

Scientific audit of a report from the Climate Commission

"The Critical Decade - Climate science, risks and responses"
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PART II - SCIENCE AUDIT

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The key messages of *The Critical Decade* are reproduced below in *italic print*, followed by our comments in ordinary type. We have not included figures, which can be found in the references cited at the end or in our previous critiques¹.

1. There is no doubt that the climate is changing. The evidence is overwhelming and clear.

The debate is not about whether climate is changing, and of course the evidence is overwhelming that it is. Rather, the issue is whether human-related carbon dioxide emissions are causing dangerous global warming. And even if warming has occurred, that in itself is obviously not evidence that human emissions were the cause.

Neither the IPCC nor the Climate Commission have provided substantive empirical evidence for either dangerous warming or for a human causation for the mild warming that occurred in the late 20th century.

The atmosphere is warming, the ocean is warming, ice is being lost from glaciers and ice caps and sea levels are rising. The biological world is changing in response to a warming world

Whether atmospheric warming is perceived as occurring depends entirely upon the period of time under consideration². For example³:

- Earth has cooled over the last 10,000 years (since the peak warming of the Holocene climatic optimum).
- Earth has cooled since 1,000 years ago (the Late 20th Century Warm Period not achieving the temperatures of the Mediaeval Warm Period).
- Earth has warmed since 400 years ago (post-Little Ice Warming).
- Earth warmed between 1979 and 1998 (Late 20th century warming).
- Earth has cooled slightly since 2001 (last 10 years).

That the atmosphere has failed to warm since 2001⁴, over the same ten year period that carbon dioxide has increased by ~5% (which represents nearly one quarter of all human emissions of carbon dioxide that have occurred since 1751)⁵, is a test for dangerous global warming and its causation - a test that the hypothesis of carbon dioxide causation fails.

Ocean temperature

Whether ocean warming is perceived to be occurring also depends entirely upon the period of time that is considered. Over the longer term, ocean temperatures in many places have declined since the early Holocene climatic optimum about 10,000 years ago⁶. On the shorter instrumental time scale, ocean warming appears to have occurred since 1950⁷, though the accuracy of many of the measurements used to sustain this conclusion is uncertain. We only have reliable global ocean temperature measurements since the 2003 deployment of 3,000 ARGO diving buoy sensors across the world's oceans⁸; the preliminary results from these show that ocean cooling has occurred since then⁹, consistent with the atmospheric cooling already referred to.

Global ice balance

The mass balance of a glacier or ice-cap is determined by the balance of precipitation of new snow on the upper part and the melting of ice at the lower end or periphery. Therefore, all glaciers and icecaps are losing ice all the time. Temperature is an important, but not the only, factor that controls glacial behaviour and whether net ice-margin advance or shrinkage occurs¹⁰.

Whether the global mass balance of ice is changing towards a net melting state is hard to determine, because (i) few glaciers have a long instrumented record of their behaviour (only 228 out of an estimated global number of more than 100,000)¹¹; and (ii) many of the modern satellite-based techniques used for measuring ice volume are new and require complex adjustments (often computer model based) to be made to the raw data; they also cover only a short time span that is inadequate for determining climate trends. The best available estimates indicate that global ice volume, including the Greenland and Antarctic ice caps, is close to balanced¹². That nonetheless some montane glaciers are retreating (and others are advancing¹³) may represent continued recovery from the Little Ice Age, or alternatively may reflect local rather than global forcing. In any event, the post-Little Ice Age retreat of many European glaciers started around 1860, i.e. it far preceded the modern industrial production of carbon dioxide, most of which has been emitted since 1950¹⁴.

Sea level change

The observed sea level rise of about 1.7 mm/yr (17 cm/century)¹⁵, or 20cm since 1880 when good tide gauge records commence, is not alarming and is consistent with a response to slight natural warming and concomitant land ice melting since then. No evidence exists of an acceleration of global sea-level rise¹⁶, as required by the IPCC's models. The higher rates of rise of >3 mm/yr since 1992 cited by the Climate Commission derive from satellite radar ranging observation. This is a new technique for which absolute calibration remains uncertain, and which anyway documents a deceleration in the rate of sea-level rise over the last few years¹⁷.

The biological response to a warming world.

