

Submission to

The Parliament of Australia

Joint Standing Committee on Treaties

Inquiry into the Kyoto Protocol

from

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Executive Summary

Any system that for its advancement destroys the foundation of its survival will eventually be itself destroyed.

Even as much as we would like to, we can no longer deny that our addiction to economic growth at any cost is destroying nature. It is no longer a question of when an environmental crisis will happen, it is how we adapt to the crisis we are in.

The sustainability of Australian society is grounded in its relation to the nature of our country. Our *every* activity is dependent on nature; all our wealth comes from nature. We degrade nature at our peril.

The Ky• t• Protocol is a step in the process of humanity coming together to deal with one continuing aspect of our degradation of nature.

In this context, we cannot afford to *not* proceed to ratify the Ky• t• Protocol as one part of meeting our responsibilities to the nature of our country, to the community of Australians and for the future of our children.

Any economic deprecations caused by so proceeding will be less than the those caused by following our present course which is degrading the systems on which we all entirely depend and which provide our wealth.

The main contributor to global warming is the burning of fossil fuels. This contravenes one of four “system conditions” for sustainability on earth as defined by the Natural Step sustainability framework and validated by prominent scientists in Europe and Australia.

Whether the conflicting current theories on global warming and any solutions proposed for it are correct or not is irrelevant to the precautionary approach that would help to deliver us a sustainable society on this continent and on this planet.

In other words, there *may* be a problem with potential to change our global climate for the worse. Most scientists agree on its existence. Many disagree on the threshold of its destructive potential. Nevertheless, we must proceed as if calamity is probable. To not do so is irresponsible, irrational and naive. To argue over the threshold is like arguing whether the height of the doorjamb is sufficient to hold back the overflowing bath, instead of turning off the taps.

The only way of achieving sustainable cultural change in modern societies is by the combined coercive action of punitive and incentive approaches by governments to public and private behaviour within a framework of education and debate. However, these approaches must send the right signals to be successful and acceptable.

At present we tax ‘the good’ (profit, saving, wages, entrepreneurship) and promote ‘the bad’ (pollution of ‘the commons’, land clearing, personal fulfillment at the expense of our natural resource base, etc).

We therefore need to make a revenue-neutral transition from our present system of taxing money, profit and entrepreneurship to a system of indirectly taxing the use of energy and resources including the environment impact of producing and using each and every good and service. Such a transition would allow the unfettered accumulation of wealth by individuals and corporations and the rapid increase in cost (and reduction in popularity) of the production and consumption of environmentally degrading, unsustainable goods and services (including those which contribute to global warming).

Our environment, economy and society can only benefit.

It is my petition that, whilst the Ky• t• Protocol is only a limited first step, and whilst Australia is having difficulty meeting its agreed-on *increased* emissions target, we must proceed to ratify the Ky• t• Protocol as a step toward true sustainability and as a signal to all Nations that such global consensus is possible in order to remedy our common troubles.

Submission

The Committee's Point 1:

The implication for Australia of proceeding or not proceeding to ratify the Kyoto protocol and meeting its target emissions levels by 2008 with regard to anticipated and/or predicted economic, environmental and social outcomes both nationally and in specific regional areas.

Overview

The nature of environmental problems has changed in the last 50-100 years.

Local problems have become global. Distinct sources of pollution have become diffuse. Short delays between production and dispersal of dangerous substances have become longer. Formerly simple issues have been replaced by extremely complex problems (Holmberg 1995).

Greenhouse gas emissions, global warming and the potential for climate change are an example of this process.

Global warming is also a symptom of a greater malaise: the lack of a modern paradigm for and systems perspective on sustainable human habitation of our planet.

The present dominant paradigm is unsustainable given that it is dependent on:

- the gross, linear (as opposed to cyclic), high waste-producing and destructive consumption of largely irreplaceable non-renewable natural resources from within the earth's crust;
- approximately 30,000 man-made unnatural and often persistent chemicals many of which are quantitatively and/or qualitatively unable to be broken down into the basic building blocks of life by natural systems;
- the degradation of the productive capacity and biodiversity of natural systems; and
- grossly inefficient and unfair systems of resource distribution across and between nations (Holmberg 1995).

