Submission on Australia's Post-2020 Emissions Reduction Target

by Des Moore, Director Institute for Private Enterprise, April 24 2015

Introduction

The Australian Government states that it has committed to review Australia's greenhouse gas emissions reduction targets and settings this year. This review is in the context of negotiations for a new global climate agreement to be concluded at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties in Paris in late 2015 (30 November to 11 December). All countries have agreed to propose a post-2020 emissions reduction target well in advance of the Paris conference. Australia will announce a post-2020 emissions reduction target in mid-2015.

The Government has published an Issues Paper outlining the context in which it purports to assess the background against which the Paris conference will occur and it has invited submissions on this target and in particular on the following issues:

- What should Australia's post-2020 target be and how should it be expressed? In responding to this question you could consider the base year (e.g. 1990/2000/2005), the end year (e.g. 2025/2030), the type of target and why the suggested target is preferred.
- What would the impact of that target be on Australia? In responding to this question you could, for example, consider the impact on our economy, jobs, business and on the environment.
- Which further policies complementary to the Australian Government's direct action approach should be considered to achieve Australia's post-2020 target and why?

This submission by the Institute for Private enterprise argues that, because of the extensive uncertainties and questions about the analyses in reports by the Intergovernmental Panel on Climate Change and in earlier government reports, Australia should indicate that it will not submit any target to reduce emissions before a comprehensive inquiry has been conducted into those analyses. Such an inquiry should be undertaken by selected individual climate experts and economists who have *not* previously contributed to analyses in IPCC reports or expressed definitive views on the dangerous warming thesis. It also argues that at the Paris Conference Australia should indicate that any proposed target must be based on an agreement by all major emitters.

The IPE submission at Section A below contains an analysis of the various changes in climate which are commonly used to justify the setting of emissions reduction targets. This analysis argues that the extensive uncertainties and questions about such justifications do not warrant the adoption of government policies designed to reduce emissions. It also rejects many of the assertions and claims made in the Issues Paper itself (see extracts at Section B) and notes that some important deficiencies in those assertions and claims are not included.

The conclusion in this submission is as follows.

"In summary, many uncertainties emerge from a careful assessment of claims that a danger exists of ever increasing temperatures because of usage of fossil fuels by humans. No substance can be established for that claim because no definitive causal correlation can be established between past changes in temperatures and in atmospheric concentrations of CO2. Some past temperature increases are clearly due to natural causes and research shows the version of published temperatures has a significant upward bias. Research also suggests that, as the extent of CO2 concentrations in the atmosphere is much smaller than previously thought, any danger from rising temperatures is much diminished. Once account is taken of naturally caused increases, of the much smaller CO2

concentrations, and of the upward bias, the need for action to reduce fossil fuel emissions disappears. Of course, some argue that precautionary government action should be taken, just as we insure our houses and buildings against damage we know may occur. But the various deficiencies in the dangerous warming thesis suggest any risk that might exist from higher temperatures could be well handled by preventive action by businesses and individuals".

Section A

Analysis of Dangerous Warming Thesis (Update of Quadrant article published in September 2013)

by Des Moore

April 24, 2015

I propose to consider the hypothesis that, unless our governments take urgent action to reduce ever-increasing emissions of greenhouse gases -- usually limited to mentioning only CO2 emissions -- ever-higher temperatures will destroy life and plants, even threaten human existence. No substantive evidence exists to support this dangerous-warming thesis.

My first question is: What is the main difference between the major parties on the supposed global-warming problem? On the surface, very little of substance: both agree Australia should reduce CO2 emissions by 5% by 2020 and produce 20% of energy from sources other than coal, gas or oil.

So why does Tony Abbott threaten a double dissolution if the Senate rejects a carbon tax that could achieve the 5% emissions target, and why does Labor oppose such an abolition?

Remember that Labor wants to abolish the $24 carbon tax from July, 2014, and substitute a price on carbon determined by European countries under their trading scheme. Labor insists carbon **must** have a price and claims Abbott's direct action plan will not achieve the 5% objective. Better to have major Australian corporates pay a quasi tax imposed by foreigners!

As to Abbott, politically his promise to abolish the tax helped get him to where he is today, but the funding for his direct action plan of $3.4 billion will come from tax revenues. That means he is going to have a "quasi carbon tax" -- a weak case for a politically risky double dissolution if it is to be pitted against Labor's scheme.[i] Much is still unclear, so perhaps Abbott can call on support from enough of the eight independents likely in the new Senate to avoid a double dissolution.

Abbott might also take advantage of the fifth IPCC report. Although the IPCC still seems to be sticking to its line that human usage of fossil fuels causes dangerous increases in temperatures, previous dud predictions and acknowledged uncertainties in the science open the way for further investigations in Australia and a review of spending on emissions reductions. [ii]

The Extent of Scepticism

Let me turn now to the widely accepted belief that a large proportion of CO2 emissions from fossil fuels is added to the atmosphere and that the extra heat then radiates back to earth from these CO2 concentrations, causing a temperature increase at the surface of the earth. **Figure 1** shows the strong upward trend in emissions, and below the main offenders -- China and India.

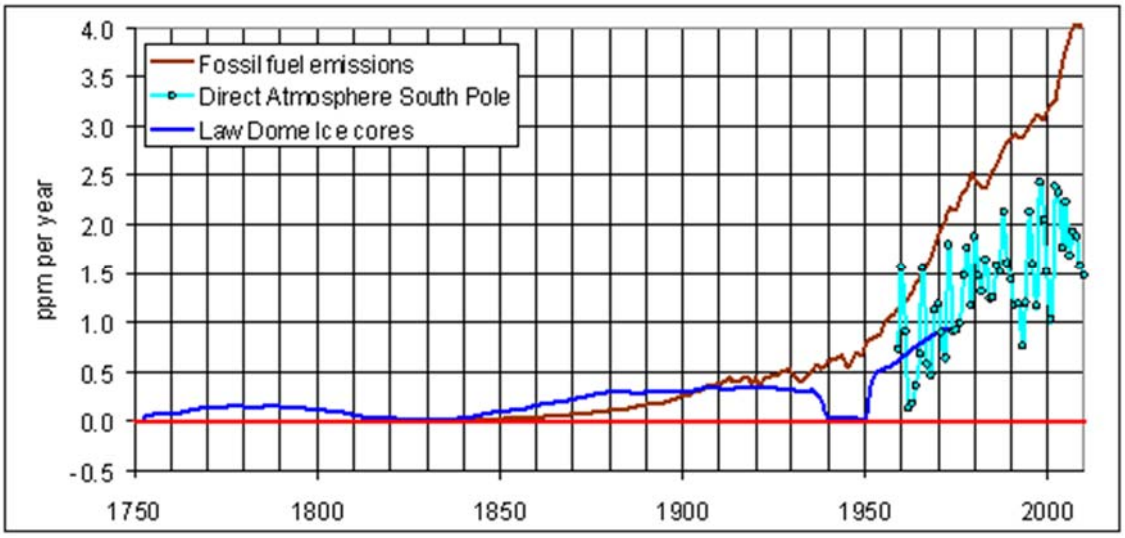
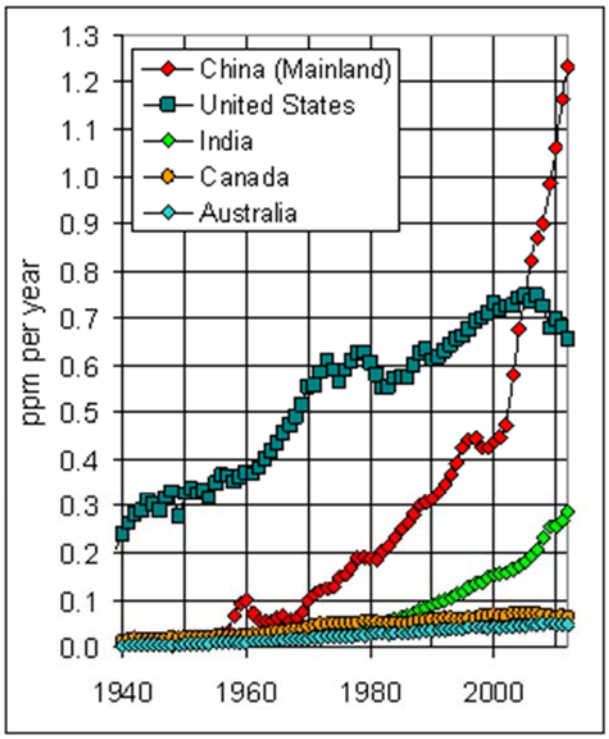
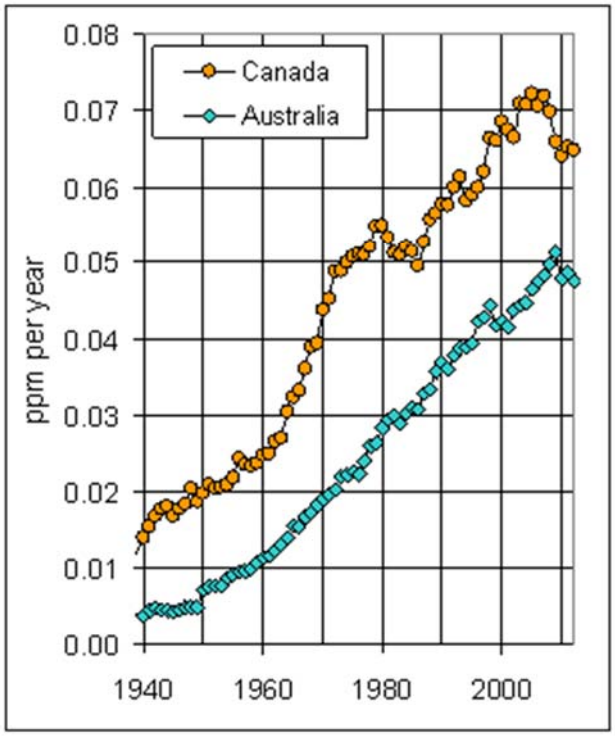


Figure 1: *Annual changes for fossil fuel and cement production emissions (**brown line**), directly measured changes in atmospheric CO_2 concentrations at the South Pole (**light blue line**) and ice core measurements of CO_2 at the Law Dome in Antarctica (**dark blue line**). Sources – Scripps Institute of Oceanography and CSIRO*





But the next step is not so widely accepted. I refer to the proposition that, if governments fails to prevent the increasing usage of fossil fuels, the increasing atmospheric concentrations must lead to danger from ever rising temperatures. True, almost all political leaders, science bodies, international organisations and media outlets seemingly accept this dangerous-warming thesis in one form or another, as does a significant proportion of the community. But since the 2007 report by the Intergovernmental Panel on Climate Change the general public has become more sceptical about the alleged danger.

