

Submission to the Senate Climate Policy Committee

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0. Overview

I thank the Parliament and the Committee for the opportunity to make a submission on climate policy, which presents the greatest challenge to humanity since pre-history, and certainly the greatest challenge since Federation.

This submission will discuss in passing some of the well-reported areas in this debate, but as these will have been discussed in the media and other submissions, it will concentrate on:

- possible direct risks to biological and geological systems of increased CO₂ levels that are not related to climate change;
- the need to promote economic metrics that directly reflect the well-being of the population directly, rather than concentrate on cash flows that are too-loosely covered with the well-being of the population;
- the need for policy and regulation development consistent with standard risk management approaches, giving due regard to expected social consequences, including mass migration and violent conflict for resources;
- the need for voluntarily decreasing the world population rather than suffer an enforced and unmanaged decrease in the population;
- the need for governments to regain lost policy levers, and develop new ones; and
- the need for independent scientific bodies that can push policy levers, with powers to set emissions and efficiency targets similar to the financial powers of the Reserve Bank board.

The scientific consensus is that there is only a narrow window of opportunity to avoid a global disaster akin to the Dark Ages, and that action delayed is disaster assured.

If our leaders act in timely fashion, looking to their place in history a century hence rather than their personal prospects for office over the next decade, then the writing of that history need not await another Renaissance and another Gibbon.

1. CO₂ and Non-Climate Effects

While the public debate has concentrated on global warming and climate change, their consequences and risk mitigation, there are other potentially significant effects of increased CO₂ that are not mediated by climate change, but because when CO₂ dissolves in water, that water becomes carbonic acid.

1.1. Biological Effects

A significant drop in atmospheric CO₂ levels roughly coincides (120,000 years ago) with the emergence of *Homo sapiens*, and ascendancy over *Homo neanderthalensis*.

Atmospheric CO₂ remained low until the industrial revolution in Europe, when levels started rising, that rise accelerating ever faster over recent decades. There are similar rises in the hydrosphere, with increasing acidity of the ocean leading to observable physiological changes in marine organisms, such as difficulty maintaining skeletal mineralization.

With CO₂ levels at, or approaching and soon to overshoot, those levels before the population size of our species overtook other members of our genus, and with observed changes in the physiology of other organisms due to rising CO₂, it becomes valid to question whether our own metabolism might be become stressed by these rises, and whether this may predispose to ill-health.

As we have no baseline data for blood pH and activities of important enzymes that are sensitive to blood pH and CO₂ concentrations, while we understand the short-term toxicity of very high (1%) CO₂ from the likes of submarine breakdowns, we have little understanding of the effects of lifelong exposure.

Some "climate skeptics" are happy to argue that increased CO₂ is desirable because higher CO₂ levels affect plant physiology, "pushing" increased photosynthesis and hence crop growth. No-one, on either side of the climate debate, disputes these physiological changes in plants. It is unreasonable to think that there should not be an equally significant effect on mammalian physiology, although it is much easier to propose pathological changes rather than beneficial ones.

The effects on human physiology of relatively subtle differences in CO₂ concentration can include those found with thalassaemia, a disease (most often associated with a Mediterranean heritage) caused by persistence of foetal haemoglobin (HbF) after leaving the intra-uterine environment. Because the placenta (and foetus) have slightly elevated CO₂ compared to most of the mother's tissues, HbF requires greater affinity for oxygen (O₂) and a lower affinity for CO₂, otherwise the foetus would not be able to receive oxygen from the mother's blood.

After delivery however, in a lower CO₂ environment, HbF is "reluctant" to release O₂ to the tissues which become "oxygen-starved". This has a significant health impact, indeed it can be life-threatening without the advantages of modern medicine.

1.1.1. Recommendations

- Undertake comprehensive studies into the long term (over 3 or 4 generations) effects of elevated CO₂ levels, using a mammalian model such as a rat or guinea pig, including investigation of any epigenetic effects, with the animals constantly in an environment with CO₂ at (or slightly above) the concentration expected within a hundred years if the trajectories of per-capita CO₂ emissions and population continues.
- Undertake "mirror" mammalian studies in a low-CO₂ environment, with CO₂ levels equivalent to the pre-industrial era, factoring in the greater evolutionary opportunity to the test animals because of their shorter lifespans and thus increased number of generations since that time compared to humans. This can allow estimation of pre-industrial norms for human physiology.
- Closely monitor the effects of ocean acidity on marine organisms, both those that can serve as "canaries in the coal mine", and those that are the basis of ocean food-chains and contribute to human food sources.