This unsustainability is further complicated by the predicted increase of human population to between 8.5 and 10 billion people by 2050. This will require an approximate tripling of food production as the quality and quantity of our arable lands decrease due to the various pressures of our unsustainable activities (Kendall & Pimentel 1994).

We are in the midst of a third environmental revolution. The first - the transition from hunter gathering to farming - was based on a lack of wild food resources. The second - the transition from a timber-fueled to a coal/oil-fueled economy - was based on a lack of forest resources. The third - the transition from waste and wasting to sustainability - is based on our generation of life-threatening levels of pollution (Harrison 1996).

The old paradigm of waste and wasting is mostly responsible for our present predicament and is based on the perceptions that:

- nature exists for the utility of humans;
- economic rationalism based on continuing economic growth, the increasing dominance of the corporation, and the globalisation of these systems are the way forward;
- our earth is ever abundant and limitless in its capacity to give us what we want;
- our science and technology (our minds) can meet all challenges; and
- life is a community of objects.

The shift required to meet the challenges of the transition to sustainability are reflected in the new paradigm and its perceptions:

- nature and all living things have inherent value apart from and above human use and values;

- we are a part of the complex web of life, not apart from it;
- economics is a sub-set of and is ruled by ecology;
- we must take a precautionary approach to using science and technology because whilst we may have much information, we have little understanding of and even less wisdom about complex natural systems and their management; and
- life is a communing of subjects (Berry 1999 & 1990, Witoszek & Brennan 1999).

The third revolution – the transition between these two paradigms – is inescapable and non-negotiable: we either find a sustainable pathway or we will be forced along a pathway with attendant chaos and destruction (Hardin 1980).

Natural systems have to be defended against unsustainable influences from human society based on the old paradigm. Efforts must first be directed towards the parts of the structures, flows and functions within the ecosphere that are irreplaceable or hard to replace. This adjustment is necessary for the maintenance of functions in the ecosphere that are essential for its productivity and stability.

But nature is a very complex system and we probably don't know every critical function. The solution to this problem is to move the focus backwards in the causal chain – from studying effects in nature to studying what constraints have to be put on society to avoid any systematic increases in society's impact on nature. The essential constraint is then that society should be embedded within nature's *biogeochemical* cycles. This involves a change in environmental pathology to societal prevention. Since problems do not originate in the environment but in society, this seems to be a reasonable change.

In terms of biogeochemical cycles, society is no longer small in comparison to nature. One important influence is the extensive human interference with the balance of atmospheric gases. It is very difficult to evaluate the risks involved. A general rule is therefore:

Not to allow deviations from the natural state that are large in comparison to natural fluctuations; in particular, deviations should not be allowed to increase systematically.

This means for example, that we must not allow a systematic increase in human-initiated substances that seem to induce changes in our climate.¹

The Kyoto Protocol is a necessary step in beginning to make the transition to sustainability in a planned, consensual, global and non-destructive way.

Environmental Outcomes

Not proceeding to ratify the Kyoto convention will contribute to the following effects:

- decreasing biodiversity (Flannery 1996);
- heightening climatic instability (Houghton et al 1990 and Houghton et al 1992);
- increasing destabilisation of our 'commons' (Hardin 1968);
- decreases in global food production (Rosenzweig 1994, Kendall & Pimentel 1994);
- delay and make more difficult the inevitable transition to a sustainable economy (Daly 1993), Hawken, Lovins & Lovins 1999);

¹ Whilst carbon dioxide levels seemed to have naturally fluctuated up to levels as high as 2,000 ppm ("super greenhouse conditions") around 55 and 40 million years ago, carbon dioxide concentrations appear to have remained below 500 ppm for the past 24 million years and were more stable than before (Pearson & Palmer 2000).

Australia has more to lose than other countries which it competes with in world markets.