It is not surprising that the biological world is changing with emergence of the Earth from the Little Ice Age. The processes involved are well understood to be those of adaptation and natural selection, and they throw no light on the causation of recent climate warming.

Global surface temperature is rising fast: the last decade was the hottest on record

The rate of increase of temperature between 1979 and 2006 was $\sim 0.16^{\circ}\text{C}/\text{decade}$ ¹⁸. This is not fast compared with the typical rates of warming and cooling of up to $0.25^{\circ}\text{C}/\text{decade}$ that characterises many Holocene temperature records¹⁹. Nor is the recent rate of warming different from the natural

warming rates observed from 1860 to 1880 and 1910 to 1940²⁰. Generally, then, the rates of global temperature change measured over the last 150 years all fall within previous natural limits. No empirical evidence exists for additional, dangerous, human-caused warming or cooling since the mid-20th century.

To invest significance in the fact that the last decade has been the hottest over the short 150-year instrumental record is fatuous, given the acknowledged warming since about 1680 which represents emergence from the Little Ice Age. Representing only five climate data points, the instrumental record covers far too short a period of time over which to draw such far-reaching climatic conclusions.

When palaeoclimate records of adequate length are inspected, it is apparent that Late 20th Century warming is associated with a well known millennial climate cycle, sometimes termed the Bond Cycle²¹. It is therefore no more surprising that warm years cluster around the recent turn of the 20th century than it is that warm days cluster around mid-summer's day each year.

2. We are already seeing the social, economic and environmental impacts of a changing climate.
This is another misleading motherhood statement. Human societies have always developed, and will always exist, in the context of the impacts of a changing climate. There is no evidence that the recent warming, generally increased precipitation, increased atmospheric carbon dioxide (essential for photosynthesis and plant growth) and longer growing seasons in middle to high latitudes have been anything other than beneficial, and nor is there any evidence that they were human-caused.

With less than 1 degree of warming globally the impacts are already being felt in Australia.

Urbanisation has caused much larger temperature increases (without ill effect) within major cities, where most people reside, than the less than 1^o rise recorded in rural temperature. In any case, outside of urban areas no climate impacts have been documented for Australia that fall outside the range of previous natural climate variation.

In the last 50 years the number of record hot days in Australia has more than doubled. This has increased the risk of heatwaves and associated deaths, as well as extreme bush fire weather in South Eastern and South Western Australia.

Given the less than 1^o C temperature rise, there is no evidence that any of these changes have been dangerous or fall outside natural variation, or have resulted from additional human-sourced carbon dioxide in the atmosphere.

Sea level has risen by 20 cm globally since the late 1800s, impacting many coastal communities. Another 20 cm increase by 2050, which is likely at current projections, would more than double the risk of coastal flooding.

The estimates cited for sea-level rise refer to global average (eustatic) sea-level change. However, the risk of coastal flooding in particular locations cannot be adjudged using this measure; rather, actual local relative sea-level change must be determined from tide gauge data. Thus determined, the rates and directions of sea-level change vary around the Australian mainland coast by magnitudes between -2.05 mm/yr and +4.25 mm/yr²². Accordingly, only one location (King Bay, Dampier) is possibly vulnerable to a rise of 20 cm by 2050, and most of the Australian coastline will experience a rise or fall of sea-level between about 1 and 10 cm, similar to that which occurred over the previous half century. There is nowhere evidence of accelerating sea level rise, and assuming

that a general 20 cm rise will occur by 2050 (requiring a more than doubling of the current rate of global sea level rise) is therefore simply speculation.

Coastal erosion and flooding are a natural consequence of storm surge and wave action, whether or not sea level is changing. Australian society has accommodated the minor coastline adjustments, including both erosion and progradation, associated with the 20 cm global sea level rise since the 1880s without difficulty, and a similar rise over the next century is therefore not alarming. Site specific remedial engineering works, in tandem with sensible and site specific coastal planning regulation, is by far the most appropriate and cost effective way to deal with future sea-level changes.

The Great Barrier Reef has suffered from nine bleaching events in the past 31 years. This iconic natural ecosystem, and the economy that depends upon it, face serious risks from climate change.