I cannot begin to outline all the reasons for this increased skepticism, although a major one has been that since 1997 temperatures have hardly increased, despite strongly increased emissions. It cannot be denied, for example, that modeled predictions of temperatures have failed badly. Other reasons include the revelation in the Climategate emails between so-called experts that they are uncertain about the science, and even prepared to manipulate data to produce results that fitted the dangerous-warming thesis. Then we have the scepticism reflected in the refusal of lower-income countries to conclude an international agreement on reducing usage of fossil fuels because they judge continued and extensive use of such fuels as vital to their economic development.

A kind of catch-up has also occurred as sceptical scientists realised the dangerous-warming thesis was being taken seriously politically. Increased publications and commentaries by sceptics led to critical submissions to governments. In Australia in 2010, then-Climate Change Minister Wong even discussed a critique by four respected sceptical scientists, but she did not agree to hold an independent inquiry into the science. Australia's professionally respected Productivity Commission has also expressed sceptical views.

People of importance have publicly locked themselves into accepting the dangerous warming thesis and regard reneging on their views as out of the question. Some fashionistas see the thesis as helping international bodies become the world's peak bodies responsible for protecting the environment. [iii]

Economic Questions

On the economic side, some see eliminating emissions as needed to prevent economic damage from supposedly ever-increasing temperatures. They acknowledge that eliminating the use of fossil fuels will have adverse short-term economic effects in the short term, but argue this should be accepted in the interests of future generations. Also, they insist this needs to happen quickly because, if temperatures increase by more than 2 degrees, there is a body of opinion which says further increases will become self-sustaining and unable to be stopped.

Of course, over an extended period the usage of fossil fuels could doubtless be eliminated and other sources of energy substituted. The possible economic effects are assessed in major 2008 reports commissioned by the previous government from economist Ross Garnaut[iv] and a similar Treasury analysis[v] released by then-Treasurer Wayne Swan and then-Climate Change Minister Wong.

The basic message is that our great-grandchildren would be saved **and** their GDP in 2100 would even be higher than otherwise. After the move to less efficient energy reduces annual growth for the next 50 years or so, there would then be a lift in growth rates and the "the main benefits of mitigation (would) accrue in the 22nd and 23rd centuries and beyond". [vi]

The Garnaut Report did acknowledge that, even if there is no reduction in fossil-fuel usage between now and 2100, there would be no adverse effects on growth. Its non-urgent claim is that "Australian material living standards are likely to grow strongly through the 21st century, **with or without** mitigation"[vii] (my emphasis).

I judge the short-term adverse effects to be understated and the benefits overstated. Climate economist Professor Richard Tol, a former IPCC lead author, estimates the cost of mitigatory action by 2100 would be about 40 times greater than the benefits[viii] But the most important defects are the failure to recognise that nuclear power is already close to being economically efficient and that historical experience suggests continued technological advances will improve the economics of other renewable energy sources. What is the need for urgent action?

Assessing the Science – New Evidence & Doubts about Existing Evidence

As mentioned, the dangerous-warming thesis is based on the widely held belief that a proportion of CO2 emissions is added to the atmosphere and the extra re-radiated heat causes a temperature increase at the surface of the earth. But is there a causal connection between the increasing concentrations and any increase in temperatures? In considering this I draw on important new research by physicist Tom Quirk.

Let me first note that an internationally accepted standard for atmospheric calculation shows that the increases in CO2 concentrations do *not* result in a *commensurate* increase in radiation back to the surface of the earth. In fact, an example calculation shows that if concentrations doubled from existing levels of about 400ppm to 800ppm, there would only be a 10% increase in radiation back to the earth's surface (see the left axis of the graph in **Figure 2).**[ix] [x]

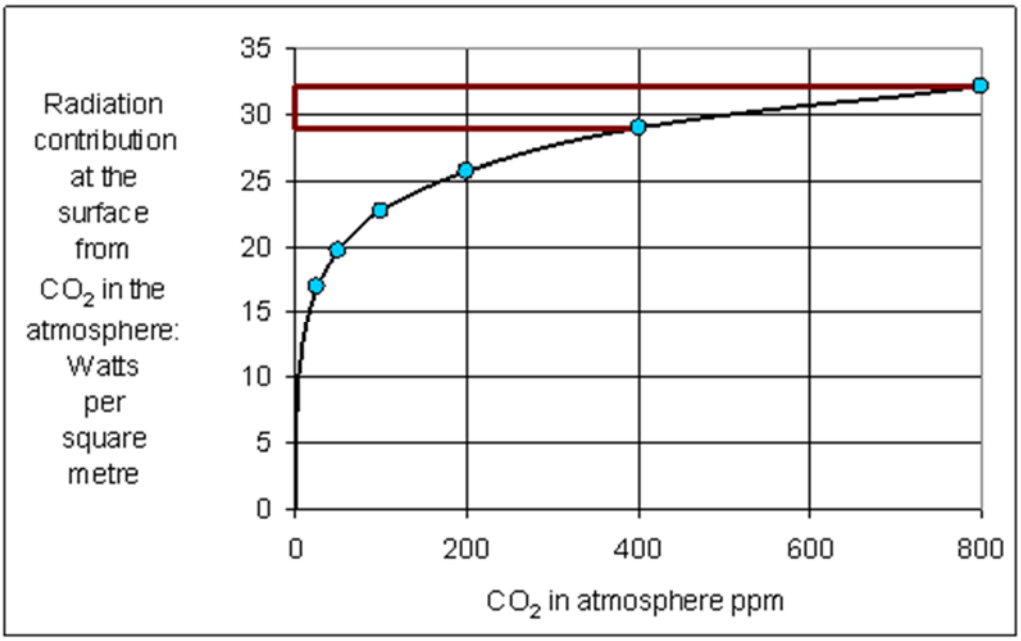


Figure 2: *As the concentration of CO_2 increases, there is increased radiation back to the surface of the earth (the greenhouse effect). This is measured in Watts per square metre (left axis). However the relationship is not linear. In fact doubling the concentration of CO_2 from 400 ppm to 800 ppm only increases the radiation from CO_2 at the surface by some 10% or 3.2 Watts per square metre. (Results derived for US standard atmosphere and cloudless sky from MODTRAN, a University of Chicago on-line calculator of energy in the atmosphere. MODTRAN is an international and IPCC accepted standard for atmospheric calculations).*

The effect of this radiation on temperatures is open to serious debate. Bill Kininmonth, the former head of the Climate Centre of our Bureau of Meteorology, argues persuasively that the evaporation from the oceans (which constitute 70% of the earth's surface) has an offsetting effect on upwards temperatures from radiation. Accordingly, although IPPC modelling assumes there will be a positive effect on temperatures, the evaporation may involve sufficient temperature damping to significantly reduce the temperature increasing from the radiation. This is a major uncertainty about the proposition that we face dangerous warming unless countervailing action is taken.

A further important uncertainty arises from the acceptance by the climate establishment of the estimate that 55 per cent of CO2 emissions from fossil fuels remain in the atmosphere. This estimate reflects an investigation made some 30 years ago on the basis of very limited observations. But important recent research by Tom Quirk suggests that the 55% estimate of concentrations is far too high and it may be only about 16% (see **Figure 3**). If this is correct, it means contribution of fossil-fuel emissions is only a third of what has been assumed in the analysis used by the IPCC. [xi]

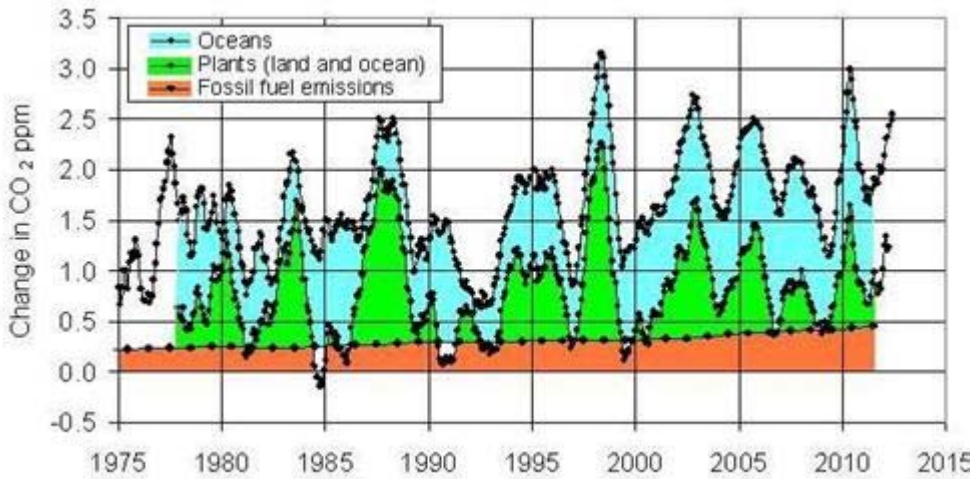


Figure 3: *5 month running averages for total annual CO_2 increases and the* ***l****and and ocean plant component of the annual CO_2 increases assuming □^{13}C = -26 for land. Also 10% of global fossil fuel and cement production emissions making up 19% of the average annual increase in CO_2 (Source CDIAC*

It is important also to examine what might be termed supporting evidence.