Australia is a dry, old, fragile and climatically unstable continent. Our soils are very old, skeletal and lack nutrients. Our agriculture is heavily dependent on the use of fertilisers (particularly phosphate fertilisers) to produce economic returns. (el Niño SOI). Our landscape has evolved with a community of extremely efficient, diverse and cooperative species (Flannery 1996).

Europe and the USA on the other hand, have had the benefit of the soil-enriching effect of most ice age glacial events that Australia missed out on (due to tectonic plate movement). These regions have extremely deep and rich topsoils and are characterised by a community of inefficient and very competitive species with low diversity.

Australia will be hurt more than all of its major economic competitors by the negative effects of greenhouse gas induced climate change.

Economic Outcomes

“The time to consider the policy dimensions of policy change is not when the link between greenhouse gases and climate change is conclusively proven, but when the possibility cannot be discounted and is taken seriously by the society of which we are part. We in BP have reached that point.”

~ John Browne, Group Chief Executive of British Petroleum (BP America), in a speech at Stanford University, 19/6/1997. Full text: [BP STATEMENT ON GLOBAL WARMING.](#)

The old paradigm economic view in Australia focuses on the use and selling of our mined commodities. Even the so-called “new economy” is based in the old unsustainable paradigm.

Whilst we (and the rest of the world) are locked into a fossil fuel powered economy, the old paradigm cannot see a way forward without the use of these substances. This was the basis for Australia’s successful lobbying for an increase in our emission levels for carbon dioxide at the Kyoto Conference.

Australia will run out of our own sources of oil in 6 years and proven reserves of natural gas will dry up in 2037 (Bureau of Statistics 1996, Chamberlin 1996). World production of oil has peaked or will soon peak (Campbell 1999).

How silly are we to be so dependent on a rapidly disappearing resource, the use of which at the same time is a major contributor to global warming?

This old paradigm also predicts the dire consequences of gross unemployment with social and economic collapse if Australia is not allowed to use and sell all its coal and other fossil fuels.

What opportunities will be lost if we follow this view, living on an increasingly devastated continent with few non-renewable resources left to sell and little skill development in the new service-focused, sustainable paradigm?

Thoughtful corporate leaders know that our energy future is going to be strikingly different from our energy past. There is a growing acceptance among the key energy players that the world is in the early stages of the transition from a carbon-based to a hydrogen-based economy. In February 1999, ARCO Chief Executive Officer, Michael Brown, said in a talk at an energy conference in Houston, Texas, “We’ve embarked on the beginning of the Last Days of the Age of Oil.” (Brown 1999).

Will Australia be left behind?

Not proceeding to ratify the Kyoto convention will contribute to the following effects:

- foregone business opportunities (Hawken, Lovins & Lovins 1999);
- economic stagnation and deterioration based on a dwindling resource base (Daly 1971);

- delay and make more difficult the inevitable transition to a sustainable economy (Daly 1993), Hawken, Lovins & Lovins 1999);
- entrench the old paradigm (economic growth at the expense of the environment/technology will save us) Daly 1991; and
- Not send the correct signals to business, our children and other nations that sustainable pathways in harmony with nature are ultimately the answer whether global warming turns out to be the problem that is predicted or not (Hawken 1994).

In fact, it appears *more* money can be made out of following a precautionary approach focused on sustainability and reducing greenhouse gas emissions.

For example, Ray Anderson, Chairman of Interface, the world's largest manufacturer of carpet and carpet tiles, has shown in his book, *Mid-course Correction: Towards a Sustainable Enterprise – the Interface model* (Anderson 1998), that savings of \$70 million (US) in the first could be made in the third year by taking a sustainable pathway.

Companies heading this way are more profitable. Amory Lovins, co-author of *Natural Capitalism* (Hawken, Lovins & Lovins 1999), said on 9/8/2000 in comments on a discussion paper on climate change (Sutton 2000):

“An all-efficiency-and-renewables/benign-sources future is neither costly nor unrealistic. In fact, it may be cheaper in private internal cost than conventional climate-damaging futures. See www.natcap.org, which offers extensive examples of very large resource savings' costing less (making more profit) than small or no savings. We ought to be going in that direction regardless of how the climate science turns out, just to save/make money.”

