Responding to the Challenge of Climate Change

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Abstract

With Climate Change, the time has come for those who can to start to make things happen. While prophetic words are still needed and will continue to be needed, the community is largely convinced of the reality and importance of the matter. We need to move beyond rock concerts, spelling out messages on the beach and preaching sermons warning of what is to come. The question now is 'How should we then live?'.

This paper explores this question, looking for pragmatic and effective courses of action for the wider community, including the church in Australia.

Key words

Climate change, response, role of the church.

Preface

Management guru, Charles Handy, distinguishes between prophets and kings. He says:

> Prophets tell the truth as they see it. They can point to the emperor's lack of clothes; that things are not what people like to think they are. They can warn of dangers ahead if a course is not changed…
>
> (Handy 2002)

But, he adds:

> I am on the side of the kings, the people who make things happen. No one…would want the prophet to run the show.
>
> (Handy 2002)

With Climate Change, the time has come for those who can to start to make things happen. While prophetic words are still needed and will continue to be needed, the community is largely convinced of the reality and importance of the matter. We need to move beyond rock concerts, spelling out messages on the beach and preaching sermons warning of what is to come. The question now is 'How should we then live?'.

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Introduction

The reality of Climate Change[1], the warming of the planet due to the build up of greenhouse gases[2] in the atmosphere as a result of human activity is now largely accepted. This is despite some strenuous objections in certain quarters.

Nevertheless, scientists now almost universally agree that, since the pre-industrial era:

- emissions and atmospheric concentrations of greenhouse gases have increased;
- the Earth has warmed by around 0.7 C;
- human activity has contributed, and will continue to contribute to, increasing the atmospheric concentrations of greenhouse gases (Productivity Commission 2007); and
- these phenomena are linked.

Carbon dioxide is the main greenhouse gas produced in Australia. In 2005 it comprised about 74% of the total estimated emissions of greenhouse gases or 415.5 Mega tonne (Mt)[3].

An assessment of greenhouse gas emissions in Australia for 2005 estimated the levels of greenhouse gas produced by the different economic sectors. At 199 Mt, the Electricity, Gas and Water Sector produced most of the greenhouse gases. This is a 47% increase on the level produced by this sector in 1990. The next sector is Agriculture, Forestry and Fisheries largely due to land clearing[4]—with the 128.2 Mt

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[1] Sir John Houghton warned of Climate Change in 1988! While, for some, this time lapse might be a sign of hard-heartedness, greed and resistance to change, for me this is a measure of how long it takes for these issues to unfold and permeate the community's consciousness. It is a lesson in the reality of the arduous task in bringing about cultural change.

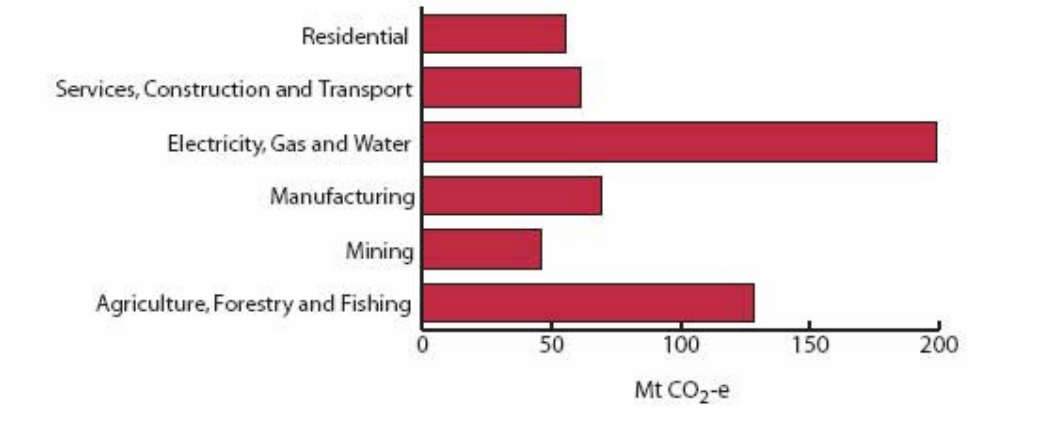
[2] The main greenhouse gases are carbon dioxide, methane, nitrous oxide, perfluorocarbons, hydrofluorocarbons and sulphur hexafluoride.