Few historic data exist on coral bleaching prior to the three recent decades referred to, but bleaching is now recognized as a widespread phenomenon that occurs in many places and times, including in the past before coral reefs came under intense scientific observation. Modern observation has led to three key conclusions: (i) bleaching episodes are related to regional oceanographic events, (including El Niño events), and also to extended periods of calm that cause unusual surface warming; (ii) reefs can to a degree adapt to bleaching episodes by substituting their photosynthetic symbionts (zooanthellae)²³; and (iii) universally, coral reefs recover from such events within a few years. Corals have evolved over hundreds of millions of years, living through times when water temperatures were warmer and carbon dioxide concentrations were much higher than today. The projected rise in human greenhouse emissions, and ensuing hypothetical temperature rise, do not exceed these past conditions²⁴.

More generally, there is no evidence that the Great Barrier Reef is being affected adversely by climate change, let alone by change of human causation. For example, reef water temperatures remain coupled to El Niño-La Niña events with no sign of an accelerated background warming trend²⁵, and several reef systems around the world, such as those of the Red Sea, flourish in warmer water than exists off the Queensland coast.

3. Human activities – the burning of fossil fuels and deforestation – are triggering the changes we are witnessing in the global climate.

This is an over-confident and over-reaching statement. Undoubtedly human activities have an impact on the local and regional environment. For example, it is known from observation that urbanisation and deforestation change the local radiation characteristics and hydrology of the land surface, thus causing local and regional increase or decrease in temperature. In contrast to these empirical data, the magnitude of any possible global temperature increase driven by “extra” carbon dioxide from fossil fuel burning can only be estimated using computer models, and has never been measured.

A very large body of observations, experiments, analyses, and physical theory points to increasing greenhouse gases in the atmosphere - with carbon dioxide being the most important - as the primary cause of the observed warming.

This statement is untrue and it does not become true by relentless repetition. Water vapour is undoubtedly the most important greenhouse gas in the atmosphere and its concentration changes

naturally. Carbon dioxide is a mild greenhouse gas at present concentrations, and its incremental warming effect lessens with increasing concentration.

Controversy exists over the numerical multiplier to be applied for enhanced levels of carbon dioxide to estimate future global temperature rise (the "climate sensitivity" issue). The IPCC relies on GCM outputs, including a positive water vapour feedback loop, for its estimates of possibly substantial (2.0-4.5° C) warming in response to carbon dioxide doubling. However, the empirical evidence indicates that sensitivity is much lower than this, and generally less than 1° C²⁶. Accordingly any human global temperature effect, whether it be from land clearing, urbanisation or burning fossil fuels, is lost in the noise of natural variation in the climate system.

Increasing carbon dioxide emissions are primarily produced by the burning of fossil fuels, such as coal and oil, as well as deforestation.

The attribution of carbon dioxide additions and subtractions to the atmosphere is a complex issue, and is based upon best-estimates with unaccounted fluxes and attendant large errors. The magnitude of the natural exchange of carbon dioxide between the atmosphere, the biosphere and the oceans is about 20 times greater than the emissions associated with human activities. As well, the human production of carbon dioxide (7.2 Gt/C/yr; IPCC, 4th Assessment Report) is more than four times less than the combined error (32 Gt/C/yr) on the estimated carbon dioxide production from all other sources²⁷. A perspective that follows is that even were human emissions to be reduced to zero, the difference would be lost amongst other uncertainties in the global carbon budget.

Natural factors, like changes in the Earth's orbit or solar activity, cannot explain the world-wide warming trend.

This is another statement that underscores the bias and limited perspective of advice rendered by the IPCC and its supporters. In reality there are manifold ways in which the late 20th century warming trend can be accounted for without substantial human forcing. They include various solar mechanisms²⁸ and changing ocean circulation²⁹, which are poorly known and omitted from the climate models, not to mention the possibility of other forcing factors that are presently unknown or misunderstood.

4. This is the critical decade. Decisions we make from now to 2020 will determine the severity of climate change our children and grandchildren experience.

Emotional and alarmist predictions such as this have been regularly promulgated ever since the statement from the Villach Conference in 1985, and have consistently failed to eventuate. Claims that we have only 10 years in which to take measures against dangerous warming first surfaced in the 1990s, and have been proved wrong by the natural downturn in temperature that occurred subsequently.

