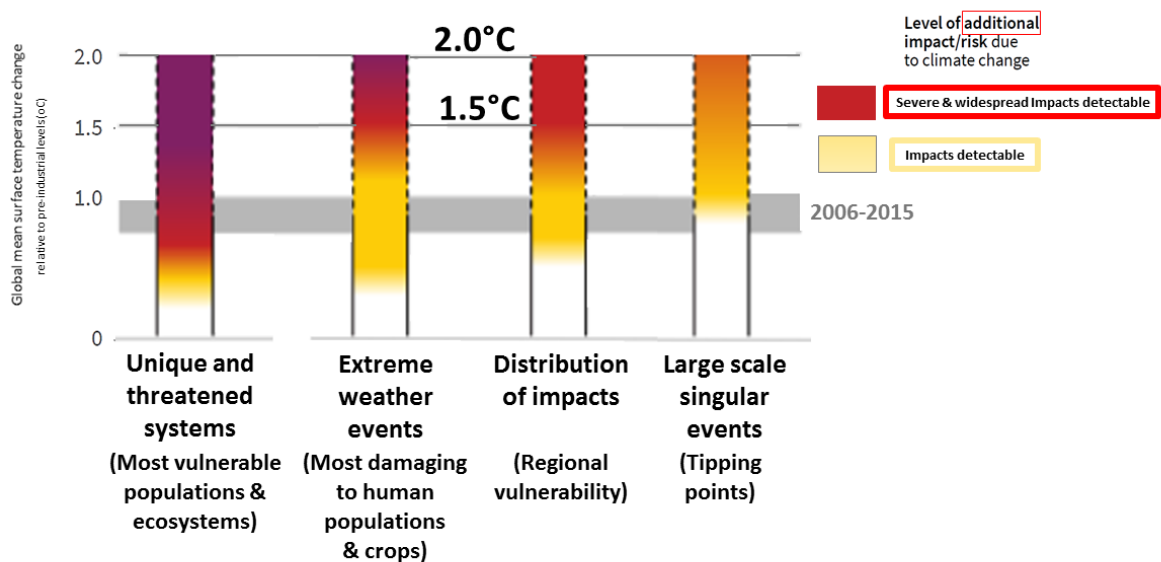
- D1. Estimates of the global emissions outcome of current nationally stated mitigation ambitions as submitted under the Paris Agreement would lead to global greenhouse gas emissions in 2030 of 52–58 GtCO₂eq yr⁻¹ (medium confidence). Pathways reflecting these ambitions would not limit global warming to 1.5°C, even if supplemented by very challenging increases in the scale and ambition of emissions reductions after 2030. Avoiding overshoot and reliance on future largescale deployment of carbon dioxide removal (CDR) can only be achieved if global CO₂ emissions start to decline well before 2030.
- D2. The avoided climate change impacts on sustainable development, eradication of poverty and reducing inequalities would be greater if global warming were limited to 1.5°C rather than 2°C.
- D3. Adaptation options specific to national contexts, if carefully selected together with enabling conditions, will have benefits for sustainable development and poverty reduction with global warming of 1.5°C.

D4. Mitigation options consistent with 1.5°C pathways are associated with multiple synergies

Summary for Policy Makers on oceans

B4.2. Global warming of 1.5°C is projected to shift the ranges of many marine species, to higher latitudes as well as increase the amount of damage to many ecosystems. It is also expected to drive the loss of coastal resources, and reduce the productivity of fisheries and aquaculture (especially at low latitudes). The risks of climate-induced impacts are projected to be higher at 2°C than those at global warming of 1.5°C. Coral reefs, for example, are projected to decline by a further 70–90% at 1.5°C with larger losses (>99%) at 2°C (*very high confidence*). The risk of irreversible loss of many marine and coastal ecosystems increases with global warming, especially at 2°C or more