[3] Reports now combine estimates of the production of all the greenhouse gases and report that production in terms of CO_2 equivalents (or CO_2e). The CO_2e is calculated by multiplying the mass of emissions of each gas by the relevant 'global warming potential' of each and combining the results into the one number.

[4] Methane production from rice paddies and from cattle rearing also adds to this sector's greenhouse gas production.

produced in 2005 being nearly a 42% decrease in the level of 1990. Residential emission of greenhouse gases (55.7 Mt) is less than 10% of the total.

Australia's Greenhouse Gas Emissions by Economic Sector, 2005



Australian Greenhouse Office 2007a

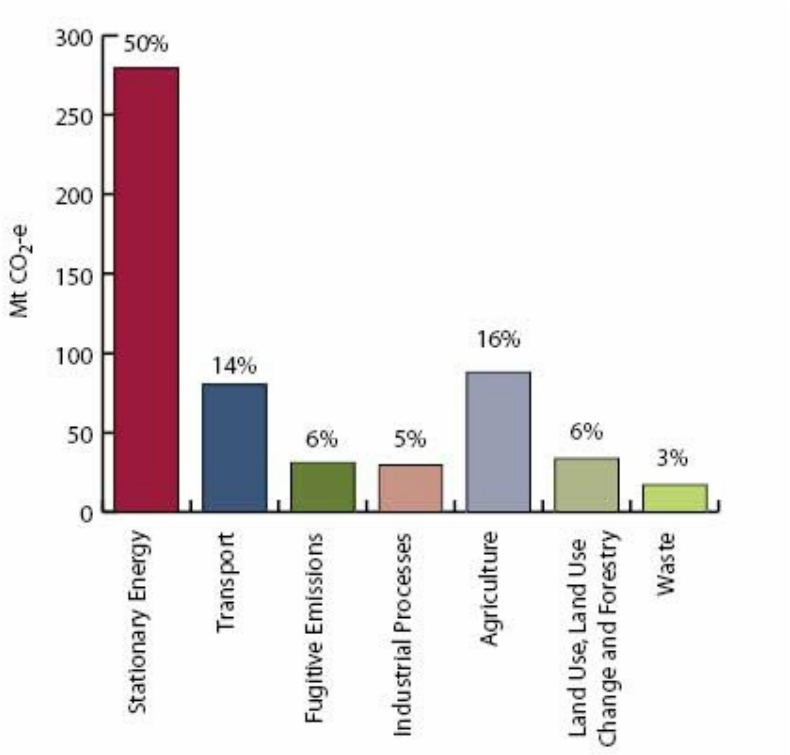
The Intergovernmental Panel on Climate Change (IPCC)[5] has approached the assessment of greenhouse gas emissions slightly differently, defining six sectors for reporting human-induced greenhouse gas emissions as follows:

1. Energy (including stationary energy, transport and fugitive emissions)
2. Industrial process
3. Solvent and other product use
4. Agriculture
5. Land use, land use change and forestry
6. Waste

Estimates of greenhouse gas emissions for each of these sectors in Australia in 2005 are presented below:

[5] The IPCC was established by World Meteorological Organisation and United Nations Environment Program to assess scientific, technical and socio-economic information relevant for the understanding of climate change, its potential impacts and options for adaptation and mitigation. It has produced (and is producing) a number of assessment reports looking at climate change and represents much of the authoritative thinking on the subject (http://www.ipcc.ch/).

Contribution to total net CO2-e emissions by sector, 2005



Australian Greenhouse Office 2007b

'Stationary Energy' relates to the combustion of fuels to generate electricity, refine petroleum, and for use in manufacturing processes. In Australia electricity generation is the main source of greenhouse gases and about 78% of it is produced by coal-fired generators (Australian Government).

The production of greenhouse gases through agriculture and forestry is not a recent phenomenon. Indeed it is postulated that climate change from agriculture and forest clearing goes back some 8,000 years (Ruddiman 2003) and for some countries these are still the dominant contributors of greenhouse gases.

While there is growing confidence about the fact of climate change, uncertainties about it also abound. Specifically, as discussed in a report of the Australian Government Productivity Commission, these include:

- the extent to which the current climate changes are due to human activity and which to natural phenomena;
- the link between climate and different greenhouse gas levels;
- the effects of temperature change on natural and human systems—particularly regionally and locally; and

- the timing and extent of future greenhouse gas levels and therefore temperature changes and therefore environmental and human impacts.