The Committee's Point 2:

The veracity of conflicting current scientific theories on global warming and any solutions proposed for it.

Whilst this is not my area of expertise, the following information is enough, I submit, to institute a precautionary approach to eliminate the systematic increase of human-initiated emissions of greenhouse gases.

I submit, there appears to be little “conflict”.

“It is important to note that the controversy surrounding global warming takes place largely outside the scientific community, but rather in the popular media and in political discourse.

The issue may seem controversial, but there is relatively widespread consensus among the scientists who study global warming.” (Kahn 1998).

“The National Climatic Data Center has just announced that last month was the warmest September on record - almost a degree F above the previous record and nearly 4 degrees F above the average. It is the 9th consecutive month to break the previous all-time record. ... there are areas of the Earth, such as the Arctic, where the temperature increase is 3 to 4 degrees Fahrenheit. This is enough to melt permafrost, the permanently frozen ground that characterizes northern tundra bogs. And melting bogs release methane, a greenhouse gas.” (UPI, 10/8/98)

Excerpts from a discussion paper by Phillip Sutton:

“THE NEED FOR ACTION

Given the magnitude of the change required to bring atmospheric CO₂ to 350 ppmv (ie. achieving a zero emission of CO₂ as a result of human economic activity, with a major program to remove excess CO₂ already in the atmosphere), is it worth making the effort? When making up our minds on this it is worth remembering that:

- *a level of atmospheric CO₂ of about 360 ppmv (the present level) maintained for the next 50-70 years is likely to cause the death of virtually all the world's coral reefs (Hoeg-Guldberg, 1999)*
- *with unmitigated emissions, substantial dieback of tropical forests and tropical grasslands is predicted to occur by the 2080s, especially in parts of northern South America and central southern Africa. Under emissions scenarios leading to stabilisation of CO₂ at 750 ppm, the dieback of tropical forests is delayed by about 100 years (White & Cannell, 1999).²*
- *at an atmospheric CO₂ level of between two and three times the natural level ie. between 550 and 800 parts per million (and above) the thermohaline circulation that keeps the deep oceans oxygenated could well cease altogether due to greatly reduced*

² But under stabilisation at 550 ppm, this loss is substantially reduced, even by the 2230s.

formation of sea ice at the poles.³ A de-oxygenated ocean below 1 to 1.5 km would result. (A doubling of atmospheric CO₂ could be reached by about 2033 and the shut-off of the deep ocean circulation could have been completed within 150 years. (Hirst, 1999; Strong, 1999; 2000).

- *If the rate of greenhouse warming is accelerating as suggested by Karl et al. (2000) and, if this apparent new trend continues, then it compounds the urgency of dealing with the greenhouse issue.⁴” (Sutton 2000).*

³ The results of modelling the global climate and ocean systems by the Australian Government's Division of Atmospheric Research (a branch of the CSIRO) suggest that:

* if the atmospheric carbon dioxide level reaches between two and three times the natural level (that is between 550 and 800 parts per million by volume) the atmosphere will heat up so much that much less sea ice will be formed in the Antarctic and the Arctic.

* when sea ice forms the salt is 'squeezed' out (which is why sea ice is fresh) and this extra salt makes the surface water heavier and as a consequence it sinks to the bottom of the ocean.

* the formation of extra-salty water normally happens on such a huge scale that the sinking water sets up a global circulation of water from the polar region to the equator and back again (the thermohaline circulation).

* if greenhouse gas emissions keep going at the rates realistically expected the atmosphere will heat up enough to greatly reduce sea ice formation and therefore enough to shut off the thermohaline circulation and this shut off is expected to happen within 150 years according to the model results.

* since it is the thermohaline circulation that brings oxygen from the atmosphere to the deep ocean, the oceans will stagnate and hydrogen sulphide will slowly build up, eventually killing oxygen-dependent life in the oceans below about 1-1.5 km (as demonstrated by the Black Sea where there is no deep circulation) - wind driven circulation will continue to aerate most oceans above the depth of 1-1.5 km.