Temperatures and Concentrations of CO2 – More New Evidence

Moving to the relationship between temperatures and emissions, look first at **Figures 4, 5 and 6**.

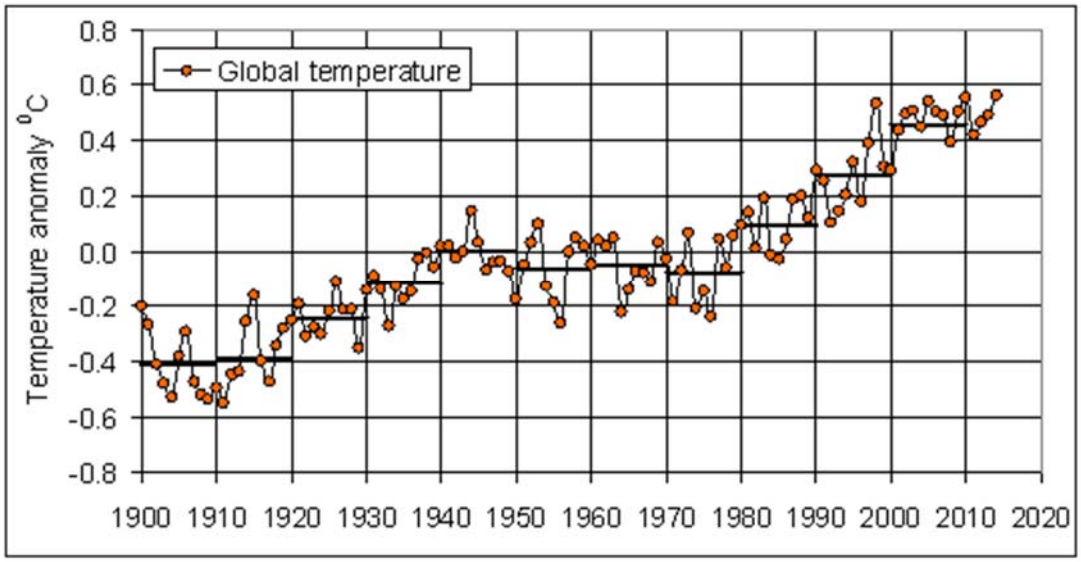


Figure 4: *Annual global temperatures from the Hadley Centre and the Climate Research Unit of the University of East Anglia (CRU). Here solid lines show ten year averages. Note the loss of detail in ten year averages such as the 1997-98 El Nino. (Source Hadley-CRU 2015)*

Figure 4 shows both annual averages and ten year averages for *global* temperatures from 1900 as published by the Hadley Centre of the UK's Met Office and used by the IPCC. This demonstrates the considerable climate variations from year to year[xii] but it is not easy to detect the major change-points indicating changes in the trend.

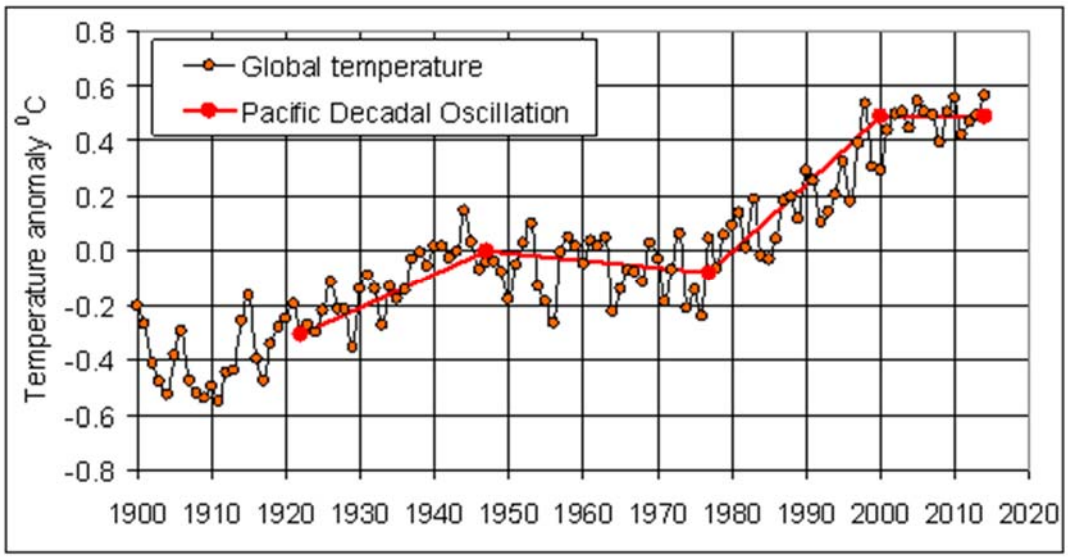


Figure 5: *Annual global temperatures from the Hadley Centre and the CRU. Here solid lines show ten year averages. The* ***red points*** *mark the phase changes of the Pacific Decadal Oscillations.*

However **Figure 5** shows major red dot points in the annual global temperatures and this statistical analysis shows major change points in the early 1920s, late 1940s, mid 1970s and late 1990s.

Figure 6 (below) shows for *Australia* annual averages from 1910 as published by our Bureau of Meteorology with its supposedly high quality data. This Figure has a black line showing a major change point in the mid 1970s. The jump then in Australian temperatures of about 0.3 of a degree reflects an ocean temperature change known as the Pacific Decadal Oscillation.

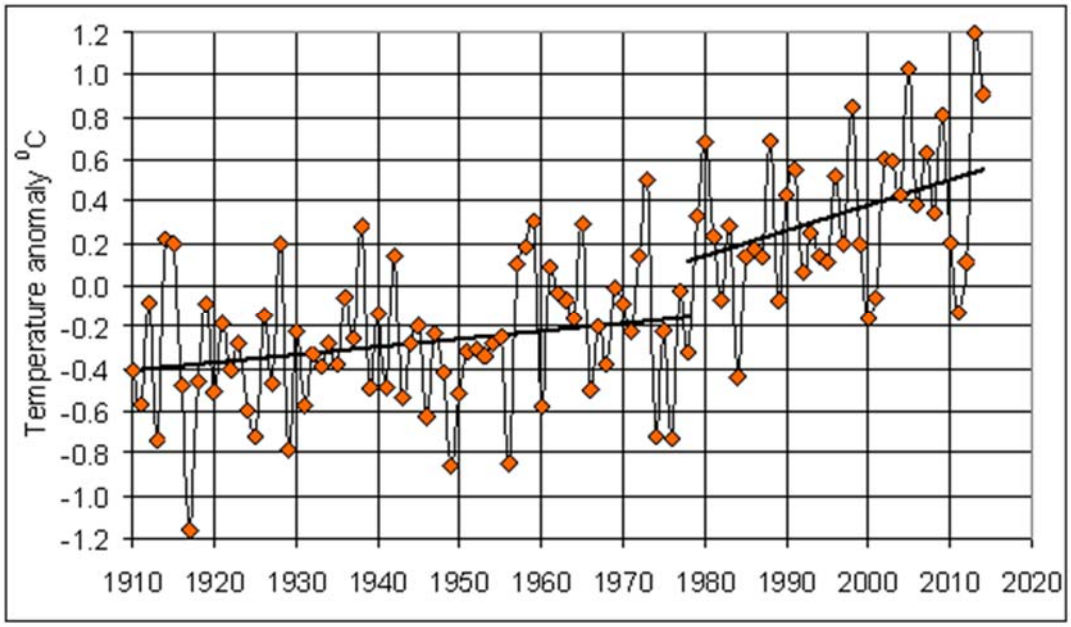


Figure 6: *Annual Australian temperatures from the Bureau of Meteorology (BOM) high quality data series. The break and jump in the solid lines of 0.3^{0}C is a consequence of the Pacific Decadal Oscillation moving from a cool to a warm phase, often called the Great Pacific Climate Shift of 1976-78 that is also reflected in the global temperature.*

This Pacific Decadal Oscillation effect is important because it reflected *natural* causes arising from a sudden replacement of cold water with warm water along the western Pacific coast of the North Americas. That had no causal connection with fossil fuel emissions.

This analysis suggests about half of the published temperature increase over the past 100 years of about 0.8 of a degree reflected natural causes, *not* increased emissions of fossil fuels.
Figure 7 allows a comparison of changes in concentrations with the changes in temperatures shown in **Figure 5.** The lack of any continuing connection between the two seems obvious.