1.2. Geological Effects

The corrosive effects of acid rain are well documented, on structures built by humans and geological formations (particularly limestone and marble).

With ocean acidification already observable, and likely to get much worse if atmospheric CO₂ continues to dissolve in the ocean at current rates (although some oceanographers think relative effectiveness of the ocean as a carbon sink will not continue indefinitely), the effects on coastal formations might be considerable.

Coastal formations are often made of limestone, the sedimentary rock created from shells accumulating on the ocean floor, and which is particularly vulnerable to attack by acid, just as mineralization of shellfish is starting to be affected by increased CO₂ dissolved in the ocean.

With rising sea-levels, the coast and the land behind it become threatened by inundation, made worse by the unfortunately synergistic effects of erosion by an acid ocean, higher sea-levels, and possibly more violent storms driven by increased ocean surface temperature.

Most artificial barriers to protect against storm surges use materials such as reinforced concrete. Unfortunately, both concrete and reinforcements will be as much affected by increased ocean acidity as they are affected by increased acidity of rain.

1.2.1. Recommendations

- Forecasting of periodic flooding or permanent coastline changes should take into account forecast changes in ocean acidity.
- The design of man-made sea barriers and other structures near the ocean (such as bridges) should pay attention to the possibility of corrosion, either by selection of materials, or by decreased life-expectancy of the structures.

2. Performance Indicator Reform

The key performance indicators currently used by the population when electing governments are counterproductive to the introduction and enforcement of sound policy¹, including mitigation of climate change threats.

Most obviously, population contraction, a key means to minimize CO2 emissions, makes it almost impossible to achieve positive GDP changes, and therefore almost impossible for responsible politicians to get re-elected if electors look mainly to a simple GDP as a measure of government economic competency.

By putting per-capita GDP figures in the public spotlight, sidelining the simplistic GDP, the public can maintain confidence in responsible politicians, who can be re-elected, and then continue introducing good policy.

Indeed, even per-capita GDP is a very limited measure of the well-being of citizens. The UN Development Program's HDI (Human Development Index) is better, but still has an emphasis on GDP – although it does provide the means to assess the efficiency of nations in turning per-capita GDP into relevant human outcomes such as health, low-infant mortality, and education.

It is worth considering how GDP, reserve bank interest rates and budget balance as the only focus of electors over recent decades when measuring economic stewardship led to many short-term and self-serving government policies that artificially pushed up GDP, at the cost of national debt, speculative rather the productive economic activity, and ability to weather adverse world economic conditions.

¹ Perhaps the best examples of counterproductive KPIs (Key Performance Indicators) involve:

- Technical helpdesks: using as KPIs the number of calls taken, and average time to “close” each issue, there is little incentive to prevent or fix “once-and-for-all” problems that are both common and taken little time to close.
- Footballers measured only on the number of possessions, rather than “work rate” (tackles, shepherds) or goals (rather than including “goal assists”) are more likely to “push up their own figures” with “selfish” play, rather than play unselfishly and improve overall team performance.

How many years is it since Australia had a current account surplus. Would government policies have been different over recent decades if the headline figure involved adjustment of GDP by the current account, and was expressed per-capita? How would policies have differed if the GINI coefficient of household income inequality regularly featured in news bulletins?

While promoting the use of per-capita GDP initially, other even more relevant metrics can be developed that include availability of amenities (e.g. distance to public transport), morbidity (including obesity and depression), family life (e.g. average child "quality-time" with parents) and ecological responsibility (per-capita net carbon-equivalent emissions and biodiversity).

One nation, Bhutan, has already introduced a "Gross National Happiness". Although the composition of this headline figure is probably inappropriate to Australian needs, it does serve as a proof-of-concept.

While there may be some disagreement about the elements and weightings in a balanced scorecard between different political groups, different compositions can be debated during election periods, and it is possible to produce scores (including promises) for one party according to the scorecard produced by another party.

With a balanced scorecard, especially when the public's priorities are reflected by that scorecard, it becomes much easier to develop holistic policies and explain the necessary trade-offs to the public and give the public the opportunity to quickly tell if "on the whole, they will be better off".

There is already precedent for use of non-financial metrics in headline figures, as various tax offices around the world have implemented, or are investigating, charges on non-monetary transactions, including rewards programs such as frequent flyer points, and exchanges carried out in virtual worlds such as Second Life.