Additionally, there is the human, social and economic uncertainty of:

- the risks associated with 'business-as-usual' emissions (ie the 'do nothing' option);
- the likely effectiveness of abatement action;
- what will be required to adapt to the new situation (costs and benefits); and
- the capacity of future technological developments to help us adapt to and abate climate change. (Productivity Commission 2007)

Attempts have been made to model these changes but the arguments continue.

There is also the temptation to exaggerate the urgency to galvanise the community into action[6]. In contrast to this, Professor Ian Harper, commenting on an earlier draft of this paper warns:

> ... the essential insight from economics into this issue is that drastic changes instituted over the short term will impose costs that are disproportionately large relative to the long-term benefits[7]. More gradual changes instituted via incentive mechanisms (as opposed to wholesale bans or shutdowns) will have a much higher benefit/cost ratio over the long term.
>
> Another insight is that future generations can expect to be in a better position to handle the impact of climate change both because they will possess superior technology/know-how and because they will be wealthier. This has been our experience with clean-up of pollution that, during the 1970s, was considered insurmountable. It has also underpinned our efforts to manage declining stocks of non-renewable resources and burgeoning human population.
>
> Economists' two great lessons to the world are the power of price and [the power of] substitution in managing demand. Ignoring these two leads to the most egregious Club-of-Rome-like extrapolations!

It is with this uncertainty that hard decisions have to be made and action taken. One thing is clear: it is a global problem that requires concerted action across international boundaries. Australia is not sequestered from the rest of the world:

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[6] Concern has been expressed for example that the Stern Review has estimated higher costs of the future impacts of climate change and underestimated the abatement costs compared with most other studies. The effect is to increase the urgency for action which could lead to adopting precipitate solutions that may well be counterproductive.

[7] Note the economists' language! '...*costs that are disproportionately large relative to the long-term benefits...'* An understated way of describing whole communities disrupted, people losing jobs, increased suicide rates because people can't cope, children not being fed or clothed properly—all sorts of pain that really does matter and certainly more than having to do without our air conditioners or selling our second car.

- what we do will affect others;
- what they do will affect us; and
- anything that we do in isolation will have little impact on the overall problem.

The International Context

Most greenhouse gases are produced by the industrialised nations (particularly USA and the European Union countries). However, of real concern are the industrialising nations (particularly China but also India and others) who are actively (if not aggressively) seeking a comparable standard of living to that of the West by developing industry and thereby increasing greenhouse gas production.

In an attempt to come to terms with Climate Change, the Kyoto Protocol was developed. It commits 35 countries and the EU-15 not to exceed specific levels of Greenhouse Gas emissions (Kyoto Protocol 2006). The objective of the protocol is the:

> stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
>
> (Kyoto Protocol 1997)

The protocol does not impose the means whereby these will be achieved, leaving individual nations free to adopt their own policies to achieve them—either by reducing emissions or by engaging in emissions trading through a system of 'Certified Emission Reductions'.

The US and Australia are the only two of these nations not to ratify the Protocol.

Australia contributes about 1.3% of the world's CO_2 (despite being the second highest per capita producer[8]) so any savings we might generate will not directly contribute much to the global situation. However, we export much coal and natural gas as well as having the capacity (through research and development) to contribute significantly to developing solutions that could be adopted elsewhere.

So, indirectly, we have much to contribute. This is both a significant responsibility and a remarkable opportunity. However, it is essential that we be realistic and that we get things right. Closing down an Australian industry or having them move off-shore will not affect global CO_2 levels much and will certainly provide no lead for other nations to follow. Coming up with alternative, attractive and innovative solutions will (particularly for the industrialising countries).

[8] This high per capita level reflects the availability in Australia of cheap coal and other hydro-carbon fuels to generate (mainly) electricity. France, for example, is a much lower per capita emitter of greenhouse gases largely because it does not have access to cheap coal and has chosen to invest in nuclear power for electricity generation instead.