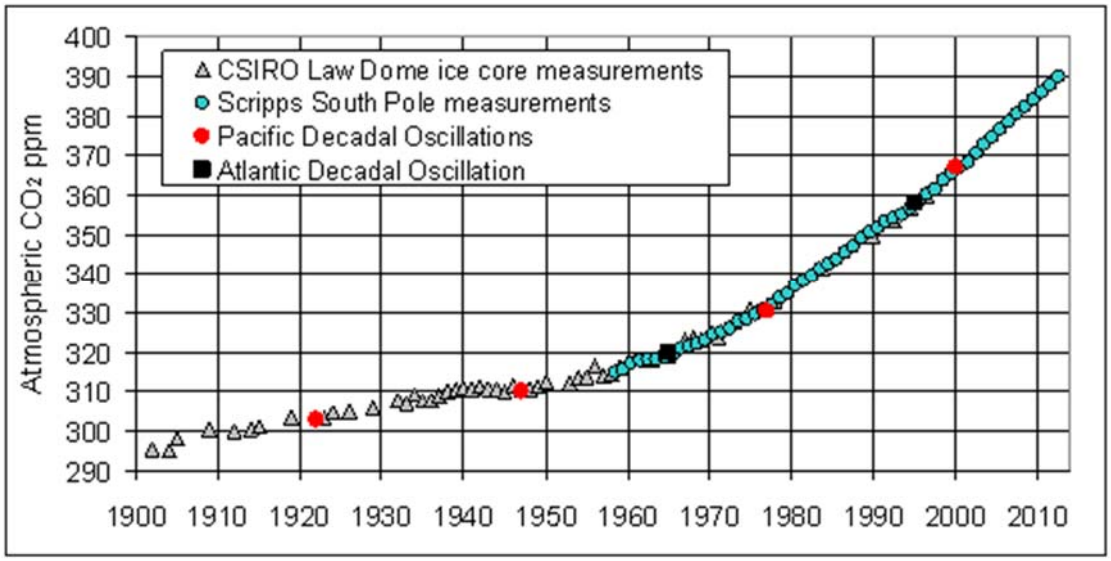


Figure 7: *Atmospheric CO_2 concentrations measured in ice cores at the Law Dome in Antarctica (CSIRO) and directly at the South Pole (Scripps Institute of Oceanography). The* ***red*** *and* ***dark blue points*** *mark the phase changes of the Pacific and Atlantic Decadal Oscillations including a probable change in 2000.*

This leads to **Table 1** summarising these changes in the different periods. First, there have been two periods during which temperatures were relatively stable but CO2 concentration levels increased quite strongly (except for a brief period in the 1940s). Those two periods are from 1948 to 1976 and from 2001 to the present. Second, the period from 1977 to 2000 shows both temperatures and CO2 concentration levels increasing. This is the period when the Pacific Decadal Oscillation clearly made a major contribution to the temperature increase.

Table 1: Variations in temperature and atmospheric CO_2

PERIOD	Pacific Decadal Oscillation Phase	Global Temperature ^{0}C increase per 10 years	CO_2 at the South Pole Annual increase in ppm
1922 - 1947	Warm	0.13 +/- 0.02	0.40 +/- 0.03
1948 - 1976	Cool	-0.02 +/- 0.03	0.85 +/- 0.03
1977 - 2000	Warm	0.16 +/- 0.03	1.49 +/- 0.01
2001 - 2014	Cool?	0.02 +/- 0.03	1.93 +/- 0.03

Third, only the 1922 to 1947 period suggests a possible causal connection between changes in concentrations and temperatures. But **Figure 7** shows that period had only a small increase in concentrations.

Considering all this analysis, how can there be any definitive conclusion that a causal correlation exists between changes in temperatures and changes in CO2 concentration levels?

Accuracy of Temperatures, Comparisons with the Past and Modelling of the Future

Other reasons for questioning any definitive conclusion include serious doubts about the accuracy of the temperatures published by official agencies and used by the IPCC. These published temperatures are calculated by averaging only the minimum and maximum recorded for the day. But if the daily

averages are calculated more properly by averaging temperatures *every 30 minutes* a vastly different picture emerges.

Such data is available back a few years and Tom Quirk has done the calculation for 101 days in March to June 2013 in two locations **(see Figure 8)**.

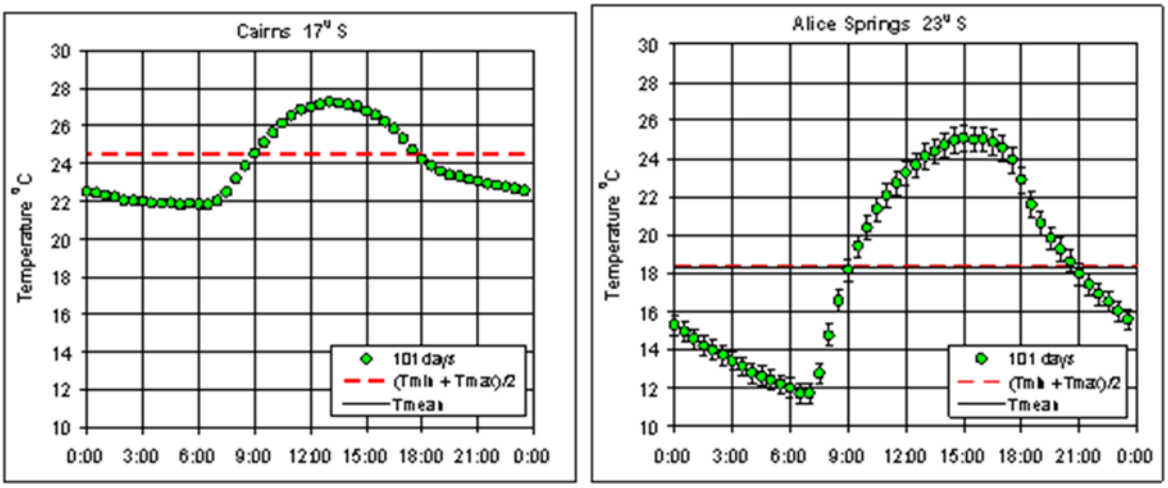
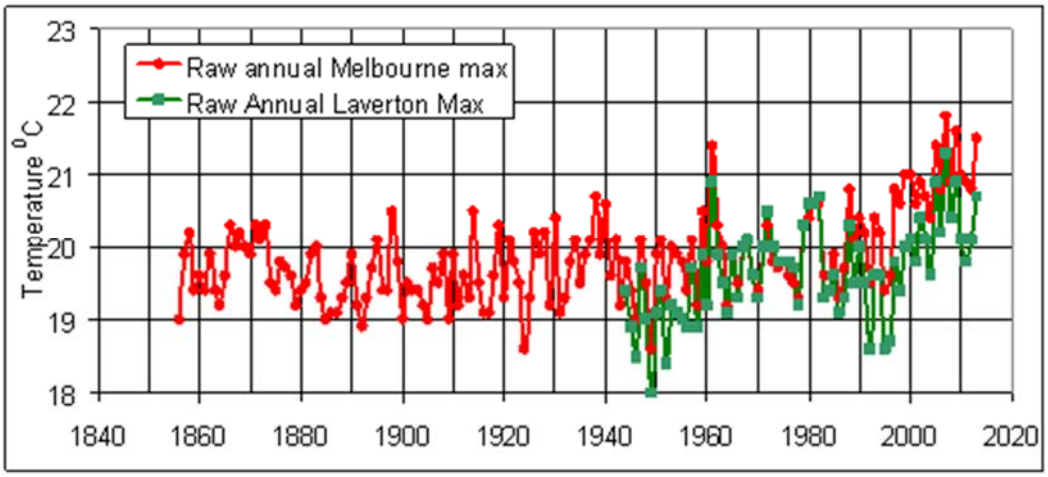


Figure 8: *Temperatures measured at 30 minute intervals through a 24 hour day.*

For a location on the east coast (Cairns), the result is an average markedly lower than the *published* average. In short, the existing maximum and minimum method of calculating averages produces a systematic upward bias, probably as much as 0.3-0.4C of a degree. [xiii]

If Australian published temperatures have an upward bias so too will any modelling of our future temperatures. These systematic errors also apply to other continents where maximum and minimum thermometers are used for land temperatures[xiv].

Another upward bias in published temperatures arises from failing to take account of the urban heat island effect. In urban areas temperatures recorded include the effect of heat retained by buildings. Tom Quirk has tested this by comparing the Bureau of Meteorology recording site in Melbourne with that at Laverton for the period from 1940 to 2010 **(see Figures 9-10)**. Given the commonalities apart from buildings, urban heating is clearly the main reason for the significantly larger increase in the minimum recorded for Melbourne.



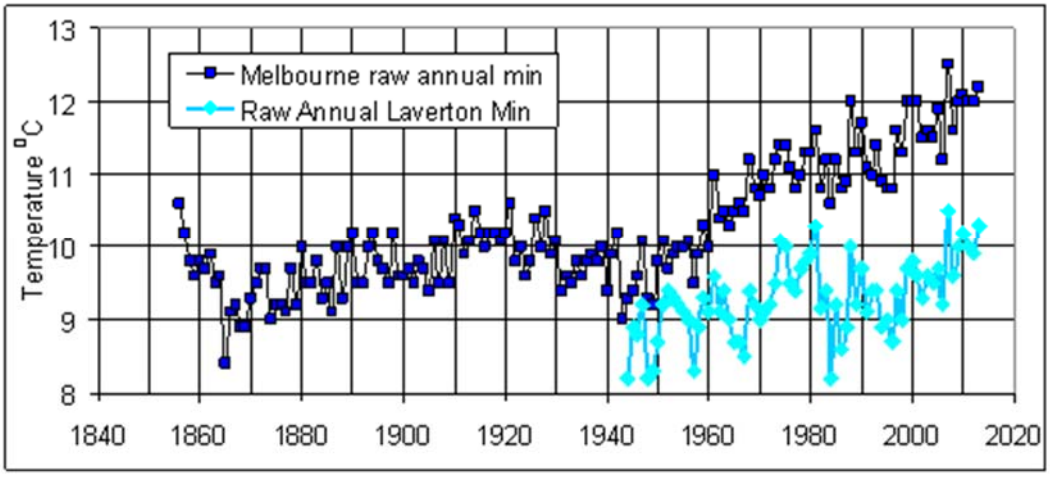


Figure 9: *BOM records of direct maximum and minimum temperatures at the BOM office in central Melbourne and at Laverton airport*