2.1. Recommendations

- Immediately start using per-capita GDP in economic press releases rather than GDP.
- Institute a working group, with input from the public and statisticians, to develop a balanced scorecard of indicators that reflect well-being, yet provide figures suitable for use in headlines. This should be a long-term evolutionary effort.
- Provide adequate resources to the Australian Bureau of Statistics to collect and calculate the new indicators.
- Provide means for the public to understand new balanced scorecard indicators as they become available.

3. Risk Management Approach

A key difficulty in developing action plans in response to climate change is the structure of the conversation between governments and the scientific community.

Governments ask "What and when should the figure for X be?"

Scientists can then only ask "What are the risks you are willing to take?"

This problem can only be resolved by adopting a proper risk management approach, as defined in the Australian Risk Management Standard (AS/NZS 4360) and associated handbooks, which provides for transparent assessment of a portfolio of risks. This allows a better allocation of spending priorities, whether for prevention or mitigation.

In essence we need a Business Continuity Plan for provision of services that provide well-being to citizens.

The risks associated with climate change do not end with increased deaths from extreme weather events, the loss of low-lying land with rising sea levels, or decreases in the food supply from drought. We need to take into account the global consequences, including mass migration, and armed conflict for scarce resources.

Already, we are seeing low-lying island nations becoming uninhabitable, for even without disappearing completely under the waves, seawater destroys supplies of fresh water and agricultural capabilities.

We are seeing the emergence of competition between nations for water, not just that on the surface, but underground cross-border water. This competition is intense and threatening when that competition is between India and Pakistan, both nuclear weapons states, and the existing source of those waters is the rapidly disappearing Himalayan glacier field.

The risks of massively increased military spending to manage these conflicts should not be underestimated.

4. Regaining Policy Levers

Over recent decades, governments have abrogated responsibility for, and control of, many of the services that provide policy levers required to manage our responses to climate change.

All recognize the need to decrease energy and water consumption and to increase public transport. The profit motives for non-state energy, water and transport providers make this impossible.

4.1. Recommendations

- Regain government control over utilities whenever current contracts expire;
- Create authorities to co-ordinate activities across all utilities.

5. Climate Policy Equivalent of RBA

Just as better economic policy has resulted from the ability of the Reserve Bank to determine interest rates, an expert committee with universally-accepted scientific credentials, determining the settings for parameters determining climate impact would result in better climate policy.

There are many such parameters: minimum costs of and maximum allocations of carbon permits and the appropriate levels of a "carbon tax" being the most obvious, but also including (as discussed in following sections) policy areas like ages for retirement and pension eligibility.

Creating such expert climate-response statutory bodies with real power provides similar advantages to politicians as those provided by allowing the RBA to determine interest rates.

As a related measure, parliaments should recognize the importance of climate policy by instituting not just temporary select committees, but standing committees on climate policy, and having Senate Estimates Committees place the same weight on environmental impact as currently placed on fiscal responsibility.

6. Selected Policy Areas

6.1. Population

The key component of any successful raft of policies to address the threats of climate change must be a decrease in the world's population.

In this respect, however draconian the implementation, the "one child" policy of China over the last generation has provided significant benefits to the world at large, and will continue to do so.

It is not merely the CO₂ emissions generated for each person, we also face extreme shortages of essentials like water - not merely in the future, but already - not merely overseas, but in Australia.

We are faced over the next century with either a managed reduction in population, or with an unmanaged and disruptive reduction.

The key question for policy-makers in democratic countries is how to decrease the population without grossly disadvantaging children who are born. Perhaps the gentlest means is a "no-baby bonus", a modest payment (perhaps a few hundred dollars) to every woman of child-bearing age who has no live births in any given year, with all women disqualified from future bonuses one having a second child.

This can increase the quality of care for those children that are born, not only by increasing the per-child resources that parents and societies can provide, but also restoring the bonds that once held extended families together - uncles and aunts with nieces and nephews, for example.

It has been shown by many studies that, especially in developing nations, decreasing the number of children increases maternal well-being, so encouraging contraception, especially by increased condom use that would also decrease the incidence of HIV infection, is very important.

While some raise panic about the costs of an ageing population, they ignore many technical advances that have raised the productivity of those no-longer young (consider common phrases such as "40 is the new 30"), as well as the ability to care for those that are older (such as home medical alarm systems, and even labor-saving devices such as microwave ovens).

Indeed, it is unreasonable to suggest that technical advances cannot outpace the rate at which a population ages, and that working lives cannot be extended in many occupations, especially if there is government support for a gradual easing of the work burden as people approach a later retirement - encouraging part time work and shared positions for those over 60 for suitable professions, such as office work.

It is more than likely that the extra wisdom available from older people contributing to the economy would lead to better decisions in companies and government agencies.