(This argument is informed by a personal communication from Dr Peter Whetton, 2000.)

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The modelling results are reported in Hirst (1999).

⁴ The Intergovernmental Panel on Climate Change (1996) projected that the rate of global warming in the 21st century would be between two and six degrees Fahrenheit. However Thomas Karl and his associates at the National Climate Data Center (Karl *et al.*, 2000) have analysed climate data from recent years and concluded that global warming since 1976 has been occurring at a rate of four to five degrees Fahrenheit per century - significantly above the warming rates prior to that. Hansen *et al.* (2000) believe that greenhouse gases other than CO₂ (eg. methane, CFCs, tropospheric O₃, N₂O, etc.) have been the main cause of the acceleration and that future emissions of these gases are unlikely to cause a continuation of the acceleration.

The Committee's Point 3:

what definitions and criteria Australia should develop and actively pursue in its national interest with regard to:

- ***grandfathering***
- ***trading credits***
- ***carbon credits***
- ***sequestration***
- ***revegetation***
- ***land management; and***
- ***definitions (eg forest)***

This is out of my area of expertise.

I would suggest assistance from people like:

- Barney Foran of the CSIRO;
- Warwick McKibben (1997); and
- Peter Wilcoxon (1997);

The Committee's Point 4:

The economic, environmental and social implications of a punitive approach to any domestic regulation of industry including such proposals as a carbon tax and an incentive-based approach.

Overview

No sooner was it announced that many countries would pursue legally binding commitments to reduce heat-trapping gas emissions at the international climate change talks, than this position was attacked by industry and science skeptics who benefit from the status quo.

One of the critics' main arguments is that taking action to reduce greenhouse gas emissions is too costly – our economy will be seriously harmed, they argue; the Australian standard of living will be lowered; and untold numbers of people will be thrown out of work.

In the face of this unrelenting mantra of a ruined economy, several prominent economists – including Nobel Laureates Kenneth Arrow of Stanford University and Robert M. Solow of the Massachusetts Institute of Technology – developed a mechanism to counter these negative and unfounded assertions.

Thus, they crafted and circulated the "Economists' Statement on Climate Change" to rally professional economists in support of the IPCC's (Intergovernmental Panel on Climate Change) conclusions and to publicly assert the economic viability of climate change mitigation strategies. The recruitment letter soliciting signers explains: "As the climate debate unfolds, it is imperative that public policy be guided by sound economics rather than misleading claims put forward by special interest groups."

The "Economists' Statement on Climate Change" was released at a press conference on 13/2/1997. 2000 economists signed on to the statement, including six Nobel Laureates. The statement (see Appendix One, p.13) champions the conclusions of the IPCC report, asserts the economic feasibility of greenhouse gas reductions without harming the American economy, and recommends market-based policies.

The only way of achieving sustainable cultural change in modern societies is by the combined coercive action of punitive and incentive approaches by governments to public and private behaviour within a framework of education and debate. However, these approaches must send the right signals to be successful and acceptable.

At present we tax 'the good' (profit, saving, wages, entrepreneurship) and promote 'the bad' (pollution of 'the commons', land clearing, personal fulfillment at the expense of our natural resource base, etc).

The Commonwealth Treasury is aware of some of the issues.

Treasury Secretary Ted Evans, said on the subject to his troops assembled at the Conference of Economists on the Gold Coast (9/7/2000):

"Governments are increasingly being obliged to look at a range of issues to do with the quality of our natural resources: the quality of our water - the water we drink and the water that's in our rivers – the quality of our land and its erosion, the quality of our air," he said.

All these things "some may call environmental issues and they are that, but they're more than that. They go to the very basis of Australia's productive base - what we have been doing to it and what is needed to ensure we have a sustainable natural resource base in this country.

We have a lot to learn on that. There's a lot to be done. But what we do know is that there are costs involved. Greenhouse is an element of that, but one element, and it may not even be the most significant element.

There will be costs and questions as to how those costs, which must initially fall upon industry, will be borne: to what extent they will be borne by consumers, to what extent by taxpayers. Whichever it is, most of us are both.