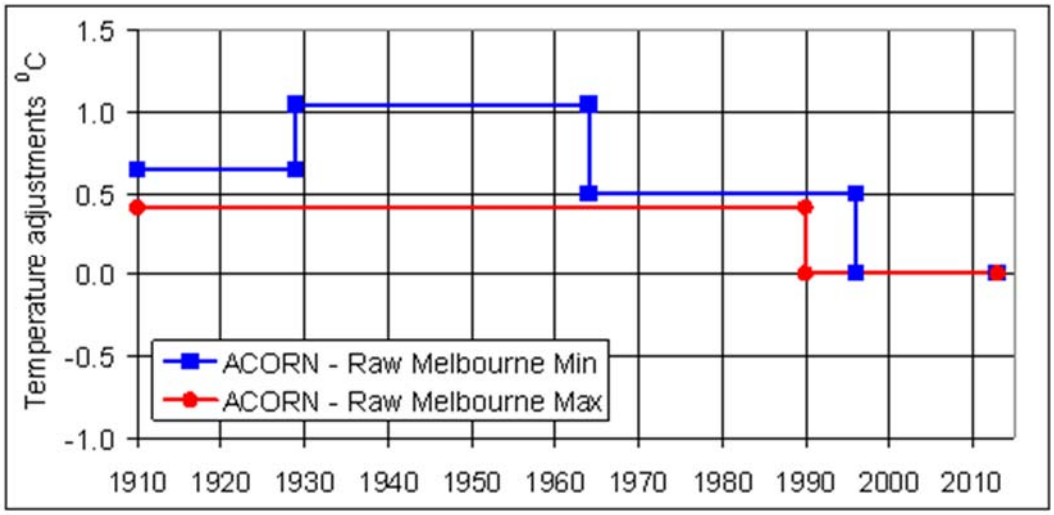


Figure 10: *Adjustments made to the direct BOM Melbourne office temperature records to give "high quality" BOM temperature records.*

However the BOM's published temperatures appear to make no allowance for the effects of urban heating and there also appear to be other upwards bias influences in its published data. In fact the adjustment in 1990 for the maximum temperature is a "correction" due to two fifteen story buildings blocking cooling winds in the summer!

But what about the oft-made claim that temperatures are higher now than they were a century ago? As soon as August finished we were told that Australia's eastern coast had experienced the highest winter temperature since 1910. Yes indeed, our 2013 winter temperature was 0.03 higher than in 1973 – clearly a signal of danger!

Temperature records such as this do not establish a need for government action. The test is whether a causal relationship exists between increased CO2 concentrations and increased temperatures – and whether published data are correct.

What is the most credible conclusion about the total published temperature increase of around 0.8 of a degree over the last century? My view is that about half is incorrectly calculated and the other half reflects natural causes.

Bear in mind also that humans experienced higher temperatures than now during the Medieval Warming Period (about 800-1,100AD), and also during the Greco-Roman warm period (600 BC - 200 AD), when fossil fuel usage in both would have been very small.

Finally on temperatures, have a look at the very extensive modelling undertaken by the IPCC **(Figure 11).** None of the many predictions has coincided with actual published temperatures. This is another illustration of the problems with the so-called "science" used by the IPCC.

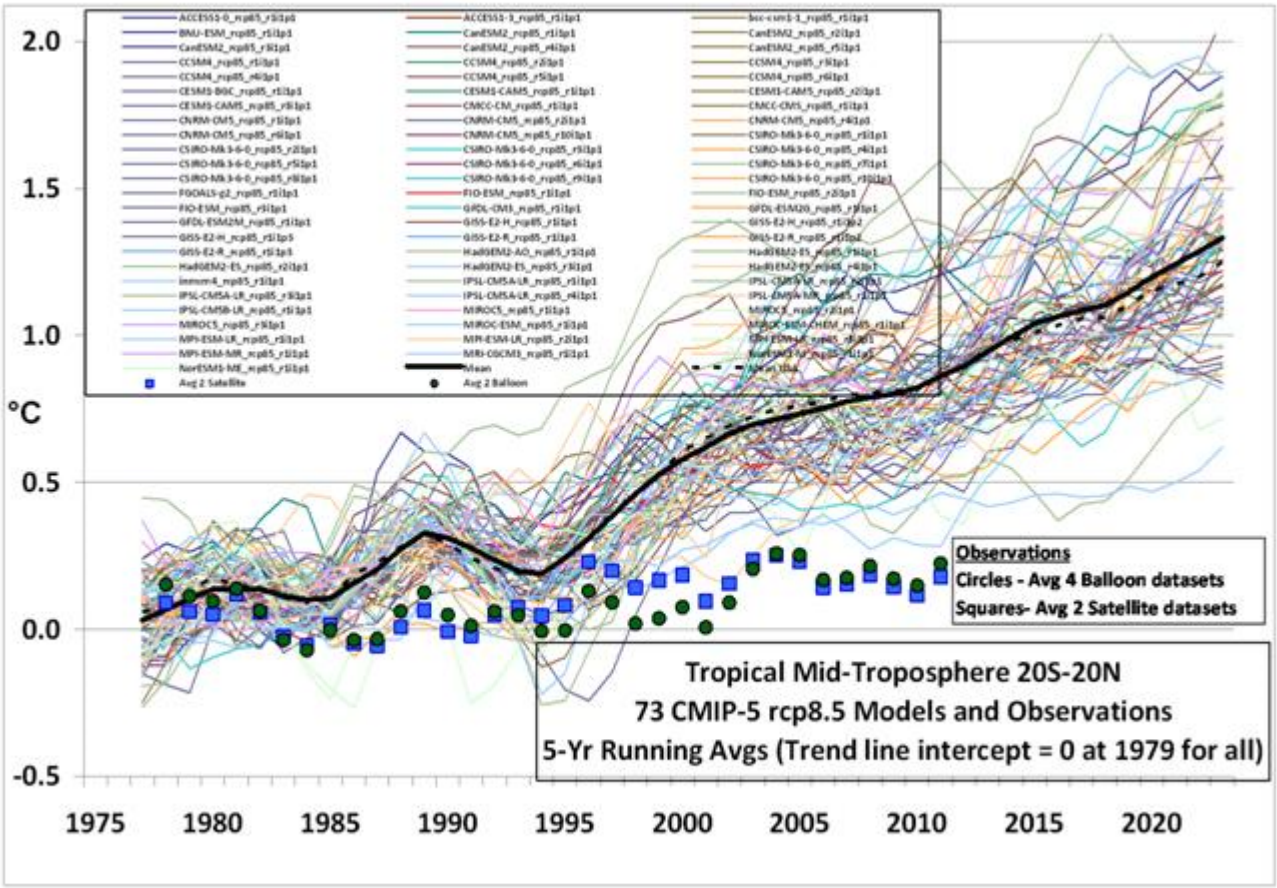


Figure 11: *A comparison of modelled and measured temperatures by Roy Spencer, University of Alabama at Huntsville. The continuous solid line is the average of 73 model projections. The green circles and blue squares are balloon and satellite measurements.*

Other Greenhouses Gases

Figures 12 and 13 show a sharp increase in the contribution of methane gases to atmospheric concentrations between 1940 and 1980 and then a subsequent sharp drop. The CSIRO-BOM State of the Climate report, published in 2010, asserted that methane has shown similar increases to carbon dioxide. But both the rise and fall reflect initial leakages from pipelines and the subsequent fixing of those leakages. This is just one of many examples of the failure of the CSIRO to properly identify events which influence climate – and those that don't.

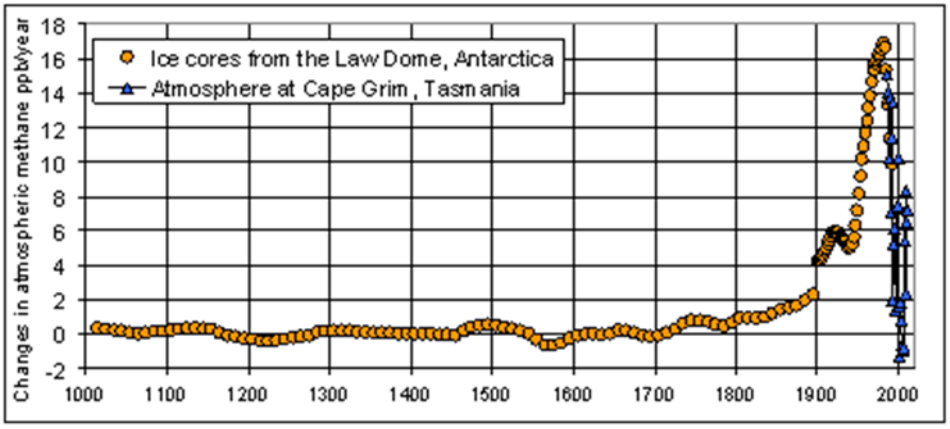


Figure 12: *Ice core and direct measurements of atmospheric methane. Data source CSIRO*

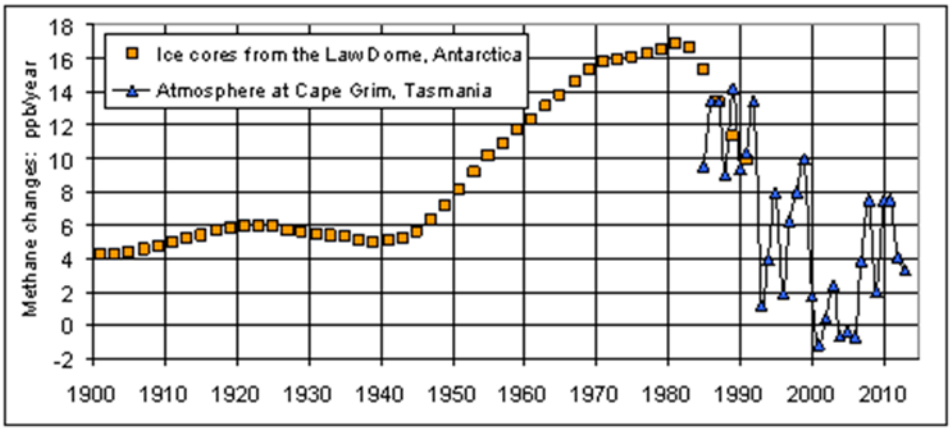
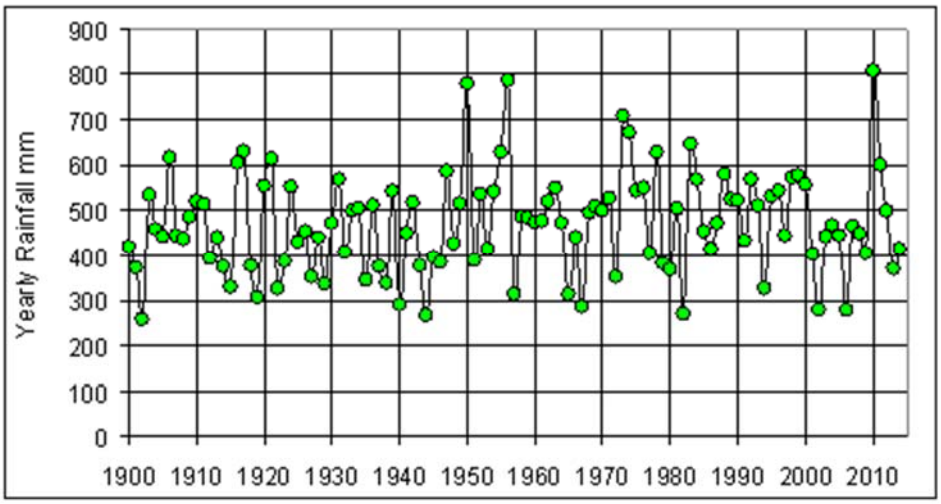