Carbon dioxide emissions from fuel combustion, by highest emitters, 2004

Country	*CO_2 Emissions*		*CO_2 Emissions per capita*
	Million tonnes	Per cent of world total	Tonnes/person
United States	5 800	21.8	19.8
China	4 732	17.8	3.7
Russia	1 529	5.8	10.6
Japan	1 215	4.6	9.5
India	1 103	4.1	1.0
Germany	849	3.2	10.3
Canada	551	2.1	17.2
United Kingdom	537	2.0	9.0
Italy	462	1.7	8.0
South Korea	462	1.7	9.6
France	387	1.5	6.4
Mexico	374	1.4	3.7
Iran	369	1.4	5.5
Australia[a]	354	1.3	17.6
World total	26 583	100.0	4.2

Sources: OECD (2007); World Bank (2007). (Productivity Commission 2007)

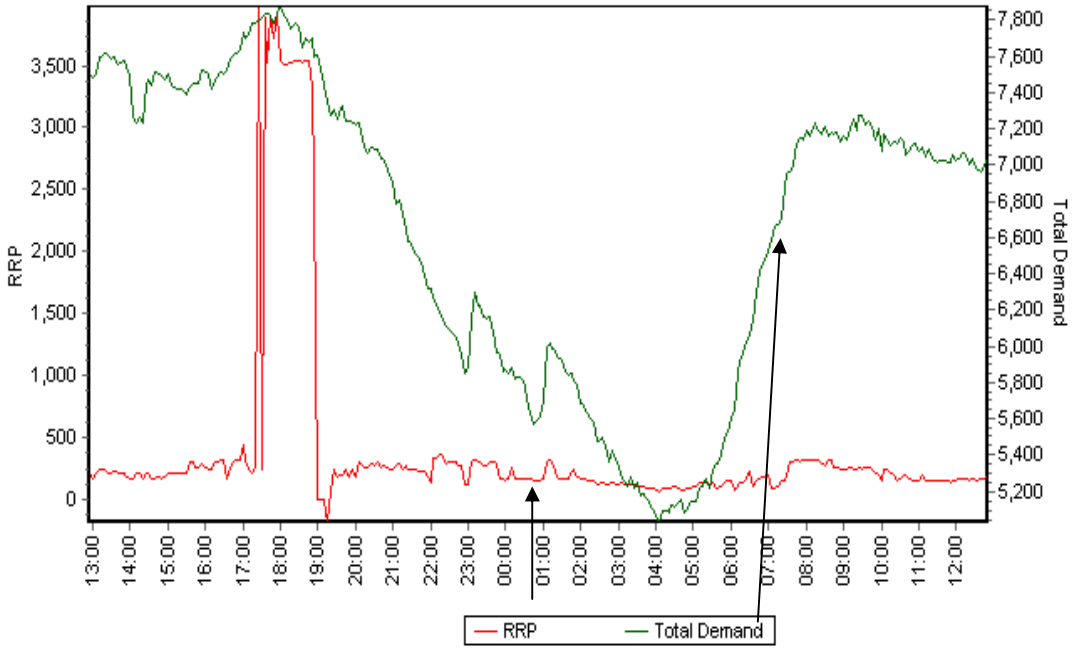
Note that the arithmetic of electricity production is not simple. Under the 'base load' model of electricity generation, storage of electricity, and stopping and starting power stations is extremely expensive. Accordingly, the generation of electricity has to be at a level of expected maximum usage and there is much electricity produced, particularly at 'off peak' times, that does not get used. Thus saving 'off-peak' electricity under this model of electricity production will have no effect on greenhouse gas production.

The table below shows the fluctuations in demand for electricity in Victoria over a 24 hour period starting at 1:00pm on 26 June 2007. Electricity production will be geared to provide electricity at the peak level (say 7,600 units) and any savings after 20:00 hours (8:00pm) will have no impact on CO_2 production.

Alternatively savings during peak times will be very significant. Thus, switching off air conditioners during the day will be far more effective than switching to alternate light bulbs (although this is not a reason not to adopt this new technology). Daylight saving (postponing by one hour

domestic use of electricity for evening activity) will also lead to energy/CO_2 production savings.

Demand for and Price of Electricity during 24 Hours
26 June 2007 to 27 June 2007 (Demand Units in Megawatts)



(Nemmco 2007)

Finally, any evaluation of alternative energy production needs to involve a 'cradle to the grave' assessment of the technology used, incorporating costs and CO_2 production at all stages of that technology; from commissioning plant, generating the energy, storing it, distributing it, disposing the waste at each stage and decommissioning the technology at the end of its life.[9]

Adapting to Climate Change

There are three possible outcomes facing us as a result of climate change:

- Climate change reaches a trigger point, a point of no return where all systems that support human life collapse. The world will continue, but we won't be there to enjoy it. We do not know if such a point exists and, if it does, where it is. The chances are that we will only know of the trigger point after we have passed it.