Climate Change Additional Impacts at 1.5°C and 2.0°C by 2100



Adapted from IPCC 2018 1.5C Report Figure SPM.2: integrative reasons for concern provide a framework for summarizing key impacts and risks across sectors and regions

P1: The only 1.5°C (or 2°C) response with proven technologies for the foreseeable future

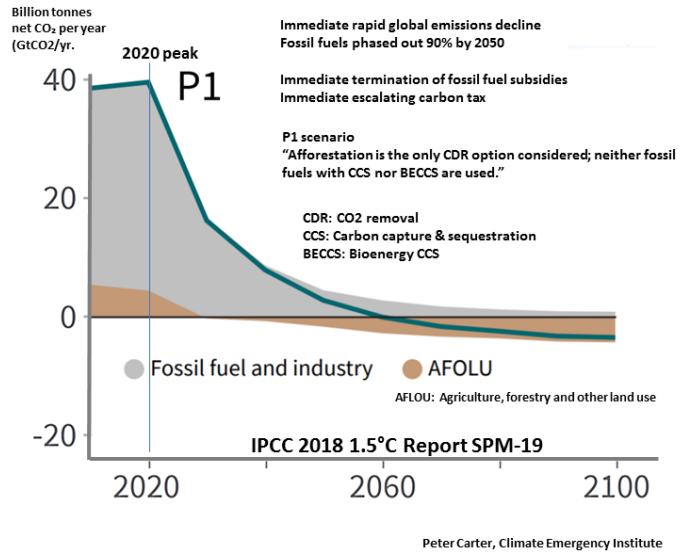
"Allowing the global temperature to temporarily exceed or 'overshoot' 1.5°C would mean a greater reliance on techniques that remove CO₂ from the air to return global temperature to below 1.5°C by 2100. The effectiveness of such techniques are unproven at large scale and some may carry significant risks for sustainable development." (IPCC media release)

IPCC 2018 1.5°C Report SPM-19

P1 "A (1.5°C by 2100) scenario in which social, business, and technological innovations result in lower energy demand up to 2050 while living standards rise, especially in the global South. A down-sized energy system enables rapid decarbonisation of energy supply. Afforestation is the only CDR option considered; neither fossil fuels with CCS nor BECCS are used."

Rapid decarbonization

Primary energy from coal in 2030 (% rel to 2010)	-78
↳ in 2050 (% rel to 2010)	-97
from oil in 2030 (% rel to 2010)	-37
↳ in 2050 (% rel to 2010)	-87
from gas in 2030 (% rel to 2010)	-25
↳ in 2050 (% rel to 2010)	-74
from nuclear in 2030 (% rel to 2010)	59
↳ in 2050 (% rel to 2010)	150



The above has been approved by all IPCC the 1.5°C report scientists and approved by all world governments through the IPCC policy maker process. This is a commendably great achievement.

Carbon capture sequestration (CCS) by technologies are assumed by their frequent references to be feasible in the near future, but as the report does acknowledge, there is no good evidence for this. Only the P1 best-case scenario avoids CCS (CCS is unfeasible today and the foreseeable future).

The 1.5C and 2.0C limits are only to 2100.

It is well known that the science of the IPCC assessments tends to be underestimated and understated, due to policy makers of all world governments who sit on the Panel final publication depends on their line by line approval.

This makes the IPCC 1.5°C Report even more of a dire global emergency today for the future of humanity.

The report acknowledges 'potential additional carbon release from future permafrost thawing and methane release from wetlands would reduce budgets by up to 100 GtCO₂ over the course of this century and more thereafter', but this is not included in global warming projections. The report does not include the extra emissions and warming due to reduced efficiency of the land and ocean carbon sinks, nor from global surface warming caused by 'terrestrial' feedback emissions (separate from permafrost and wetlands), which are substantial by 2100 at 2°C and above. This is an extremely large source of error above 1.5°C that makes benefits from 1.5°C compared to 2°C much greater, hopefully avoiding runaway.

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