Figure 13: *Ice core and direct measurements of atmospheric methane from 1900. The peaks in the direct measurements correspond to El Ninos with the exception of 1992 which is an indirect result of the Mt Pinatubo eruption. Data source CSIRO*

Droughts and Rainfall

Another part of the dangerous warming scare is that below average rainfalls and droughts are a sign that higher temperatures and more droughts are on the way. But past Australian droughts occurred when global temperatures were lower than now and wet years occurred when such temperatures were rising. Annual rainfall records for the Murray Darling Basin **(Figures 14 and 15)** do not suggest any threat from persistently lower rainfalls or that there is a close connection between changes in average temperatures and in rainfalls.



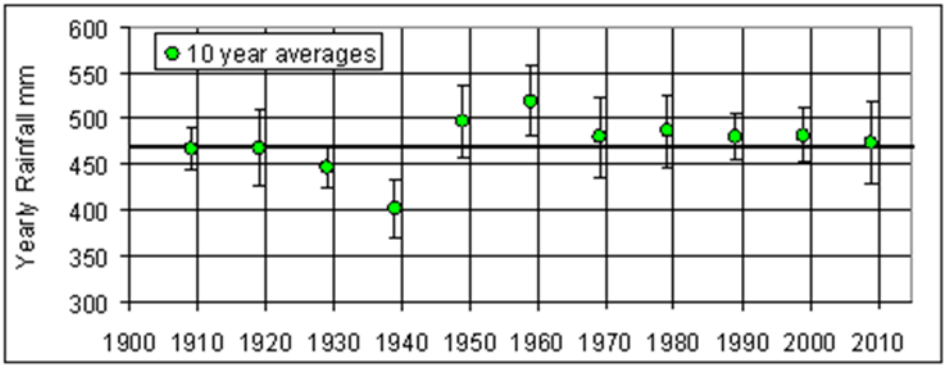


***Figure 14: Upper**: Yearly and **Lower** 10 year average rainfall in the Murray-Darling Basin. Mean value (solid line) and median are 471 mm. There is no significant trend in rainfall through this period but with large variability- standard deviation of 111 mm with rainfall extremes of a minimum 258 mm and a maximum of 809 mm in 2010*

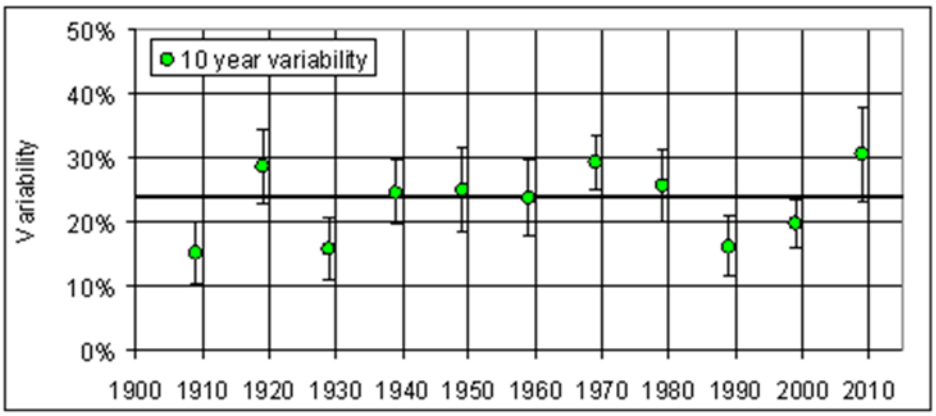


***Figure 15:** Murray Darling Basin variability. Variability is the rainfall standard deviation divided by mean rainfall for 10 year periods. Solid line is the overall variability of 24%.*

Antarctic and Arctic Ice Sheets –Sea Levels and the Reef

Another warming scare relates to supposed meltings of ice and resultant damaging increases in sea levels. But satellite measurements of sea levels from 1994 (**Figure 16**) show that a continuation of the average rate of increase since then hardly signal danger and would allow most sea-side property owners to take appropriate preventive measures. [xv]

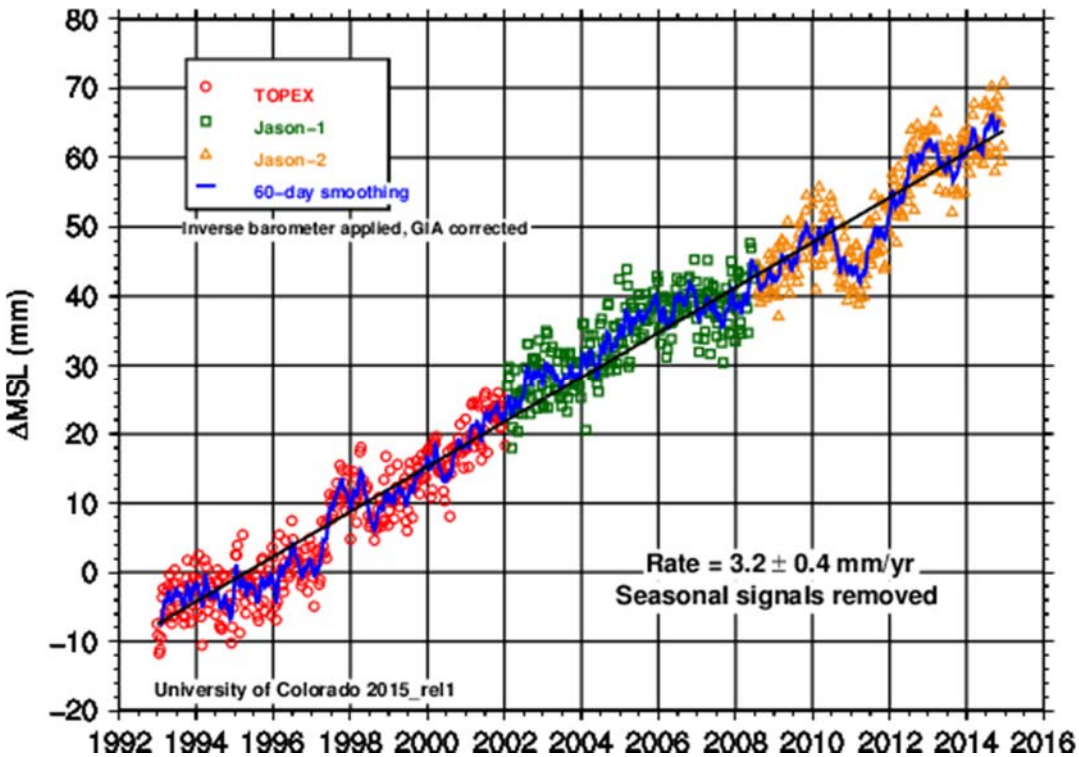
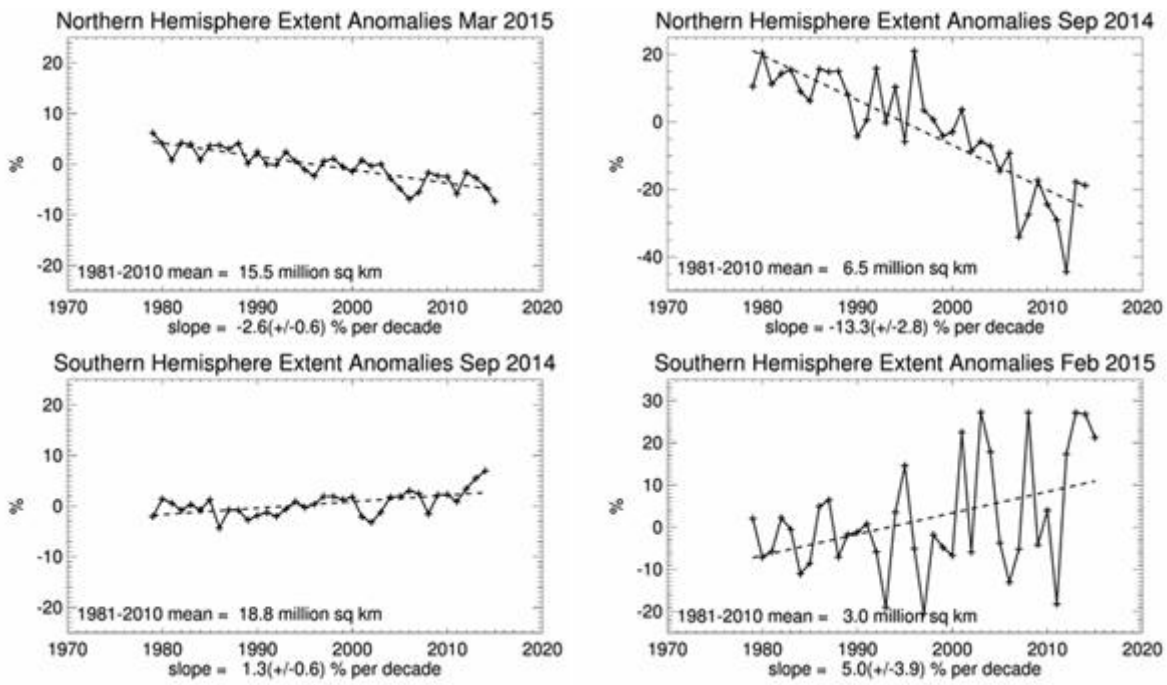


Figure 16: *The global mean sea level graph was made using satellite altimetry and processed by the University of Colorado at Boulder. Note that the rate of increase is 3.2 +/- 0.4 mm/year for1992 to 2012 but falls to 2.6+/- 0.3 mm/year for 2002-2012. If the rate of increase continues at about 3 mm a year, sea levels would reach about 30 cm in 2100. That is consistent with the IPCC's projection of 19-59 cm by 2100 and would not involve any significant inundations.*

As to the Arctic **(Figure 17)**, while there is a downward trend in ice extents, recent reports indicate that a re-icing is now in progress and extensive Arctic meltings have occurred in the past when CO2 emissions were very much lower.[xvi] Meltings in the Arctic have no effect on sea levels because the ice there is already in the sea.