Governments would be looking at how it "might best be done in terms of being most efficiently done, but also done most equitably."

There must be a cost to the economy "unless - and let's not rule this out - we can find more efficient ways of doing things. And that, of course, is partly what we're talking about. We must find more efficient ways to use water, for example, and that goes to the pricing of water.

But it would be surprising if all of this could be done without government assistance. Whether that be the Commonwealth or the state governments - or, indeed, local government - is yet to be decided.

But the total cost, one way or another, has to be borne throughout the community. Typically, those things don't happen without governments being involved, and there will no doubt be quite extensive calls for government investment in a number of areas." (Gittins 2000).

Recommendation

We therefore need to make a revenue-neutral transition from our present system of taxing money, profit and entrepreneurship to a system of indirectly taxing the use of energy and resources including the environment impact of producing and using each and every good and service.

Such a transition would allow the unfettered accumulation of wealth by individuals and corporations and the rapid increase in cost (and reduction in popularity) of the production and consumption of environmentally degrading, unsustainable goods and services (including those which contribute to global warming - Hawken 1994).

The main criteria for any coercive system of incentives and disincentives are:

- the focus should be on 'turning off the taps' and eliminating emissions rather than trading the right to pollute based on the present excessive emissions of industry and society.
- Any system of permits and user fees should also focus on this reduction and elimination of emissions.

Appendix 1

"ECONOMISTS' STATEMENT ON CLIMATE CHANGE" - Feb. 13, 1997

We the undersigned agree that:

- I The review conducted by a distinguished international panel of scientists under the auspices of the Intergovernmental Panel on Climate Change has determined that "the balance of evidence suggests a discernible human influence on global climate." As economists, we believe that global climate change carries with it significant environmental, economic, social, and geopolitical risks, and that preventive steps are justified.
- II Economics studies have found that there are many potential policies to reduce greenhouse-gas emissions for which the total benefits outweigh the total costs. For the United States⁵ in particular, sound economic analysis shows that there are policy options that would slow climate change without harming American living standards, and these measures may in fact improve U.S. productivity in the longer run.
- III The most efficient approach to slowing climate change is through market-based policies. In order for the world to achieve its climatic objectives at minimum cost, a cooperative approach among nations is required - such as an international emissions trading agreement. The United States and other nations can most efficiently implement their climate policies through market mechanisms, such as carbon taxes or the auction of emissions permits. The revenues generated from such policies can effectively be used to reduce the deficit or to lower existing taxes."

SUPPLEMENTAL INFORMATION

The six Nobel Laureates are:

Kenneth J. Arrow, Stanford University;
Gerard Debreu, University of California at Berkeley;
John C. Harsanyi, University of California at Berkeley;
Lawrence R. Klein, Pennsylvania State University;
Robert M. Solow, Massachusetts Institute of Technology; and
James Tobin, Yale University.

The project's five organizers are: Arrow and Solow, plus
Dale W. Jorgenson, Harvard University;
Paul R. Krugman, Massachusetts Institute of Technology; and
William D. Nordhaus, Yale University.

The organizational impetus behind the economists' effort comes from Redefining Progress, a non-partisan, non-profit public policy organization based in San Francisco. For information about "Redefining Progress" or how to sign onto the statement, contact: "Redefining Progress" at 1 Kearny Street, 4th floor, San Francisco, CA 94108 Tel: +1 415 781 1191.

⁵ This would apply equally to Australian conditions.