[9] Thus adopting a new technology just because it produces less greenhouse gases in operation may lead to a false economy. Opponents of nuclear power for example complain that the production of greenhouse gases in commissioning the technology has not been factored into the savings espoused for this source of energy. The same could also be said for wind farms.

- Climate change continues to develop causing significant disruption to life as we know it. Estimates of such disruptions continue to emerge, the latest and most authoritative being the third IPCC report (IPPC Working Group II 2001).
- The climate change sceptics are proven right and the natural climate cycles continue apparently unaffected by human activity[10].

Given the almost universal certainty of the reality of Climate Change (although not the impact or degree of impact it will have) the second outcome above has to be the most responsible one to plan for.

Any strategy we pursue to address this should have three prongs:

1. reduce our greenhouse gas production,
2. increase our greenhouse gas sequestration (carbon sinks) and
3. learn how to adapt to the new situation.

In line with Ian Harper's advice above, such strategies should be determined but ramped up incrementally, allowing us to learn and adapt as we go along. Assuming that we know now all that we need to know and adopting disruptive strategies (however well meant) may well be counterproductive.

1. Reducing our CO_2 production

In Australia there are perhaps four sub-strategies available to us:

- developing alternative energy sources (especially for electricity generation),
- developing other models of electricity distribution,
- reducing our overall demand for energy and
- continuing to reduce land clearing.

a. Developing Alternative Sources of Energy

Of these, nuclear power is the most advanced alternative to coal-fired generators at the scale required (i.e. it is already being used in other countries at the scale that we would require). However, many people have significant misgivings about the technology relating mainly to the up-front cost, safety and disposal of the waste. Proponents of nuclear energy argue these can be addressed and that nothing else will be available in time at the scale required.

There are other sources of energy that many feel are under-developed mainly (they say) due to political neglect. These are based around renewable energy sources (solar, wind, geothermal, tidal, and biomass). All of these however are largely untried at the scales required and we simply do not know just how practical these

[10] We forget that the present concern (certainly in Australia) for climate change is strongly influenced by the drought that recently affected the country. Whether the level of concern will continue after the drought ends remains to be seen.

technologies are at the scale and urgency required. There is certainly much potential and much money being invested in the race to develop these technologies to prove their place in the new energy paradigm that is required.

b. Developing Alternative Models of Energy Production

As noted earlier, electricity generation in Australia is essentially a 'base-load' model relying on huge, centralised coal-fired generators producing the bulk of electricity we require at a level to meet expected peak demand. Thus much electricity generated is surplus and sold as 'off-peak' as much to dispose of it as anything else. In Australia these generation plants are supplemented by hydro-electricity and smaller plants strategically located to help cover short term extreme demand.

An alternative model of production would be a distributed model which would rely on smaller, distributed sources of electricity which would be able to respond more readily to fluctuations in demand and operate through an effective energy market and distributive grid. The generators would be whatever best suits the local situation and resource—solar, geothermal etc as well as co-generation (capturing waste industrial heat from industrial processes).

Again this model has not been tried but, apparently, innovative energy generation options are emerging in centres remote from the National electricity grid and give hope that there is room to move. Small initiatives for this are emerging including plants such as wind farms and household-scale solar plants feeding in to the grid. These represent only a very small start to such a model of production. Presently their impact would really depend on when they feed electricity into the grid and how this reduces peak levels of demand.

c. Reducing Demand

Ziggy Switkowski was asked by the Australian government to conduct a review of the potential of nuclear energy for Australia (Commonwealth of Australia 2006). Much of his analysis is based on the prediction that electricity consumption will double by 2050 and that nuclear energy is the only source available to provide for this at the level and urgency that currently exists. However, the prediction of doubled electricity demand is not a given, rather it is an extrapolation of demand based on current trends of population, price and levels of usage. The price of energy and the adoption of substitute forms of energy are two major variables that cannot be taken for granted.