6.1.1. Recommendations

- Immediately cease all funding for "fertility treatments";
- Immediately cease all programs such as the "baby bonus";
- Assist with international efforts to promote contraception and smaller families;
- Provide incentives for one-child families in Australia, including programs to build communities so that children become properly socialized with others in their neighborhoods;
- Create government information programs outlining the benefits of family planning and limited family sizes; and
- Gradually increase retirement ages for selected professions, especially those in "sedentary" occupations.

6.2. Urban Planning

The most energy-efficient urban organization is medium density housing, insulating adjoining residences while avoiding the energy inefficiencies of high-rise housing, as well as decreasing costs for provision of transport and other distributive infrastructure.

At the same time, better precinct planning (e.g. for shops and other workplaces) can improve the ability to manage the environmental impact of household transport.

Many of the perceived benefits of the urban sprawl (such as availability of play areas for children) can be removed by appropriate acquisition of land for parks and playgrounds.

6.2.1. Recommendations

- Create national urban planning authorities, removing inappropriate incentives from councils and state governments;
- Create incentives for medium-density housing and local services and work opportunities;
- Introduce significant disincentives to all urban expansion.

6.3. Food Supply

A significant and easy-to-reduce proportion of Australian release of CO₂-e comes from the methane produced by livestock, in particular cattle and sheep with digestive systems reliant on methanogenic bacteria.

An obvious remedy is to cut consumption of meat, along with increased consumption of water-efficient food crops (e.g. potatoes rather than grain).

However, meat sources need not be methanogenic: macropods (kangaroos) do not rely on methanogenic bacteria, and it is possible to reduce total Australian CO₂ emissions by 3% if two-thirds of land currently used for beef and lamb is instead used to raise macropods².

There is also the theoretical possibility of inoculating cattle and sheep against methanogenic bacteria, and seeding their guts with non-methanogenic varieties. The downside of this is that it may lead to significant efficiency drops of conversion of fodder into flesh.

Decreasing per-capita food consumption and changing the types of food consumed can provide benefits not only by decreasing the environmental costs of food production and delivery, but also the costs required to treat the health effects of over-consumption.

6.3.1. Recommendations

- Require food labelling to indicate CO₂ production (including processing and transport) and water consumption;
- Impose taxes on foodstuffs that have a high environmental impact;
- Encourage of beef and lamb food-sources with kangaroo for human consumption, including regimes for rewarding farm areas that provide a range for kangaroo production, not merely the farm from which the kangaroos are harvested;
- Increase funding for development of food supplies that have lower environmental impact; and
- Increase incentives for moderating food consumption, including perhaps tax disincentives for those who are voluntarily overweight.

² Other benefits come from use of macropod meat, including health benefits from a better fat profile of the meat, as well as environmental benefits because of the way macropods graze, have soft feet, and are water-efficient.

6.4. Energy Supply

The environmental impact of energy supply does not involve merely the means of generation of power, but distribution. More localized power generation allows for much more efficient distribution, avoiding much of the power loss from high-tension cables, or transport of fuel.

Localized power generation need not only involve production from wind, sun or wave power, but can also involve what are called "micro-nuclear reactors", which have many advantages over large nuclear reactors including low maintenance, no production of weapons-grade fuel, and little maintenance.

That said, encouraging wind, solar, and wave power generation has many advantages - the power generation portfolio can be refreshed incrementally as technology advances, while the lead-in and planning times can be significantly reduced compared to the introduction of other power sources.

Looking at policies encouraging solar power generation in Germany, for example, we see that innovative policy can create expansion of new industries with ready international market potential.

6.4.1. Recommendations

- Encourage local power generation that minimizes distribution costs;
- Provide significant research and development funds, and industry incentives, for energy sources such as wind, solar and wave power, especially those that are innovative enough to provide potential for exports, and thus increase national revenue.

7. Afterword

The wide scope and short period of this inquiry prevents individual submissions from outlining the range of measures required. This submission suffers from those limitations, and thus highlighted only a few areas of concern in a piecemeal fashion.

Despite my daughter's significant injuries in a very recent car accident, placing significant unexpected demands on my time, including the need to provide extra care for my grandson, the lack of adequate action by our government on climate-related issues is worrying enough for me, for my grandson's welfare, to continue work on this submission - which is significantly less complete than I had hoped. This rush will have increased the risk of typing and grammatical errors, for which I apologise.

However, I again stress that the most important response, and perhaps the easiest to manage, is control over population levels, not merely requiring limits to growth, but requiring significant decreases, both here and internationally.