References

- Anderson, Ray (1998), *Mid-course Correction: Towards a Sustainable Enterprise – the Interface model*, Peregrinzilla Press.
- Berry, Thomas (1990), *Dream of the Earth*, Sierra Club.
- Berry, Thomas (1999), *The Great Work: Our way into the Future*, Bell Tower.
- Brown, Lester R., “the Rise and Fall of the Global Climate Coalition,” www.worldwatch.org.
- Bureau of Statistics (1996), *Energy Accounts for Australia*.
- Campbell C.J. (1999), THE IMMINENT PEAK OF WORLD OIL PRODUCTION, A Presentation to a House of Commons All-Party Committee on July 7th 1999.
- Chamberlin, Paul (1996), “Fuel gauge is running low, report warns,” *The Age*, 12/11/1996, p. A8.
- Common, Mick and David Stern, “Greenhouse needs a carbon tax”, *The Australian Financial Review*, 26/2/1997.
- Daly, Herman, and John Cobb (1994), *For the Common Good*, Beacon.
- Daly, Herman (1971), TOWARDS A NEW ECONOMICS: Questioning Growth.
- Daly, Herman (1991), STEADY-STATE ECONOMICS: A Catechism of Growth Fallacies.
- Daly, Herman (1993), SUSTAINABLE GROWTH: An Impossibility Theorem
- Flannery, Tim (1996), *The Future Eaters: an ecological history of Australia*,
- Gittins, Ross (2000), “The environment makes a comeback”, *The Age*, 12/7/2000.
- Hansen, J., Sato, M., Ruedy, R., Lacis, A. & Oinas, V. (2000). "Global Warming in the 21st Century: An Alternative Scenario", *Proc. Natl. Acad. Sci. USA*. August 15, 2000 , 10.1073/pnas.170278997.
- Hardin, Garrett (1968), *The Tragedy of the Commons*, (And: “A General Statement of the Tragedy of the Commons” by Herschel Elliott (www.dieoff.org/page121.htm)).
- Hardin, Garrett (1980), “An Ecolocate View of the Human Predicament” (David Klein’s study on the deer populations on St Matthew’s Island) in McCrostie (ed), *Global Resources: perspectives and alternatives*, Baltimore University Park Press, Baltimore, USA.
- Harrison, Paul (1996), *The Third Revolution*: Penguin., Hammondsworth, UK.
- Hawken, Paul (1994), *The Ecology of Commerce: a declaration of sustainability*, Harper Business.
- Hawken, Paul, A. Lovins & L.H. Lovins (1999), *Natural Capitalism*, Little Brown & Co. <http://www.natcap.org/sitepages/pid20.asp>
- Hirst, A. (1999). "The southern ocean response to global warming in the CSIRO coupled ocean-atmosphere model". *Environmental Modelling and Software*, Vol 14, pp. 227-241. tony.hirst@dar.csiro.au
- Hoeg-Guldberg, O. (1999). Climate change, coral bleaching and the future of the world's coral reefs. Greenpeace: Sydney.
- Holmberg John, (1995), *Socioeconomic Principles and Indicators For Sustainability*, Institute of Physical Resource Theory, Chalmers University of Technology and Göteborg University, Göteborg, Sweden.
- Houghton, J., G.J. Jenkins, & J.J. Ephramus (Eds) 1990, *Climate Change: The IPCC Scientific Assessment*, Cambridge University Press, Cambridge, USA.
- Houghton, J., B.A. Callander & S.K. Varney (Eds) 1992, *The Supplementary Report to the IPCC Scientific Assessment*, Cambridge University Press, Cambridge, USA.