A major increase in the price of hydro-carbon-generated electricity through, say, a Carbon Tax will lead to major reductions in demand for electricity. These reductions will be through any or all of:

- reduced energy consumption,
- efficiencies of production of energy,
- the rapid adoption of alternatively generated electricity or

- the adoption of other, non-electric forms of energy

Such a response occurred in the consumption of oil in the 1980s when sharp increases in the price produced major reductions in demand involving many innovations and changes that people simply did not realise they were capable of[11].

Essentially, our economy is built around electricity that is produced by generators powered by cheap coal. Built into this will be many inefficiencies and indulgent uses that will only become apparent with such a price hike[12].

Note also that demand reduction has to take place essentially at the industrial level. Domestic/residential consumption of energy is only a minor source of greenhouse gases produced in Australia (less than 10%). Campaigns to get individuals to reduce energy consumption have their place. They will do much to help people identify with the problem, help with acceptance of otherwise unpopular measures such as a Carbon Tax and not to feel helpless in the face of such a major disruption to their lives but it must not stop there. However, we have to avoid the 'Yes Minister' scenario of *'Something must be done, this is something, therefore we must do it!'*.

Further, the reductions in industrial use of energy have to be in a way that does not reduce outputs. In other words, the focus has to be on efficiency as a means of reducing consumption. Having companies go broke for a marginal reduction in our global 1.3% contribution to greenhouse gases will not help anyone[13].

To achieve these efficiencies the incentives will need to be right. Pricing, taxation, rewards, legislation, regulation are for the various governments to set and adjust. At the moment though, access to energy from coal-fired sources is too cheap and easy for industry to want to look elsewhere.

d. Reducing Land Clearing

While land clearing is becoming less of a source of greenhouse gases from Australian activity, it is still a major contributor in other countries. It would be easy to tell them to stop land clearing but this raises issues of sovereignty and equity, particularly since Australia is

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11 Including even four cylinder Holden Commodores!!!

12 I must confess to being wary of relying on calls to the community to reduce consumption without such price hikes (even when these calls are coupled with moral/ethical overtones). Such reductions are usually marginal, selective, lead to a pharisaic pride and environmental one-upmanship, and end up being divisive in the community (especially when neighbours are being encouraged to report each other's excessive consumption to the authorities). Rarely do reductions really bite and then lead to innovation that is broadly adopted. In fact it was widely reported that despite calls to reduce water use in Melbourne in response to the drought, consumption actually increased in some suburbs—bemusingly some of these were the ones most likely to vote 'Green' at elections.

13 This does not mean that all businesses will be able to continue to operate in the new regime. Those that rely solely on cheap hydrocarbon based energy and for which there are no alternatives will have to close down sooner or later.

seen to have cleared (some would say over-cleared) the land that it currently needs for agricultural and other production.

It is in this context that the Australian government has set aside $200M to address reforestation and reduce deforestation overseas. If reducing the production of greenhouse gases from land clearing is to be addressed then overseas is where most of this will need to be done (as well as continuing to reduce forest clearing at home) but it will have to be done with sensitivity and applied as a catalyst since the $200M will not go far on its own.

2. Carbon Sequestration

Another strategy is to capture the greenhouse gases from the atmosphere, or from within the production processes, and lock them away.

a. Reforestation:

The most basic and technologically simple method of carbon sequestration is to plant lots of trees. This is supported publicly by concepts of carbon neutrality and carbon trading particularly within the Kyoto framework. It is also very attractive in that it has other environmental benefits but it is not a silver bullet.

First, there is a limit to the extent that trees can absorb carbon produced from coal, oil and gas combustion. Planting trees to consume the carbon produced by forest clearing makes sense and the arithmetic is relatively simple. Expecting the trees to absorb all the CO_2 locked away millions of years ago and now being released through combustion is a bit much.

Second, trees grow at different rates during their life cycle and therefore consume CO_2 at different rates (indeed, old growth forests are net releasers of CO_2). Managing forests to maximise CO_2 absorption will require active management including harvesting at the right stage of the life cycle and ensuring that the products remain locked away in timber or other products indefinitely.

Third, concerns have been expressed about tree canopies capturing solar energy (and therefore heating the area) when snow reflects that energy (the 'albedo effect'). The net result is that the forests may end up warming an area (during the snow season) and possibly cancelling the benefit of absorbing the carbon in their wood (one suspects the science of this has a long way to go!).