As to the Antarctic, the total ice area there has been increasing and temperature readings since 1955 at Mawson Bay on the Antarctic coast indicate a long term trend of cooling at a rate of 0.9C per 100 years. The Antarctic ice mass, which has existed for an estimated 21 million years, is preserved by a cold wind-driven current which circulates it and is refreshed by upwelling cold water from the deep. This cold circumpolar current prevents warmer subtropical water from the north reaching Antarctica and causing melting.



Maximum Minimum

Figure 17: *Arctic and Antarctica ice extent. The maximum extent occurs in March in the Northern Hemisphere and in September in the Southern Hemisphere, summer minima occur in September and February. The Northern Hemisphere ice extent is decreasing with reducing maximum and minimum extent. Note that the slopes for the fitted straight lines give the change per decade.*

Data from National Snow and Ice Data Center: http://nsidc.org/data/seaice_index/

Turning to the Great Barrier Reef, a major concern relates to possible bleaching caused by global warming. However, most of the reef recovered from the bleachings of 1998 and 2002 and any action by Australia to reduce emissions would not help there unless there is an effective international agreement by major emitters.

Possible Errors in Estimated Influences on Warming/Cooling

The foregoing has suggested possible errors in analysis but did not refer to the wide margins of error applying to the estimates compiled by the IPCC of the ten various possible warming and cooling influences on temperatures. These are important because the combined effect of the various influences determines what the IPCC decides is their total effect on temperatures.[xvii] (**Figure 18**) shows that the estimated total of these influences adds to 1.6 watts per square metre, with an error margin ranging from 0.6 to 2.4 watts. This estimate is not included here in order to comment on the various influences but to illustrate the very wide potential for error.

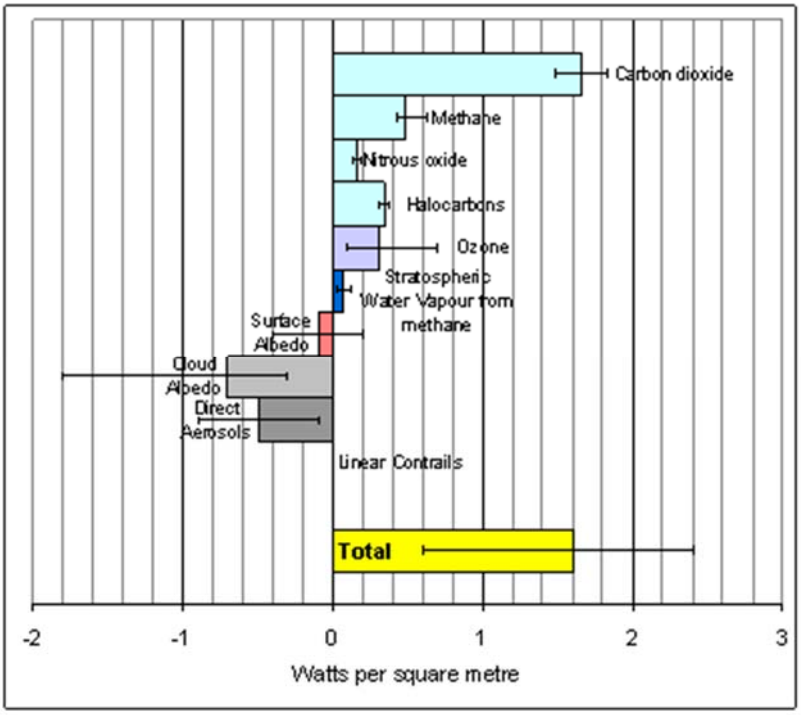


Figure 18: *Radiative forcing from various sources. The error bars show the uncertainty for each source. The total is described by the IPCC as "the global average net effect of human activities since 1750 has been one of warming, with a radiative forcing of +1.6 [+0.6 to +2.4] W m^{-2} (see Figure SPM.2)". [IPCC-AR4 2007 WG1 Fig SPM.2]. Note the large uncertainties for aerosol and albedo forcing.*

Conclusion

"In summary, many uncertainties emerge from a careful assessment of claims that a danger exists of ever increasing temperatures because of usage of fossil fuels by humans. No substance can be established for that claim because no definitive causal correlation can be established between past changes in temperatures and in atmospheric concentrations of CO2. Some past temperature increases are clearly due to natural causes and research shows the version of published temperatures has a significant upward bias. Research also suggests that, as the extent of CO2 concentrations in the atmosphere is much smaller than previously thought, any danger from rising temperatures is much diminished. Once account is taken of naturally caused increases, of the much smaller CO2 concentrations, and of the upward bias, the need for action to reduce fossil fuel emissions disappears. Of course, some argue that precautionary government action should be taken, just as we insure our houses and buildings against damage we know may occur. But the various deficiencies in the dangerous warming thesis suggest any risk that might exist from higher temperatures could be well handled by preventive action by businesses and individuals".

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[i] Of course, the elimination of the carbon tax will reduce costs but with *direct action plan capped at $3.4 billion over four years it raises doubts as to whether the 5% reduction in emissions will be achieved. That plan was outlined i*n an article published in the AFR on 3 September, 2013 by the then Shadow Minister for Climate Action, Greg Hunt. He said this could include "programs to support the uptake of solar energy and the re-vegetation of our land" and "may be a mix of energy efficiency, cleaning up waste coal mine gas, cleaning up power stations, and landfill gas. It may be reafforestation of marginal lands or revegetation or improvement of soil carbon". It appears that it will also include *government funding of incentives to encourage the private sector to invest in projects*

designed to reduce emissions, with bids invited for such projects and the lowest cost bids receiving some funding.

[ii] The assessment that the initial or "transient" increase in temperatures is "extremely unlikely" to be greater than 3 degrees if governments take no countervailing action is an improvement on the conclusion in the 2007 report that it was "very likely" temperatures would reach up to 3.5 degrees. It arguably removes the need for urgent government action.

[iii] For example, the United Nations program, AGENDA 21 was established at the UN 1992 Earth Summit in Rio at which Chairman Maurice Strong said from the chair "*Isn't the only hope for the planet that the industrialised civilizations collapse? Isn't it our responsibility to bring that about*?" Representatives of the Keating Government voted for its implementation at the Earth Summit, known as the Rio Declaration in 1992. It was also subsequently supported by the Howard Government and progressively implemented to different degrees by subsequent federal and state governments and municipal councils of all political persuasions. Agenda 21 does not officially form part of the policies of either major party but has the objective of having the environment regulated by an international body. It includes a blueprint for forcing populations to live in high density "human settlements" and for abolishing private property rights.

[iv] The Garnaut Climate Change Review Final Report, 30 September 2008

[v] *Australia's Low Pollution Future: The Economics of Climate Change Mitigation, 30 Oct 08.*

[vi] Garnaut Report p249

[vii] Ditto p565

[viii] "*Climate folly before failure", Alan Wood, The Australian, 1 Oct 09.*

[ix] The graph shows an increase in the level of radiation of only about 3 watts per square metre – from 29 to about 32 watts

[x] This *analysis comes from an online calculator of energy in the atmosphere (MODTRAN) and, as indicated, it provides an internationally accepted standard for atmospheric calculation.*

[xi] By way of background, it should be noted that CO2 emissions into the atmosphere are continuously exchanged with sources and sinks in the ocean and on land. That is, there are various sources of emission and absorption. In fact, the overall CO2 imbalance is only 1-2 per cent of the annual atmosphere-land-ocean exchanges of CO2. In the ocean CO2 is absorbed and dissociated in water and it is also removed by ocean plant life, like phytoplankton. The amount of CO2 exchanged (absorbed or emitted) with the oceans varies with water temperature: the higher the water temperature, the less CO2 is absorbed or the more is emitted and conversely for a lower water temperature. Also, the behavior of oceans varies. There is absorption taking place in the North and South of the Atlantic and Pacific oceans whereas the tropical oceans are emitters of CO2. Overall, the oceans are net emitters of CO2. For the land the sources of CO2 emissions are plant decay and fossil fuel usage. The sinks are plants that with photosynthesis absorb CO2, with the extent of absorption by forests being very high: they are net absorbers of course.

[xii] Including from El Ninos.

[xiii] For example, a 10 minute 1degree fluctuation that increased the temperature would give a 0.5 degree increase in the average calculated by the maximum and minimum method whereas it would

only give an increase of 0.01 degree in the average calculated by taking temperatures every 30 minutes.