Dr James Hansen, in testimony to the US Congress in 1988, and subsequently in peer-reviewed climate papers, made specific predictions of how much the earth would warm if carbon dioxide emissions kept rising unchecked (scenario A), rose more slowly (scenario B), or were strongly curtailed by immediate action taken in 1988 so that the carbon dioxide levels stopped rising by 2000 (scenario C). Despite the fact that human carbon dioxide emissions have risen in line with scenario A, the measured temperature over the last 22 years has not risen as fast as predicted in any of the scenarios, including scenario C³⁰.

Similar statements now resurrected by the Climate Commission are in reality value judgements that rest on discredited economic assumptions (such as unrealistically low discount rates for wealth passed on to future generations)³¹, and are not scientifically driven. Claims are made that “The science is settled”, but model predictions persistently fail to validate against the evolving climate. **The climate models today, although more detailed, are essentially unchanged from their 1980s predecessors and they continue to reflect the same exaggerated sensitivity to carbon dioxide.**

The models therefore provide no evidence for urgency of action to curtail carbon dioxide emissions. Squandering money ineffectively in vain attempts to “stop global warming” will only act to reduce the wealth available for passing down to our grandchildren, and therefore decrease their capacity to adapt to natural climate and other hazards.

Without strong and rapid action there is a significant risk that climate change will undermine our society's prosperity, health, stability and way of life.

The motivation for strong and rapid action to reduce atmospheric carbon dioxide rests solely on the flawed process of GCM computer modelling. History demonstrates that climate will continue to change regardless of human activity. The ability of societies to adapt, preserving their prosperity, health, stability and way of life, will be linked to their resilience and overall economic strength. Wantonly destroying the energy security that is our main source of economic strength can only decrease resilience and increase vulnerability to climate hazards.

A significant risk of societal disruption from natural climate events and change surely exists, but there is no evidence that curtailing carbon dioxide emissions, at huge cost and social disruption, will in any way lessen that risk.

To minimise this risk, we must decarbonise our economy and move to clean energy sources by 2050.

To repeat, the perception of dangerous climate change as a result of burning fossil fuels is based solely on the flawed predictions of rudimentary computer models, and has become grossly exaggerated.

Any move to decarbonise our economy before natural economic adaptation takes place, and before alternative sources are commercially competitive, will be disruptive and economically disadvantageous. National energy security must be a higher priority in the short term than chasing the chimera of human caused climate change.

That means carbon emissions must peak within the next few years and then strongly decline. The longer we wait to start reducing carbon emissions, the more difficult and costly those reductions become.

Carbon dioxide emissions will peak at about the same time that the usage of fossil fuels for energy generation peaks. No number of “musts” based upon a belief in faulty climate models will alter the iron reality that that is not going to happen in the next few years.

In any case, reductions in fossil fuel usage aren't called for, because the hypothesis and predictions of dangerous human caused global warming disagree with real-world observations. Science would likely have dropped the failed theory of anthropogenic warming, and moved on more than a decade ago, were it not for the pervasive and corrosive influence of politics on research funding, and related matters such as vote-trawling based upon environmental sanctimony.

This decade is critical. Unless effective action is taken, the global climate may be so irreversibly altered we will struggle to maintain our present way of life. The choices we make this decade will shape the long-term climate future for our children and grandchildren.

These comments, together with earlier statements, represent unabashed advocacy for the political cause of dismantling modern industrialised economies under the guise of a phantom global warming scare. The statement is an appeal to emotion that ignores rationality and the reality of empirical science.

There are many genuine ways in which political decisions made during this and forthcoming decades can improve the habitability of the Earth, but reducing carbon dioxide emissions is not one of them. Rather, wealthy western nations need to strive to help reduce the genuine environmental footprint of damaging activities such as forest clearing, soil erosion, city development, unsustainable agriculture, fish stock depletion and genuine industrial smokestack pollution (SOX, NOX, particulates, etc.), especially in rapidly industrialising societies. At the same time, and using the money saved from not repeating the futile Kyoto Protocol exercise, we might see if we can better help underdeveloped nations to increase the wealth of their economies (the key to which is cheap energy) in order to liberate the estimated 1.5 billion people who currently lack sanitation, clean water, and basic health and education services.

The opportunity cost of the money and resources intended for allocation towards reducing carbon dioxide emissions runs into trillions of dollars. This is more than enough to deal with the poverty problems of undeveloped countries, as well as to pay for a better standard of living for everyone through more medical research, more geophysical research, better designed cities and improved environmental stewardship all around.

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