Finally forests, unlike standard agricultural crops, have many uses and values that will require complex trade-offs. Do we want to maximise CO_2 absorption at the expense of water production (given that the period of maximum CO_2 absorption is also the period of maximum water consumption)? Trees (particularly old growth forests) also contribute to biodiversity but this is the growth stage where CO_2 absorption is least effective. Including biodiversity in the goals will complicate any CO_2 absorption strategy.

Timber production from CO_2-sink forests would be very compatible to absorption goals particularly when considering the alternatives (cement, plastic, brick etc) but the arithmetic will need to be done and the figures worked out (Australian Greenhouse Office 2005)[14].

And so people will also use Climate Change in all sorts of ways to grind their particular forest conservation axes. Expect to see much debate (so much of it contradictory) on this in the media and elsewhere on this subject over the next few years[15]!

b. Industrial capture of the CO_2 at the source and lock it away:

Under this strategy, 'clean coal' (removing or reducing CO_2 from coal burning furnaces) is clearly the political preference in Australia. This is understandable given the enormous employment, revenue and investment in this sector. Simply switching things off here will mean major disruption to lives, communities and the economy and there certainly will be no 'demonstration effect' for other nations to follow.

Whatever we think of other technologies (and we all have our favourites) and whatever path we end up taking, Australia must start here. However, existing technology for this is also very much 'demonstration only' and, once again, we are being pushed into the unknown. Can these be ramped up quickly enough and broadly enough to make a difference?

Extending this concept to other industrial, greenhouse gas-producing processes also has enormous potential but, again, where are the incentives? Do we need to introduce legislation and regulations to ensure that polluters pay? Is a Carbon Tax sufficient incentive to get industry to explore innovative solutions?

These are policy settings which will need to be set. If we get them right, industry will respond. However, if we get them wrong we might choke off industry or send it to other places where it can pollute with less difficulty. Worse, given that the priority is to demonstrate innovation for other countries to adopt, we may end up scaring off possible emulators and removing any potential multiplier effect which will be the real benefit of anything we do in Australia.

3. Learning to adapt

This is the third response to the climate change we need to consider. The difficulty is that we simply do not know what changes we will be facing, what their impact on our lives will be or how long we will have to prepare

[14] This report explores modelling forest management and CO_2 emissions.

[15] The Great Britain Forestry Commission puts it thus:'…we are also convinced that the weight of current evidence suggests that there is also—for the UK—a positive benefit in terms of carbon absorbed. As a mitigation measure for climate change, carbon sequestration by forests has clear limitations and should not affect our absolute priority to tackle the problem at source by reducing emissions from burning fossil fuels. Nonetheless, afforestation and reforestation in appropriate circumstances are a valuable addition to our armoury'. (Forestry Commission of Great Britain)

for them. The latest IPCC report reviews the likely impacts of climate change far more thoroughly than is done here. The items below merely list some of the changes that Australians may have to confront:

a. **Major environmental change:** environmental niches will disappear and many species are very likely to become extinct (the mountain pygmy possum comes to mind). This will be a major challenge to our policy makers: do we go all out to save every species or exercise some sort of triage and seek to bolster the more secure niches giving up as lost those most likely to go! Artificial niches in zoos and sanctuaries will become important 'living museums' for species that will not be able to live anywhere otherwise.

b. **Sea levels/environmental refugees:** Flooding of low-lying areas such as the Pacific islands will mean environmental refugees. Are we ready to welcome them? Also, given that most of our settlement in Australia is on the coast, this may mean major disruption for us also.

c. **Change in water availability:** some places will be wetter and some drier and we don't know which. Our current water consumption is based on water supply being limitless (eg Melbourne was supposed to be 'drought proof' with the building of the Thompson Dam). This is changing but we still see limitless water access as a right and our economy and standard of living is based on this.

d. Shift in agricultural productivity: the studies imply major disruptions to agriculture and therefore to rural populations. There will be much trial and error as farmers come to terms with newly productive areas, new techniques and new crops. Opportunities for changes in the way we do agriculture will also emerge, but there will also be major pain particularly by those least willing to or least capable of change[16].

e. **Change in fire regimes:** Following the recent spate of bad fire seasons, there have been dire predictions about future fire seasons being longer, harder and even more severe. This might not necessarily be the case however. Our fire-prone areas are not the hottest and driest parts of the country, but the areas of highest growth. It is the occasional severe drought that makes

[16] With agriculture currently responsible for only 2% of Australia's GDP, we might end up not doing too much beyond allowing it to decline to whatever is economic in the new climate. Economic 'climate change' may affect agriculture far quicker than the environmental version.

these areas so flammable. Fire impact could well be reduced in places where it is now severe.

f. **Loss of tourism venues/iconic landmarks:** predictions that we will lose (for example) the Great Barrier Reef are being touted. This will not only affect biodiversity or tourism but our understanding of ourselves as so much of our identity is caught up in such iconic landmarks.