[xiv] A*s ocean temperatures are measured in a quite different manner, this means there are additional systematic uncertainties when land and ocean temperatures are combined to give a global temperature.*

[xv] The 2007 IPCC report predicted an increase in average global sea levels to 2100 ranging between 18 and 59 cms (about 2 feet). The satellite measurements of sea levels from 1994 show an increase of about 3mm a year or 20cms by 2100.

[xvi] *Canada's North West passage has in fact been navigated in periods when fossil fuel usage was low*

[xvii] According to the IPCC, this estimate of 1.6 watts explains the temperature increase since 1750.

Section B - Extracts from Issues Paper

A strong and effective global agreement, that addresses carbon leakage and delivers environmental benefit, is in Australia's national interest. The latest climate information from the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Bureau of Meteorology indicates that Australia has warmed by 0.9°C since 1910, with most of the warming since 1950. There has been a rise in sea levels of about 20 centimetres over the past century, increased ocean acidification and a shift in rainfall patterns.[i]

Australia's climate will continue to have high variability. Nevertheless, average temperatures are projected to continue to increase and extreme rain events are projected to become more intense. Average rainfall in southern Australia is projected to decrease.[ii]

Australia is taking strong action on climate change. Between 1990 and 2014 the economy nearly doubled in size and our population grew strongly, while greenhouse gas emissions remained broadly the same. Australia's emissions per capita have reduced by 28 per cent since 1990 and by 20 per cent since 2000 and emissions per unit of gross domestic product have fallen by 52 per cent since 1990 and by 35 per cent since 2000.

The Australian Government is committed to achieving a five per cent reduction on 2000 emissions levels by 2020. This target is equivalent to a reduction of 13 per cent below 2005 emissions levels and a 19 per cent reduction from projected business as usual emissions.[iii]

The Government's focus is on taking direct action, including through the $2.55 billion Emissions Reduction Fund, which is a market-based scheme. Actions by state and local governments, business, farmers and the broader community are, and will continue to be, critical to Australia's climate efforts.

International efforts to address climate change

Australia plays a constructive role in international climate change efforts. Since its formation in 1992 the UNFCCC has been an important forum for countries to cooperate on climate change. Australia was one of the first countries to join the UNFCCC and it now has almost universal membership. In 1997 Australia, alongside other countries, adopted the Kyoto Protocol which established binding emissions reduction targets for developed countries.

Australia performed well over the Kyoto Protocol's first commitment period (2008-2012). During that time Australia's emissions were limited to 103 per cent of 1990 levels, which was considerably less than Australia's target of 108 per cent. Australia's target under the second commitment period, which began in 2013 and ends in 2020, is 99.5 per cent of 1990 levels. Australia is on track to meet this target, which is consistent with our UNFCCC target of a five per cent reduction on 2000 emissions levels by 2020.

The Paris Agreement

Australia is working with the international community to conclude a new global climate agreement at the Paris conference. The Paris Agreement will set out how countries will tackle climate change after 2020, when current emissions reduction commitments under the UNFCCC and Kyoto Protocol lapse.

Commitments by all countries to reduce or limit their greenhouse gas emissions are needed to make a genuine impact globally. To do this, the Paris Agreement must encourage full participation and commitments to take serious, coordinated action from all countries. Australia, together with all UNFCCC Parties, has agreed that new commitments should be appropriate to countries' national circumstances so these can work alongside plans for strong economic growth, jobs and development.

Australia's national circumstances

In setting their post-2020 emissions reduction targets, all countries will consider what would represent a fair and appropriate contribution to tackling climate change in light of their particular national circumstances. Compared with other developed countries, Australia has stronger economic and population growth, and our economic structure is different. Our resource and agricultural industries represent a significantly larger share of national economic output. These factors affect the emissions intensity of our exports and economy. This is putting upwards pressure on our greenhouse gas emissions, in particular:

- The economy is projected to grow approximately 17 per cent over the five year period 2014 to 2019 (or at an annual average of about 3.3 per cent)[iv], compared to around 12 per cent (or an annual average of 2.4 per cent) for other advanced economies.[v]
- Australia's population is growing more quickly than comparable countries, at around 1.6 per cent in 2014.[vi] The average annual rate of population growth in the developed world was around 0.4 per cent over the period 1980-2013 and this is projected to decline further over the coming decades.[vii]
- Coal accounts for nearly 60 per cent of our total primary energy supply, against an average in other developed countries of 20 per cent.[viii]
- 95 per cent of Australia's energy consumption comes from fossil fuel sources[ix], compared to an OECD average of 81 per cent.[x] This is primarily the result of Australia's abundant energy and mineral resources and limited scope to harness hydroelectricity.
- In 2013, iron ore and concentrates, coal and natural gas made up around 40 per cent of Australia's exports at a value of around $124 billion.[xi]

For the foreseeable future, Australia will continue to be a major supplier of crucial energy and raw materials to the rest of the world, especially Asian countries. At present, around 80 per cent of the world's primary energy needs are met through carbon-based fuels. By 2040, it is estimated that 74 per cent will still be met by carbon-based sources because of growing demand in emerging economies.[xii]

Australia's action on climate change

Australia will continue to play its part to tackle climate change. A new target will build on current efforts and policy, including direct action through the $2.55 billion Emissions Reduction Fund.

Research, development and deployment of new technologies will underpin global emissions reductions. Australia has long supported the development of alternative energy sources as part of Australia's energy mix and has invested heavily in the development of both renewable energy supply and low-carbon technologies. The Australian Government is providing $588 million for low emissions fossil fuels programmes. Collectively these are designed to support a range of low emissions technologies, including carbon capture and storage (CCS) demonstration projects. Other important initiatives include the Government's investment of over $1 billion in 200 projects across a range of renewable energy technologies. The Australian Government will continue working with industry to promote research and development of new technologies to reduce emissions from carbon-based energy production.
Across Australia all levels of government, business, farmers and the broader community are continuing to take action in ways that make critical contributions to Australia's emissions reduction efforts.
Australia also continues to support other countries to take climate action and build resilience and capacity to adapt to a changing climate through our aid programme. Most recently, this included a contribution of $200 million to the Green Climate Fund which will be targeted to assist Indo-Pacific neighbours meet their climate goals.

Australia's strong advocacy and implementation of the Montreal Protocol is another way Australia can play a key role in global efforts to reduce greenhouse gas emissions. The Montreal Protocol is the logical forum to take action on synthetic greenhouse gas emissions.

It has worked with industry to reduce emissions of ozone depleting substances, and has the expertise to phase down hydro-fluorocarbon gases.

Setting Australia's post-2020 emissions reduction target

The Australian Government will set its post-2020 emissions reduction target within the framework of the UNFCCC and its objectives. At the UNFCCC's Lima conference in December 2014, all Parties confirmed they would bring forward intended nationally determined contributions setting out the targets they will adopt from 2020 onwards. The expectations for intended nationally determined contributions include that they be a progression beyond the country's current undertaking and be transparent, easy to understand and announced well in advance of the Paris conference.[xiii]

Countries are expected to describe the key parameters of their target, including a reference point (e.g. base year) and coverage of greenhouse gases and sectors. They are also expected to explain how the target is fair and ambitious in light of their national circumstances, and how it contributes to achieving the UNFCCC's objective of stabilising emissions at a level that would avoid dangerous climate change.

Australia's current undertakings are a five per cent reduction on 2000 emissions levels by 2020 under the UNFCCC, and our target under the second commitment period of the Kyoto Protocol to reduce emissions to 99.5 per cent of 1990 levels from 2013-2020. These undertakings cover all sectors of the economy and all seven Kyoto Protocol greenhouse gases, and are expressed as an absolute reduction from an historical base year.

The Australian Government will announce Australia's post-2020 emissions reduction target in mid-2015, well ahead of the Paris conference at the end of the year.

Australia's target must provide certainty to business and the Australian community to facilitate decision making and investment.

The target will represent Australia's fair share of the global effort needed to respond to climate change.

The Australian Government will consider a range of factors in determining Australia's post-2020 target, including:

- Australia's national circumstances – our economic structure, projected economic growth, resource endowments, geography and demography – will have implications for Australia's emissions reduction opportunities. Different targets have different costs and benefits for Australia.
- The scope and nature of other countries' targets – so that our target represents Australia's fair share and does not put Australia at a competitive disadvantage to our key trading partners and the major economies.

Australia's post-2020 target will be consistent with continued strong economic growth, jobs growth and development in Australia.

Identifying the policies that will help achieve a post-2020 target is also important. The Australian Government's preference is for direct action and it recognises there is a range of effective and cost-efficient options for actions supplementary to the Emissions Reduction Fund and its safeguard mechanism. These could include fuel efficiency standards for light and heavy vehicles, building and appliance energy efficiency standards and measures to reduce synthetic greenhouse gas emissions. Before taking decisions on such policy measures, the Australian Government will consult with business and the community.

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[i] CSIRO and the Bureau of Meteorology, State of the Climate Report 2014.
[ii] CSIRO and the Bureau of Meteorology, State of the Climate Report 2014.
[iii] Department of the Environment, Australia's Emissions Projections 2014-15.
[iv] The Treasury, 2015 Intergenerational Report.
[v] International Monetary Fund, World Economic Outlook, January 2015.
[vi] Australian Bureau of Statistics, 3101.0, December 2014.
[vii] United Nations, World Populations Prospects, 2012 Revision, Table I.3.
[viii] Climate Change Authority, Reducing Australia's Greenhouse Gas Emissions: Targets and Progress Review Final Report, February 2014.
[ix] Australian Bureau of Resources and Energy Economics, Australian Energy Statistics 2014, Table O.
[x] World Bank, World Development Indicators, Fossil fuel energy consumption 2014.
[xi] Department of Foreign Affairs and Trade, Trade at a Glance, 2014.
[xii] Based on the new policies scenario. World Energy Outlook 2014, International Energy Agency.
[xiii] United Nations Framework Convention on Climate Change, Decision –/CP.20.