- Intergovernmental Panel on Climate Change. (1996). *Climate Change 1995: The science of climate change*. WMO/UNEP.
- Kahn, James, R. (1998), *The Economic Approach to Environmental and Natural Resources*, The Dryden Press, Fort Worth, TX, USA.
- Karl, T., Knight, R. & Baker, B. (2000). "The record breaking global temperatures of 1997 and 1998: Evidence for an increase in the rate of global warming?", *Geophys. Res. Lett.* Vol. 27 , No. 5 , p. 719. (And media story: http://www.enn.com/news/enn-stories/2000/02/02232000/fastwarm_10318.asp)
- Kendall, H.W. & D. Pimentel, "Constraints on the expansion of the global food supply", *Ambio*, Vol. 23, No. 3, May 1994.
- McKibben, Warwick and Peter Wilcoxon (1997), "How to cut use of fossil fuel", *The Australian Financial Review*, 20/3/1997, p.20.
- Meadows, Donella, Dennis Meadows, and Jorgen Randers (1993), *Beyond the Limits: Confronting global collapse, envisioning a sustainable future*, Chelsea Green Publishing Co.
- Nakićenović, Nebojša et al (1998), *A special Report of Working Group III of the IPCC: Summary for Policymakers – Special Report on Emission Scenarios*, www.ipcc.org/pub/SPM_SRES.pdf.
- The Natural Step Environment Institute Australian Scientists' Consensus Document, Chair: Dr Brian Robinson (Chairman of the Victorian EPA), www.ozemail.com.au/~natstep.
- Pearson, P.N. & M.R. Palmer (2000), "Atmospheric carbon dioxide concentrations over the past 60 million years", *Nature*, 406: 695-699.
- Rosenzweig, C. & M.L. Parry, "Potential impact of climate change on world food supply", *Nature*, 367: 133-138.
- Suter, Keith (2000), "After GST should come green taxes", *The Age*, 14/7/2000
- Strong, G. (1999). "Putting our greenhouse in order" *The Age* (newspaper) 26/6/99
- Strong, G. (2000). "Wading in a poison sea" *The Age* (newspaper) 4/4/98
- Sutton, Phillip, *Global warming - how bad is it?*
www.green-innovations.asn.au/how-far-how-fast-greenhouse-case.htm
- White, A. & Cannell, M. (1999). "The impacts of climate change on natural vegetation", Climate change and its impacts: Stabilisation of CO₂ in the atmosphere http://www.met-office.gov.uk/sec5/CR_div/CoP5/imp_nat_veg.html. Hadley Centre, UK.
- Witoszek, N. & A. Brennan, *Philosophical Dialogues: Arne Naess and the progress of Ecophilosophy*, Rowman and Littlefield.

Links to interesting internet information on Climate Change

THE CLIMATE BOMB: Climate Change & the Fate of the Northern Boreal Forests, Greenpeace, 1994

Global warming - how bad is it?

www.green-innovations.asn.au/how-far-how-fast-greenhouse-case.htm

SUDDEN CLIMATE CHANGE THROUGH HUMAN HISTORY, by Jonathan Adams and Randy Foote

Dead on Arrival: positive feedback in the climate system

BP STATEMENT ON GLOBAL WARMING, by John Browne, Group Chief Executive, British Petroleum (BP America) Stanford University, 19 May 1997

THE HEAT IS ON: The warming of the world's climate sparks a blaze of denial, by Ross Gelbspan (12/95).

DEAD. WRONG. Is a short essay on the fundamental errors of industrial society. Also included are some references for OZONE DEPLETION and GLOBAL WARMING.

link to Changes in Time in the Temperature of the Earth

A series of six charts displaying variations in temperature from the Mesozoic to the present, see the web site listed below. The current "blip" is put in perspective, based on the work of a number of scientists. References are cited.

link to Globally-Averaged Atmospheric Temperatures A brief discussion with figures depicting global lower stratospheric temperature variations during the period 1979 to 1997, based on data obtained by the National Oceanographic and Atmospheric Administration TIROS-N satellite.

GLOBAL WARNING

"Arctic's icy pole watered down" by Martin Kettle

"For nearly a century, human visitors to the North Pole have found a frozen featureless scene covered in thick ice. Until now. This month, a group of international scientists aboard a Russian icebreaker arrived at the Pole to find not ice but a stretch of at least 1.6 kilometres of open water, with gulls flying overhead. Since Robert Peary led the first expedition to the top of the world on foot, no one had ever before found a watery pole, or birds flying in the Arctic air, and it is 50 million years since scientists can be certain that the pole was last definitively awash."

<http://www.theage.com.au/news/20000822/A18574-2000Aug21.html>

"What every executive needs to know about global warming" by K Packard and F Reinhardt in the Harvard Business Review (July-August 2000)

"Extremism and emotion have dominated the debate about global climate change. It's time to cool off and take a level-headed business view of the risks and opportunities associated with the problem. As with any risk, uncertainty is no excuse for inaction." www.hbr.org (Reprint R00409)