However, through all this and assuming that we don't reach our trigger point, there will be both winners and losers coming out of the changes we are facing. There will be a new poor as people who up to now prospered will have to confront changes they could only have imagined. At the same time there will be those who will adapt and prosper or for whom the climate changes will be beneficial.

How does the Church respond to this situation? Does she side with the losers (the poor, the weak and those who become poor and weak because of the inability and/or refusal to change)? Does she seek to encourage the would-be winners, those who will pave the way by finding new solutions, innovations and ways of adapting and possibly become rich in doing so? Or is the church irrelevant to such a process merely reacting to the situation that emerges?

The Role of the Church

Most of what is presented above is common knowledge and a re-presentation of what people have been discussing increasingly for the last 20 years. It is an attempt to present the challenge we are facing in the one picture.

In compiling this, three issues relating to the church and its role emerged in my mind.

1. The first relates to the continually evolving environmental ethic that is emerging. 'Thou shalt not commit adultery' is being replaced by 'Thou shalt not waste energy and water'. There is a clear role for the church to be involved here to work with the community to put the whole ethical package into perspective.

   Christians as a group are probably as sophisticated as any in the community when it comes to ethical thinking. Applying that sophistication to developing the environmental dimension to our 'ethical package' is something the Church is well equipped to do. My only concern is that we go beyond the tokenistic environmental one-upmanship as seen on television and the 'dob in your neighbours if you feel they are consuming too much' approach. Rather we need an ethic that is informed, effective and inclusive in its formulation and application.

   My other concern, shared with Brian Edgar (Edgar, Pope 2007) is that the ethic goes beyond our cultures and borders in pursuing this. His term is 'tribalism'. The ethic that is required here is one

that is shared across borders and adopted universally. Something unique to white Australia will always be inadequate. The trans-national nature of the church means that it is uniquely placed to be involved here.

2. The second relates to the church's theological thinking on environmental matters. As a forest manager, I have found much theological reflection on environmental issues to be less than helpful in providing me a framework that is informed by Christian theology and within which I can operate. Much of it simply skirts the hard decisions and difficult trade offs that are called for. As was said of one theologian 'If he knows as much about theology as he does about the environment, then we are in trouble!'.

   The immediacy of the climate change issue and the fundamental way in which it will affect everyone means that it will not allow for short cuts, glib judgements or simplistic solutions in our theological reflection. Our theology must be linked with and reflect the nature of the hard decision making, the real issues and the trade offs that are required.

   The church has a marvellous opportunity here to so formulate its theology that it is able to speak to our times and the people affected, and provide them with direction, correction where necessary, succour, and hope. If it does not grasp this opportunity it will have little relevance in the turmoil of change that is coming[17].

3. The third flows on from this. Even if climate change ends up being a furphy[18] we are on the cusp of incredible change. With that change the community will look for someone who can speak its language and speak of justice and judgement, correction and redemption, and warning and hope.

   The church's challenge and opportunity, having done its homework and sorted out its theology, is to announce this to all people.

   Brian Edgar argues that Climate Change is a gospel issue challenging how we see ourselves, and to whom we see ourselves as being accountable (Edgar 2007). It challenges how we relate to our neighbours (locally, regionally, nationally, and globally) and it challenges how we see ourselves in relation to the rest of creation that we are possibly changing so dramatically.

   Ultimately it then challenges how we see ourselves relating to God. This is a stunning challenge that the church is commissioned to

[17] Brian Edgar and Mick Pope's Christo-centric environmental approach resonates with me but it remains to be seen whether it will deteriorate into some form of theocratic tyranny as has emerged out of other theocratic models.

[18] Let's face it, environmental predictions do not have a good track record of eventuating.

address and is the reason why it exists. God grant that we be not found wanting.

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